Policy Priorities for International Trade and Jobs

Edited by Douglas Lippoldt



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A PRODUCT OF THE INTERNATIONAL COLLABORATIVE INITIATIVE ON TRADE AND EMPLOYMENT (ICITE)

Policy Priorities
for
International Trade and Jobs

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Foreword

The International Collaborative Initiative on Trade and Employment (ICITE) brings together ten international organisations with the aim of improving understanding of the interaction of trade and the labour market, promoting dialogue among stakeholders, and developing policy-relevant conclusions. Launched in 2010, the first wave of work under ICITE is nearing completion. The "e-publication" before you presents highlights from the first two years of work, as selected by ICITE partners.

Under ICITE, a broad research agenda has been implemented. Regional ICITE conferences have been held in Asia, Africa and Latin America. An OECD-ICITE *Global Forum* event on trade and employment was held in Paris. Numerous working papers have been issued. The scope of this initiative has spanned a broad range of issues and contexts, and the research has pointed to the importance of taking into account local and regional specificities such as institutions or geography.

The present volume includes an overview chapter prepared by an OECD team.[1] There follows a compendium of analytical chapters prepared by various contributors to the ICITE project, underscoring the rich detail and nuance from the research results, including local and contextual specificities. Two special sections address selected topics of particular interest (on trade in tasks and on offshoring and migration), providing an introduction and links to further references beyond the scope of ICITE.

The ICITE project represents a unique world-wide effort among international organisations working on issues related to trade and jobs. It has benefitted from a strong desire among the partners to collaborate and deliver meaningful progress. Each organisation has invested its own resources to make this possible in a truly collaborative fashion. First and foremost, they have mobilised an outstanding group of dedicated experts in relevant fields to contribute to the project development. Their efforts have ensured the success of this unique endeavour. The ICITE project is being implemented in consultation with the ICITE Steering Committee and the OECD Trade Community. Under their guidance, it is envisaged that the next phase of ICITE will give particular focus to communication of the key findings from the work to-date.

We hope you find this e-publication a useful resource in your quest for a better understanding of trade and employment issues leading to improved economic performance.

1. The views expressed in the various chapters are those of the authors and do not necessarily reflect those of the OECD, OECD Member country governments or partner organisations of ICITE.

OECD Acknowledgements

Launched and co-ordinated by the OECD, the International Collaborative Initiative on Trade and Employment (ICITE) is a two-year old joint undertaking of ten international organisations. Participating organisations include: ADB, AfDB, ECLAC, IADB, ILO, OAS, OECD, UNCTAD, World Bank and WTO.

General oversight for the ICITE project at OECD, including the preparation of this volume, comes under the direction of Carmel Cahill, the Acting Head of the Development Division. Her predecessor, Michael G. Plummer, former head of division (now at Johns Hopkins University, Bologna, Italy), oversaw the original development and implementation of the first phases of the project. Overall management is provided by Ken Ash, OECD Director for Trade and Agriculture, and Raed Safadi, OECD Deputy Director for Trade and Agriculture. Douglas Lippoldt is the OECD's project manager for ICITE and editor of this volume. Monika Sztajerowska is an economist on the team, providing analytical, editorial and other substantive inputs within ICITE and in the preparation of this volume. Jacqueline Maher is responsible for secretarial and administrative support for ICITE, including the preparation of this volume. Additional assistance in the formatting of this volume has been provided by Anita Lari. Clarisse Legendre is responsible for statistical assistance for all the OECD contributions to ICITE. OECD Communications support for ICITE is provided by Aidan Curran and Michèle Patterson. Richard Newfarmer and Craig VanGrasstek worked as consultants to the OECD team.

The OECD ICITE team would like to thank each of the authors for their excellent contributions to the ICITE research programme. The team wishes to thank the representatives of the ICITE partner organisations and especially the members of the ICITE Steering Committee for their excellent engagement and many substantive contributions to this project. In addition to the OECD team, Steering Committee members include: Vinaye Dey Ancharaz (AfDB), Marc Bacchetta (WTO), Cosimo Beverelli (WTO), Douglas H. Brooks (ADB), Paolo Giordano (IADB), Marion Jansen (ILO), Niny Khor (ADB), Daniel Lederman (World Bank), Mina Mashayekhi (UNCTAD), Nanno Mulder (ECLAC), Ralf Peters (UNCTAD) and Maryse Roberts (OAS). The team greatly appreciates the support and helpful input from the OECD Trade Committee and its Working Party, which have been essential to the success of the ICITE project.

In addition, the team wishes to thank the participants at the ICITE regional events hosted by ADB in Manila, AfDB in Tunis, and ECLAC in Santiago (Chile), as well as the Global Forum on Trade hosted by OECD in Paris. The project has also benefitted from consultations with other parts of the OECD, including especially the Development Centre and the Directorate for Employment, Labour and Social Affairs, as well as with experts from the countries covered. The comments and suggestions from all of these contacts have helped us in achieving successful results in ICITE and preparing for follow up in the year to come.

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Chapter 1

Trade and Employment in a Fast-Changing World

Richard Newfarmer* and Monika Sztajerowska**

Organisation for Economic Co-operation and Development

Anchored by a new wave of research under the International Collaborative Initiative on Trade and Employment, this paper reviews the vast literature on ways that trade might affect job creation and wages, including its relation to economic growth, productivity, and income distribution as well as working conditions. The paper also looks at evidence related to oft-voiced concerns about the effects of offshoring and trade in services as well as adjustment costs associated with trade. On balance, the paper concludes that in virtually all of these dimensions trade can play an important role in creating better jobs, increasing wages in both rich and poor countries, and improving working conditions. However, benefits of trade do not accrue automatically, and policies that complement trade opening are needed to have full positive effects on growth and employment. Moreover, as with adjusting to technological progress, the process of trade-induced growth necessarily entails the continual reallocation of resources away from less productive activities to more productive ones, and this can mean that, even as average wages and employment conditions improve, some workers may experience unemployment or may even see their real wages decline as they change jobs. For these reasons, policies that embed trade reforms in a context of macroeconomic stability and a sound investment climate on the one hand, and, on the other, protection for workers, maintenance of high-quality working conditions, and facilitation of labour transitions, can play an important role in realising the potential wage, employment and income gains associated with trade.

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The study was conducted under the general guidance of Carmel Cahill, the Acting Head of the Development Division, Raed Safadi, OECD Deputy Director for Trade and Agriculture and Ken Ash, OECD Director for Trade and Agriculture as well as direction of Douglas Lippoldt, the project manager and Secretary to ICITE. The authors thank them for their comments and insights as well as several economists commenting on earlier drafts: Jaime de Melo, Elisa Gamberoni, Bernard Hoekman, Marion Jansen, Sebastian Miroudot, Susan Stone, Erik von Uexkull. Clarisse Legendre provided excellent statistical assistance.

Context: A Fast-Integrating World

The world economy is becoming integrated through trade at an unprecedented pace. The last three decades have witnessed huge changes in the *structure of trade.* Trade as a share of GDP has risen in nearly all corners of the world and made trade one of the most dynamic sources of growth for many countries. Developing countries – particularly China and the other BRIICs – have become major actors in the world market, both as exporters and importers. And the continued rapid fall in cost of communication and transportation have not only powered the integration of goods and services markets, but also facilitate an accelerated pace of technological dissemination. Integral to these changes have been innovations in *business organisation* that have spawned new trends in trade. The development of "trade in tasks" – global value chains, segmentation of production through offshoring, and global out-sourcing[1] – are fast-integrating distant economies into the global market, often through the intra-firm trade of multinational companies. Moreover, services, formerly thought to be largely non-tradable, have become a leading sector in global trade – including, for example, accounting, financial, legal, construction services, and many more.

These changes have effectively integrated not only markets for products, services, finance and technology, but also directly or indirectly markets for labour. Workers in OECD countries now voice worries about job opportunities lost to offshoring and services outsourcing as well as increased vulnerability associated with job and income volatility. At the same time, workers in many developing countries worry about adverse consequences of trade liberalisation, lagging employment opportunities for burgeoning labour forces, and competition from China. A more general concern of workers everywhere is that globalisation may be contributing to increased income inequality and poorer working conditions, and that they may not share in the prosperity that growth would otherwise bring. The Great Recession that began in 2007-08 has only deepened these concerns (Box 1.1).

This chapter looks at these issues drawing on work prepared for the International Collaborative Initiative on Trade and Employment (ICITE) as well as the recent larger literature, especially recent work analysing firms' trading behaviour. The objective is to tease out points of relative analytical certainty, to inform the debate by summarising information on less certain points, and to identify areas where more research is needed. The chapter is organised around the relation of trade to six topics: growth, productivity, jobs and wages, income inequality, working conditions, and adjustment costs. A final two sections venture some summary generalisations and point to policies that lead to more inclusive growth.

To foreshadow the conclusions: the evidence reviewed here is compelling that trade can be a driver of economic growth and rising wages – as long as companion policies in the form of a positive investment climate, labour markets and social protection systems support trade openness. Resulting productivity gains from exporting and importing entail a continual movement of labour and capital to more internationally competitive sectors with higher productivity – but also may result in frictional unemployment and income losses for displaced workers, hence the need for affirmative public policies. Rising average incomes, however, say nothing about distributional consequences, but for those countries that experience greater

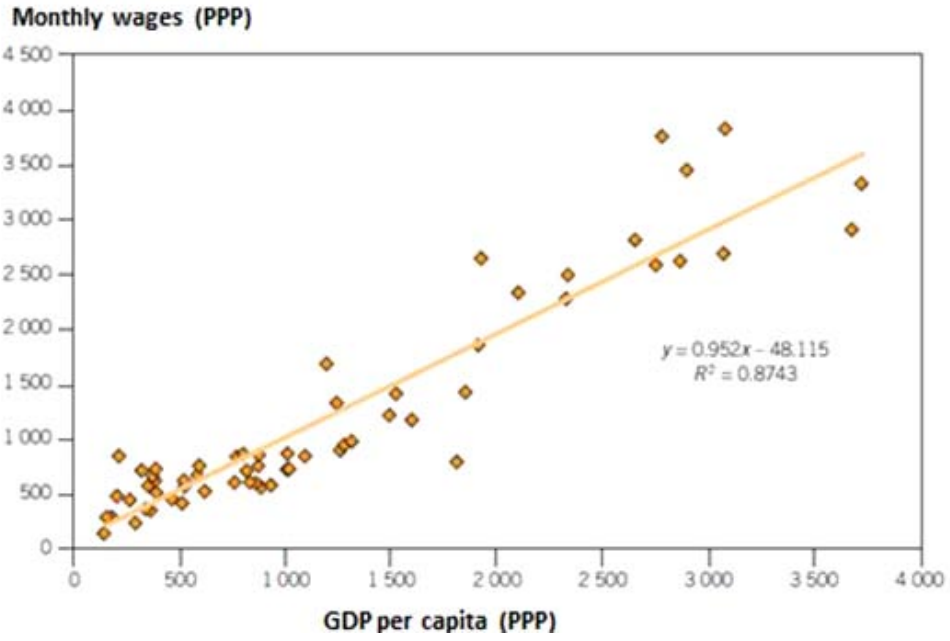
1. We use a broad definition of offshoring, which refers to both offshore-outsourcing and vertical integration abroad, and is widely used in the literature (e.g. Contractor *et al.*, 2010). Off-shoring is the relocation abroad (a geographical change) and outsourcing the move of production outside the firm (an organisational change).

income inequality, it seems that other factors are more important than trade in driving inequality. Moreover, working conditions in developing countries, contrary to the assertions of some, have not deteriorated with trade openness. Indeed the positive effect of trade on investment and incomes carries with it important implications for reduced child labour, workplace injuries, and informality, while offering new opportunities for female entrepreneurs. However, trade, as with changes in technology, does entail reallocation of resources, so policies that help workers to move more quickly into new, higher productivity jobs can help attenuate human costs of normal job transitions and unemployment arising from economic shocks as well as lay the foundations for more rapid growth.

1.1. Trade and growth

The pace of economic growth is central to rising incomes, job creation, and real wages. Average wages are closely correlated with national income per capita (Figure 1.1). The relationship of trade to economic growth is central to the question of whether integration into the global economy promotes employment growth. Numerous reviews of this literature have found a fairly consistent pattern: trade indeed is a key factor in promoting economic growth.[2] One recent example, Noguer and Siscart (2005), took careful account of geography along with other factors, and concluded that a 1% increase in openness was associated with a 1% increase in per capita incomes.

Figure 1.1. Average wages and per capita income go hand in hand



Source: ILO wage database.

Other studies have shown that openness in trade is associated with additional drivers of growth. For example, Levine and Renelt (1992) emphasise the effects of trade on raising ratios of investment to GDP, Frankel and Romer (1999) on deepening physical and human capital, and Alcala and Ciccone (2004) on total factor productivity. Cline (2004), who reviewed a number of studies on the relationship between trade and growth, concludes quite succinctly:

2. See numerous reviews listed in Annex Table 1.A1.2, including Cline (2004), Winters (2004), Baldwin (2003), Berg and Krueger (2003), Hallaert (2006), and Rodriguez and Rodrik (2000).

> "Despite all the debate about whether openness contributes to growth, if the issue were truly one warranting nothing but agnosticism, we should expect at least some of the estimates to be negative … The uniformly positive estimates suggest the that the relevant terms of the debate by now should be about the size of the positive influence of openness on growth, and probably also about how trade policy is related to observed openness, rather than about whether increase levels of trade relative to GDP have a positive effect on productivity and growth" (2004:237).

One recent study merits special mention because of its focus on Africa and its sophistication in responding to critiques of earlier econometric studies. In a paper boldly titled "Trade Causes Growth in Sub-Saharan Africa", Brückner and Lederman (2012) adopted econometric techniques that correct for endogeneity bias associated with reverse causality and omitted country variables. Their control variables included rainfall, OECD growth and political institutions, among others. They found that trade openness causes economic growth: a 1 percentage point increase in the ratio of trade over gross domestic product is associated with a short-run increase in growth of approximately 0.5% per year, and with an even larger effect in the long-run, reaching about 0.8% after ten years.

If *trade openness* is now widely accepted to be associated with more rapid growth over the long run, the effects of *trade liberalisation* on growth in the immediate aftermath of the reform are more contentious. The problems of measurement are nontrivial and lie at the root of controversies in the literature.[3] Rodriguez and Rodrik (2000) offered a convincing and devastating critique of the early econometric literature relating trade liberalisation to growth.

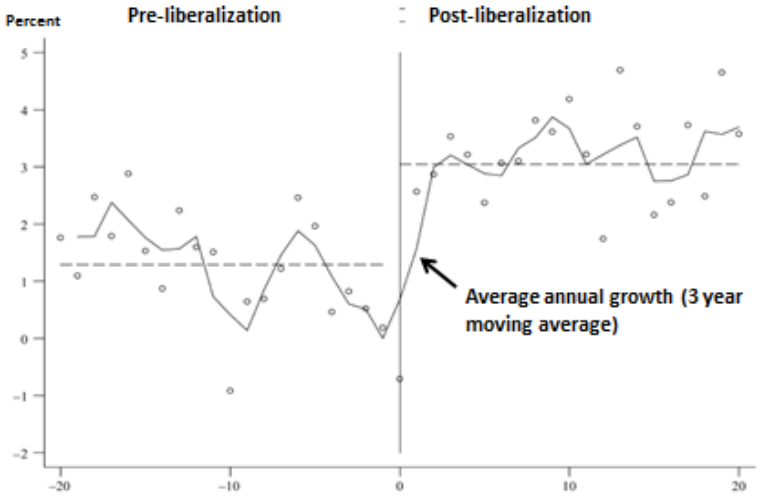
Since then, several new studies have been undertaken that address in varying degrees many of the methodological shortcomings of the early literature (see Annex 1.A1). For all their variety of methodologies and approaches, these recent studies point in the same direction – that trade liberalisation has a positive effect on growth (Winters, 2004; Hallaert, 2006). Moreover, no study finds that trade *restrictions* positively affect long-run growth, a point conceded by even the most sophisticated critics. Second, case studies of the best performing economies, often neglected by econometricians, identify several causes of growth and growth surges. In fact, Srinivasan and Bhagwati (2001), in a seminal riposte to the trade skeptics, argued that case studies made the case overwhelmingly for openness, and with a methodological validity that cross-country regressions did not enjoy. Similarly, the Growth Commission (Spence and El-Erian, 2008) looked for commonalities among the top 12 high performing economies over the long period after 1950, and found that increasing openness and trade liberalisation were traits common to all. Third, the growing body of firm-level evidence that finds trade and trade liberalisation are positively correlated with productivity improvements has become a persuasive and now robust foundation of the trade-growth literature (a point elaborated in the next section). Finally, Winters (2004) highlights findings in the literature on the interaction of *trade and other determinants of rapid growth* – better macroeconomic policy (manifest in lower inflation), lower corruption, increases in investment, and education, among others – and concludes that the

3. Studies of growth often fail to distinguish between a temporary increase in the growth rate and a sustained increase associated with the trade policy changes over the long run. Moreover, measurements of trade policy pose considerable problems because of the complexity of border barriers (e.g. tariffs, specific duties, non-tariff barriers, administrative controls, to say nothing of barriers to services trade) and difficulties of distilling these into comparable measures across countries. Also, trade reforms often occur in conjunction with other policy changes that cannot be captured adequately in the cross-country comparative models. Finally, the econometric difficulties of dealing with omitted variables and controlling for reverse causation haunt the literature, especially the early studies.

comprehensive effect of trade openness on growth may be as much through positive effects on these other characteristics of high performing countries as directly affecting growth itself.

Two recent studies merit honourable mention because their econometric sophistication tries to allay the concerns of the trade skeptics. Wacziarg and Welch (2008) undertook an event analysis of 141 liberalisation episodes (24 in depth), comparing growth before and after liberalisation. They found that, after controlling for several other determinants of growth, indeed the impact of trade liberalisation on growth was substantial. Per capita growth of countries liberalising was some 1.5 percentage points higher than before liberalisation (Figure 1.2), and investment rates were 1.5- 2.0 percentage points higher.

Figure 1.2. Economic growth after liberalisation tends to be more rapid

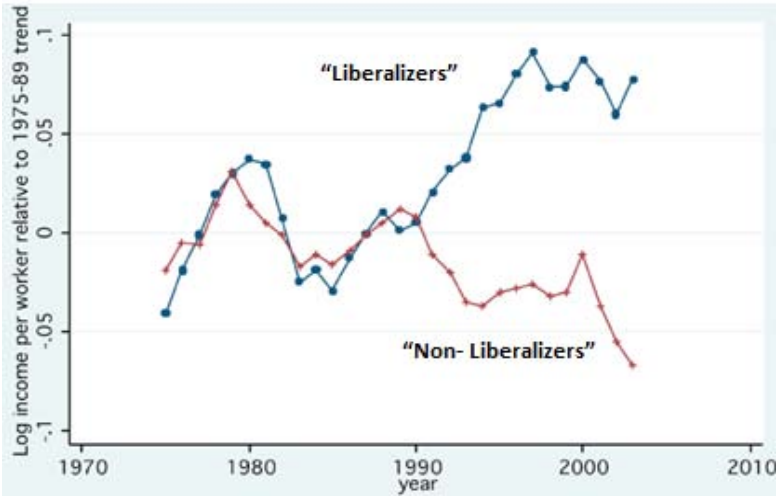


Source: Wacziarg and Welch (2008).

Estevadeordal and Taylor (2009) took the analysis further by comparing growth rates before and after 1990 when a wave of trade liberalisations occurred. They divided countries into a "treatment group" ("liberalisers") and a control group ("non-liberalisers"), an approach that is now the gold standard of impact evaluation but rarely applied to trade.[4] They also took into account the differentiated impact of liberalisation in consumption and intermediate goods. They find strong evidence that liberalising tariffs on imported capital and intermediate goods, raised growth rates by about one percentage point annually in the liberalising countries (Figure 1.3). Changes to tariffs on consumption goods, though collinear with general tariffs reforms, were only weakly correlated with growth outcomes.

4. This approach has been widely used for health and other non-trade issues where it is easier to distinguish between beneficiaries and non-beneficiaries in randomised samples. This is more difficult to do in trade because changes in trade policy routinely affect the whole country. For more on this approach in development economics, see Banerjee and Duflo (2011) and Karlan and Appel (2011). For limited trade applications, see Cadot, Fernandes, Gourdon and Mattoo (2011), and Cadot and Newfarmer (2011).

Figure 1.3. Economic growth after liberalisation tends to be more rapid



Source: Estevadeordal and Taylor (2008).

Finally, apart from open goods markets, the role of competitive services sectors has been increasingly acknowledged in the literature as an important determinant of growth (Hoekman and Mattoo, 2008; Francois and Hoekman, 2010; Jensen, 2011). In general, developing countries are more defensive of their incipient service sectors than are OECD countries (Gootiiz and Mattoo, 2009). Openness in financial and telecommunications services is an important determinant of growth. Full openness in financial and telecommunications services was associated with growth rates of up to 1.5 percentage points faster than in other countries (Mattoo *et al.*, 2006). This is because services imports generally are characterised by the liberalisation of both foreign and domestic access to the markets and because foreign suppliers to domestic market often bring in new technologies or product differentiation advantages (Hoekman and Mattoo, 2008).[5]

But trade liberalisation is not an elixir. By itself, reducing border barriers does not automatically propel growth to new trajectories. Initial spurts of growth in the wake of trade reforms in Chile during the 1970s and later in Argentina in the 1990s both ended in severe recession by the end of their first decades due to misconceived macroeconomic policies.[6] Trade reform in South Africa had minimal consequence for trend growth (McMillan and Rodrik, 2011). A conclusion coming out of reviews of several trade liberalisation episodes that failed is that liberalisation unsupported by other complementary policies may have negligible effects on economic growth. *Inappropriate macroeconomic policies* can readily undermine the otherwise

5. Recognising this potential, all 34 OECD economies, whose substantial share of output and employment lies in the services sector, have in fact agreed to build a systematic measure of barriers to trade in services – Services Trade Restrictiveness Index (STRI) – to track changes in barriers to services trade among the members, in support of GATS commitments. For more information, consult: *www.oecd.org/dataoecd/31/15/47342418.pdf.*

6. These include inconsistent combinations of fiscal, monetary and exchange rate policies that led to overvaluation of domestic currencies. Panagariya (2004) recounted several examples of trade-defeating macroeconomic policies – either through monetary shocks or misaligned exchange rate policies. Wacziarg and Welch (2008) point to inappropriate macroeconomic policies as the chief villain in vitiating the effects of trade on growth in their study. See Tybout, Corbo and de Melo (1991) for a detailed discussion of the productivity gains associated with Chile's initial reforms and the measurement complications of the subsequent macroeconomic unraveling at the end of the 1970s.

positive microeconomic effects of trade policy – as witnessed in the cases of Chile and Argentina. *Investment policies* are also crucial; Wacziarg and Welch (2008) found that fully one-fifth of the positive effects of trade liberalisation came through higher rates of investment. This, in turn, is only possible with adequate *property rights* (Edwards, 1998) and an absence of other *major distortions*[7], particularly in credit markets. *Social protection systems* are important to help smooth adjustment and address concerns that could lead to a backlash against reform, as explained by one of the studies generated under ICITE (VanGrasstek, 2011). Bolaky and Freund (2004) found that trade liberalisation was only effective in situations where the larger *regulatory environment* was supportive of private investment. Brückner and Lederman (2012), echoing earlier studies, point out that *ethnic rivalries* and national polarisation can undermine this relation and depress the otherwise positive effects of trade on growth. Haltiwanger described ways that *barriers to entry and exit* at the firm level may brake processes of resource reallocation, concluding that "(…) trade liberalisation in an economy with many distortions can yield especially adverse outcomes, and perhaps few benefits" (2011: 121).[8]

In summary, trade liberalisation may (sooner or later) be a necessary but not a sufficient condition for attaining more rapid growth. Whether countries realise the potential gains from trade liberalisation depends heavily on companion policies and the general economic environment. These supportive policies – stable macroeconomic policies, adequate property rights, effective regulation, and well designed public investments – can determine the difference between a trade reform that helps catapult trend growth to a higher level or one that produces little. Winters concludes:

> "…the preponderance of evidence points to that conclusion [i.e. that trade liberalisation contributes positively to economic performance]. Part of the benefits of trade liberalisation depends on other policies and institutions being supportive, but there is also evidence that openness actually induces improvements in these dimensions. …the case for making it part of a pro-growth policy cocktail is very strong" (2004: F18).

While much remains to be done on the liberalisation agenda – notably in trade in agriculture and services – average rates of protection have come down dramatically around the world. The main policy challenges in most countries have now transformed from managing liberalisation reforms into managing technology and other external shocks, overcoming supply side constraints, and coping with regulatory and restrictive business practices that may impede taking full advantage of trade.

1.2. Trade and productivity

A main channel through which trade affects growth in incomes is by stimulating increases in productivity. This is brought about by progressively greater specialisation in both exporting and importing activities. Indeed, rising trade ratios are broadly correlated with overall increases in productivity over the long run. Cline (2004) concluded that an increase in the ratio of trade to GDP by 10 percentage points will on average produce a long-term increase in labour productivity between 1.4 and 9.6%. Several studies show that trade liberalisation is associated

7. Krishna (2010) in Porto and Hoekman (2010) analysed several major distortions: monopolies in product markets, "hold-up problems" associated with corruption, laws and regulations that distort price incentives, poor infrastructure, and high costs of transportation.

8. Haltiwanger (2011:36) present a full list of factors that constitute policies supportive of trade liberalisation: flexible labour markets; safety nets; infrastructure; competitive product markets; developed financial markets; regulation; and property rights.

with improvements in productivity in developing countries too.[9] Chapter 14 in this volume (von Uexkull, 2012) using the example of developing countries belonging to the Economic Community of West African States also shows that exporters have higher productivity and pay higher wages.

One potential driver of productivity gains is foreign investment. This can occur through the contribution of foreign ownership to product design, technology, management, access to markets and or further specialisation associated with intra-firm trade and integration into supply chains. Consider one example: Arnold and Javorcik (2009) use Indonesian plant level data to analyse the consequences of foreign ownership. Using a control group for purposes of comparison, their analysis showed that foreign ownership led to significant productivity improvements in the acquired plants, visible in the acquisition year and continued in subsequent periods. After three years, the acquired plants exhibited a 13.5% higher productivity than the control group. The rise in productivity, driven in part by restructuring and increases in investment, resulted in greater employment and wages. Foreign ownership also appeared to enhance the integration of plants into the global economy through increased exports and imports.

These trade and investment stories have in common the impulse to reallocate resources – including labour – towards ever more productive uses. Traditional development economics literature has focused on the role of shifts of employment from low-productivity sectors, such as agriculture, into high productivity sectors, such as manufacturing (*between-sector shifts*). The recent literature on heterogeneous firms has emphasised the productivity *shifts within sectors*, where labour moves from the less productive firms into more productive ones, even in sectors that contract with trade integration, – notwithstanding measurement difficulties (see Houseman *et al.*, 2011).

The effects of these two trends may not necessarily go in the same direction. In fact, McMillan and Verduzco (2011) presented evidence showing that sectoral change driven by within-sectoral shifts may actually imply movement of labour out of high productivity sectors into lower productivity sectors in natural resource exporting countries, a process which they characterise as retarding productivity (though it is not clear whether the out-migration on balance ended up in firms and jobs with lower productivity than those the workers left). A similar observation lead McMillan and Rodrik (2011) to conclude that economies with growing and diversified industries (notably Asia), as well as a competitive real exchange rate and flexible labour markets, were better able to capture productivity gains from both within-sector productivity growth and structural change across sectors. As the authors point out: "globalisation does increase the costs of getting the policies wrong, just as it increases the benefits of getting them right" (2011:79). While the conclusion is compelling, the empirics may require more research: Workers leaving higher-productivity sectors may in fact be leaving low-productivity jobs to accept higher-productivity jobs if in the lower-productivity sectors.

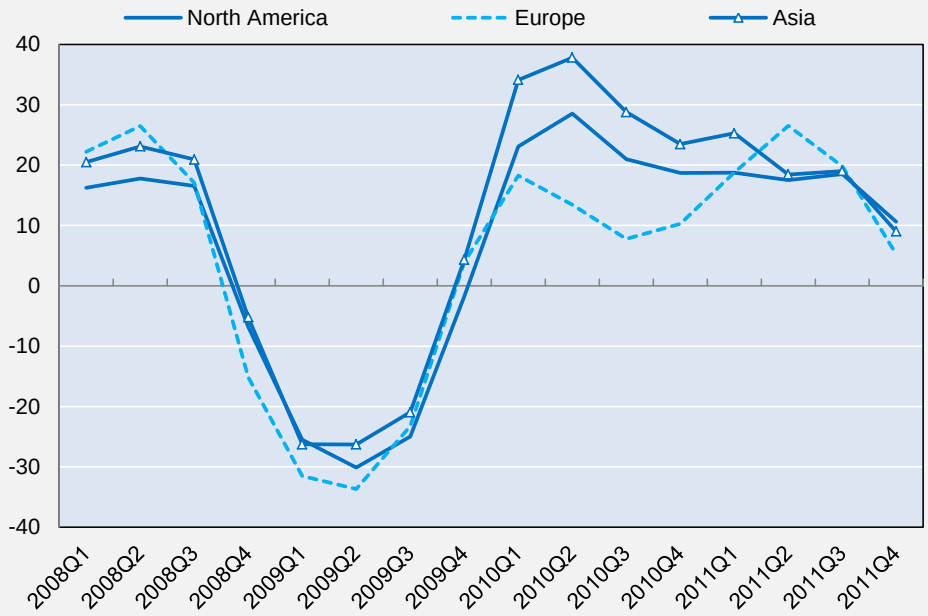
9. Goldberg and Pavcnik, wrote: "recent empirical studies suggest that trade liberalisation is associated with productivity improvements in developing countries (Harrison (1994) for Cote d'Ivoire, Krishna and Mitra (1998), Aghion, Burgess, Redding, Zilibotti (2003), and Topalova (2003) for India, Kim (2000) for Korea, Pavcnik for Chile (2002), Fernandes for Colombia (2003), Muendler (2004) and Hay (2001) for Brazil. If these productivity gains are shared with workers in the form of higher wages, trade liberalisation could increase industry wage premiums in sectors that experienced largest tariff cuts" (2007: 21).

Box 1.1. Great Recession and "Great Trade Collapse" of 2008-09: Trade shocks and adjustment

In the Great Recession, trade became a major channel of recessionary impulses from North to South – and to domestic labour markets. Trade fell sharply in the first quarter of 2009 (19.3%) putting pressure on output and employment, only to recover significantly in the second half of 2009 (Box Figure 1.1.1). While goods trade plummeted, trade in services proved more resilient during the crisis (Borchert and Mattoo, 2009). For example, while the value of US goods imports and exports declined by 33% and 21% respectively by February 2009, services imports and exports each fell by less than 7%. Consequently, overall exports of countries with higher shares of services trade also fared better.

Box Figure 1.1.1. Trade dropped significantly during the crisis, only to rebound relatively quickly… albeit at different speeds and to varying degrees in various countries

Growth in world trade, 2008Q1-2011Q4



Source: WTO, Short-term merchandise trade statistics.

The impact of a recessionary shock on labour markets varies depending on a nature of the shock in a given country. Gamberoni *et al.* (2010), for example, showed that the average domestic debt and banking crisis has more than twice the impact on domestic employment than a typical global economic downturn (defined as periods with a significant decline in world GDP). Nonetheless, trade shocks can interact with domestic shocks with pernicious results, and trade openness may amplify output fluctuations caused by domestic crises. In the case of a debt or banking crisis, open economies experienced a stronger reduction in employment growth in the initial phase, but also a faster recovery. This confirms a certain trade-off between exposure to trade as a source of vulnerability to external shocks and as an engine of growth promoting recovery, a point also highlighted by other analysts (e.g. ILO-WTO, 2011).

Policies made a huge difference to labour outcomes in response to shocks. Countries with similar falls in trade have experienced very different employment outcomes. For example, while Israel and Denmark experienced similar declines in trade over the 2008-09 period (around 10%), in Israel the total number of jobs increased by 2%, while it decreased by 2% in Denmark. An ICITE study examining the experience of Denmark and Spain (Arnal, 2011) shows that Denmark's "flexicurity" policies facilitated smoother adjustment to long-term changes in the labour market by encouraging workers to migrate to new jobs. In the case of short-term recessionary shocks such as the 2008-09 crisis, however, employment protection legislation as well as part-time work schemes have proved more effective in keeping employment stable (e.g. Gamberoni, *et al.,* 2010; Görg and Görlich, 2011). Policies that slow adjustment in the labour market may mitigate immediate impacts of a crisis, but may come at the cost of aggravating market distortions and reducing job creation in the longer term (e.g. Paci *et al.*, 2009).

Exports foster productivity growth –

Exporting firms within almost any given country tend to be larger and more productive through specialisation and achieving economies of scale and scope. Relative to firms that sell solely on the domestic market, exporters pay higher wages, a characteristic not only of the United States (Bernard *et al*., 2007), but also developing countries[10], consistent with the predictions of new trade theory that the most productive firms survive and improve their productivity, usually through exporting.[11] This is partly because access to global markets allows companies to attain much larger economies of scale as fixed costs can be spread over a larger output (Spence, 2007).

Moreover, would-be exporters explicitly targeting foreign markets make different business decisions affecting their investment, human resources, technology and the selection of inputs – and this helps to drive their productivity growth (Box 1.2). In the view of Hoekman and Winters, the "exporter selection" process is not necessarily driven by exogenous shocks, such as trade reforms, but reflects investments made by firms in anticipation of accessing foreign markets" (2007). Hallward-Driemeier, *et al.* (2002) in their study of five East Asian countries found that exporting firms and FDI subsidiaries not only self-selected into export markets, but made their choices of technology, investment inputs, and labour training practices with an eye to being more efficient in reaching foreign markets.

– and so do imports

Imports also can drive increases in productivity (Box 1.2). Imports can provide access to more inexpensive or high-quality inputs, products with different factor contents (including technology) and competition in final goods markets. Several early studies for specific countries show that import competition can spur productivity growth.[12] More recently, Amiti and Konings (2007) studied Indonesian manufacturing for the period from 1991 to 2001, and showed that a reduction of 10% in final goods tariffs would increase productivity by 1%, while reducing input tariffs would increase productivity by 3%. In the last three decades, the integration of global markets through trade has ushered in a distinctive trend toward distributed international production of components for a single final product. This process is more complex than the previous model of import competition for final products. Today, different parts of the production process may be located in several countries, while the services attendant to its creation, production and marketing may be located in countries other than the home market of the product. This trend has been called, if with different nuances, trade in intermediate inputs,

10. See for example, Clerides, Lach and Tybout (1998) for Colombia, Mexico and Morocco, and Aw, Chung and Roberts (2000) for Chinese Taipei and South Korea Hallward-Driemeier, Iarossi and Sokoloff (2002) for five East Asian countries.

11. Melitz (2003) showed that trade-induced competition associated with trade liberalisation led to expansion of the more productive firms into export markets and contraction of less productive, usually non-exporting firms, with long-term dynamic effects on productivity.

12. See Tybout and de Melo (1991) for Chile, for example. Hallaert (2006: 71 ff) reviews several of the early studies: Coe *et al.* (1997) showed that openness to imports of capital goods (supposed to incorporate trading partners' stock of knowledge) enhances total factor productivity growth. Yanikkaya (2003) argued that trade promotes growth through technology transfers: the more a country (especially for developing countries) trades with the United States (one of the most highly innovative countries), the more likely it is to grow faster. Tybout and Westbrook (1995) in the case of Mexico, Aw *et al.* (2000) in the case of Chinese Taipei, and Pavcnik (2002) in the case of Chile provide suggestive evidence linking trade liberalisation and productivity growth driven by reallocations.

vertical specialisation, production sharing, and trade in tasks, as well as "slicing the production chain" (Krugman, 1995) and "second unbundling" (Baldwin, 2006).

Box 1.2. How import liberalisation affected one company in Mexico

Ann Krueger recently told of the example of one firm adjusting to liberalisation: "In Mexico, it is reported, a leading opponent of NAFTA was an owner of a white goods manufacturing company. The apartment-sized refrigerators that were produced usually lasted less than a year before a new (domestically-made) compressor was needed. The businessman believed that, once NAFTA was in effect his refrigerators would no longer be able to compete. Despite his efforts, NAFTA came into being. With its introduction, the businessman discovered that he could buy foreign-made compressors that were both cheaper and longer-lasting. Not only did he retain his share of the Mexican market, but he became the largest seller of apartment-sized refrigerators in the US market!"

Source: Ann Krueger, Keynote Address to Conference on Aid for Trade, OECD Paris, 28 March 2011.

A similar trend can be seen in developing countries. For example, Frazer (2012), studying the effects of Rwanda's lower tariffs after joining the East African Community, estimated that a five percentage point reduction in the tariff on imported inputs resulted in an increase in exports of between 5% and 10% for those firms that imported inputs. These findings are also consistent with Estevadeordal and Taylor (2009) who charted the power of lowering tariffs on intermediate goods on economic growth. Finally, Muendler (2010) found that trade liberalisation in Brazil in the 1990s led to new import competition that triggered faster productivity growth among exporters and in comparative-advantage industries, because larger market potential offers stronger incentives to improve efficiency for these firms and industries.

Services trade is also now driving productivity

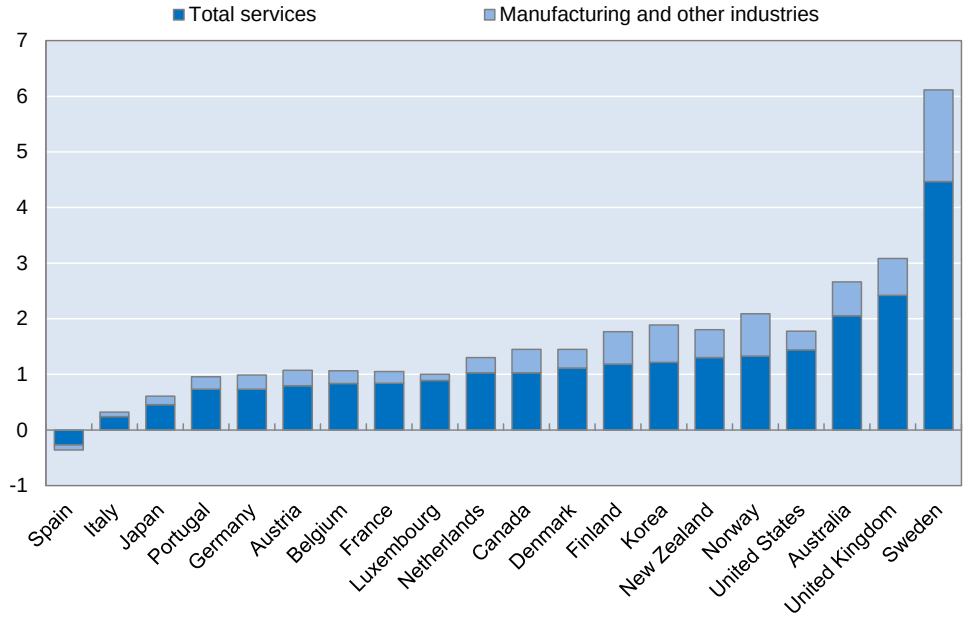
Trade in services has become increasingly important in proportion to the overall growth in international trade. Services have fluctuated around a fifth of total trade in goods and services since the 1970s, and stood at around 20% of global and OECD trade in 2006 (OECD, 2007). The largest services trade volumes are in travel, transport and other business services, while trade growth has been strongest in computer services, finance, and other business services. Services are heterogeneous – ranging from finance and telecommunications to professional services such as accounting and legal work to retail trade. They also include what have often been thought of as public services – health and education. Many services are inputs into the productive process, and as a consequence are a driver of productivity growth as well as sources of employment. In many OECD countries services accounted for more than one half of growth in labour productivity between 1990 and 2002 (Figure 1.4).

The role of trade as a driver of productivity gains is only now being studied in light of these developments. Offshoring and out-sourcing of services have figured prominently in the growth rate of services, particularly in back office services, software development, research and development functions. In Chapter 5 of this book, an ICITE study by Gonzales, Jensen, Kim and Nordås (2012) concluded that new technologies – in computers, tablets, smart phones and other telecommunications particularly – are transforming the links between business services and production in both consumer and investment industries. They argued that openness in business services can support a deepening virtuous circle of specialisation, productivity growth and movement up the quality ladder in manufactured exports. They show that using imported intermediate business services helps tailor the product to the needs of the export market, and this is one determinant of expanding export share. They related the export share of total output in each sector to the share of imported business services in gross output for the selected 44 countries from the OECD input-output database. The export share of gross output was found

to be positively associated with the import share of business services inputs. They found that a one percentage point higher services import share is associated with a 0.3 percentage point higher export share. Interestingly, for low-technology manufacturing, each additional percentage point of business services imports in gross output was associated with an additional 1.4 percentage points in export share of gross output, at the mean. For high-tech industries and business services, the corresponding figures were 0.8 and 1.2, respectively.

Figure 1.4. Services account for a large share of labour productivity growth in the OECD

Contribution to growth of value added per person employed, percentage points, 1990-2006



Source: Authors' calculations based on OECD STAN.

Another developing country study arrived at a similar conclusion, while using a different approach. Arnold, Javorcik, Lipscomb and Mattoo (2012) charted the effects of services reforms in India (measured in changes in indices of services liberalisation) on the productivity of manufacturing firms using data for about 4 000 firms from 1993 to 2005. They found that banking, telecommunications, insurance and transport reforms all had significant, positive effects on the productivity of manufacturing firms, both domestic and foreign. The aggregate effect of services liberalisation was an increase in productivity of 11.7% for domestic firms and 13.2% for foreign firms for a one-standard-deviation increase in the liberalisation index. For banking reforms, a one-standard-deviation change in the banking sector index corresponded to a 6.5% change in productivity for both domestic and foreign firms. A one-standard-deviation change in the telecommunications liberalisation index corresponded to a 7.2% increase in productivity for domestic firms and a 9.8% increase in productivity for foreign firms. A similar change in the transport index led to a 19% improvement in productivity of all firms. Only foreign firms appeared to benefit from the insurance reform enjoying a productivity boost of 3.3%.

In a study of services in another developing country, Mattoo and Payton (2007) conducted one of the most comprehensive reviews of services and their past and potential role in one low-income country – Zambia. The study argued that moving toward greater services liberalisation could contribute to future productivity growth in several sectors and provide new sources of exports.

Productivity matters for wages

Increases in productivity, trade-induced or otherwise, will necessarily impact labour involved in the production process. Over the long run, the growth of productivity is broadly correlated with rising wages. Irwin (2009) showed that labour productivity growth in the United States has been a fairly accurate predictor of real compensation to workers. This correlation is not perfect, however, and during relatively long periods, growth in wages can lag or exceed growth rates in productivity.[13] In the United States, for example, labour compensation lagged productivity increases beginning in 2002. The US Bureau of Labor Statistics (Fleck, Glaser and Sprague, 2011) attribute this gap not just to the difference between the prices indices used to adjust for inflation in hourly compensation and productivity measures, but also by an unprecedented decline in the labor share (the share of employees' compensation in total output) since 2000. Irwin attributes some of this gap to the spiraling executive compensation (particularly in the financial industry) that also increased income inequality in the United States. Similarly, for a sample of large OECD countries, unit labour costs rose in tandem – broadly – with productivity (See Figure 1.5 for selected countries).

Trade, together with technological progress and domestic competition, is integral to a larger Schumpeterian process of growth. This process entails "creative destruction" of businesses and jobs as more productive firms take their place. In the United States, for example, Haltiwanger (2011) reported that on average 15% of plant-level jobs were destroyed each year, but that 17% of establishment jobs were created – for a gross turnover rate of 24% between 1980 and 2009. About 90% of the job reallocation occurred within rather than across industries. Other countries experience similar churning in the labour market. In the United Kingdom, some 15-16% of the labour force experiences a job turnover in any given year (Hijzen and Swaim, 2007). These patterns reflect the underlying growth processes of new technologies entering production, and new products coming on the markets, while old products mature and contract – and thus a continual reallocation of resources, inputs and labour from low-productivity businesses to high-productivity businesses. In the United States, about half of productivity gains in a manufacturing industry over a decade were associated with reallocation of inputs and outputs. In retail trade, where productivity growth has been especially rapid in the United States, the reallocation process has been even greater (Haltiwanger, 2011).

1.3. Trade and labour markets

Does trade create jobs? No…and yes

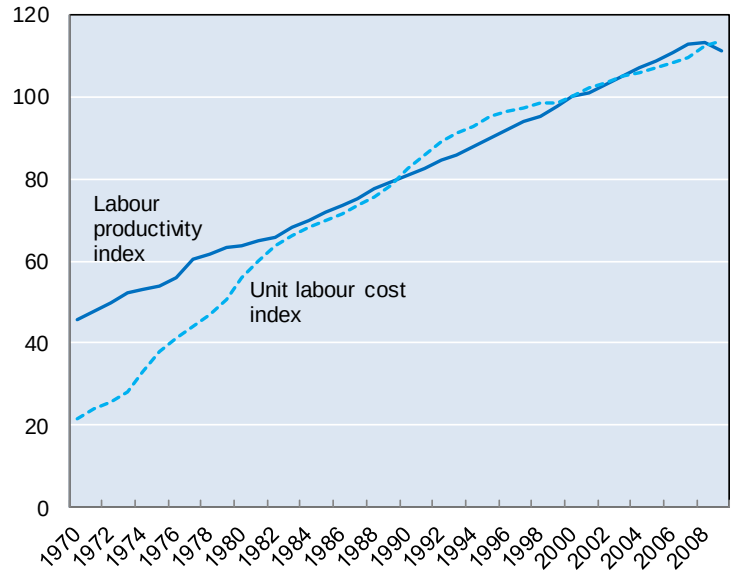
At its most basic and from a long-run perspective, as Irwin (2009) wrote, "…total employment is not a function of trade but of the total number of people in the labour force". Indeed, for OECD countries, total employment has closely tracked the growth in the labour force (Figure 1.6). Moreover, unemployment rates in the United States had been coming down from the oil-crisis of the 1970s until the Great Recession. The gaps between the lines in Figure 1.6 can vary considerably from country to country. Average reported official unemployment rates appear to be higher in developing countries than the 8.2% reported for the high-income OECD in 2012, ranging from 10.2% in Latin America to 28.8% in Sub-Saharan Africa (McMillan and Verduzco, 2011:24). These numbers can be deceiving. For many developing countries, labour force surveys are often limited to major urban areas, rarely include informal employment, and too frequently are absent altogether. In most low-income countries,

13. See also ILO (2011b, Chapter 3) for evidence on falling wage share of national income. Using population weighted averages and a different dataset, Belser and Lee (2011) found that wage growth lagged behind productivity growth in the United States, France and Germany after 2000.

where most people work in agriculture or the informal service sector, people are too poor to weather long periods without any earnings at all. If surveys were standardised, including informal and rural nonfarm employment, it seems likely that they would reveal a similar pattern of long-term growth, albeit with larger or smaller levels of effective unemployment.

Figure 1.5. Rising labour productivity is associated with rising wages… usually

Labour productivity and unit labour cost, 2000=100, simple average of 6 OECD countries[a]



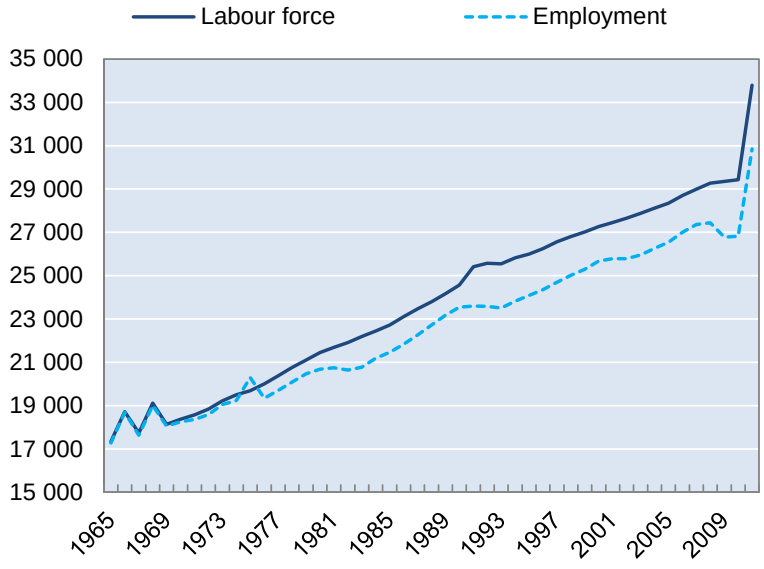
a) France, Germany, Japan, Korea, United Kingdom, United States.

Note: A similar trend can be obtained by substituting deflated compensation per employee for unit labour cost.

Source: OECD STAN Database.

Figure 1.6. Labour Force growth largely determines employment growth

Labour force and employment (in thousand workers), simple average of selected OECD economies[a]



a) Australia, Canada, Denmark, Finland, Germany, Ireland, Italy, Japan, New Zealand, Spain, Switzerland, Turkey, United Kingdom, United States.

Source: OECD Labour Force Statistics.

It is precisely for this reason that Hoekman and Winters (2007) drew a useful distinction between long-run and short-run labour market effects. In long- run growth models, aggregate employment is determined by growth in the labour force, macroeconomic variables, and labour market institutions – and trade openness or trade liberalisation plays no role at all (2007:77) or a marginally positive one.[14] The secular trend downward in unemployment rates between the mid-1970s and the Great Recession occurred at the same time as growth in US imports from developing countries, which rose from under 6% to nearly 20%. To be sure, external or domestic shocks can disrupt labour markets and cause unemployment, but after some period, labour markets generally clear and return to long-run employment equilibrium. In a recent study Dutt, Mitra and Ranjan (2009) indeed found a striking difference in the short versus long-run responsiveness of unemployment to trade liberalisation. When considering permanent trade liberalisation episodes, they found an immediate rise in unemployment in the short run and a reversal of that rise and an eventual decline in unemployment in the long run.

In some countries there may be a slight secular increase in the rate of unemployment, adjusted for the business cycle, but institutional factors – the tax wedge, the average unemployment benefit replacement rate, union density and an indicator of regulatory impediments to product market competition – play the predominant roles. Imports are largely uncorrelated with unemployment (Figure 1.7). Görg and Görlich (2011) in an ICITE study included as Chapter 6 in this volume review a dozen more recent studies, and conclude that:

> "…imports may cause job displacement in the short-run, due to adjustment costs. (…) While fewer studies have been able to consider differences between the long and short run, those that have done so generally find that, in the long run, there appears to be a positive relationship between imports and employment…" (2011:28).

Beneath these aggregate numbers, however, a tectonic shift in the global location of manufacturing has taken place in the last three decades. McMillan (2011) showed that outside of Asia and Eastern Europe, total employment in manufacturing has remained remarkably stable or even declined. At a time when global manufacturing employment rose from 115 million in 1980 to 162 million, high-income countries saw their collective employment in industry fall from 61 million in 1980 to 54 million in 2005. Similarly, employment in manufacturing fell in Latin America, the Middle East and North Africa and in Sub-Saharan Africa. While India showed some slight increase, the huge gains were in East Asia, which saw employment their manufacturing sector rise from 27 million to 69 million, and Eastern Europe, where it rose from 6 million to 18 million.

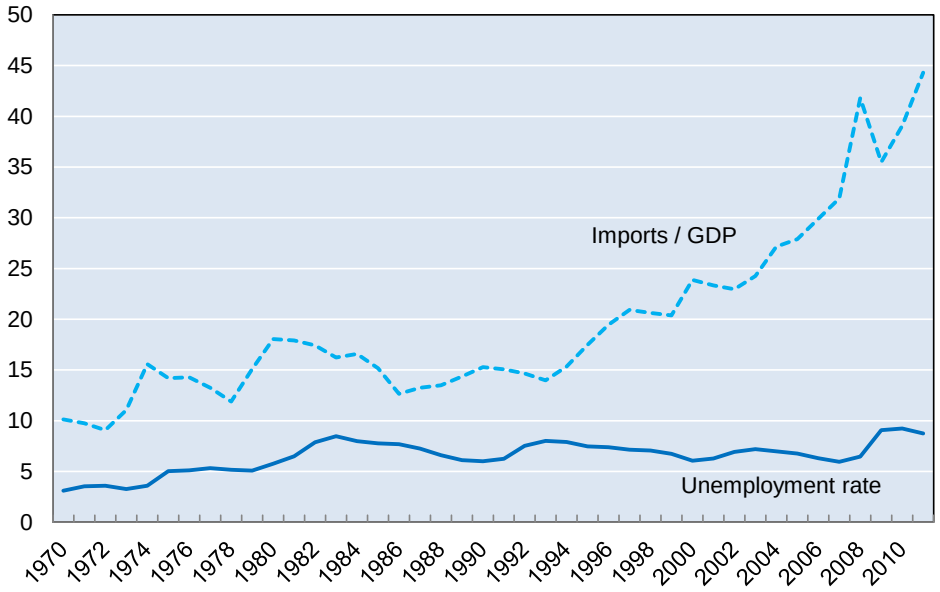
This process reflects long-run growth in the global economy. The shift in global employment in manufacturing has been remarkable in the last 30 years. The developing world has been growing at a pace twice as fast as the high income countries for the better part of the last three decades, and associated new investment has gone into manufacturing, especially low technology and labour-intensive products. Even though the United States, for example, has witnessed a steady secular decline in jobs in manufacturing, services have expanded. The tendency of manufacturing employment to decline as a percent of the total labour force and for services to rise is a characteristic of most high-income countries. In France and the United Kingdom, manufacturing employment has declined while services rose. This is partly because many of the

14. In a recent paper, Dutt, Mitra and Ranjan (2009), using cross-country data on trade policy, unemployment, and various controls (such as employment laws, trade union power, civil liberties, country and labour force size) and controlling for endogeneity and measurement-error problems, found fairly strong and robust evidence that unemployment and trade openness were negatively related.

jobs created in the services sector require greater skills and pay more than manufacturing, even though sectoral wage averages may be lower in services (see Gonzales *et al.*, 2012 - Chapter 5 in this book). Görg and Görlich report in Chapter 6 in this volume that German employment in manufacturing declined by 5% between 1999 and 2008, notwithstanding strong export performance; other declining sectors were agriculture (9%), mining (40%), construction (23%), finance (6%) and public administration (9%). Meanwhile, employment in hotels, transportation, education, health and personal services increased.

Figure 1.7. Rising imports are uncorrelated with unemployment… in the long run

Percentages, selected OECD countries[a]



a) Australia, Austria, Belgium, Canada, Denmark, Finland, Former Federal Republic of Germany until 1991, France, Germany, Iceland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States (simple averages).

Source: OECD *Economic Outlook* database.

Most economists analysing job losses economy-wide ascribe the dominant effect to technological change. This also has the effect of creating stronger demand for skilled workers and less demand for unskilled workers – even in developing countries (Feenstra and Hanson, 1999). Moreover, many industries with high job turnovers experience little import competition (Kletzer, 1998). Several studies[15] have found that trade has little explanatory effect on changes in labour demand across industries. As a long literature that preceded these studies, Hoekman and Winters (2007) conclude that "Thus, despite different methodologies, the labour and trade literatures have been in substantial agreement on the effect of trade on wages and employment: i.e. skill-biased technical change dominates."

Wages and employment: trade lift, trade pressures

Any discussion of wages requires a preface. Wages do not constitute the principal form of income of many workers, especially in developing countries. Only a small share of the labour

15. These include Lawrence and Slaughter (1993), Sachs and Shatz (1994), Robbins (1996), and Desjonqueres, Machin and van Reenan (1999), among others.

force is part of the wage-earning sector in developing countries, and so changes in wages, especially in the short run, may not reflect changes in per capita incomes. In low-income developing countries, workers earning wages in the formal sector may be less than 20% of the total. Analysis of trade and labour that focuses solely on wages will miss important developments in income, employment and working conditions in agriculture, services, construction and mining sectors.[16]

These caveats notwithstanding, several *firm*-level *studies* point in a common direction: firms that trade usually pay higher wages. As noted earlier, exporters make investment and technology decisions that increase their productivity – and this invariably increases the skill-content of their labour force and consequently their average wages (Melitz, 2003). An abundant literature has documented that exporting firms pay higher-than-average wages. Exporters in the United States, for example, on average pay wages that are some 6% higher than non-exporters (Bernard *et al.*, 2007).

More recently, the literature has focused on import effects on wages. In an ICITE study (Chapter 2 of this volume), Stone and Cavazos (2011) used a panel of 60 high-income and developing countries[17] over the period from 1989 to 2004 to examine the relationship of trade and wages. They found that imports have a strong and positive effect on wages through their effects on productivity. Detailed two stage analysis indicated that the dominant effects were through productivity shifts associated with import competition driving out less productive firms. They also found that returns to capital tended to increase. Conversely, tariffs were found to have a depressing effect on wages. They conclude: "Taken as a whole, the evidence is that imports are good for wages".

An ICITE study by Friedman *et al.* (2011, Chapter 4 of the present volume) examined the interrelated effects of openness to trade and FDI in Chile. These authors categorised 29 different sectors for 2003 and 2008, into three clusters of openness (low, medium and high) based on three measures of openness: import competition, export opportunities, and FDI. They found that the open sectors paid a wage premium to their workers. In fact, wages in the open tradable sectors were 18% higher than the non-tradable sectors, and that wage gap increased to 25% in 2008. Seen from a different angle, the average wage in the most open sectors proved to be about 25% higher. Labour market policies were also found to be important, including those with respect to core labour standards. Unionisation had an important positive effect on wages in high openness sectors – belonging to a union was associated with wages that were 34% higher in 2008.

Offshoring and the effects of intermediate trade

Trade in intermediates, according to Miroudot *et al.* (2009), amounted to 56% of goods trade and 73% of services trade in OECD countries in the period from 1995 to 2005.[18] To arrive at these numbers, they looked at disaggregated trade statistics for major products and crossed these

16. Analysis in developing countries – especially low income developing countries – is further limited by the fact that labour market surveys are sporadic and incomplete.

17. Because of missing data for many countries, the actual number of countries that entered into the econometric analysis fell to 30, "mostly EU economies".

18. These shares are considerably larger than those found in other studies, arguably because of their more comprehensive methodology. An earlier study focusing on trade in intermediates (Feenstra and Hanson, 2001) found that, while the total was substantially lower, the rate of increase surpassed that of most merchandise trade. For the US between 1972 and 1990, the imported share of intermediate inputs rose from 6.5% to 11.6%; they report much higher shares for Europe and Japan.

findings with findings from input-output tables. They find that intermediate goods trade is growing at about the same pace as all trade, so the trend did not affect the final composition of OECD merchandise trade. Services exhibit a different pattern, as services intermediates were indeed a faster growth segment of the market.

The consequences for productivity mirror findings for trade as a whole.[19] Higher trade flows of intermediates are correlated with higher productivity. For example, an OECD study on dynamic gains of trade finds that a 1% increase in the share of imported intermediate inputs raises a firm's productivity by 0.3% (Stone and Shephard, 2010). Miroudot *et al.* (2009), analysing 29 industries in 11 OECD countries, find two channels through which trade in intermediate goods and services exerts this positive impact: First, foreign inputs embody the foreign technology, and this technology is more productive than the one embodied in domestic inputs; second, trade in intermediates pushes the frontier of a reallocation of resources to greater efficiency. Country-specific studies confirm these positive effects on productivity of offshoring of intermediate inputs in high-income economies.[20]

An oft-voiced concern among policymakers – predominantly in high income countries – is the fear of the impact of offshoring on domestic economies. In a paper treating the role of multinational corporations, Ebenstein *et al.* (2009) sought to determine whether offshoring or trade had led to reallocation of labour both within and out of manufacturing, and then measure its impact on the wages of domestic workers. They linked industry-level data on offshoring activities of US multinational firms, import penetration, and export shares with individual level worker data from the Current Population Surveys in the US for this purpose. Controlling for the "routineness" of individual occupations, they found that offshoring to high-wage countries is positively correlated with US manufacturing employment, while offshoring to low-wage countries is associated with US employment declines. At the same time, wages for workers who remain in manufacturing are generally positively affected by offshoring; in particular, they found that wages are positively associated with an increase in US multinational employment in high-income locations. Using data between 1982 and 2002, they found that changes in import competition or offshoring within the same industry range were associated with wage changes ranging from zero to positive and significant, albeit small in magnitude. For example, a 10% increase in the number of workers employed by US firms in low-income countries had virtually no impact on wages across all skill groups. However, a 10% increase in offshoring to high-income countries is associated with a small increase in wages of less-skilled workers of between 0.1 and 0.2%. The impact of an increase in import penetration is negligible and not statistically significant when the authors focus only on manufacturing workers.

19. These new patterns of trade have required theoretical innovations to create trade models that explain outcomes (Baldwin and Robert-Nicoud, 2007), for example, extend the traditional Hechsher-Ohlin trade model by arguing that off-shoring is the equivalent of "shadow migration" that plays a similar role to technological progress. The theoretical formulations suggest that the off-shoring can help realize new sources of comparative advantage and explain inter-industry trade. While the general consequences for production, prices and wages are ambiguous, they conclude that typically factor owners of home country nations are better off with off-shoring, depending on terms of trade effects. Rojas-Romagosa (2011) used simulations to deduce that off-shoring can raise or lower welfare in rich countries depending on terms of trade effects, but in low-income countries, off-shoring will always be welfare increasing.

20. For example, US studies find that offshoring material inputs has a positive effect on productivity, accounting for approximately 5% of productivity growth (Amiti and Wei, 2006). Gorg and Hanley (2009) found that offshoring intermediate services enhances innovation in Irish firms, and a study of Spanish firms found a positive productivity effect of offshoring intermediate inputs (Kohler and Smolka, 2009 – cited in Lanz *et al.*, 2011). US studies find that offshoring material inputs has a positive effect on productivity accounting for approximately 5% of productivity growth (Amiti and Wei, 2006).

As with Brazil's trade reform, this study found that for the United States, much of the negative effects on wages of offshoring and trade operate through downward pressure on wages of workers who leave manufacturing to take jobs mostly in services or in agriculture. Some workers in those industries exposed to import competition – mainly unskilled workers – did suffer from such dislocation and left manufacturing, often suffered cuts in wages when relocating to the service sector. The negative wage impact is particularly large among displaced workers who also switch occupations. Ebenstein *et al.* (2009) estimated wage losses of 2-4% among workers leaving manufacturing and an additional 4-11% wage loss among workers who also switch occupations. These effects are most pronounced for workers who perform routine tasks.

It is not only wages that adjust, but so too can employment rates. For the United States, Amiti and Wei (2006) found that offshoring material inputs had a small negative effect of less than 0.5% on employment, when industries are finely disaggregated (450 manufacturing industries). However, even this effect disappeared at the more aggregate level of 96 industries indicating that there is sufficient growth in demand in other industries within these broadly defined classifications to offset any negative effects.

Two ICITE studies explored the impact of offshoring on wages and employment in two European countries. The ICITE study of Italy (Iapadre, 2011) examined the employment and wage effects of trade and offshoring in Italian manufacturing industry using a panel of 15 sectors for the period from 1999 to 2008. The authors find that after controlling for the effects of output growth and technical progress on labour demand, trade specialisation has played a positive role in sustaining growth of employment in the last decade, offsetting the negative impact of the competitive pressures from developing countries and production offshoring by Italian firms. The positive impact of trade specialisation on labour demand exceeded by nearly ten-fold the combined negative effect of the share of developing countries in world exports and the impact of offshoring. Furthermore, using a panel of data on individual workers for the period from 1997 to 2003 the authors find, after controlling for a set of individual characteristics, firm size and productivity, competitive pressures from developing countries exert a negative effect on wage growth. The elasticity of wages with respect to the share of developing countries in world exports is around -2%. While this effect can be attenuated, depending on the export specialisation of the region in which workers are located, the wage gap between white- and blue-collar workers increases in any case.

In their ICITE study on Germany, Görg and Görlich (Chapter 6) found no significant effect of trade on individual-level wages, once standard controls for firm size and location (East Germany) and individual worker characteristics were considered. The authors suggest that the relatively small differences over the decade between the performance of these industries is rooted in German labour market policies that are designed to promote stability and conclude that trade in its various facets is only to a low degree responsible for wage developments at the individual level. The study further looks at the link between an individual's probability of losing his or her job and offshoring. It finds that offshoring of material inputs reduced the risk of being unemployed in both services and manufacturing sectors.[21] The effect was larger for the services sector (60% lower probability of unemployment). This is in line with the findings by Bachmann and Braun (2011) that outsourcing of materials increases employment stability in services industries. On the other hand, offshoring of services in the services sector in Germany increased in the risk of being unemployed, in particular for high-skilled workers. (There is no comparable

21. In the case of manufacturing, the effect is statistically significant only for the medium skilled group – a one percentage point increase in material offshoring implies a reduction in probability of being unemployed by about 30%.

employment effect in the manufacturing sector beyond the positive impact of offshoring of material inputs.) The authors suggest that this outcome is driven by the fact that Germany does not have a comparative advantage in the services sector and, thus, may encounter difficulties in competing internationally in services.

Services offshoring – trade in tasks

Apart from offshoring of material inputs, it is offshoring and outsourcing of selected tasks in services sectors that has increasingly become a dominant trade concern of politicians in high-income countries.[22] To better illustrate the mechanisms behind services offshoring, Jensen and Kletzer (2006) define a set of occupational characteristics that make them susceptible to offshoring or out-sourcing. Movable jobs are those with little face-to-face customer contact, high information content, and work processes are "telecommutable" – and the work can be sent over the internet. They conclude that as much as 40% of the services jobs in the United States could potentially be affected – and these are workers with higher skills and higher incomes than workers in manufacturing and in the non-tradable services industries.

In a paper included as a special section in this volume, Lanz, Miroudot and Nordås (2011) re-examine the question of the extent to which services are off-shorable (Chapter 7). This study looks at tasks distribution by occupation and then performs a cluster analysis to see that tasks in fact come in bundles and are not as easily separable and thus offshorable as might have been assumed in the literature. Matching indices of the importance of offshorable tasks by occupation with data on employment by occupation, they find that between 20 and 29% of all jobs in major economies such as the United States, Canada and Australia could be off-shored (though not all would be).[23] An alternative approach to measuring trade in tasks is to extend the technique of measuring the factor content of trade[8] to measuring the tasks content of trade.[24]

Studies of the wage and employment effect of services offshoring are too few in number and cover too few countries (mostly advanced countries) to produce definitive conclusions. Lanz *et al.* (2011) then look at the relative share of selected task clusters in output and exports. Imports of services were found to be unrelated to "Working with others", but positively associated with "Information processing tasks" and "Getting information and communicating", suggesting that services imports may complement "Information processing" tasks and "getting information and communicating". The effects are small, however, and must be interpreted with caution (the more so, given the small sample of countries). Import penetration of goods seems to have negligible effects on the composition of tasks within an industry performed in the local economy. In some capital-intensive manufacturing industries, import penetration is associated with a shift from tasks related to operating or monitoring machinery towards information related tasks, while import penetration by and large appears to have little effect on the composition of tasks in local services sectors. That said, they found that the import penetration in services has a small, but *positive* effect on the share of tasks related to getting and processing information being performed in the local economy. They concluded that offshoring complements rather than replaces local information processing. As with distortions in the market for intermediate inputs

22. The WTO has divided services trade into four categories: Mode 1: Cross border supply of services (e.g. internet-related services); Mode 2: Consumption abroad (e.g. tourism and travel); Mode 3: Commercial presence (e.g. foreign companies investing abroad in services, such as retail trade or finance); Mode 4: Temporary movement of worker (e.g. labour service contracts or professional services permits). This section focuses only on Modes 1 and 4.

23. See van Welsum and Vickery (2005), Blinder (2009) and Jensen and Kletzer (2010).

24. See, for example, Stone *et al.* (2011); and Trefler and Zhu (2010).

generally, restrictions on offshored tasks will have a negative effect on national productivity, especially in more diversified, complex economies.

Other studies also show no or somewhat positive effects of offshoring of services on wages and employment. Criscuolo and Garicano (2010) for the United Kingdom found that increased imports of services raised both wages and employment in occupations subject to licensing requirements. Similarly, Geishecker and Görg (2008) also using British data, found that offshoring raised the wages of skilled labour and lowers the wages of unskilled labour. Crinò (2009) showed that service imports drove up the relative demand for skilled versus unskilled labour in tradable sectors. Blinder and Krueger (2009) administered a worker-level survey on earnings and job offshorability and found no correlation between the two. In a 2007 paper, Kletzer pointed out that workers and occupations exposed to trade in services experience job losses at a rate slightly higher than for the whole economy – 0.13%, higher than for the economy as a whole of 0.10%; she is quick to point out that the data used in the analysis came from 2001-03 in the United States, the period when the dot-com bubble burst. One study for the United Kingdom found no evidence that importing intermediate services is associated with job losses or greater worker turnover (Hijzen *et al.*, 2007). Using firm-level data, the study found that firms that start importing intermediate services experience faster employment growth than equivalent firms which do not. This appears to result from the cost-saving or productivity effects of offshoring that give rise to an increase in the scale of production.

But not all the news is good. Using data for 1996–2007, Liu and Trefler (2011) studied the impact of services imports from China and India on US labor markets over a ten-year period. They found that the trade was associated with considerable occupational movement in US white collar workers. Switching to jobs with a lower wage occurred in 17% of the trade-exposed labour force and to ones with a higher wage in 4%. Import penetration was also associated with transitions to unemployment of 0.9 percentage points. Those staying in their pre-importation occupations saw only marginal downward pressure in their occupations, a fall of 2.3%. The study could not account for unobserved worker characteristics. Under the assumption that these had no effect (i.e. "no sorting"), downward switching was associated with an annual earnings hit of –13.9% and upward switching was associated with an annual earnings gain of +12.1%; under the assumption of worker sorting, trade-induced switching had no statistically significant impact on earnings. They conclude that "service offshoring to China and India has had adverse effects" on US labor markets – and while these effects are small, they are not small enough that they can be dismissed out of hand.

Virtually all of these studies of services trade have focused on the impacts in high-income countries. The view is different from the perspective of developing countries. Messenger and Ghosheh (2010) examined the effects of business processing outsourcing on labour markets in four countries – Argentina, Brazil, India and the Philippines. Wages of workers were generally higher than prevailing average wages. In India, wages in the Business Process Outsourcing sector were nearly double the average Indian wage, and in the Philippines 53% higher for workers of the same age on average. They also point out that the work had downsides – it is high stress, often at night in Asia to accommodate Western markets, and subject to electronic monitoring (cited in McMillan and Verduzco, 2011).

Skilled labour seems to benefit more from increased labour demand and higher wages in both high-income and low-income countries, contrary to Stolper-Samuelson logic. Low-skill jobs in high-income markets are often high- skill jobs in low-income countries, so off-shoring can create demand for relatively skilled labor in both trading countries. Gonzales *et al.* (2012) cited studies showing that demand for high-skilled workers generally increases in high income countries as a response to offshoring of services (Crinò, 2010; Jensen, 2011). This is because

offshored services are complementary to high-skilled tasks performed at home, and because jobs are created when skills-intensive services sectors start exporting.[25] Information-intensive tasks performed in the European Union and the United States held steady or increased slightly after 2000; moreover, the share of information-intensive tasks in local inputs was positively associated with import penetration in services, pointing to the complementarity of off-shored services and locally produced services (Lanz, 2011, and Crinò, 2010). Meanwhile, in India, nominal high-skilled wages more than doubled both in manufacturing and tradable business services in 2003-07. Gonzales *et al.* (2012) argue that if regulatory and trade barriers were reduced further for trade in business services, developing countries would benefit from greater employment in the sector and higher wages (Chapter 5).

In addition to studies of trade in business services, studies of services trade in the form of temporary movement of workers (Mode 4) are gradually emerging. For example, movement in professional services – accountants, lawyers, computer programmers, engineers – are particularly important for developing countries, particularly small countries, where services may not be plentiful but whose contribution to productivity and growth is essential. For example, the average labour productivity of East African users of professional services is 10-45% higher than non-users (Brenton *et al.*, 2012). Yet barriers to the temporary movement of workers limit competition and the efficiency of professional service providers in Eastern and Southern Africa. National markets for professionals and professional services in East Africa remain underdeveloped, whereas regional markets are fragmented by restrictive policies and regulatory heterogeneity. An effective reform agenda will require policy action in four areas: education, regulation of professional services, trade policy, and labour mobility at both the national and international levels.

A special section in this volume (Beverelli, 2012) examines "spillover effects" of migration and offshoring policies in a framework with multiple origin and multiple destination countries to establish how policies in various areas may impact one another (Chapter 8). The paper's starting point is an observation that the public tends to support open trade policy more than open migration policy. If domestic spillover effects are relevant, a host government can influence the number of migrant workers not only by acting directly on its migration policy, but also indirectly, by providing incentives for firms to source labour abroad via offshoring. These findings are in line with the findings by Baldwin and Robert-Nicoud (2010) that depict offshoring as shadow-migration.

Trade in services, one could conclude provisionally from this literature, is largely beneficial to wages in both high-income and low-income countries. Services outsourcing has either had minimal or no effects in high income markets to date – and there is some evidence that it may even have increased labour demand and contributed to higher wages, if in small measure. In developing countries, services liberalisation, particularly through Modes 1 and 3, seems to have had a more definitive impact in job creation. The telecommunications revolution and back-office-processing industries have been net plusses for workers in developing countries. These conclusions might well be taken as provisional – because research is limited and gaps abound, and because the world is undoubtedly at the earliest phase of a global integration in services that is likely to intensify in the years ahead.

In summary, the mosaic of offshoring studies in intermediate goods as well as services presents only a partial picture and one without conclusive patterns. On the one hand, workers

25. In 2010, the ten largest exporters of commercial services (share of global exports in parentheses) were: United States (14.1), United Kingdom (6.2), Germany (6.2), China (4.4), France (3.8), Japan (3.7), India (3.2), Spain (3.2), Singapore (2.9), Hong Kong, China (2.8).

in exporting firms and in sectors with comparative advantage are likely to enjoy more buoyant job opportunities and higher wages. Workers with higher skills and in higher skilled occupations are also likely to benefit and perhaps substantially. On the other hand, workers in import-competing industries and occupations may well see their activities contract; for those workers that remain, wages may actually increase, but for those that exit and migrate to different occupations or different sectors, earnings losses can be substantial. Offshoring and trade in tasks merely expand the scope for productivity and wage gains from this process – but they also expand the scope for losses, though the effects in the aggregate appear to be minimal.

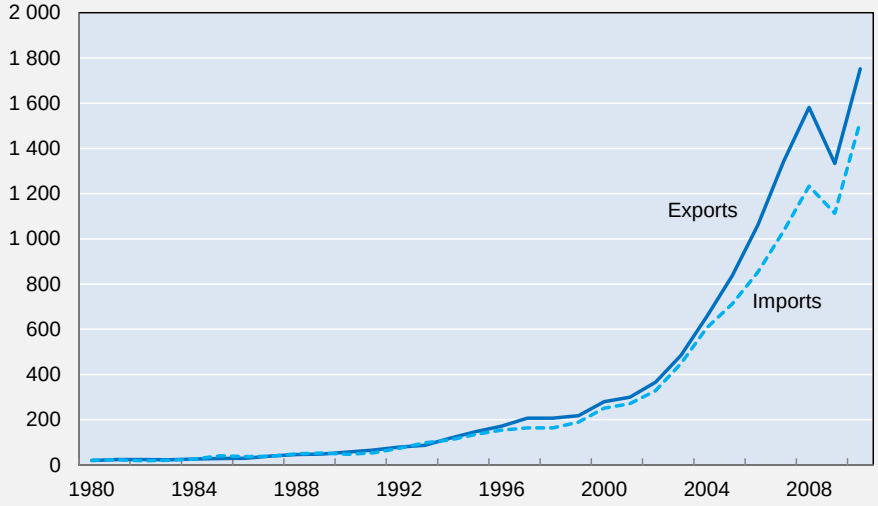
Box 1.3. China's expanding role in the global economy

China's participation in the global economy began an historic acceleration after its opening in 1992. The relatively rapid rise of China has undoubtedly had an impact in many countries. Beginning with its trade reforms in the early 1990s and continuing progressively through to its joining of the WTO in 2001, the availability of this new pool of workers for manufacturing has transformed the global supply of labour. This combined with the entry of Russia and Eastern Europe into global markets following the fall of the Berlin Wall, effectively "doubled" the size of the world labour force producing tradable manufactures (Freeman, 2005). China became the world's largest exporter in the space of two decades. Autor *et al.* (2011) calculated that Chinese imports explain one-quarter of the aggregate decline in US manufacturing employment.

But this is only half of the story. To increase its domestic productivity and be able to export, the Chinese government progressively liberalised its economy and reduced import barriers. Since 1994, China has also hugely increased its imports and has become the world's second largest importing country (Box Figure 1.3.1). As a consequence, China is importing raw materials from Africa, foodstuffs and grain from Latin America, and many intermediate and capital goods from the middle- and high-income countries of Asia and the West. Many of its exports have an intermediate import content that is unusually high compared to other BRICS economies. In a recent OECD study, imported intermediates in exports from China and other selected economies were computed from OECD input-output tables combined with bilateral trade data; the study showed that in 2005 some 27.4% of China's exports value originated from imported intermediates (OECD, 2011d). As part of global value chains, the country has tended to specialise in parts of the production process that are labour-intensive.

Box Figure 1.3.1. China has become the world's largest exporter and… the second largest importer

China's exports and imports of goods and services, 1980-2010, billion USD.



Source: WDI.

The consequence of China's importing high technology goods and services is to create high-paying jobs in exporting firms in partner countries. That said, there may remain an asymmetry in labour markets because contractions in employment and wages in import-competing industries may exceed employment and wage increase in export industries.

1.4. Trade and inequality

Even if trade facilitates growth in *average* per capita incomes and wages, the effects are not uniform. Averages may mask a "polarisation" in employment – and, by creating high-skilled, high-wage jobs and jobs in low-wage but non-routine tasks, while hollowing out less skilled middle wage jobs (Davidson and Matusz, 2004), that may contribute to a worsening of income distribution. Thus, the role of trade and globalisation in changes in income distribution and wage inequality merit special review.

Is trade a driver of income inequality–

Inequality has increased in most high income countries since the 1980s (OECD, 2011a).[26] According to the OECD's *Divided We Stand* study, in 17 of the 22 countries for which long-term data exist, income inequality worsened, three remained roughly the same and two recorded reduced inequality. Many developing countries also exhibit a trend of rising inequality, including China and other East Asian countries, India, and about half of Latin American countries, while Eastern Europe and Africa lack reliable data to assert dominance of one trend over another (World Bank, 2006:45-46). Another measure, albeit partial, points in the same direction: labour's share of national income has fallen since the 1990s in "nearly three quarters of the 69 countries" for which data were available (ILO, 2011b: 56).

More recently, within the OECD, the latest trends in the 2000s showed a widening gap between rich and poor, not only in some of the already high inequality countries like Israel and the United States, but also – for the first time – in traditionally low-inequality countries, such as Germany, Denmark, and Sweden (and other Nordic countries), where inequality grew more than anywhere else in the 2000s. At the same time, Chile, Brazil, Mexico, Greece, Turkey, and Hungary reduced income inequality considerably – often from very high initial levels. In fact, in Latin America, a region with perennially high inequality, 12 of 17 countries for which data were available *reduced* income inequality between 2000 and 2007 (Gasparini and Lustig, 2011, Birdsall *et al.*, 2011). These conflicting trends led Scarpetta *et al.* (OECD, 2011a) to posit that perhaps there is a global trend toward a similar level of inequality, higher than that in the 1990s, but more uniform across countries.

The same OECD study analysed the determinants of changing income inequality, focusing on three factors – globalisation, technology and employment policies. Globalisation is of concern because it may be coupled with rising imports and related job dislocation. Moreover, theory would suggest that in wealthy countries skilled workers benefit as trade opening creates demand for their products and services while imports and outsourcing compete away less-skilled jobs.[27]

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26. The OECD (2011a) is careful to point out that inequality can be measured in several ways, and studies frequently employ different definition.

27. Theory suggests that average wages between rich and poor countries are likely to converge with trade, but that wages within rich countries will likely widen, even as wages within poor countries are likely to narrow. Hecksher-Ohlin and the Stolper-Samuelson theories would predict that trade integration would raise the returns to the abundant factors of production. In this theoretical world, trade opening would mean that skilled workers in developed countries, which are abundant in skilled labour, would see their demand expand as the products they produce experience greater demand with trade, while unskilled workers would see their demand fall. This is because developing countries, using their abundant supply of unskilled labour, supply an ever greater share of the world market for labour-intensive goods. In this world, wages in rich countries would tend to widen, while wages in poor countries to narrow; and average income gaps separating rich and poor countries would tend to narrow.

But the world in more complex than this one dimensional construct. The study found that "neither rising trade integration nor financial openness had a significant impact on either wage inequality or employment trends within the OECD countries" (OECD, 2011a:29). Even when only the effects of import penetration from emerging countries were considered, the effects of trade on wage-inequality appeared neutral. Regulation and employment protection legislation did have an impact. In countries with weaker employment protection legislation, imports from low-income countries did tend to heighten wage dispersion. Foreign direct investment and its offshoring activities were also found to play a role, but the most important source was technological change.

These findings are consistent with those of the IMF (2007). The IMF team looked at factors determining changes in Gini coefficients for both developed and developing countries, and found that globalisation was less important than technological change, as well as other factors in both rich and poor countries. While globalisation – including measures of international capital flows and trade – did have an impact on income inequality in rich countries, it was outward FDI, not trade that led to this impact. For developing countries, neither globalisation nor its subcomponents were associated with rising income inequality. To the contrary, trade openness in fact contributed to greater income equality in developing countries.

Whereas the studies above focused on trade openness, a study by Gourdon, Maystre and de Melo (2008), focused on the role of trade liberalisation in countries with differing factor proportions, not only skilled and unskilled labour but also differing endowments of natural resources and technology. This study used Gini coefficients as the measure of inequality and considered the changes in within country income inequality in 61 countries between 1980-2000 as well as a different data set with 55 countries for 1998-2008. They interacted various measures of factor endowments with tariff reductions. They concluded that tariff reductions were associated with increases in inequality in the capital-abundant and high-skill abundant countries of the high-income world. Increases in inequality were also positively correlated with trade liberalisation in countries abundant in a non-educated labour force and/or dependent on a few natural resources. However, trade liberalisation tended to decrease inequality in countries that are well-endowed with primary-educated labour. This serves to underscore the importance of educating labour to realise any wage-equalising effect of trade.

The chapter in this volume by Giordano and Li provides an exhaustive review of the recent literature on the impact of trade and poverty nexus in Latin America – a region with one of the most unequal distributions of wealth and other assets in the world (Chapter 12).The preponderance of evidence they cite, though at times conflicting, suggests trade leads to growth and poverty reduction, if with a relatively small contribution. Whenever trade integration was not necessarily "pro-poor", rigidities in the labour markets, the historical pattern of protection that created rents in unskilled-labour-intensive sectors and the emergence of new global low-wage competitors were among the main suspects as the causes of increasing inequality.

– or perhaps wage inequality?

Much of the trade literature has focused on *wage inequalities* rather than measures of *household consumption inequality*.[28] Focusing solely on wage inequality may miss broader movements in the opposite direction for several reasons: in many countries (particularly developing countries) only a small portion of the labour force may be wage earners; relative price shifts affect household consumption baskets of the poor differently than the rich; nearly all

28. Several excellent reviews of this enormous body of work can be found in Winters *et al.* (2004), Goldberg and Pavcnik (2007), Harrison *et al.* (2011) and Pavcnik (2011).

governments have policies that facilitate transfers to households; and rising commodity prices may shift incomes toward rural households. For example, Viet Nam's liberalisation produced wage widening while at the same time it improved the distribution of household income (Box 1.4).[29]

Box 1.4. When trade-induced wage inequality worsens but income becomes more evenly distributed: The case of Viet Nam

Most people in Viet Nam worked in the country side as farmers in the mid-1990s. With the trade opening, many young and underemployed workers left the land to take jobs in new shoe and garment factories. These new industries paid a premium for skilled workers and non-production workers that rose rather quickly, increasing wage inequality in the cities. Simultaneously, the price of rice went up, and the price of fertiliser fell, increasing the real incomes of low-income households. The combination of these effects created a more equitable distribution of household income, but with widening wage differentials.

Source: Dollar, 2005.

When focusing on the determinants of wage inequality, the literature does not speak with one voice. Some recent empirical studies lend credence to the view that technology is the principal driver. Michaels *et al.* (2010) studied the United States, Japan, and nine other OECD countries from 1980 to 2004 focusing on the role of technology, captured in measures of ICT. They found that indeed ICT was a driving force of wage "polarisation" in these countries. Trade openness seemed also to be associated with rising skill premiums, but the trade effect disappeared when combined with ICT. Industries with faster growth of ICT had greater increases in relative demand for workers with higher levels of education; these industries also exhibited bigger falls in relative demand for middle-educated workers. Technologies can account for up to a quarter of the growth in demand for the college educated in the quarter century since 1980.

Both Dollar (2005) and Hoekman and Winters (2007) assert as stylised facts that the returns to skilled labour relative to unskilled labour in both high-income and developing countries have increased, implying that wage inequality has become worse. However, this cannot be taken for granted in all countries at all times. In fact, Lederman (2011), using more recent data, asserts that in six countries of Latin America the returns to education – one proxy for skilled labour – have held roughly stable since the 1990s; generally, returns to secondary education have declined, while returns to university education have declined except in Chile and Colombia.

Other studies also suggest that trade liberalisation should not be automatically assumed to increase the returns for the high-skilled workers. For example, Ferreira *et al.* (2007) studied net trade-induced changes in industry-specific wage and skill premiums in the period 1988-95 in all sectors of the Brazilian economy and found that trade liberalisation in Brazil did in fact contribute to the reduction in wage inequality in the entire Brazilian economy, not just in manufacturing. This is because pre-liberalisation tariffs adjusted by import penetration were highest for skill-intensive goods and fell more than those protecting other goods. Moreover, massive exports of cereals and sugar to China have simultaneously boosted demand for unskilled agricultural labour. The ICITE study on Mexico, using urban labour force surveys for the period from 1992 to 2009, also finds that trade liberalisation associated with NAFTA led to larger employment expansion in low skilled occupations, thus, benefitting unskilled workers (Campos-Vázquez and Rodríguez-López, 2011). In the case of Mexico, this result may, however, be driven by certain bottlenecks in the economy, including the quality of education (OECD, 2009b).

29. Lederman (2011) points out the importance of this gap, and suggests ways to unite these two literatures in future research.

If skill-biased technology remains the dominant view among economists of wage inequality determinants, Pavcnik (2011) and Harrison *et al.* (2011) in their respective and thoughtful reviews point out that recent research raises new questions about trade. One channel is through trade in tasks. Feenstra and Hanson (1999), among others, have found evidence that makes a strong case that trade in intermediates raises the skill premium in both trading partner countries – as the offshored intermediate may involve low-skill labour in wealthy countries but relatively high skilled in developing countries. Other studies of occupational wage differentials, notably for routine tasks (Autor *et al.*, 2003 and Ebenstein *et al.*, 2009), provide evidence of rising skill premia in the United States associated with import competition. A second channel of effects has to do with quality up-grading in the presence of trade; as firms are exposed to trade, those that expand their market share, tend to shed lower-skilled workers to realise productivity gains, and that effect is magnified as they simultaneously begin to compete on the basis of product quality – which also typically creates demand for greater skills within the firm (Verhoogan and Kugler, 2012). Because of the difficulties of disentangling technological change and trade-related change, a third channel is through bundling of technology in traded goods, that is, the combined effects of technology and trade in imported machinery. One recent paper by Burstein, Cravino and Vogel (2011) studied trade in computers and machinery, and its complementarity to skilled labour; they found that trade in capital goods could raise the relative demand for skilled labour and the skill premium. To illustrate this, they conducted a counterfactual calculation moving from the trade levels observed in the year 2000 to autarky, and found that doing so would decrease the skill premium by 16% in the median country of their sample, by 5% in the United States, and by a much larger magnitude in countries that heavily rely on imported capital equipment. Coe, Helpman and Hoffmaister (1999) presented empirical evidence demonstrating the impact of technology diffusion – in their case through trade in goods – on total factor productivity growth. At least theoretically, the same should hold true for technology that is diffused through factor flows. Both Pavcnik (2011) and Lederman *et al.* (2011) call for new research to explore these channels through which trade might affect income distribution.

In the meantime, this discussion leads to several conclusions:

- There is no definitive and generalisable evidence that trade is associated with worsening household income distributions in either high-income or low- and middle-income countries; in those countries with deteriorating income inequality, if anything, the bulk of the evidence points other more powerful determinants, including the role of technological progress, regulations and labour market institutions, and tax and expenditure policies of governments.
- To the extent that globalisation plays a role in the increasing inequality evident in high-income countries, the aggregate cross-country studies suggest it has more to do with finance and outward foreign direct investment rather than trade.
- Recent work suggests that offshoring and outsourcing may indeed play a role in widening some wage disparities among occupations, as might the interactive effects of trade and technology together, but the evidence is preliminary.
- Even if trade were to exert pressures toward household income inequality, using trade policy to attempt a remedy for these pressures would likely be an ineffective and counterproductive response (see final section).

1.5. Trade and working conditions

Job quality has several dimensions

The quantity of jobs is of interest to society and workers, but so too is the quality of jobs. Job quality has several dimensions. Though by no means comprehensive, important elements of job quality include respect for core labour standards as defined by the ILO[30], as well as working hours, health and safety at the workplace, job security and benefits (Robertson *et al.*, 2009). Trade-induced competitive pressures could conceivably encourage countries to compete against each other by reducing labour standards and working conditions to minimise costs – a "race to the bottom". Also, increased competition could reduce workers bargaining power, thus, also leading to a reduction in labour protection and benefits, and, at the extreme, provoke a downward spiral in labour standards and working conditions around the world.

Donado and Wälde (2012) explore the effect of international differences in occupational health and safety (OHS) standards on international capital flows, and then the effect of these flows on accident rates (as a proxy for OHS standards) in the developing countries. Their method is a careful theoretical argument and literature review. Their underlying assumption is that trade unions, with access to greater knowledge than the individual, collectively set higher workplace standards. If unions in the North produce moderate safety standards, capital flows to the South will less than flows without unions as some level of health are better so marginal productivities of capital are higher with unions; if unions produce standards that are too high from the vantage of capital owners, some capital will be driven out of the country and these flows will reduce safety standards in the North as workers lose power to set high standards. In the South, however, active unions and the associated rise southern standards will increase global output in the world as a whole will rise and so will welfare. Their review of the quantitative literature suggests that the effect of integrating capital markets on northern standards is small: a 1% reduction of the northern capital stock would lead to an increase in the sickness level of less than one-tenth of a percentage point, though positive effects of unions on the south is stronger. They conclude: "Globalization effects on OHS standards … do therefore not provide an argument against globalization."

Indeed, the worst of fears about a race to the bottom do not appear to have materialised systematically in the real world, though examples do arise. A large empirical literature seems to point, if anything, to the opposite conclusion.[31] For example, Flanagan (2006), researching 30 years of data for a wide sample of countries, found that open economies have, in fact, *significantly better* working conditions than more closed economies, including fewer accidents at work, fewer hours of work, and greater freedom of association. Moreover, inferior working conditions as measured by gender inequality, child labour and lack of respect for rights to free association and collective bargaining more often than not deter, rather than encourage, foreign

30. The four core labour standards are: elimination of all forms of forced or compulsory labour; effective abolition of child labour; equality of opportunity and treatment; and freedom of association and right to collective bargaining.

31. See, for example, Rodrik (1996), Oman (2000), OECD (1996, 2000), Kucera (2002), Ghose (2003), Busse (2004), Flannagan (2006). For example, OECD studies (1996, 2000) found that countries with lower core labour standards have not enjoyed better export performance, though China may be an exception.

investment of multinational companies (e.g. Kucera, 2001; Neumayer and de Soysa, 2004, 2005a, 2005b).[32]

Broad-based cross-country studies covering both developed and developing countries that trace the relationship between trade and working conditions beyond core labour standards have, however, been rare, which explains to some degree the persistence of the "race-to-the-bottom" view.[33] Two systematic cross-country comparisons included in this volume that emerged from ICITE research – Flanagan and Khor (2012) in Chapter 9 and Häberli, Jansen and Monteiro (2012) in Chapter 10 – contribute therefore in important ways to a better understanding of the relationship between trade and working conditions. Flanagan and Khor (2012) studied a broad sample of economies during the period from 1970 to 2000 and found that openness was in fact associated with improved working conditions and open economies significantly outperform closed ones. While in Asia the differential was mostly related to higher wages, outside of Asia the rate of fatal on-the-job accidents in manufacturing and measures of work hours are also significantly lower in open economies. Labour rights are also generally better respected. The impact of trade has been mostly indirect, through its impact on GDP. Country case studies undertaken as part of ICITE complement these broad-based findings by showing that trade contributed to a reduction in the number of hours worked in Japan (Kiyota, 2011) and interacted with unionisation in the export sectors in Chile to raise wage premia for workers in those sectors (Friedman *et al.*, 2011, included as Chapter 4).[34]

The study by Häberli *et al.* (2012), Chapter 10 of this book, further explores the question whether regional trade liberalisation (as embodied in regional trade agreements, RTAs) led to a weakening of labour market regulation other than that relating to core labour standards. The authors study a broad sample of 74 countries, both developed and developing, over the period from 1980 to 2005, and found that regional trade agreements were, in three of eight regression models, associated with selected indicators of working conditions: reductions in severance payments (after 20 years), reductions on unemployment benefits for one year, and advance notice after nine months of employment. However, the associated reduction in labor protection occurred only in high-income countries and, contrary to a common perception, only in response to RTAs with other rich economies – rather than with the emerging South.[35] There is also no evidence for a lowering of labour protection related to RTA trade in low-income countries, while the impact was either positive or negligible in middle-income countries. The fear that trade agreements between high-income countries and developing countries would worsen working conditions in the North because of trade competition from low-wage workers in sweatshops of the South found no support from the evidence of this study.

32. Since civil liberties are correlated with wages, and higher wages may deter labour-seeking FDI, the correlation between increased respect for civil liberties and FDI is only positive when estimations control for wages (Kucera, 2002).

33. Flanagan (2006), quoted here, is a notable exception, however the study does not account for demographic characteristics or within-country variations. Hasan and Mitra (2003) and Robertson *et al.* (2009) also attempt a broad-based comparison but do not apply a universal framework, pursuing an eclectic approach instead.

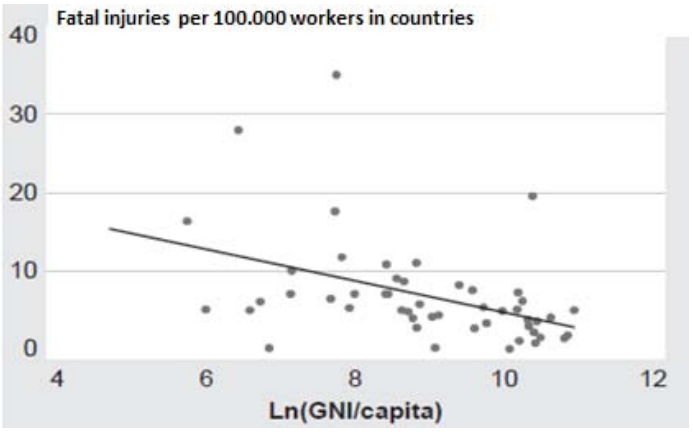
34. It is interesting to note that this finding also confirms the view that exposure to globalisation did not contribute to erosion of unions, but rather that this trend has occurred independently of trade (Baldwin, 2003).

35. The study extends Fischer and Somogyi (2009) and Olney (2011) who analyse how globalisation affects employment protection legislation in OECD countries.

Trade can improve working conditions through several channels. *Growth*, inextricably bound up with trade, is one channel as working conditions tend to rise with the level of development. For example, fatal injuries are negatively correlated with national per capita income (Figure 1.8). Working conditions may improve because developed countries specialise in industries with better conditions or because they raised labour standards through policy and increased enforcement as income increased – both likely to be linked to globalisation (Robertson *et al.*, 2009). Also, the shift of labour from the agricultural sector, typically the locus of poorest working conditions in developing countries, to urban jobs tends to deliver higher wages and better conditions (Robertson *et al.*, 2009).

Reputation-sensitive international buyers and pressure from advocacy groups constitute a second important channel of convergence towards higher labour standards. Harrison and Scorse (2010), who examine the effects of anti-sweatshop campaigning by US activists in Indonesia, found evidence that foreign-owned and export-oriented firms are more susceptible to pressure exerted by labour advocacy groups, which led to higher compliance with minimum wages and labour standards. Even after controlling for worker and plant characteristics foreign-owned and export oriented firms were more likely to comply with labour standards legislation. Exposure to foreign anti-sweatshop agitation, which involved dissemination of information to workers, has also helped to redress the bargaining imbalance, strengthening the positive impact on working conditions, as predicted by the literature (e.g. Kim, 2007; Polaski, 2006).

Figure 1.8. Fatal injuries usually fall as countries become wealthier



Source: Robertson *et al.* (2009).

Foreign direct investment can also impact the quality of working conditions in a country through operations of multinational enterprises (MNEs) in the local labour market. A recent study by the OECD (2008a) shows that FDI may have a substantial positive effect on wages in foreign-owned firms in the host country, but that this effect is mostly related to a short-term impact of cross-border mergers and acquisitions and is reflected mostly in better paid opportunities for new employees rather than increased wages for incumbent workers following a takeover.[36] Other studies also find evidence that local workers employed in multinational

36. The study compares the wages and working conditions of employees in the foreign affiliates of MNEs and their supplier firms to the wages and working conditions that they would have received had they not been employed by a foreign firm or one of its suppliers. The comparison with employment conditions in comparable domestic firms provides therefore a plausible approximation of the conditions that would have been offered to individuals had they not been able to work for MNEs (directly or indirectly) and thus allows an estimation of the contribution of MNEs to improving wages and working conditions in a host country.

companies receive wage premia, in particular in developing countries, even after controlling for workers characteristics, but some papers point to negligible or slightly negative effects.[37] Besides the impact on wages, foreign investors are also likely to impact the working conditions in the country. As mentioned earlier gender inequality, child labour and lack of civil rights are negatively correlated with FDI inflows, which suggests that FDI, after controlling for wages, tends to encourage better working conditions (Kucera, 2002, and Neumayer and de Soysa, 2004, 2005a, 2005b). While there appears to be no systematic evidence on the propensity of MNEs to export domestic labour practices to developing countries (OECD, 2008b), the impact of domestic consumers and non-governmental monitoring groups increases compliance with the existing laws, often having an overall positive effect on compliance in the country. The recent controversy over the production of the iPad in China is an illuminating example (Box 1.5).

Box 1.5. How international companies and NGOs can impact local working conditions: The case of Apple in China

Globalisation implies not only international competition but also increased influence of international pressure-groups on domestic markets. While global companies may be tempted to cut corners and increase their profit margins by, for example, increasing working hours or compromising on other workers rights, international NGOs can make a big difference by bringing to light such abuses and impacting reputation-sensitive international buyers. For example, most recently, an inspection of Chinese plants making electronic products for Apple conducted by the Fair Labour Association, a monitoring group, found widespread violations - mainly in regards to hours worked. Although far from unusual in the Chinese market, these discoveries made headlines and provoked an outcry that drew protests and petitions. Several labour rights organisations started independently scrutinising Apple's suppliers. As a result, the manufacturing giant supplying electronic parts to Apple, Foxconn, pressured by its reputation-conscious client, pledged to sharply curtail working hours and significantly increase wages on 29 March 2012. The move is seen as a breakthrough and could improve working conditions across China. In the global market where reputation matters, international companies open to pressure from clients and NGOs have an important role to play in increasing working conditions in the local market.

Source: *New York Times*, 30 March 2012.

Conditionality embedded in trade agreements is also playing an increasingly important role in the convergence of standards. Specific provisions embedded in international trade agreements that require compliance with labour standards in exchange for market access may contribute to the upward trend. One example is the 1999 United States-Cambodia trade agreement that offered a possible 18% annual increase in export entitlements for Cambodian textile and apparel industry on top of Multi-Fibre Arrangement (MFA) entitlements, conditional on the implementation of a program to improve working conditions. The ILO was requested to monitor progress in implementation through a technical cooperation project - "Better Factories Cambodia" and so Cambodia's apparel quota allocation under the MFA was effectively linked to ILO reports on working conditions. Polaski (2004) notes the positive

37. Some studies look at composition of workers at different education- and skill levels in foreign-owned firms in a host country (Lipsey and Sjöholm, 2004, and Morrissey and Te Velde, 2003) and find positive effects; others trace the impact of foreign take-overs on individual wages using either firm-level data (e.g. Girma and Görg, 2007 or Lipsey and Sjöholm, 2006), which tend to yield large positive results but are likely to be biased, or worker-level data that, at best, find small positive effects (e.g. Andrews *et al.*, 2007 and Balsvik, 2006). Other studies exploit workers mobility by tracing workers moving from domestic to foreign-owned firms (e.g. Andrews *et al.*, 2007 and Balsvik, 2006) and find confirming evidence for positive short-term effects.

impact of such conditionality-driven approaches, but also point to the necessity of effective monitoring and safeguards in order to ensure these effects are not short-lived (Polaski, 2006).

Informality might increase

Trade may be associated with improvements in the working conditions of the formal sector, but that simultaneously occur with increases in informal employment. According to the 2002 ILO framework of informality, the "informal economy" refers to economic activities that are not covered by formal legal protection normally benefiting workers. This includes home-based work, subcontracting, and services provided outside the firm, some of which is self-employment and other is paid work in informal arrangements. In practice, this may mean a lack of social protection, labour rights or disrespect for safety regulations. Sinha (2011) estimates that 80% of workers in low-income countries, 40% of those in middle-income countries, and 15% of those in high-income countries are employed in the informal economy.

Competition from imports – arising from liberalisation or new technological advances – could drive firms out of business or induce firms to improve their productivity by adopting new technologies, shedding labour, or focusing on a narrower range of product lines. In either case, newly shed workers may migrate into the informal sector. Similarly, import competition may create incentives for firms to opt-out of the formal sector altogether to minimise costs associated with compliance with standard labour protection laws (though a more common motivation is to escape taxes).[38]

While there is some evidence that trade liberalisation does lead to exit from the import-competing sectors (e.g. Muendler, 2010), trade liberalisation does not seem to systematically contribute to an increase in informality. A study of Brazil by Goldberg and Pavcnik (2003) found that, controlling for individual worker characteristics, cross-sectoral variation in tariff changes is not a significant determinant of the probability of employment in the informal sector. Moreover, in another study co-written with Attanasio (2004), they find that whereas trade liberalisation initially led to increased informal employment in Colombia, this effect disappeared once a labour market reform was implemented, allowing more flexible adjustment and formalisation. Therefore, it seems that trade does not lead to an expansion of the informal sector, provided that country's labour markets are flexible enough to allow adjustment within the formal sector. A number of studies find that capital or labour mobility are crucial for allowing trade liberalisation to improve welfare of workers in the informal economy (e.g. Marjit and Acharyya, 2003; Marjit and Beladi, 2005; Marjit and Maiti, 2005) and others highlight the importance of education and skill upgrading to facilitate the formalisation of the informal sector (e.g. de Ferranti *et al.*, 2001). A recent review of empirical, quantitative studies on the impact of trade liberalisation on informality in Sinha (2011) found that trade liberalisation had an inconsistent effect on the degree of informality, and the empirical studies from Latin America found that trade had a small impact, if any. The largest determinants of the size of the informal sector are per capita income levels and government policies – towards small and medium-sized enterprises, requirements for establishing a business, labour taxation, and the like.

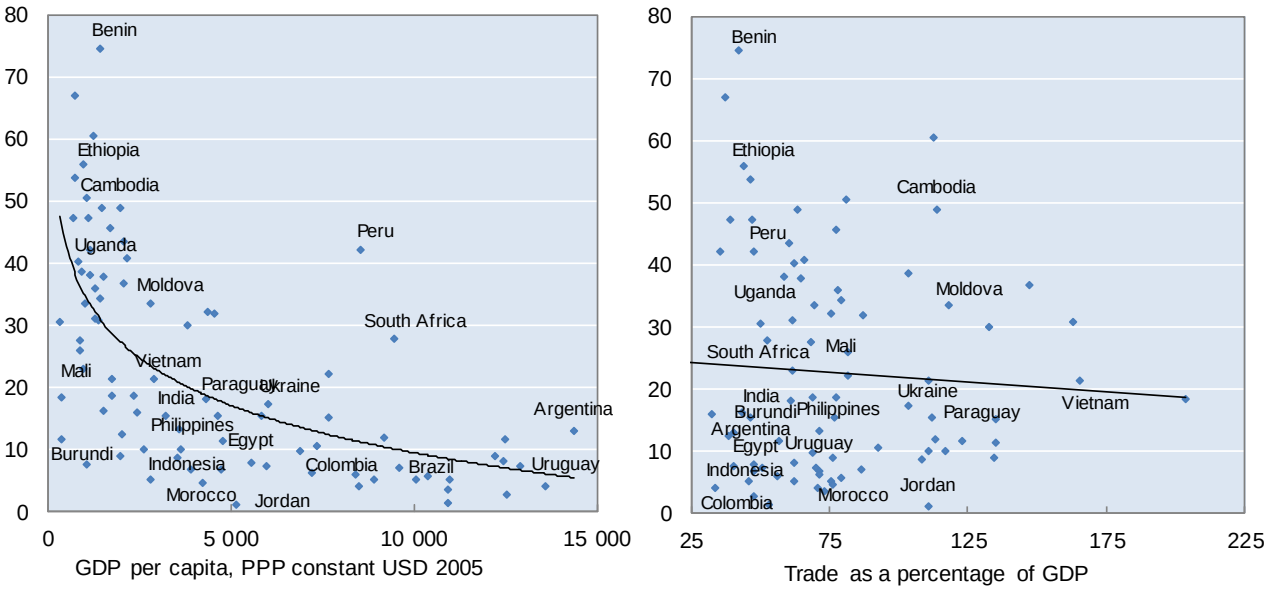
38. For a review of theoretical models showing that trade may induce informality, see Bacchetta, Erst and Bustamante (2009) and Sinha (2011).

Will trade increase child labour?

Child labour is prevalent in poor developing countries[39], but as countries develop, children spend more time in school (Figure 1.9). Trade plays a minimal direct role – but there are abusive firms in the tradable sectors much as with the non-tradable sector. Most working children live in rural areas and work in subsistence agriculture and in non-tradable commercial agriculture (Edmonds, 2010). There appears to be no direct link between trade openness and increasing child labour rates. There is some evidence to suggest that the opposite is true. To the extent that trade liberalisation can reduce poverty, it is also likely to reduce the incidence of child labour (McMillan and Verduzco, 2011). For example, a cross-country analysis by Edmonds and Pavcnik (2006) shows that 1% of increased trade openness *reduced* child labour by 0.7%, an effect primarily achieved through income growth. The primary channel through which trade affects child labour is therefore income growth.

Figure 1.9. Child labour declines as countries climb out of poverty and trade plays a negligible role

Economic activity rate of children, age 7-14 (% of total) by income and trade ratio



Note: Chart on the left: Logarithmic trendline, chart on the right: linear trendline.

Source: WDI, latest year available.

Foreign investment, at times demonised as a driver of child labour in developing countries, is largely exonerated in the several studies of this issue. Many studies find a negative correlation between FDI and child labour as investors systematically prefer countries with lower incidence of child labour and higher secondary school attendance.[40] Child labour is found to negatively affect labour quality (Kucera, 2002) as well as works as a brake on human capital formation (Braun, 2002), deterring FDI in the short and long run.

39. See, for example, Edmonds and Pavcnik (2005a and 2005b) and Edmonds, Pavcnik and Topalova (2010).

40. For example, Neumayer and de Soysa (2004, 2005a, 2005b), Kucera (2002), Busse and Braun (2003).

Trade can create opportunities for women workers (as well as for men)…

Trade can generate both positive and negative effects for women.[41] First, trade-induced competitive pressures may reduce the margin for discriminatory behaviour, as companies seek to hire the best workers at the least costs. Second, to the extent that trade liberalisation benefits unskilled workers in developing countries, women may benefit disproportionally, given their limited access to education and resulting generally inferior skill levels. Third (and in contrast), unequal access to inputs can impede the ability of women to take advantage of new opportunities created by trade liberalisation. Female subsistence farmers may lack access to finance that would otherwise allow them to profit from trade liberalisation. Similarly, while technological diffusion related to globalisation facilitates access to new jobs to women, in particular in the services sector using ICT technologies, it can equally lead to higher female job precarity and reduced wages, if gender educational and skills gaps persist and women are unable to meet the demands of new technologies. Finally, as explained by Sen (1990) due to low value attached to unpaid and household work, when trade leads to the expansion of employment opportunities for women in export sectors, it may also boost female inter-household bargaining power (Kabeer, 2004). This is reflected, for example, in increased decision-making by women over marriage and fertility decisions reported among workers in exporting sectors in Bangladesh (Fontana, 2008). This in turn may have important spillovers into education and training decisions of women facing improved employment prospects and their children.

The way these cross-cutting forces play out depends on the country. In general, trade has been found to narrow the gender gap, by increasing female labour participation.[42] On average, the more countries open to trade, the more female labour participation increases (Figure 1.10). This is particularly the case in the developing countries that enjoy a comparative advantage in unskilled-labour abundant sectors and tend to see women disproportionally employed in the exports sector, mostly manufacturing. For example, 70% of employment in export processing zones (EPZs) in 2005-2006 was female, reaching 90% in countries like Jamaica and Nicaragua (Boyange, 2007). This positive female employment elasticity to exports, also reflected in country studies presented at the ICITE conference in Tunis, has led to assertions of "feminisation" of manufacturing employment (Berik, 2011).

Despite these overall positive effects, trade does not seem to improve other pre-existing gender inequalities associated with vertical and horizontal occupational segregation and the gender wage gap. In fact, such high concentration in exporting sector due to limited opportunities in the domestic economy may expose female employment to volatility related to sudden changes in terms of trade or other trade shocks.[43] In terms of impact on female wages at home some studies confirm the competitive effect of trade on female wages (e.g. Garcia-Cuellar 2002; Black and Brainerd, 2004), while others find contrary evidence (Berik *et al.*, 2004; Busse and Spielmann, 2006). An ICITE study on South Africa finds higher gains from regional agricultural liberalisation for women than for men (Sandrey *et al.*, 2011), but generally evidence remains inconclusive. Overall, cross-country studies suggest that, once worker's skills and occupation are accounted for, the gap falls in high-income countries, while no

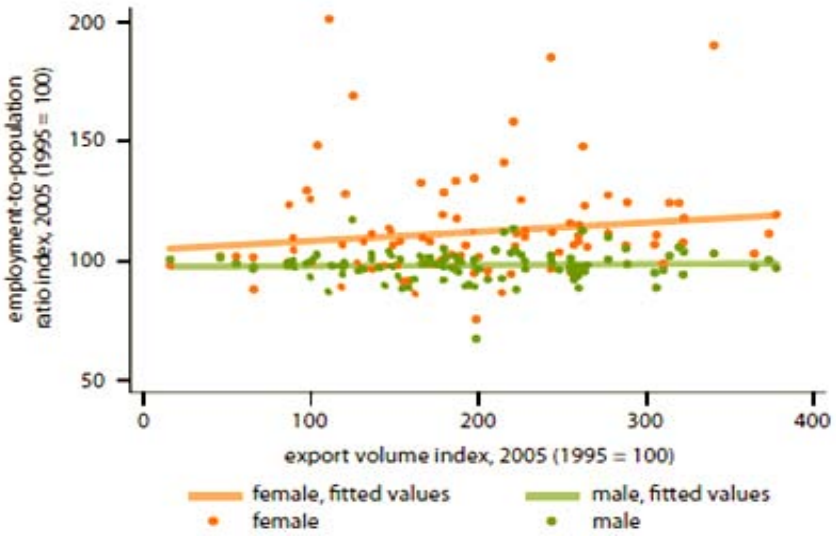
41. See Berik (2011) for a review of theoretical approaches to gender effects of trade liberalisation.

42. See, for example, Bussman (2009) who finds that trade openness increases female labor force participation in developing countries. Busse and Spielmann (2006) further find that gender inequality in labour force activity rates and educational attainment rates are negatively linked with comparative advantage in labour-intensive commodities.

43. Levinsohn (1999), for example, in analysing the impact of trade liberalisation in Chile, finds that gross job reallocation rates are often over twice as high for women than for men.

discrimination-reducing effect is found in medium and low-income countries (Oostendorp, 2009). This may suggest that technology embedded in FDI that raises demand for skills dominates pro-competitive effect, as long as educational differences between women and men persist. While in the OECD economies there remain no significant gender educational gaps (OECD, 2011b), developing countries persistently underperform in gender equality in education (World Bank, 2012), which is an important factor for high concentration of women in low-productivity, low-pay jobs there. Unless educational and vocational training gaps are bridged, trade-induced productivity growth may impact negatively female employment opportunities over time.[44] Improved skills, on the other hand, may allow women to profit from new jobs arising in export-oriented services sectors.[45]

Figure 1.10. Trade openness creates jobs for women disproportionately, if slightly so…



Source: World Bank (2012a), World Development report: 2012.

All this is to say that trade can create new job opportunities (Box 1.6), but it cannot ameliorate pre-existing problems of unequal access to assets and education. If domestic barriers to employment and skills mismatch are not addressed, high elasticity of female employment to exports may in fact expose female workers to higher volatility of employment, as displayed most clearly after the expiry of the MFA agreement and resulting contraction of light manufacturing sectors in some developing countries (e.g. World Bank, 2012b). These problems however necessitate reforms at home and cannot be addressed through trade policy.

Therefore, trade does not seem to emerge from the literature as either the hero or villain in setting the working conditions of labour. Trade per se seems to have no systematic effect on the

44. For example, the process of upgrading and moving up the value chain in manufacturing has already reversed the process of feminisation of employment in the sector in some developing countries (Berik, 2011). A cross-country study by Milberg and Tejani (2010) shows that that during 1985-2006 period in middle-income countries the growth of the female share of employment was inversely related to the growth rate of both capital intensity and value added per worker in manufacturing. Doraisami (2008) and Berik (2000) present evidence that a gender skills mismatch explains this trend.

45. In countries like India, where important advances in female education were made, women make up 40-70% of call centre workers and the share of women working in IT services has increased from 10% in 1993 to 30% in 2008.

various aspects of working conditions – whether measured through job quality, informality, job safety, child and female labour. The strongest systematic effect is its first order effects on income growth, which is the single biggest common denominator for improved working conditions. To the extent that trade is associated with rising incomes, it helps improve opportunities for women, children and male workers as well.

Box 1.6. Linking women to global markets to raise incomes

The Marula tree is commonly found in the savannas of Namibia and constitutes an important source of food an income in rural communities in the country. For generations women in rural Namibian communities have been using traditional techniques to produce marula oil for the use of their families to sell locally on an informal scale. By starting a cooperative in 1996 - the *Eudafano Women's Cooperative (EWC)* - these rural women were able to start selling their product on local and export markets. It quickly turned out that the global market allowed the community to transform the local produce into a niche international product sought, after in the cosmetic industry. In 2000, EWC became the exclusive provider of marula oil to *The Body Shop*, which uses it in its cosmetic products. Following a scientific collaboration with an international R&D company the community also developed a marula-based active botanical ingredient that entered a portfolio of many cosmetic companies producing natural products. Effects on rural development and social uplifting have been impressive. By now EWC boasts membership of over 6 000 women and is the second largest producer of marula products in southern Africa. With access to new markets, by 2000 rural marula producers were receiving over USD 60 000 annually and by 2010 were receiving USD 2.35 per kilogram of marula oil– an invaluable income boost for communities with otherwise limited salary opportunities.

Source: WTO/OECD, *Aid for Trade at a Glance 2011: Showing Results*.

…but may increase volatility and job insecurity for some

Globalisation may affect volatility and rate of turnover in the labour market as competition drives resource re-allocation towards greater productivity. This would suggest that trade may induce a secular increase in the rate of *job turnover* over time. This does not seem to have been the case in the United States – Faberman (2008) and Davis *et al.* (2007 and 2010) document a decline in business-level job variability measures for the United States that roughly coincided with a decline in the magnitude of monthly unemployment flows in the country over the last three decades.[46] Among other determining factors, Davis *et al.* (2007) suggest the shift in retail trade to large distribution chains (e.g. Wal-Mart), where employment is less sensitive to business-cycle fluctuations than smaller firms.[47] ICITE studies of Germany and Spain show that temporary contracts for some workers alongside relatively strong employment protection for workers on permanent contracts, may render temporary employment particularly volatile (Arnal, 2011; Görg and Görlich, 2011).

Earnings volatility may also pose new *income risks* for workers. Krebs, Krishna and Maloney (2010) and Krishna and Senses (2009) found that while trade openness may be

46. Davis *et al.* (2010) show that the employment-weighted mean volatility of firm growth rates for all US businesses has declined by more than 40%t since 1982 (noting that while the aggregate trend was negative, the trend for publicly traded firms has the opposite direction, as confirmed by other literature).

47. The pattern is somewhat different in other economies. Haltiwanger (2011) suggests that in the case of transition economies, volatility in labour markets increased dramatically since 1990s. Albeit this time period coincides with rapid opening of these economies, studies reviewed by Haltiwanger do not point to trade openness as the culprit of increased volatility. The collapse of the communist regime has played a crucial role in the initial phase and so did the policies introduced in the aftermath of the system's change. For example, the study by Haltiwanger and Vodopivec (2003) looking at Slovenia points to the wage-setting mechanism in the country as a key factor determining the patterns of worker and job flows.

associated with higher average incomes, it also increased the variance of income and, thus, the individual income risk. This is a particularly pertinent issue in the case of developing countries where credit markets are incomplete, which limits workers' ability to insure themselves against shocks, even of an idiosyncratic nature.[48]

By inducing faster changes in specialisation patterns of firms and industries and facilitating technological change, globalisation may be also altering returns to a given skill level, thus, complicating educational choices and investment in human capital (e.g. Krebs, 2003). For example, Lederman *et al.* (2011) in a paper presented at an ICITE conference in Chile show that globalisation may have indeed increased volatility of returns to schooling in the LAC region. Given that education and skills are an important part of workers' "insurance policy" against the risk of being unemployment or experiencing a wage reduction (as well as impacting workers' mobility during the adjustment period following a shock), further research of these second-order effects appears important.

1.6. Adjustment costs

To reap the benefits of enhanced productivity, trade and other drivers of the growth process require a continuing reallocation of resources. Technologies create new products while old ones wilt. Competition creates opportunities for some firms to expand market share and drives others out of business. Demand for labour shifts in responses to these larger market forces, and so the reallocation process requires difficult short-term adjustments. If trade reforms shift relative prices sharply, the reallocation process of both capital and labour to the internationally competitive sectors can be abrupt. Adjustment costs can refer to the value of output that is forgone in the transition to a new long-term production equilibrium usually manifest in unemployment (Francois *et al*., 2011).

Trade-induced adjustment costs cut into the overall benefits of the trade reform, and often fall disproportionately on one or another group of workers. When trade surges or liberalisation affects a specific region or group, it may create a tightly affected group that is able to raise barriers to trade, even when it undermines the interest of the more diffuse set of consumers and producers. As discussed above, worker dislocation through job destruction in import-competing sectors can often be greater than job creation in new export activities (e.g. Hoekman and Porto, 2010), or there may be a non-trivial lag between spells of job destruction early in the reform process and a subsequent recovery and renewed job creation (e.g. Haltiwanger, 2011).

In earlier studies the adjustment costs were calculated by multiplying an estimate of the average amount of time workers were unemployed by the estimate of their average wages before unemployment. Estimates ranged from 1 to 4% of total gains from trade liberalisation.[49] More recent work, however, suggests that the adjustment costs may in fact be much larger, when previously unmeasured costs are taken into account (e.g. Davidson and Matusz, 2000 and 2004; Francois *et al.*, 2011). For example, Davidson and Matusz (2004) incorporated the time and resource cost of job searches and retraining in their estimates and found that the adjustment costs reach between 30 to 80% of the overall gains, depending on the model assumptions. One recent estimate based on a model with data from Brazil's trade reform put the costs of reallocation at between 16 and 42% of the gains from trade, depending on the mobility of

48. Krebs *et al.* (2010) specifically analyse welfare implication of income risk in the context of missing credit markets on the example of Mexico and find that liberalisation indeed appears to leave workers more exposed to idiosyncratic income shocks.

49. For example, the costs account for 4% of gains from trade liberalisation in Magee (1972), 1.5% in de Melo and Tarr (1990) and 0.5-1.5% for the first year after liberalisation in Takacs and Winters (1991).

capital in the adjustment process (Dix-Carneiro, 2011). Even if the aggregate adjustment costs appear to be larger than previously thought, most studies still find that the benefits significantly outweigh the losses. For example, Bradford, Grieco and Hufbauer (2005) assert that benefits are seven times larger than costs.

High-income countries, in particular, fear the impact of trade-related competition from low-income countries on their local labour markets and the degree of adjustment required. Recent literature has looked anew at the role of trade and labour displacement, especially within the context of China's emergence. For example, Autor *et al.* (2011) analysed the effect of rising Chinese import competition between 1990 and 2007 on regional and local US labour markets where import-competitive activities were concentrated. The authors relate changes in exposure to low-income-country imports to changes in municipal-level local wages, employment levels, industry employment shares, unemployment, and labour-force participation rates and allow impacts to vary by age, gender, and education. They find that rising exposure indeed increases unemployment, lowers labour force participation, and reduces wages in local markets. The authors calculated that Chinese imports explain one-quarter of the aggregate decline in US manufacturing employment. Furthermore, they added up the transfer benefits payments for unemployment, disability, retirement, and healthcare associated with these labour lay-offs and concluded that these transfers amount to one to two-thirds of the US gains from trade with China. This calculation of course is short-term static analysis; from a long term and dynamic perspective, eventual re-absorption of workers into the labour force, combined with the productivity effects of trade, would likely leave the United States far better-off, even if the short-term adjustment costs were high due to dislocation.

Overall, the magnitude of the adjustment costs will depend, among other things, on the degree of market rigidities in the economy, such as labour market inflexibilities or inefficient capital markets, preventing smooth reallocation of resources. Capital and financial markets are important because the shift in relative prices opens up new investment opportunities, and if financial markets can supply investment funds to investors in the new internationally competitive sectors, it will create jobs at a faster rate. Dix-Carneiro (2011) found that ability of capital to move quickly was one of the key determinants of adjustments costs and speed of adjustment. By the same token, onerous labour employment protection regulation can hamper labour mobility also prolonging the adjustment period (Jansen and Lee, 2007). The easier the ability of factors of production to move smoothly across the economy, the smaller adjustment costs are observed (e.g. Davidson and Matusz, 2000). But beyond this, labor market adjustment is at best "sluggish", and the argument for public interventions to aid workers is compelling (see Coşar, 2011).

Institutions play a vital role in determining not only the speed, but also the channel of adjustment. In some cases competitive pressures can lead to reduced employment in the short-run (quantity effect), in others it will be wages that adapt (price effect). Hoekman and Winters (2007), among others, discussed the importance of labour market institutions in determining varying labour market outcomes following trade reforms. Chang *et al.* (2009) finds that characteristics of labour market institutions are key determinants of whether a country is able to reap the benefits from trade reforms. In particular, excessively stringent employment protection and hiring practices hamper growth potential by restricting the movement of resources to the most productive sectors of the economy. Gamberoni *et al.* (2010) in a more recent paper further explored the impact of both trade openness and labour market institutions on employment dynamics during economic crises. They found that high severance pay dampened the employment effects of crisis regardless of their cause, while generous unemployment benefits

were associated with stronger reductions in employment growth.[50] Francois *et al.* (2011) also suggested that severance pay and dismissal notification requirements can be a means of protecting workers from short-term labour demand volatility. Mitra and Ranjan (2011) highlighted the benefits of public work programs in the context of external shocks and in countries that do not have social protection systems in place.

As explained in Chapter 11 by Douglas H. Brooks and Eugenia C. Go, analysing the employment situation and labour market policies in Asia and the Pacific, there is a certain trade-off between the stabilising effect of employment protection legislation and the opportunity cost of allowing reallocation to maximise growth potential. A review of employment evolution and available policy tools in this dynamically growing region is instructive, not only because it identifies significant variation in the region usually praised for its flexibility, but also highlights some of the inherent difficulties in designing effective labour market policies in developing countries. For example, average severance pay of fifteen salary weeks is seen by the authors as a factor meaningfully driving upwards labour costs in the region. While recognising usefulness of severance pay, given low coverage of unemployment insurance in the region, they point to a high risk of firms' moving to the informal sector, which remains very large (67% of employment in 2008). Overall, they conclude that while serving an important role in shielding workers from adverse shorter-term conditions, these measures are hardly a panacea for managing changes in the structure of demand for labour, with which the region as well as emerging economies elsewhere are grappling.

In general, in developing countries, the adjustment tends to occur through changes in relative wages, rather than inter-sectoral shift of employment (e.g. Goldberg and Pavcik, 2004). This may be indicative of market rigidities, particularly relevant to developing countries in the short run (Goldberg and Pavcnik, 2003 and 2004). In the case of high-income countries, we observe a wider heterogeneity in terms of labour outcomes, depending on, often quite complex, institutional set-ups. For example, the 2008 crisis had rather muted effects on total employment in Germany, unlike in most other EU economies. As an ICITE study points out, this could be partly attributed to relatively low real wage growth compared to changes in productivity as well as newer policy reforms that allowed firms to flexibly decrease working hours of their employees (Görg and Görlich, 2011, included as Chapter 6 in this book).[51] Another ICITE study, comparing the labour outcomes following recessionary shocks in Denmark and Spain concludes that it is the Danish "flexicurity" model – combining relatively generous unemployment benefits and weak employment protection – that allowed a more flexible adjustment to recessionary shocks.

The often neglected aspect of managing adjustment is the need for spurring competition in the services sector to minimise the overall costs of adjustment to trade liberalisation. Such services as transport, energy or telecommunications are key inputs into production process of firms and, thus, ensuring their competitiveness may reduce costs, enhance quality and increase variety of inputs used by firms, facilitating the adjustment (Hoekman and Javorcik, 2004). For example, a CGE stimulation in Konan and Maskus (2006) showed that in the case of Tunisia removing commodity tariffs without services liberalisation would lead to a much greater

50. The effect seems, nevertheless to be non-linear and driven mainly by countries in the highest 20th percentile of unemployment benefits (Gamberoni *et al.*, 2010).

51. Short-time work schemes, additionally subsidised by the government, have also played a role, while some firms hoarded qualified workers due to experienced, and expected, skill shortages (Möller, 2010). Also, while overall effects were muted, workers on temporary contracts did experience increased unemployment (Görg and Görlich, 2011).

movement of labour than would be required, if a set of reforms lowering operating costs and reducing barriers to entry in services sectors were also implemented.

Box 1.7. Effects of trade liberalisation on workers

The effects of a trade reform – that is, tariff liberalisation, dismantling of quotas and non-tariff barriers, and reducing other border barriers – on employment and wages is distinct from the natural evolution of trade-driven changes associated with technological change, business innovation and shifting consumer preferences. Often trade liberalisation involves a more immediate shift in relative prices, it involves identifiable winners and losers, and it involves a political process (e.g. VanGrasstek, 2011 or Rodrik, 2012).

Trade liberalisation typically induces an expansion of export-related sectors as firms have access to the cheapest inputs at international prices and terms of trade shift in their favour. At the same time, liberalisation induces contraction of import-competing sectors. In Chile, for example, Edwards and Edwards (1996) found a positive association between the degree of liberalisation a sector experienced and the extent of subsequent layoffs; the sectors experiencing the greatest liberalisation were also the ones where unemployment was of the longest duration. Similarly, Muendler (2010) also found that import-competing industries in Brazil after its major reform in the early 1990s tended to shrink.

So what happens to workers who are displaced? Muendler (2010) in his study of Brazil was able to trace the consequences for labour displaced by the reform-induced rapid shift in relative prices. Trade-exposed industries shrank their workforces by dismissing less-schooled workers more frequently than more-schooled workers. Most displaced workers migrated to the non-tradable sectors or left recorded employment altogether. But neither industries with comparative advantage nor exporters absorbed all of the trade-displaced workers. (Comparative-advantage industries and exporting industries do not necessarily have to be the same and Muendler treats both groups seperately.) To the contrary, comparative-advantage industries and exporters hired fewer workers than the average employer, and labour reallocation to the dynamic sectors appeared to remain incomplete for years.

Increases in labour productivity at a relatively fast pace among exporters and in comparative advantage industries explain these patterns. Indeed, competition in those activities drove employers to raise productivity, and they did so faster than non-exporters and firms in disadvantage industries. Muendler (2010) argued this is because firms expected exporting activity to increase the return to innovation, but presumably lower costs through access to cheaper and higher quality inputs as well as higher expected returns to all firm-level assets also played a role. This accelerated shifting of product market shares to more productive firms, but since product market-shares grow less than proportional with productivity, trade-induced productivity growth may lead to labour savings.

This asymmetry in the expansion path of the export sectors and the contraction of import-competing sectors often entails unemployment – much as technologically advanced activities progressively outshine older technologies. Indeed, Dutt *et al.* (2009) find that trade liberalisation may increase unemployment in the short run, reversing this effect in the longer run and driving unemployment level to a new lower steady state. It is part of the adjustment costs that an open, fast-growing economy cannot escape – but which can be mitigated through public policy.

Nonetheless, it is people, not industries, that experience job and income losses. These costs can be high for dislocated workers and their families. For example, one study found that the average loss in lifetime income for dislocated workers was roughly USD 80 000 (Jacobson *et al.*, 1993). Kletzer (2001) estimated that the average trade-related dislocated worker takes roughly a 13% wage reduction in his or her new job. The implication is that even if aggregate adjustment costs are small, the personal costs to individual workers may be high. These findings underscore the need for programs for dislocated workers.[52] Since the source of dislocation – technology, trade, or the business cycle – is usually difficult to identify, it make sense to design

52. For example, Bailey, Burtless, Litan and Shapiro (1998); Kletzer and Litan (2001).

programs that are applicable to all unemployed workers, irrespective of the cause of dislocation.[53]

1.7. Summing up: Ten generalisations about trade and employment

Despite the complexity and volume of writings about the relation of trade to employment, incomes and wages, the previous discussion might be distilled into nine generalisations, if at risk of sacrificing nuance. To be sure, "generalisations" imply "exceptions", and indeed in many country circumstances and historical episodes, they undoubtedly will not hold for idiosyncratic reasons. Cross-country regressions have the great virtue of allowing analysts to establish general relationships; but they have the inconvenience of masking the frequently wide variations of country experiences that fall above or below the line. So it is with these generalisations. That said, these may serve to summarise what we know about trade and employment. These include:

- Trade can play a powerful role in contributing to rising incomes and creating jobs. To be effective trade reforms have to be embedded in supportive policies. Countries where trade openness has failed to provide a growth stimulus commonly have unstable macroeconomic policies, inadequate property rights, a dearth of public investment in overcoming supply-side constraints, or other socio-political constraints.
- A main channel through which trade increases income is productivity growth. Importing creates competition that forces domestic firms to become more efficient and provides access to inputs of international calibre; exporting creates incentives for firms to invest in the most modern technologies, scales of production and worker training. The combined effect is to spawn a process of continual resource reallocation, shifting capital and labour into activities with higher productivity.
- Those firms that ride the wave of continuing transition toward higher productivity in tradable activities typically pay higher wages to their workers, and these workers tend to have greater skills and be in less routine occupations; but low-skilled workers and workers undertaking routine jobs are less able to make these transitions, and often fall into unemployment or may be compelled to accept work in lower paying jobs.
- In responding to shifts of relative prices in favour of tradable – whether these emanate from exchange rate movements, discontinuous technological change, trade liberalisation, or sudden shifts in global demand – employment gains in exporting sectors often lag or do not fully compensate for employment losses in import-competing sectors, sometimes ushering periods of higher unemployment; policies that support flexible movement of capital and labour into the new sectors can minimise these costs.
- Offshoring and production-sharing arrangements have created new opportunities for raising productivity through specialisation, providing the basis for the contention that these activities

53. The literature on the subject does not seem to point to any strong differences that could legitimise differentiation of worker support programs depending on the source of dislocation. For example, Kletzer (2001) finds for the United States and the OECD (2005) for 14 EU countries that the share of re-employed workers after two years is only slightly lower in sectors with high import competition. Comparisons of dismissed workers characteristics in these studies also suggest that, on average, the groups appear quite similar in terms of education and work experience, though the trade-related unemployed are slightly older, have more tenure and slightly higher earnings related to the lost job. Given the practical difficulty of identifying the exact source of dislocation when implementing an income and employment support program, trade-specific labour market policies have been viewed skeptically by international organisations, such as the OECD, ILO and WB.

are more often complements than they are substitutes for jobs in high-income countries, though some offshored activities have placed downward pressure on selected import-competing occupations in high-income countries.

- Trade in services, including trade through FDI in services (mode 3) and services trade across borders (mode 1) through outsourcing or offshoring, has had positive effects on job creation and wages in developing countries – and seemingly had only minor effects in labour markets of high-income countries.
- There is virtually no evidence that trade (as distinct from the other forces of globalisation) has played a major and/or systematic role across countries in increasing household income inequality (as distinct from the much narrower concept of wage inequality) in either high income or in developing countries. Where income inequalities have increased, analysis outside of the trade literature points to fiscal policies, the business cycle, financial deregulation, skill-biased technical change, and long-term regressive deficiencies in educational systems as being the primary culprits. An exception to this may be discoveries of natural resources that create sudden new wealth captured by elites.
- That said, recent studies of wages in heterogeneous firms point to several channels through which trade may exacerbate wage inequality, though this literature is in its infancy and pertains only to the formal wage segment of the labour market. Trade is undoubtedly part of the process of technical diffusion and integral to foreign direct investment, and may be a bundled purveyor of skill-intensive technology that increases skill premium among wage workers. What seems clear is that trade does not play the wage-equalising role within developing countries envisaged in elementary trade theory.
- Trade does not systematically undermine working conditions in developing countries – whether measured by job quality, safety, child or female labour – and indeed there is some evidence that trade contributes to *better* working conditions, either directly through FDI and labour standards, or indirectly through growth effects. However, the several anecdotal cases of abusive working conditions arising in the press underscore the need for policy to take enforcement of labour standards seriously in both tradable and non-tradable sectors. In some industries in advanced countries, trade may be putting pressure on labour standards, pressure arising ironically not from imports from developing countries but from other high-income countries.
- Trade-led growth, much like growth emanating from technological progress, requires reallocation of resources, and because expanding sectors may not have the same skill requirements as contracting sectors, the process is often uneven, with some workers benefiting through higher wages and some workers left behind. Even though most studies indicate these adjustment costs are relatively small from the vantage of the whole society over time, the human cost to some individuals and families can be severe. Evidence on trade-related volatility seem to indicate risks to workers' incomes may in fact be on the rise with integration. Moreover, to the extent that the pace of integration and technical changes is accelerating, these costs may be expected to be greater in the future. For these reasons, they deserve the attention of policy makers.

1.8. Policies to realise the promise of trade for inclusive growth

Policies matter.[54] Good policies can attenuate adjustment costs, lay the foundation for harnessing trade to growth, and result in nations working together to reduce barriers and expand trade. We conclude with suggested areas where further research could illuminate policy.

Managing adjustment effectively can reduce costs of dislocation

Protect workers, not jobs

Each of the potential problems associated with trade reviewed above – ranging from informality to child labour and income inequality – share one commonality: using trade policies as a remedy is invariably counterproductive. Much as it is counterproductive to slow the pace of technological progress, so too is it counterproductive to raise barriers to trade in an attempt to preserve jobs. Raising trade barriers is usually anti-poor. Moreover, it is typically not the most powerful instrument to deal with the problem at hand. For example, if market imperfections render adjustment to globalisation costly for firms, protectionist measures only sustain or exacerbate the sub-optimal status quo by reducing the incentives for firms to adapt or even creating perverse incentives not to adjust (Leidy and Hoekman, 1991; Bown and McCulloch, 2004). Instead policies that are responsible for sluggish adjustment or for a cyclical downturn, such as labour market rigidities, shallow capital markets, or excessively de-regulated financial markets, should be addressed to facilitate adaptation.[55]

The trade literature has focused – perhaps disproportionately – on managing adjustment to trade liberalisation. But as noted above, border protection has come down to historic lows, and the main policy challenges are associated with managing adjustment to abrupt changes in relative prices associated with technological change, business innovations, and macroeconomic shocks – and indeed the normal processes associated with competitive pressures to continually reallocate resources to higher levels of productivity.

Policies can help protect workers, if not particular jobs. Establishing market structures that smooth and quicken adjustment has assumed a new importance with deepening trade integration and new forms of trade. The best adjustment program is growth itself. Rapid growth creates a greater flow of job opportunities. In addition, adjustment is best undertaken in situations of flexible labour markets to allow fast adaptability. Finally, robust social safety systems are crucial to protect those affected directly by the adjustment (ILO and WTO, 2007; OECD, 2006; OECD *et al.*, 2011). The recent Bachelet Report (Bachelet, 2011) illustrates that there is by now a wealth of experience with the design and the funding of social protection systems in low and middle income countries. Programs tend to differ across countries in their components, in their scale and in beneficiary selection. Their funding mechanisms will also differ. Examples exist of countries funding social protection through mineral based taxation, social contributions, increases in general taxation or through Official Development Assistance.

54. This was the message of an important article by Hoekman and Mattoo (2010).

55. For these reasons, at the onset of the Great Recession and remembering the counterproductive surge in protectionism during the Great Depression, the G-20 leaders on multiple occasions beginning in 2008, heeding the admonitions of the joint efforts of ILO, OECD, World Bank and WTO, pledged to resist protectionist responses to the Great Recession and other adjustment related problems. Among the joint efforts of these multilateral institutions, see the Report to the G20 in Seoul in 2010 "Seizing the benefits of trade", available at: *www.oecd.org/dataoecd/61/57/46353240.pdf*

For high-income countries, long-term OECD studies such as the Jobs Strategy (OECD, 2006) highlight the role of employment flexibility in enabling firms to adapt to changing economic conditions and the role of wage flexibility in ensuring that markets are able to transmit clear signals to workers and firms. Significant variation nevertheless persists in the level of employment protection among OECD economies. While protection from arbitrary actions and provision of some stability in employment is desirable on social and efficiency grounds, onerous employment protection provisions can raise the labour costs and reduce job creation as well as drive up adjustment costs by preventing firms from quickly reallocating resources (OECD, 2010; OECD *et al.*, 2010). For example, Chapter 3 in this volume (Thompson *et al.*, 2012) shows that even in the case of a deep structural change caused by a drastic change in terms of trade of a country, adjustment can be attenuated when labour mobility is high. Overall, protecting workers through programs of income maintenance and wage subsidies for reemployment is more effective than protecting jobs made obsolete by technology or trade.

Easing restrictions on temporary employment may increase overall flexibility, but at the cost of disproportionally exposing workers on temporary contracts to business-cycle fluctuations. This was evident in the Great Recessions when temporary workers bore the brunt of most job losses in Germany and some other OECD countries (OECD, 2010; Görg and Görlich, 2011; Arnal, 2011). Introduction of flexibility on the margin while avoiding a change in the overall employment rigidities may exacerbate dualism in the labour market (e.g. OECD *et al.*, 2010; OECD, 2011c; OECD, 2012).

In developing countries, where informality is the norm and where the rate of job creation is much faster than in high income countries, it may be preferable to focus on enforcing core labour standards, and designing tax regimes to facilitate the formalising of employment. Designing appropriately dimensioned severance pay packages that provide some protection but are not so large as to discourage employment is one key element. Public work programs appropriately designed can also at times be beneficial (Mitra and Ranjan, 2011); for example, Chile after the devastating collapse in 1981-82 put in place a program for heads of households that lasted through 1988 and offers an example of an effective emergency program.

An argument against resorting to increases in protection should not be read to infer that immediate liberalising reforms are desirable in all circumstances. In situations of financial or macroeconomic turbulence or political unrest, abrupt reductions in border protections are merely likely to increase unemployment and undermine the long-term political support for reforms. Trade reforms undertaken when currencies are overvalued are likely to be ineffective. Some degree of political and macroeconomic stability, especially with a competitive real exchange rate, are crucial to the success of trade liberalisation; these ensure that resources – labour and capital – will move into export sectors in response to new trade liberalisation. Similarly, synergies can arise, for example, with financial sector reforms that encourage market-based allocation of credit with the private sector; this is necessary to ensure that new investment will flow into the dynamic internationally competitive activities post reform. Finally, selective public investments – in roads, a port or telecommunications – may also be necessary to ensure that new post-liberalisation price signals elicit an export response that is not otherwise blocked because of inadequate trading infrastructure. In most countries, reductions in border protection have historically been undertaken progressively and purposefully over a fairly long but sustained period. This has the advantage of allowing reforms in multiple policy arenas to move forward together and to develop a political economy, in which exporters' interests grow along with reforms to eventually supersede interests in the protected sectors (see Hoekman and Olarreaga, 2007).

Cushioning income losses…

As OECD *et al.* (2010) notes adequate employment protection legislation works best when accompanied by effective labour market programs to cushion the costs for workers affected by labour mobility and facilitate their quick reintegration into the labour market. These include robust safety nets – mostly in the form of unemployment insurance – as well as other income-support measures that compensate partially for income losses of affected workers and provide incentives to return to work.

In the case of high-income countries, unemployment benefits provide social insurance against the loss of earnings to unemployment. They are, however, unlikely to compensate fully for the total individual income loss incurred by the workers. Moreover, trade-displaced workers may earn significantly less in the jobs they find following unemployment (e.g. Kletzer, 2004; Ebenstein *et al.*, 2009). Wage insurance programmes (Kletzer, 2001) together with one-off compensation programs (World Bank, 2007) can be used as supplementary tools, providing an earnings subsidy to displaced workers to compensate for incurred losses and appease calls for protectionism. Such a wage insurance mechanism has been included, for example, in the United States Trade Adjustment Assistance. While it remains a controversy whether trade displaced workers should receive income support different from other types of displaced workers (OECD, 2005; ILO and WTO, 2007) in the case of large-scale lay-offs in local labour markets targeted policy packages may be required to cushion adjustment and make change palatable (OECD, 2005).

These policies are not cheap. As we have seen in the Autor *et al.* (2011) study, the burdens of unemployment benefits in particular localities can be substantial. In times of austerity such as today, mobilising political support for these programs is not easy – but this is precisely when they are most needed because austerity usually comes at a time of high unemployment.[56]

In the case of developing countries, affiliation to social security among the poorest remains low as does the levels of benefits provided, which limits the degree to which such programmes offer protection to workers. Moreover, weak administrative capacity and widespread informal employment create unique trade-offs between the objectives of social and employment policies in developing countries that are different from those in high-income countries (OECD 2011c; Hoekman and Winters, 2007).[57] For example, a worker may have both a formal and informal job, which makes it difficult to establish his true employment or income status. This, in turn, complicates the design of policy that would truly target the most vulnerable and encourage formal employment.

For these reasons, in developing countries, social assistance benefits, such as cash transfers that do not require social security contributions for eligibility, tend to be more efficient and easily administered than social insurance mechanisms (OECD, 2011c; World Bank, 2007). Cash transfers cushion the impact of shocks in particular for the poorest segment of the population, while the implicit tax on working is found to be lower than in the case of unemployment benefits in the context of a large shadow economy (OECD, 2011c).[58] In South Africa, workers

56. There is even an argument for raising taxes to pay for these measures; to the extent that the tax incidence is progressive and payments to support labor transition go disproportionately to low income groups with a higher marginal propensity to consume, the net effect can be expansionary, if only minimally so.

57. For an in-depth explanation and comparison see Chapter 2 in OECD (2011c).

58. These recommendations are in line with the UN's Social Protection Floor initiative which seeks to promote access to at least minimum levels of social protection for all and are described in detail in the most recent *OECD Employment Outlook* (OECD, 2011c).

receiving social cash transfers put more effort into finding work than those in comparable households not receiving grants and they are more successful in finding employment (Samson *et al.*, 2004; Samson and Williams, 2007; Williams, 2007). Evidence from Brazil, on the other hand, suggests that providing income support to job losers in the form of unemployment benefits or severance pay reduces the incentives to find employment, particularly for those facing tight liquidity constraints (OECD, 2011c). As a complement to the social assistance benefits for those with insufficient savings, mandatory self-insurance based on individual savings accounts is also recommended (OECD 2011c; World Bank 2007). Self-insurance for those who can afford it encourages re-employment while freeing up the resources needed for those with insufficient needs. The Chilean unemployment insurance system of individual unemployment savings accounts (*Régimen de Seguro de Cesantía*) in combination with a Solidarity Fund (*Fondo de Cesantía Solidario*) provides an example of this type of arrangement.

…and facilitating transitions to new jobs

Complementary to various income-support programs, active labour market policies (ALMPs) may enhance the ability of the dislocated workers to reintegrate quickly into the labour force and, thus, help minimise the costs of adjustment (OECD, 2005). ALMPs comprise job brokering with the purpose of speeding the matching between vacancies and job seekers; retraining and skills upgrading of job seekers; and direct job creation, either public-sector employment, subsidisation of private-sector work or self-employment assistance.

While OECD countries employ a large variety of ALMPs, evidence suggests that they work best when fully integrated with income-support schemes and when tailored carefully to different needs of the jobseekers (OECD, 2005). Recent studies suggest that increases in spending on employment incentives as well as on training, increase employment in the short term – particularly training for women (Bouis *et al.*, 2012). Given the prolongation of the spells of unemployment in the developed countries in the aftermath of the Great Recession and the simultaneous tightening of government's fiscal capacity, the use of active labour market policies to boost short-term job creation is likely to play an important role and thus should be spared from budget consolidation efforts (OECD, 2012).

While many developing countries use ALMPs,[59] the scale of interventions and the resources devoted to them are more limited usually because of fiscal constraints (ILO and WTO 2007; Betcherman *et al.*, 2004). Empirical evidence suggests that while some of these interventions when properly designed can be effective for certain workers, policy makers must be cautious regarding what such training programs can realistically achieve and broad-based education reform should take priority (Martin and Grubb, 2001; Auer *et al.*, 2005; Kluve, 2006).

Laying stronger foundations for trade can promote growth and employment

Improving the investment and business climate

Ensuring an appropriate business climate is an important part of the mix in using trade opportunities to create jobs. Establishing a sound macroeconomic environment, progressively removing bureaucratic obstacles to doing business, and establishing the legal basis for property rights remain a priority. Reducing the burden of doing business in the formal sector is particularly important to reduce informality, which is pervasive in many emerging economies and can hamper the supply response to trade reform (Sinha, 2011).

59. See Sanchez Puerta (2010) for an overview of studies examining the effects of ALMPs in developing countries.

In the case of high-income economies, where a sound framework for doing business is already in place, further improvements in product market regulation and competition policies can allow quicker adjustments through their impact on exit and entry strategies of firms (see OECD, 2012). Also, improving competitiveness of the services sectors, especially in the so-called "backbone services" (transport, energy, communications) can facilitate adjustment as competitive services sectors allow easier exit of firms in declining industries by lowering costs, increasing quality and variety of services, and creating new opportunities for workers and entrepreneurs (Hoekman and Javorcik, 2004).

One element of the business environment that has been too often neglected in the trade literature is competition policy. In a world in which multinational companies operate in multiple national jurisdictions and multiple markets, restrictive business practices such as vertical restraints on trade and horizontal price fixing arrangements by introducing private restraints on trade are a threat to economic performance (see Hoekman and Winters, 2007). Evenett (2000) has shown how these can adversely affect price efficiency that trade competition would otherwise bring. Competition authorities in high-income countries and in developing countries have to work vigilantly to maintain markets open.

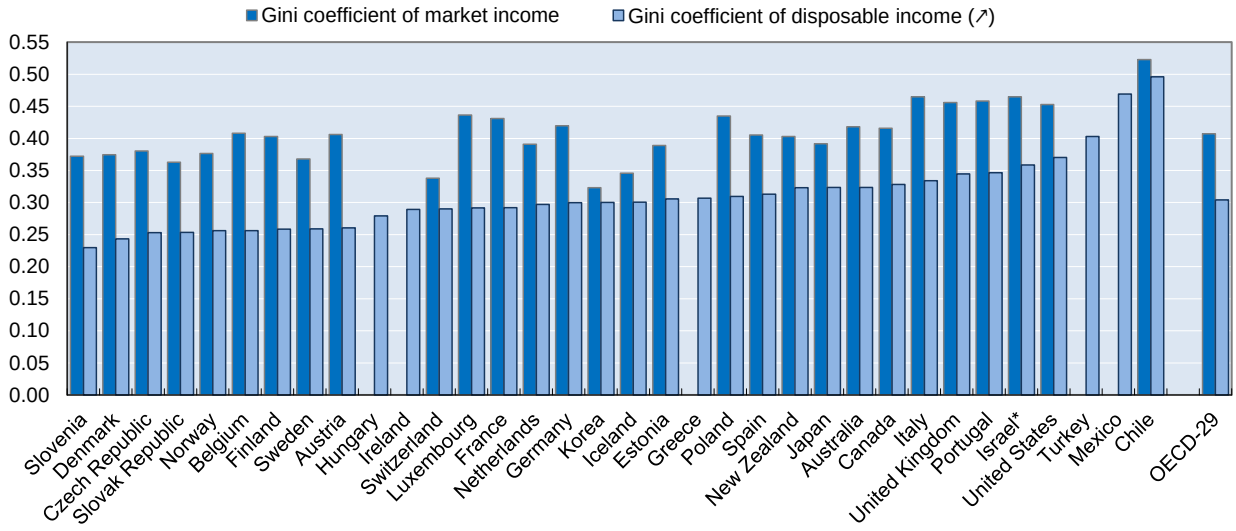
Using fiscal policies to offset income inequality

Recent trends towards greater income inequality may require a policy response. In high-income countries, the combination of skill-biased technological change together with changes in the tax code and executive compensation explain in large measure increasing inequality. In some countries, these characteristics may interact with the forces of globalisation – including capital flows, trade flows, and immigration – to aggravate inequality. In developing countries, the structure of asset ownership (particularly land) and natural resource endowments interact with skill-biased technological change to explain income distribution. While there is some evidence of convergence within the OECD toward some distributional norm, as the most unequal countries seem to be experiencing a trend toward greater equality and vice versa (OECD, 2011a), it is not obvious that market-driven outcomes will produce more equal societies over time.

Even the most unequal societies, such as Chile and the United States, use progressive tax policy and fiscal transfers to offset unequal market outcomes, if perhaps less than other OECD countries (Figure 1.11). But few OECD countries do as much as the Nordic and Northern European countries. Muting the forces of inequality is not only a function of taxation and income transfers. The distributional consequences of public expenditures can be more important (see World Bank, 2006). Some expenditure policies, properly structured, can make a large contribution toward lowering inequality at the same time as they position countries to grow more rapidly. This is particularly true for progressive subsidies to education and public investment in infrastructure.

Figure 1.11. Market incomes are distributed much more unequally than net incomes

Inequality (Gini coefficient) of market income and disposable (net) income in the OECD area, working-age persons, late 2000s



Note: Late 2000s refers to a year between 2006 and 2009. The OECD average excludes Greece, Hungary, Ireland, Mexico and Turkey (no information on market income available). Working age is defined as 18-65 years old. Countries are ranked in increasing order of disposable income inequality.

Source: OECD (2011a).

Education to up-grade the skill level of the workforce

High-quality education and training is one of the most consistently highlighted prerequisites to reap the benefits of trade opening. High-level of education permits adaptation to new technologies and thus is necessary for technological absorption and innovation (OECD *et al*., 2010; OECD, 2009a). A well-educated workforce is also more able to move from job to job, as skilled workers tend to be more mobile and adapt to changes more quickly (Hoekman and Javorcik, 2004). Also, investment in skills of a broad base of a population is likely to reduce the skill premium, thus, allowing a more equitable distribution of the gains from trade (Jansen, *et al*., 2011). Finally, skills and education have been found to be important in allowing export diversification at the extensive margin following trade liberalisation (Cadot *et al.*, 2011) and better educated populations are more likely to understand and support the trade liberalisation agenda.

While primary school enrolment has improved significantly among developing countries over the past two decades, many individuals still do not have access to any form of formal education in least developed countries (LDCs). Given the importance of early childhood education for lifelong learning capacity (Wossman and Schultz, 2011), increasing access in line with the Millennium Development Goals remains a priority. An example of Brazil shows that policies establishing minimum spending requirements per student or provisions of funds directly to households conditional on a child's school attendance (e.g. *Bolsa Familia*) have proven successful in raising the enrolment rates substantially (de Melo and Hoppe, 2005). More public funding, provided either through public educational institutions or conditional cash transfers to households, may be required, in addition to other support programs (World Bank, 2007; World Bank, 2006).

High-income countries also have educational weaknesses. On average for the OECD area, one in four workers is over-qualified (they possess higher qualifications than those required by their job) and just over one in four are under-qualified (they possess lower qualifications than those required by their job) (OECD, 2011c). What employers seek is skills, not qualifications. Encouraging introduction of industry-specific training and high-quality career guidance counselling might help allow a better matching of potential workers with jobs. Simultaneously, given the potential increase in outsourcing of services and volatility of employment in the future, improved opportunities for rapid retraining, skills upgrading and lifelong learning also emerge as a priority and will have to become an integral part of active labour market policies discussed later.

Facilitating connectivity through investing in infrastructure

Connectivity of the poor to markets is an ever more essential element to ensuring they can participate in growth.[60] Access to the internet, telecommunications, roads and ports, and air transport are the vital elements to absorbing technology and using trade to power growth. One of the most pervasive binding constraints in developing countries to trade growth and increases in national incomes is the quality of infrastructure. Several studies have made the link between investments in infrastructure and increasing capacity to trade. For example, Limao and Venables (2001) studied the relationship between roads and telecommunications and shipping costs, and then the relations between shipping costs and trade volumes; they found that an improvement in transport and communication infrastructure from the median score on surveys to the highest 25th percentile is associated with a decrease in transport costs by 12% - and this in turn is associated with an increase in trade volumes of 28%.[61] Adequate infrastructure is thus a necessary link allowing countries to participate in global value chains and exchange goods, services and ideas across borders. While upgrading the obsolete infrastructure is of policy concern to high–income countries too, lack of basic infrastructure is a key barrier to trade in developing countries, in particular LDCs. For example, in Africa the costs of trading regionally appear to be as high as trading globally because of poor transportation infrastructure and inefficient border procedures, even between neighbouring countries (von Uexkull, 2012).

Von Uexkull (2012) included as Chapter 14 explores this issue using data from the World Bank Enterprise Survey to analyse exporter characteristics in 15 Western African countries belonging to the Economic Community of West African States (ECOWAS). The author finds that, contrary to theoretical predictions, regional and global exporters resemble each other in terms of average size, productivity level and average pay, which points both to the employment potential of regional trade as well as to the existence of high barriers to exporting within the region. The following Chapter 15 by UNCTAD complements these results by looking at regional trade patterns among 15 Southern African economies using a gravity model (Peters and Mashayekhi, 2012). The authors find no evidence that reduction of trade barriers within the region has boosted intra-regional trade, suggesting that there are other important bottlenecks preventing the flow of goods and services across borders. These results illustrate the importance of a combination of good transport connectivity, favourable business climate and trade-facilitation measures in allowing countries to actively engage in international trade.

60. Paul Collier emphasised this point in his lecture on development in Rwanda, 6 February 2012. See International Growth Centre website, Rwanda country program, for a summary of his lecture.

61. They take as an infrastructure indicator four components: the density of rail road per square km, the density of road and of paved road per square km and the number of telephone mainlines per capita. The indicator has been widely used by other researchers to proxy for the quality of infrastructure cost and, thus, the cost of transport and communication (See Carrère, 2006).

Nations working together can enhance the benefits of trade

With the increasing potential for trade to power growth and the rising importance of complex new trade issues, multilateral and regional discussions on border barriers, services, and rules are as important as national policies to creating – and preserving – greater opportunities for trade. While national labour market policies and the domestic policy environment are crucial for delivering results for local labour markets, collective action is needed to allow countries reap the benefits of globalisation that otherwise would have been outside of their reach. This includes strengthening the global multilateral trading system, further regional cooperation and development assistance.

As highlighted in the OECD *et al.* (2010) report to G20, there is scope for a more active and ambitious trade liberalisation agenda to deliver better results for growth and jobs globally. An extensive empirical literature documents the potential gains from a Doha agreement and new analysis by the World Bank concludes that once the dispersion in protection across products is taken into account the gains from further trade reforms are two times higher for developing countries and 50% higher for high-income economies than previous estimates (Laborde *et al.*, 2010). Apart from the benefits from increased market access, a Doha deal would also lock in trade reforms and thus increase business confidence, solidify the essential role of the rule-based, multilateral trading system, and deliver new economic opportunities (OECD *et al.*, 2010). Despite the political deadlock, these benefits have to be clearly kept in mind.

Regional trade agreements and regional cooperation can complement multilateral cooperation in generating an environment more conducive to job creation. Pooling resources regionally can allow emerging economies to fund infrastructure projects and improve connectivity required for trade (e.g. Mekong Initiative). Regional agreements also allow a more targeted and far-reaching liberalisation, including specific provisions on services liberalisation (e.g. Trans-Pacific Partnership) and labour standards (e.g. 1999 United States-Cambodia Trade Agreement).

Finally, the scope for development assistance in the form of aid for trade is large. Given the fiscal limitations of many low-income countries and their large needs in terms of increased spending on education, infrastructure, improving productive and institutional capacity and adjustment assistance, the WTO-led Aid for Trade initiative is another form of international cooperation that can stimulate trade. It aims at capacity building and dismantling supply-side bottlenecks so as to allow countries to participate and benefit more from trade. This aid is already achieving results, but more could be done (see OECD/WTO, 2011, for the overview of the results to date).

Addressing what we don't know: the need for further research

Despite the voluminous research that supports these robust generalisations and policy options, additional research in three areas could produce insights useful for policy purposes.

First, it would useful to understand better the *globalisation and productivity* links. Are the job turnover rates accelerating for both trade and non-trade reasons in many countries around the world; if one posits an acceleration of technological change, increased factor mobility, and increased globalisation (finance, trade, movement of people, and technological diffusion), it may well be that over time, turnover rates in labour markets increase- and with them frictional unemployment rates. This, however, may not be the case; for example, Faberman (2008) and Davis *et al.* (2007 and 2010) document a decline in business-level job variability measures for the United States, roughly coinciding with a decline in the magnitude of unemployment flows in the country over the last three decades. While Haltiwanger (2011) suggests volatility elsewhere

may be on the rise, evidence is sparse. Further research might also facilitate a better understanding of second-order effects of trade that may be worker-specific, such as income risk as well as risks associated with investment in human capital, reflected in fluctuating returns to education, among other things (Lederman *et al.*, 2011). It would also be important to know more about trade-induced sectoral change and the McMillan-Rodrik (2011) puzzle; why is there net movement in some countries from higher-productivity to lower-productivity sectors, and is this really a drag on growth? It may be that workers leaving higher-productivity sectors are in fact leaving low-productivity jobs to accept higher-productivity jobs if in the lower-productivity sectors.

Second, firm-level research has opened up new questions about the role of *trade and inequality*; research needs to take this deeper to explore the links to household income inequality; the discussions in Harrison (2011) and Lederman (2012) have pointed to new avenues that might be explored. Another strand of research worth pursuing is the relation of trade to FDI and skill biased technological change as a collective determinant of income inequality (Pavcnik, 2011). Also, integrating trade and heterogeneous firm analyses with other variables not usually in the models of trade economists – such as financial variables, instruments to capture tax and spending incidence, and changes in regulatory policy – might help us decompose the forces driving inequality more accurately. These may lead to new evidence that contravenes our generalisations. Moreover, as noted in Hoekman and Porto (2010) there could be rather complex intra-household effects of trade liberalisation, depending on relative opportunities faced by different members of the same household following trade opening and some insights could be gained there as well, in particular in respect to demand for child and female labour.

Third, given the importance of *labour market institutions* in determining labour market outcomes, a deeper understanding of the causes of informality in interaction with incentives provided by formal market institutions in the case of developing countries is needed. Finally, contrary to work of economists in health and education, the trade economists have not made adequate use of *impact evaluation* in policy analysis, as pointed out by Cadot *et al.* (2011).

These are all areas where research might challenge or elaborate on the ten generalisations.

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In sum, this policy agenda is broad and ambitious. The good news is most countries already have charted a path towards its implementation, if in varying degrees and with different strategies. Moreover, these policies do not have to be undertaken at once or in the same fashion across countries. Incremental progress can lead to progressive expansion of trade opportunities. And in the long run, their enactment will help realise the potential for trade to contribute to rising standards of living for workers and everyone else.

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Annex 1.A1

Table 1.A1.1. Trade and growth: main econometric studies since 2000

Measures of trade openness	Number of countries	Time Period	Impact on growth	Source
I. Trade shares				
Trade share (within country regression)	~100	1980s-90s	Positive	Dollar and Kraay (2001)
Trade share in GDP	23 to 62	1913-90	Positive	Irwin and Tervis (2002)
Export share	>100	1970-97	Positive	Yanikkaya (2003)
Import penetration	>100	1970-97	Positive	Yanikkaya (2003)
Trade shares in GDP	>100	1970-97	Positive	Yanikkaya (2003)
Changes in trade share in GDP	~100	1980s-90s	Positive	Dollar and Kraay (2004)
Trade shares in GDP	~100	1961-2000	Positive	Lee, Ricci and Rigobon (2004)
Trade share in GDP	>100	2000	Positive (negative for heavily regulated economies)	Bolaky and Freund (2004)
Trade share in GDP	82	1960-2000	Positive if complementary reforms are undertaken	Chang *et al*. (2009)
Trade (geography instrument)	97	1985	Positive (1% increase in the trade share of GDP leads to about a 1% increase in income per capita)	Noguer and Siscart (2005)
Trade (bilateral trade instrument)	101-62	1960-1995	Positive (differences in trade growth explain ~17% of cross-country variation in income growth)	Feyrer (2009)
Trade openness (residual variation that is not due to GDP growth)	41 Sub-Saharan countries	1979-2009	Positive - trade openness causes economic growth (a 1 percentage point increase in trade openness leads to a ~0.5% short-term increase in growth per year and ~0.8% after ten years)	Brückner & Lederman (2012)
II. Indexes aggregating several measures of openness				
Sachs and Warner Index	111	1970-89	Positive	Wacziarg and Welch (2003)
Sachs and Warner Index	141	1990-98	Not significant	Wacziarg and Welch (2003)
III. Trade liberalisation				
Trade liberalisation	44 to 82	1975-2000	Positive (liberalising tariffs on imported capital and intermediate goods, did lead to faster GDP growth	Estedevordal and Taylor (2009)
Trade liberalisation (Panel; within country regression)	141 with further analysis on 24 developing countries	1950-98	Positive (countries that liberalised experienced on average 1.5 percentage point higher growth rates and 1.5-2.0 percentage points higher investment)	Wacziarg and Welch (2008)
Trade liberalisation (Panel; within country regression)	108 to 133	1950-98	Positive (liberalisation raises GDP growth &investment share)	Wacziarg and Welch (2003)
Trade liberalisation on export growth	22	Since mid-70s	Positive	Santos-Paulino and Thirlwal (2004)

Table 1.A1.2. Selected literature reviews on trade, growth, inequality and employment

Review	Topic	Number of studies
	Trade and growth	
Lederman (2011)	Trade and inclusive growth	~40
Hallaert (2006)	Trade, growth, productivity	~50
Cline (2004)	Trade and economic growth	>100
Winters (2004)	Trade liberalisation and growth	~50
Baldwin (2003)	Trade and economic growth	>30
Berg and Krueger (2003)	Trade and poverty reduction	>100
Srinivasan and Bhagwati (2001)	Trade openness, growth, welfare	>50
Rodriguez and Rodrik (2000)	Trade openness and economic growth	~100
Edwards (1998)	Trade, productivity and growth	~40
Edwards (1993)	Trade liberalisation & growth in developing countries	>100
	Trade, poverty and inequality	
Harrison *et al*. (2011)	Trade and inequality	~70
Pavcnik (2011)	Globalisation and inequality	~50
Goldberg and Pavcnik (2007, 2004)	Trade, poverty, inequality	>80
Dollar (2005)	Trade, poverty and inequality	~50
Milanovic (2005)	Trade and income distribution	>30
Cline (2004)	Trade and poverty reduction	>100
Winters *et al*. (2004)	Trade liberalisation and poverty	>200
Berg and Krueger (2003)	Trade and poverty reduction	>100
	Trade and employment	
OECD *et al*. (2011)	Trade, growth, employment	>100
Görg (2011b)	Trade, offshoring, employment	>60
ILO-WTO (2011)	Trade, employment, adjustment	>200
Porto and Hoekman (2010)	Trade & adjustment in developing countries	>200
Davidson and Matusz (2004, 2009)	Trade and adjustment costs	>200
Hoekman and Winters (2007)	Trade, trade policy and labour market	~100
Lee and Jansen (2007)	Trade, employment, inequality and the role of complementary policies	~200
Francois (2004)	Trade policy impact on production & employment	~40
Feenstra and Hanson (2004)	Trade, wages, inequality	~100
Greenaway and Nelson (2001)	Globalisation and labour markets	~90
Matusz and Tarr (1999)	Trade liberalisation and adjustment costs	>50

Chapter 2

Wage Implications of Trade Liberalisation: Evidence for Effective Policy Formation

Susan F. Stone and Ricardo H. Cavazos Cepeda

Organisation for Economic Co-operation and Development

The relationship between trade and wages has been subject to intense scrutiny in the academic literature with no clear consensus emerging. This chapter adds to this body of research by moving beyond the single country analysis level to a panel including developed and developing countries and data through the mid 2000's. First we examine the relationship between wages and trade using the approach of Feenstra and Hanson to calculate mandated wage changes for our dataset. We find that imports have a significant and positive impact on wages while the sign on tariffs is negative and significant. We also look at the relationship of wage differentials at the occupation level between partner countries. We find that the difference in occupation wage is smaller for large trade partners. Finally, we discuss the potential role of NTMs in influencing the wage and trade relationship

2.1. Introduction

Economists have long explained the relationship between wages and trade within the framework of the Stolper Samuelson (SS) theorem (Stolper and Samuelson, 1941). Within neoclassical trade theory (the Heckscher-Ohlin or HO), SS shows that in the case of two goods and two factors, a decline in the relative price of a product reduces both the relative and absolute earnings of the factor used relatively intensively in its production. Correspondingly when a country opens up to trade, its most abundant factor gains and its scarce factor loses. Hence, a capital-abundant developed country would experience a relative and absolute rise (fall) in the returns to the owners of capital (labour), whereas the opposite would result in the case of a labour abundant developing country.

The HO/SS framework is useful because it predicts patterns of trade among countries and distributional changes from that trade. In this framework, the product prices of traded goods drive factor prices throughout the economy. In small, price taking countries changes in relative factor supplies have no effect at all on factor prices and in larger countries, supply changes have an impact only to the extent they affect world prices of traded goods. Since SS assumes that skilled and unskilled labour are perfectly mobile, its predictions are extremely powerful because mobility implies the forces affecting wages of workers producing the goods that compete directly in international trade have similar effects on workers who produce non-traded goods and services in the rest of the economy. Hence the popularity of Freeman's (1995) article entitled "Are your wages set in Beijing?" which concludes that they are not.

The policy implications of the SS theorem are highly significant. It implies that expanded trade with developing countries, other things equal, could be associated with increased wage inequality in the more developed countries. This connection between trade and wages became a major focus of attention particularly in the 1990s, following rising exports from low-skill labour abundant countries coupled with rising wage inequality in importing developed countries. Much of the empirical research has focused on the United States and United Kingdom, two countries who experienced this phenomenon earliest and ostensibly to the largest extent. However, other economies, mostly OECD, experienced similar trends.

Early investigations found little evidence that the two trends were causal. The majority of the findings were based on one or a combination of three basic arguments. First, the volume of trade between the United States and developing countries at the time was seen to be too small to lead to the observed wage changes. Krugman (1995) observed that many countries' trade to GDP ratios were still below their pre-World War I levels. This fact was true for most developed economies, including the United Kingdom, France, Germany and Canada (Feenstra and Hanson, 2001). Second, the movement of prices, again at that time, was shown to contradict the movement of relative wages. Prices for many low-skill intensive goods actually rose in the 1980s (Leamer, 1998). Lawrence and Slaughter (1993) showed that industries with some of the most low-skill intensive production actually experienced the highest price increases between 1980 and 1990. Finally, it was reasoned that international trade should affect workers moving between, rather than within, industries as different industries expand or contract due to foreign opportunities or competition. Berman, Bound and Griliches (1994) in an oft-cited paper, presented evidence clearly showing that most changes in this period were within industries, which could not be explained by cheaper imports displacing domestic production. The conclusion coming out of this body of research was that other factors, such as the decline in union membership and technology, in the form of skilled-bias technological change, were the main source of the observed disparity in the growth of skilled and unskilled wages.

Among the first papers to reconsider this position, Feenstra and Hanson (2001) observed that global production sharing changed not only the nature of trade but also the way we should think about connecting trade with wages. They argued that volumes aren't as important as what is being traded. The share of processing trade and intermediate inputs for US manufacturing, for example, increased from 6.5% in 1972 to 11.6% in 1990 and are estimated to be over 40% in 2006 (Miroudot *et al.* 2010). This growth of trade within industrial segments discounts the "within versus between industry" argument discussed above. Production fragmentation is entirely consistent with the within industry effects dominating the results of Berman, Bound and Griliches (1994). In addition, the growth in intermediate input trade also impacts the way we look at the price data. As more intermediate goods are imported from lower price alternatives, we would expect prices within each industry to be rising relative to import prices. Feenstra and Hanson (2001) report that this was indeed the trend during the 1980s for the United States, as well as for Japan and Germany. Thus, they argue, the price changes observed were not in contradiction to trade impacts at all.

Subsequent studies have been critical of these earlier findings for a number of other reasons. Krugman (2008) provided an overview of the evidence and argued that most empirical studies were based on data in the decades before developing/developed world trade really took off. He notes that in 1990, China's exports as a percent of US GDP were 6.7% while by 2006 they had reached 20%, a growth of almost 200%. The surge in developing country manufactures involves a particular concentration in apparently sophisticated products, which seems to be inconsistent with a trade driven effect on wage inequality. Yet there is good reason to believe the apparent sophistication of developing country exports is largely a statistical illusion, created by vertical integration in a world of low cost trade (Krugman, 2008).

Another argument calling into question the findings of early empirical studies is that they were mis-specified due to endogeneity problems. For example, it is likely that US prices depend both on trade-related and domestic forces. This would imply the sector bias of price changes may convey no information about the wage effects of trade-related forces given the importance of domestic factors. Haskel and Slaughter (2003) looked to see if the endogeneity problem was the reason behind the inability of early studies to establish a strong trade effect on relative wages. They pointed out that during the 1970s and 1980s declines in trade barriers were concentrated in unskilled-intensive sectors which is consistent with the observed rise in the US skill premium, assuming the price effects of this liberalisation changed product prices uniformly across sectors. When they tested for this, however, they found that the rise in skill premium mandated by price changes induced by tariffs or transport costs was mostly insignificant, even after controlling for potential endogeneity. They noted other trade-related factors, such as non-tariff measures (NTMs) may be important in driving these results, and that the effect of trade barriers on technical change may be another influence.

The rising number of empirical studies that followed did little to resolve the debate. There were those who argued (e.g. Krugman 2000) that "factor bias" implicit in trade is important when determining wages, and those who argued (e.g. Leamer, 1998 and 2000) that it is the "sector bias" technical change that matters. The thrust of many studies (surveyed in Slaughter 1999) is that the skill premium tends to rise if price increases are concentrated in skill-intensive industries, that is, if price increases are sector biased towards skilled-intensive industries. Feenstra and Hanson (1999) estimated the relative influence of trade versus technology on wages in the United States, by focusing on whether foreign outsourcing of intermediate inputs was the primary source of wage declines in the United States. They found that technology (proxied by computers) had a larger impact on relative wages of non-production workers than outsourcing.

In their review of the empirical literature, Feenstra and Hanson (2001) conclude that existing studies have just begun to scratch the surface of how the globalisation of production changes industry structure and factor demand in both advanced and emerging economies. Anecdotal evidence suggests foreign outsourcing is an important mechanism through which countries integrated themselves into the world economy. Amiti and Davis (2008) find that the degree to which firms are engaged internationally matters to measure outcomes of trade impact on wages. They estimated that a 10% cut in tariffs on outputs decreased wages in firms oriented exclusively to the domestic market but increased exporting firm's wages. The same tariff reduction on inputs had no significant impact on the wages of firms that did not import, but raised the wages of those that did. Thus, integration into the global economy plays a role in determining wage effects, and this impact is differentiated across firms.

Our work will contribute to this body of evidence by expanding the level of analysis beyond the single-country framework. We will examine the extent to which there is evidence of a relationship, broadly using the SS framework, across a number of economies. We capture the effect of the economy's structural variables on prices and then use these estimates to determine the wage changes corresponding to capital and labour used in production. The methodology we employ provides a tractable way to combine the SS framework with multiple countries. Section 2.2 sets the stage for the investigation of the relationship between trade and wages. Section 2.3 briefly describes the methodology and data. Section 2.4 presents a graphical analysis and our results regarding the relationship between trade and wages. Section 2.5 concludes and puts forth policy implications.

2.2. Deviations from underlying theoretical assumptions?

The literature has shown that evidence of the influence of trade on wages depends on the time period examined as well as the level of aggregation. Another important factor is the degree of specialisation in the economy after trade. Wood (1994) argued that any trade impact on unskilled workers in developed countries would be diminishing because additional downward pressure on the prices of most unskilled-labour intensive products would not put pressure on the wages of domestic unskilled workers more generally once that country no longer produced the competing goods. Edwards and Lawrence (2010) present empirical evidence that this standard assumption of the HO/SS framework – the same goods that are imported are also produced domestically – does not hold in actual practice. They show that specialisation can and does occur in international trade and such deviations from the underlying model imply a divergence in its predicted outcomes.

Grossman and Rossi-Hansberg (2008) provide further arguments as to why trade effects on wages may not be consistent with SS. They identify three channels through which imported inputs can affect domestic factor prices: (1) the price effect (along traditional SS lines); (2) the labour-supply effect (which results from displacement of activities through changing specialisation); and (3) a productivity effect. The productivity effect operates as a sector-biased technical change that raises returns to factors used intensively in the importing sector. In this sense, domestic factors are complements to imports rather than substitutes.

Implications for policy

Despite these deviations, broadly speaking the SS framework does provide relevant guidance on our expectations on the wage and trade relationship. Thus, in a framework of policy analysis that implies such a strong influence of trade on domestic factor returns (as the HO/SS framework does), it is important to understand clearly the exact mechanisms through which trade and wages are linked. This will help devise effective policies to deal with anticipated

adjustment costs associated with trade-induced changes. Establishing causality is of the essence; a concomitant rise in imports and inequality does not necessarily suggest causation and without careful empirical analysis serious policy mistakes can be made. For example, previous studies (e.g. Keller, 2004; Stone and Shepherd, 2010) have shown the potentially beneficial impact of imports on domestic economies, a result that should assuage concerns regarding the effect of trade on economic outcomes. Providing clear and robust analysis of the underlying nature of these relationships and the trade-wages links should help inform policy and clear up misconceptions regarding the role of international trade in growth and development. This is the principal objective of this chapter.

2.3. Measuring the trade effect: methodology and data

Method

In order to investigate the relationship between trade and wages we follow the approach originally outlined in Leamer (1998) and applied in Feenstra and Hanson (1999) and more recently in Edwards and Lawrence (2010). We follow the standard approach to derive price regressions by totally differentiating the zero-profit condition for each industry. We can express this in first-differences as follows:

$$\Delta \ln(p_{it}) = -TFP_{it} + 1/2(s_{it} + s_{it-1})'\Delta lnw_{it} \quad (1)$$

In this equation, *p* denotes the value-added price in industry *i* at time *t*, *TFP* is the total factor productivity, *w* is the vector of factor prices and *s* is the primary factor shares averaged over two periods.[1] This equation expresses the relationship between the movement in value-added prices and productivity, with primary factor prices at given factor shares. In order to isolate changes in trade on factor prices, we must disentangle the effects of general structural variables on prices and productivity. We can do this by conducting regressions in two steps. In the first step we regress changes in prices and productivity on an identified set of structural variables. In the second step we use the first step estimation results to decompose "mandated" changes in primary factor prices attributable to each structural variable's impact on value-added prices. We have to employ a two-step procedure because the relationships we seek, the set of dependent variables for the second stage, are not directly observable and need to be estimated in the first stage. We can model the system with the following two equations: [2]

$$\Delta lnP_{it} + TFP_{it} = \gamma' \Delta z_{it} + \eta_{it} \quad (2)$$

$$\gamma_k \Delta z_{itk} = \delta'_k (s_{it} + s_{it-1})/2 + \upsilon_{itk} \quad (3)$$

Here, the δ_k obtained from the regression in (3) are interpreted as the change in primary factor prices that are explained by structural variable *k* contained in *z*. In other words, the regression coefficients in (3) can be interpreted as the changes in factor prices that would have occurred if changes in each structural variable had been the only source of change in value added prices and productivity. This specification allows us to measure the structural variables' direct impact on prices over and above the indirect impact via productivity. It also means that

1. Primary factor shares are defined here as the share of labour and capital used in production. They are measured as the share of each factor in total cost.

2. For complete details of the derivation of this system see Feenstra and Hanson (1999).

the estimated coefficient in (3) can be interpreted as the change in the factor prices mandated by changes in the value-added price due to each structural variable, including trade variables.

Data

As stated above, we intend to extend the work most recently exemplified for the United States in Edwards and Lawrence (2010) by broadening country coverage.[3] Thus, for equations (1) through (3) an additional subscript j should be added to indicate country. This provides us with a panel dataset that covers industry and country as a group, against time. The Data Annex provides details of the individual data series used in this paper. While expanding the number of countries provides a much greater range of economic conditions to test the SS relationship, it is costly in terms of data quality and detail. We discuss below those complicating factors which deviate from the theoretical derivation.

The original work by Feenstra and Hanson (1999) adjusts TFP by changes in wage differentials, but not all studies do this. For example, Edwards and Lawrence (2010) make no adjustment and report regressions with what they call 'primal' TFP. Given that we do not have the necessary detail of wage information to make this adjustment across our sample of countries we use the "primal' TFP as well. By not making the adjustment, we potentially overstate TFPs impact on wages. However, as TFP does not play a major part in our results, we believe that the bias, if any, is small.

Most authors, including Haskel and Slaughter (2003) for the United States and Abrego and Edwards (2004) for the United Kingdom, use value-added unit prices at the industry level. One goal of our paper is to examine a range of countries, covering both sides of the trade equations, i.e. low cost as well as higher value-added, exporters. Value-added prices at the industry level are not available for the majority of the countries in our sample, thus we need to proxy this price series. We have done this by collecting unit import values at the industry level for 65 economies.[4] Once imported goods enter the domestic market, they compete fully. Thus, import prices could be a good proxy for domestic prices in a competitive market. However, proxying domestic value-added prices with import unit prices means, to the degree these two price series diverge, that we are potentially introducing noise into our estimation.[5] Given that the purpose is to ascertain the trade variable's effect on wages as they pass through observed price changes, using import prices could potentially bias the results in favour of finding no effect as import prices are less likely to encompass more relevant domestically-based price impact. Thus any results we do find using import prices are more likely to be robust.[6]

3. We follow Edwards and Lawrence's (2010) empirical specification. However, we note that Edwards and Lawrence have a different objective, and thus ultimately, a different specification, in their paper. They look in more detail at the incomplete specialisation assumption in the HO/SS framework as well as using more detailed information for the United States.

4. As detailed in the Data Annex, this series was obtained using the CEPII-BACI database.

5. We investigate the degree to which this may influence our results by using a variety of specifications in a two-stage least squares approach, including using instrumental variables in the estimation of the price equation. Our results are broadly consistent with what is reported below and are available upon request.

6. In theoretical terms by extending the data to cover more countries which have less detailed information we introduce potential measurement error into our analysis. The consequences of measurement error, when it causes us to fail to capture the actual measure, could lead to a misinterpretation of the behavioural response. More specifically, measurement error may inflate the error term's variance when the error of measurement is correlated with the explanatory variable. On the other hand, when we consider errors-in-variables and assume the error in measurement is uncorrelated with the true explanatory variable

Tables 2.A1.1 and 2.A1.2 in the Data Annex of this chapter outline the countries and industries included in the study. Actual country/industry coverage in each regression depends on relevant variable availability. The time period encompasses 1988 through 2007, but most of the core regressions are based on complete information from 1995 through 2004.

We utilise the "Occupational Wages around the World" (OWW) database, provided by Freeman and Oostendorp[7], which contains occupational wage data for 161 occupations in over 150 countries from 1983 to 2003. We matched information on wages for occupations in 25 industries with imports, exports and bilateral tariffs for 93 countries for the years 1988 to 2007.[8] Industries were divided into three groups: primary products, final consumer products, and intermediate products to look for different patterns due to the nature and characteristics of the goods involved. The figures on employment we use come from the Bureau of Labour Statistics and are disaggregated into four big sectors: agriculture, mining, manufacturing, and services for ten OECD countries.

Table 2.A1.3 presents the ISIC Code, industry name, and the occupations included in these groupings. The industries contain varying numbers of occupations within them as a result of the aggregation and merging of the information. This also provides variation among the wage information within the different ISIC categories.

2.4. Graphic analysis and regression results

We begin our analysis by examining the trends in trade (imports, exports, and tariffs), wages, and employment over time in order to provide context for our analysis. The graphs shown divide the countries in the sample into two groups comprising OECD countries and non-OECD countries to tease out and identify differences between them.[9]

Trade, both in terms of exports and imports, for OECD countries present an upward trend coming down in the last years of the period of interest (Figures 2.A1.1 and 2.A1.2). This increase is evident for trade in intermediate products when compared to final goods. In addition, tariff levels remained low for the three product categories (primary, intermediate, and final) and tariffs in intermediate products show a steady decline (Figure 2.A1.3).[10] The highest recorded average tariff for OECD countries in the final products category is around the 10% level. On the other hand, non-OECD countries' exports and imports in intermediates show an upward trend which declines by the end of the sample period. Primary and final products do not show much volatility (Figures 2.A1.4 and 2.A1.5). Tariffs in non-OECD countries, on the other hand, decline considerably. For example, the average tariff decreases from above 60% to under 20%

but correlated with the observed explanatory variable the parameter estimates will be biased towards zero. We believe much of the exposure to measurement error in this dataset would be country-specific and thus captured by the fixed effects. For a thorough and intuitive treatment of measurement error refer to Judge *et al*. (1985).

7. The OWW database is publicly available at *www.nber.org/oww/*. Accessed on 15 February 2011.

8. Details of the wage, occupation and industry groupings are reported in the Data Annex.

9. See Table 2.A1.1 for complete country listing.

10. Services trade was not included due to the problematic nature of services trade data.

for final products; from around a maximum above 35% to 10% for both primary and intermediate products (Figure 2.A1.6).[11]

Turning to real monthly wages for both country groupings we note (naturally) that OECD countries (Figure 2.A1.7) are above the non-OECD countries real wage monthly mean (Figure 2.A1.8). This is clear for those occupations in the final consumer goods in particular. A peculiar pattern is the U-shape depicted by the evolution of mean monthly wages in OECD countries: they decline until 1996 and then change direction and begin rising. Real monthly wages for non-OECD countries do not portray much movement in the three categories until around 1996 when they rise steadily for primary, intermediates, and final goods.

We explored the correlations among these variables to tie them together before moving into more detailed descriptions. We calculated these correlation coefficients separately for both OECD and non-OECD countries and present the results in Tables 2.A1.4 and 2.A1.5, respectively.[12] The correlation coefficients revealed interesting associations as imports and exports were positively correlated between themselves in a statistically significant way among OECD countries. This is not the case in non-OECD countries. This could be due to the more diverse nature of the underlying sample of developing economies which includes, for example, China, Malaysia and Zimbabwe (Table 2.A1.1). We observed the same sign and statistical significance between exports and wages and imports and wages in OECD countries, but not in non-OECD countries. Finally, there were negative relationships among tariffs and exports; tariffs and imports; and tariffs and wages, and all of these were statistically significant for both OECD and non-OECD economies. These correlations do not imply any causal relationships. They simply are useful observations to relate and tie together this part of the graphical descriptive analysis.

Trade, tariffs, and wages across time

By disaggregating the evolution through time of key variables such as exports, imports, tariffs, and real wages by countries and broad sector categories we are able to identify which sectors experienced more dynamic movements across the sample period. We also consider movements in tariff changes in OECD and non-OECD economies (Figures 2.A1.3 and 2.A1.6, respectively). We identify a general opening up via tariff reductions and observed a positive correlation between trade and real wage movements for the majority of the countries investigated. Of course, there are a number of domestic factors that are absent from the analysis; nevertheless, these results suggest strongly that openness is *not* correlated with a decline of wages.

We go into more detail to obtain insights from the disaggregated data relating trade flows, tariffs, and wages. The countries covered, the United States and the United Kingdom, and later their trading partners China and France, respectively, were chosen mainly because they provide a contrast between major developing/developed country and developed/developed country trade.

US exports are dominated by intermediate goods (Figures 2.A1.9 and 2.A1.10). The final goods category stays constant throughout the sample period. Tariffs experienced small declines for both final and intermediate products, even though tariff levels for these are already low at less than 8% (Figure 2.A1.11). Tariffs for primary products reached a level of zero by the end of

11. Currie and Harrison (1997) for Morocco, Hanson and Harrison (1999) for Mexico, and Attanasio, Goldberg, and Pavcnik (2004), for Colombia are country studies documenting tariff reductions of similar magnitude to the ones just described.

12. We also examine these relationships for the four categories presented but, in the interest of space; do not report the results here. They are available upon request.

the sample period. Simultaneously, wages for all categories show upward movements (Figure 2.A1.12). The rapid rise in US real wages post-1995 is evident in these graphs.

Disaggregating both by category and by trading partner we look at the relationship in bilateral trade between the United States and China in three different industries, textile manufacturing, manufacturing of electronic machinery, and printing and publishing, in relation to the wages of the different occupations within the category. Combining US exports and imports into US net exports for the category we identify the country's position and trade's correlation to wages.[13]

All three occupation categories present negative net exports and the correlation with wages is negative suggesting a trade deficit does not imply low wages (Figures 2.A1.13-2.A1.15). Occupations that correlate with net exports in the first two categories seem to be related with the operation of machinery and, thus we speculate, the production process is mechanised. For example, for textile manufacturing the occupation descriptions of thread and yarn spinner, loom fixer, and cloth weaver all mention the individual operating machinery; and manufacturing of electronic machinery was classified as an intermediate product and the individuals working in it also operate complex machinery.[14] Earlier discussion pointed to the increase in intermediate trade worldwide and thus it is not surprising occupations in this category have wages which are correlated with trade flows. In the printing and publishing category we find not all occupations respond to net exports. The journalist; stenographer-typist; and labourer do not seem to be correlated with net exports. On the contrary, the job descriptions for printing pressman; hand compositor; bookbinder; and machine compositor, which do respond to net exports, include the explicit mention of operating machinery.

We looked at the United Kingdom's trade to provide an example of a trading European nation. Its trade does not show much dynamism with regards to primary or final products (Figures 2.A1.16 and 2.A1.17). Exports of intermediate goods show a trend upward, but it declines slightly around 2003. Average tariffs are well under the 10% level and show a trend downwards for all categories (Figure 2.A1.18). Average monthly wages in the United Kingdom show a steady increase (Figure 2.A1.19).

We calculate net exports for the United Kingdom and perform the same disaggregation in the same categories as with the United States, but consider the United Kingdom's trade with France as an example of two European trading partners. In this example, we observe different relationships in the different product categories: textile manufacturing; manufacturing of electronic machinery; and printing and publishing (Figures 2.A1.20-2.A1.22). The only category where occupational wages show correlation with net exports is manufacturing of electric machinery (classified as intermediate product). In this case, we only have wage information for two occupations: electronic fitter and electronic equipment assembler. Note the United Kingdom has positive net exports in this category which could suggest higher productivity by the firms operating in this ISIC code. The other two categories, textile manufacturing and printing and publishing, show weak correlations between monthly average wages and net exports. This makes any inference from them difficult, but also could suggest the presence and importance of local conditions in the wage setting process as Freeman (1995) explains.

13. We leave tariffs aside for now to explore the relationship between trade flows and wages.

14. The occupation descriptions are available at *http://laborsta.ilo.org/applv8/data/to1ae.html* accessed on 7 February 2011.

Before moving to the mandated wages approach, we present some basic price, wage and employment regressions to help us in our understanding the fundamental relationships posed by this dataset. While the focus of this paper is on trade and wages, previous literature has found that labour market adjustment to trade shocks may occur through changes in employment depending on the flexibility of the domestic labour market and imperfectly competitive product markets (Currie and Harrison 1997; Green *et al.* 2001). Moreover, Harrison (1994) notes that many developing country markets have few players and high barriers to entry. In this case, firms may cut profit margins and raise productivity instead of dismissing workers as a response to international trade. Therefore, in an effort to be thorough we present initial regressions on these three dependent variables.[15]

Table 2.A1.6 reports the results of these preliminary regressions. The overall sample results are shown in columns (1) and (2). The coefficients on TFP, output and the capital/labour (K/L) ratio are all negative and while output and K/L are insignificant and both trade variables are significant. As expected, imports have a negative and significant impact while the effect of tariffs on prices is positive. When we remove TFP from the estimating equation, the outcome for imports and tariffs remains unchanged; however, output and K/L become significant (column 2). Output has a negative impact while capital intensity has a positive one. This result seems to validate the point alluded to above that the impact of TFP may not be fully captured in our price proxy.

The table also shows the breakdown in results for OECD economies (columns 3 and 4) and those industries with high import penetration (column 5).[16] Like the overall sample, for OECD economies, K/L is insignificant and negative, however output is now significant and TFP is not. The impact of tariffs on prices for OECD economies is positive and significant but the coefficient is smaller than that of the sample as a whole, implying tariffs have a smaller impact on price changes for OECD economies. Imports, on the other hand, have a larger negative coefficient than the overall sample, indicating a stronger quantity effect. OECD economies experience a similar outcome when TFP is removed from the equation (column 4), that is, the K/L ratio becomes significant and is shown to have a positive impact on prices. The results for high importers show that tariffs have the only statistically significant impact on prices, and this remains so with or without TFP in the equation.

Moving to the wage equations we see the three structural variables, TFP, output and the K/L ratio significantly affect wages in the total sample, as well as in the OECD sub-sample. Both TFP and output have positive impacts while increasing capital intensity seems to put downward pressure on wages. These results are not surprising. The effects of TFP and output describe a movement along the supply curve and the result on the K/L ratio describes the substitution effect between capital and labour. Neither of the trade variables significantly impacts wages for the entire sample nor the two sub-samples. Taken together we see that the structural variables are significant in explaining both price and wages.

15. We make the caveat that the employment data only cover ten OECD countries with four big sectors. The ten OECD countries are: Australia, Canada, France, Germany, Italy, Japan, Netherlands, Sweden, United Kingdom, and United States. The four sectors are: agriculture, industry, manufacturing, and services.

16. We define high import penetration as those industries where imports are more than 50% of output. Like all blanket measures, this is an imperfect approach since we will not capture those industries which have no domestic production. However, given our data is relatively aggregate (3-digit ISIC) we believe that it will provide a valid differentiation between those industries facing a large degree of import competition and those that do not.

Finally, the table also reports regressions with employment figures as the dependent variable.[17] The results show movements in employment due to international trade which would suggest part of the adjustment takes place through employment allocations which would fall in line with the assumptions in the HO model. Note, increases in the amount of imports tend to decrease domestic employment and tariffs tend to increase domestic employment. One reason explaining the decrease in employment is the displacement of domestically produced goods by lower priced imports reducing domestic production of goods. On the other hand, the increase in consumer prices when a tariff is applied to the price of a good would be a reason explaining the increase in employment. Other explanatory variables, such as TFP and output, show the expected positive sign associated with the parameter estimates suggesting increases in productivity and increased production would tend to increase employment.

Mandated wage changes

We now turn to the empirical analysis. The regressions outlined in equations (2) and (3) are run using a fixed effects model. This controls for the variation across industry and country groupings. To the extent that the variation in industry value-added prices is mainly found within a country, rather than across countries, the fixed effects model may also help control for the noise introduced by proxying domestic value-added prices with import prices.

When estimating the first step equation we want to capture the structural variables' effect on prices over and above their impact through TFP. Yet the results of the empirical analysis above show TFP has little impact on our price variable. In order to determine the validity of applying the standard approach we regress import prices on TFP and the structural variables. The structural variables are jointly statistically significant which, following Krugman (2000) and Feenstra and Hanson (1999), suggests the structural variables contribute to non-neutral shifts in technology.[18] Thus we report the results using effective prices, i.e. price plus TFP, as outlined in equation (2).[19]

Table 2.A1.7 reports the results of the first stage regressions. Consistent with the argument of productivity above, both the K/L and output variables have positive coefficients; although none of the individual results are statistically significant. These results are consistent for the OECD and high importer sub-samples as well.

As described above, the second stage of the estimation decomposes the dependent variables from equation (2) into that part explained by each structural variable, and then uses these components as the dependent variable in (3), where the independent variables are the shares of primary factors in the industries over 1995-2004 sample period. The coefficients of these regressions are interpreted as predicted factor-price changes due to the price impact of each structural variable. Consider the K/L ratio in Table 2.A1.8. It is estimated to have decreased the (real) price of capital by 0.013% annually over the period. Thus the price changes induced by

17. Please refer to footnote 15 regarding the coverage of the employment data.

18. An assumption of the underlying model combining price and TFP is that changes in productivity are "passed-through" to industry prices either because the country in question is large in world markets or because the technology shocks are common across countries. (Krugman, 2000). Our sample contains countries meeting both these criteria.

19. While we have validated this approach, we also ran a second set of regressions using price alone and including TFP as a structural variable. These results yielded the same conclusions as the effective price equations. Results are available upon request.

changes in the K/L ratio have mandated a reduction in the price of capital. No significant impact is shown for wages of skilled labour.[20]

Turning to the variables of most interest, the results show that both imports and tariffs have significant effect on the price of factors for the overall sample. Imports have a positive and significant impact on both labour wages and returns to capital while tariffs impact both negatively. This is consistent with the correlation coefficients reported in Tables 2.A1.4 and 2.A1.5. According to these results, imports have mandated increases in both the real wages of workers and returns to capital while tariffs have mandated reductions in factor returns.

These outcomes would provide credible evidence that the productivity effect of imports dominates. We find this explanation particularly probable given the results of the previous sets of regressions. Imports were seen to have a positive, if not significant, impact on wages as shown in Table 2.A1.6 while they were shown to have a significant and negative impact on prices. The result in Table 2.A1.8 shows that these import-related effects have led to an increase in wages and returns to capital. Tariffs, being more of a direct cost, have a negative impact.

Turning to the sub-sample of OECD economies, we find no statistically significant relationship between factor prices and the K/L ratio, but there is a positive role for output. This would imply that greater output increases returns to factors through price effects. This may be interpreted as a size effect, where firms operating in large markets are able to pay workers higher wages.

When we turn to imports however, we find the impact is negative and significant on both factors. The impact on workers is -1.4%, implying that imports have reduced the return to skilled workers. The reduction to capital is 0.44%.These results are surprising given both the positive impact observed for the overall sample as well as the nature (i.e. large intermediate trade) of OECD trade. Given the composition of the sample used in these regressions, which is heavily dominated manufacturing sectors,[21] we must interpret the results in the context of the underlying sample. The majority of OECD imports come from other OECD economies and involve high value-added, skill-intensive production. To the extent that these industries are restricted in their ability to import, it would raise costs, relatively speaking, and lower returns to the factors used intensively in those industries, i.e. skilled workers and capital. This is evidenced by our tariff results. Thus, the negative impact of imports on factor returns could be due to non-measured trade barriers such as NTMs. Indeed, as noted above, Haskel and Slaughter (2003) suggested that NTMs may be playing a large role in the trade-wages link. This

20. Dumont *et al*. (2005) point out a statistical correction regarding the standard errors associated with the variables of interest in the second stage of the mandated wages approach. They show standard errors calculated in the way Feenstra and Hanson proceed are biased downwards. We investigated this issue and obtained negative variances. We accounted for this problem in two ways: 1) we calculated standard errors accounting for the correlation stemming from the product-country unit of observation which did not produce negative variances (which we present in the tables); 2) we calculated the standard errors in the way Dumont, *et al.* suggest and while we did not obtain negative variances, they differ from the ones obtained in 1). Further investigation of the differences between the standard errors associated with the parameter estimates in the second stage are out of the scope of this chapter.

21. In order to provide a consistent set of observations across both estimating equations, we had to drop many of those countries with incomplete or missing data for all variables under consideration. This reduced our sample from the original 60 economies listed in Table 2.A1.2 to 30, mostly EU economies. It also reduced our sample of industries in half.

explanation seems plausible given the positive association with import wages express in the overall sample results.[22]

We test this supposition by introducing an industry interaction term and re-estimating the equations.[23] We interacted factor cost shares with industry dummies to investigate which industries exhibited a negative relationship with mandated wage changes and imports. The results of the interaction terms are presented in Table 2.A1.9. Only those industry dummies that were found significant are shown. All of the five significant industries have a negative sign. We compared these industries with those reported in Dee *et al.* (2011) and find a consistency with highly ranked NTM industries.[24] This provides further evidence that NTMs may be playing a role in these results

For high import intensive industries, all factors with the exception of imports have a significant impact on wages and capital returns. While the import coefficient is not significant, its sign with respect to wages is positive, consistent with the overall results. The K/L ratio and output have positive impacts while tariffs negatively affect returns. While capital intensity drove down returns to capital in the total sample, in high importing industries, it has the opposite effect – raising returns to capital. This may be a reflection of quantity versus productivity impacts. Increasing capital intensity could be due to either increasing capital investment, or a decrease in the relative use of labour. It could be that in the overall sample, effects were dominated (albeit, only slightly given the very small size of the coefficient) by declining labour inputs while industries with high imports, experienced an increase in relative capital usage.

Measuring the role of trade on wage differentials

We now move to examining the influence that trade (in the form of imports) and trade policy (in the form of tariffs) has on wage differentials. We define wage differentials as the difference in wages in occupation *p*, industry *k* between countries *i* and *j*. For example, the difference in the wages paid to weavers in the textile industry in the United States and China. We regress on wage differentials the amount of imports of textiles from China to the United States and the tariff rate applied in the United States on Chinese textile imports.[25] We report our findings in Table 2.A1.10.

Table 2.A1.10 reports results using several specifications.[26] First we examine the link between imports and tariffs only on wage differentials. The sign on the coefficient of imports is negative and significant, implying that the bigger the imports the smaller is the wage differential. When we break these findings down further by skill, we find the impact of imports stronger on unskilled workers than skilled. The sign on tariffs is also significant but it is positive, indicating that large tariffs are associated with large wage differentials. Taken with the

22. Indeed, given that non-OECD economies make up a relatively small share of the remaining sample, it stands to reason that this positive result is strong.

23. No good quantitative estimates of NTMs are available for our sample. Given the limited sample size, we estimated these results using pooled OLS with dummies to control for fixed effects. The results were broadly consistent with those found in the original fixed effects model.

24. This is based on Table 2.2 reported in Dee *et al*. (2011) which presents *ad valorem* estimates of NTMs for US/EU trade.

25. See Data Annex for detailed definitions of these variables.

26. Additional variables examined included differentials in industry outputs, differentials in industry's share of GDP, differentials in number of employees and using dummies for both industry and year. Details of these outcomes are available upon request.

outcome reported above, one could infer that large imports have a significant and positive impact on domestic wages.

In column (2) we report the findings controlling for the level of capital intensity in the industry, using the capital/labour ratio (K/L). The findings for imports remain the same, however tariffs are now insignificant. The K/L is negative and significant, indicating that more capital intensive industries are associated with smaller wage differentials. This could be due to the fact that occupations that work with machinery may be more standardised with fewer differences between countries. This explanation is given weight by the fact that when we break these results down by skill, K/L is no longer significant for skilled workers yet is negative and significant for unskilled workers.

Column (3) shows the relationship if we control for the partner's share of total imports in this industry. The sign is significant and negative. The interpretation is that large trade partners are associated with smaller wage differentials. We also interact import shares with tariffs but the results (column 4) are not significant.

Our final model includes all variables as well as the interaction term [column (5)]. In this regression, imports are no longer significant and tariffs fall to the 10% level of significance. The impact of these variables is being captured by the import shares and the interaction of import share with tariffs. Here, the interpretation is that large importers with high tariffs are associated with larger wage differentials. However, the coefficient on the tariff variable was not robust to various specifications so its results should be viewed with caution.[27]

2.5. Conclusions

The graphical analysis in this paper provides an overview of developments relating trade, tariffs, and wages from 1988 until 2004. Correlation coefficients relate exports and imports with wages and tariffs for both OECD and non-OECD countries. The resulting evidence suggests wages fluctuate with trade flows, providing support for a SS view of trade. This view is also consistent with evidence of resource-driven model of production networks, i.e. taking advantage of different cost-saving opportunities offered to them in various countries. Moreover, examining certain country/industry pairs, we show that trade deficits are not necessarily associated with low wages and a trade surplus could be an outcome of higher productivity by the firms in that industry.

The regressions provide a more nuanced story. We find that imports have a positive impact on wages for the entire sample, yet a negative impact for the OECD economies alone. This negative impact repeats when the dependent variable is employment. However, imports do not significantly impact factor prices in import-intensive industries. These seemingly conflicting results could be due to the level of aggregation in the sample, the fact that we cover mostly manufacturing industries, and domestic particularities associated with specific countries in the way wages are set and the degree of flexibility in domestic labour markets in their response to import shocks. We provide evidence that the outcome associated with OECD economies could be due to other trade policies in the form of NTMs.

An analysis of wage differentials shows that the larger the trade is between countries, the smaller is the wage differentials. In sum, overall the evidence supports the contention that imports positively affect wages and we attribute this positive relationship to the productivity gains associated with these imports. These results, taken with the finding that large trade flows

27. Over certain time periods and for some industries, the tariff coefficient became negative and significant or not significant. Given that the sign of the coefficient varied, we must interpret this outcome with caution.

are related to small wage differentials implies that trade could lead to an upward wage conversion for skilled workers. That is, the inference is that imports may tend to bring wages up, rather than push wages down.

The implications for policy formulation are that the trade story is not simply a matter of protecting domestic workers from 'cheap' overseas imports. Imports do not, out of hand, cause wages to decline. On the contrary, we present evidence that trade barriers have a larger negative impact on wages. Policymakers concerned with the potentially detrimental impacts of further liberalisation on labour markets should be cautioned against focusing on negative outcomes. Taken as a whole, the evidence is that imports are good for wages. Potential negative outcomes on employment are best dealt with in the context of improving resource allocation rather than blocking imports.

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Annex 2.A1

Data

The data used in the above analysis are derived from a number of sources. The Occupational Wages around the World dataset by Richard Freeman and Remco Oostendorp was used to examine wages and occupations. Freeman and Oostendorp transformed the International Labour Organization's October Inquiry Survey into a consistent data file on pay for 161 occupations in over 150 countries from 1983 to 2003. The standardisation allowed for comparison across countries circumventing measurement problems such as differences in reporting units, quality of reporting sources, wage levels, and any other country specific issues. The wages are reported in domestic currency units and in US dollars. The figures employed were in US dollars and deflated using the deflators in the Penn World Tables to account for purchasing power parity issues.

The output, value-added, wage-bill were taken from the Trade, Production and Protection dataset as outlined in Nicita and Olarreaga (2006) and based primarily on World Bank data. It covers mainly manufacturing data at the 3-digit International Standard and Industrial Classification (ISIC) Rev 2 level. This dataset provides coverage for over 100 developed and developing economies from 1976 through 2004. Values for capital are obtained by subtracting the wage bill from value-added. Again, values are deflated using the Penn World Tables.

The import price series is taken CEPII BACI dataset (Gaulier, Martin, Méjean and Zignago 2008). This series contains a variety of import and export price series for over 250 countries from 1996 through 2004. Complete description of the data as well as derivation of the indices can be found at *www.cepii.fr/anglaisgraph/bdd/baci/non_restrict/price.asp*. We use the chained geometric Laspeyres index for the ISIC Rev2 series at the 3-digit level.

The TFP numbers are taken from EUKLEMS and described in detail in O'Mahony and Timmer (2009). This database estimated TFP values for 28, mostly European, economies for the period 1970-2005. This information was reported using the European NACE Revision 1 classification system. This data was supplemented with data from the Asian Productivity Organisation (APO) out of Keio University, Tokyo, Japan. This organisation publishes productivity estimates for a number of Asian Economies from 1970 through 2007. We were able to obtain TFP estimates for Korea, Indonesia, China, the Philippines and Thailand from this source. Unfortunately, detailed industry-level data was not available. Thus we applied economy-wide estimates to the industry level detail along with a dummy variable to control for this effect. The dummy was not significant in any of the regressions here.

Data on import and export flows are from the COMTRADE database and tariffs were taken from the TRAINS database. Both sources report values in ISIC Rev2 at the three digit level for a period from 1995 through 2007.

The factor shares are derived using data from the Global Trade Analysis Project (GTAP). This publicly available, completely documented (Dimaranan and McDougall (2002) and Badri and Walmsley (2008)) database provides input-output tables for between 45 and 85 countries (depending on the database version), 57 sectors and 5 factors of production for the years 1997, 2001 and 2004. Factors of production are: skilled labour, unskilled labour, capital, natural resources and land. We calculate our factor shares using skilled and unskilled labour and capital.

The derivation of skilled versus unskilled labour is econometrically estimated based on ILO statistics and generalised to GTAP economies based on income and education. Complete documentation of the methods used to split total labour payments into skilled and unskilled can be found in Liu, *et al.* (1998). We use the values for 1997 to complete the series for the years through 2000, and for 2001 for the years up until 2003.

The employment data comes from the Bureau of Labor Statistics International Labor Comparisons. The coverage of the employment data is limited to ten OECD countries: Australia, Canada, France, Germany, Italy, Japan, Netherlands, Sweden, United Kingdom, and United States. Similarly, the disaggregation of the employment data is for larger sectors of the economy only. These sectors are: agriculture, industry, manufacturing, and services. To match the employment data to the wages and trade flows the latter had to be aggregated to four big categories. The employment data are available at *www.bls.gov/fls/flscomparelf/employment.htm* accessed on 29 June 2011.

We needed to then concord the different reporting standards from the various data source to one system – namely SICI Rev 2. We relied on published concordance schedules from the UN, as well as those available through the GTAP website. Finally, we also used Jon Haveman's website which provides concordances for a number of different data standards:

www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources/TradeConcordances.html.

Tables 2.A1.1 and 2.A1.2 list the countries and industries remaining while Table 2.A1.3 lists the occupations.

Table 2.A1.1. Country coverage[a]

Argentina	Morocco
Australia	Mozambique
Bangladesh	Netherlands
Belgium	New Zealand
Botswana	Peru
Brazil	Philippines
Canada	Poland
Chile	Portugal
China	Russian Federation
Colombia	Singapore
Denmark	Slovak Republic
Finland	Slovenia
France	South Africa
Germany	Spain
Greece	Sri Lanka
Hungary	Sweden
India	Switzerland
Indonesia	Taiwan, China
Ireland	Thailand
Israel	Turkey
Italy	Uganda
Japan	United Kingdom
Korea, Republic	United States
Luxembourg	Uruguay
Malawi	Venezuela
Malaysia	Viet Nam
Mexico	Zambia
	Zimbabwe

a. Country coverage varied for individual regressions depending on data availability.

Table 2.A1.2. Industry coverage[a]

ISIC	Description
111	Agricultural and livestock production
112	Agricultural services
113	Hunting, trapping and game
121	Forestry
122	Logging
130	Fishing
210	Coal mining
220	Crude petroleum and natural gas production
230	Metal ore mining
290	Other mining
311	Food manufacturing-1
312	Food manufacturing-2
313	Beverage industries
314	Tobacco manufactures
321	Manufacture of textiles
322	Manufacture of wearing apparel, except footwear
323	Manufacture of leather and products
324	Manufacturing of footwear, except vulcanized or moulded rubber or plastic footwear
331	Manufacture of wood and wood and cork
332	Manufacture of furniture and fixtures
341	Manufacture of paper and paper products
342	Printing, publishing and allied industries
351	Manufacture of industrial chemicals
352	Manufacture of other chemical products
353	Petroleum refineries
354	Manufacture of miscellaneous product
355	Manufacture of rubber products
356	Manufacture of plastics products not elsewhere
361	Manufacture of pottery, china and earthenware
362	Manufacture of glass and glass products
369	Manufacture of other non-metallic mineral products
371	Iron and steel basic industries
372	Non-ferrous metal basic industries
381	Manufacture of fabricated metal products
382	Manufacture of machinery except electrical
383	Manufacture of electrical machinery
384	Manufacture of transport equipment
385	Manufacture of professional and scientific
390	Other manufacturing industries
410	Electricity, gas and steam

a. Industry coverage varied for individual regressions depending on data availability.

Table 2.A1.3. Industry, occupation coverage

ISIC code	Industry name	Occupations included in industry
	Primary products	
21	Coal Mining	Coalmining engineer, Miner, Underground helper, loader
22	Crude petroleum and Natural Gas Production	Derrickman, Petroleum and natural gas engineer, Petroleum and natural gas extraction fe, Supervisor of general foreman
29	Other Mining and Quarrying	Miner, Quarryman,
111	Agricultural Production	Farm supervisor, Field crop farm worker, Plantation supervisor, Plantation worker
121	Forestry	Forest supervisor, Forestry worker,
122	Logging	Logger, Tree feller and bucker,
130	Fishing	Deep-sea fisherman, Inshore (coastal) maritime fisherman,
	Final consumer products	
311	Food Manufacturing	Baker (ovenman), Butcher, Dairy product processor, Grain miller, Packer
321	Manufacture of Textiles	Cloth weaver (machine), Labourer, Loom fixer, tuner, Thread and yarn spinner,
322	Manufacture of Wearing Apparel, except Footwear	Garment cutter, Sewing-machine operator,
323	Manufacture of Leather and Products of Leather	Leather goods maker, Tanner,
324	Manufacturing of Footwear	Clicker cutter (machine), Laster, Shoe sewer (machine),
331	Manufacture of Wood and Wood and Cork Products	Plywood press operator, Sawmill sawyer, Veneer cutter,
332	Manufacture of Furniture and Fixtures	Cabinetmaker, Furniture upholsterer, Wooden furniture finisher,
341	Manufacture of Paper and Paper Products	Paper-making-machine operator (wet end), Wood grinder,
342	Printing, Publishing and Allied Industries	Bookbinder (machine), Hand composito, Journalist, Labourer, Machine composito, Office clerk, Printing pressman, Stenographer-typist
	Intermediate Products	
351	Manufacture of Industrial Chemicals	Chemical engineer, Chemistry technician, Labourer, Mixing-and blending-machine operator, Supervisor or general foreman,
352	Manufacture of Other Chemical Products	Labourer, Mixing-and blending-machine operator, Packer,
353	Petroleum refineries	Controlman,
371	Iron and Steel Basic Industries	Blast furnaceman (ore smelting), Hot-roller (steel), Labourer, Metal melter, Occupational health nurse
381	Manufacture of Fabricated Metal Products	Metalworking machine setter, Welder,
382	Manufacture of Machinery (except electrical)	Bench moulder (metal), Labourer, Machinery fitter-assembler,
383	Manufacture of Electronic Equipment, Machinery and Supplies	Electronic equipment assembler, Electronics draughtsman, Electronics engineering technician, Electronics fitter,
384	Manufacture of Transport Equipment	Shipplater,
	Services	
410	Electricity, Gas and Steam	Electricpower lineman, Labourer, Office clerk, Power distribution and transmission engineer, Power-generating machinery operator

Table 2.A1.4. Correlation coefficients for OECD countries[a]

	Exports	Imports	Tariffs	Wages
Exports	1			
Imports	0.8242	1		
	(0.00)			
Tariffs	-0.3221	-0.5486	1	
	(0.0094)	(0.00)		
Wages	0.7093	0.7384	-0.6043	1
	(0.00)	(0.00)	(0.00)	

a. Significance levels in parenthesis

Source: Authors' calculations.

Table 2.A1.5. Correlation coefficients for non-OECD countries[a]

	Exports	Imports	Tariffs	Wages
Exports	1			
Imports	0.1060	1		
	(0.4282)			
Tariffs	-0.3977	-0.4126	1	
	(0.0017)	(0.0011)		
Wages	0.1733	0.0842	-0.4025	1
	(0.1743)	(0.5118)	(0.0014)	

a. Significance levels in parenthesis

Source: Authors' calculations.

Table 2.A1.6. Price, wage and employment equations[a]

Depen-dent variable	Total	OECD	High importer[c]	Total	OECD	High importer[c]			Total / OECD	High importer[c]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
TFP	-0.003*		-0.061		-0.273	0.148)*	0.172*	0.037	0.027	0.024
	(-1.89)		(-0.98)		(-0.42)	(1.81	(1.96)	-0.46	(1.96)	(1.57)
Output	-0.031	-0.035*	-0.090*	-0.083***	0.006	0.562***	0.525***	0.815***	0.081**	0.083**
	(-1.39)	(-1.92)	(-1.72)	(2.97)	-0.26	(3.73)	(2.92)	(15.25)	(5.10)	(5.44)
Imports	-0.082**	-0.106***	-0.149**	-0.176***	-0.114	0.073	0.068	0.181	-0.041*	-0.057**
	(-2.18)	-4.23	(-3.44)	(4.74)	(-1.52)	(-1.17)	(-1.06)	(-1.27)	(2.26)	(2.84)
Tariffs	0.068***	0.026***	0.045**	0.011	0.138***	-0.016	-0.026	0.044	0.041**	0.013**
	(-2.56)	(-3.28)	(-1.97)	(-1.25)	(6.51)	(-1.40)	(-1.52)	-0.87	(3.66)	(3.37)
K/L	-0.003	0.049***	-0.011	0.078***	0.02	-0.464***	-0.341***	-0.403***	0.009**	0.005
	(-0.17)	(3.65)	(-0.18)	(3.18)	-0.87	(13.40)	(4.16)	(15.32)	(3.03)	(1.54)
Con-stant	6.27***	6.65***	8.52***	8.44***	6.26**	2.03	2.61	3.19*	7.04	7.334
Obs	860	2731	734	2082	311	496	437	159	335	335
R-squared	0.12	0.06	0.2	0.09	0.28	0.73	0.68	0.94	0.27	0.25

a. Estimation is by fixed effect across country-industry groupings, robust t-statistics (in parentheses).

* p<0.10

** p<0.05

*** p<0.01. Values are reported in percent change.

b. All data are at the 3-digit ISIC sector. Prices are import price data using chained geometric Laspayre; Wages are the skill share of total wage bill. All variables are logged. .

c. High importer defined as those industries where the value of imports is 50% or more of total output.

Source: Authors' calculations.

Table 2.A1.7. First stage: determinants of effective prices[a]

Dependent variable	Total	OECD	High importer[b]
K/L	0.004	0.044	0.027
	(0.25)	(0.79)	(1.30)
Output	0.016	0.103	0.010
	(0.62)	(1.10)	(0.18)
Imports	0.005	-0.075	0.133
	(0.13)	(-1.18)	(1.11)
Tariffs	0.003	0.008	0.042
	(0.23)	(0.63)	(0.79)
Constant	8.95***	8.74***	7.20***
Observations	436	377	141
R-squared	0.01	0.02	0.04

a. Estimation is by fixed effect across country-industry groupings, robust t-statistics (in parentheses).

* p<0.10;

** p<0.05;

*** p<0.01. Effective prices are the log of import unit price plus the log of TFP. Values reported are percentage change.

b. High importer defined as those industries where the value of imports is 50% or more of total output.

Source: Authors' calculations.

Table 2.A1.8. Second stage: estimated factor price change[a]

Dependent variable	K/L	Output	Imports	Tariffs
Total				
Share of skilled labour	-0.039	0.110	0.032**	-0.041*
	(-1.21)	(1.38)	(1.99)	(-1.64)
Share of capital	-0.013***	0.014	0.007*	-0.013**
	(3.55)	(1.00)	(1.76)	(2.60)
Observations	436	436	436	436
R-squared	0.02	0.02	0.01	0.02
OECD				
Share of skilled labour	0.293	1.667**	-1.391***	-0.300**
	(1.47)	(3.45)	(3.24)	(2.45)
Share of capital	0.124	0.417**	-0.438***	-0.082*
	(1.62)	(2.41)	(2.91)	-1.93
Observations	377	377	377	377
R-squared	0.02	0.02	0.01	0.01
High Importer[b]				
Share of skilled labour	2.058***	0.123***	0.186	-2.428***
	(2.77)	(4.27)	(0.25)	(13.87)
Share of capital	0.755***	0.026**	-0.07	-0.708***
	(2.99)	(2.59)	(-0.29)	(10.61)
Observations	141	141	141	141
R-squared	0.19	0.01	0.04	0.11

a. Estimation is by fixed effect across country-industry groupings, robust t-statistics (in parentheses). * p<0.10; ** p<0.05; *** p<0.01. Values reported are percentage chance.

b. High importer defined as those industries where the value of imports is 50% or more of total output.

Source: Authors' calculations.

Table 2.A1.9. Second stage: estimations for OECD imports[a]

Skilled labour	Coefficient	Standard error	t-Statistic	P value	NTM rank[c]
Interaction industry[b]					
Footwear	-0.0389	0.011	-3.28	0.001	7
Printing, Paper	-0.0407	0.007	-5.61	0.000	10
Chemicals	-0.0478	0.009	-4.92	0.000	2 and 3
Non-metallic	-0.0397	0.007	-5.30	0.000	8
Metal products and machinery	-0.0356	0.008	-4.30	0.000	6
Capital					
Interaction industry[b]					
Food, Beverage, Tobacco	0.0165	0.004	3.82	0.000	9
Chemicals	-0.0123	0.004	-3.26	0.001	2 and 3
Plastics	0.0102	0.005	1.74	0.083	3
Metal products and machinery	-0.0072	0.004	-1.93	0.055	6
Professional and scientific measuring equipment	0.0067	0.004	1.76	0.079	5

a. Estimation is by OLS industry grouping dummies, robust t-statistics reported.

b. Results for selected significant industries shown. Complete results available upon request.

c. NTM rank based on table 2.2 of 25 industries reported in Dee *et al.* (2011). Two ranks reported for industry specifications that span two NTM categories.

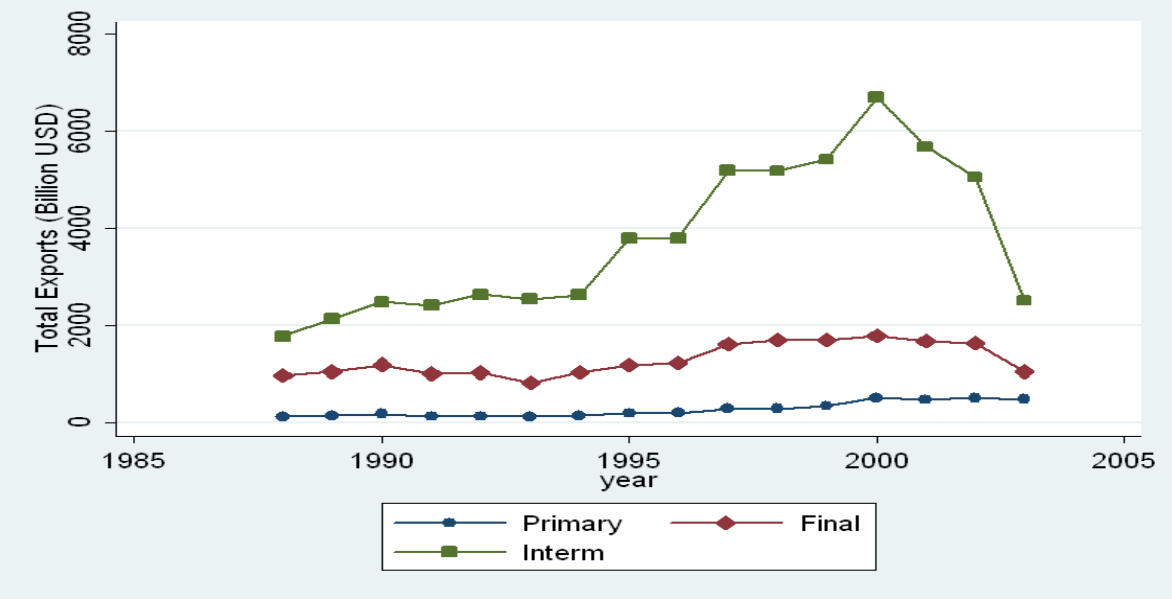
Source: Authors' calculations.

Table 2.A1.10. Estimated trade impact on wages differentials[a]

Dependent variable: DiffWage	(1)	(2)	(3)	(4)	(5)
Imports	-0.089***	-0.051***	-0.016***	-0.016***	0.009
	(-64.92)	(-24.21)	(2.96)	(-2.96)	(1.35)
Tariffs	0.033***	0.001	0.034***	0.034***	0.028*
	(6.66)	(0.22)	(4.73)	(2.91	(1.81)
K/L		-0.077***			-0.091***
		(-15.87)			(-11.08)
Importshare			-0.073***	-0.074***	-0.073***
			(-12.72)	(-12.32)	(-8.75)
Importshare*tariffs				-0.000	0.009***
				(-0.09)	(2.82)
Observations	23603	11393	10161	10161	4675
R-squared	0.47	0.51	0.47	0.47	0.52

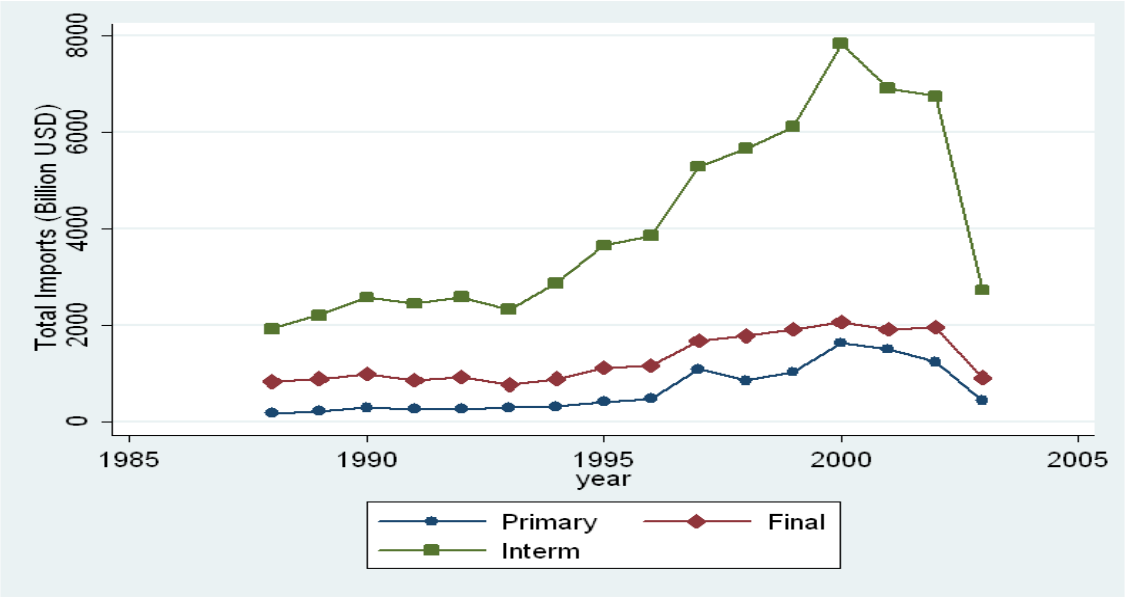
a. Estimation is by OLS using country dummies, robust t-statistics (in parentheses), * p<0.10; ** p<0.05; *** p<0.01.
Source: Authors' calculations.

Figure 2.A1.1. Total exports by categories OECD countries (1988-2003)[a]



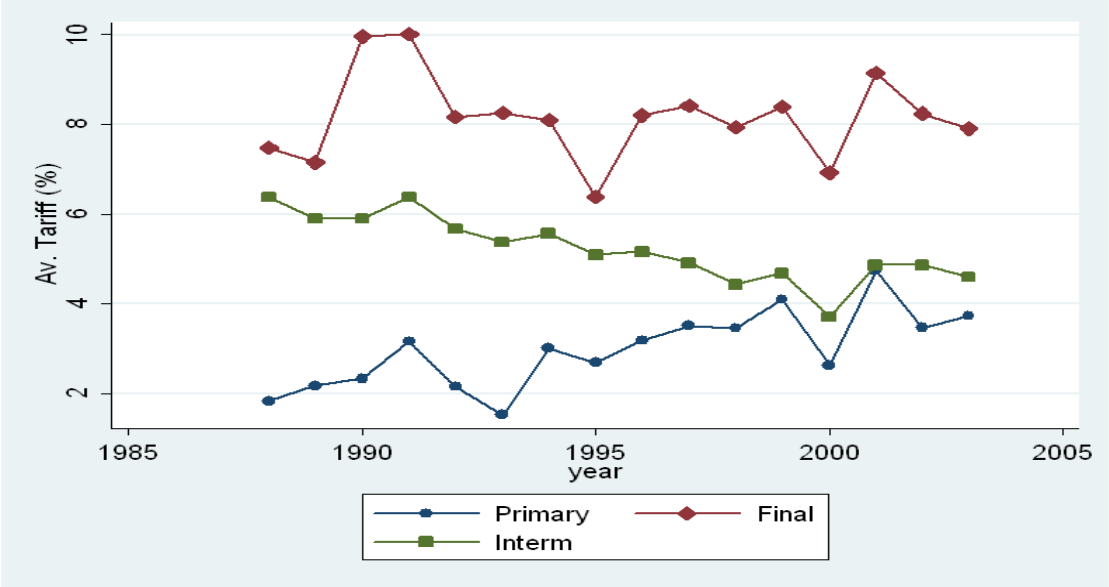
a. United States not included in 2003.
Source: Authors' calculations.

Figure 2.A1.2. Total imports by categories OECD countries (1988-2003)[a]



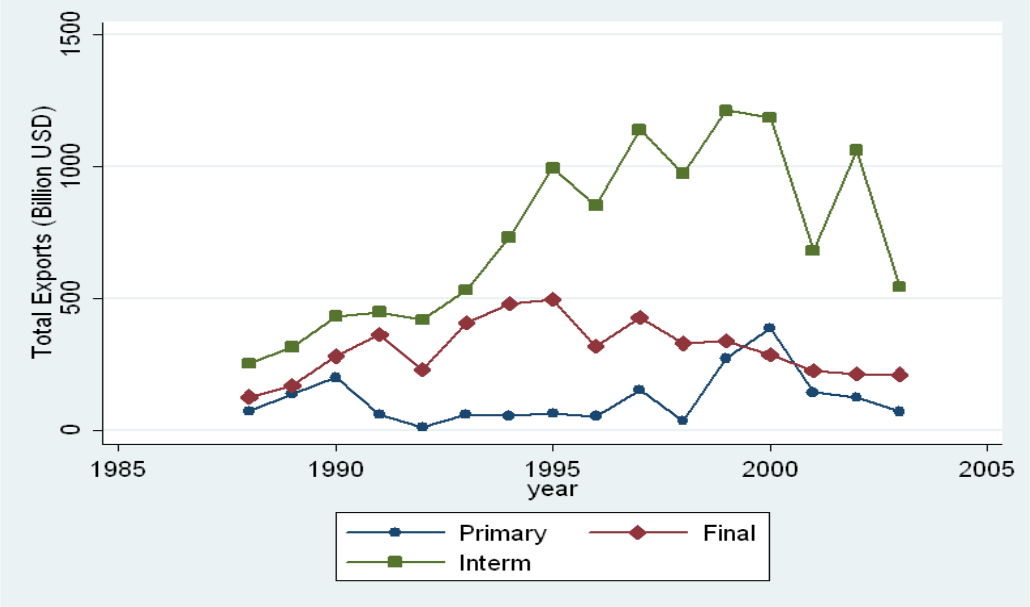
a. United States not included in 2003.
Source: Authors' calculations.

Figure 2.A1.3. Average tariffs by categories OECD countries (1988-2003)[a]



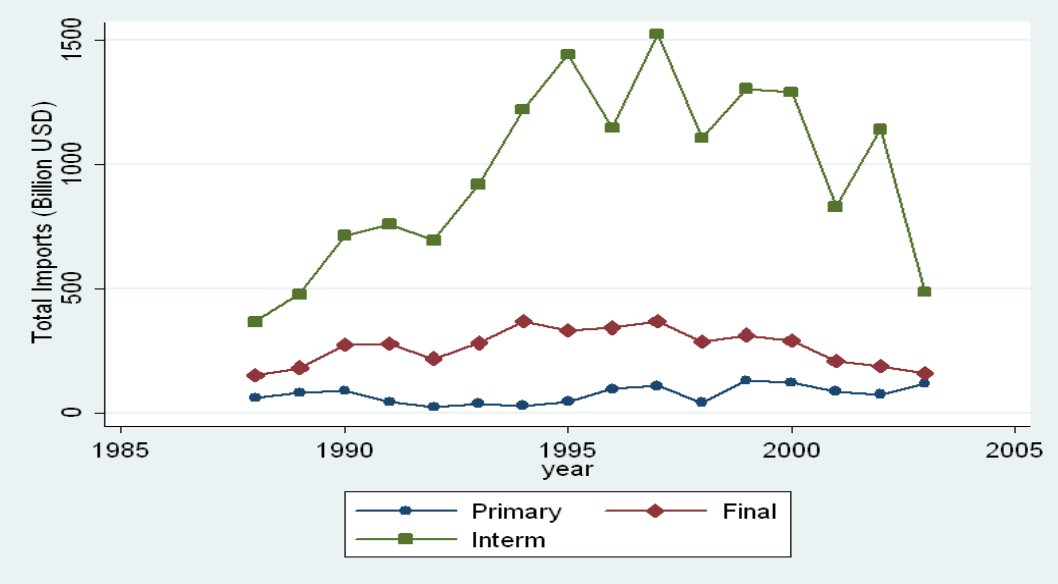
a. United States not included in 2003.
Source: Authors' calculations.

Figure 2.A1.4. Total exports by categories non-OECD countries (1988-2003)



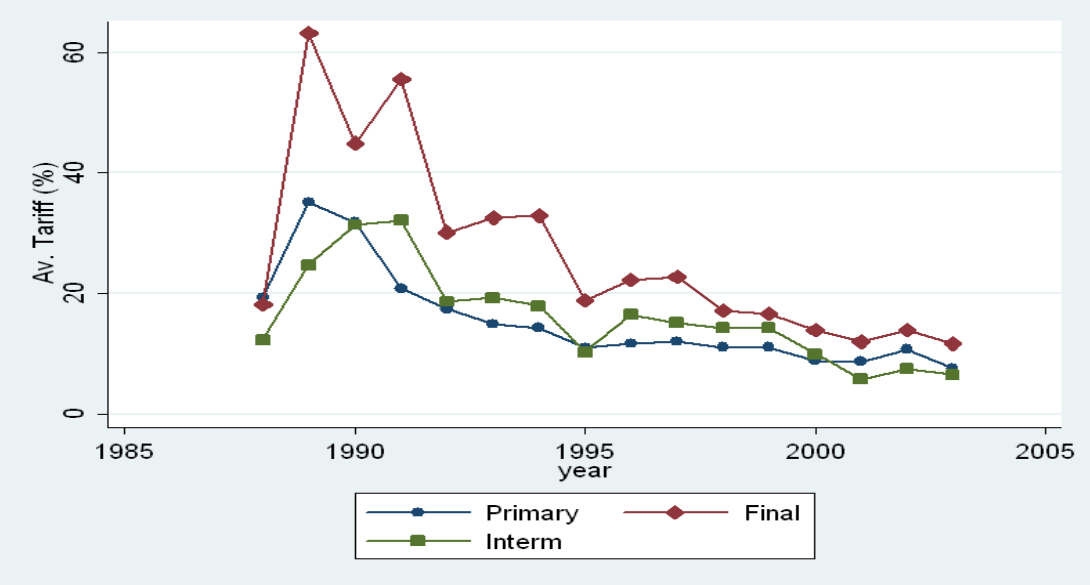
Source: Authors' calculations.

Figure 2.A1.5.Total imports by categories non-OECD countries (1988-2003)



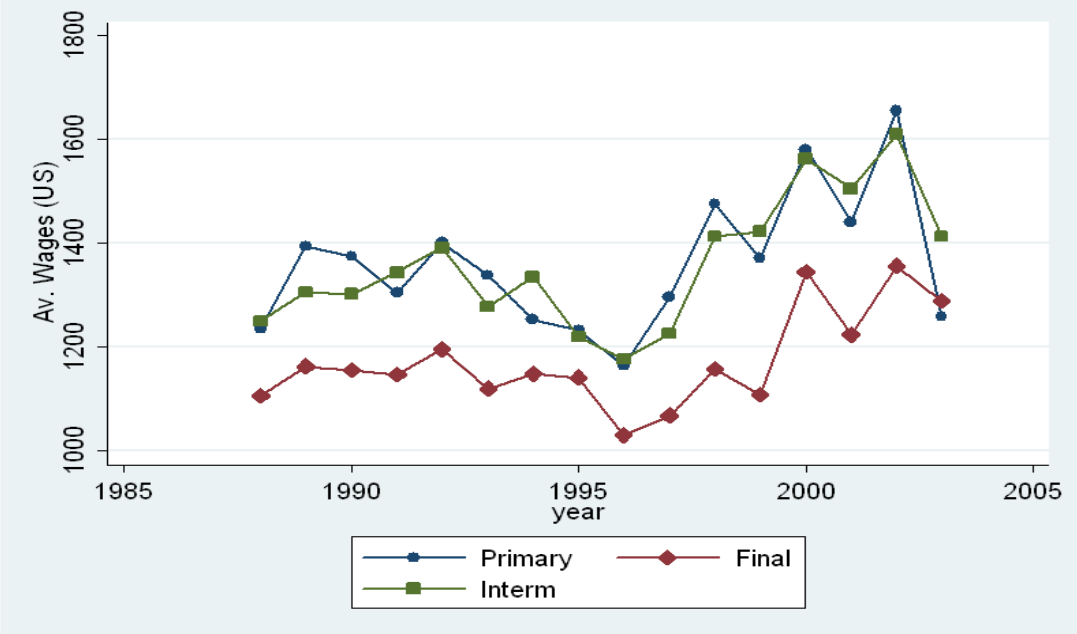
Source: Authors' calculations.

Figure 2.A1.6. Average tariffs by categories non-OECD countries (1988-2003)



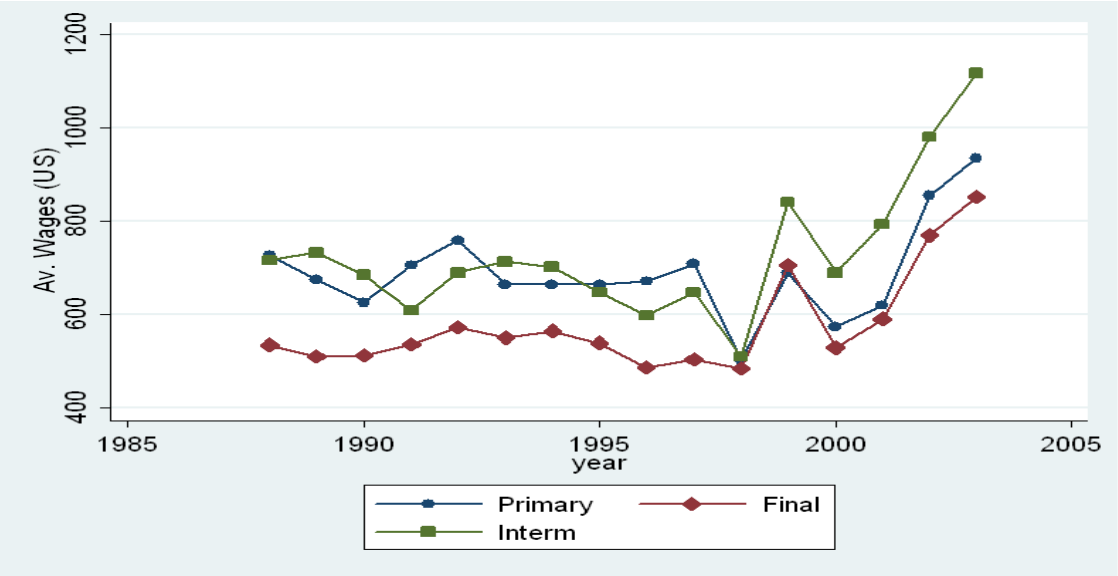
Source: Authors' calculations.

Figure 2.A1.7. Average wages by categories OECD countries (1988-2003)[a]



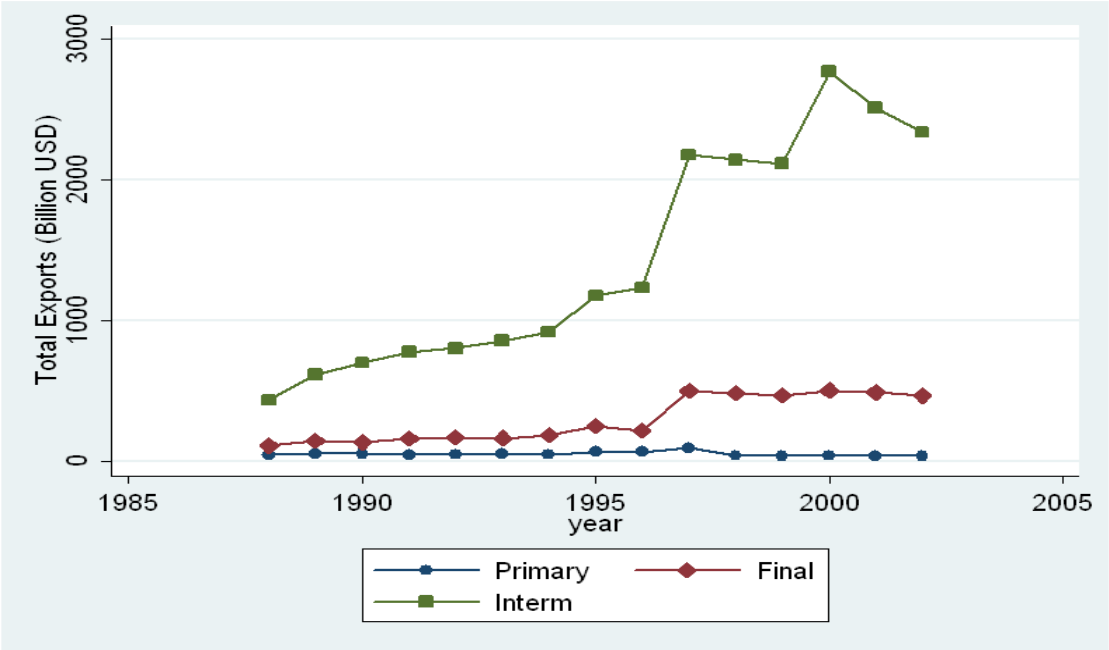
a. United States not included in 2003 due to lack of comparable wage data.
Source: Authors' calculations.

Figure 2.A1.8. Average wages by categories non-OECD countries (1988-2003)



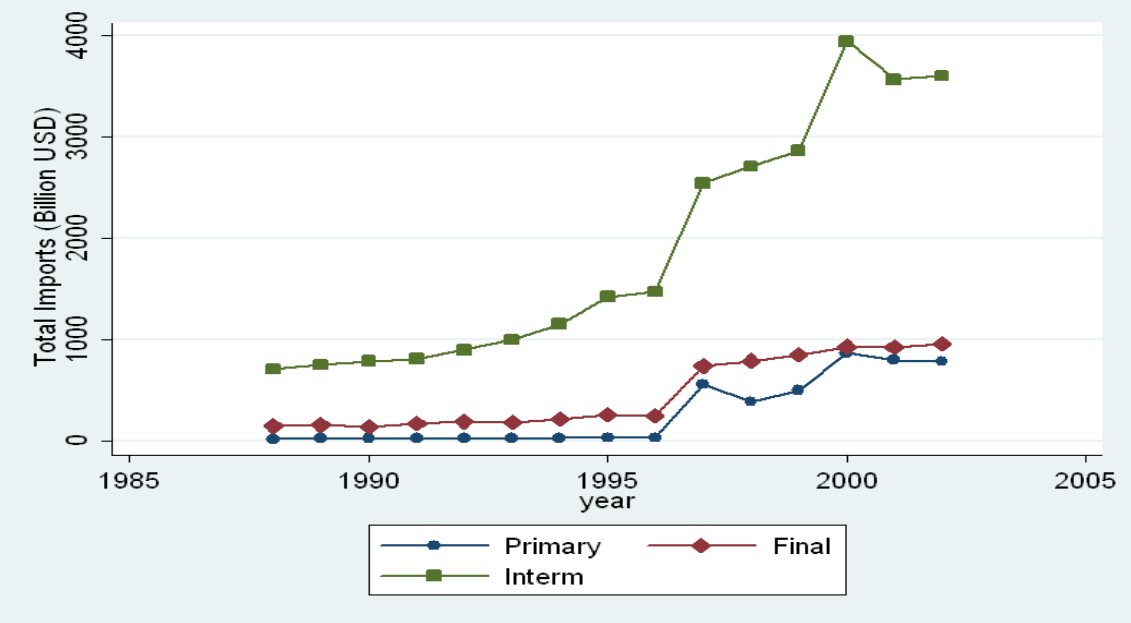
Source: Authors' calculations.

Figure 2.A1.9. United States' total exports by categories (1988-2002)



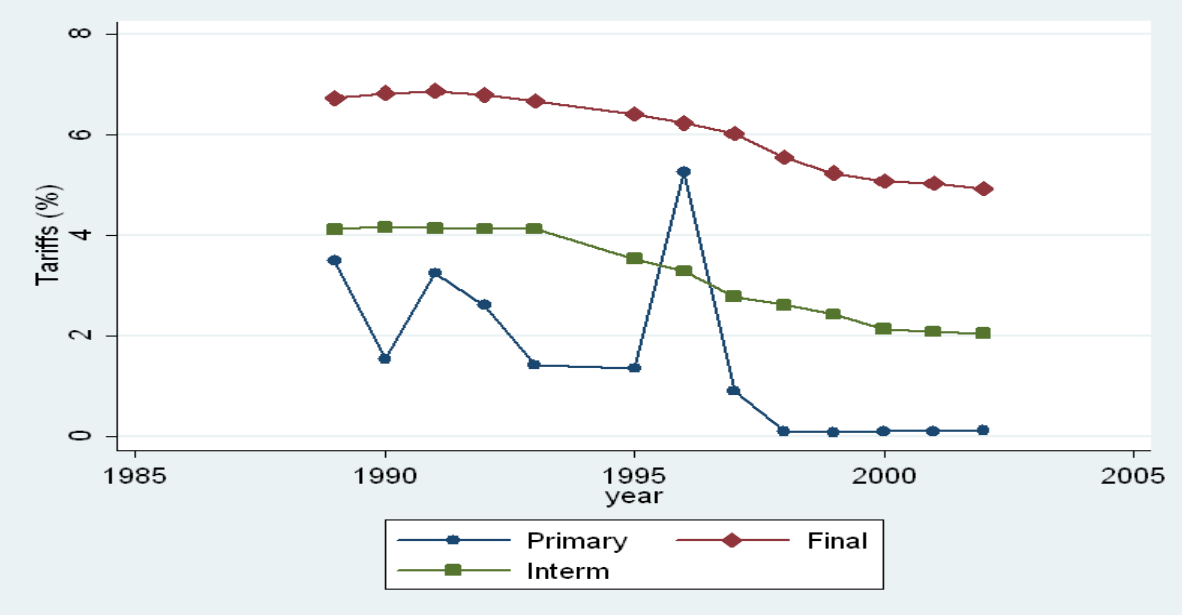
Source: Authors' calculations.

Figure 2.A1.10. United States' total imports by categories (1988-2002)



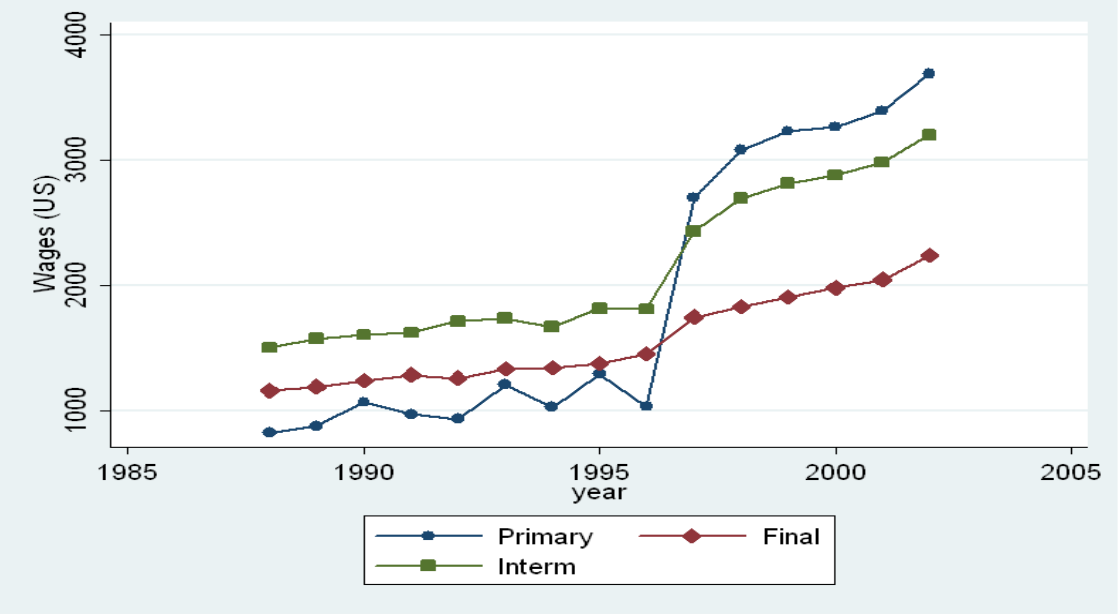
Source: Authors' calculations.

Figure 2.A1.11. United States' average tariffs (1988-2002)



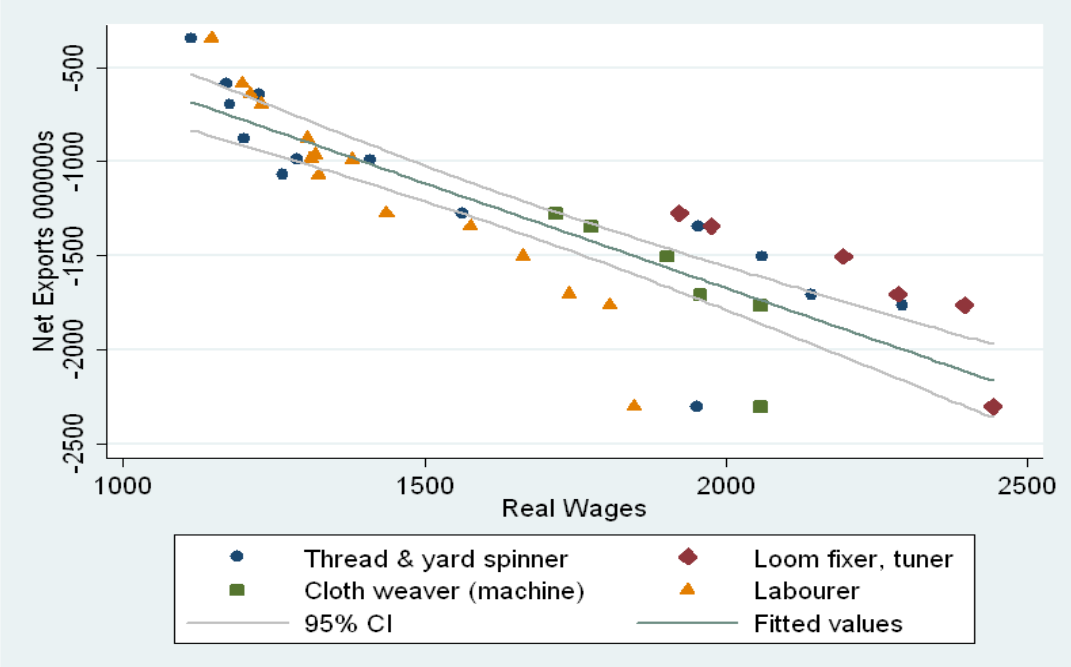
Source: Authors' calculations.

Figure 2.A1.12. United States' average wages (1988-2002)



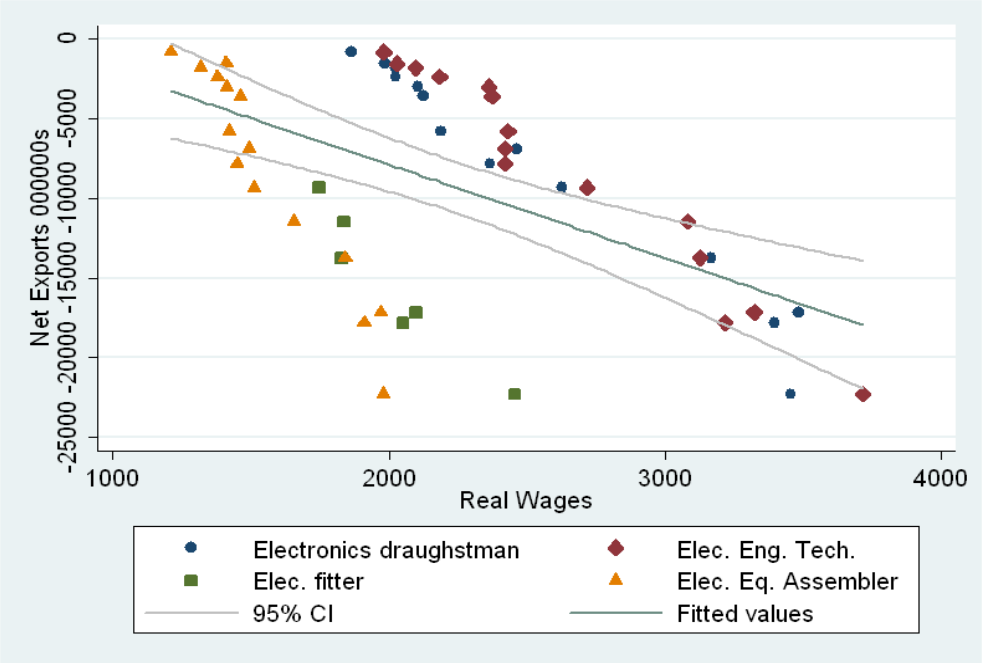
Source: Authors' calculations.

Figure 2.A1.13. US-China textile manufacturing:
US net exports and real wages by occupation (1988-2002)[a]



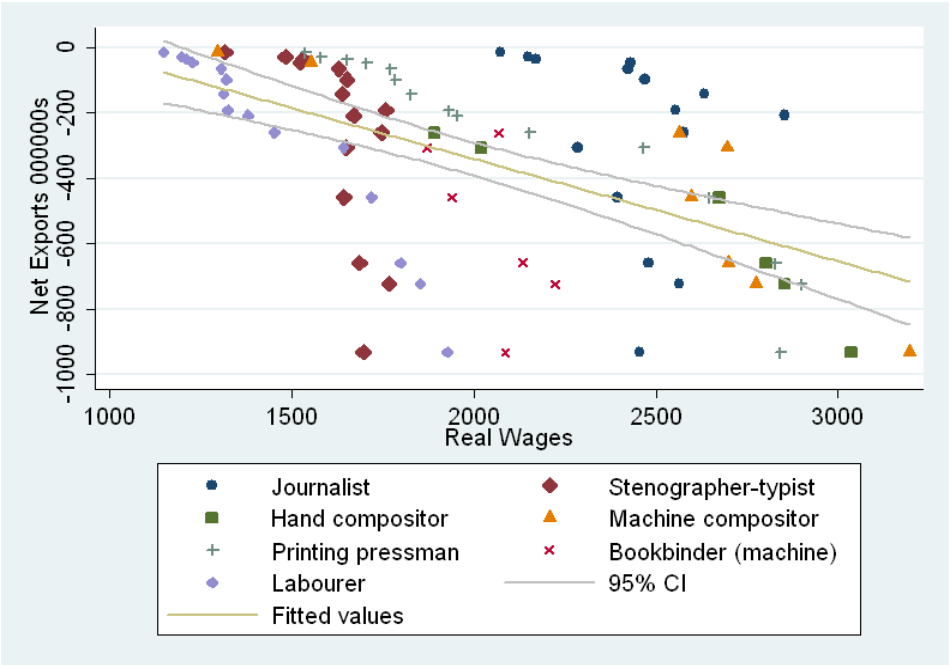
a. 95% CI represents a 95% Confidence Interval estimated around the fitted line.
Source: Authors' calculations.

Figure 2.A1.14. US-China manufacturing of electronic machinery: US net exports and real wages by occupation (1988-2002)[a]



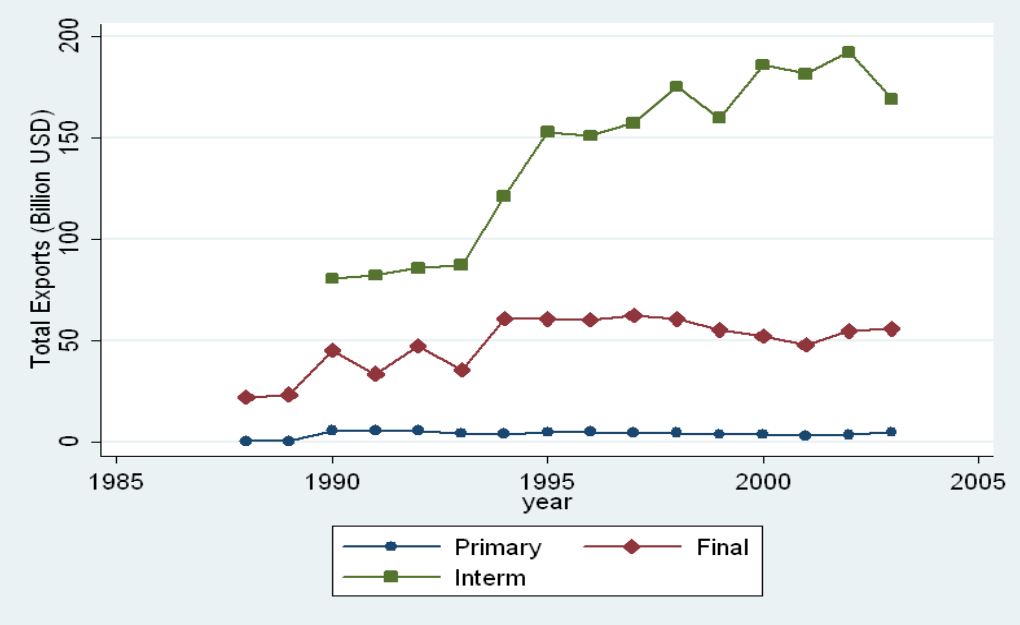
a. 95% CI represents a 95% Confidence Interval estimated around the fitted line.
Source: Authors' calculations.

Figure 2.A1.15. US-China printing and publishing: US net exports and real wages by occupation (1988-2002)[a]



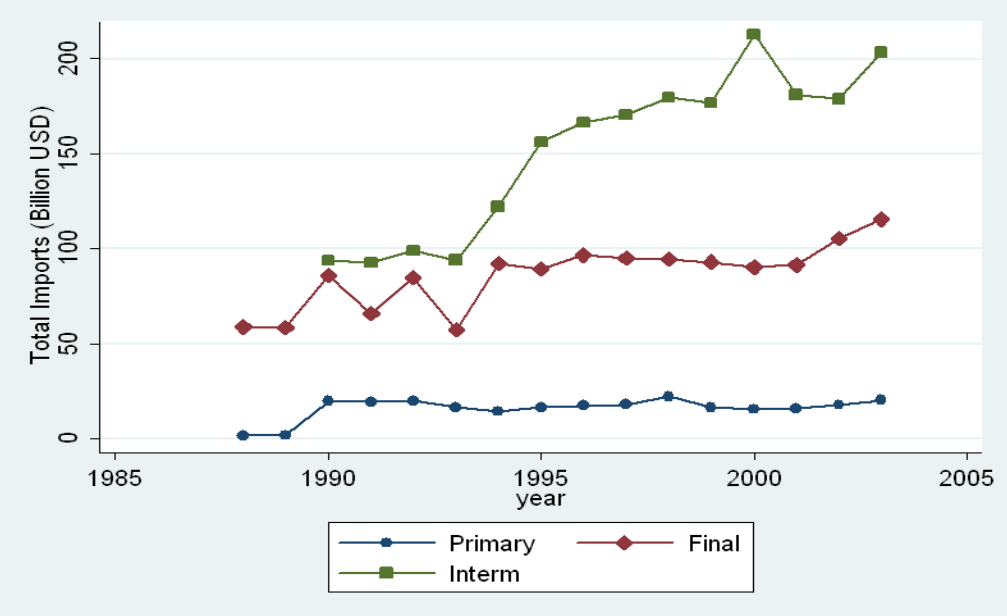
a. 95% CI represents a 95% Confidence Interval estimated around the fitted line.
Source: Authors' calculations.

Figure 2.A1.16. United Kingdom's total exports by categories (1988-2003)



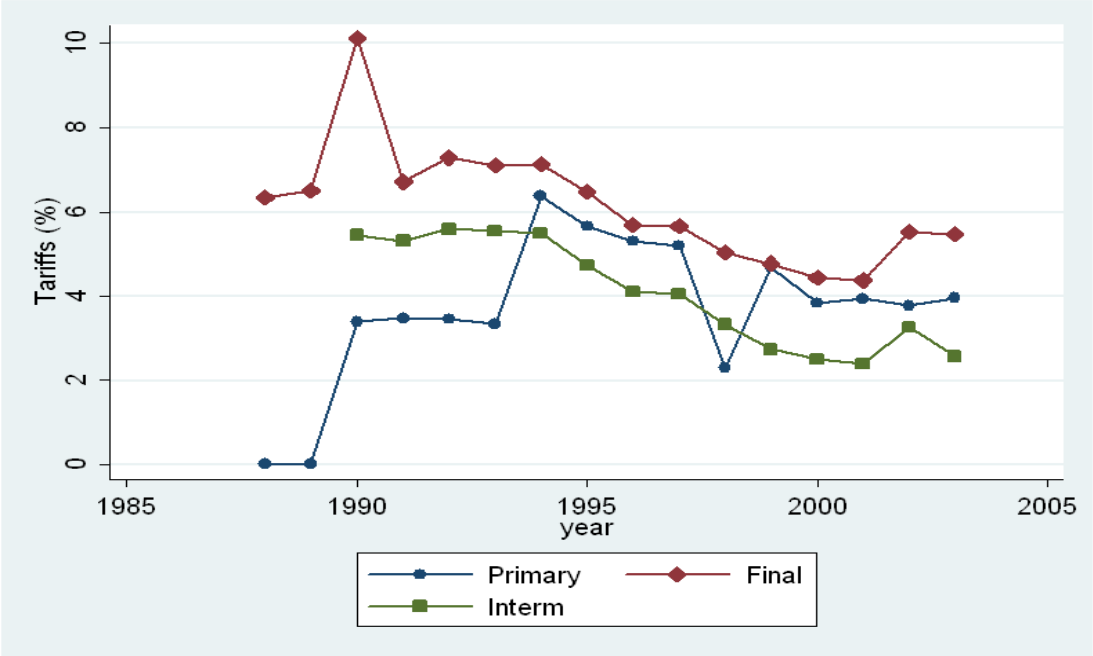
Source: Authors' calculations.

Figure 2.A1.17. United Kingdom's total imports by categories (1988-2003) Error! Bookmark not defined.



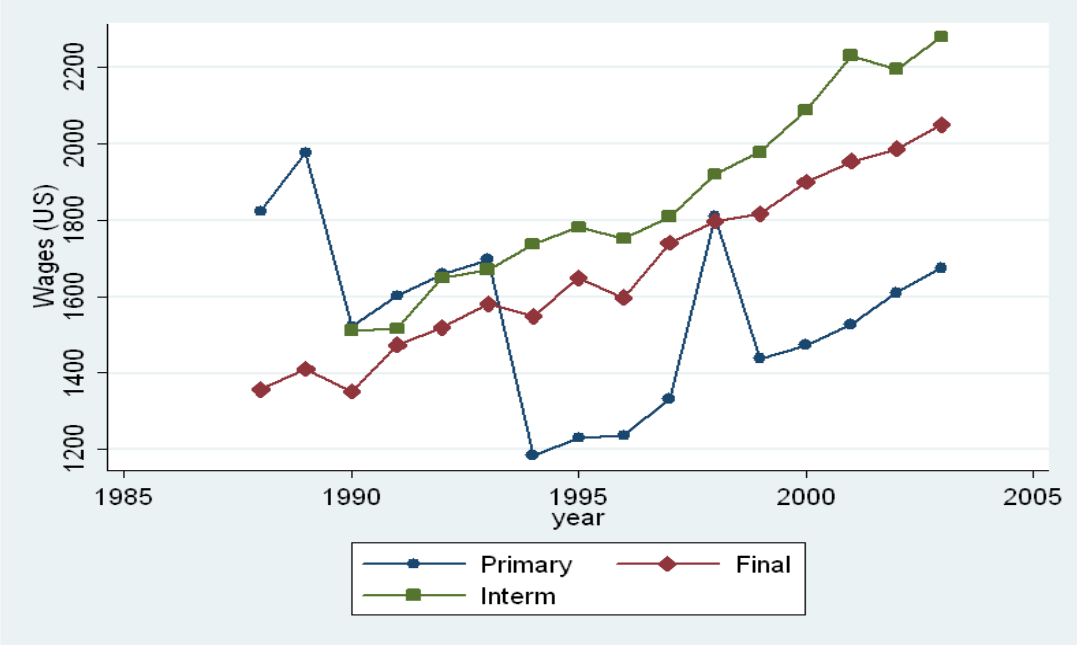
Source: Authors' calculations.

Figure 2.A1.18. United Kingdom's average tariffs (1988-2003)



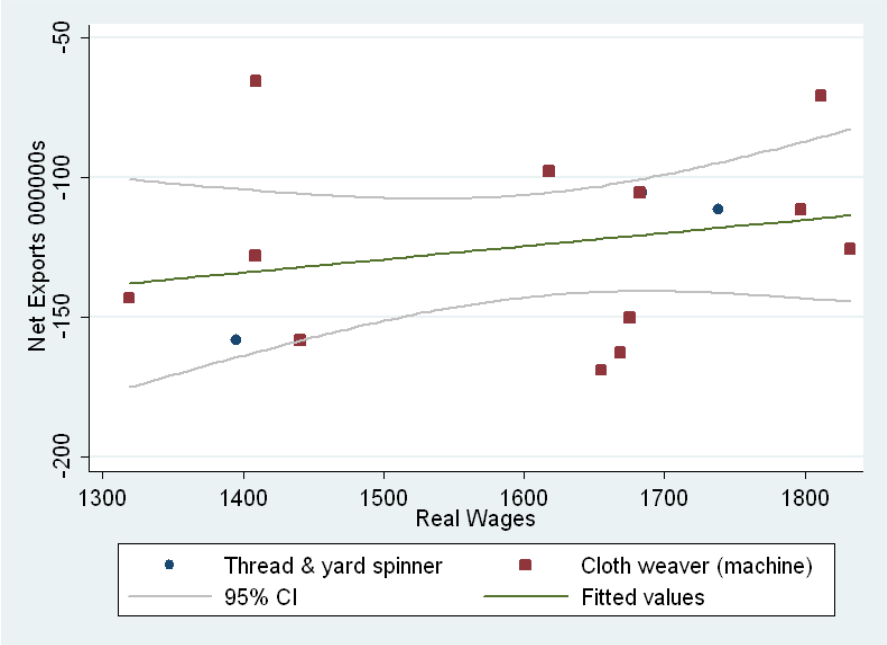
Source: Authors' calculations.

Figure 2.A1.19. United Kingdom's average wages (1988-2003)



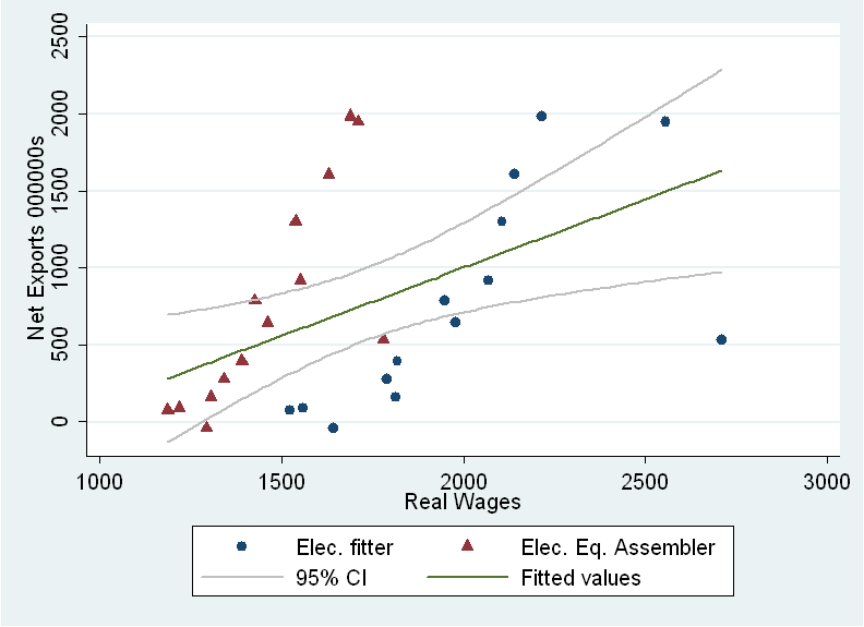
Source: Authors' calculations.

Figure 2.A1.20. United Kingdom-France textile manufacturing: UK net exports and real wages by occupation (1988-2003)[a]



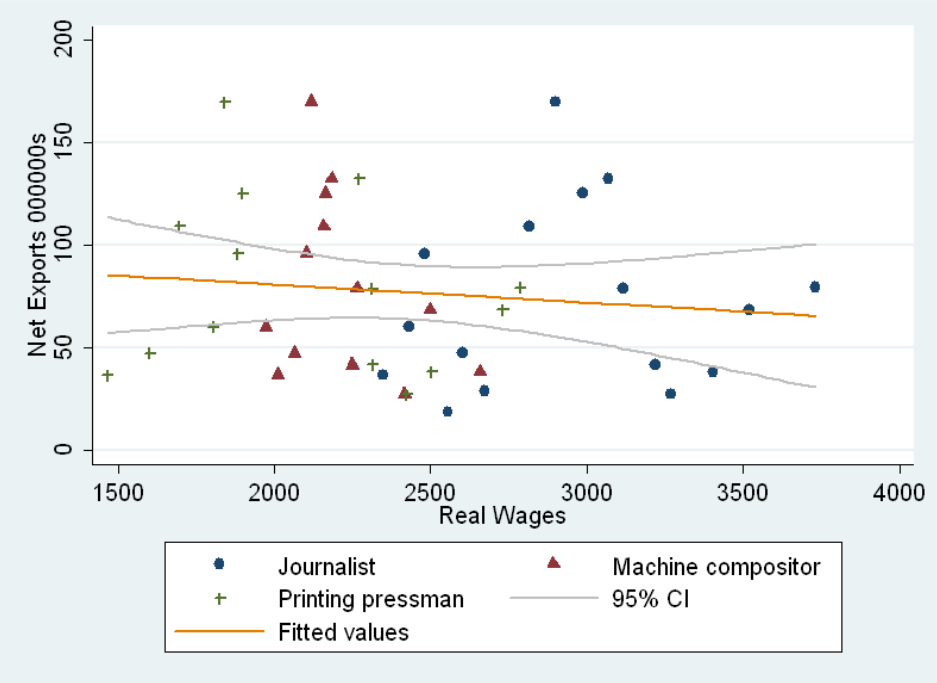
a. 95% CI represents a 95% Confidence Interval estimated around the fitted line.
Source: Authors' calculations.

Figure 2.A1.21. United Kingdom-France manufacturing of electronic machinery: UK net exports and real wages by occupation (1988-2003)[a]



a. 95% CI represents a 95% Confidence Interval estimated around the fitted line.
Source: Authors' calculations.

Figure 2.A1.22. United Kingdom-France printing and publishing: UK net exports and real wages by occupation (1988-2003)[a]



a. 95% CI represents a 95% Confidence Interval estimated around the fitted line.

Source: Authors' calculations.

Chapter 3

Trade, Employment and Structural Change: The Australian Experience

Greg Thompson, Tim Murray and Patrick Jomini

Australian Productivity Commission

International trade produces income gains across the world by facilitating an efficient allocation of production among trading countries. However, increased trade exposure also creates some challenges, and there are adjustment costs associated with changing trade patterns. Effective complementary policies, by promoting flexibility and adaptation within economies, can reduce adjustment costs associated with increased trade, and therefore ensure the benefits are maximised. This paper highlights these issues with reference to recent experience in Australia. Computable General Equilibrium modelling shows how the recent improvement in Australia's terms of trade is likely to have increased incomes and that the magnitude of these gains is directly linked to the degree of flexibility of the economy.

3.1. Introduction

International trade produces income gains that accrue across nations by facilitating an efficient allocation of production across the world.[1] However, communities and policy makers are often concerned about the effect that international trade might have on particular *domestic* industries, and the amount of employment. Traditionally, the debate has focused on the potential loss of domestic jobs in import-competing industries following trade liberalisation. But similar considerations arise when a country is already open to international trade, and the forces for structural adjustment stem from changes in world prices.

Trade and trade policy have not, of themselves, been found to have significant effects on employment in aggregate. Essentially trade policy allows a country to move along its production frontier to maximise returns from international exchange. As Krugman (1993) notes:

... the level of employment is a macroeconomic issue, depending in the short run on aggregate demand and depending in the long run on the natural rate of unemployment, with microeconomic policies like tariffs having little net effect. (p. 25)

That said, if trade openness were to promote increased national aggregate productivity, it could expand a country's production frontier. Interactions between trade shocks and labour market settings also have possible implications for aggregate employment. There is the potential for complementary policies (such as policies relating to the labour market) to affect the outcome of trade policies across several dimensions, but especially with regard to associated adjustment costs.

Openness to international trade in Australia has been increased by reducing barriers to imports while simultaneously implementing a range of competition-enhancing reforms domestically. Australia's trade intensity has nearly doubled over the past 50 years through increased integration with trading partners. Reforms have contributed to growth in real incomes, and international trade has been an important contributor to Australian income growth, most recently through an improvement in terms of trade.

At the same time, increased trade exposure and external shocks have created some challenges. Large changes in the relative prices of exports and imports are responsible for some recent adjustment pressures.

The purpose of this paper is to illustrate the mechanisms that link trade, income and employment in Australia. A framework section is followed by an overview of the Australian experience. Various modelling approaches have been used to estimate the likely contribution of liberalisation, and of the recent rise in Australia's terms of trade, to incomes and sectoral employment changes, and the role of flexibility in facilitating the structural changes required to reap the benefits of trade. Computable General Equilibrium (CGE) modelling – including a study developed for this paper – shows how the recent improvement in Australia's terms of trade is likely to have increased incomes and that the magnitude of these gains is directly linked to the flexibility of the economy.

1. The views expressed in this paper are those of the staff involved and do not necessarily reflect the views of the Productivity Commission, the OECD, OECD Member Countries or partner organisations of the International Collaborative Initiative on Trade and Employment (ICITE).
Thanks to Philip Harslett for modelling assistance and Lisa Gropp for valuable input into previous drafts.

3.2 Links between trade and employment – framework

Trade allows countries to specialise in the areas in which they have a comparative advantage – that is, where the opportunity costs of resources are lowest. Specialisation leads to an increase in activity and employment in the export sector. At the same time, consumers can purchase imported commodities at lower prices than if trade were restricted.

Trade liberalisation triggers a restructuring process, which causes some jobs to be lost, and new ones to be created (ILO and WTO, 2007). Specialising in the areas of comparative advantage shifts resources to their most productive use, increasing the value of aggregate production and incomes. Openness to trade (and competition from foreign firms) also encourages producers to search for more efficient production processes, and can improve their future prospects.

A reduction in import price and an increase in export prices both contribute to increasing real incomes, although they can require significant adjustments. Notwithstanding the benefits of liberalisation and of terms of trade improvements, the induced contraction of some sectors and the expansion of others in response to price signals involve adjustments (Box 3.1). Factors of production such as buildings and machinery either need to be put to other uses or written off. Workers who become unemployed need to be able to move to other jobs. That said, trade is not the only cause of structural change – improvements in technology, changes in demography and consumer tastes, etc also contribute to continuous structural change.

Box 3.1. Income and adjustment effects of a mining boom

The recent expansion in Australian mining activity has revived interest in the sectoral and employment effects of growth in export industries. In an early contribution, Gregory (1976) examined the effect of new mineral discoveries on a 'traditional' (rural) export sector and an import competing sector. Work in this area was extended by Snape (1977), Corden and Neary (1982) and Cook and Sieper (1984), among others, and is relevant to the analysis of the effects of new mineral discoveries, as well as of changes in the terms of trade.

The forces behind the structural adjustment to a resource boom can be reduced to expenditure and resource reallocation effects, which are effected via changes in real exchange rate and relative price signals:

- The expenditure effect arises from the increase in real income due to the new discovery or terms of trade improvement. Some increased income is directed to expenditure on non-traded goods. As a consequence, the real exchange rate appreciates and puts pressure on the other parts of the economy, especially the non-booming traded sector.
- The resource movement effect arises from resources (labour and capital) moving into the mining sector in response to increased returns in that sector and into the non-traded sector as a result of its expansion.

The contraction in non-mineral exports and import-competing industries is often referred to as the "Gregory thesis", "de-industrialisation", or "Dutch Disease" (named after the perceived effects on manufacturing in the Netherlands following the discovery of North Sea gas in the 1970s).

In practice, structural adjustment takes time and is not costless. Many factors can hinder labour mobility, particularly in the short run. These can include various barriers to geographic mobility (for example, relocation costs) or limited transferability of skills across and within sectors (resulting in re-training costs). Inflexible or distorted prices can also affect the speed and degree of adjustment, by preventing prices from transmitting vital signals to buyers and sellers. In turn, this hinders the ability of resources to move to areas in which they can be used most productively, reducing efficiency and the potential gains from trade.

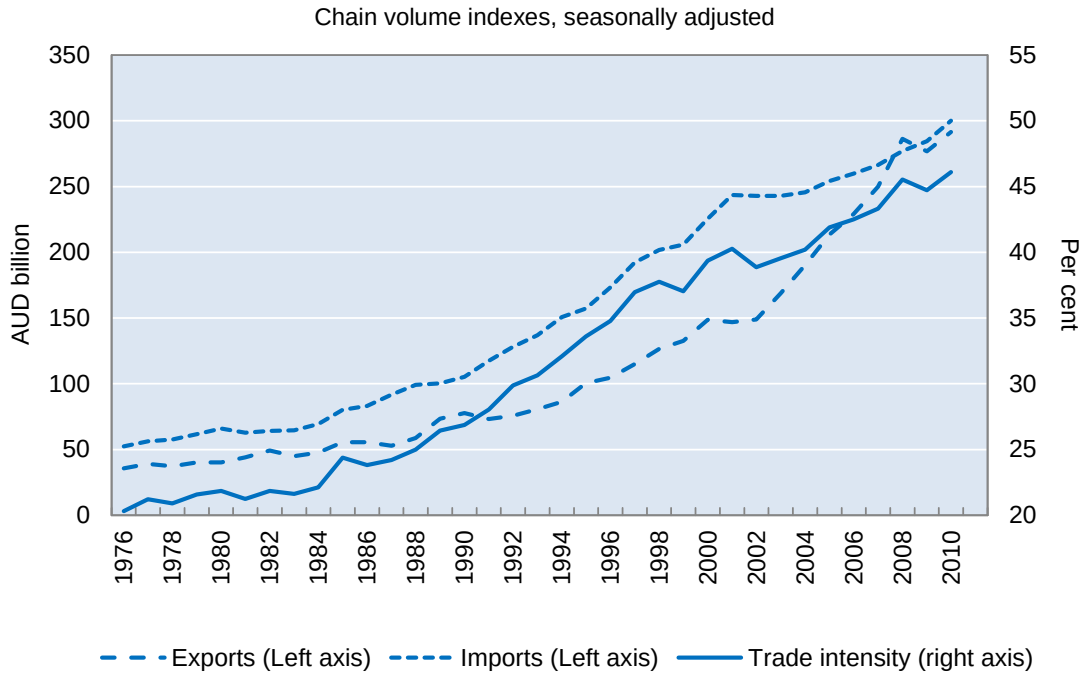
3.3 The Australian experience

Increased 'interconnectedness', decreasing transport costs and trade and travel market liberalisation have all contributed to opening of the Australian economy, and led to significant changes in the structure of its trade, output and employment.

Trade: volumes, assistance and prices

Australia's linkages with overseas economies have steadily increased (Figure 3.1). Over the past 50 years, Australia's trade intensity (the ratio of exports and imports to GDP) has nearly doubled, increasing from around 25% of GDP in 1975 to over 45% by 2010.

Figure 3.1. Australia's trade in goods and services, 1976–2010



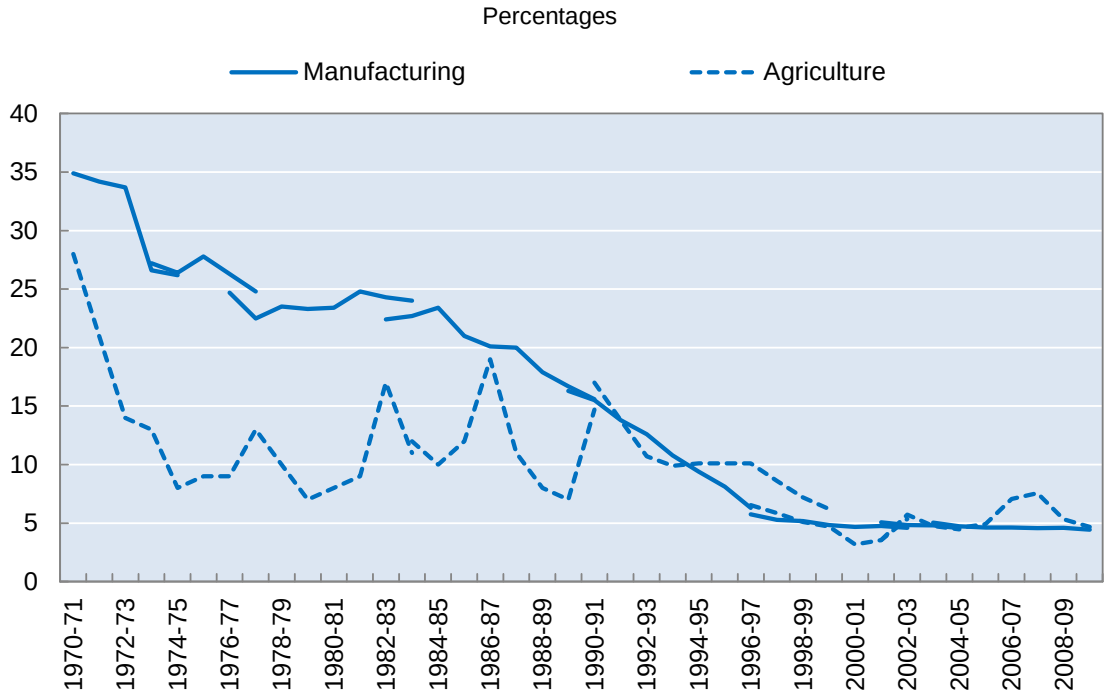
Source: ABS (Balance of Payments and International Investment Position, Australia, Cat. no. 5302.0); ABS (Australian System of National Accounts, Cat. no. 5204.0); World Bank (2011).

Unilateral liberalisation

Australia's trading system in the immediate post-Second World War era was one of high regulation, involving the use of policy tools such as tariffs, quotas, price controls, and production subsidies to protect import-competing firms from international competition (Snape, Gropp and Luttrell 1998).

In July 1973, a 25% tariff reduction across the board marked the beginning of a move to a more liberal trading regime. While followed by some reinstatement of support to certain industries, the trend towards liberalisation and deregulation resumed in the 1980s, with sustained reductions in effective rates of assistance for manufacturing and agriculture (Figure 3.2).

Figure 3.2. Effective rates of assistance[a,b], 1970-71 to 2009-10



a) The effective rate of assistance is defined as the net assistance received per dollar of value added.
b) Overlapping observations arise from revisions to industry input and output measures used to estimate effective rates.

Source: PC (2011).

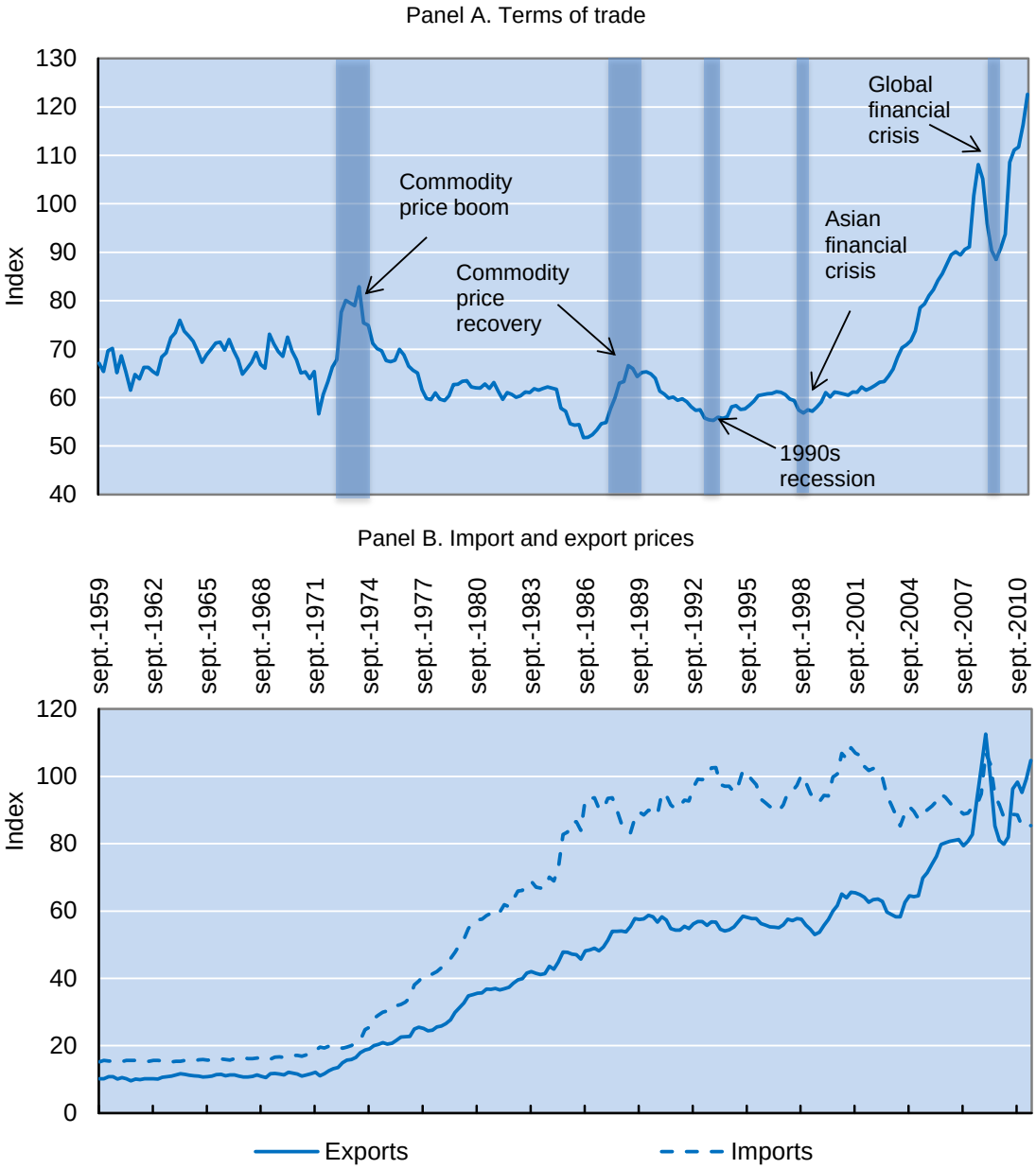
Terms of trade: recent improvements

A great deal of attention in Australia has focused on the recent expansion in mining activity brought about largely by China's growth. This has been associated with a large rise in Australia's terms of trade, to historically high levels, driven by increases in demand for exports (combined with a slow supply response), and decreasing import prices. The terms of trade improvements are larger than many other external shocks experienced post WWII, such as previous commodity price booms, the Asian Crisis in 1997, and the 2008 Global Financial Crisis (Figure 3.3).

Since 2004, there has been a sustained increase in the prices of Australian minerals. The prices of many Australian consumer imports have also declined over the past ten years (Figure 3.4). The "China effect" – the combined increase in demand for Australian exports and decrease in the cost of Australian imports – has been a major source of change in the structure of prices for Australian producers and consumers: the price of exports increased nearly 20%, and the price of imports fell nearly 10% (adding up to a 30% improvement in the terms of trade).

Figure 3.3. Australia's terms of trade, export and import prices, 1959 to 2011

Goods and services, seasonally adjusted, 2008-09 = 100

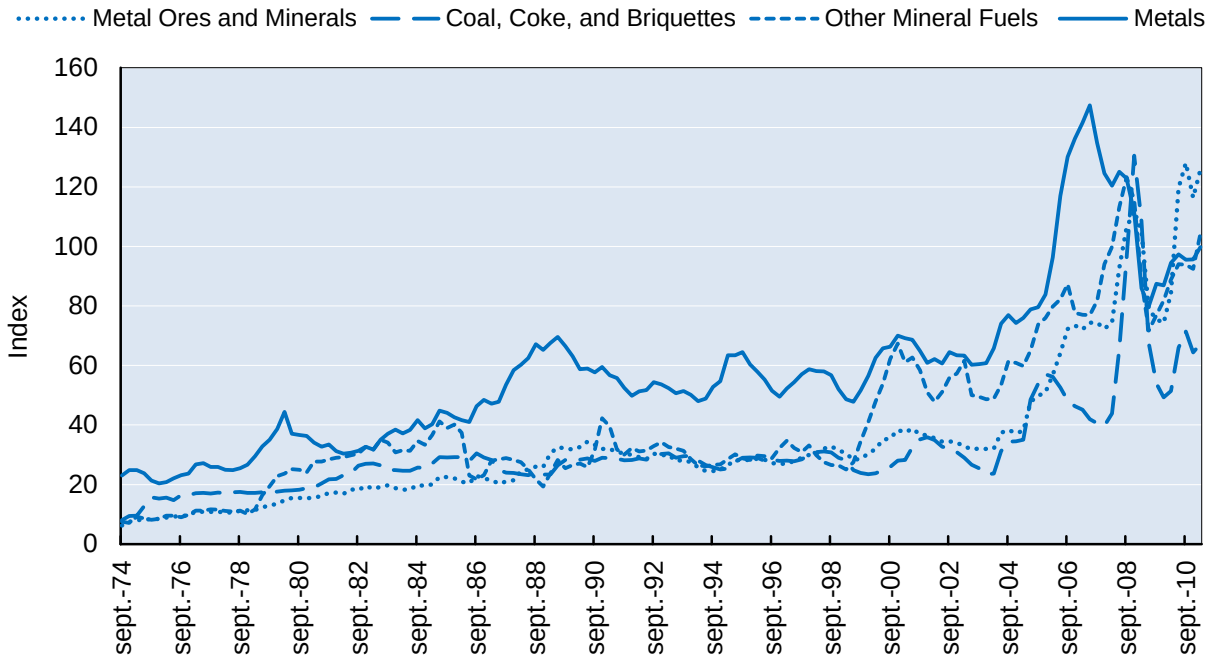


Source: ABS (*Australian National Accounts: National Income, Expenditure and Product*, Cat. no. 5206.0) and Treasury (2002).

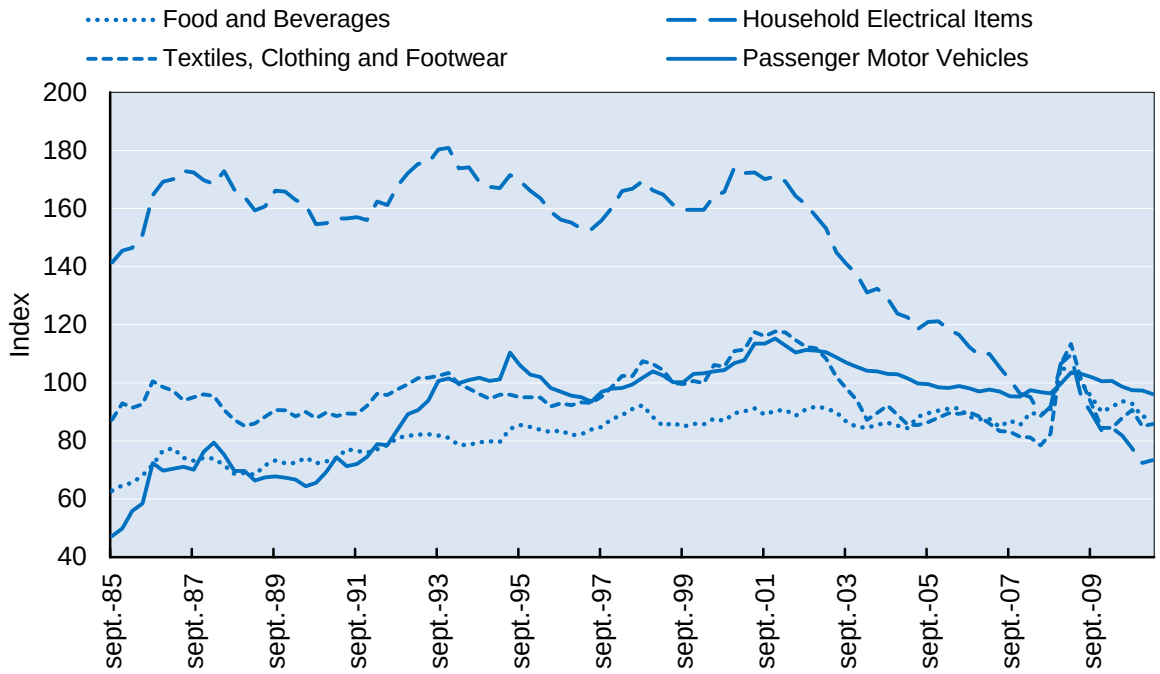
Figure 3.4. Selected export and import prices, Sep 1974 to Mar 2011

2008-09 = 100

Panel A. Export prices



Panel B. Import prices



Source: ABS (*Balance of Payments and International Investment Position, Australia*, Cat. no. 5302.0).

Employment and wages

Over the liberalisation period, aggregate employment has grown, and the structure of employment has changed (Figure 3.5, Panel A). Since 1984, employment has declined by around 10% in manufacturing, has more than doubled in mining, and has increased by 40% in services, which now accounts for over 80% of Australia's total employment.[2]

Since 2005-06, real wages have grown about 3% annually in mining, and more slowly in manufacturing and services (about 0.5% annually; Figure 3.5, Panel B).

3.4. Structural change and flexibility

The composition of the Australian economy has changed markedly over the past century. In the early decades of the twentieth century, more than 20% of Australian workers worked in the agricultural sector of the economy (Figure 3.6), another 20% were employed in the production of manufactures, and about half were employed in services.

As Australia's economy has developed and incomes have grown, services have become a greater part of the consumption bundle and a greater source of employment. At the same time, the share of agricultural employment has declined. Post WWII to the late 1960s, the share of manufacturing employment was roughly stable. Since the early 1970s, the share of manufacturing employment has been on a downward trend. Today, services account for the overwhelming majority of jobs. Similar trends are observed in relation to the contribution of the various sectors of the economy to total output (Figure 3.6). The rising importance of services in the economy and the relative decline of other sectors is a natural consequence of generally rising incomes, an experience shared by many other economies in the OECD (Görg, 2011).

Indicators of structural adjustments and mechanisms by which these occur include:

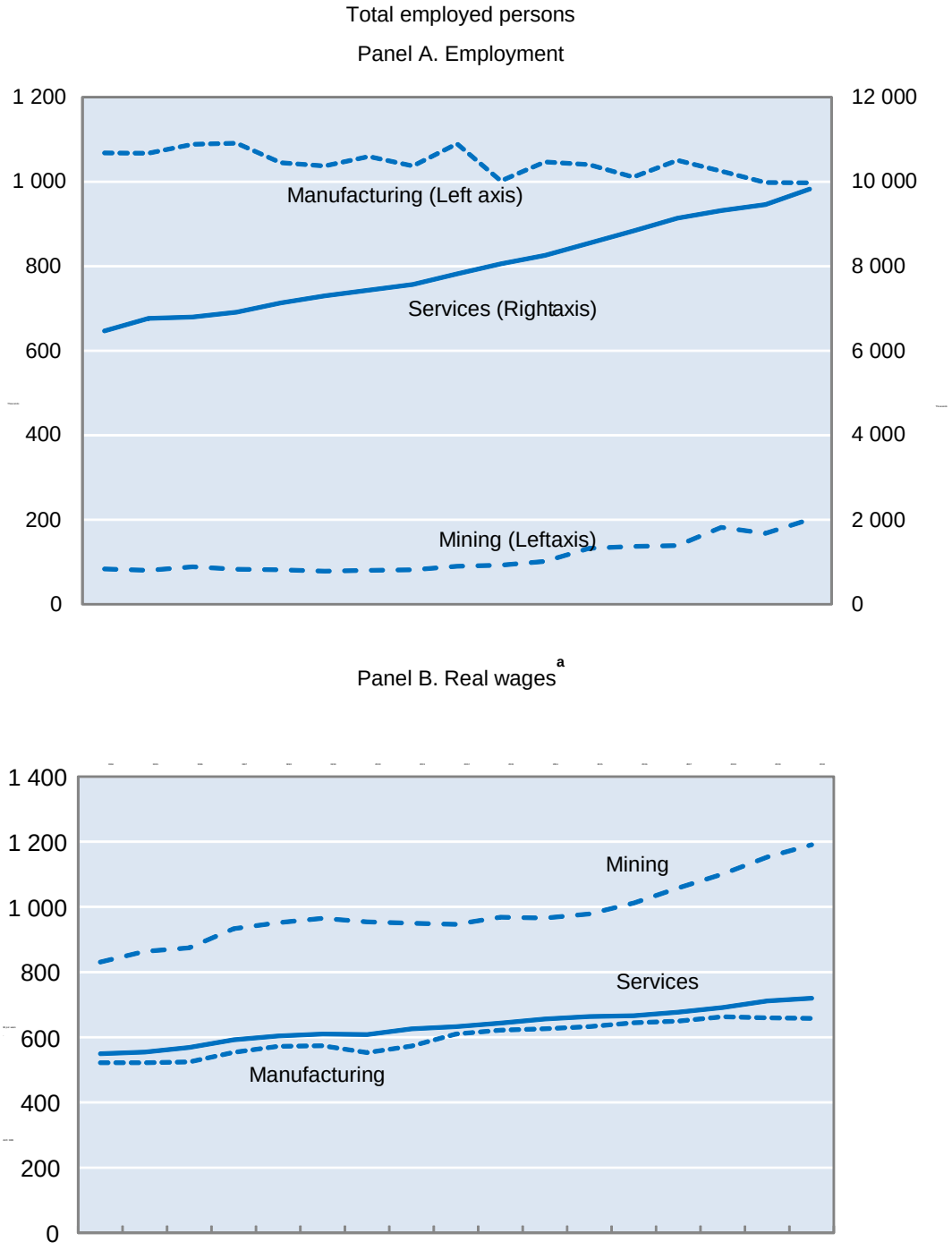
- Each year around 300 000 new businesses are created, and a similar number cease to exist (ABS, 2010a).
- As at February 2010, nearly two million workers (or almost 20% of a workforce of around 11 million) had been with their current employer or worked in their current business for less than 12 months; of those, almost 550 000 had changed the industry in which they worked relative to their previous job (ABS, 2010b).

Noting these data, the Secretary of the Australian Treasury observed:

Just as Australia is an economy in transition, the business and people who succeed are those that embrace and adapt to changing circumstances (Parkinson, 2011, p. 24).

2. Part of the reduction in employment in manufacturing is attributable to a statistical artefact linked to increased outsourcing since the 1990s. For example, prior to the 1990s, many manufacturing firms employed accountants who were counted as part of manufacturing employment. Since then, many manufacturing firms have outsourced their accounting to external accounting firms whose employees are counted as part of the services sector. A similar trend has occurred for many other functions including logistics, warehousing and engineering.

Figure 3.5. Employment and real wages, by sector, Australia, 1994-95 to 2010-11[a]

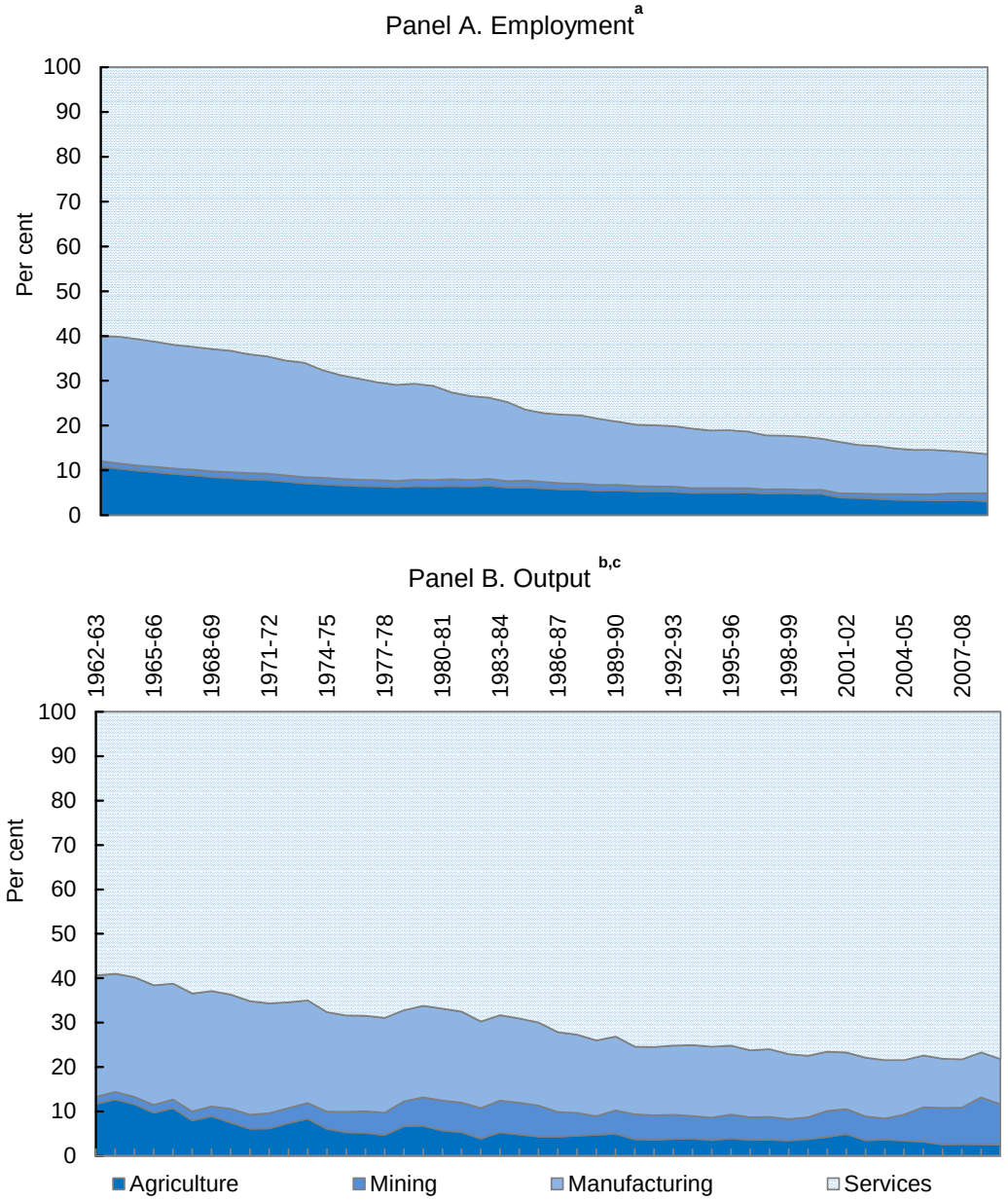


a) Average weekly adult ordinary time earnings deflated by the consumer price index. Average across 16 service industries.

Sources: ABS (*Labour Force, Australia, Detailed, Quarterly*, Cat. no. 6291.0.55.003); ABS *(Average Weekly Earnings, Australia*, Cat. no. 6302.0; *Consumer Price Index, Australia*, Cat. no. 6401.0).

Figure 3.6. Composition of Australian employment and output, 1962-63 to 2010-11

Sectoral shares of total employment and output [b, c]



a) Data from 1962-63 to 1980-81 based on Withers, *et al.* (1985); for 1981-82 to 1984-85, data based on Foster (1996); from 1985-86, annual averages from ABS.

b) Share of sectoral value added in GDP less ownership of dwellings and taxes and subsidies, current prices.

c) Data from 1962-63 to 1988-89 based on Foster (1996); from 1989-90 onwards, based on ABS.

Sources: ABS (*Australian System of National Accounts*, cat. no. 5204.0); ABS (*Labour Force, Australia, Detailed, Quarterly*, Cat. no. 6291.0.55.003); Foster (1996); Withers, *et al.* (1985).

Facilitating structural change and minimising adjustment costs

When resources are reallocated according to market price signals, they are directed to their most highly valued activities, yielding income gains to an economy. However, structural adjustment can be costly, requiring substantial retraining, relocation, and administrative costs (Francois *et al.*, 2011). Flexibility in prices and resource movements can minimise the costs of adjustment.

The wide-ranging program of economic reform in Australia in the 1980s and 1990s included the floating of the dollar in 1983, deregulation of the banking sector, phased reductions in tariffs and other industry assistance, reforms of government business enterprises and deregulation of the labour market (IC, 1998). These reforms enhanced the flexibility and dynamism of the Australian economy and improved its ability to adapt to change (Downes and Stoeckel, 2006).

Labour can be limited in its ability to move between sectors and regions, incurring adjustment costs as it moves across the economy. Costs are associated with acquiring new skills and qualifications, relocation, and finding new employment. Sometimes, displaced workers take on lower paid jobs as they move across sectors, particularly if the cost of moving to another jurisdiction is high.

Some costs are inherent to structural adjustment and largely unavoidable. For example, there are always costs associated with relocating. Well-designed labour market policies can facilitate adjustment by reducing the costs of labour mobility, both across occupations and regions (Francois *et al.*, 2011). Efforts have been made to reduce inherent costs associated with adjustment, for example training and adjustment assistance, and policies designed to help the unemployed find work (Box 3.2).

Further efforts have been made to reduce policy-related labour market rigidities. In Australia, reforms encouraging wage flexibility, and addressing impediments associated with in regulatory arrangements, have reduced such adjustment costs.

Box 3.2. Unemployment services in Australia

In Australia, subsidised employment services are provided to the unemployed to help them find work. These services are particularly targeted at disadvantaged groups. Up until 1998, this service was provided by the Commonwealth Employment Service, a government agency. This service is now funded through Job Services Australia and for-profit, not-for-profit, and potentially, government owned agencies can compete for contracts. Centrelink, which also manages welfare benefits, was established as the government agency responsible for administering the system.

The Productivity Commission found that the 'purchaser-provider' model reduced the cost of service without affecting client outcomes. The network provides incentives for providers to match clients with suitable employment and training.

Source: Department of Education Employment and Workplace Relations 2011, PC 2002.

Policy settings in the current mining boom

The current mining boom in Australia has seen Australia's nominal exchange rate appreciate considerably as higher demand for exports puts pressure on the real exchange rate to appreciate. Flexibility of the exchange rate and in wages during this boom have contributed to lessening some of the adjustment costs relative to those experienced in previous booms.

As Battelino (2010) and Banks (2011) have observed, in earlier mining booms (in the 1960s and 1970s), the required appreciation of the real exchange rate occurred via an increase in domestic prices. Increasing prices reduced the competitiveness of Australian goods, reducing net

exports until a new equilibrium was attained. Labour and other resources were reallocated to expanding sectors, even though the wage setting system was much less flexible than it is today, and wages could not vary as easily across industries, occupations and time. With fixed nominal exchange rates and relatively constrained nominal wage adjustments, short-term adjustments were magnified. There were large expansions of the sectors participating in the booms, and correspondingly large contractions of others, which ultimately were partly reversed by increases in Australian domestic prices. Flexible exchange rates, by directly changing the relative prices of traded and non-traded goods and services, better facilitate the efficient movement of resources across sectors, avoiding magnified short-run responses and consequent readjustments.

A more flexible wage system has facilitated the movement of labour to expanding sectors. Connolly and Orsmond (2011) argue:

> *The consequences of the mining booms in the 1970s and early 1980s for inflation were magnified by the wage fixing system, which tended to transmit demand pressures in one sector to wages across the economy through the principle of comparative wage justice … In contrast, the replacement of the centralised wage system with more deregulated wage structures has enabled a rise in mining industry wages in the 2000s to be contained from the wage structure across the economy. … the economic reforms undertaken by Australian Governments since the 1970s to deregulate product markets have improved the ability of the economy to flexibly respond to mining booms and relative prices more broadly … lower trade barriers have given households and businesses greater access to global markets to satisfy the extra demand generated by the mining boom. (pp. 37–38).*

Labour market flexibility has been associated with increased employment, hours worked and labour productivity. Changes in external conditions have increased the interest of employers in market and regulatory structures that enabled them to make differentiated labour market responses (Wooden, 2001). These changes have not been associated with declines in job security. Wooden (1998) found that in 1998 on average, workers had been in their current job longer and the proportion of persons in short-term jobs had declined relative to 1975.

Greater flexibility in foreign exchange, labour, and product markets have therefore enabled Australia to better capture benefits from the boom while avoiding some of the adjustments that have arisen in the past.

The benefits afforded by flexibility are not limited to events such as mining booms and terms of trade increases. It can improve the ability of the economy to respond to shocks – positive and negative – from other sources. The Reserve Bank of Australia's Assistant Governor, has attributed part of Australia's success during the Global Financial Crisis to the flexibility built in the Australian economy:

> *When demand weakened, many firms and their employees agreed to reduce working hours as a way of preserving jobs. And in other cases, wage rises were reduced or delayed as a way of avoiding layoffs. These responses helped limit the rise in the unemployment rate. (Lowe 2010, p. 2).*

Structural adjustment and "Dutch disease"

Some argue that, although the mining boom offers Australia an opportunity to enjoy higher real incomes, it has detrimental long-term effects on industries, such as manufacturing, that are adversely affected by the real appreciation. That is, Australia might be afflicted by "Dutch disease". Dutch disease refers to the possibility of a diminished role for manufacturing in a country following the discovery of, or increased demand for, a country's natural resources. However, as Banks (2011) has observed:

... if and when the mining boom comes to an end, there will be forces within our economy that will automatically favour other traded industries again. (p. 11)

For example, were demands for Australia's mining commodities to fall in the future, the exchange rate would depreciate, and other export industries and import-competing industries would experience an increase in their competitiveness. The varied nature of the Australian manufacturing sector means that even in the event of certain industries disappearing entirely, other industries in the manufacturing sector could expand in response to those terms of trade movements. Flexibility would be important in responding to such a development – ensuring that resources could easily be directed to alternative uses, allowing for a smooth transition to new production and employment activities.

It has also been argued that due to the ephemeral nature of sudden increases in demand, the manufacturing sector needs to be protected to prevent major capital shedding (both in terms of physical and human capital), enabling the industry to return to previous levels of output when the boom recedes. However, it could also be argued that a better approach would be to remove barriers that limit productivity and the movement of factors, and implement policies that minimise the adjustments associated with the structural changes that are required to adapt to the changes in economic environment.

Attempting to limit Dutch Disease

Attempting to prevent the movement of resources towards mining and related activities – where they are currently highly valued – has the potential to be costly. It would require Australia to forgo part of the increases in aggregate income.

The increase in income as a result of the resource boom provides scope for redistribution through the tax system. Increased labour and capital income throughout the economy increases government revenues, through income taxes and taxes that relate to economic activity (such as goods and services taxes). In Australia, given significant foreign ownership in the mining sector, taxes on mining incomes are an important means of increasing national income. Additional tax revenue allows increased government expenditure; some of which (for example education and health expenditure) has strong redistributive characteristics.

Holding resources in industries under threat from import competition comes at the cost of foregoing the benefits that arise from the reallocation of resources toward expanding sectors.[3] This is in addition to costs such as higher consumer prices for imported goods, and possible longer-term effects such as reduced incentives for innovation due to weaker exposure to competition.

3.5. Links between trade and employment - evidence

This section draws on various studies – including one developed for this paper – that use modelling techniques to explain the likely influence of trade on employment outcomes, income and the structure of the economy. The studies are divided into two types: econometric studies that identify statistical associations that confirm theoretical hypotheses and CGE studies that make strong assumptions about economic structure and behaviour to explain the likely links between trade, income and employment. The CGE studies are also used to illustrate the

3. This analysis is complicated if there are varying degrees of foreign ownership across industries. Given the relatively small deviations between industries in the share of factor incomes that flow to foreigners, this impact is likely to be small.

importance of flexibility, particularly in labour markets, in maximising the benefits flowing from changes in external conditions.

Import competition, trade and employment

Gaston (1998) used a regression framework to estimate how reductions in assistance to manufacturing have affected employment in the sector. Using data for twelve manufacturing industries for the period 1973-74 to 1991-92, Gaston estimated that a 10% reduction in the effective rate of protection was associated with a 1% reduction in manufacturing employment.

The Productivity Commission (2003) used Gaston's parameters to estimate the effects of trade on manufacturing employment over a longer timeframe. The overall effect of trade on employment was computed as the sum of effects from export and import growth and from reductions in the effective rate of assistance.[4] These changes were estimated to reduce manufacturing employment by around 20% from 1969-70 to 2001-02. The bulk of this was attributable to a growth in imports mainly due to decreases in import prices, rather than through reduced assistance.

Felbermayr *et al.* (2009) seek to answer whether trade openness affects the long run rate of unemployment. They conclude that openness to trade is associated with a lower rate of structural unemployment. In the preferred regression, a 10% increase in trade openness is associated with a one percentage point reduction in the unemployment rate.

This result is consistent with the possibility that trade openness lowers unemployment via productivity improvement. If greater exposure to trade induces low-productivity import-competing firms to shut down and high-productivity firms to expand, economy-wide productivity will increase, raising the incentive for firms to increase hiring. Recent theoretical work supports the link between trade and productivity. For example, in the Melitz (2003) model of firm heterogeneity, trade exposure eliminates low-productivity firms and induces high-productive firms in an industry to export. These reallocations lead to industry-wide productivity growth.

Gaston and Rajaguru (2011) relate changes in unemployment to changes in the terms of trade, controlling for other factors, using annual Australian data from 1960 to 2008. They find a 10% improvement in the terms of trade is associated with a fall in the unemployment rate of approximately one percentage point. Though it might be tempting to interpret this as a direct link between trade and aggregate employment, labour market settings are likely to have contributed to this result.

Trade and structural adjustment

Dixon and McDonald (1993) investigated the causes of structural change in the Australian economy between 1986-87 and 1990-91, some way into the program of liberalisation. Their analysis supports the hypothesis that trade contributed a significant proportion of structural change in Australia over the period. The authors used the ORANI model of the Australian economy to attribute changes in the economy to a dozen sets of potential influences, such as changes in productivity and in consumer preferences,[5] changes in tariffs and other forms of assistance and changes in external conditions (foreign demands and supplies). The contributions

4. The inclusion of trade flows and protection measures in the regression is justified on the basis that changes in protection may have effects on employment other than those occurring directly through trade flows.

5. These changes represent changes in demand and supplies that cannot be accounted for by observed changes in prices, incomes, etc and the algebraic and data structure of the model.

of the latter to changes in sectoral outputs experienced during the period are summarised in the first column of Table 3.1. The other influences are aggregated in the second column.

Between 1986-87 and 1990-91, changes in foreign demands and supplies – that is, shifts in export demands and import supplies – are estimated to have contributed to reducing output in the agricultural, transport equipment, textiles, clothing and footwear industries. Changes in foreign demands and supplies are estimated to have contributed to the growth of construction and other services.

Table 3.1. The contribution of trade to structural change

Sectoral output, percentage changes, 1986–87 to 1990–91

Sector	Shifts in foreign demands and supplies	Other influences[a]	Total change
Agriculture, forestry, fishing	-24.2	28.9	4.7
Mining	7.0	23.5	30.5
Food processing	1.4	3.9	5.2
Textiles, clothing, footwear	-12.7	8.2	-4.5
Wood products	7.0	3.7	10.7
Chemicals, oil	-2.3	12.5	10.2
Non-metal manufactures	5.5	-11.4	-5.9
Metal manufactures	5.4	5.6	11.0
Transport equipment	-19.4	12.3	-7.1
Other machinery	-0.9	8.2	7.4
Other manufacturing	-0.6	7.0	6.4
Utilities	4.9	13.4	18.3
Construction	6.3	-3.7	2.6
Trade, transport, communication	7.2	7.7	14.9
Services	6.4	6.5	13.0
Total	3.4	8.8	12.2

a) "Other influences" includes changes in: consumer preferences and productivity, industry assistance and compositional changes in exports and agriculture.

Source: Dixon and McDonald 1993.

Modelling the recent terms of trade improvements

Several recent studies have used the Monash Multi-Regional Forecasting (MMRF) model (Box 3.3) to estimate the likely impacts on the Australian economy of the recent terms of trade improvement. The modelling isolates the effects of the changes in the terms of trade from any other effects, such as economic and population growth, or changes in technology or productivity that are not related to the modelled changes, for example. The modelled changes can be interpreted as the contribution of the changes in the terms of trade to the observed economic outcomes, as in Dixon and McDonald (1993).

In most applications presented in this section, the MMRF model is used in 'dynamic' mode. However, the results are interpreted as the effects of the modelled changes under different assumptions about adjustments, especially in labour markets. In particular, results labelled 'short run' are interpreted as the effects of the modelled shocks in an environment in which wages cannot adjust quickly and adjustments to capital stocks are not completed. Conversely, results

labelled 'long run' are interpreted as the effects of the modelled changes when there are few impediments to adjustments in capital stocks and to changes in real wages.

Box 3.3. The MMRF model

The MMRF model was developed by the Centre of Policy Studies at Monash University. It is used by many organisations and academics in Australia.

The MMRF model is a computable general equilibrium model of the Australian economy. The model treats each of the six states and two territories as a separate economy, linked by inter-regional trade matrixes. It is a 'bottom-up' model, which includes a range of industries, commodities and labour types, aggregated to produce macroeconomic results. The model includes a representative household and government in each region, as well as the Australian government. Foreign demands are represented by downward sloping export demand curves, and import prices are given. MMRF also accounts for state and territory taxes, including income and payroll taxes, the GST, excise and other commodity specific taxes and tariffs.

The version of MMRF used in this project includes 58 industries, 63 commodities and nine labour types. The model was run in dynamic mode and the reported effects are in terms of percentage deviations relative to a baseline. The main dynamic adjustment mechanisms are that:

- Real wages are sticky in the short run and adjust through a partial adjustment mechanism to bring long-run employment back to base over a 10 year period.
- Capital stocks grow in line with expected rates of return, and investment demand is driven by the change in capital stock (allowing for depreciation). An adjustment process allows for short-run disequilibrium in the rate of return on capital.

The original database (2004-05) was updated to 2009-10 using a range of data sources (for example, employment data, gross state products, and industry shares).

The equations used in Adams (2010) were modified.

- To model changes in the price of exports individually, individual export demand curves were allowed to move in response to observed changes in export prices.
- Movements in foreign and inter-regional migration were also included. Foreign migration was connected to movements in the real wage, and interstate migration driven by the difference between region-specific real wages (which move with the level of state and territory employment) and the national, average real wage. These population movements were linked to movements of the regional labour supply.

Scenarios with limited labour market flexibility were also examined by constraining movements in foreign and inter-regional migration additions.

Source: Appendix 3.A1.

The simulations reported below model various versions of the recent terms or trade improvement. The main difference between them is in the degree of flexibility allowed for resources to adjust to the modelled shocks. The simulations do not produce forecasts, but are rather experiments designed to isolate the effects of the modelled shocks under various assumptions about the environment in which they are assumed to occur.

Fixed resources at the industry and regional level (Assumption 1)

The Victorian Department of Treasury and Finance (2006) modelled the short-run effects of an expansion in the demand for Australian resource exports with the MMRF model. The modelling assumed that industry-specific capital, regional labour supplies, and regional real wages were fixed. Labour outcomes were determined by movements in unemployment.

This simulation isolates the effects of a terms of trade movement assuming extreme rigidity in the economy: neither labour nor capital can be reallocated to the industries or regions where

they are valued most highly. This set of assumptions produces decreases in projected real GDP, exports, and employment relative to the base case. The immobility of factors prevents the reallocation of resources toward export intensive industries, and non-commodity export industries are unable to reduce their production and employment in response to the exchange rate appreciation. The inability of exports to expand reduces the potential for income increases.

More flexibility (Assumption 2)

McKissack *et al.* (2008) used MMRF to illustrate the short-run impacts of a rise in the terms of trade on the domestic economy, fixing aggregate labour supply by region, and keeping capital stocks fixed within each region.

Under these more flexible labour market assumptions, the simulated 20% improvement in the terms of trade raises GDP by approximately 0.3%.

Because the simulation involved modelling an increase in coal and iron ore prices, these two industries expand, as does domestic income. The construction industry also expands, because (i) it is an input into iron and coal production, (ii) it is an important input to investment in these expanding sectors, and (iii) increased domestic incomes drive increases in consumption. The retail sector expands in several states – generally those where mining is concentrated – and contracts in others, where income effects are projected to be smaller, and from which workers migrate to the mining states. In this simulation, the manufacturing sector was projected to decline as fixed national resources were reallocated to other sectors.

Impact of labour mobility

In its Review of Mutual Recognition Schemes (PC 2009) the Productivity Commission used CGE modelling to illustrate the potential benefits of labour flexibility in the context of a hypothetical improvement in the terms of trade. The exercise involved two simulations. In the first, a 10% increase in export prices of mining commodities was applied to an economy in which all labour was perfectly mobile. In the second simulation, labour in several skilled occupations was prevented from moving across jurisdictions.[6] The modelled increase in commodity prices produced larger increases in GDP and average real wages when labour was fully mobile. Labour mobility also played an important role in distributing the benefits of the resource boom across Australia, moderating the growth in wages in booming jurisdictions, and increasing it elsewhere (PC 2009).

Unpacking flexibility assumptions (Assumption 3 and Assumption 4)

In the context of this project, the MMRF model was used to illustrate the short- and long-run effects of the observed behaviour of export and import prices from 2006 to 2010 on the Australian economy. Specifically, the impact of the equivalent of a 30% increase in the terms of trade on short- and long-run incomes and employment was modelled. Table 3.2 summarises the inputs used. Appendix 3.A1 contains a description of the version of the MMRF model and of the shocks used, and a detailed description of model results.

6. This barrier to cross-border mobility was assumed to simulate the absence of mutual recognition of some registered occupations by Australian jurisdictions.

Table 3.2. Summary of shares and modelled changes in export and import prices[a]

% and percentage changes

	Exports		Imports	
Sector	**Share**	**Price change**	**Share**	**Price change**
Agriculture	25.2	-2.4	6.3	23.1
Mining	56.4	42.3	7.7	15.7
Manufacturing	18.4	-16.3	86.0	-12.6

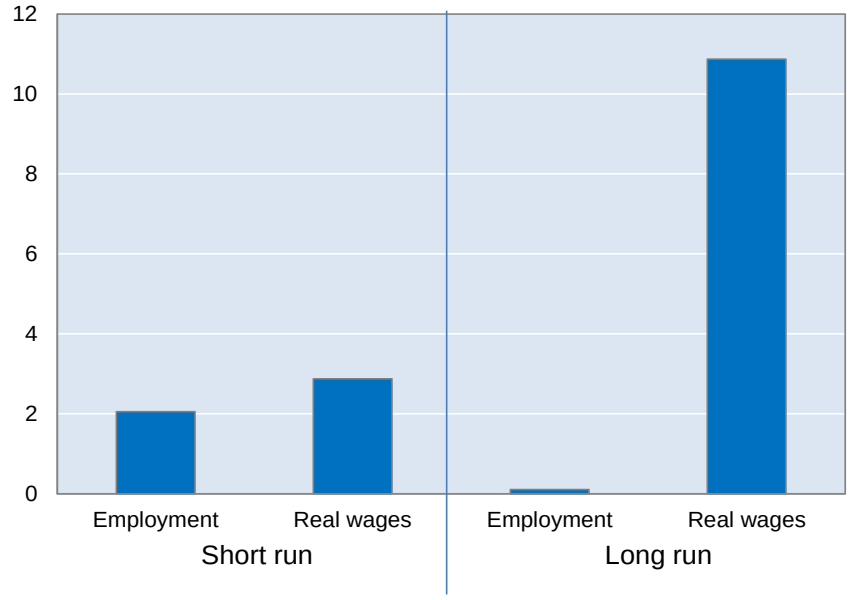
a) Aggregated to broad sectors. Shocks were applied at the commodity level. See Appendix 3.A1.

Source: Commission estimates.

The improvement in the terms of trade is projected to increase domestic incomes. In the short run, the expansion in the output of exporting industries increases employment without a significant effect on wages due to assumed short run wage stickiness. Labour moves to regions and industries where it is most highly valued, principally exporting industries. This is driven in particular by expansions in construction, as resources projects enter the construction phase to accommodate the required expansion of the mining sector. Employment increases by 225 000 full-time equivalent workers, and domestic incomes rise by approximately 6% (Figure 3.7). In the long run, wages increase and employment returns to its long-run level. Real wages increase by over 10%, and the shares of both mining and services in the Australian economy increase. The increases in labour income drive increases in tax revenue collections, resulting in an increase in the government net operating balance. The employment share of services in the economy increases, driven principally by health, education and personal services. Traded services, such as tourism, contract as a share of total employment as a result of the terms of trade movement.

Figure 3.7. Labour market outcomes

Percentage changes relative to base



Source: Commission estimates.

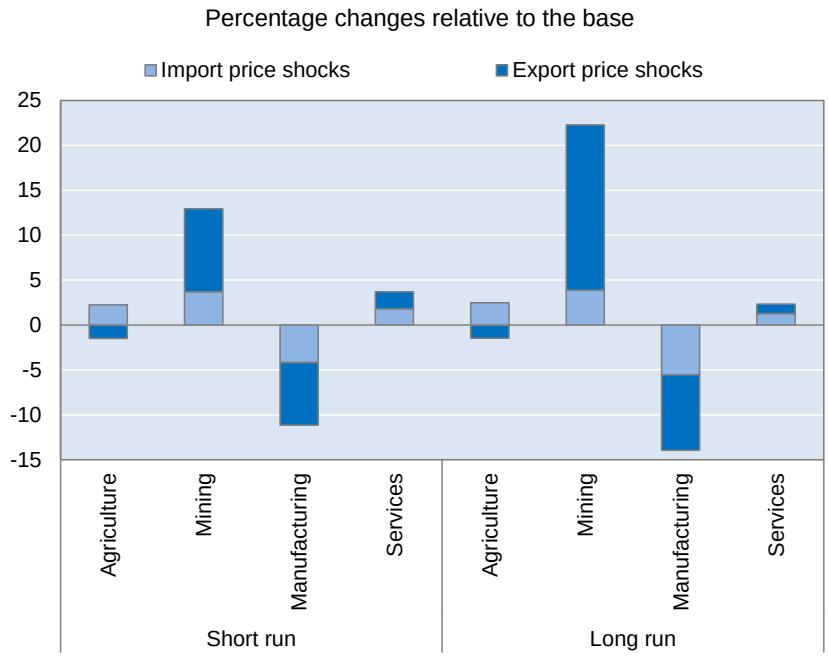
The structural adjustment resulting from the modelled terms of trade improvement was split according to the effects of export and import prices (Figure 3.8).

- Agricultural employment increases as a result of the modelled increase in agricultural import prices, but declines as a result of the modelled decrease in agricultural export prices.
- Mining benefits from both strong growth in export demand and a decrease in the prices of some inputs to production.
- Manufacturing employment contracts in both simulations, crowded out by cheaper imports and increased demands for labour in mining and services.
- Employment in services increases: increased domestic income increases the consumption of services; and increased mining activity drives increases in investment, which increases demand for services such as construction.

The terms of trade shocks have made a significant contribution to the structural changes observed over 2006-2010 (Table 3.3). This table is analogous to Table 3.1, with the last column representing changes in employment as reported by the ABS and the first column reporting the effects of the simulation; however, in this case, the second column is derived as the difference between the two column, and not all influences have been modelled as in Dixon and McDonald (1993).

- Over the period, mining employment is measured to have expanded about 7.5%, while the modelled changes account for a 13% increase in employment in mining. This suggests that other factors account for a reduction in employment of around 5.5%.
- In services, the shocks account for practically all the measured increase in employment in the sector. Thus the net effect of all other influences is small.

Figure 3.8. Changes in sectoral employment resulting from a 20% increase in export prices and a 10% decrease in import prices



Source: Commission estimates.

Table 3.3. Contribution of terms of trade to observed structural change in employment

Persons employed, percentage changes, 2006-10

	Changes attributable to:		Total change[c]
	Terms of trade shock[a]	Other contributors[b]	
Agriculture	0.75	-1.27	-0.52
Mining	12.94	-5.52	7.42
Manufacturing	-11.15	8.95	-2.20
Services	3.71	0.30	4.00

a) 30% improvement in terms of trade.

b) Cumulative effects of all other influences, see note in Table 3.1. Calculated as the difference between observed changes in sectoral employment and modelled changes in sectoral employment.

c) Observed changes in employment as reported by ABS.

Source: ABS (*Labour Force, Australia, Detailed, Quarterly*, Cat. no. 6291.0.55.003); Commission estimates.

The terms of trade improvement causes a large expansion in the services sector. This expansion comes from two sources: the mining boom requires a range of services as inputs, especially construction services in the investment phase; and households increase their demand for services, including construction, as incomes increase. The composition of the structural change has a significant impact on the sources of expenditure within the domestic economy (Figure 3.9).

In the short run, the expansion of the resources sector causes a significant increase in investment. This increase in investment drives an increase in demand for a range of domestic goods and services. Construction expands particularly strongly, as it is a necessary input to the investment required by the resource sector, and an input to dwellings and accommodation. In the long run, increases in disposable income cause demand for services in consumption to increase, particular entertainment and health-related services,[7] public services (including education and health), and financial services (Figure 3.10).

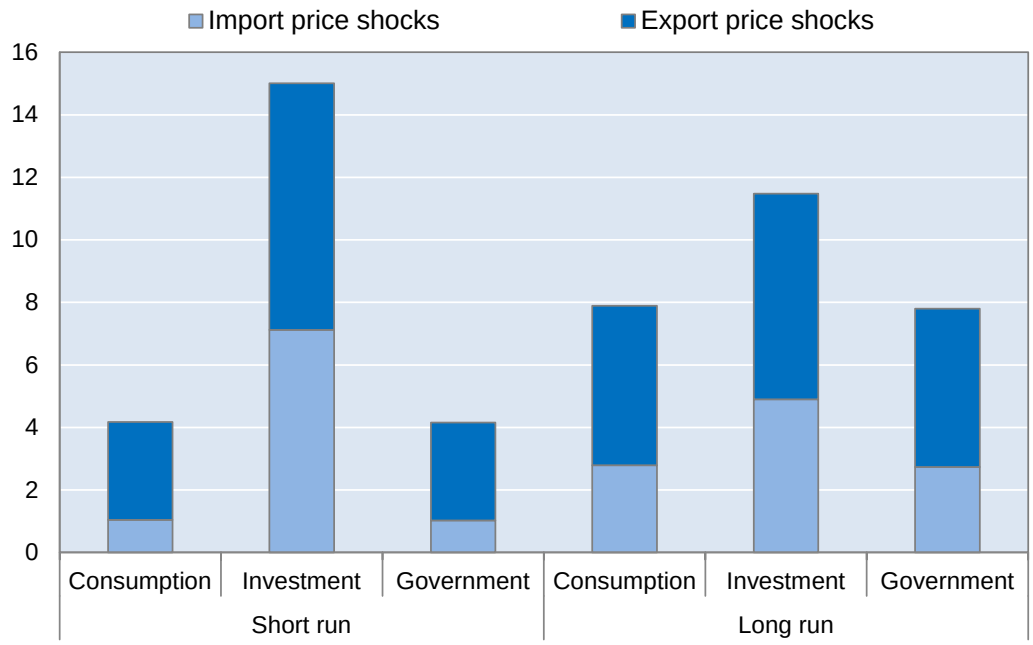
The gains linked to increased export demand for minerals are concentrated in export intensive regions, the Northern Territory and Western Australia in particular.

That said, incomes increase across all regions: some regions supply inputs into the mining regions, increased tax incomes affect incomes across regions and decreased prices of imports increase real incomes across the country. The larger states – NSW and Victoria in particular – benefit most from increases in domestic consumption, due to the concentration of services in those states. Figure 3.11 shows the short- and long-run impact of an improvement in the terms of trade on labour incomes across regions.

7. Entertainment and health-related services are included in the "other services" industry of Commission's version of the MMRF model.

Figure 3.9. Changes in real expenditure resulting from a 20% increase in export prices and a 10% decrease in import prices

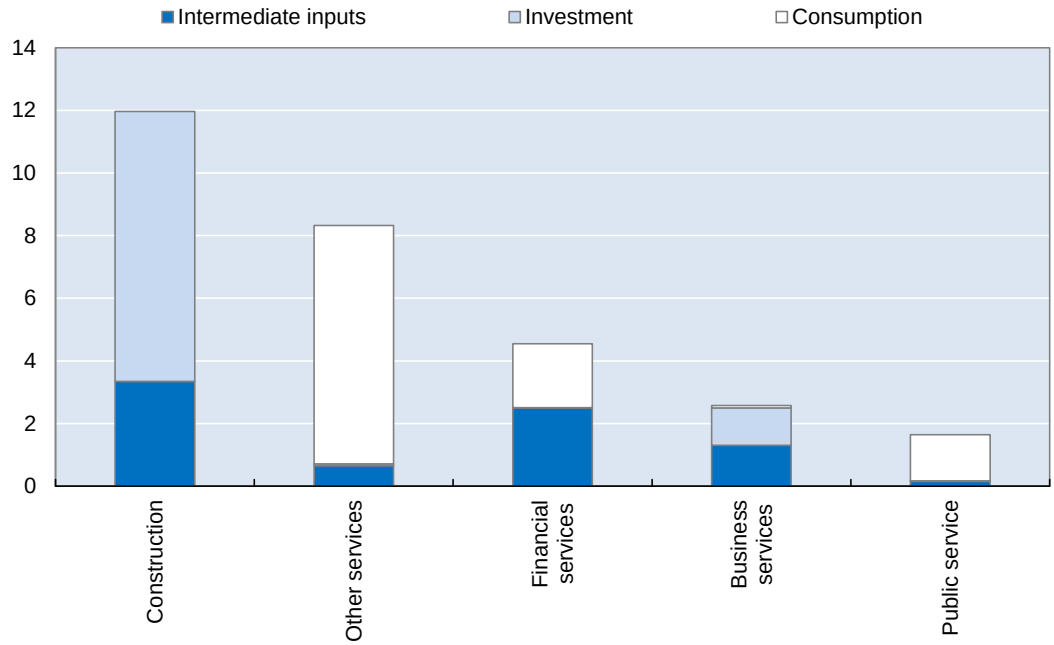
Percentage changes relative to the base



Source: Commission estimates.

Figure 3.10. Share of output used in consumption, investment and intermediate inputs[a]

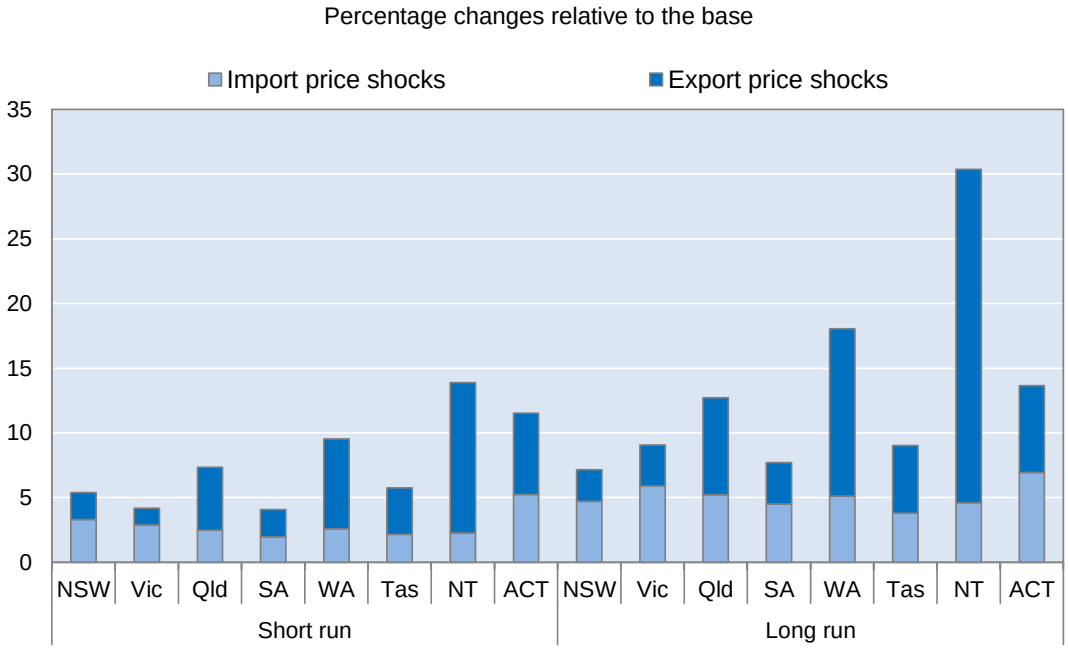
Percentage changes relative to the base, five industries



a) Abstracts from output used in exports, government current consumption, margin services and inventories.

Source: Commission estimates.

Figure 3.11. Changes in labour incomes from a 20% increase in export prices and a 10% decrease in import prices



Source: Commission estimates.

An additional simulation, in which the movements of labour across regions and internationally are constrained, illustrates how this type of impediment can constrain the gains from reallocating labour across the economy.[8] Limiting inter-regional and international migration reduces the short run income gains to labour supply to 4% in the short run (Assumption 3b), and to 9% in the long run (Assumption 4b). At the aggregate level, this causes GDP to grow by nearly 1% less than when labour is fully mobile.

Effects of limiting flexibility

Table 3.4 provides a comparison of the simulations discussed above. With extreme constraints on resource movements as in Assumption 1, the modelled shocks produce a decrease in output and a corresponding reduction in employment. Under Assumption 2, the assumed impediments to the movement of capital across regions limit the ability to take advantage of the modelled improvements in export prices. Under Assumptions 3 and 4, short-term (labour movement) and long-term flexibility (wage movement) allow the benefits of the modelled increases in export and decreases in import prices to be captured. Under Assumption 3, wage stickiness means that initially real wages fall in expanding sectors, allowing employment to increase. Under Assumption 4, wages adjust, and employment returns to the long-run level. Assumptions 3b and 4b indicating how limitations on labour mobility constrain the scenarios.

8. Labour is surprisingly mobile across industries and occupations and international migration can be responsive to demand shocks in certain sectors. Anecdotal evidence points to agricultural workers moving into mining, especially as equipment operators and truck drivers; shortages of teachers and clerks are reported as they too take on jobs in the mining sector. Although immigration procedures can be lengthy, they have been shortened for some skilled jobs.

Table 3.4. Projected effects of terms of trade improvements on employment and GDP

Percentage changes relative to base

	Shock	Assumptions	Employment	GDP
Assumption 1	Increase in export prices (8%-40%, increase in export demands for in resource commodities)	Labour and capital fixed in industry and regions	-0.33	-0.22
Assumption 2	20% terms of trade improvement (coal and iron ore demand)	Labour mobile across industries and regions; capital fixed within each region	0.00	0.30
Assumption 3 (short run)	30% terms of trade improvement (export demand, import prices)	Employment flexible; wages sticky; capital reallocates slowly	2.05	1.46
Assumption 3b (short run)	Same as Assumption 3	Same as Assumption 3 Constrained migration	1.51	1.26
Assumption 4 (long run)	Same as Assumption 3	Labour supply flexible wages flexible; capital reallocated	0.11	3.41
Assumption 4b (long run)	Same as Assumption 3	Same as Assumption 4 Constrained migration	0.08	2.48

Sources: Department of Treasury and Finance (Victoria) (2006); McKissack *et al.* (2008); Commission estimates.

3.6. Conclusions

Since the 1980s, trade liberalisation and other microeconomic reforms have contributed to significant structural change throughout the Australian economy. The contribution of services and mining activity has increased further, while manufacturing has contracted. This has been accompanied by a significant increase in Australia's trade intensity. The recent effects of a 30% improvement in the terms of trade are leading to significant further structural adjustments, not unlike those experienced as a result of trade liberalisation undertaken earlier.

Australian residents benefit from improvements in the terms of trade. Economic modelling indicates that increases in Australian incomes flow across the economy. When export demand increases and responses are constrained, incomes increase through the increase in export prices. The same applies to increased competition from reductions in import prices.

The greatest increases in income involve some structural adjustment, as labour and capital move to the industries and regions where their use is most highly valued. Maximising the benefits and minimising the adjustments costs associated with changes requires a flexible economy that enables resources to move relatively freely across sectors and regions.

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Appendix 3.A1.

The Monash Multi-Regional Forecasting model

The Monash Multi-Regional Forecasting (MMRF) model is a detailed model of the Australian economy developed by the Centre of Policy Studies (CoPS) at Monash University (Adams *et al.*, 2011). The version of MMRF used by in this paper includes 58 industries, 63 goods and services, nine occupational types of labour, and provides results for all eight states and territories of Australia. The model includes a representative consumer and government demand in each region, as well as a Federal Government demand. It is a dynamic model of the Australian economy, employing recursive mechanisms to explain adjustments over time.

MMRF determines regional supplies and demands of commodities through optimising behaviour of agents in competitive markets. Optimising behaviour also determines industry demands for labour and capital. Labour supply at the national level is determined by demographic factors, while national capital supply responds to rates of return. Labour and capital can cross regional borders so that each region's stock of productive resources reflects regional employment opportunities and relative rates of return.

All markets clear, other than the labour market (where excess supply conditions can hold, allowing for unemployment). A range of taxes are incorporated in the model including income and payroll taxes, company taxes, the GST, and a range of commodity and factor-specific taxes and tariffs.

Australian exports face a downward-sloping demand curve. A shock that improves the price competitiveness of an export sector will result in increased export volume, but at a lower world price.

Calculating the shocks for the modelling

In order to implement detailed price shocks to the traded commodities in the model, disaggregated data on export and import prices were required. The data used for this purpose were the SITC export and import price indices measured by the ABS. Each goods trading sector of MMRF was matched with two-digit SITC price data. Where more than one index was applicable to an MMRF sector, a composite price index was derived by calculating a weighted sum of prices based on all 2-digit SITC sectors relevant to the MMRF sector in question. (A brief description of the 2-digit SITC sectors is provided in Appendix Table 3.A1.2).

The shocks imposed on the model (Appendix Table 3.A1.1) were based on the two-year geometric growth rate of the relevant price index between June 2006 and December 2010, for a total terms of trade change of 30%. The changes in export and import prices were split across two years of the model, to clearly demonstrate the effects of the shocks on employment and other variables, rather than spreading the shocks across a greater number of years and diluting their impact.

The overall change in import prices implied by the SITC indices was smaller than that recorded by the implicit price deflator for imports between June 2006 and December 2010. Hence, the import price changes derived from SITC indices were scaled by a factor of 1.8 in order to result in a general movement in import prices approximately of the same order as that

indicated by the implicit price deflator for imports. No such adjustment was required for export prices.

For some two-digit SITC sectors, export and import price indices were not available (typically because of small recorded trade volumes). Where a single two-digit SITC sector was matched with a single sector of MMRF, the absence of a price index meant that no shock was applied to the sector.

The changes in import prices were imposed on the model by directly altering the price of the imported commodities in question in MMRF. A different process, however, was used to enter the export price shocks into the model. In the MMRF model, each exported commodity has an exogenously specified, downward-sloping demand curve with an elasticity of -5. As a result of this structure, directly shocking individual export prices would have implied large quantity changes that were inconsistent with observed data. In turn, this would have resulted in unrealistic movements in the output and employment levels of industries producing exported commodities.

As a result, the export simulations were implemented in the model using two mechanisms. An aggregate export price change of 10% was imposed in 2010 and 2011, in accordance with the increase in the aggregate export price deflator of 20% between June 2006 and December 2010. In order to ensure that the aggregate export price change was appropriately divided across exported commodities, export demand curves were allowed to shift up (down) to reflect increases (decreases) in the observed prices of exports. Each individual export demand shift variable was given a weighting in accordance with the observed changes in commodity prices.

International and interregional domestic migration were included in the modelling. International migration to all states and territories in Australia was linked to the national real wage. This was based on the assumption that a foreign migrant is more likely to choose Australia as a migration destination based on national wage (and other, non-financial) considerations without specifically targeting a state or territory. Regional choice is largely driven by local policies and social factors, and would be included in the interregional domestic migration impacts. The responsiveness of foreign migration to changes in the real wage was based on observed data.

Interregional domestic migration was driven by the real wage differential between states. States and territories with real wages above (below) the national average real wage experience increases (decreases) in the number of interregional migrants. This was specified such that the aggregation of all interregional migration within Australia summed to zero. The degree of migration caused by changes in the relative real wage was based on observed data.

Both of these additions were coupled with region-specific real wages. The real wage in each region was allowed to adjust with local labour market conditions, allowing the region-specific real wage to influence population movements.

Table 3.A1.1. MMRF and SITC concordance, and annual price shocks

MMRF sector	SITC 2-digit sector	Export price shock	Import price shock
Sheep and Cattle	00	19.05	n/a
Dairy	02	14.90	24.74
Other Animals	03	-0.09	-2.63
Grains	04,08	5.93	n/a
Other Agriculture	05, 06, 21, 22	-11.59	-9.94
Forestry	24	6.04	7.47
Coal	32	11.34	n/a
Oil	33	-6.43	-7.48
Gas	34	37.67	n/a
Iron Ore	28	21.81	n/a
Non-iron Ore	28	21.81	n/a
Other Mining	27	23.99	83.30
Meat Products	01	12.11	n/a
Other Food	07, 09, 11, 12, 41, 42	-19.50	25.54
Textiles, Clothing, and Footwear	26, 61, 65, 84, 85	-19.62	-1.01
Wood Products	63	n/a	11.71
Paper Products	25, 64	4.12	-16.39
Printing	64	4.12	-9.56
Chemicals	51, 52, 53, 54, 55, 56, 59	-11.09	3.00
Rubber and Plastics	23, 57, 58, 62	-14.44	1.00
Non-metal commodities	65	n/a	1.98
Cement	66	-12.97	-10.67
Steel	67	4.60	13.58
Alumina	28	21.81	n/a
Aluminium	68	-11.39	-4.24
Other Metals	69	n/a	-1.82
Metal Products	69	n/a	-1.82
Motor Vehicles and Parts	78	-5.85	-0.80
Other Manufacturing	71, 72, 74, 75, 76, 77, 79, 81, 82, 83, 87, 88, 89	-18.38	-19.00

Table 3.A1.2. SITC 2-digit sectors

2-digit sector	Description
00	Live animals other than animals of division 03
01	Meat and meat preparations
02	Dairy products and birds' eggs
03	Fish, crustaceans, molluscs and aquatic invertebrates and preparations thereof
04	Cereals and cereal preparations
05	Vegetables and fruit
06	Sugars, sugar preparations and honey
07	Coffee, tea, cocoa, spices and manufactures thereof
08	Feeding stuff for animals (not including unmilled cereals)
09	Miscellaneous edible products and preparations
11	Beverages
12	Tobacco
21	Hides, skins and furskins, raw
22	Oil seeds and oleaginous fruits
23	Crude rubber
24	Cork and wood
25	Pulp and Waste Paper
26	Textile fibres and their wastes
27	Crude fertilisers, other than those of division 56, and crude minerals (excluding coal, petroleum)
28	Metalliferous ores and metal scrap
32	Coal, coke and briquettes
33	Petroleum, petroleum products and related materials
34	Gas, natural and manufactured
41	Animal oils and fats
42	Fixed vegetable fats and oils
51	Organic chemicals
52	Inorganic chemicals
53	Dyeing and colouring materials
54	Medicinal products
55	Essential oils etc
56	Fertilisers (excluding crude)
57	Plastics in primary forms
58	Plastics in non-primary forms
59	Chemical materials and products, n.e.s.
61	Leather and leather manufactures
62	Rubber manufactures n.e.s.
63	Cork and wood manufactures
64	Paper, paperboard and articles of paper pulp, of paper or of paperboard

Table 3.A1.2. SITC 2-digit sectors (*continued*)

2-digit sector	Description
65	Textile yarn, fabrics, made-up articles, n.e.s., and related products
66	Non-metallic mineral manufactures
67	Iron and steel
68	Non-ferrous metals
69	Manufactures of metals, n.e.s.
71	Power generating machinery and equipment
72	Machinery specialised for particular industries
74	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.
75	Office machines and ADP machines
76	Telecommunications and sound recording equipment and reproducing apparatus and equipment
77	Electrical machinery, etc. and parts thereof
78	Road vehicles (incl. air–cushion vehicles)
79	Other transport equipment
81	Prefabricated buildings and fixtures n.e.s.
82	Furniture and parts thereof
83	Travel goods and handbags
84	Articles of apparel and clothing
85	Footwear
87	Professional, scientific and controlling instruments and apparatus, n.e.s.
88	Photographic and optical goods
89	Miscellaneous manufactured articles, n.e.s.
97	Gold, non-monetary

Chapter 4

Openness, Wage Gaps and Unions in Chile: A Micro-Econometric Analysis

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This chapter examines the relationship between wages and levels of trade and FDI openness in twenty-nine sectors of the Chilean economy. Over the last four decades, this country almost fully liberalised its trade and foreign direct investment, which accelerated growth of flows in both areas and contributed to important changes in the labour market. Using cluster analysis, we divide 29 sectors into three groups of high, medium and low levels of trade and foreign direct investment penetration in 2003 and 2008. Subsequently, an average wage equation is estimated for salaried workers in each group based on their characteristics (gender, education, work experience and union membership) using microdata of the Supplementary Income Survey (SIS) database. Differences between average wages of the three groups are decomposed with the Oaxaca-Blinder method. The results confirm that the group of most open sectors pays a "wage premium" to its workers. It is also shown that most of this premium is accounted for by higher levels of labour unionisation compared to other sectors. An alternative grouping of sectors into two categories of tradable and non-tradable sectors based on export intensity only yields similar results.

4.1. Introduction[1]

Important changes have taken place in both openness and wage gaps in Chile over the past decades, which may be related. Since the 1970s, the country has reduced its trade barriers unilaterally, and through multilateral and multiple bilateral free trade agreements. This reduction in obstacles to trade, together with other factors, has contributed to a growing intensity in terms of exports and imports relative to GDP. Moreover, an attractive framework for foreign direct investment (FDI) created in 1974 contributed to high investment inflows, in particular after the return to democracy in 1990. Simultaneously, important changes in wage gaps between workers with different levels of education can be observed over time. After increasing during the 1980s and 1990s, this wage gap fell in the past decade. Also, the wage gap between the highest and lowest quintiles shrunk from 1996 to 2006, after which it increased.

This paper represents a collaborative effort of ECLAC and ILO to analyse the relationship between trade and investment penetration and sectoral wage gaps in Chile. It contributes to the existing literature by a) the use of cluster analysis instead of an *a priori* classification of sectors to determine the degree of openness based on actual trade and investment flows, b) the application of the Oaxaca-Blinder method to analyse wage gaps among groups of sectors according to levels of openness, c) the use of micro data on wages with national coverage (instead of the metropolitan area only), and d) the inclusion of unionisation levels as a possible factor explaining wage differentials among sectors.

We use cluster analysis to allocate twenty-nine sectors of the economy into three groups according to their levels of openness with respect to trade and FDI, reflecting high, medium and low levels of openness, respectively. This clustering was based on three proxies of openness as suggested by the literature: a) the share of production exported (export coefficient); b) the import share of final consumption (external dependence); and c) foreign direct investment (FDI) relative to value added (FDI intensity).

With the help of the Supplementary Income Survey (ESI) micro data base of the National Institute of Statistics (INE), we estimated econometric regressions of the average salary for each of the three groups of sectors using gender, education, experience in the labour market and the degree of unionisation as independent variables. In turn, average wage difference between groups of sectors were broken down into three parts through the Oaxaca-Blinder method: a) differences in the workers' characteristics, b) the discrimination effect indicating the 'premium' (or punishment) of working in a certain groups of sectors, and c) an interaction effect.

In line with other theoretical and empirical studies, we show that, both in 2003 and 2008, wage earners in the group of open sectors received a premium compared to their peers in the rest of the economy. This chapter shows that a large share of this wage premium is explained by a higher level of labour unionisation in the most open group. This chapter, thus, points to institutional factors, such as extent to which labour is "unionised", that affect sectoral wage

1. This chapter is a collaborative effort between ECLAC and ILO. It was originally presented at the second regional conference of the International Collaborative Initiative on Trade and Employment (ICITE) in Santiago on 14-15 June 2011, organised by the ECLAC, OECD and World Bank with financial support from the Government of Spain. The authors are grateful for comments received by Sébastian Jean, Daniel Lederman, Douglas Lippoldt, Osvaldo Rosales, Monika Sztajerowska, the Permanent Mission of Chile to the OECD and participants of the ICITE aforementioned conference in Santiago. The views expressed in this document are those of the authors and may not reflect the official views of ECLAC, ILO, OECD or other ICITE partner organisations. For comments, please contact *nanno.mulder@cepal.org*.

levels. This important result opens up new areas of research focussing on the relationship between wage differentials, labour market institutions, and outward orientation.

In addition to this introduction, this chapter has four sections. The next documents the process of economic opening and main labour market trends, with emphasis on wage trends. Section 4.3 summarises available evidence on the link between openness and wages in Chile. Section 4.4 presents the empirical analysis, while the final section provides conclusions and suggestions for future research.

4.2. Trends in international trade and labour markets

Trade and investment flows: trends in de jure liberalisation and de facto flows[2]

In 1973, Chile began a process of trade and financial opening as part of an outward oriented development strategy accompanied by a process of macroeconomic stabilisation and privatisation of state companies. Import liberalisation took place by eliminating non-tariff barriers and a by reducing tariffs. The average tariff fell from 104% in 1973 to 10% in 1979. Likewise, tariff dispersion was reduced to almost zero.[3] The severe financial and banking crisis that hit the country in the early eighties, which resulted in a significant economic contraction and rise in unemployment, reversed the process of trade opening as the tariff was raised to 35% in 1984.

As the economy started to recover in 1985, Chile resumed its trade opening process. The average tariff was reduced to 15% in 1988 and 11% in 1991. It also established measures such as *drawbacks* (a refund for non-traditional exports and exemption from payment of fees on importers of capital goods) to diminish the anti-export bias. But at the same time price bands and surcharges were also established, which raised the effective protection on some agricultural products.

The process of trade opening was consolidated after the early nineties, when Chile started to negotiate bilateral trade agreements in parallel to the multilateral Uruguay Round Agreement. The benefits of multilateral trade opening were mostly limited compared to the unilateral tariff reductions. Further on, bilateral agreements were the predominant route to promote trade. Following this strategy, Chile has signed (partial) agreements with almost every country in Latin America. The country has also signed agreements with several extra regional partners.[4] Currently, it has negotiated agreements with more than 50 trading partners, covering 93% of its trade. It is one of the countries with the highest number of preferential trade agreements in the world.[5]

2. The term *de jure* liberalisation refers to lower barriers to trade and investment, while *de facto* flows refer to actual trade and investment flows.

3. With the exception of the automotive sector for which tariffs remained in a range between 10% and 90%.

4. The trade agreements signed by Chile are (with year of implementation in parentheses): Bolivia and Venezuela (1993), Mercosur (1996), Canada (1997), Mexico (1999), Costa Rica and El Salvador (2002), European Union and Japan (2004), EFTA, Republic of Korea and United States (2004), Brunei, China, New Zealand and Singapore (2006), India and Japan (2007), Cuba, Honduras and Panamá (2008), Australia, Colombia and Peru (2009), Ecuador and Guatemala (2010), and Turkey (2011).

5. Chile also continued the process of unilateral trade opening. From 1997, a uniform and unilateral reduction by one percentage point per year of the general tariff was implemented, until it reached 6% in 2003. However, some exceptions remain for some agricultural products whose average tariff is 12.5%. The maximum tariff rate is 25% for all products except for some agricultural products which are taxed at 31.5%.

The trade liberalisation process was complemented with financial liberalisation. This was initially reflected in the progressive liberalisation of the interest rate structure, privatisation of state-owned banks, reduction of entry barriers to the financial system, and creation of a private pension system.[6] In 1974, at the same time of the first tariff reductions, the Law Decree 600 was passed, which regulates foreign investment in the country. This law provides national treatment to foreign investors, allows them to hold up to 100% of the shares of companies in most sectors and grants the right to reinvest or repatriate net profits.[7] Between 1975 and 2006, over 75% of foreign investment entered Chile protected by this decree.

Tariff reductions and bilateral trade agreements contributed to trade dynamism *de facto* (Figure 4.1.). In fact, exports of goods and services grew faster than GDP, increasing the ratio between both from 35% in the nineties to 50% in 2007. Imports, in turn, also grew faster than GDP, resulting in a rising intensity from 30% to more than 40% in the same period. In the nineties, exports and imports grew at similar rates and the trade balance fluctuated between slightly positive and negative. However, after 2003, the value of exports grew faster than that of imports and as a result the trade surplus grew to 15% of GDP in 2008 (Figure 4.1a). Finally, the 2008–09 crisis affected trade stronger than the overall economy, which lowered the trade intensity. In the post–crisis period, values of imports and exports recovered, but they did not reach pre–crisis levels.

In the first decade of the 21st century, export prices rose much faster than import prices, which explains in large part why the volume of the former grew more slowly than that of the latter (Figure 4.1b). In terms of volume, post-crisis imports have already surpassed their pre-crisis levels. It is also noteworthy that in the period from 1986 until the Asian crisis in 1999, the volume of imports grew faster than that of exports, possibly due to the *de jure* opening process.

The rise in the value of exports from 2003 to 2008 is mostly due to higher foreign sales of copper (crude and refined). The share of this product in total exports increased from 38% to almost 60% (Figure 4.1c). During this period, the country reversed a trend – one that had been maintained for more than two decades – of diversifying its export basket and reducing its external dependence on copper. As shown in Figure 4.1d, the number of exported products grew from 929 in 1990 1 054 in 1998 and the degree of export concentration decreased. The concentration in terms of export destinations fell throughout this period, probably due to the better access to the markets of several of its trading partners through trade agreements.

Chile diversified its export basket mainly to other commodities and manufactures based on natural resources. The country became the world's largest salmon exporter, and developed into a major player in international markets of, among others, fruits, wine, wood and cellulose. Nevertheless, Chile's export structure in terms of technological intensity changed little over time (Figure 4.1e). However, a small increase in the participation of medium-tech products is observed, which refers mainly to the expansion of the chemical industry and its derivatives.

The attractive legal framework, in particular the Law Decree 600, alongside its macroeconomic stability, the availability of large reserves of minerals such as copper and

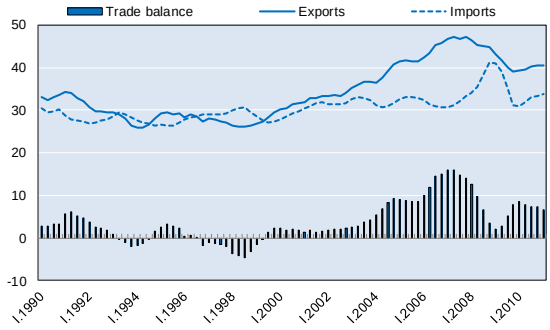
6. The financial liberalisation process was partially suspended during the financial crisis of the early eighties, but then resumed after the crisis along with better and more rigorous banking supervision practices. Despite the implementation of capital controls in the nineties, bilateral agreements (in particular the bilateral treaty with the United States) rushing the country into free transfer of capital, see Section 10.8 of the free trade agreement between Chile and the United States (WTO, 2009).

7. A new bill, known as the "investment platform" law, was passed in 2002, but has had little effect attracting FDI.

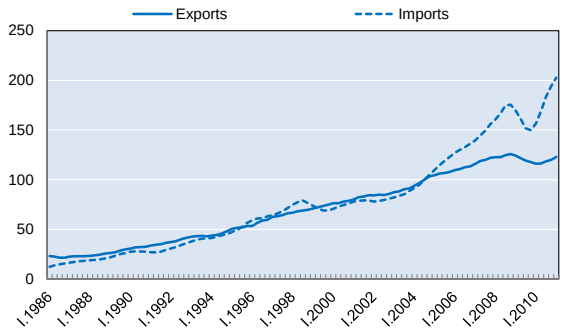
molybdenum and the investment opportunities in (network) services, contributed to growing flows of foreign investment, especially between 2005 and 2010. A new phenomenon is the growing investment by Chilean companies abroad, particularly in the retail sector in neighbouring countries.

Figure 4.1. Dynamism of trade and investment, 1985 to 2010

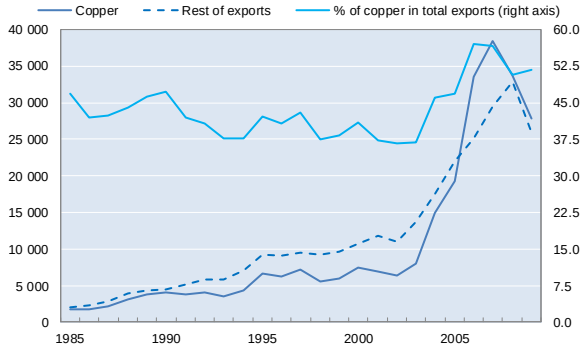
a. Trading in value and balance as % of the GDP



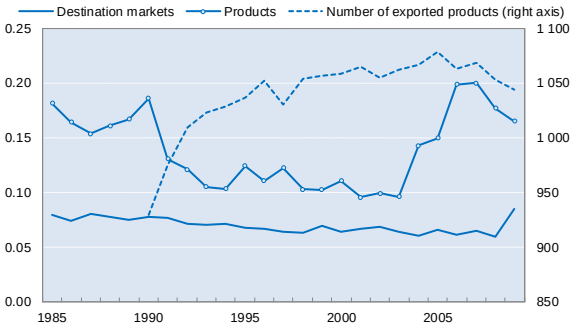
b. Volume growth of exports and imports 2003 = 100



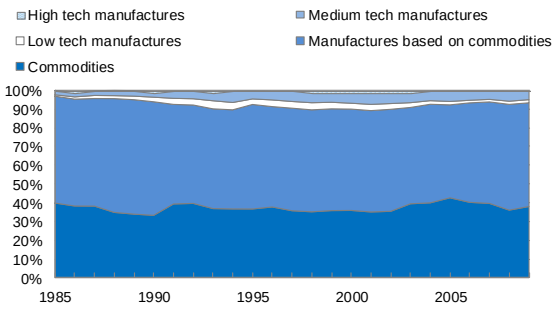
c. Exports of copper and rest in million USD and %



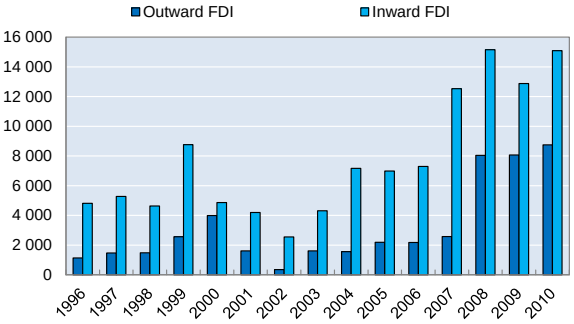
d. Export concentration Herfindahl-Hirschman index



e. Technological content of exports as % of exports



f. Foreign direct investment in USD million



Source: Authors' calculations based on data from the Central Bank and UN-COMTRADE.

Trends in the labour market and wages

From 1997 to 2009, the evolution of employment has followed a similar pattern as that of the economy. The average annual growth rate of GDP was 3.7%, while that of employment reached 1.9%. In addition, as shown in Figure 4.2a, 1999 and 2009 were recession years following the Asian crisis and the recent financial crisis, respectively. In those years, GDP registered drops of -1% and -1.7%, respectively, while employment contracted by -0.2% and -0.7%, respectively.

During this period, the composition of employment registered a slight trend in favour of wage-earners versus own account workers. In fact, in a context of sustained economic growth between 2000 and 2008, the proportion of wage-earners increased from 64% to 69% (Figure 4.2b). Simultaneously, the proportion of own account workers fell from 27% to 23%. These trends, however, were reversed in 2009 due to the effects of the global crisis.[8]

Wage differentials show contrasting trends during this period. First, while both the real average and real minimum wages grew over the period (Figure 4.2c), the former increased more rapidly than the latter. The resulting gap rose from 36% in 1996 to 52% to in 2009. Second, the wage differential between workers with higher education compared to those with primary education shows a downward trend. That is, the ratio of wages of highly educated workers to those of workers with primary education dropped from 4.3 to 3.9 (Figure 4.2d). Third, the wage gap between those with secondary education and those with primary education also declined over time (the wage ratio between the two fell from 1.9 to 1.5).

Fourth, the gap between the quintile of highest wages and that of lowest wages fell from 1996 to 2006, but increased thereafter until 2009. This trend reversal coincides in a context in which the rate of employment generation was falling, reaching a negative number in 2009, along with a drop in economic activity (Figure 4.2e). Furthermore, the gap between deciles 5 and 1 remained practically stable during the period. However, the gap between the highest and lowest deciles of the wage distribution followed a similar pattern as that as of the differences between the top quintile and lowest quintiles.[9]

In sum, the trends in wage gaps by level of education differ from the evolution of the average to minimum wage ratio, and those by wage quintiles and deciles. This suggests there may be other factors at play than education levels affecting wage levels.

8. Thus, the recession in 2009 destroyed about 120 000 jobs of wage earners, which was partially compensated by an increase of about 80 000 own-account jobs.

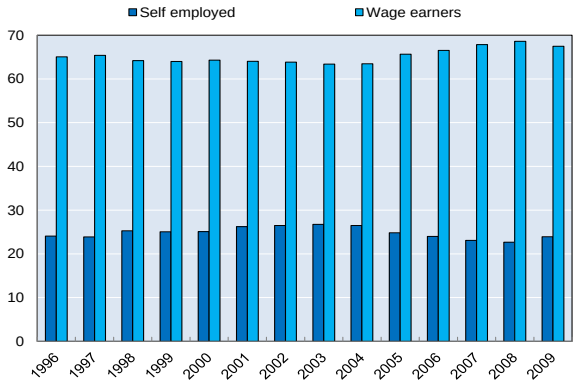
9. Annual variation in the wage distribution should be interpreted with caution, as they may reflect technical challenges of income measurement through household surveys. This paper emphasises structural explanations of the wage distribution rather than short-term variations and should therefore be less affected by measurement issues.

Figure 4.2. Trends in the labour market, 1996 to 2009

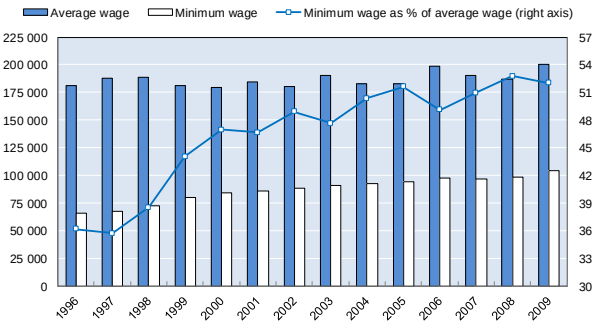
a. GDP and employment
% of annual growth



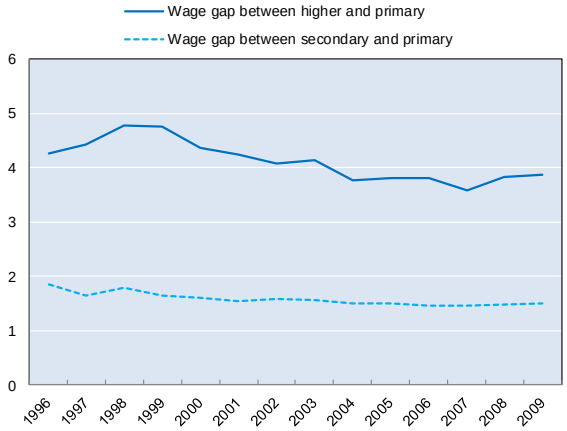
b. Wage-earners and self-employment
% of annual growth



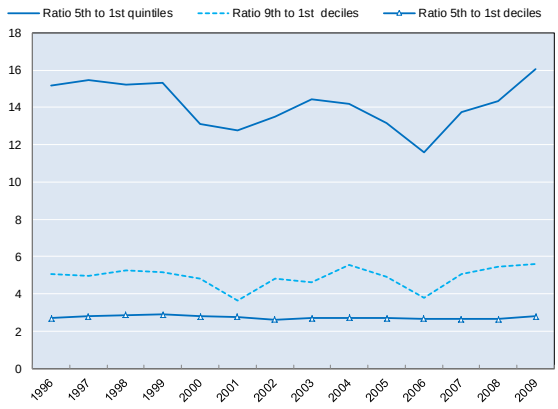
c. Average and minimum wages;
minimum wage – average wage in constant CLPs and
% of average wage



d. Wage gap by level of education in number of times



e. Wage gap by quintiles of wages
in number of times



Source: Author's calculations based on data from the Central Bank, LA-KLEMS and the Supplementary Income Survey.

4.3. Possible links between trade and wages: a survey for Chile

Evidence for Chile up to the turn of the last century and other countries in the region shows that trade liberalisation increased the wage gap between low and high-skilled workers.[10] This runs counter the predictions of the traditional Heckscher-Ohlin theory suggesting that increased trade between industrialised and developing countries should reduce the wage gap in the second group of countries, favouring less-skilled workers being the abundant factor in these economies.

The contrasting evidence of growing wage gaps in Chile – until recently – can be explained by three types of reasons elaborated in studies summarised below: skill-biased technical change, the quality effects embodied in goods, plants and workers, and the role of labour market institutions.[11]

Skill-biased technical change

Growing wage gaps can be explained in part by the increased demand for skilled workers resulting from skill-biased technological change induced or accelerated by trade liberalisation (Acemoglu, 2003). Endogenous technological change in developing countries takes place through imports of machinery, office equipment and other capital assets that require skilled labour. Lower tariffs reduce domestic prices of capital assets, which leads to an increase in imports and in turn raise the demand for skilled workers to operate this new equipment.[12] In this context, Wood (1995) introduces the term "defensive innovation" to describe the response of companies to trade opening. Increased competition from abroad induces firms to engage in R&D and incorporate modern foreign technologies unavailable before liberalisation.

Robbins (1994a) examines trends in relative wages in Chile between 1967 and 1991. He argues that, for a given distribution of educational levels, an increase or decrease in the differential of relative wages tends to worsen or, improve respectively, the distribution of income. In his approach, the effects of educational experience can be decomposed in a *"composition effect"* and a *"wage effect"*. For a given rate of return on education, an increase in education reduces the variance in wages (composition effect). Additionally, in a context of an equal increase in the demand for factors, changes in relative supply generate changes in relative wages (wage effect).

The author tests the neutrality of changes in labour demand from 1974 onwards when trade liberalisation began. From 1975 to 1990, relative incomes grew rapidly and demand for workers was biased towards those with higher education. He concludes that higher education is complementary to the export process, especially in marketing and distribution functions. This is compatible with the notion that trade increases the transfer of knowledge between countries and thereby increases the returns on education and relative wages.

The same author (Robbins, 1994b) extends the analysis to 1992 and finds a significant increase in wages of university graduates versus less educated workers. This trend is not

10. For example, the wage gap grew during the 1980s and 1990s in Argentina, Brazil, Colombia and Mexico. In Chile, the wage gap grew from 140% in the 1960s to 250% in the 1980s and 1990s (Gallego, 2011). However, between 2000 and 2009 there was a slight reduction in this gap.

11. Annex 4.A1. presents evidence for other Latin American countries.

12. He anticipates that trade liberalisation in a developing country increases imports of office equipment and advanced machinery from industrialised countries. The demand for skilled workers should be more pronounced in sectors that import this machinery.

explained by changes in labour supply nor by the composition of unemployment, but by shifts in demand in favour of more skilled workers.

For their part, Meller and Tokman (1996) analyse the impact of trade liberalisation on relative wages in Chilean manufacturing in the period 1968 to 1992. They conclude that trade liberalisation in the early seventies increased the wage gap. However, they also show that this gap narrowed during the export boom of the Chilean economy after the crisis of the eighties.

The ILO (1998) argues that trade opening in Chile should have stimulated the demand for goods used intensively in the exploitation and export of natural resources. Moreover, trade liberalisation could have benefited the owners of this production factor and skilled workers, which are complementary to natural resources. In contrast, the process should have reduced wages of unskilled workers in import-competing sectors. Its empirical analysis confirms these theoretical predictions: the regression of wage gaps on proxies of technological innovation, trade liberalisation and the relative supply of labour confirmed the key role of the first factor, whereas the effect of the second turned out small.

Beyer *et al.* (1999) evaluate the long-term relationship (1960-96) between the wage premium by workers' qualification, product prices, trade opening and factor endowments. They conclude that openness increases wage inequality, although the effect is small. They also point out that Latin America is rich in natural resources, which traditionally are little exploited due to the existence of distorted economic environments. Once a country liberalises its trade, its endowments will not be the only determinants of these changes in the wage gap. The authors find that the decrease in the relative price of labour intensive products and skill-biased technical change tended to increase wage inequality, while the increasing proportion of university graduates helped to reduce it. Although trade opening amplified the skill premium in Chile during the period, this phenomenon apparently went beyond technology transfer.

Reinecke and Torres (2001) investigate whether trade liberalisation after the mid-eighties contributed to higher inequality. The authors argue that the nature of Chile's trade specialisation based on the extraction and export of natural resources increased the demand for skilled workers. Moreover, the export success increased income, and thus the demand for non-tradable goods (relatively intensive in skilled labour). After the mid-eighties, imports of capital goods embodying new technologies grew substantially, reinforcing the demand for skilled labour. They find that three factors explain most of the growing inequality, with technological change being the most important, whereas trade itself explains only 10% of the increase in wage inequality. In contrast, the increasing supply of skilled workers mitigated the above effects.

In a comparative study on the structural adjustment periods in Chile and Costa Rica, Gindling and Robbins (2001) note that wage inequality increased more in the former country. They identify rising skill premiums as an important cause of larger inequality due to a sharp increase in the demand for more qualified workers. Also, they note that the *composition effect* of the educational expansion was similar in both countries. The "price effect" of the increased demand for skilled workers did not come from changes in the quality of education, the power of unions, minimum wages or unemployment, but from trade liberalisation. The increase of returns on education show a positive correlation with the increase of exports to GDP (*skill enhancing-trade*), and increased imports of machinery and physical capital.

Gallego (2006) studies the evolution of the wage gap between skilled and unskilled workers in the previous four decades. Using macroeconomic and sectoral time series, he confirms a positive correlation with the pattern of technological change in Chile and the United States.

In a more recent study, Gallego (2011) investigates the determinants of the skill premium between 1960 and 2000. He studies the hypothesis that changes in demand for skilled labour is a

consequence of the international transmission of modern technology from developed to developing countries, which in the case of Chile is the United States. He argues that the relative demand for skilled workers increases faster in Chile than in the United States in the same industries. This correlation is stronger for tradable and non tradable industries which are intensive in imported capital. Moreover, there is also between positive correlation between the skill premium in Chile and the United States. The evidence supports the above hypotheses, and emphasises the role of technology transfer from developed to developing countries, which tends to favour disproportionately high-skilled workers.

Quality effects embodied in goods, plants and workers

This approach focuses on the effects of trade reforms on productivity and the reallocation of resources within industries towards more efficient plants, which in turn affect wages. The idea is that trade liberalisation improves the "quality" of companies in terms of their productivity or product quality.

Alvarez and Opazo (2011) show how relative wages respond to growing international competition from low-wage countries. In particular, they analyze how the competition of Chinese imports has affected relative wages in the Chilean manufacturing sector. Using plant level data for the period 1996-2005, they find that increasing imports from China (i.e. clothing, various manufactured and rubber goods) depressed relative wages in sectors with a high penetration of these imports between 4% and 25%. This effect was particularly strong for small businesses, while large companies are less affected.

For their part, Alvarez and Lopez (2005) test three hypotheses to explain the superior characteristics of exporters over non-exporters: self-selection, learning by exporting, and the process of conscious self-selection. Using plant level data for the period 1990 to 1996, they find that companies that export show superior initial performance compared to non-exporters, which is consistent with the self-selection hypothesis. They also observe increases in productivity once the plants began to export, which supports the learning-by-exporting assumption. Finally, their evidence underscores the idea that self-selection is a conscious process, as plants increase productivity in order to become exporters.

A complementary explanation is provided by Kandilov (2009), who evaluates the effect of an export subsidy programme for small and medium enterprises (SMEs) implemented in 1986. Using data from a manufacturing survey for the period 1979-96, he shows that the grant benefited mostly medium-sized establishments in terms of increasing the probability to enter foreign markets. He further demonstrates that the grant had only a discreet positive effect on wages of highly qualified workers. In more general terms, he finds little variance in the employment of skilled workers in the short term, but confirmed these workers earn higher wages due to specific industry skills that facilitate exports.

The role of labour institutions

Several studies explored the role of labour institutions in explaining wage gaps. Generally speaking, higher rates of unionisation as well as higher coverage and coordination of collective bargaining have been found to be associated with lower levels of income inequality and wage disparity, a lower gap between the wages of skilled and unskilled workers as well as a lower gap between men and women (Aidt and Tzannatos, 2002; OECD, 2004; Hayter and Weinberg, 2011). Recent studies, however, raise the question whether the impact of unionisation on inequality may have diminished more recently (Beccaro, 2008). In the case of Chile, Reinecke and Valenzuela (2011) argue that the potential role of unions and collective bargaining in improving the distribution of wages has been used in a very limited manner.

Few studies explicitly address the interaction between labour market institutions and international trade. For example, Goldberg and Pavcnik (2007) suggest that the relationship between trade reform and informality depends on the institutional setting. Other institutions are the minimum wages and presence of unions.

Borghi (2005) analyses the effect of trade liberalisation on wage inequality between different groups of workers. He finds that trade liberalisation increased wage differentials between workers with university degrees and those with secondary education only, as it did not affect the wage gap between workers with secondary and those with primary education. He cautions, however, that a limitation of the results is the assumption of perfect competition in labour markets, despite the fact that regulations, unions, collective bargaining and other labour institutions abound. The outcomes in the labour market induced by changes in trading policies could be very different if some of these features of labour markets were explicitly considered.

Along the same lines, Bussolo *et al*. (2002) suggest that patterns of economic growth and employment depend critically on the labour market conditions. They present empirical evidence on how labour market regulation can interact with the expansion of trade. It is analysed how trade reforms affect the economy in a context of perfectly competitive labour markets, adding to the analysis relevant labour institutions in the country. In particular, the collective bargaining process is considered as the standard negotiating case resulting from bilateral monopoly.

They claim that a main consequence of the presence of imperfect wage bargaining processes is that real wages deviate from productivity levels, and that companies must pay a premium over the marginal product of labour. The size of this premium will depend directly on the preferences (of both unions and companies) and on the bargaining power of the parties (especially in the sectors of energy, copper or mining, but also in the tobacco, paper and printing, financial services and chemicals industries).

By simulating a reduction of union bargaining power, justified by the observed reduction of unionisation in the Chilean economy, we observe a sharp fall in the initial income of groups with sector-specific skills, down to almost a third of the initial value, which explains the larger increase observed in the income of relatively more skilled workers than unskilled workers.

Finally, Landerretche *et al.* (2011) estimate that salary premium for education in Chile in the 2004-2009 period, is close to 20%. They also find evidence that unions tend to be associated with higher wages for those on the bottom of the wage distribution. Moreover, economic sectors are found to be important in the wage equation, but not as much as firm size.

4.4. Analysis of sectoral wages according to their intensity in international trade and investment

The purpose of our empirical analysis is to test if wages in "open" ("tradable") sectors are higher than those in "closed" ("non-tradable") sectors. We define openness not only in terms of the share of production exported, but also the competition faced in the domestic market due to imports and the extent of foreign direct investment. In addition, we also consider the degree of unionisation as a possible explanatory factor of wage gaps.

The data

For the empirical analysis, we used the micro database of the Supplementary Survey on Incomes (ESI), which is part of the National Employment Survey (ENE) of the National

Institute of Statistics for 2003 and 2008.[13] For each wage earner, this database reports years of education, age and gender, as well as monthly wages, working hours, sector and company size. Union membership data by sector was drawn from the Ministry of Labour.

Definition of openness

To classify the 29 sectors of the Chilean economy into tradable and non-tradable groups, a cluster analysis was carried out. This analysis separates observations into relatively homogeneous groups (with minimum variance) called clusters or segments, which are as heterogeneous as possible between them (maximum variance).

The *clustering* was based on three proxies of openness for each of the 29 sectors. These are a) the proportion of total production exported *(export ratio)*, b) the import share of final consumption (*external dependence*), and c) the ratio of foreign direct investment to value-added (*FDI intensity*). All three variables turn out relevant to differentiate sectors. This clustering exercise was done for 2003 and 2008 using data from LA-KLEMS and the Foreign Investment Committee.

All sectors were classified into three groups (high, medium and low openness). The Euclidian distance based on group averages was used as a measure of similarity and as a final clustering criterion (Annex 4.A3.). As expected, the most open sectors are those traditionally considered tradable and the low-open sectors are those viewed as non-tradable (Table 4.1). Those grouped as "medium open" present a moderate participation in foreign trade and are a moderate driver of FDI. As a robustness test, the k-means clustering method was also applied, yielding the same results.

The results for 2003 and 2008 are similar. The most open sectors are mining and some manufacturing industries such as machinery (mostly imported), which have maintained their status as highly tradable from 2003 to 2008. In the latter year, two sectors were added: textiles, leather and footwear, and chemicals and derivatives. The least open group, also referred to as "non-tradable", includes most service sectors, plus some manufacturing sectors. From 2003 to 2008, some sectors (including food, beverages and tobacco, and transport and storage) moved from a "medium level" to a "low level" of openness.

To test the robustness of the results, we also used a more "traditional" division of the 29 sectors into two instead of three groups of sectors on the basis of their exports over production ratio using cluster analysis. The group of high-export intensity group includes the high openness sectors of 2008 in Table 4.1, except for textiles, leather and footwear, while the group of low-export intensity sectors covers the remaining sectors of the economy.

13. We did not consider 2009 or 2010, as these years are highly atypical due to the effects of the international crisis on the domestic economy and employment in 2009 and the recovery in the following year.

Table 4.1. Sector groupings based on levels of openness

2003	2008
High	**High**
Mining and extraction	Mining and extraction
Other machinery	Other machinery
Electrical and optical equipment	Electrical and optical equipment
Transport equipment	Transport equipment
Other manufactures	Other manufactures
	Textiles, leather and footwear
	Chemicals and derivatives
Medium	**Medium**
Wood	Wood
Pulp, paper products, printing and publications	Pulp, paper products, printing and publications
Refined petroleum	Refined petroleum
Rubber and plastic	Rubber and plastic
Basic metals and fabricated metallic products	Basic metals and fabricated metallic products
Chemicals and derivatives	
Textiles, leather and footwear	
Food, beverages and tobacco	
Transport and storage	
Lower	**Lower**
Other non metallic minerals	Other non metallic minerals
Electricity, gas and water	Electricity, gas and water
Construction	Construction
Trade	Trade
Hotels and restaurants	Hotels and restaurants
Postal services and telecommunications	Postal services and telecommunications
Financial Intermediation	Financial Intermediation
Real Estate	Real Estate
Business services	Business services
Public Administration and defence	Public Administration and defence
Education	Education
Health and social work	Health and social work
Other community and personal services	Other community and personal services
	Food, beverages and tobacco
	Transport and storage

Source: Author's calculations based on data in LA-KLEMS.

Decomposition of wage differentials with the Oaxaca-Blinder method[14]

Wage levels among the three groups of sectors were compared following different steps. First, for each group, an average wage equation was estimated using the Mincer function:

$$ln(w)=ß_0+ ß_1+Edu+ ß_2E_+ ß_3E^2+ ß_4\ man+ ß_5\ unionisation + u \quad (1)$$

where:

- *ln (w)* is the natural logarithm of the hourly wage;
- *Edu* is *the* education level in years;
- *E* is the *experience* in the labour market estimated by the individual's age;
- *E2* is a quadratic term of experience, which captures possible nonlinearities between the logarithm of salary and experience;
- *Male* is a dummy variable for gender with value 1 for males and 0 for females;
- *Unionisation* is a dummy variable with value 1 for workers in sectors with a union affiliation rate above 20% and 0 otherwise; and
- *u* is a random error.

Education and experience are proxies of human capital, while $ß_1$ and $ß_2$ are the returns on human capital. We can analyse the wage distribution based on the amount of human capital and its return. This equation was estimated for the three groups of sectors defined above with high, medium and low levels of openness.

Secondly, we decompose average wage differences between the three groups with the Oaxaca-Blinder methodology. This methodology separates the effects of various factors on the difference of average wages attributing them to different rebates to human capital in both sectors and the heterogeneity in the distribution of human capital. In particular, it decomposes the wage difference as follows:

$$E\ [\ln(w_T)] - E\ [\ln(w_{NT})] = [E(X_T) - E(X_{NT})]^{'}\ ß_{NT} + E(X_{NT})^{'}\ (ß_T - ß_{NT}) + E(X_T) - E(X_{NT})]^{'}\ (ß_T - ß_{NT}) \quad (2)$$

where:

- T and NT indicate two of the three sectors with a high (T) or medium or low level of openness (NT),
- $E\ [\ln(w_T)]$ is the expected natural logarithm of the wage per hour in the group with a high level of openness and $E\ [\ln(w_{NT})]$ in the group with a medium or low level of openness.
- $ß_T$ and $ß_{NT}$ are vectors of coefficients of the separate regressions for each group. $E(X_T)$ and $E(X_{NT})$ refer to characteristics in both groups of sectors. The right hand side is broken down into three parts.
- $[E(X_T) - E(X_{NT})]^{'}\ ß_{NT}$ is the part of the wage gap related to differences in the variables of human capital endowments between the "tradable" (high level of openness) and "non-tradable" groups (medium or low level of openness).

14. This paper follows the procedures of Lemieux (2002, 2006) and Firpo *et al.* (2010).

- $E(X_{NT})^{'}$ $(ß_T - ß_{NT})$ measures the contribution to the difference in coefficients of the equations of the two groups and refers to the part of the wage differential related to unobserved variables between the two groups. This term shows differences in rates of return on human capital between the two groups.
- $E(X_T) - E(X_{NT})]^{'}$ $(ß_T - ß_{NT})$ is an interaction term, which captures differences in endowments and coefficients simultaneously between the two groups.

Econometric results

For 2003 and 2008 we made two comparisons.

- analysis of the wage gap between the group of sectors with a high level of openness (tradable group) versus the group with a low level of openness (non-tradable group);
- analysis of the wage gap between the group of sectors with a high level of openness (tradable group) versus the groups with a medium- and low level of openness (the rest).

In addition, in both years and for each comparison two types of regressions are performed: one regression including the union affiliation dummy variable and another excluding it. This is to single out the impact of the degree of unionisation on wages.

The results including the variable of union affiliation show the following.

- All independent variables are significant for both years.
- Education has a return of 13% to 14% for each additional year of studies for both groups of sectors with high and low levels of openness.[15]
- Experience also has a significant effect on wages. In 2008, an additional year of experience increases the average wage by 1.4-1.7%, while in 2003 this elasticity was higher in both groups.
- Men earn higher wages in both groups of sectors. In the group with a high level of openness, male wages are on average 27% higher than female wage, while in the group with low-openness this difference is smaller (20% to 22%).
- The effect of unionisation is especially important in the group of high openness. An individual in this group earns on average 34% if he or she works in a sector with a high unionisation rate, compared to a peer who works in a sector with a low unionisation rate in 2008. In contrast, in the "non-tradable group", the premium of union penetration is much lower (6% and 8% in the same year). In 2003, the effect of unionisation is 29% for the tradable group and between 7% and 10% for the non-tradable group.

15. The estimates of the returns to schooling are probably biased. It is possible that talented workers have both more education and higher wages, thus biasing the estimated returns to schooling. This is also referred to as the "ability bias".

Table 4.2. Wage regressions for groups with different levels of openness

Dependable variable:	With unionisation				With no unionisation			
ln (wages)	High/lower		High/rest		High/lower		High/rest	
	High	Lower	High	Rest	High	Lower	High	Rest
Years of study	0.137	0.135	0.137	0.129	0.144	0.136	0.144	0.130
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Experience	0.014	0.017	0.014	0.017	0.016	0.017	0.016	0.017
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Exper*Exper	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)**	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Gender	0.267	0.216	0.267	0.200	0.368	0.222	0.368	0.205
	(0.003)***	(0.001)***	(0.003)***	(0.001)***	(0.003)***	(0.001)***	(0.003)***	(0.001)***
Unionisation	0.336	0.060	0.336	0.078				
	(0.002)***	(0.001)***	(0.002)***	(0.001)***				
Constant	5.094	5.164	5.094	5.232	5.083	5.166	5.083	5.230
	(0.006)***	(0.001)***	(0.006)***	(0.001)***	(0.007)***	(0.001)***	(0.007)***	(0.001)***
Dependable variable:	**With unionisation**				**With no unionisation**			
ln(wages)	**High/Lower**		**High/Rest**		**High/Lower**		**High/Rest**	
	High	**Lower**	**High**	**Rest**	**High**	**Lower**	**High**	**Rest**
Years of study	0.133	0.143	0.133	0.139	0.146	0.144	0.146	0.140
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Experience	0.024	0.018	0.024	0.019	0.025	0.018	0.025	0.019
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Exper*Exper	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Gender	0.225	0.183	0.225	0.157	0.326	0.190	0.326	0.163
	(0.003)***	(0.001)***	(0.003)***	(0.001)***	(0.003)***	(0.001)***	(0.003)***	(0.001)***
Unionisation	0.289	0.070	0.289	0.095				
	(0.003)***	(0.001)***	(0.003)***	(0.001)***				
Constant	4.816	4.796	4.816	4.840	4.707	4.797	4.707	4.836
	(0.006)***	(0.002)***	(0.006)***	(0.001)***	(0.007)***	(0.002)***	(0.007)***	(0.001)***

Note: Standard errors in parentheses. *** and ** indicate significance levels at 1% and 5%, respectively.

Source: Author's calculations base on data of ENE-ESI and LA-KLEMS.

Table 4.3 displays the results of the Blinder-Oaxaca decomposition. It consists of four columns per year, showing comparisons between a) groups of high and low levels of openness and b) groups of high level of openness and two remaining groups (the rest). One set of regressions includes the unionisation rate, while the other does not.

Table 4.3 has three parts. The first summarises the results of the Oaxaca decomposition of the wage differential into three effects: endowments, discrimination and interaction. The second represents details, by variable, of the effect of differences in human capital, while the third

illustrates the role of wage discrimination in the wage gap, with details for each variable included in the analysis.

Table 4.3. Oaxaca-Blinder decomposition, 2003 and 2008

	2008				2003			
	With no unionisation		With unionisation		With no unionisation		With unionisation	
Total	**High/ lower**	**High/ the rest**	**High/ lower**	**High/ the rest**	**High/ lower**	**High/ the rest**	**High/ lower**	**High/ the rest**
"Tradable"	7.47	7.47	7.47	7.47	7.14	7.14	7.14	7.14
"Non tradable"	7.26	7.20	7.26	7.20	6.97	6.90	6.97	6.90
Difference	0.22	0.27	0.22	0.27	0.17	0.25	0.17	0.25
Endowments	0.07	0.11	0.09	0.14	0.05	0.11	0.07	0.14
Discrimination	0.12	0.13	0.01	0.02	0.09	0.11	0.01	0.03
Interaction	0.03	0.03	0.12	0.12	0.02	0.02	0.08	0.08
Endowment								
Years of study	0.02	0.08	0.02	0.07	0.02	0.10	0.02	0.09
Experience	0.01	0.00	0.01	0.00	0.00	-0.01	0.00	-0.01
Exper*Exper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gender	0.04	0.03	0.04	0.03	0.03	0.02	0.03	0.02
Unionisation			0.02	0.03			0.02	0.03
Discrimination								
Years of study	0.11	0.16	0.02	0.08	0.03	0.07	-0.12	-0.06
Experience	-0.02	-0.02	-0.07	-0.07	0.14	0.12	0.12	0.09
Exper*Exper	0.04	0.04	0.06	0.07	-0.06	-0.05	-0.07	-0.05
Gender	0.08	0.10	0.03	0.04	0.08	0.10	0.02	0.04
Unionisation	-0.08	-0.15	0.05	0.04	-0.09	-0.13	0.04	0.03
Constant			-0.07	-0.14			0.02	-0.02

Source: Author's calculations based on data from ENE-ESI and LA-KLEMS.

For 2008, the logarithm of the average hourly wage is 7.47 for individuals working in the group with a high level of openness, while that of individuals working in the group with a low level of openness is 7.26. In other words, the wage gap is 0.22 logarithm points (Column 1). The average wages in the first group is about 25% higher than that of the second.

The decomposition of the wage difference shows that:

- Excluding the variable of union affiliation, 0.07 logarithm points or 32% of this gap is due to differences in the characteristics of individuals (endowment effect). That is, if workers in the non-tradable group would have the characteristics of their peers in the tradable group, the natural logarithm of the hourly wage of the former would be 0.07 higher. In addition, 0.12 logarithm points refer to differences in the coefficients of separate regressions for both groups, i.e. 55% corresponds to the "price or discrimination effect". This effect indicates the wage premium paid to all workers in a particular group of sectors, in this case the tradable group, independent of their characteristics.

- Comparing the group of high openness with the rest, we see that the difference equals 0.27 logarithm points. This gap is larger than the comparison of high openness with low openness. In this case, 39% corresponds to the endowment effect and 49% to the price effect.
- When union membership is included in the analysis, we find that 0.09 logarithm points of the gap is explained by differences in workers' endowments between the two groups. The price effect, however, diminishes and explains only 6% of the difference, showing a slight discrimination effect in favour of the high openness group.

Among the workers' endowments, the most important factor is the gender variable (0.04 logarithm points), followed by years of study and unionisation (0.02 logarithm points each). In the comparison of the group with high openness versus the rest, the endowment effect is higher than in the previous case, explaining over 50% of the difference in the wage gap. However, the price effect (or discrimination) drops to explain 6%.

In 2003, the wage differential is 0.17 logarithm points corresponding to an hourly wage differential of about 18%. A decomposition without union membership shows that the endowment effect explains 30% of the gap, while the price effect explains 55% of the wage differential. That is, the relationships remained very stable between 2003 and 2008.

Table 4.4. Decomposition of hourly wage, 2003 and 2008

2008 CLP and percentages

	2008				2009			
	With no unionisation		With unionisation		With no unionisation		With unionisation	
	High/ lower	High/ the rest	High/ lower	High/ the rest	High/ lower	High/ the rest	High/ lower	High/ the rest
High (CLP)	1.763	1.763	1.763	1.763	1.604	1.604	1.604	1.604
Lower or the rest (CLP)	1.416	1.343	1.416	1.343	1.356	1.255	1.356	1.255
Difference (CLPs)	347	420	347	420	248	349	248	349
Decomposition:								
Endowment (%)	31%	39%	41%	51%	30%	44%	43%	58%
Coefficients (%)	55%	49%	6%	5%	55%	47%	9%	11%
Interaction (%)	14%	12%	53%	44%	15%	9%	48%	31%
Total (%)	100%	100%	100%	100%	100%	100%	100%	100%

Note: The exchange rate in 2008 was CLP 522 per US dollar.

Source: Author's calculations based on data of ENE-ESI and LA-KLEMS.

When union affiliation is included to explain the wage gap, the endowment effect explains 43% in the high/low openness comparison and 58% when comparing high openness with the rest of the economy. Furthermore, in the high/low openness comparison 9% is explained by the discrimination effect, while in the comparison high/the rest this effect explains 11%.

In 2003, as in 2008, when including the impact of union affiliation to explain the wage differential, the endowment effect increases significantly, while the effect of discrimination is diluted.

Figure 4.3.shows the decomposition of wage differentials between the sectors of high versus low openness and high openness versus the rest. In 2008, a worker in the group of high openness sectors earned on average CLP 350 more per hour than a worker in the low openness

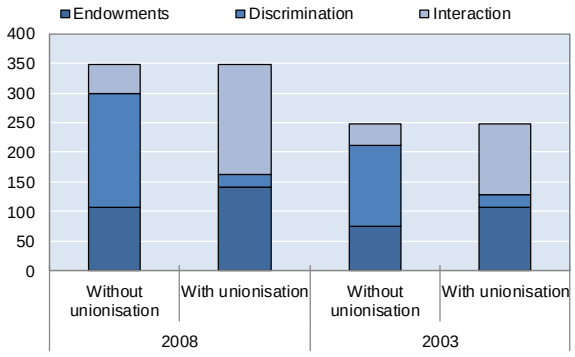
group (first bar of Figure 4.3a). About CLP 100 of this larger remuneration corresponds to the workers' greater attributes (i.e. level of education) in the first group, while CLP 200 corresponds to the "high openness sector premium." However, when the workers' affiliation to a union is also considered, this sector "premium" is strongly reduced (second bar in Figure 4.3a). In other words, the higher level of union membership in the tradable sector seems to explain most of the industry premium. In 2003, the wage gap was smaller, but the explanations for the difference seem similar.

In comparison, the wage gap between the sectors of high versus low and medium openness (Figure 4.3b) was higher than between the sectors of high openness versus low. This is mainly due to the presence of the agricultural sector in the group of medium openness, where the average income is low. The wage gaps are explained by the similar reasons as in the case of the comparison in Figure 4.3a.

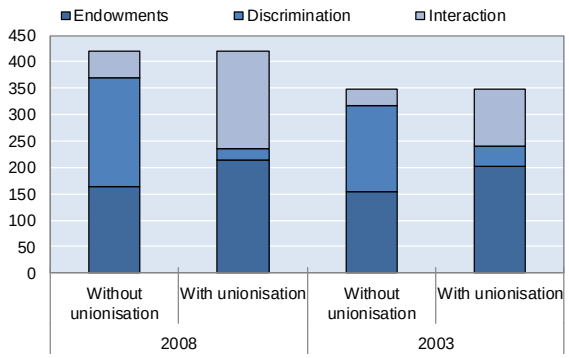
Figure 4.3. Decomposition into three components of per hour wage gap between high openness group versus the low group and lower medium openness, 2003 and 2008

Constant 2008 CLP

a. High openness versus low openness



b. High openness versus low and medium openness



Note: The exchange rate in 2008 was CLP 522 per US dollar.

Source: Authors' calculations based on data of ENE-ESI and LA-KLEMS.

The alternative classification into two instead of three groups yielded similar results (not shown separately). In 2008, a worker in the group of high-export intensity sectors earned on average CLP 409 more per hour than a worker in the group of low-export intensity sectors. About CLP 190 of this larger remuneration corresponds to the workers' greater endowments in the first group, while CLP 220 correspond to the "high-export intensity premium." However, when the workers' affiliation to a union is also considered, this sector "premium" is strongly reduced. In other words, the higher level of union membership in the tradable sector also seems to explain most of the industry premium. In 2003, the wage gap was smaller, but the explanations for the difference seem similar.[16]

4.5. Conclusions and future research

The study attempts to explain average wage gaps between the tradable and non-tradable sectors in 2003 and 2008. The 29 sectors of the economy were grouped into three groups of high, medium and low levels of openness with a novel form of clustering considering three

16. Detailed results of the wage comparisons between the group of high-export intensity sectors and group of low-export intensity sectors are available upon request from the authors.

dimensions: export ratio, external dependence and foreign direct investment intensity. Using the micro database of the INE-ESI, wage-earners were split into the three groups defined above. We find a significant wage gap between individuals working in the most open group of sectors and those working in the rest of the economy.

The hourly wage gap between the tradable and non-tradable sectors has increased from 18% in 2003 to 25% in 2008. Furthermore, in both years the group of sectors with a medium degree of openness has lower average wages than both other groups – with a high and low degree of openness. This is mainly due to the negative influence exerted by agriculture, stockbreeding, hunting, forestry and fishery, which represent 12% of total employment and is one of the sectors with the lowest average wage.

The study explains average wage levels by years of education, experience, gender and labour unionisation. The average wage regressions show that all independent variables are significant. The coefficients associated with education have shown a return of between 13% and 14% per additional year of education for the groups of high and low openness. In both groups, an additional year of experience produces an increase over 0.14% in average wages. Men have higher wages in both groups of sectors, particularly in sectors with a high degree of openness. The effect of unionisation is important in high openness sectors: the wage of unionised workers is 34% (29%) higher than those who are not affiliated to a union in 2008 (2003).

Decomposing the wage gap between groups of high and low openness in 2008, excluding the union membership variable, shows that 32% is explained by workers' endowments. Moreover, 55% corresponds to the price effect, indicating a strong discrimination in favour of workers in the high openness group. When union membership is included in the analysis, however, the endowment effect increases to 41%, while the price effect drops to 6%. In other words, the discrimination effect in favour of the tradable sectors almost disappears. The results for 2003 are similar to those in 2008, even though wage differential between the sectors of high versus low and medium opening increased between 2003 and 2008.

In sum, wage differentials can be decomposed into three factors. Higher average salaries in the tradable group are due in part to better workers' endowment compared to other sectors of the economy. Moreover, there is a discrimination effect between groups of sector in favour of the high openness group. However, when unionisation is included as an explanatory factor of wage differentials, this discrimination effect is strongly reduced and the interaction effect increases. In other words, union membership in the group of high openness sectors appears to be of great importance.

This chapter could be complemented in several ways.

- Cluster analysis of tradable and non-tradable sectors could be complemented with other indicators of participation in the global economy, which under different theories affect wages. Examples of this are the proportion of imported consumables as the total of intermediate consumption (excluding energy), and the importance of imported capital goods from industrialised countries as a mechanism of technological transfer from the knowledge generators of to the country (see Gallego, 2011).
- This analysis could be carried out for some benchmark years in the eighties and nineties, to analyse, on the one hand, changes in wage differentials between tradable and non-tradable sectors, and on the other hand, the link with trade opening of the Chilean economy both *de jure* (in terms of lower barriers to trade) and *de facto* (in terms of an increase in the trade to GDP ratio). The analysis in this paper has already noticed some major changes between 2003 and 2008, suggesting that for previous year the differences could be greater.

- The impact of unionisation on wages, especially in sectors most exposed to international trade, deserves additional analysis, if possible incorporating micro data on union membership.
- It is possible the econometric results are affected by changes in the size of firms during the period of analysis. If trade opening is accompanied by an increase in firm size, as predicted by trade theory with heterogeneous firms, the degree of unionisation also rises because this is more important in large firms.
- A further exploration of the results of this paper could include the analysis of the relationship between trade opening, wage gaps and levels of unionisation on the one hand, and employment trends on the other.
- In addition, an assessment over a longer time period would be welcome as further data become available, in order to capture more completely the effects of liberalisation from the already concluded FTAs. Also, in this context and subject to data availability, it may be useful to make a more disaggregated assessment with respect to factors associated with such effects of RTAs.

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Annex 4.A1.

Trade and skill premiums in Latin America: A review of selected studies

To analyse the link between trade and increasing skill premiums in Latin America observed over the past decades, we followed three out of six theoretical approaches proposed by Pavcnik *et al*. (2007)[1] These are skill biased technological change, industry specificities and compositional changes within industries, and the exporting and "quality" upgrading of products, plants and workers.

Skill biased technological change

Studies on Latin America show that trade liberalisation affected the distribution of wages, although in many cases this effect was small in relation to the role of technological change. The latter can be considered as an indirect effect of trade liberalisation, since most innovations are embodied in machinery, equipment and inputs imported from industrialised countries.

For example, **Colombia** experienced growing wage inequality in the context trade liberalisation (Attanasio *et al.*, 2002). With an estimated Mincer-type wage equation based on household survey data, these authors find that trade policy contributed to the increasing skill premium, in particular in the form of technological change favouring qualified workers. In a 2004 study, the same authors documented that during 1984 – 1998, the increase in the demand for skilled workers in Colombia was greater in the sectors that experienced the largest tariff reductions. This supports the finding that technological change was an endogenous response to trade liberalisation.

In the case of **Brazil**, Pavcnik *et al*. (2002) conclude that trade reforms contributed to rising inequalities mostly through skill biased technological change induced by trade liberalisation. Empirical evidence on the direct contribution of import liberalisation to increasing wage gaps is mixed and inconclusive.

Industry wages

Another explanation of increased skill premiums is the "industry wage". This approach focuses on how trade liberalisation affects specific industries through several channels:

- In models with short to medium term horizons, where workers cannot easily move across sectors, tariff cuts translate into proportional declines in wage premiums in the most affected industries.

1. To explain rising *skill premiums*, Goldberg and Pavcnik (2007) refer to the Stolper-Samuelson effects, the role of intermediate goods and outsourcing, the increase of capital flows and rising capital-skilled labour ratios, skill biased technological change, the composition of quality changes within industries and changes in returns in high-skilled jobs. Among the additional pathways, transitional unemployment, industry wages, uncertainty, labor standards and the production and consumption of households, are considered.

- In models with imperfect competition, profitable industries share part of their income with their workers because of their union bargaining power. In these industries, labour unions may agree to lower wages in exchange for employment security in the context of tariff cuts.
- When trade liberalisation improves productivity, these gains may be passed on to workers by wage increases.

Empirical evidence on the response of industry wage premiums to trade reforms is mixed. No association was found for this relationship in **Mexico** (Feliciano, 2001) nor **Brazil** (Pavcnik *et al.*, 2004), whereas a positive association was found in **Colombia** (Goldberg and Pavcnik (2004). For their part, Kaplan and Verhoogen (2005) present proof that wages increased in plants with higher productivity, and that these increases were explained by higher wages of incumbent workers rather than newcomers.

Other studies point to the fact that industries that experienced wage declines following trade liberalisation were also the ones facing the largest tariff cuts, having the highest proportions of unskilled workers and paying the lowest wages. Following trade liberalisation, less-skilled workers suffer a double shock in terms of the increasing skill premiums and wage declines in industries that employ high proportions of unskilled workers.

Nevertheless, most studies finding proof of increasing wage inequality following trade liberalisation show that the magnitude of this effect is rather small. This can be explained in part by the large informal sector in many developing countries offering alternative a buffer to trade shocks. In **Brazil**, Pavcnik *et al*. (2004) indicate that while industry affiliation is an important component of the worker's earnings, the structure of each industry wage premiums is relatively stable over time, and there is no statistical association between changes in the industry wage premiums and changes in trade policy.

The quality effect in products, plants and workers

This approach focuses on the effect of trade reform on productivity and factor reallocations within industries towards more efficient plants. Import liberalisation induces "quality" upgrading of companies, both in terms of "firm productivity" and "product quality". Following trade opening, quality improves because firms face greater competitive pressure from imports and because resources are transferred from non-tradable to export sectors, with the latter being more productive (Melitz, 2003). For the growing wage inequality debate, a connection needs to be established between, on the one hand, compositional changes within an industry and the "superior quality" of firms with higher demand for skilled labour, and, on the other hand, the increased skill premium. If higher quality products require a higher proportion of skilled workers, the shift towards higher quality products will benefit the latter.

Verhoogen (2008) adopts this "quality" approach in the case of **Mexico** using panel data of manufacturing plants. In a model with heterogeneous plants and quality differentiation, he finds that more productive plants produce higher quality goods and pay higher wages to maintain a more skilled workforce than less productive plants. Moreover, these more productive plants produce goods for exports that are of better quality than those made for the domestic market. He finds that more productive plants increased the proportion of export to sales, pay better wages and have more ISO 9000 certifications, than less productive plants in the decade following the 1994 Tequila crisis.

Galiani and Sanguinetti (2003) study whether trade liberalisation has played a role in the evolution of the wage structure in **Argentina** during the nineties. Specifically, they tests if sectors where import penetration deepened are also the sectors where, *ceteris paribus*, a greater

increase in the wage inequality is observed. Although the results support this hypothesis, the authors conclude trade deepening explains only a small part of the observed increase in wage inequality.

In a more recent study, Brambilla *et al*. (2011), investigate the link between exports and the wage premium in manufacturing **Latin America and the Caribbean**. They show that exporting firms in general are bigger, more productive, employ more workers and pay higher wages. Also, they analyse the possible association between exports and wage premiums, considering that export activities are skill-intensive requiring marketing and quality upgrading (labelling, warranties and certification). Using firm-level data, the authors find support for such a link, as they find a positive and statistically significant relationship between wage premiums and the level of exports. This elasticity is, however, small, because a doubling of exports is associated with an increase of only 0.28 percentage points of the wage premium.

Annex 4.A2.

Trade and employment in Chile: A review of selected studies

Literature on the Chilean experience with the effects of trade on employment have traditionally focused on ex-post evaluations of the effects of trade liberalisation, while more recent studies estimated the impact of free trade agreements on employment.

Meller and Tokman (1996) analyse employment behaviour in manufacturing after trade opening in the seventies. This process increased the relative demand for skilled workers, especially in the tradable sectors competing with imports and, within the non-tradable sector, in banking and insurance. Less-skilled labour also increased in export sectors. During the second stage of the opening process after 1984, skilled labour grew in the import-competing sector and did not change in the export sector.

On their part, Marquez and Pages (1997) criticise the studies such as the one above as they do not control for simultaneous effects affecting the demand of labour. These include changes in productivity, real exchange rate, real wages, and the terms of trade. Their study assesses the impact trade liberalisation in 18 countries in Latin America and the Caribbean. Using a panel data approach, they conclude that trade liberalisation had a small direct negative effect on employment, in part resulting from the parallel appreciation of the exchange rate in many countries.

Levinson (1996) points out that import liberalisation in combination with macroeconomic shocks resulted in an 8% decline of manufacturing employment from 1979 to 1986. Despite the absence of job creation, there was a very dynamic process of job creation and destruction within all sectors, as about 25% of all workers changed jobs every year. Firm level data suggest that the recovery following the recession in the early eighties resulted in a consolidation of employment in large firms.

Several studies used input-output matrices to evaluate the employment impact of trade liberalisation. First, the Ministry of Planning (Mideplan, 2003) used the input-output matrix of 1996 to evaluate the employment impact of the growth in exports in the 1990s. It finds that the expansion of exports created 59 000 permanent jobs. Second, Guardia *et al.* (2004a) and (2004b), made ex-post evaluations of Chile's trade agreements with Canada and Mexico, respectively, using the same methodology. In the case of the agreement with Canada, they report a positive effect of trade liberalisation on employment as the net increase of jobs was 13 000 or 3.4% of all net jobs created during the 1997-2003 period. In the case of the agreement with Mexico, the net job growth was 73 000 jobs or 6.5% of total net job growth in the 1992-2003 period.

Finally, ILO (2008) estimates jobs creation resulting from trade agreements signed by Chile, incorporating the effect of FDI. Using input-output matrices for 1996 and 2003, it is shown that wage-earning employment associated to exports amounted to 716 624 jobs in 2003. This was a 29% increase relative to the level recorded in 1996. Total employment generated by exports accounted for 16% and 20% of total private wage-earning employment in 1996 and in 2003, respectively. When employment generated by FDI is included, wage-earning employment generated is equivalent to 22% of the total economy.

Annex 4.A3.

Cluster Analysis by Euclidian Distances

The distance function ***d***( ) between points x_i and x_j defined in ***l*** dimensions can be represented by:

$d(x_i,x_j) = d_{ij}$
$(x_i , x_j) \geq 0$
$(x_i , x_j) = 0$ when $x_i = x_j$
$(x_i , x_j) = d(x_j , x_i)$

The distances are represented in square symmetrical matrixes, where the *n* rows and the *n* columns are elements or objects on the basis of which we are calculate the distances. Thus, a distance matrix is:

$$D = \begin{bmatrix} d_{11} & d_{12} & \dots & d_{1n} \\ d_{21} & d_{22} & \dots & d_{2n} \\ \vdots & \vdots & . & \vdots \\ d_{n1} & d_{n2} & \dots & d_{nn} \end{bmatrix}$$

A frequently used distance measures is the Euclidean distance expressed by:

$$d_{ij} = \sqrt{\sum_{l=1}^{p} \left(x_{il} - x_{jl} \right)^2}$$

Where X_{il} represents the average element or indicator being measured. In this paper, we use hierarchical clustering of the divisive type, which starts with all observations within one single cluster and subsequently divides the elements into smaller clusters.

Figure 4.A3.1. Export Coefficient

As % of production, 2008

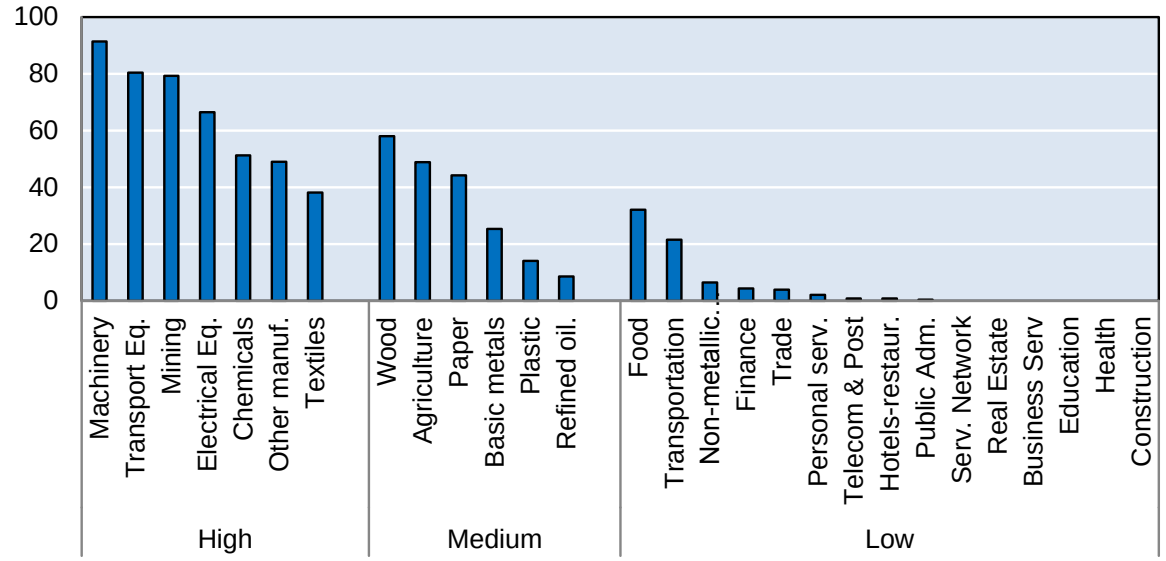


Figure 4.A3.2. External dependence

As % of domestic demand, 2008

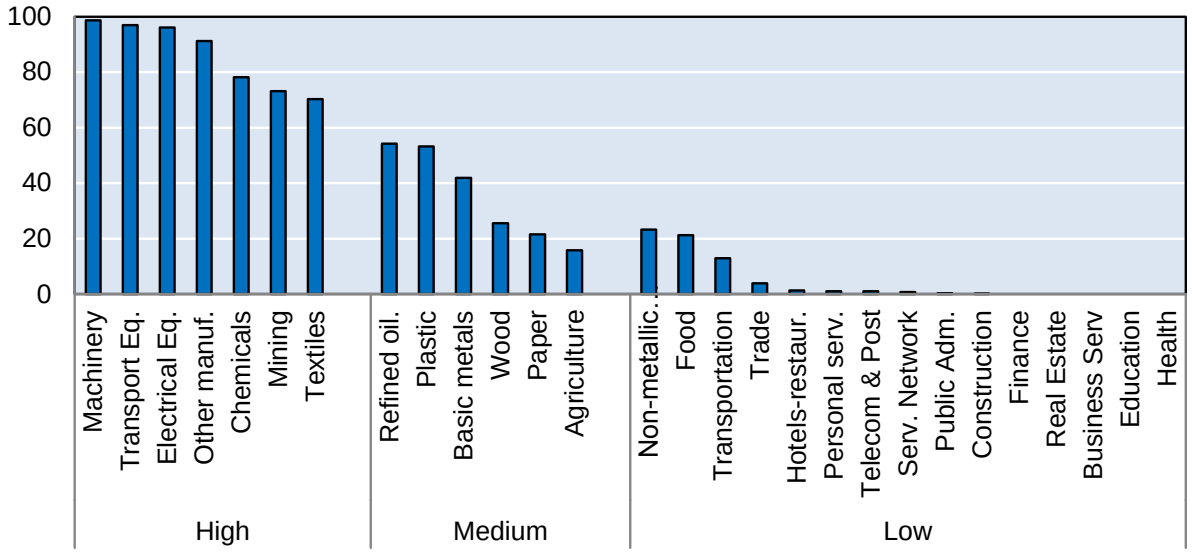
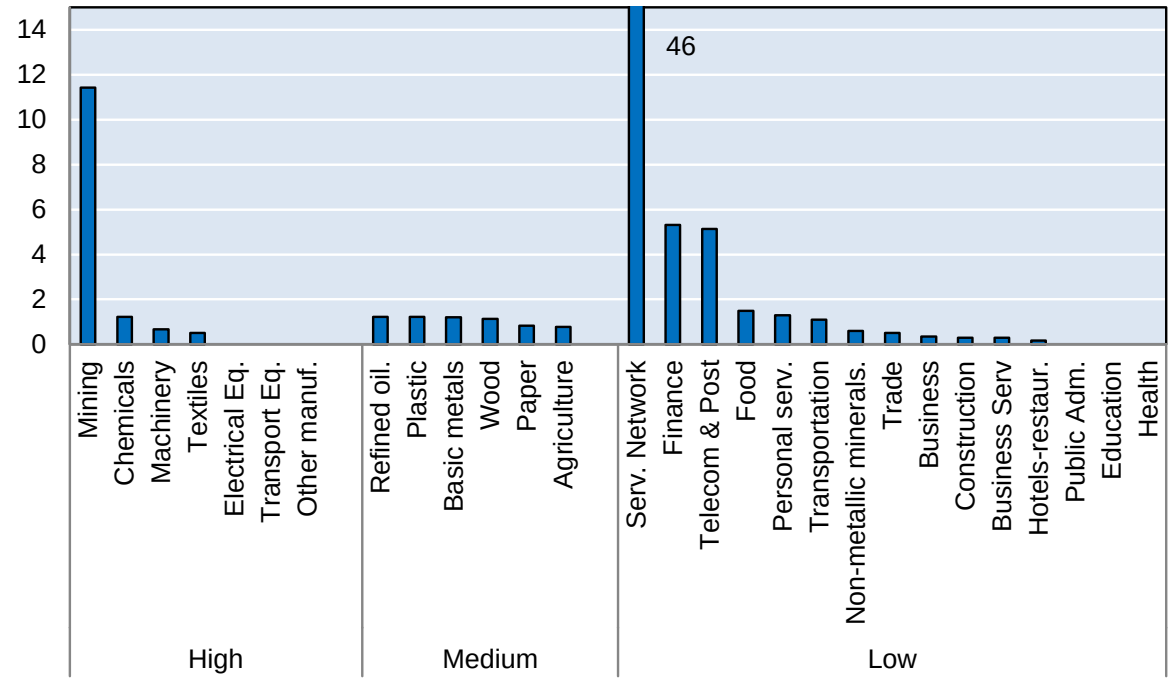


Figure 4.A3.3 Foreign direct investment intensity

As % of GDP, 2008



Source: Authors' calculations on the basis of LA-KLEMS and Foreign Investment Committee.

Table 4.A3.1. Description of the indicators

Indicator	Description	Formula	Variables	Data source
Export Coefficient	Share of gross output sold abroad	$CE = \frac{X}{GO} \times 100$	*X*: exports (basic prices)	Central Bank of Chile
			GO: gross output (basic prices)	Central Bank of Chile
External Dependence	The import share of final consumption	$D = \frac{M}{(GO + M - X)} \times 100$	*M*: imports (basic prices)	Central Bank of Chile
			GO: gross output (basic prices)	Central Bank of Chile
			X: exports (basic prices)	Central Bank of Chile
			M: imports (basic prices)	
Foreign Direct Investment (FDI) Intensity	Ratio of FDI to value added	$I = \frac{IED}{VA} \times 100$	*IED*: foreign direct investment (FDI)	Foreign Investment Committee of Chile
			VA: value added (basic prices)	Central Bank of Chile

Chapter 5

Globalisation of Services and Jobs

Frédéric Gonzales, J. Bradford Jensen*, Yunhee Kim and Hildegunn Kyvik Nordås

Organisation for Economic Co-operation and Development

This paper explores the potential for increased trade in services to improve economic growth prospects globally drawing on information from labour force surveys in Chile, France, India, the United Kingdom and the United States, as well as the OECD input-output database. It documents that many activities in the business services sector are tradable across international borders. Tradable business services account for a larger share of employment than manufacturing in some high-income countries. In all countries in our sample tradable business services employ mainly high to medium skilled workers who earn significantly higher wages than in manufacturing or non-tradable services. High-income countries are relatively abundant in skilled workers and therefore have comparative advantage for this sector. In the event of trade liberalisation, rich countries such as the United Kingdom and the United States would likely experience significant export growth in this sector. State-of-the-art business services are, however, essential for the competitiveness of high-to-medium technology manufacturing. Access to such services through imports would help middle income countries strengthen their comparative advantage in these manufacturing industries and move up the value chain.

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5.1. Introduction

The developing world needs state-of-the-art services to continue on a path of rapid development. In middle income countries, services are needed both as an engine of job creation in its own right and as a facilitator of job creation in other sectors. State-of-the-art services are needed for manufacturing firms to connect to global value chains and to develop competitiveness in more skill-intensive activities along the value chain. The developed world tends to have a comparative advantage in business services and needs to export more to grow. More open business services markets would generate a win-win scenario where countries with comparative advantage in business services would generate well-paying jobs in this sector, while countries with comparative advantage in manufacturing would benefit from access to state-of-the-art business services that would help them move up the value chain in manufacturing.

Decreases in air travel costs, rapidly declining telecommunication costs, increasing internet adoption around the world, and rapid proliferation of broadband internet services have made internationalisation of a host of information-intensive services possible. Unfortunately, comparable information on international trade in services across countries is not readily available and a straight forward analysis of the relationship between trade and employment is not possible. This study offers a way of getting around this problem, providing a descriptive analysis of the relationship between services tradability, employment and earnings patterns.

While the service sector accounts for between half and four fifths of employment, we focus on "business services" (including ICT services, finance, insurance, and professional, scientific and technical industries). Business services make up a significant share of the economic activities in the developed economies. For example, in the United States, business services account for 25% of employment and, in the United Kingdom and France, they account for 20% and 15% of employment, respectively. In the fast-growing BRICs, business services account for a small, though growing, share of employment. We will attempt to demonstrate that many of these activities are deliverable over distance and thus – in the absence of policy impediments – tradable internationally and that there are significant opportunities for both developing and developed economies from increased trade in business services. Where we have data, most notably the United States, services imports and exports have been growing rapidly over the past 10-15 years. The types of business services that we will emphasise in this report have contributed the most to US export and import growth.

Cross-border trade in services has remained stable at about 20% of total world trade since the 1970s. This flat trend masks large variations across sectors and income groups, however. The highest share, well above 25%, but with a flat trend, is found in low-income countries. Middle-income countries in contrast have seen their services share of total trade dropping from 25% in 1977 to 15% in 2010. Nevertheless, services trade has risen both in absolute terms and as a share of GDP also in middle-income countries. The services share of total trade for OECD countries is on a rising trend, increasing from 19% in 1971 to 23% in 2010.[1] Finally, services account for about 30% of US exports. If trade were measured in value added terms (instead of gross output terms), it seems highly likely that this share would be significantly higher – possibly even exceeding 50%.

Transport and travel account for almost half of global, and as much as 65% of middle income countries' services trade. Transport and travel has supported the rapid export-led growth in these countries, ensuring connectivity to regional and global value chains. However, as

1. Data in this section are taken from the World Bank's World Development Indicators.

middle-income countries become richer, comparative advantage in labour-intensive manufactured products becomes exhausted. The development of comparative advantage in more skills-intensive products will require the support of a different set of services, notably business services.

The rise of trade in ICT services has captured the headlines as a potentially disruptive force in international labour markets. The sector accounted for less than 4% of global services trade in 1997, but has more than doubled its share to about 9% in 2010. The world's largest exporter of ICT services is India, followed by Ireland and the United States. ICT services feature most prominently in middle income countries exports where they accounted for more than 13% in 2009, as compared to about 9% in OECD countries.

This paper will provide evidence on the skill intensity of business services and provide information on skill abundance in a variety of countries to argue that the developed world has comparative advantage in tradable business services. Allowing for specialisation according to comparative advantage would likely induce developed economies to produce and export more business services and the fast-growing BRICs would import more business services – thus helping balance growth.

The rest of this paper is organised as follows. Section 5.2 discusses ways of assessing the tradability of services and describes employment patterns in tradable and non-tradable services as compared to employment in manufacturing in the five countries for which detailed comprehensive labour force surveys are available. These are Chile, France, India, the United Kingdom and the United States. Section 5.3 portrays jobs and workers in services focusing on earnings and skills, followed by a discussion of comparative advantage in section 5.4. Tradability has both a technical and political dimension and the policy dimension is introduced in section 5.5 where barriers to trade in services are presented and discussed. Section 5.6 examines how policy-determined barriers to trade in services may be reduced and the labour market impact of such reforms, while section seven draws tentative policy implications.

5.2. How tradable are services?

How tradable are services in general and which services in particular can be delivered at a distance? Unfortunately, official statistical data do not provide much detailed information on trade in services. In stark contrast to the manufacturing sector, where very detailed and timely data are available from a broad range of countries (typically bilateral import and export flows for 8 000 or more merchandise trade categories for most countries in the world), services trade flows are only available for a small number of sectors (for example, in the United States only about 30 categories) for trade with large countries or regions. Examining at a detailed level which services are being traded is not feasible with existing official data. Instead, we turn to other means of identifying the scope and potential impact of trade in services.

In the trade policy literature, services used to be considered as one non-tradable sector. Many services are indeed non-storable and require face-to-face interaction between producers and consumers in real time. Services such as office cleaning, physical therapy, taxi driving or hair dressing cannot be provided at a distance. But even services that in principle may be digitised and transmitted across borders over the internet may not be traded as much as one would expect. For instance, the most important ingredient in digitized services is information, and language barriers may consequently be more important for business services than for goods.

Trade in tasks has recently entered the debate on the labour market impact of services offshoring (Grossman and Rossi-Hansberg, 2008; Jensen and Kletzer, 2010). The idea is that individual tasks that can be codified and digitised may be sliced off, outsourced and offshored,

for instance to low-wage countries. This would lead to deepening of the division of labour and increased efficiency, but also fragmentation of jobs, it is argued. However, the debate has largely overlooked the possibility that there may be strong economies of scope in business services jobs. There may for instance be complementarities between tasks that cannot easily be codified and services that can. Multitasked workers would in such cases be more productive than single-tasked workers, and the cost of unbundling tasks a natural barrier to trade.

Lanz *et al*. (2011) find evidence that tradable and non-tradable tasks tend to be performed together across occupations and jobs. They argue that what is going on is deepening of the division of labour, or fragmentation of production, if you will, but not necessarily fragmentation of jobs. Thus, functions that are non-core in one firm are being outsourced and possibly offshored to another firm whose core business is the function in question. Both firms retain multitasked workers in many different occupations. Outsourcing can be seen as the process of generating new industries from functions that were previously carried out within manufacturing firms. Examples are office cleaning, business process outsourcing and many more. The ongoing process of deepening of the division of labour is an important source of economic growth and should be welcome even if growth pains need to be adequately dealt with.

Natural barriers to trade in services other than language and differences in legal frameworks should apply to trade in services within countries as well as across borders. A useful measure of natural barriers to trade in services is therefore the extent to which a service is more geographically concentrated within a country than demand for the service in question. When natural or technological barriers to trade are high, then we see service production ubiquitously distributed with demand – for example barber shops and beauty salons. In cases where the technological costs of services trade are low relative to economies of scale in production or other locational economies, we see concentrations of service production that far exceed local demand. Examples of these types of services are software production, motion picture production and distribution, and many financial services. When this is observed, by necessity some services must be consumed in a different location than where they are produced. Investment banking for instance tends to be located in financial centres servicing the entire country and beyond, while the movie industry is concentrated in Los Angeles, Mumbai and a few other cities and consumed everywhere. A measure of the geographical concentration of sectors is the Gini-coefficient of geographical concentration. It takes values between zero and unity where unity signifies the case when services are concentrated in one single location while zero represents the case where services suppliers are located evenly across the territory, for instance of a country such as the United States.

This measure was proposed by Jensen and Kletzer (2006) and applied to a comprehensive analysis of the US labour market in Jensen (2011). While this measure is intuitively appealing, Jensen and Kletzer report that their measure of tradability is highly correlated with actual trade flows where this information is available. The measure has the advantage that it can be constructed to take advantage of the most detailed data available on employment or production. In the US context, Jensen and Kletzer produce tradability indices at the 6-digit NAICS industry level and the 6-digit SOC occupation level. All sectors at a 6-digit NAICS level were classified as tradable or not, and 14% of the workforce in the United States was found to work in tradable business services sectors, as opposed to 10% in the entire manufacturing sector. Tradable business services jobs are better paid and workers are better educated than in manufacturing and non-tradable services.

This report extends the analysis to four additional countries: Chile, France, India and the United Kingdom.[2] These countries are compared and contrasted: employment patterns in this section and wages and skills in the next sections.[3] It presents data from 2000 and 2007, or the closest year available for these countries. These years are chosen since comparable data are available only since 2000, but after the financial crisis that started in 2008, developments may be driven more by the crisis than by fundamentals.

Table 5.1. Employment by sector, selected countries, 2007

Share of total employment (%)

	Chile*	France	India	UK	US**
Primary	14.9	1.4	59.1	1.8	1
Manufacturing	13.4	16.0	10.8	12.1	11
Tradable business services	8.1	10.0	1.5	12.7	16
Non-tradable business services	2.9	5.7	0.8	7.6	12
Personal services		25.4	5.4	27.2	33
Retail and wholesale trade		13.2	8.3	16.0	17
Other	63.6	28.2	14.1	22.7	10

Note: * Data for Chile are from 2006, "Other" includes personal services and retail and wholesale trade;
** US data do not include the public sector and exclude some of the agricultural sector.
Source: Labour force surveys.

The sectoral composition of employment is similar in France, the United Kingdom and the United States, with a very small share of total employment in the primary sectors and between 70 and 80% of employment in the services sectors. However, even among these three high-income countries there are notable differences as far as the relative importance of manufacturing and tradable business services are concerned. France has a relatively larger manufacturing sector and a comparably smaller business services sector than the other two. India in turn, still has a relatively large share of the labour force employed in the primary sector.[4] Chile falls between France, the United Kingdom and the United States on the one hand and India on the other. Employment in the primary sectors is still high as Chile is an important producer of both minerals and agricultural products, while the business services sector is relatively small, but much larger than in India in relative terms.

India's manufacturing sector absorbs a relatively small share of the labour force.[5] Given India's success story as a major exporter of business services, notably ICT-related services, it is perhaps surprising to note that tradable business services account for only 1.8% of the labour force. Nevertheless more than 7 million people worked in tradable business services in India in 2007.

2. Data availability severely restricts the number of countries that could be included.

3. Unfortunately information on employment by six-digit NAICS code is only available for the United States. The Gini-coefficients were therefore aggregated to a 4-digit level using concordances with NAICS and national industrial classification systems in the countries in question.

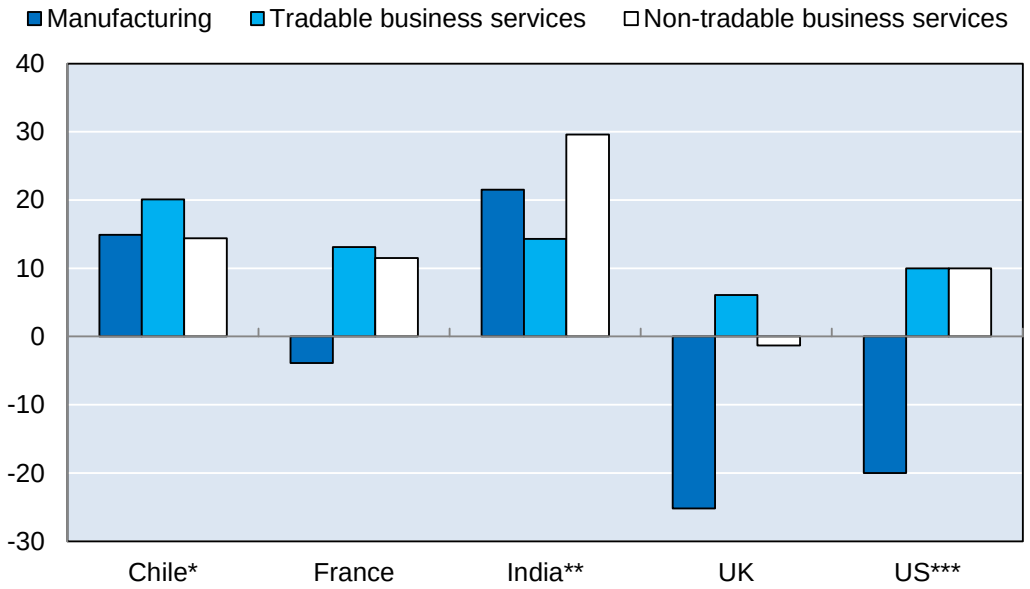
4. The labour force survey for India contains information on 1 137 208 797 workers of which 655 000 000 are not allocated to any particular sector. The latter are not included in the sector shares reported in Table 5.1.

5. According to the World Development Indicators, the share of total employment in industry, which includes mining, manufacturing, construction, electricity, gas and water, was 19% in 2005, the same as the average for lower middle income countries.

Turning to structural changes during the recent past, Figure 5.1 reports changes in employment by sector during the period 2000-07, or the closest year for which data are available. This is a period during which trade in business services was booming. Yet, employment in the sector increased in all our sample countries, and in Chile and France it was the fastest growing sector in terms of employment.

Figure 5.1. Employment growth 2000-07

Manufacturing and business services



Note: *For Chile the growth rate is from 2000 to 2006; ** For India the growth rate refers to the period 2004-07; US data do not include the public sector and exclude some of the agricultural sector.

Source: Labour force surveys.

In India and Chile employment growth is observed in all sector categories, which reflects a growing labour force. The Indian labour force grew by 17% from 2004 to 2007, while employment grew by 30% during the same period. The share of the labour force outside employment thus declined somewhat: from 62 to 58%. It appears, however, that the period has seen a shift in employment away from relatively well-paying manufacturing jobs towards the primary sector and "Other", which includes the public sector. It is also interesting to note that in spite of its export success, the employment share in tradable business services has declined from 2004 to 2007. This could reflect a movement up the value chain in business services and higher productivity (NASSCOM, 2012) or reflect rapidly rising wages in business services in India that reduce employment growth in the sector (or both). It is notable that employment has been rising in the primary sectors both in the United States and France, possibly reflecting the commodity boom observed over the past decade or so.

5.3. Skills and wages – do tradable services differ?

Wages

In the popular debate, jobs in manufacturing are believed to be better paid and contributing more to growth and income generation than services jobs. However, business services not only account for a larger share of employment than manufacturing in developed countries, but business services are also significantly better paid than manufacturing jobs as illustrated by

Table 5.2. In fact, business services have the highest wage rates in all of our sample countries, and the wage premium is highest in Chile followed by India, while the wage premium is the lowest in France and the United Kingdom. France stands out as the country with the lowest sectoral dispersion of wages.

Table 5.2. Average wages by sector, selected countries 2007

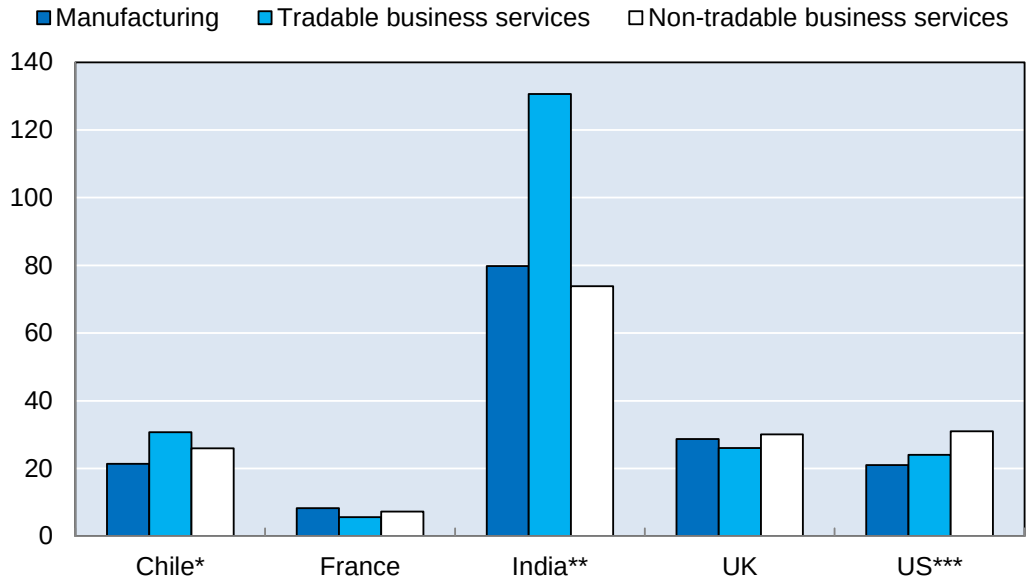
Manufacturing =100

	Chile	France	India	UK	US**
Primary	87.5	71.4	96.0	99.7	113
Tradable business services	184.9	112.9	167.1	119.7	154
Non-tradable business services	142.8	99.5	132.3	99.6	82
Personal services		84.3	107.7	67.7	62
Retail and wholesale trade		84.3	84.7	79.3	71
Other	111.0	91.6	134.2	109.3	98

* Data for Chile are from 2006; "Other" includes personal services and retail and wholesale trade;
** US data do not include the public sector and exclude some of the agricultural sector.

Source: Labour force surveys.

Figure 5.2. Nominal wage growth 2000-07 by sector



Note: *For Chile the growth rate is from 2000 to 2006; ** For India the growth rate refers to the period 2004-07; US data do not include the public sector and exclude some of the agricultural sector.

Source: Labour force surveys.

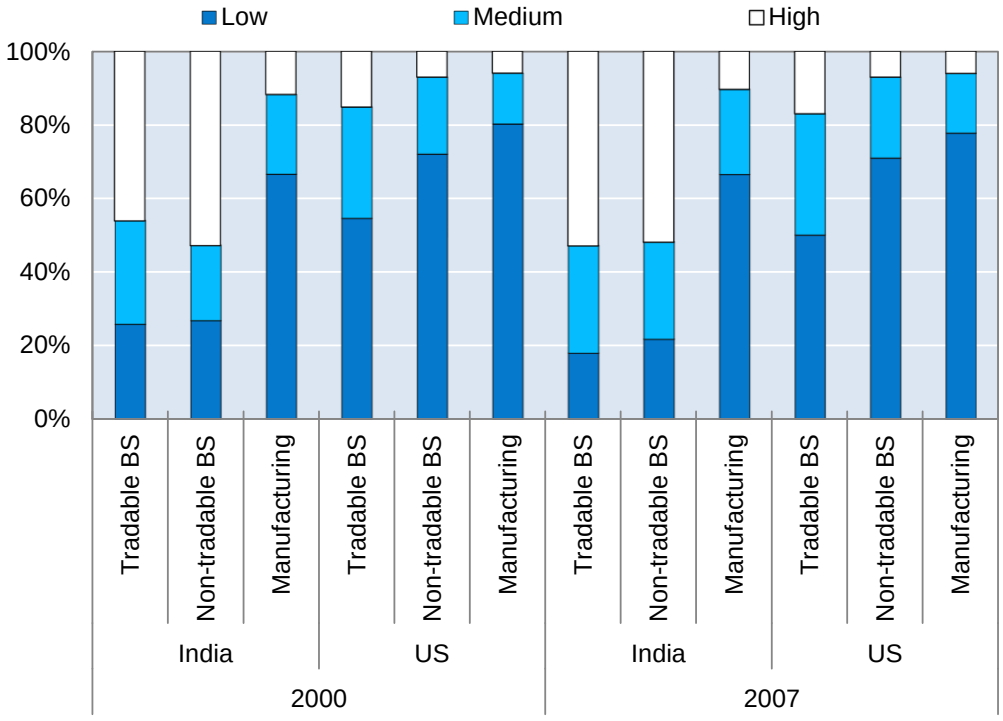
Chile and India have experienced both the highest employment growth and the highest wage growth in tradable business services in our sample. Also in the United States, wages grew faster in tradable business services than in manufacturing, while wages in non-tradable business services grew faster still, narrowing the gap towards tradable services somewhat. The United Kingdom and France in contrast, have seen wages grow faster in manufacturing. In the United Kingdom, this appears to reflect productivity gains as the sector has shed labour rather dramatically and retained the highest value added manufacturing sectors. In France a similar, albeit less dramatic process has taken place. One important factor explaining the wage premium

in tradable business services is the skills intensity of the sector, to which we turn in the next section.

Skills

Among tradable business services are professional services, finance and computer services. These sectors offer jobs mainly to high and medium skilled workers. We define high-skilled workers as workers with a college degree and above, medium-skilled as having a high-school degree and some college, and low skilled as high-school drop outs. Detailed information on skills at this level of detail for the four to six digit level industry sectors studied here is only available for the United States and India. It appears that the threshold for being categorised as high-skilled workers may be lower in India than in the United States. Bearing this caveat in mind, some interesting patterns can be observed from Figure 5.3.

Figure 5.3. Employment by skills category India and the United States



Note: Data for India are from 2004 and 2007.

Source: Labour force surveys.

First, the ranking of the three sectors according to skill intensity is the same in the two countries. The difference in skill intensity between manufacturing on the one hand and business services on the other is, however far larger in India. In both countries, tradable business services have become more intensive employers of high-skilled workers over time, while all sectors have become less low-skills intensive. The sharpest decline in relative demand for low-skilled labour is in tradable business services in both countries, but also manufacturing has become more skill-intensive in both countries.

The similarities between these two countries at the opposite ends of relative resource endowments suggest that tradable business services may show similar employment patterns in most countries.

5.4. Comparative advantage in services trade

As shown in the previous section, business services in general and tradable business services in particular use skilled labour intensively. From the theory of comparative advantage one would therefore expect that countries that are relatively well endowed with skilled workers have a comparative advantage for business services. Average educational attainment is a commonly used measure of skills endowment. This measure is depicted for the five countries in Table 5.3, together with two measures of trade performance in business services. The first shows net exports, while the second presents business services exports as share of GDP.

Table 5.3. Education and business services trade

	Chile		France		India		UK		US	
	2000	*2010*	*2000*	*2010*	*2000*	*2010*	*2000*	*2010*	*2000*	*2010*
Years of schooling	9.1	10.2	9.6	10.5	4.2	5.1	8.9	9.8	12.7	13.1
Net exports, USD mill.	-653	19.1	5 370	-2 190	-2 270	48 900	41 000	90 900	21 400	30 300
Exports, % of GDP	1.0	1.1	1.7	1.5	0.2	5.0	2.8	4.0	0.2	0.2

Note: business services in trade statistics include insurance (253), finance (260), computer and information services (262) and other business services (268).

Source: UN Comtrade; WDI and Barro and Lee.

The sample appears to defy the theory of comparative advantage. The United States is clearly the county best endowed with skilled labour. Although it is also a large net exporter of business services, the volume is quite insignificant relative to the US GDP. India, in contrast, clearly has the smallest endowment of skilled workers in the sample. Nevertheless the country has developed from a net importer of business services in the year 2000 to one of the world's largest net exporters of business services, and exports of these services accounted for as much as 5% of GDP in 2010. The value of US exports in business services were more than twice the value of India's export in 2010, but the US import bill of business services was more than four times that of India, leaving India the larger net exporter.

Business services also account for a significant share of GDP in the United Kingdom, largely driven by its role as a global financial centre. France has swung from a net exporter to a net importer of business services during the past decade, while Chile has moved in the opposite direction. As noted above, France has strengthened its manufacturing sector during this period, and it is possible that increased imports of business services have helped shoring up the competitiveness of French manufacturing (Nordås, 2010). Chile, France and the United Kingdom have similar endowments of skilled labour.

Table 5.3 shows that comparative advantage may not be the most decisive factor determining trade in business services. Indeed, looking at this table, one may question the idea that trade in business services is driven by comparative advantage. In order to test this, we ran a simple regression relating years of schooling to net exports of business services, controlling for unobserved country-specific factors. The regression was run for the years 2000, 2005 and 2010 for 128 countries. A robust positive correlation was observed between years of schooling and net exports of business services, as predicted by the theory of comparative advantage.

There are several possible reasons why individual countries at particular points in time specialise in ways that seem to be at odds with their comparative advantages. One possibility is simply that in a world of many sectors, many factors of production, and vertically linked sectors, the pattern of specialisation is more complex than what can be captured by a simple version of the theory of comparative advantage. Another reason may be barriers to trade and

investment that prevent countries from exploiting their comparative advantage. For example India has historically imposed a heavy regulatory burden on its manufacturing firms, creating impediments for Indian manufacturing firms to reach minimum efficient scale. As a result, India produces a far smaller share of global manufacturing output than its size and factor endowments would suggest. The policy mix that impedes the manufacturing sector could create an artificial comparative advantage in tradable business services in India.

The main insight from the theory of comparative advantage is that economic activities differ according to which factors of production they use intensively; and countries differ in their relative endowment of factors of production. Countries with relative abundance of a particular factor have a comparative advantage for sectors that employ this factor intensively. Traditionally the theory has been applied to primary factors of production, including skilled workers. However, the theory could also be modified to apply to intermediate inputs. Thus, countries with access to a well-developed business services supplier base have a comparative advantage in business services intensive industries. The next step in our analysis is therefore to identify the sectors that use business services the most intensively. For this purpose we use the OECD input-output database for three periods: the mid 1990s, around 2000 and the mid 2000s.[6]

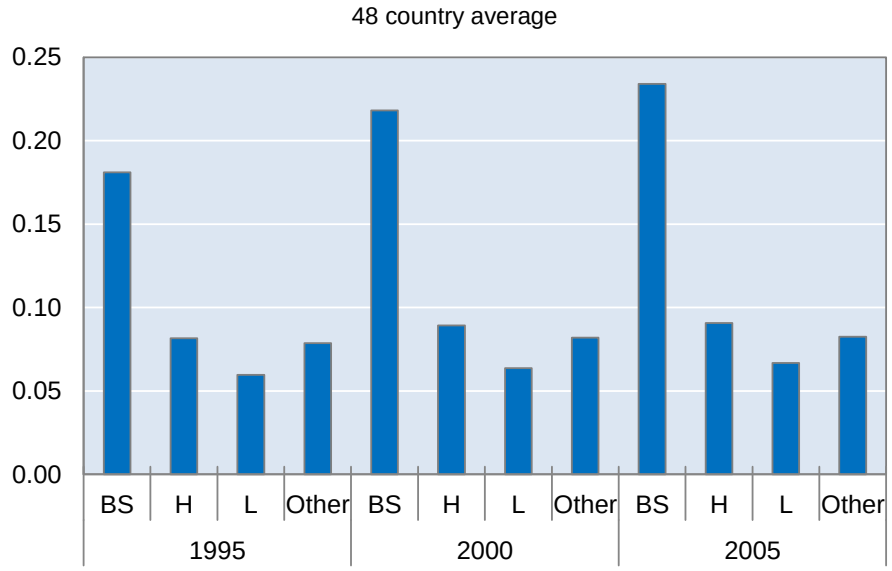
The following sectors are considered business services in the input-output database (ISIC rev 3 codes in parenthesis): Post and telecommunications (64), Finance and insurance (65-67), Real estate (70), Renting of machinery (71), Computer and related services (72), R&D services (73) and Other business services (74). The OECD also classifies industries according to their technological sophistication. This is a useful categorisation for the purpose of studying comparative advantage based on intermediate inputs. High-to-medium tech industries include chemicals and machinery and equipment producing sectors (ISIC rev 3 sectors 24, 29-33 and 35), while low-to-medium technology sectors include labour-intensive consumer goods producing industries such as food processing, textiles and clothing, and others (ISIC rev. 3 15-23, 36 and 37). As shown in Figure 5.4, high-technology manufacturing is the most services-intensive manufacturing category.[7] Among the high-technology industries, ICT manufacturing (ISIC rev. 3 categories 30, 32 and 33) is the most business services-intensive with a services share of gross output averaging 8.5% in 1995, rising to 10% in 2005. Finally it is worth noticing that business services use business services inputs the most intensively of all sectors. Countries with a well developed business services sector would on the basis of these figures have a comparative advantage in high-technology manufacturing and business services.

It is also interesting to note that high-tech sectors tend to be more integrated in international value chains than low-technology industries, as shown in Figure 5.5. Imports of intermediate inputs as a share of gross output are larger for high-technology manufacturing, and among high-technology sectors ICT manufacturing sectors are the most integrated. We also notice that business services tend not to rely much on imports, and that business services account for a small share of imported intermediate inputs in other sectors as well. Furthermore, the share of imported business services has remained fairly stable during the decade covered by the data.

6. The 44 countries included in the database produce input-output tables around every five years, but the times of release differ somewhat between the countries.

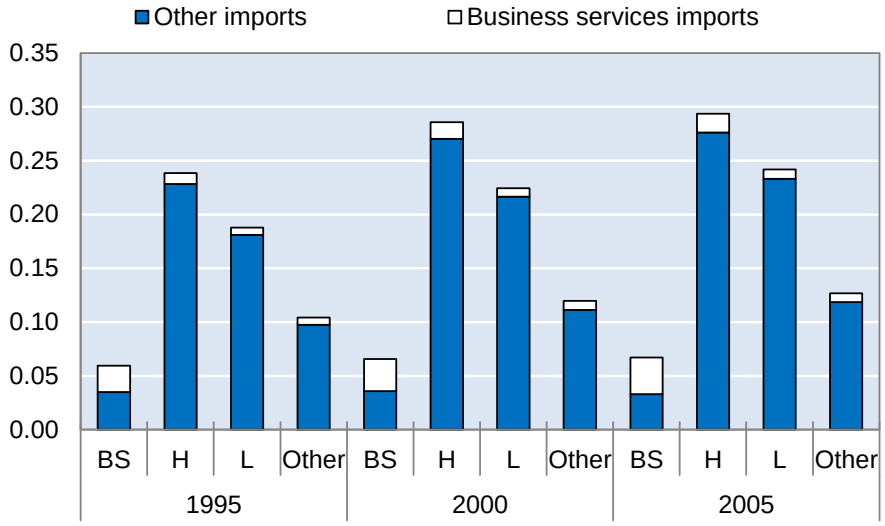
7. The average is calculated for all 44 countries included in the OECD input-output database.

Figure 5.4. Services share of gross output by technology category



Note: BS= business services; H=high/medium-technology; L=Low/medium technology; Other = sectors not classified.

Figure 5.5. Import share of intermediate inputs, business services and other imports



Source: OECD input-output database.

To summarise, business services account for a rising share of intermediate inputs in manufacturing over time. Furthermore, the more high-tech the industry, the more business service intensive it is. Finally, high-tech industries tend to be integrated in international production networks as indicated by a higher share of imported intermediate inputs. Imported business services, however account for only a small share of total intermediate inputs. The 44 country average has not changed much over time, but there is significant variation across countries and sectors. In the sample of 44 countries, the share of imported business services varies from about 2% of gross output to about 50%, with the highest share in computer services, finance, insurance and chemicals in Luxembourg and Ireland. The Netherlands also tend to have a relatively high import share of intermediate business services. In our five country case studies

however, imported business services accounted for only between 0.1% of gross output in the United States and India in 2005 and 1.4% in the United Kingdom.

Having observed that some countries source a significant share of their business services inputs from abroad, one could envisage that the services supplier base could be strengthened through imports in countries in which access to sophisticated business services may be a constraint on moving up the value chain in manufacturing. Furthermore, even when the local business services sector is strong, imported business services may still be needed in order to strengthen competitiveness in other sectors. Particularly in sectors where product differentiation through branding and marketing is important, knowledge of the local market is essential for success, and business services providers in the local market may help filling this gap.

An indicator of competitiveness in export markets is the share of total output that is exported. Our hypothesis is that competitiveness is strengthened through the use of imported intermediate business services which help tailoring the product to the needs of the export market. In order to test this hypothesis we related the export share of total output in each sector to the share of imported business services in gross output for the 44 countries included in the OECD input-output database. The export share of gross output was found to be positively associated with the import share of business services inputs. Our estimate suggests that a one percentage point higher services import share is associated with a 0.3 percentage point higher export share.[8] We also explored to what extent business services imports relate differently to export orientation of downstream industries depending on technology category. We found that there is a statistically significant difference. Perhaps surprisingly, low-technology manufacturing shows the largest effect, where a percentage point higher business services imports in gross output is associated with 1.4 percentage points higher export share of gross output at the mean. The corresponding figures for high-tech industries and business services are 0.8 and 1.2 respectively.[9]

We have now documented that business services are skills intensive, pay relatively high wages, and employ a larger share of the labour force than manufacturing in high-income countries; high-to-medium technology industries use business services intensively and imported business services strengthen competitiveness in downstream industries. These findings suggest that high-income countries have comparative advantage for business services and would experience an expansion of the sector in the event of lower barriers to trade in services, while middle-income countries could strengthen their competitiveness in services-intensive industries through opening their markets for imported business services. Expansion of services-intensive industries in middle-income countries would in turn generate relatively well-paying jobs for the rising middle class in these countries. What may prevent this win-win situation from unfolding is discussed in the next section.

5.5. Policy-determined barriers to trade in services

Explicit barriers to cross-border trade in services are not common for several reasons. First, by the time services trade across broadband internet had reached a critical mass and entered the trade policy debate, there was a broad consensus that protectionism is harmful not only to trading partners but also to the country imposing restrictions. Second, policy measures such as

8. The result is significant at a 1% level and robust to including country fixed effects in order to capture unobserved country-specific factors that may influence export orientation.

9. The category that has a lower coefficient than the average is "other", which includes a number of services sectors and primary sectors.

tariffs and other border measures cannot easily be applied to cross-border services trade. As is well known, information transmitted over the internet is assembled only when it reaches its final destination in the computers of the importing company; and it does not cross a border post.

Policy-determined barriers to cross-border services are therefore mainly related to restrictions on complementary movement of natural persons, the establishment of a commercial presence or in the form of standards, qualification requirements and licenses. Computer services, for instance, can easily be traded over the internet, but from time to time a software engineer may need to visit the customer to sort out a technical problem or to solicit information on future needs that the customer may not be able to articulate due to lack of expertise.

Intra-firm trade accounts for 28% of US cross-border services exports and 25% of imports in 2010.[10] Unfortunately, other countries do not report intra-firm trade, but it is not unreasonable to assume it plays an important role in other countries as well. When FDI and cross-border trade are complementary, barriers to FDI also restrict cross-border trade.[11] Barriers to foreign direct investment in services, as measured by the OECD investment restrictiveness index, are found to be negatively related to cross-border trade in services. In addition, trade is positively associated with FDI stocks, but not the other way around, suggesting that FDI generates trade in services but that trade does not necessarily precede FDI flows (Kox and Nordås, 2008). The FDI restrictiveness index by sector for the five countries included in this study is reported in Table 5.4.

The index takes values between zero and one, one being the most restrictive. Business services in this case refer to professional services (accounting, architecture, engineering and legal services). Transport and media stand out as the most restrictive services sectors in this selection of countries as well as in the full sample of countries covered by the FDI restrictiveness index. India is the most restrictive country in the sample. In general, non-OECD countries tend to have more restrictions on foreign investment than OECD countries.

Many functions performed by professionals are considered tradable across borders and fall squarely in the tradable business services category. However, professional services are typically regulated and a license is often required in order to operate. There are many reasons why licensing may be socially optimal, but the criteria for obtaining a license may not always be transparent and clear, adding entry and trade costs to potential foreign services providers.[12] Table 5.5 presents licensing requirements and related regulation for the five countries in the sample as captured by the OECD Product Market Regulation Index (PMR). The index takes values between zero and six with six being the most restrictive.

Although regulating professions in many cases is considered necessary for consumer protection purposes, not all countries find it necessary to regulate all professions. France and the United Kingdom have in common with a number of other OECD countries that they do not regulate engineering. Architecture is the second least regulated sector, and several OECD

10. The shares are calculated as the share of affiliated sales of total services exports and imports from BEA services trade statistics *www.bea.gov/international/international_services.htm*.

11. On the other hand, there may be cases where cross-border trade is a substitute for commercial presence. In such cases barriers to FDI flows could be positively associated with cross-border trade. However, empirical evidence suggests that FDI are increasingly the preferred choice of mode of supply, and that cross-border trade is either complementary to or independent from commercial presence.

12. Article VI in the GATS mandates future negotiations on disciplines on licensing procedures, qualification requirements and international standards with the objective of reducing such trade costs. However, no disciplines have been established yet.

countries do not regulate this profession either. Legal services are the most heavily regulated among these professional services and only Finland and Sweden among the OECD countries do not require a license to provide this service. Again we observe that India has stricter regulation than the other four sample countries.

Table 5.4. FDI restrictiveness index 2010

	Chile	France	India	UK	US
Manufacturing	0	0	0.02	0.02	0
Electricity	0	0	0.05	0.02	0.20
Construction	0	0	0.15	0.02	0
Distribution	0	0	0.43	0.02	0
Transport	0.41	0.15	0.26	0.11	0.55
Hotels & restaurants	0	0	0	0.02	0
Media	0.41	0.05	0.5	0.25	0.25
Communications	0	0	0.425	0.02	0.11
Financial services	0.017	0.05	0.31	0.02	0.04
Business services	0.013	0.00	0.56	0.02	0
Real estate investment	0	0	1	0	0
Total FDI Index	0.07	0.04	0.30	0.06	0.09

Source: OECD.

Table 5.5. The OECD PMR index for professional services, selected countries, 2008

	Accounting	Architect	Engineer	Legal	All professions
France	2.8	2.8	0.0	2.8	2.1
United Kingdom	2.6	0.0	0.0	0.3	0.7
United States	1.7	0.3	0.3	1.9	1.1
Chile	2.7	2.2	2.3	2.2	2.4
India	3.3	2.8	1.2	3.3	2.7

Source: OECD.

The fact that some countries do not find it necessary to regulate, where others find it unthinkable not to, raises interesting questions. How do countries that do not regulate make sure that the objectives that others seek to obtain through regulation are obtained? Is an unregulated profession more open to trade than a regulated profession? The two questions are related. Architects and engineers provide inputs into the construction of buildings and infrastructure and regulation may be imposed elsewhere in the supply chain, for instance related to the issuance of building permit. Whether or not this makes it easier to source services from abroad is an open question that so far has not been investigated.

Another highly regulated profession is medical services. The profession contains some tradable functions such as reading and interpreting x-rays, computed tomography or magnetic resonance imaging. Reading these images can be done anywhere with access to high-speed internet services. Import demand for radiology services has increased rapidly as local capacity has failed to keep up with a surge in the use of scanning in diagnostics and treatment. Specialised companies have emerged which employ radiologists licensed to provide services to US hospitals from a number of countries, and assigning them to tasks for which they are qualified (Clark *et al.*, 2011), though Frank Levy in recent work presents a more cautious view of the potential for international trade in radiology services. This example illustrates nicely both

the complementarity between local and offshored services and trade costs associated with offshoring. Offshoring radiology services opens a bottleneck allowing on-shore medical professionals to perform more scanning, satisfying a rapidly rising demand. The local licensing requirement adds costs of offshoring. Setting high standards for radiology services is of course necessary, but recognition of foreign qualifications could in many cases reduce costs while satisfying the qualification requirement.

Comparing the policy-determined barriers to trade in services with the natural barriers to trade in services as identified by Jensen and Kletzer (2006) using the Gini-coefficient of geographical concentration of production, it appears that for business services there is ample scope for trade liberalisation that would result in a genuine opening of markets. The next section discusses the likely labour market effects of such policy reforms.

5.6. Labour market effects of business services trade liberalisation

Services trade costs have come down over the recent decade both due to lower communication costs and due to unilateral trade liberalisation and regulatory reforms, resulting in growing offshoring of services. There is evidence that demand for high-skilled workers increases as a response to offshoring of services (Crinò, 2010a; Crinò, 2010b; Jensen, 2011). What raises demand for skilled workers is first, that offshored services are complementary to high-skilled tasks performed in the offshoring country. Second, jobs are created when skill-intensive services sectors start exporting.[13] Lanz *et al*. (2011) found that as opposed to what was feared, the relative share of information-intensive tasks performed in the EU and the US held steady and if anything increased slightly during the 2000s. Furthermore, the study found that the share of information-intensive tasks in local inputs is positively associated with import penetration in services, suggesting that offshored services are complementary to locally produced services, a result supported by Crinò (2010a) studying the US economy.

Our sample of five countries illustrates nicely the possible labour market effects of business services trade liberalisation on both sides of comparative advantage. The United States is the country most abundant in skilled workers in our sample and therefore likely to have the strongest comparative advantage for business services. India in contrast is the country least abundant in skilled labour, and therefore likely to have the least comparative advantage for business services. Yet, net exports of business services are higher in India than in the United States, while gross exports are higher in the United States.

A possible explanation for this state of affairs is that domestic demand for business services in India is constrained by a host of regulations, barriers to trade and investment and poor infrastructure which have constrained the growth of manufacturing. More than 75% of output in computer services was exported from India according to the 2005 input-output table. Easing regulatory barriers on manufacturing as well as trade and investment barriers in services would probably unleash India's potential for exploiting its comparative advantage in labour-intensive manufacturing to a larger extent than today. Labour demand as well as business services demand from Indian manufacturing would in that case grow rapidly and Indian business services producers would to a larger extent support the expansion and exports of local manufacturing.

13. In 2010, the 10 largest exporters of commercial services (share of global exports in parentheses) are: United States (14.1), United Kingdom (6.2), Germany (6.2), China (4.4), France (3.8), Japan (3.7), India (3.2), Spain (3.2), Singapore (2.9), Hong Kong, China (2.8).

During the period 2003-07 nominal high-skilled wages more than doubled both in manufacturing and tradable business services in India, suggesting that skills are relatively scarce. Further, highly skilled and unskilled workers are likely to be complements rather than substitutes both in manufacturing and services.[14] For each high-skilled worker there are more than six low-skilled workers in manufacturing, while there are three high-skilled workers for every low-skilled worker in tradable business services in India. India appears to have a pool of unemployed or underemployed low-skilled workers. Assuming that scarcity of high-skilled workers (in addition to regulation) is a binding constraint on manufacturing, a back-of the envelope calculation suggests that if ten newly graduated civil engineers were employed in manufacturing, they could generate 64 new jobs for unskilled workers, while if employed in tradable business services they would generate three additional jobs for unskilled workers, taking into account only direct effects. This is of course a rough and highly tentative estimate, but nevertheless illustrates the possible gains from a more open trade and regulatory regime, bearing in mind that it is the *abundant* factor, in India's case unskilled labour, that gains from trade liberalisation.

In the United States in contrast, domestic demand for business services is relatively high and employment in tradable and non-tradable business services has grown at about the same pace during the past decade. Trade liberalisation both at home and abroad would see a shift in resources towards tradable business services which in turn would support both local high-technology manufacturing industries and generate export-led growth in tradable business services. France appears to have strengthened high-technology manufacturing while becoming a net importer of business services during the implementation of the European Union's services directive, although one should be cautious of drawing conclusions on causes and effects here.

5.7. Policy implications

The business service sector is large and growing in the developed economies, and there is more employment in tradable business services in the United States and United Kingdom than in the manufacturing sector. Tradable business services are skill intensive activities. As a result, in all our five sample countries tradable business services pay higher average wages than the manufacturing sector. These results suggest that skill abundant countries should have comparative advantage in producing tradable business services. Policy makers therefore need to pay attention to business services as a source of job creation in well-paid jobs as well as export earnings.

Developing economies are currently under-resourced in terms of business services – their business service sectors are small relative to the size of the overall economy. Business services provide important inputs to higher value-added manufacturing and to the development of physical infrastructure like roads, bridges, harbours, airports, telecommunications and energy infrastructure and water treatment, all essential for future growth. Opening up to trade and investment in business services could complement local resources and support industrial development. Small European countries such as Ireland, Luxembourg and the Netherlands featured high business services import penetration rates during a period of export-led growth during the period 1995-2005, suggesting that foreign business services may indeed contribute to a more competitive services supplier base to the benefit of downstream industries.

Barriers to trade in services are relatively high in the large, fast-growing emerging markets. Limitations on foreign direct investment, local sourcing requirements, and in many cases heavy

14. An unskilled assistant would probably not be usefully employed to do software programming no matter how low the wage rate compared to a trained software programmer.

administrative burdens are common. Eliminating or at least reducing such policy impediments to services trade would enable the fast-growing, large developing economies to access state-of-the-art business services at lower prices and thus more rapidly develop their infrastructures and facilitate the movement to higher value-added manufacturing. Trade and investment liberalisation in emerging economies would also enable the developed countries, which currently have a natural comparative advantage in tradable business services, to export these services and grow faster. Because of the size of these sectors and the amount of money expected to be spent on infrastructure over the next two decades (USD 40 trillion by some estimates), these potential gains to welfare globally are not insignificant.

There is also room for services trade liberalisation in developed countries. Barriers to foreign investment remain in some countries, particularly in transport, media and communications sectors. Lengthy and expensive business visa procedures are also a source of trade costs for service providers, particularly from developing countries. While trade barriers of this nature can be easily reduced when there is political will to do so, reducing behind-the-border regulatory barriers is more complex. Regulation is introduced for a purpose and often restricts trade in business services unintentionally. Regulatory reform takes time and involves many stakeholders. Making sure that such reforms take into account international best practice and when relevant and feasible adopt international standards and best practice would reduce entry barriers both for local and foreign services providers.

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Chapter 6

Trade and Labour Market Outcomes in Germany

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The German economy is characterised by a high degree of foreign exposure through exports and imports. This chapter considers the link between trade and labour market outcomes in Germany. To that end, we combine individual-level data from the German Socio Economic Panel for the period 1999 to 2007 with industry-level data on various aspects of trade – exports, imports and offshoring. We consider their effects on wages and the probability of moving into unemployment. Our econometric analysis suggests that there is little impact of trade-related variables on individual-level wages, whereas there appears to be some impact with respect to employment. We find some important differences between manufacturing and services sectors, in particular with regard to exporting and offshoring.

6.1. Introduction

Germany is one of the most important countries for world-wide trade. According to figures available from the World Trade Organization, it was the second largest exporting economy and the third largest importer in the world in 2009.[1] The importance of trade is also evident when putting it in perspective with the size of the economy. With an openness indicator (trade relative to GDP) of more than 80% in 2006, Germany is also a very open economy. In comparison, the United States had a ratio of less than 30%, while France and the United Kingdom were around 55 to 60% in the same year (OECD, 2008b).

The dependence of the German economy on international trade has spurred much research into the potential consequences, in particular in terms of labour market outcomes (e.g. Geishecker and Görg, 2008, Winkler, 2009, van Suntum *et al*., 2010). The recent financial and economic crisis has turned the lime light back onto this issue. Initially, given the rapid decreases in world-wide exports, countries dependent on exports were expected to suffer significantly during the crisis (Baldwin and Evenett, 2009). In Germany, at least, this did not happen. A number of possible explanations for this have been put forward in the literature. For example, Boysen-Hogrefe and Groll (2010) and Gartner and Merkl (2011) argue that wage moderation before the crisis is an important explanatory variable. Because of this, firms were able to adjust employment only marginally during the crisis. Möller (2010) also puts forward other explanations, including the fact that firms were reluctant to let go off highly qualified staff during what was perceived as a temporary slump, given skill shortages and high training costs for new workers. Also, both studies mention the generous provision of short-time work (*Kurzarbeit*) as an important factor in mitigating negative employment effects.

In this chapter, we leave aside the current preoccupation with the recent crisis and take a broader view to investigate the link between trade and employment in Germany over the period 1999 to 2007. We consider not only exports and imports but also look at labour market consequences of trade in intermediate goods – commonly referred to as international outsourcing or offshoring. We also consider some labour market policies related to trade and focus particularly on one that has importantly changed work arrangements in Germany, namely, temporary contracts. We investigate whether trade has had different implications for temporary compared to permanent workers.

6.2. Trade and labour markets: an overview

Trade developments

This section looks at what happened to trade in Germany between 1999 and 2007. The analysis is based on data from German Input-Output tables from 1999 to 2007, available from the Federal Statistical Office (*Statistisches Bundesamt*).[2] The data is also used in the econometric analysis on the link between trade and labour markets further below.

1. *See* the *International Trade Statistics 2010*, at: *www.wto.org/english/res_e/statis_e/its2010_e/its10_toc_e.htm.*

2. More recent input-output tables at the same level of detail are not yet available for Germany, hence the cut-off at 2007. We use these data rather than trade statistics because we are also interested in computing measures of international outsourcing, for which we also need input-output data. This is discussed further below.

A look at the aggregate data shows that the first decade in the new millennium was a period of strong growth in the German trade performance. As shown in Figure 6.1 the aggregate export intensity of the manufacturing sector increased from about 30 to 38% between 1999 and 2007. Over the same period, imports grew also, but at a much slower rate, leading to a strongly increasing net export ratio for Germany.[3]

A similar development is evident for the services sector, albeit at a much smaller scale. Services sector exports increased from 5% to about 8% of output between 1999 and 2007, while imports increased from about 4% to 5% over the same period. Again, this contributed to an increasingly positive trade balance for Germany.

The aggregate figures, however, hide a strong degree of sectoral heterogeneity in the trade performance. In order to gain further insight into this issue, Tables 6.1 and 6.2 present export and import ratios by industry for 1999 and 2007, for the manufacturing and services sector respectively. In manufacturing, especially transport equipment (NACE 35), motor vehicles (34), machinery and equipment (29) are industries with consistently high export ratios. This is in line with the popular view that Germany has a strong export performance in particular in machinery, automobiles and related industries (see also Godart and Görg, 2011).

One noteworthy point in a comparison between 1999 and 2007 is that at the end of the period, the lowest export ratio in a sector is 19% (food, NACE 15). In 1999, by contrast, there are a few industries with export ratios well below this mark, such as wood (NACE 20) at 10%, publishing and printing (22) at 11% or food (15) at 13%. This again indicates the strong export growth in the German economy in the manufacturing sector. There is no two-digit industry that experienced any substantial decline in the export ratio over the period under investigation.[4]

Imports grew similarly in all manufacturing industries. The most important importer industries are office machinery (NACE 30), wearing apparel (18) and leather (19) where imports account for between roughly two-thirds and three-quarters of output. At the other end of the spectrum are publishing and printing (22), fabricated metals (28) and non-metallic minerals (26), where the import ratio is well below 20% of output.

3. This is consistent with firm level evidence by Vogel *et al*. (2009), who show that the number of manufacturing firms not involved in exporting or importing has declined from 67% to 61% between 2001 and 2005. This shows that the increase in exports and imports is not just due to an expansion along the intensive margin, but also at the extensive margin, as more firms enter into exporting and importing activity.

4. The export ratio in Transport Equipment (NACE 35) declined slightly from 51% to 49%.

Figure 6.1. Export and import intensities in German manufacturing

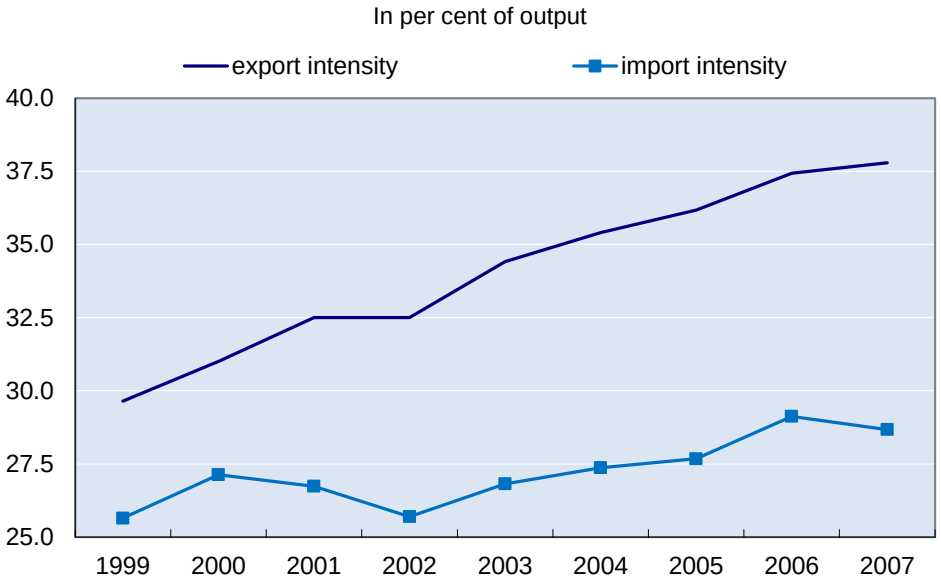


Figure 6.2. Export and import intensities in German services industries

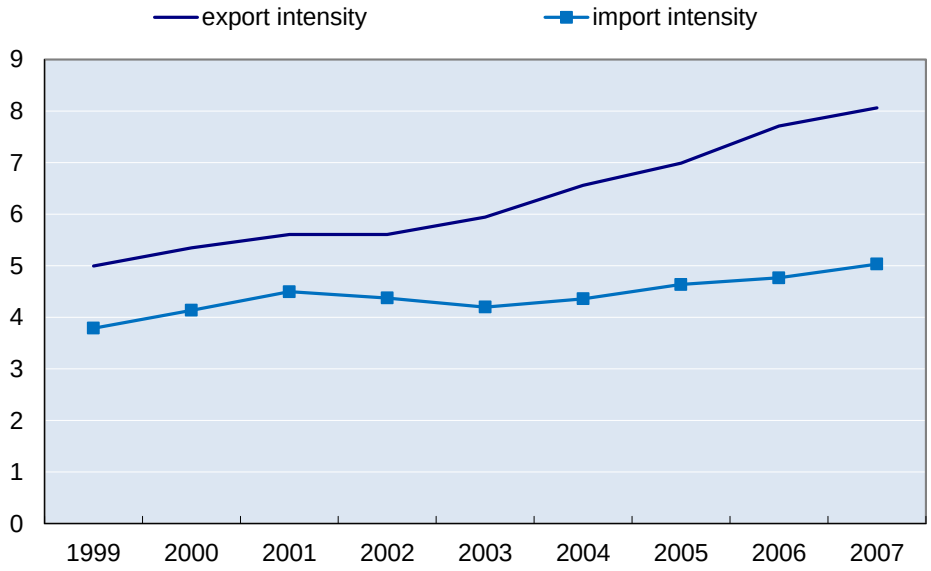


Table 6.1. Export and import intensities in Germany, 1999 and 2007, by manufacturing industry, percentage of output

Industry	Import intensity	Import intensity	Export intensity	Export intensity
	1999	2007	1999	2007
15: Food products and beverages	18.983	21.579	13.162	19.125
16: Tobacco products	15.186	27.038	27.790	**51.994**
17: Textiles	47.211	**50.056**	36.847	**42.648**
18: Wearing apparel; dressing and dyeing of fur	62.183	**68.419**	22.580	35.377
19: Leather, luggage, handbags, saddlery, harness, and footwear	65.991	**69.182**	23.643	37.436
20: Wood and wood products, except furniture	20.103	19.359	10.925	22.672
21: Pulp, paper, and paper products	28.131	**31.741**	28.212	36.686
22: Publishing, printing, and reproduction of recorded media	8.754	11.310	11.762	25.047
23: Coke, refined petroleum products, and nuclear fuel	32.350	**30.350**	13.094	22.483
24: Chemicals, chemical products and man-made fibres	25.502	**32.973**	33.834	**42.317**
25: Rubber and plastic products	23.011	27.206	28.292	**39.552**
26: Other non-metallic mineral products	16.567	18.818	15.708	25.810
27: Basic metals	27.253	**33.444**	25.933	31.225
28: Fabricated metal products, except machinery and equipment	13.736	16.599	18.127	25.544
29: Machinery and equipment n.e.c.	19.180	21.416	42.001	**49.146**
30: Office machinery and computers	72.179	**70.650**	31.107	**49.201**
31: Electrical machinery and apparatus n.e.c.	21.053	26.131	27.727	**37.845**
32: Radio, television and communication equipment and apparatus	45.984	**49.068**	40.978	**40.048**
33: Medical, precision and optical instruments, watches and clocks	28.777	**31.886**	39.830	**51.691**
34: Motor vehicles, trailers and semi-trailers	20.533	20.048	39.382	**44.544**
35: Other transport equipment	47.511	**47.619**	51.157	**49.579**
36: Furniture; manufacturing n.e.c.	29.793	**38.004**	21.102	35.981

Note: Bold print indicates export or import intensive industries, respectively.

Table 6.2. Export and import intensities in Germany, 1999 and 2007, by services industry, in % or output

Industry	Import intensity	Import intensity	Export intensity	Export intensity
	1999	2007	1999	2007
[40] Electricity, gas, steam and hot water supply	1.257	6.580	1.129	**9.032**
[41] Collection, purification and distribution of water	0.000	0.000	0.000	0.000
[45] Construction	1.466	1.552	0.036	0.078
[50] Sale, maint, repair motor vehicles; retail car gas	0.000	0.000	5.044	7.295
[51] Wholesale trade, commission trade, ex. motor vehicles	1.996	2.353	17.930	**27.305**
[52] Retail, Ex. Motor vehicles, Motorcycles; Repair	0.082	0.076	0.087	0.092
[55] Hotels and restaurants	9.121	**8.157**	4.529	6.473
[60] Land transport; transport via pipelines	10.962	**12.346**	7.690	7.311
[61] Water transport	10.016	**16.922**	68.953	**72.270**
[62] Air transport	17.289	**12.348**	23.632	**23.468**
[63] Supporting, Aux. Transport Activities; Travel agencies	7.392	**10.953**	6.952	**10.739**
[64] Post and telecommunications	7.414	**8.258**	2.674	4.150
[65] Financial intermediation, ex. insurance, pension funding	2.368	3.750	7.400	4.975
[66] Insurance and pension funding, ex. compulsory socsec	3.721	3.535	4.620	6.170
[67] Activities auxiliary to financial intermediation	21.061	**19.393**	3.731	6.949
[70] Real estate, property activities	1.491	2.367	0.193	0.294
[71] Renting of machinery, equip wo. oper., pers,HH goods	0.000	0.000	0.000	0.000
[72] Computer and related activities	8.384	**12.745**	8.007	**17.979**
[73] Research and development	18.674	**18.801**	18.934	**26.598**
[74] Other business activities	4.294	5.004	4.377	7.387

Note: Bold print indicates export or import intensive industries, respectively.

We use the information in the table to classify industries as export- or import-intensive in 2007.[5] An industry is classified as export-intensive when its share of exports exceeds the average export share across all industries. The averages are calculated separately for manufacturing industries (15 to 36) and service industries (40 to 74) in order to account for the different trade levels in these two groups. Import-intensive industries are also classified along these lines. We mark these industries in the table using bold print for the export and import data. For example, all industries with NACE codes between 29 and 35 (generally high-tech industries) are considered export-intensive, as are NACE industries 24 and 25, and 16 and 17, 30, 32, 33 and 35 are also considered import intensive.

The trade performance of individual industries is much more diverse in the services sector. Perhaps not surprisingly, a number of sectors have virtually no trade or only very low export and import ratios (e.g. water (NACE 41), construction (45), retail (52), real estate (70) and renting of machinery (71)). By contrast, water transport (NACE 61) has an export ratio of

5. As Godart and Görg (2011) show, export-intensive industries are of particular importance for economic activity in Germany, in terms of total employment and net value added. Moreover, since many of these industries are also characterised by large import shares, they are subject to a high degree of international competition. Hence, they may arguably be likely to display stronger trade-related labour market effects.

almost 75% in 2007. Other sectors with high export ratios are research and development (73), air transport (62) and wholesale trade (51), although exports only account for about 25% of output in those industries. On the import side, research and development (73), auxiliary financial intermediation (67) and water transport (61) have the highest import penetration ratios.

An important facet of today's world economy is that trade is no longer concentrated in final goods only. Instead, the recent wave of globalisation is characterised by the strong emergence of vertical specialisation and offshoring of production (Yi, 2003). While the exact magnitude of offshoring is difficult to measure, empirical work in international trade generally gauges its importance by looking at imports of intermediate goods. Following Feenstra and Hanson (1999), many studies, including Geishecker and Görg (2008) for Germany, use input-output tables to estimate the importance of intermediate goods trade for certain industries. We follow this approach here and calculate these figures for manufacturing and services industries separately.

In each case, we calculate a measure of narrow offshoring, which is defined as the amount of intermediate inputs used by the domestic 2-digit industry *j*, which is imported from the same industry *j* abroad. This is scaled by total output of the domestic industry *j*. Note that *j* can be any manufacturing (*m*) or services industry (*s*). This measure can be considered as the offshoring of core competencies that could have been carried out by the industries themselves (Feenstra and Hanson, 1999).

We also calculate for each 2-digit manufacturing industry (*m*) the amount of services offshored by the industry, as total services imports by manufacturing industry *m* over total output of industry *m*. This is, thus, similar to Amiti and Wei (2005) who investigate the increasing importance of services offshoring in manufacturing industries. Similarly, we also calculate, for each 2-digit manufacturing industry the amount of materials offshoring as imports from all other manufacturing industries, including the own industry *m*. These three types of offshoring, thus, encompass the various possibilities of offshoring from the own industry, other manufacturing industries, and services industries.[6]

Similar to manufacturing we also calculate three measures of offshoring for 2-digit services industries (*s*). The first one is narrow offshoring, which is defined as described above. The second is other services offshoring, which includes intermediate imports from services industries, including the own industry *s*. Finally, there is materials offshoring as imports of intermediate inputs from manufacturing industries.

Figure 6.3 shows the aggregate data for the German manufacturing sector. Note that all three offshoring measures in manufacturing industries have risen between 1999 and 2007. Notable, however, is the level difference, with inputs imported from manufacturing industries being much more important than services offshoring.[7] The picture is less clear for the services sector in Figure 6.4. Offshoring of services (narrow or other) has clearly risen considerably, while material offshoring has fluctuated somewhat, but was at roughly the same level in 1999 and 2007. Not surprisingly, services offshoring is much more important in the services sector than in manufacturing industries.

6. The exact definitions of our offshoring measures are described in the appendix.

7. This is consistent with evidence at the industry level for the United Kingdom by Amiti and Wei (2005) and firm-level evidence for Ireland by Görg *et al.* (2008).

Figure 6.3. Materials and services outsourcing in German manufacturing

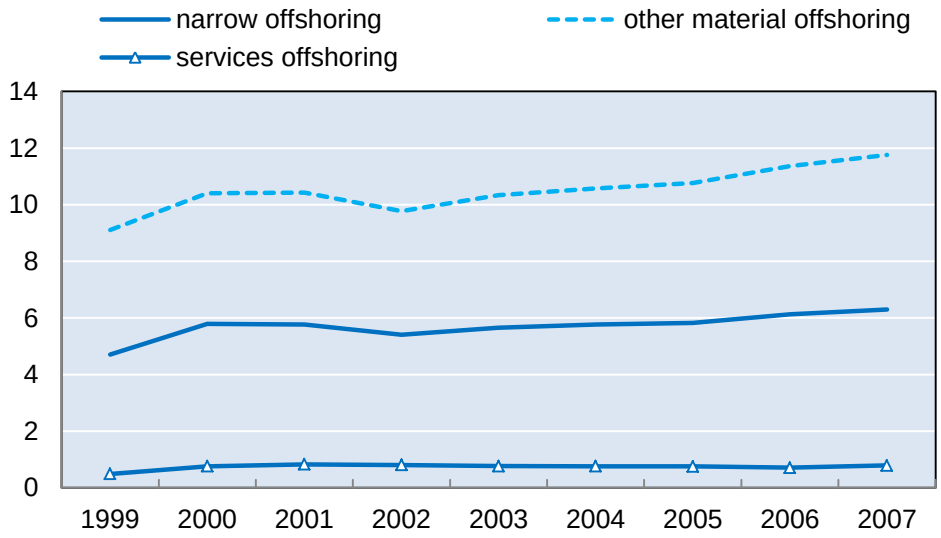
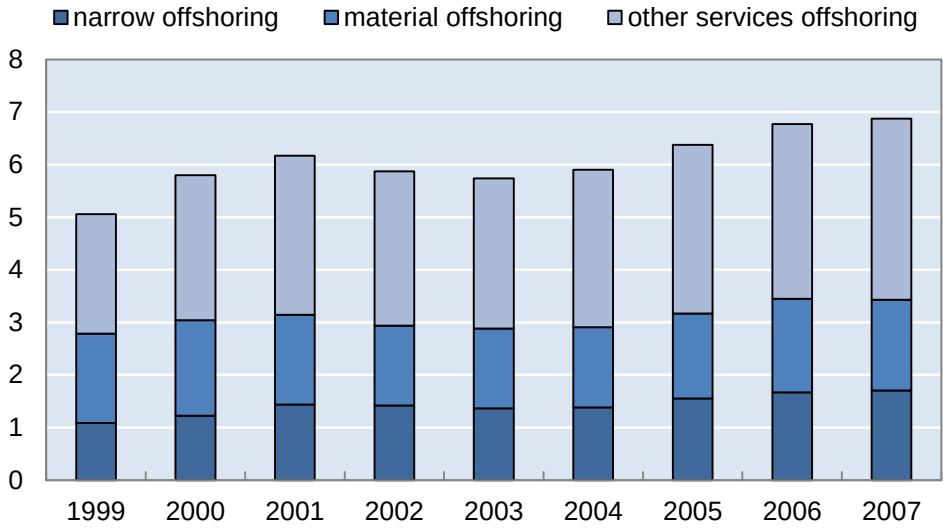


Figure 6.4. Materials and services outsourcing in German services industries



Tables 6.3 and 6.4 look at sectoral heterogeneity.[8] A number of manufacturing sectors use narrow offshoring more intensively than the aggregate figure of roughly 6% in 2007. These are mainly high-tech sectors such as communication equipment (NACE 32), office machinery (30), motor vehicles and transport equipment (34 and 35) and chemicals (24), but also other industries such as basic metals (27), which would not generally be regarded as high-tech. The growth of materials offshoring has been most pronounced in communication equipment with an increase from 3% to almost 13% of output between 1999 and 2007. As regards services offshoring, most manufacturing industries have levels below one%, with the exception of tobacco (16), chemicals (24) and non-metallic minerals (26).

8. In order to save space, we do not report figures on the third category of offshoring, "other" materials respectively services. These are strongly positively correlated with the narrow offshoring measures and, hence, do not add much to the discussion.

In the services sector, the industries most heavily engaged in offshoring of services activities are electricity and gas (NACE 40), telecommunications (64) and auxiliary financial intermediation (67). A number of industries do not engage in any offshoring of services at all, such as water (41), services related to motor vehicles (50), retail (52), water and air transport (61, 62), insurance (66) and renting of machinery (71). Hence, this shows that the level of offshoring of core competencies of the industry (captured by the narrow offshoring measure) is not as pronounced yet as was shown by narrow offshoring in manufacturing industries.

Materials offshoring is also at relatively low levels with one important exception: the air transport industry imports material inputs accounting for roughly 20% of total output in 2007. This dwarfs all other services sectors.

Table 6.3. Offshoring intensities in Germany, 1999 and 2007, by manufacturing industry, in % of output

Industry	Services offshoring	Services offshoring	Materials offshoring	Materials offshoring
	1999	2007	1999	2007
15: Food products and beverages	0.261	0.373	2.644	3.963
16: Tobacco products	0.975	1.505	1.788	0.351
17: Textiles	0.199	0.237	5.141	4.366
18: Wearing apparel; dressing and dyeing of fur	0.126	0.121	4.630	5.935
19: Leather, luggage, handbags, saddlery, harness, and footwear	0.059	0.062	8.183	7.885
20: Wood and wood products, except furniture	0.727	0.524	3.949	3.581
21: Pulp, paper, and paper products	0.413	0.658	6.039	7.659
22: Publishing, printing, and reproduction of recorded media	0.547	0.965	0.154	1.227
23: Coke, refined petroleum products, and nuclear fuel	0.405	0.219	4.462	1.835
24: Chemicals, chemical products and man-made fibres	1.192	1.901	7.908	7.996
25: Rubber and plastic products	0.509	0.993	0.829	1.447
26: Other non-metallic mineral products	1.276	1.781	1.790	2.186
27: Basic metals	0.369	0.534	7.068	10.950
28: Fabricated metal products, except machinery and equipment	0.445	0.705	1.371	1.949
29: Machinery and equipment n.e.c.	0.398	0.681	4.946	5.998
30: Office machinery and computers	1.137	0.762	1.316	7.353
31: Electrical machinery and apparatus n.e.c.	0.392	0.633	5.086	5.031
32: Radio, television and communication equipment and apparatus	0.286	0.605	3.307	12.984
33: Medical, precision and optical instruments, watches and clocks	0.394	0.630	2.545	3.752
34: Motor vehicles, trailers and semi-trailers	0.294	0.803	5.968	7.666
35: Other transport equipment	0.272	0.254	11.346	8.035
36: Furniture; manufacturing n.e.c.	0.143	0.344	5.081	6.204

Table 6.4. Offshoring intensities in Germany, 1999 and 2007, by services industry, in % of output

Industry	Services offshoring	Services offshoring	Materials offshoring	Materials offshoring
	1999	2007	1999	2007
[40] Electricity, gas, steam and hot water supply	0.082	5.273	1.972	1.894
[41] Collection, purification and distribution of water	0.000	0.000	1.979	2.099
[45] Construction	0.251	0.278	5.431	6.395
[50] Sale, maint, repair motor vehicles; retail car gas	0.000	0.000	4.319	3.988
[51] Wholesale trade, commission trade, *example* motor vehicles	1.996	1.328	0.565	0.486
[52] Retail, *example* motor vehicles, motorcycles; repair	0.000	0.000	1.215	1.513
[55] Hotels and restaurants	0.000	0.046	6.594	4.945
[60] Land transport; transport via pipelines	0.998	1.114	1.283	1.379
[61] Water transport	0.000	0.000	1.243	1.801
[62] Air transport	0.005	0.003	12.284	20.863
[63] Supporting, aux. transport activities; travel agencies	0.363	0.232	0.401	0.470
[64] Post and telecommunications	4.900	6.802	0.656	1.007
[65] Financial intermediation, *example* insurance, pension funding	0.846	0.333	0.145	0.203
[66] Insurance and Pension Funding, *example* Compulsory SocSec	0.002	0.000	0.261	0.252
[67] Activities auxiliary to financial intermediation	1.077	5.685	0.023	0.125
[70] Real estate, property activities	0.515	2.367	0.080	0.056
[71] Renting of machinery, equipment wo. oper., pers,hh goods	0.000	0.000	0.073	0.067
[72] Computer and related activities	3.947	2.879	1.002	1.172
[73] Research and development	1.044	0.831	1.713	2.408
[74] Other business activities	2.697	2.637	0.775	0.475

Labour market developments

Having described trade developments we now direct our attention to the labour market. We first present aggregate trends in total employment, employment by skill group, and wages over the period 1999 to 2009. Then, we present labour market outcomes by industry. This allows us to compare labour market trends between import-, export-, and offshoring-intensive industries, and, hence, to link labour market and trade developments.[9]

Aggregate trends 1999-2009

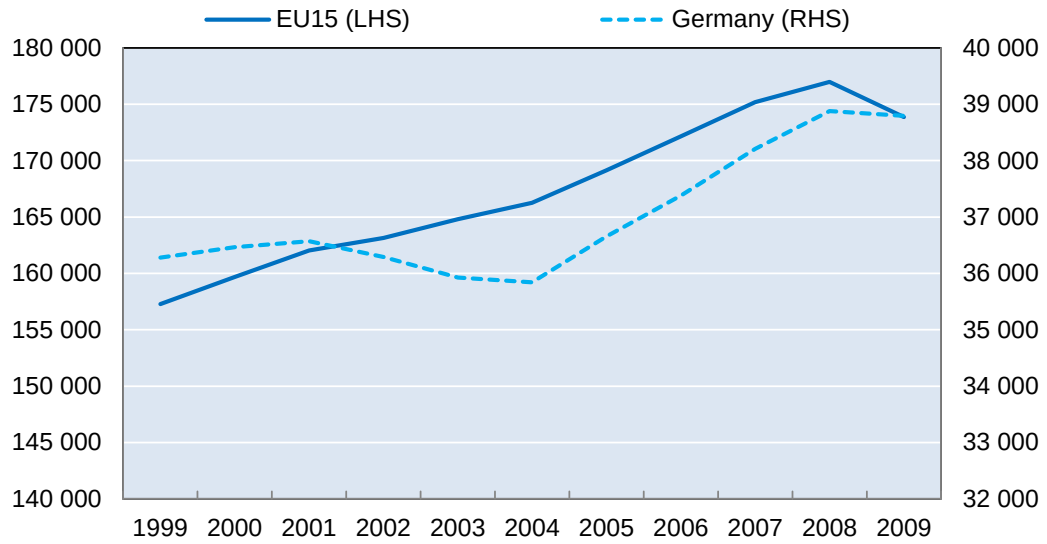
Total employment

Germany's performance in total employment throughout the decade of 1999 to 2009 was mixed (Figure 6.5). Total employment increased between 1999 and 2001 due to an economic upswing since 1999 (OECD, 2001). Compared to earlier periods of sluggish growth and weak

9. We use employment data provided by Eurostat, originating from the National Accounts (e.g. total employment, employment by industry) and the Labour Force Survey (e.g. employment by skill group). Wage data stems from the National Accounts, and the German Socio-Economic Panel (SOEP).

labour market performance, employment gains have been rather strong.[10] While total employment in the EU-15 further increased after 2001, in Germany it declined between 2001 and 2004. The bad performance relative to other countries has often been attributed to the continuing adjustment costs of the reunification (e.g. OECD, 2004). Moreover, Germany experienced a recession in 2003, so that reduced employment also reflects the stagnation in output and weak confidence. In 2004, the German economy recovered from the recession and started a period of impressive employment growth, strongly outperforming that of other EU-15 countries. For several years, real wage growth has been low compared to changes in labour productivity, allowing for the robust recovery of the labour market (OECD, 2008a).

Figure 6.5. Total employment (LFS)



Source: Eurostat, based on Labour Force Survey.

In contrast to other European Union countries, the financial crisis in early 2008 had rather muted effects on total employment in Germany. Also unemployment increased only slightly. It has been suggested that a major reason for the small effects was that previously introduced government policies allowed firms to flexibly decrease working hours of their employees. Short-time work schemes, additionally subsidised by the government, have also been a very popular instrument for firms to deal with the economic downturn, even though these schemes have not been the major source of employment stability (Boysen-Hogrefe and Groll, 2010, Gartner and Merkl, 2011). Also, firms hoarded qualified workers due to experienced, and expected, skill shortages (Möller, 2010).

10. However, these increases in total employment mask that hours worked have increased at a much slower rate, suggesting that the overall increase was mainly driven by the creation of part-time employment (OECD, 2001).

Employment by skill group

In Table 6.5, total employment is broken down by workers' educational attainment.[11] The last row shows the growth rates for each group during the decade: employment of workers with primary education has decreased by 12.8%, while employment of workers with secondary and tertiary education has increased by 13% and 21.5%, respectively. Note, however, that these numbers partly reflect composition effects, as can be seen from the evolution of employment *rates* by education group (Figure 6.6). While employment rates of workers with primary education experienced a sharp drop in 2001, they moved in tandem with those of medium- and high-skilled workers thereafter. Yet, the 2003 recession had a stronger impact on low-skilled workers. Similarly, the employment rate of low-skilled workers declined after the 2008 financial crisis, while it stagnated or even increased for medium- and high-skilled workers, respectively.

The roles of trade and offshoring in these aggregate labour market developments is not entirely clear (Lurweg and Uhde, 2010; Geishecker, 2008, Bachmann and Braun, 2011). The declines in employment have been mostly attributed to a weak overall economic performance, even though offshoring has certainly contributed to firms' shedding of labour. For example, it has been shown that offshoring mainly affects low-skilled labour (e.g. Geishecker, 2006; Geishecker and Görg, 2008; Winkler, 2009). However, trade, in particular exports, is a major driving force during economic upswings (OECD, 2008a). Below we look into employment by export-, import-, and offshoring-intensive industries.

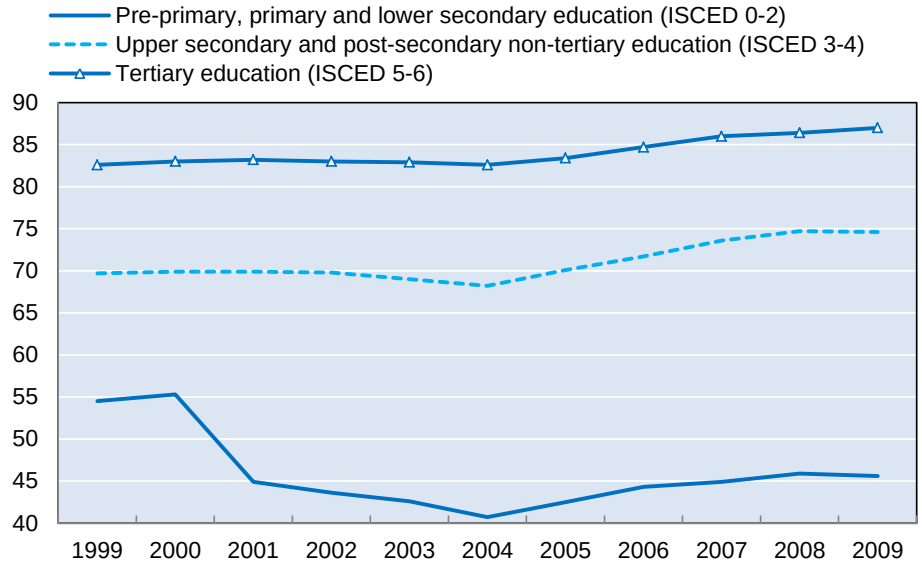
Table 6.5. Total employment by educational attainment (in thousands of workers)

	Educational attainment		
Levels	**Primary**	**Secondary**	**Tertiary**
1999	6 163	19 722	8 550
2000	5 856	19 685	8 775
2001	5 790	20 362	8 729
2002	5 550	20 954	8 293
2003	5 328	20 047	8 812
2004	4 994	19 604	9 049
2005	5 771	20 965	9 398
2006	5 927	21 629	9 273
2007	5 722	22 403	9 484
2008	5 511	22 672	9 957
2009	5 373	22 289	10 387
Growth rates			
1999-2009	-12.8%	13%	21.5%

Source: Eurostat, LFS, authors' calculations; 23 November 2010.

11. The time series on total employment described above is based on the German microcensus (labour force survey). Due to data availability, we employ a different time series from the national accounts (NA) for the breakdown of employment by industry at the 2-digit level. That series is partly based on the LFS, but also other data sources are taken into account. For completeness, the two series are compared in the annex in Figure 6.A1.1. Employment levels in the NA series are higher than in the LFS series, but the development of employment over time is mostly identical, even though the strong increase only starts in 2005 in the NA series.

Figure 6.6. Employment rates by educational attainment, 1999-2009



Source: Eurostat, LFS.

Real wages

This subsection describes the development of real wages in Germany. We employ two different sources of wage data for this purpose. First, we calculate annual earnings using data from the National Accounts (gross wages, salaries and total employment). Data is available for all industries, except for 2009. Second, we use survey data from the German Socio-Economic Panel (SOEP). All series are in nominal terms and are deflated using the CPI provided by the German Statistical Office.

Figure 6.7. Real annual earnings, 1999-2009
in Euros



Notes: From National Accounts (NA), and Socio-Economic Panel (SOEP); NA: Wages and salaries divided by total employment; SOEP: monthly earning multiplied by 12; all series deflated with CPI (German Statistical Office).

Real annual earnings are displayed in Figure 6.7. Even though the level of annual earnings calculated from the National Accounts is lower than in the SOEP, the development of real wages over time is similar.[12] The NA series indicates that real annual earnings stagnated between 1999 and 2003 and constantly declined thereafter. These observations are in line with other examinations of real wages in Germany (Brenke, 2009). While earnings in the SOEP increased relatively strongly between 2001 and 2003, real annual earnings also almost constantly declined thereafter. Interestingly, the SOEP data also indicate that annual earnings have risen in the aftermath of the financial crisis, whereas this does not show in the NA series.

Trends by industry 1999-2009

Employment

We now look at employment trends within detailed industries. First, we look at aggregate industry trends at a 1-digit NACE level. Second, we identify the five industries with highest and lowest change in employment levels between 1999 and 2008.[13] Third, we identify the five industries with strongest and weakest employment growth. Finally, we report employment changes within export-, import-, and offshoring-intensive industries using the classification described in Section 6.2.

Table 6.6. shows employment growth rates by 1-digit industry. Real estate, renting, and business activities (industry K) has had the strongest employment growth in percentage terms (about 40%). It has also been the strongest in terms of net job creation, with more than 1.6 million net jobs created between 1999 and 2008. Employment in hotels and restaurants (H), and health and social work (N) grew by about 18% between 1999 and 2008. The strongest decline in employment (in percentage terms) has been in mining and quarrying (industry C), but in absolute terms, the employment decrease has been rather small (53 000 jobs). More important in terms of jobs lost has been the decline in the construction industry (F) and in manufacturing (D).

Looking at more detailed industries, Table 6.7 reports the five best and worst performers in terms of absolute job growth. Employment in "Other business services", comprising professional business services (e.g. accounting, consultancies), technical business services (e.g. architectural), advertising, and personnel services, increased by about 1.3 million employees. Health and social work is the second most important industry, which shows about 600 000 jobs more in 2009 than in 1999. The strongest decreases in employment occurred in construction, with more than 660 000 jobs lost. Also public administration and defense shrank strongly by more than 260 000 jobs.

In Table 6.8, we show the five best and worst performers in terms of employment growth rates. The oil and gas extraction industry has grown strongly by 75%. Business services (computer and related activities and other business services) have also grown strongly by 70% and 42%, respectively. The largest decreases occurred in the mining industries, and in textile and related industries.

12. The difference is likely to originate from differences in measuring wages (i.e. bonus payments, 13th salaries, overtime pay, etc.), differences in the sample of employed (full-time, part-time, etc.), and possibly also differences in the population concept (residents, foreigners working in Germany, etc.).

13. Note that we compare to 2008 levels because the financial crisis of 2008 might have had unpredictable influences on employment trends at the industry level.

Linking employment trends to trade, we now compare the development of employment between export-, import, and offshoring-intensive industries.[14] As to offshoring intensities, we distinguish between narrow offshoring, materials and services offshoring. Figure 6.8 shows employment trends over time for these five industry aggregates (1999=100). Industries intensive in narrow offshoring have shown the strongest growth in employment; an increase of more than 20% between 1999 and 2008. While overall employment declined between 2001 and 2004 (recall Figure 6.5), employment levels in industries intensive in narrow offshoring increased throughout. All other industry aggregates follow the overall trend of an employment decline starting in 2001. Employment only started to pick up again around 2005 in these industries. In particular, industries intensive in materials offshoring show shrinking employment levels almost throughout the entire period and only return to 1999 employment levels by 2008.

Table 6.6. Employment growth by industry 1999-2008 (one-digit NACE)

NACE	Description	1999-2008	
		In '000	In %
A	Agriculture, hunting and forestry	-86.0	-9.14%
C	Mining and quarrying	-53	-39.55%
D	Manufacturing	-375	-4.66%
E	Electricity, gas and water supply	-37	-11.64%
F	Construction	-666	-23.29%
G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	26	0.44%
H	Hotels and restaurants	289	18.61%
I	Transport, storage and communication	141	6.77%
J	Financial intermediation	-80	-6.35%
K	Real estate, renting and business activities	1661	39.83%
L	Public administration and defence; compulsory social security	-265	-9.13%
M	Education	282	13.33%
N	Health and social work	646	18.06%
O	Other community, social and personal service activities	297	15.81%
P	Activities of households	72	11.34%

Source: Eurostat, National Accounts.

14. A description of how we classify trade intensities is given in section 6.2 above. We classified the industries on the basis of trade data for 2007.

Table 6.7. Industries with strongest and weakest absolute job growth between 1999 and 2008 (in thousands of workers, two-digit NACE)

Five industries with strongest job creation 1999-2008		
74	Other business activities	1349
85	Health and social work	646
55	Hotels and restaurants	289
80	Education	282
72	Computer and related activities	244
Five industries with weakest job creation 1999-2008		
65	Financial intermediation, except insurance and pension funding	-90
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	-99
22	Publishing, printing and reproduction of recorded media	-130
75	Public administration and defence; compulsory social security	-265
45	Construction	-666

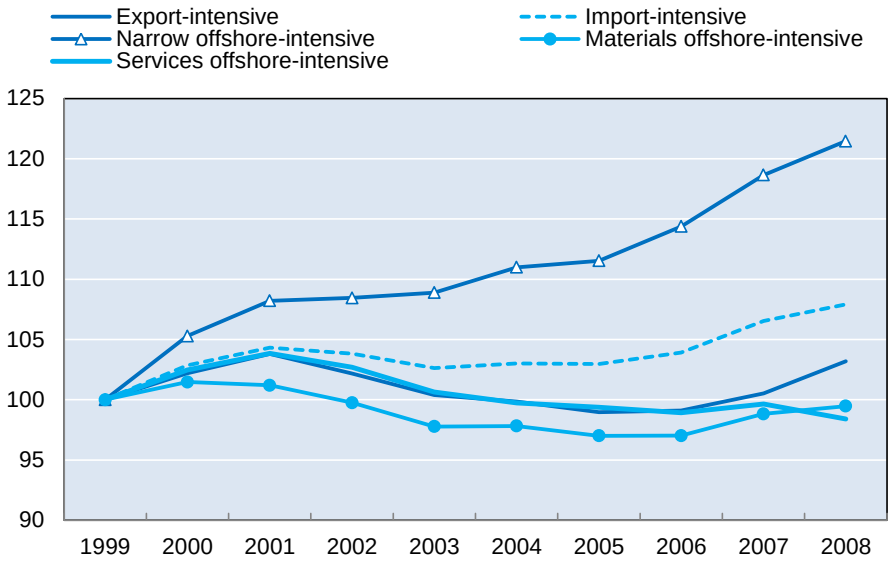
Source: Eurostat, National Accounts.

Table 6.8. Industries with highest and lowest employment growth rates between 1999 and 2008 (in %, two-digit NACE)

Five industries with highest employment growth 1999-2008		
11	Extraction of crude petroleum and natural gas; related service activities	75.00%
72	Computer and related activities	70.52%
37	Recycling	68.75%
74	Other business activities	42.54%
62	Air transport	36.73%
Five industries with lowest employment growth 1999-2008		
19	Manufacture of leather and leather products	-26.47%
17	Manufacture of textiles	-32.90%
5	Mining and quarrying	-39.55%
18	Manufacture of wearing apparel; dressing; dyeing of fur	-44.00%
10	Mining of coal and lignite; extraction of peat	-55.21%

Source: Eurostat, National Accounts.

Figure 6.8. Employment trends in trade intensive sectors



Source: Eurostat, National Accounts.

Employment by skill group

Table 6.9 displays the share of employed persons with a specific educational attainment in total employment (manufacturing and services) and separately by industry aggregates.[15] Looking at the overall figures, the table shows that the share of workers with no or only secondary education has declined from 16.2% to 11.3% between 1999 and 2009. The share of workers with vocational training has remained constant at around 62% throughout the period. The share of workers with tertiary education increased from 20.9% to 26.7%.

The rest of the table shows the shares of workers with different educational attainment in each of our five trade-intensity industry aggregates. The employment share of workers with no or just secondary education in all five industry aggregates is similar to their share in the overall economy. The share of workers with vocational training in trade-intensive industries is low compared to their share in overall employment (except in industries intensive in materials offshoring). In contrast, workers with tertiary education make up a relatively large share in trade-intensive industries. In export-intensive industries, and in industries intensive in narrow and services offshoring, their share is clearly above their average share in the overall economy. This is in line with the conventional wisdom that offshoring of materials and services increases demand for skilled labour (Geishecker, 2006; Winkler, 2009).[16]

15. Given limitations for data from official statistical sources, we rely on employment figures from the SOEP in this section.

16. Note, however, that in industries intensive in broadly defined materials offshoring, the share of skilled workers is below average.

Table 6.9. Share of workers by educational attainment and industry aggregates (in %)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
A. No or secondary education											
Overall	16.2	15.1	14.3	14.9	13.7	14.0	13.0	11.8	12.4	11.4	11.3
Export-int.	15.0	13.4	13.1	12.8	10.9	11.8	11.2	10.1	8.7	8.6	9.2
Import-int.	18.3	16.4	15.6	18.2	16.7	17.9	17.5	16.1	16.8	14.5	12.8
Narrow offsh.-int.	16.8	13.7	12.6	13.3	12.1	12.5	12.3	11.2	11.5	11.6	11.1
Material offsh.-int.	17.8	16.3	15.6	16.7	15.6	15.6	14.8	13.7	15.5	13.7	12.9
Service offsh-int.	16.1	13.5	13.4	14.0	12.0	11.7	11.4	10.7	11.2	11.2	10.6
B. Vocational education											
Overall	62.9	62.2	62.3	61.9	62.0	62.0	62.4	62.8	62.7	63.4	62.0
Export-int.	58.0	56.7	56.8	57.0	57.6	58.6	58.5	58.8	60.8	60.9	54.8
Import-int.	59.6	58.1	59.0	56.8	57.3	57.3	56.9	58.8	58.5	60.6	60.1
Narrow offsh.-int.	52.5	53.2	53.3	52.4	50.8	52.8	51.3	53.1	51.2	50.3	50.5
Material offsh.-int.	64.2	62.7	62.6	62.3	63.0	63.2	63.3	65.1	63.8	65.2	65.1
Service offsh-int.	60.2	57.1	56.9	57.2	56.6	59.1	57.3	58.3	57.9	58.0	56.8
C. Tertiary education											
Overall	20.9	22.8	23.5	23.1	24.3	24.0	24.7	25.3	24.9	25.2	26.7
Export-int.	27.0	29.9	30.0	30.2	31.5	29.5	30.3	31.1	30.4	30.5	36.0
Import-int.	22.1	25.5	25.4	25.0	26.0	24.8	25.6	25.0	24.8	25.0	27.1
Narrow offsh.-int.	30.7	33.1	34.1	34.3	37.1	34.7	36.4	35.7	37.3	38.1	38.4
Material offsh.-int.	18.0	21.0	21.8	21.0	21.5	21.2	21.9	21.2	20.7	21.1	22.1
Service offsh-int.	23.7	29.4	29.7	28.9	31.4	29.2	31.3	31.0	30.9	30.8	32.6

Note: Cells show percentage of workers with specific educational attainment in respective industry, e.g. percentage of workers with tertiary education in export-intensive industries.

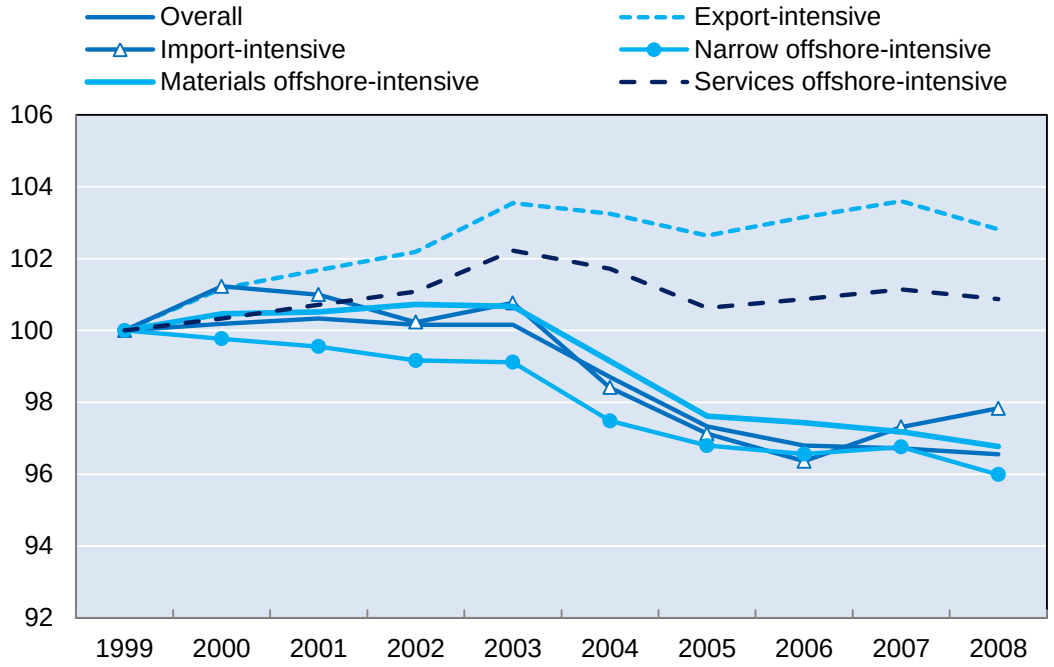
Source: SOEP.

Real wages

The evolution of real annual earnings between 1999 and 2008 for the overall economy (except agriculture and public services) and by trade-intensity industry aggregates is shown in Figure 6.9. In import-intensive industries and in industries intensive in narrow and materials offshoring, real wages have closely followed the overall trend of declining wages since 2003 (recall Figure 6.7). In contrast, wages in the export-intensive sectors increased more rapidly until 2003 and more or less stagnated thereafter. Similarly, real wages in industries intensive in services offshoring increased relatively strongly until 2003, and declined only slightly thereafter.

Table 6.10 shows the five best- and worst performing 2-digit industries in terms of growth in real earnings. Manufacture of communication equipment, transport equipment, coke, petroleum, nuclear fuels, and tobacco, and air transport industries had the strongest increase in real annual earnings. The strongest real earnings decline has occurred in education, recreational and sporting activities, mining, forestry, and extraction industries. Table 6.11 shows the best-and-worst performing industries in terms of earnings growth in percentages. The industry with the strongest increase was activities auxiliary to financial intermediation.

Figure 6.9. Evolution of real annual wages 1999-2008 overall and by industry aggregates (1999=100)



Note: Overall refers to manufacturing and private services (i.e. excluding agriculture and public services).
Source: Eurostat, LFS; own calculations.

Table 6.10. Industries with strongest and weakest real annual wage change between 1999 and 2008 (in levels, two-digit NACE)

A. Five industries with strongest real wage increase (levels) 1999-2008		
32	Manufacture of radio, television and communication equipment and apparatus	6544.1
35	Manufacture of other transport equipment	5103.6
23	Manufacture of coke, refined petroleum products and nuclear fuel	4849.0
62	Air transport	4808.1
16	Manufacture of tobacco products	4530.9
B. Five industries with weakest real wage increase (levels) 1999-2008		
92	Recreational, cultural and sporting activities	-4459.4
80	Education	-4502.3
10	Mining of coal and lignite; extraction of peat	-4914.3
2	Forestry, logging and related service activities	-5782.3
11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying	-10974.0

Source: Eurostat, National Accounts.

Table 6.11. Industries with strongest and weakest real annual wage change between 1999 and 2008 (in %, two-digit NACE)

A. Five industries with strongest real wage increase (%) 1999-2008		
67	Activities auxiliary to financial intermediation	26.34%
32	Manufacture of radio, television and communication equipment and apparatus	16.40%
18	Manufacture of wearing apparel; dressing; dyeing of fur	14.03%
35	Manufacture of other transport equipment	11.91%
16	Manufacture of tobacco products	9.94%
B. Five industries with weakest real wage increase (%) 1999-2008		
80	Education	-14.73%
4	Fishing	-14.86%
11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying	-18.18%
92	Recreational, cultural and sporting activities	-21.28%
2	Forestry, logging and related service activities	-27.72%

Source: Eurostat, National Accounts.

6.3. Linking trade and labour markets: econometric evidence

The analysis of aggregates in the preceding section allows us to say something about correlations between trade and labour market outcomes. Yet, labour market effects may strongly depend on individual level characteristics, such as education, age, tenure, *etc*. In order to be able to abstract from such confounding effects we now turn to an econometric analysis, where we use individual-level data combined with industry-level data on trade.[17] We look at two possible labour market outcomes, namely, individuals' wages and individuals' probability of moving into unemployment. The analysis is based on SOEP data for male and female full-time employees, aged 18 to 64, who are employed in manufacturing (NACE 15-36) or services industries (NACE 40-74), combined with industry-level data on trade variables (described in Section 6.2) for the period from 1999 to 2007.

Wage effects

To investigate the relationship between trade and individuals' wages we estimate variants of the following Mincerian wage regression:[18]

$$\ln WAGE_{ijt} = \alpha + \beta X_{it} + \gamma TRADE_{jt} + d_j + d_t + d_i + v_{it} \quad (1)$$

where *WAGE* is the real monthly gross wage for individual *i* in industry *j* in year *t*. As explanatory variables we include a vector of individual-specific characteristics (including marital status, tenure, work experience, education, size and ownership of the firm where the individual works, and a dummy for individuals living in East Germany).[19] Dummies for

17. This approach has recently been employed by other researchers, see Geishecker and Görg (2008) and Lurweg and Uhde (2010) for Germany or Liu and Trefler (2008) for the United States.

18. This approach is similar to Geishecker and Görg (2008) and Liu and Trefler (2008).

19. A definition of the explanatory variables and some summary statistics are in the Annex.

industry *j*, time *t* and individual *i* control for unobserved effects at these levels. We also include industry-specific time trends, in order to control for technical change that is specific to an industry. The main variable of interest is the vector TRADE, which includes various measures of trade exposure of the industry. Specifically, these are the export share (exports over total output) and import share (imports over total output) of the industry, as well as the offshoring measures (narrow, materials, services) as described in Section 6.2. We also alternatively use an openness measure defined as exports plus imports over industry output.

The baseline results using data for individuals employed in manufacturing or services industries are presented in Table 6.12. Given the potential endogeneity of the trade variables (Geishecker and Görg, 2008), we estimate all wage models using instrumental variables (IV) techniques.[20] Note, firstly, that the coefficients on our control variables are largely as expected: wages increase with firm size, work experience, tenure, education and status as married individuals.[21]

As regards the trade variables, a mixed picture emerges. Firstly, the export share of an industry is not statistically significantly correlated with individual-level wages.[22] This may, at first sight, be seen as out of line with evidence suggesting that exporting firms pay higher wages than non-exporters (e.g. Schank *et al*., 2007 for Germany). However, it has to be stressed that here we are concerned with individuals, not firms, and these individuals may work in firms that export or those that do not. We do not have information on exporting at the firm-level, only at the industry-level. In addition, German exports are strongly influenced by wage moderation during the period under investigation (Felbermayr *et al*., 2010), and even though we use an IV approach, perhaps we are not able to control for this endogeneity issue fully. Imports, materials offshoring and general openness are all negatively correlated with individual wage levels. The coefficient on services offshoring is positive, but not statistically significant.

Of course, the regression results hide substantial heterogeneity in our sample. Firstly, we pool manufacturing and services industries. Secondly, traditional trade theory would predict that trade effects should be different for workers with different skills. This is what we turn to investigating now. We run regressions of equation (1) for the subsamples of manufacturing and services industries, respectively. Within the broad sector, we also distinguish between export-intensive and non-export intensive industries. Furthermore, we allow for different effects of trade on individuals with different education levels, by including interactions of the trade variable with three education categories.

We report the regression results in Table 6.13. We estimate variants of equation (1), similar to Table 6.12. However, in order to save space we do not report all the regression results in a large number of tables. Rather, we collect the coefficients on the trade interactions from the various regression models and report these in the table.

20. Excluded instruments are the first and second difference in the respective trade variable. The diagnostic tests, which are not reported here to save space, suggest that the exogenous instruments are both relevant (based on first stage F test) and valid (based on Hansen J statistic for overidentification restrictions). Note that results do not change importantly if we include more than one trade variable jointly in the model. We, therefore, prefer the more parsimonious models reported here.

21. The coefficients on education and tenure are statistically insignificant. This may be due to our estimation procedure which controls for time invariant individual specific effects. Education and tenure vary only little over time, so they may not be able to be estimated with precision.

22. This is in line with Lurweg and Uhde (2009) who also use SOEP data and find that workers in "high volume trade" industries do not experience wage gains.

We find no statistical evidence that offshoring of materials is associated with individual level wages.[23]

Table 6.12. Baseline regression results (manufacturing and services industries)

	(1)	(2)	(3)	(4)	(5)	(6)
Export share	-0.0102					
	(-1.44)					
Import share		-0.0724				
		(-2.67)***				
Narrow offshoring			-0.0271			
			(-0.89)			
Material offshoring				-0.0997		
				(-2.62)***		
Services offshoring					0.0192	
					(1.15)	
Openness						-0.0199
						(-2.27)**
Married	0.0218	0.0180	0.0217	0.0211	0.0228	0.0201
	(2.15)**	(1.73)*	(2.14)**	(2.07)**	(2.24)**	(1.96)**
Tenure	0.0000357	0.000142	0.0000699	-0.0000509	0.0000521	0.0000429
	(0.04)	(0.15)	(0.08)	(-0.06)	(0.06)	(0.05)
Public ownership	-0.00335	-0.00320	-0.00376	-0.00472	-0.00443	-0.00273
	(-0.30)	(-0.28)	(-0.34)	(-0.42)	(-0.40)	(-0.24)
Firm size 2	0.0309	0.0326	0.0313	0.0323	0.0312	0.0309
	(3.05)***	(3.19)***	(3.09)***	(3.17)***	(3.08)***	(3.04)***
Firm size 3	0.0260	0.0302	0.0266	0.0272	0.0262	0.0267
	(2.07)**	(2.37)**	(2.13)**	(2.16)**	(2.09)**	(2.12)**
Firm size 4	0.0231	0.0261	0.0229	0.0238	0.0225	0.0245
	(1.62)	(1.80)*	(1.61)	(1.67)*	(1.58)	(1.70)*
Education medium	0.0336	0.0345	0.0309	0.0256	0.0307	0.0368
	(0.30)	(0.31)	(0.27)	(0.23)	(0.27)	(0.33)
Education high	0.117	0.121	0.117	0.114	0.116	0.119
	(1.08)	(1.12)	(1.08)	(1.05)	(1.07)	(1.10)
Experience	0.0827	0.0832	0.0829	0.0833	0.0835	0.0823
	(5.56)***	(5.59)***	(5.59)***	(5.60)***	(5.63)***	(5.51)***
Experience squared	-0.000544	-0.000546	-0.000546	-0.000549	-0.000547	-0.000543
	(-12.81)***	(-12.69)***	(-12.89)***	(-12.87)***	(-12.90)***	(-12.71)***
East Germany	0.0100	0.0214	0.0108	0.00989	0.0102	0.0131
	(0.27)	(0.57)	(0.29)	(0.27)	(0.28)	(0.35)
N individuals	6059	6059	6059	6059	6059	6059
N	27466	27466	27466	27466	27466	27466

Notes: IV estimations, Endogenous: trade shares, Instruments: First and second difference of trade shares, t-statistics of robust standard errors in parentheses; all models include year dummies, industry dummies, and industry-specific time trends; *** significance at 1%, ** significance at 5%, * significance at 10%.

23. This is different to Geishecker and Görg (2008) who find positive effects for high skilled workers and negative for low skilled workers. However, even though there effects are statistically significant, they are also small. While Geishecker and Görg also combine SOEP data with industry level trade data, they investigate a different time period (1991 to 2000) and a different measure of offshoring which can only indirectly capture trade in intermediates, while we can observe it directly from the input-output tables. This may explain some of the differences in results. See also Winkler and Milberg (2009).

Table 6.13. Estimates by sector and education

	(1) All manufacturing	(2) Export intensive manf.	(3) Non-export intensive manf.	(4) All services	(5) Export intensive services	(6) Non-export intensive services
Model 1						
edu1Xexpsh	-0.0246	0.0359	-0.0312	0.0103	0.0537	0.0186
	(-1.63)	(0.71)	(-1.05)	(1.60)	(0.39)	(1.05)
edu2Xexpsh	-0.0298	-0.0593	-0.0238	0.00377	0.119	0.00628
	(-1.86)*	(-1.17)	(-0.81)	(0.68)	(1.63)	(0.78)
edu3Xexpsh	-0.0293	-0.0418	-0.0373	0.000878	0.0536	-0.00153
	(-1.78)*	(-1.13)	(-1.32)	(0.14)	(0.56)	(-0.14)
Model 2						
edu1Ximpsh	-0.0390	-0.00373	-0.0542	-0.0241	0.0506	-0.0229
	(-1.83)*	(-0.15)	(-1.30)	(-0.72)	(1.13)	(-0.54)
edu2Ximpsh	-0.0463	-0.0438	-0.0593	-0.0376	-0.0173	-0.0319
	(-2.06)**	(-1.88)*	(-1.39)	(-1.10)	(-0.35)	(-0.74)
edu3Ximpsh	-0.0431	-0.0372	-0.0633	-0.0581	-0.0105	-0.0646
	(-1.97)**	(-1.65)*	(-1.57)	(-1.58)	(-0.32)	(-1.25)
Model 3						
edu1Xnarrowsh	0.00128	0.0912	0.0172	0.0633	0.0346	0.0519
	(0.04)	(1.25)	(0.34)	(1.16)	(0.10)	(0.94)
edu2Xnarrowsh	-0.00396	-0.00520	0.00959	-0.0126	-0.142	-0.00595
	(-0.12)	(-0.08)	(0.19)	(-0.26)	(-0.54)	(-0.12)
edu3Xnarrowsh	-0.00161	0.00937	-0.00269	-0.0593	-0.196	-0.0681
	(-0.05)	(0.14)	(-0.05)	(-1.16)	(-1.14)	(-1.25)
Model 4						
edu1Xmatsh	-0.0247	0.158	-0.00788	-0.0378	2.211	-0.0546
	(-0.98)	(1.09)	(-0.22)	(-0.38)	(0.84)	(-0.30)
edu2Xmatsh	-0.0439	-0.129	-0.0118	-0.113	-0.0791	-0.141
	(-1.52)	(-1.06)	(-0.32)	(-1.14)	(-0.87)	(-0.75)
edu3Xmatsh	-0.0243	0.00108	-0.0120	-0.133	-0.302	-0.161
	(-0.86)	(0.01)	(-0.32)	(-1.26)	(-0.93)	(-0.82)
Model 5						
edu1Xsersh	0.335	2.561	-0.700	0.0447	0.228	0.0301
	(1.09)	(2.32)**	(-1.38)	(1.88)*	(0.97)	(1.24)
edu2Xsersh	0.169	1.315	-1.003	-0.00286	0.0175	-0.00896
	(0.53)	(1.69)*	(-1.76)*	(-0.18)	(0.29)	(-0.53)
edu3Xsersh	0.147	1.302	-0.878	-0.0164	0.0101	-0.0296
	(0.45)	(1.44)	(-1.58)	(-1.00)	(0.08)	(-1.79)*
Model 6						
edu1Xopen	-0.0219	0.0124	-0.0231	0.00522	0.0411	0.00686
	(-1.96)**	(0.54)	(-1.24)	(0.63)	(0.50)	(0.58)
edu2Xopen	-0.0263	-0.0401	-0.0241	-0.00113	0.0791	0.00122
	(-2.18)**	(-1.65)*	(-1.25)	(-0.15)	(1.72)*	(0.13)
edu3Xopen	-0.0252	-0.0318	-0.0291	-0.00625	-0.0108	-0.0111
	(-2.09)**	(-1.55)	(-1.54)	(-0.74)	(-0.10)	(-0.89)

Notes: IV estimations, robust standard errors in parentheses. Models include all covariates as in Table 6.12.; these are not reported here to save space.

To summarise the results, we can, firstly, see that there is little evidence that export activity in an industry is statistically significantly associated with individual-level wages. Secondly, total imports have a negative effect on individual-level wages only in export intensive manufacturing industries. These industries are in many cases also those that have high import penetration, as seen in Section 6.2. Hence, export intensive industries may see a large degree of international competition, which may lead to higher pressure on wages than in other industries.

By contrast, services offshoring is positively associated with wages for low- and medium-skilled workers in export-intensive manufacturing industries, while there is a negative correlation for medium-skilled workers in non-export intensive industries. This suggests that in export-intensive manufacturing industries, the offshoring of services is complementary to low-and medium-skilled activities in the industry. By contrast, in other manufacturing industries, services offshoring may substitute for medium-skilled work, such as, for example, back-office activities, such as accounting.

Overall, however, our estimates give the impression that trade in its various facets is only to a low degree responsible for wage developments at the individual level.[24] Or, to cite Liu and Trefler (2008), there may be "much ado about nothing". This may perhaps not come at a surprise as Germany is generally regarded as being fairly inflexible in terms of wage setting, which is done by large unions at the sectoral level. In countries with rigid wage setting institutions, trade may perhaps have larger effects on employment than wages, as argued by Krugman (1995). We turn to investigating this in the next section.

Employment effects

In this section, we look at the link between an individual's probability of losing her job and trade. To do so, we estimate the probability of job loss conditional on individual and industry characteristics:

$$\Pr(\text{job loss})_{ijt} = \alpha\, X_{it} + \lambda\, \text{TRADE}_{jt} + d_j + d_t + d_i + e_{it} \qquad (2)$$

where job loss is defined as a dummy variable equal to one if an individual i moves from full-time employment in period t-1 into unemployment in period t, and zero otherwise. The explanatory variables are identical to those in equation (1). Given the binary nature of the dependent variable the model is estimated using fixed effects logit techniques.[25]

The baseline results for the full sample are presented in Table 6.14.[26] The estimates suggest that the probability of switching into unemployment is positively correlated with the export share – in other words, individuals in industries with high export shares are more likely to lose their jobs. This may be against the common expectation.

24. A similar conclusion is drawn by Lurweg and Uhde (2009) and Geishecker and Görg (2008).

25. This approach is similar to Geishecker (2008) and Bachmann and Braun (2011) who, however, focus only on the link between offshoring and labour market transitions at the individual level. Lurweg and Uhde (2009) also have a similar analysis but use very different definitions of the trade variables. They do not distinguish between exports and imports, and also do not consider offshoring. Also, they do not control for individual fixed effects.

26. Since we include individual-level fixed effects, the estimation only utilises observations for individuals that switch from employment to unemployment. This allows us to examine the specific question of what determines switches into unemployment, rather than a comparison of individuals who lose their job with those that do not.

However, splitting the sample into export-intensive and not export-intensive sectors sheds further light on this (Table 6.15.). It is only in the latter sectors that we find a positive relationship. Workers in industries that are not very export-oriented become more likely to lose their jobs with increasing export exposure of the industry. This may be because these are industries that do not belong to the most internationally competitive and, therefore, are likely to lose out to foreign competition as they increase their exposure to the export market. Note that we do not find any statistically significant coefficients for any of the other trade-related variables.

Table 6.14. Job loss estimations: baseline regression results (manufacturing and services industries)

	(1)	(2)	(3)	(4)	(5)	(6)
Export share	1.099					
	(2.44)**					
Import share		1.059				
		(0.82)				
Narrow offshoring			1.101			
			(0.55)			
Material offshoring				0.948		
				(-0.48)		
Services offshoring					1.387	
					(1.55)	
Openness						1.071
						(2.26)**
Married	0.854	0.850	0.847	0.847	0.854	0.855
	(-0.66)	(-0.68)	(-0.69)	(-0.69)	(-0.65)	(-0.65)
Tenure	1.166	1.164	1.164	1.164	1.166	1.166
	(8.90)***	(8.88)***	(8.88)***	(8.88)***	(8.89)***	(8.90)***
Public ownership	1.691	1.668	1.672	1.676	1.688	1.677
	(1.02)	(0.99)	(1.00)	(1.00)	(1.01)	(1.00)
Firm size 2	1.011	1.009	1.007	1.003	0.996	1.013
	(0.06)	(0.05)	(0.04)	(0.02)	(-0.02)	(0.07)
Firm size 3	0.991	1.004	1.008	0.991	1.007	0.999
	(-0.04)	(0.02)	(0.03)	(-0.03)	(0.03)	(-0.00)
Firm size 4	0.932	0.948	0.949	0.941	0.934	0.942
	(-0.21)	(-0.16)	(-0.16)	(-0.18)	(-0.21)	(-0.18)
Education medium	1.719	1.751	1.735	1.703	1.776	1.754
	(0.61)	(0.64)	(0.63)	(0.61)	(0.66)	(0.64)
Education high	1.494	1.526	1.497	1.471	1.528	1.537
	(0.30)	(0.31)	(0.30)	(0.29)	(0.31)	(0.32)
Experience	1.511	1.512	1.507	1.503	1.502	1.516
	(3.41)***	(3.43)***	(3.40)***	(3.37)***	(3.37)***	(3.44)***
Experience squared	1.008	1.008	1.008	1.008	1.008	1.008
	(5.04)***	(4.98)***	(5.01)***	(5.00)***	(5.02)***	(5.00)***
East Germany	1.000	1.000	1.000	1.000	1.000	1.000
	(0.07)	(0.32)	(0.38)	(0.61)	(0.60)	(-0.02)
N	5524	5524	5524	5524	5524	5524

Notes: Fixed effects logit estimation, displayed coefficients are odds ratios, t-statistics in parentheses; all models include year dummies, and industry dummies; *** significance at 1%, ** significance at 5%, * significance at 10%.

Table 6.15 allows for further heterogeneity in the effects by industry and educational attainment of the individual. Here, a number of other noteworthy results emerge. Firstly, the positive relationship between exports and job loss in non-export intensive sectors affects both low- and high-skilled workers. There is no evidence, however, that this also affects workers with medium-skill levels.

We can now also document some important differences between manufacturing and services sectors.[27] In the services sector, we find strong evidence of positive correlations between export exposure and becoming unemployed. All three different skill groups are equally affected. We also find that the offshoring of material inputs in the services industry is strongly negatively correlated with moving into unemployment, again affecting all skill groups equally. Here, the results suggest that a one percentage point increase in material offshoring reduces the risk of becoming unemployed by about 60%.[28] By contrast, the offshoring of services in the services industry is associated with increases in the risk of becoming unemployed, and this effect is stronger for high-skilled than for low- or medium-skilled workers. These two results taken together are consistent with the idea that the offshoring of non-core activities, such as materials, allows services firms to focus on their core activity and increase productivity (as in Amiti and Wei, 2009 and Görg *et al*., 2008), thereby improving employment prospects. By contrast, offshoring of services activities substitutes for domestic labour, in particular of high-skilled workers.

For manufacturing industries, the story is different. There is only weak evidence that exporting and importing are positively related with the probability of becoming unemployed, although these estimates are barely or never statistically significant. The only stronger effect is observed for materials offshoring, where we find that offshoring of this type reduces the risk of becoming unemployed, but only for medium-skilled workers.

Overall, the results suggest for manufacturing industries that trade does not seem to have any strong effects on unemployment probabilities (similar to the wage effects). However, for services industries we do find some stronger effects. Here, in particular, offshoring has two types of effects: the offshoring of non-core material inputs reduces the risk of unemployment, while offshoring of core services activities increases this risk. Also, exporting of final goods is positively associated with the probability of becoming unemployed. This may suggest that German services firms are finding it difficult to compete internationally with other services exporters that may be better placed in world markets, such as the world's top services exporters United States or United Kingdom.

27. Due to data limitations we do not split the sample between export-intensive and other industries in the logit estimations.

28. This result is in line with Bachmann and Braun (2011) who also find that outsourcing of materials increases employment stability in services industries.

Table 6.15. Job loss estimates by sector and education

	(1) All	(2) All export intensive	(3) All non-export intensive	(4) Manufacturing	(5) Services
Model 1					
edu1Xexpsh	1.075	0.845	1.103	1.162	1.195
	(2.09)**	(-1.06)	(2.17)**	(1.68)*	(2.19)**
edu2Xexpsh	1.046	1.197	1.067	1.094	1.170
	(1.41)	(1.45)	(1.57)	(1.11)	(2.17)**
edu3Xexpsh	1.098	0.987	1.124	1.089	1.245
	(2.64)***	(-0.09)	(2.44)**	(0.96)	(2.57)**
Model 2					
edu1Ximpsh	1.045	0.827	1.052	1.192	1.194
	(0.85)	(-0.85)	(0.84)	(1.33)	(1.15)
edu2Ximpsh	1.010	0.848	1.030	1.217	0.939
	(0.19)	(-0.91)	(0.53)	(1.56)	(-0.49)
edu3Ximpsh	1.067	0.913	1.071	1.270	0.983
	(1.25)	(-0.45)	(1.13)	(1.76)*	(-0.13)
Model 3					
edu1Xnarrowsh	1.079	0.614	1.060	0.732	0.840
	(0.47)	(-0.71)	(0.30)	(-0.96)	(-0.22)
edu2Xnarrowsh	1.056	0.956	1.127	0.938	1.557
	(0.38)	(-0.08)	(0.75)	(-0.22)	(1.59)
edu3Xnarrowsh	1.234	0.686	1.208	0.998	1.573
	(1.29)	(-0.57)	(0.90)	(-0.00)	(1.30)
Model 4					
edu1Xmatsh	0.984	0.916	0.951	1.032	0.431
	(-0.15)	(-0.19)	(-0.39)	(0.14)	(-2.10)**
edu2Xmatsh	0.923	0.986	0.873	0.687	0.442
	(-0.78)	(-0.03)	(-1.16)	(-2.07)**	(-2.24)**
edu3Xmatsh	1.044	1.006	0.966	0.701	0.406
	(0.38)	(0.01)	(-0.25)	(-1.32)	(-2.30)**
Model 5					
edu1Xsersh	1.332	2.484	1.348	0.101	1.523
	(1.13)	(1.05)	(1.00)	(-1.07)	(0.97)
edu2Xsersh	1.487	3.697	1.480	0.160	1.970
	(1.99)**	(1.20)	(1.70)*	(-0.92)	(2.65)***
edu3Xsersh	1.223	2.143	1.316	0.527	2.143
	(0.84)	(1.02)	(0.89)	(-0.29)	(2.37)**
Model 6					
edu1Xopen	1.042	0.890	1.048	1.124	1.173
	(1.78)*	(-0.81)	(1.70)*	(1.75)*	(2.33)**
edu2Xopen	1.024	1.069	1.032	1.119	1.099
	(1.08)	(0.58)	(1.24)	(1.77)*	(1.63)
edu3Xopen	1.054	0.960	1.057	1.125	1.137
	(2.22)**	(-0.29)	(1.97)**	(1.68)*	(2.00)**

Notes: Fixed effects logit estimation, displayed coefficients are odds ratios, t-statistics in parentheses.
*** significance at 1%
** significance at 5%,
* significance at 10%
Models include all covariates as in Table 6.14. These are not reported here to save space.

6.4. The impact of labour market policies

Overview

One important macroeconomic explanation for Germany's export success is without doubt the labour market reforms implemented in the early 2000s, and here in particular the policy of wage moderation. While wage restraint was not one of the aims of the labour market reforms per se, it appeared as an important and very welcome side-effect (Meier, 2009). As we show in Figure 6.9, reported earlier, real wages fell since 2003. This came after periods of much higher wage growth in the 1980s and 1990s (Boysen-Hogrefe and Groll, 2010). Wage restraint, implying relative low growth of real wages, made German exports more competitive as it effectively lead to a real depreciation vis-à-vis other Euro member countries (e.g. Felbermayr *et al.*, 2010).

More recently, the limiting factors to German export growth have been the topic of debate. Here, in particular, much of the focus is on skill shortages. The *Institut der deutschen Wirtschaft* (Institute of the German Economy, IW, 2008) calculates that in 2008 there was a gap of about 140 000 skilled positions in engineering and technical jobs. In other words, these were jobs that could not be filled with suitably qualified candidates. This, of course, implies substantial losses to the German economy, which are calculated by IW (2008) to be around EUR 28.5 billion during the period mid-2007 to mid-2008.

The notion of skill shortages is not uniformly accepted however. Brenke (2010), for example, argues that there is no convincing evidence of skill shortages in the German economy since there is no accepted method of determining such shortages. If there were shortages in some aspects of labour supply, then wages should rise considerably, which is not what one sees in the data. Still, the question of skill shortages and whether or not a potential shortage should be alleviated by immigration are important topics on the current public policy agenda.

Another important development in labour market policy in Germany is the recent strong increase in temporary work arrangements. This was one aspect of labour market reforms implemented in the early 2000s with the aim of making employment contracts more flexible. As this is an aspect of labour market changes that, to the best of our knowledge, has not received much attention, we focus on this aspect in this section.

Labour markets are considered dual when workers are segregated into two groups: one group with permanent contracts, high protection through Employment Protection Legislation (EPL), and hence sheltered from many risks; and another group with temporary contracts, low protection through EPL, and hence exposed to all the risks of the market. Several OECD countries, including Germany, Spain and Italy reformed their EPL between the late 1980s and the early 2000s, easing legislation for workers with temporary contracts, but leaving legislation for workers with permanent contracts mostly unchanged (Boeri and Garibaldi, 2007). As a consequence, dual labour markets were created in these economies.

In Table 6.16, we compare the prevalence of temporary contracts in Germany and several other European countries. Looking at total German employment, the share of temporary contracts increased slightly from 13% in 1999 to 14.5% in 2009. This share is comparable to those in other countries, e.g. France, Italy and Netherlands. Spain exhibits an exceptionally high share of temporary contracts with figures ranging from 25% to 34%. However, looking at younger workers (up to 24 years old), the table shows that Spain is no longer particularly exceptional: in fact, among the young, the share of workers with temporary contracts in 2009 is higher in Germany than in all other countries (57%; up from 53% in 1999). Among workers

between 15 and 19 years old, the share is even higher: 79% hold temporary contracts in Germany in 2009.[29]

While easing EPL on temporary contracts has led to increased job creation and employment growth when the economy is in good shape, several authors have discussed the problems created by dual labour markets when a recession hits the economy (e.g. Dolado *et al*., 2002). Due to a large wedge between firing costs for permanent and temporary workers, firms are hesitant to transform temporary contracts into permanent ones. In a recession with many jobs being shed, this can result in high levels of unemployment among groups with a high prevalence of temporary contracts (Blanchard and Landier, 2002; Cahuc and Postel-Vinay, 2002; Boeri and Garibaldi, 2007).

Table 6.16. Temporary workers as a percentage of the total number of employees (by age and countries)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
A. 15-64 years old											
Germany	13.1	12.8	12.4	12.0	12.2	12.5	14.2	14.5	14.6	14.7	14.5
EU	13.3	13.6	13.5	13.2	13.1	13.5	14.5	15.0	14.5	14.0	13.4
Denmark	10.1	10.2	9.4	8.9	9.5	9.8	9.8	8.9	8.6	8.3	8.9
Spain	32.8	32.4	32.1	32.1	31.8	32.1	33.4	34.1	31.7	29.3	25.5
France	13.9	15.4	14.9	14.1	13.4	13.0	14.1	14.1	14.4	14.1	13.5
Italy	9.8	10.1	9.6	9.9	9.5	11.9	12.3	13.1	13.2	13.3	12.5
Netherlands	11.9	13.8	14.3	14.2	14.4	14.4	15.4	16.4	17.9	17.9	18.0
B. 15-24 years old											
Germany	53.1	52.4	52.1	51.4	53.0	55.5	58.0	57.6	57.5	56.6	57.2
EU	39.2	39.4	39.0	38.2	38.1	39.1	41.2	41.9	41.1	40.0	40.2
Denmark	29.7	29.8	26.9	25.0	27.3	26.9	26.9	22.4	22.2	23.2	23.6
Spain	70.3	68.9	66.6	65.1	63.9	64.8	66.5	66.1	62.8	59.4	55.9
France	54.4	55.0	52.2	48.5	47.4	47.8	50.7	50.8	52.5	51.5	51.2
Italy	26.2	26.2	23.3	27.3	25.5	34.4	37.0	40.9	42.3	43.3	44.4
Netherlands	33.3	35.3	36.5	36.4	37.2	37.9	41.7	43.5	45.1	45.2	46.5
C. 15-19 years old											
Germany	82.9	81.3	79.9	80.2	82.0	84.0	83.3	80.6	79.8	77.5	78.8
EU	52.1	52.4	51.5	50.9	50.9	50.9	53.8	54.5	55.3	54.0	55.5
Denmark	27.2	26.4	25.4	23.0	27.8	23.4	26.4	21.0	20.2	23.4	22.6
Spain	86.7	85.4	83.4	80.7	80.6	82.2	80.0	82.1	79.8	77.2	73.6
France	81.7	82.8	79.6	78.0	73.7	78.0	81.5	82.4	82.4	80.9	82.5
Italy	32.9	35.2	28.3	37.1	36.1	43.2	43.4	49.8	50.9	55.5	58.8
Netherlands	43.4	45.3	43.7	44.9	46.3	44.5	49.6	51.3	53.1	53.8	54.9

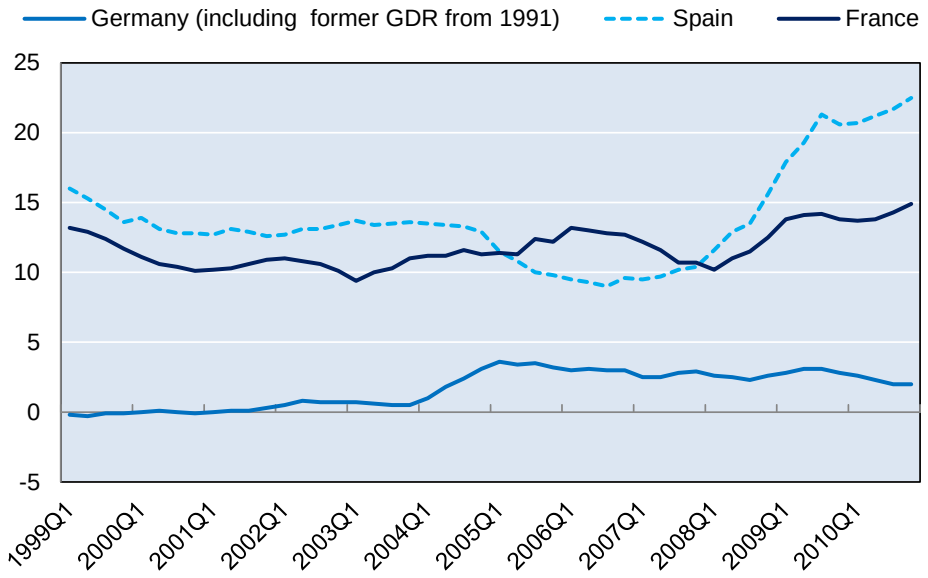
Source: Eurostat, LFS.

In Figure 6.10, we plot the difference between the *youth* unemployment rate and the total unemployment rate for Germany, Spain, and the European Union average. It shows that, in a country such as Spain, with many young workers holding temporary contracts, youth unemployment was indeed shooting up during the economic crisis in 2008. Interestingly, such developments did not occur in Germany, even though the prevalence of temporary contracts

29. Note, however, that this number might be strongly influenced by the particularities of the German apprenticeship system, where young workers are already employed in firms, but only on a temporary basis for the duration of their training.

among young workers was comparable to that of Spain. Note however, that Germany's labour market performed exceptionally well during the crisis (see Boysen-Hogrefe and Groll, 2010), so that a comparison of Germany and Spain is difficult. Nevertheless, it seems that labour market dualism is not creating the same problems in Germany as in other economies, even though the extent of segmentation is extremely high.

Figure 6.10. Differences between youth unemployment rate and total unemployment (quarterly, seasonally adjusted, in %)



Source: Eurostat, LFS.

As a first attempt to link the dualism to international trade, we summarise the prevalence of temporary contracts by our trade intensity industry aggregates (Table 6.17). The analysis is based on survey data from the SOEP. Looking first at the entire workforce (16-64 years old; panel A), the data confirm the positive trend in the share of temporary contracts in all industries, as reported above. The same holds for the sample of younger workers (panel B). Looking inside the industry aggregates does not confirm the impression of a steady increase in the prevalence of temporary contracts. Rather, the increase seems to be concentrated in the years since 2007 (with the industries intensive in offshoring materials being an exception). Again, this holds for both the entire workforce and younger workers.

In general, the table shows that trade-intensive industries have a lower share of temporary workers than the economy average. Yet, individual characteristics also play a role in explaining whether or not an individual has a temporary contract. A way of controlling for individual characteristics is to run individual-level probit regressions of holding a temporary contract on each indicator for trade intensity.[30] Using the entire age distribution, this exercise conveys that working in an export-intensive industry, or in an industry intensive in materials offshoring is associated with a higher probability of holding a temporary contract. Working in an industry intensive in narrow offshoring is associated with a lower probability, while there is no statistically significant relationship between being on a temporary contract and working in an import-intensive or service offshoring industry.[31]

30. These results are not reported here to save space.

31. For the sample of young workers, all trade-related variables are statistically insignificant.

Table 6.17. Temporary workers as a percentage of the total number of employees (by age groups and industry aggregate)

		Export-intensive	Import-intensive	Narrow-intensive	Materials-intensive	Service-intensive
			B. 16-64 years old			
1999	13.7%	10.2%	10.9%	9.9%	11.8%	9.5%
2000	13.8%	11.5%	12.6%	11.0%	14.4%	9.6%
2001	13.7%	10.2%	10.6%	9.8%	12.5%	7.7%
2002	13.8%	10.1%	10.0%	9.9%	13.6%	9.2%
2003	14.0%	9.0%	10.1%	8.7%	11.4%	7.7%
2004	14.8%	9.4%	11.5%	10.8%	14.3%	8.4%
2005	14.2%	8.2%	9.3%	9.1%	13.7%	7.7%
2006	15.1%	9.6%	9.9%	11.4%	13.5%	9.5%
2007	15.6%	12.4%	16.6%	13.5%	15.7%	11.0%
2008	15.9%	12.7%	15.4%	14.5%	14.8%	11.5%
2009	15.6%	14.0%	14.8%	13.1%	13.6%	12.4%
Average	14.6%	10.7%	12.0%	11.1%	13.6%	9.5%
			B. 16-25 years old			
1999	51.0%	53.0%	52.7%	50.0%	49.1%	41.4%
2000	52.7%	52.1%	44.2%	46.0%	51.7%	46.1%
2001	55.8%	53.4%	42.6%	48.0%	50.3%	48.2%
2002	58.2%	58.8%	47.0%	48.8%	56.3%	54.7%
2003	57.9%	59.9%	48.3%	44.4%	54.8%	51.7%
2004	59.1%	49.0%	48.5%	48.6%	59.5%	49.8%
2005	61.1%	45.8%	48.9%	48.6%	57.8%	44.9%
2006	62.5%	65.1%	58.0%	67.4%	54.7%	64.4%
2007	59.6%	61.8%	72.1%	62.6%	59.9%	60.5%
2008	58.3%	54.9%	62.6%	63.1%	54.7%	54.1%
2009	61.6%	70.4%	69.8%	58.7%	57.7%	66.5%
Average	58.0%	56.7%	54.1%	53.3%	55.1%	52.9%

Source: SOEP, weighted using cross-section weights.

We now look into the implications of such temporary work arrangements on labour market outcomes. In particular, we will investigate whether the impact of trade differs between workers on temporary and permanent contracts. To answer these questions, we again need to turn to econometric estimation, which allows us to control for other important individual characteristics that also affect labour market outcomes.

Econometric estimation

As in the previous section, we estimate the effects of trade and temporary contracts on wages in an instrumental variables framework. The estimated model is identical to the previous one, except that we add a dummy for holding a temporary contract and the interaction of this dummy with the trade intensities. The base line regression for the full sample is displayed in Table 6.18. For the separate manufacturing and services regressions, we only present a summary of the results in order to save space (Table 6.19).

Table 6.18. Temporary contracts and wages: baseline regression results (manufacturing and services industries)

	(1)	(2)	(3)	(4)	(5)	(6)
Export share	-0.00203					
	(-0.35)					
Temp. contract*export share	0.00134					
	(1.28)					
Import share		-0.0253				
		(-1.26)				
Temp. contract*import share		0.00141				
		(0.95)				
Narrow offshoring			0.0174			
			(0.68)			
Temp. contract*narrow offsh.			-0.0000565			
			(-0.01)			
Material offshoring				-0.0267		
				(-0.91)		
Temp. contract*material offsh.				0.00522		
				(1.45)		
Services offshoring					0.00652	
					(0.37)	
Temp. contract*services offsh.					0.0377	
					(3.08)***	
Openness						-0.00613
						(-0.89)
Temp. contract*openness						0.000770
						(1.18)
Temp. contract	-0.0816	-0.0770	-0.0568	-0.0873	-0.116	-0.0817
	(-3.74)***	(-3.42)***	(-3.02)***	(-3.68)***	(-5.05)***	(-3.53)***
Married	0.0258	0.0246	0.0266	0.0255	0.0271	0.0252
	(3.20)***	(3.01)***	(3.30)***	(3.16)***	(3.36)***	(3.11)***
Tenure	0.000127	0.000125	0.000114	0.000114	0.0000737	0.000117
	(0.16)	(0.15)	(0.14)	(0.14)	(0.09)	(0.14)
Public ownership	-0.0116	-0.0112	-0.0114	-0.0122	-0.0110	-0.0113
	(-1.17)	(-1.12)	(-1.15)	(-1.23)	(-1.09)	(-1.14)
Firm size 2	0.0367	0.0374	0.0366	0.0372	0.0367	0.0367
	(4.06)***	(4.12)***	(4.05)***	(4.11)***	(4.06)***	(4.06)***
Firm size 3	0.0376	0.0392	0.0372	0.0382	0.0368	0.0379
	(3.42)***	(3.53)***	(3.38)***	(3.46)***	(3.34)***	(3.44)***
Firm size 4	0.0415	0.0427	0.0413	0.0420	0.0403	0.0419
	(3.38)***	(3.46)***	(3.37)***	(3.42)***	(3.28)***	(3.41)***
Education medium	0.176	0.178	0.173	0.173	0.168	0.178
	(1.85)*	(1.86)*	(1.80)*	(1.80)*	(1.75)*	(1.88)*
Education high	0.277	0.279	0.274	0.276	0.271	0.279
	(2.97)***	(2.98)***	(2.90)***	(2.92)***	(2.87)***	(2.99)***
Experience	0.0317	0.0315	0.0325	0.0318	0.0314	0.0311
	(2.21)**	(2.21)**	(2.27)**	(2.23)**	(2.18)**	(2.16)**
Experience squared	-0.000460	-0.000460	-0.000459	-0.000462	-0.000458	-0.000459
	(-11.90)***	(-11.89)***	(-11.89)***	(-11.96)***	(-11.87)***	(-11.86)***
N individuals	4970	4970	4970	4970	4970	4970
N	22119	22119	22119	22119	22119	22119
Cragg-Donald F stat. (first stage)	239.7	54.95	198.7	123.4	646.7	105.9
Hansen J stat. (p-value)	0.691	0.0997	0.0999	0.463	0.0590	0.344

Notes: IV estimations, Endogenous: trade shares, interaction trade shares/temp. contract, Instruments: First and second difference of trade shares and interactions, t-statistics of robust standard errors in parentheses; all models include year dummies, industry dummies, and industry-specific time trends; *** significance at 1%, ** significance at 5%, * significance at 10%.

Table 6.19. Wage regression by sector

	Manufacturing			Services		
	All	Export intensive	Non-export intensive	All	Export intensive	Non-export intensive
Model 1						
Export share	0.00284	-0.00273	0.00947	0.00182	0.0259	0.00859
	(0.18)	(-0.09)	(0.37)	(0.4)	(0.35)	(1.44)
Temp. contract*export share	0.000724	0.0785	-0.00144	0.00808	0.0355	0.0464
	(0.18)	(0.55)	(-0.18)	(2.01)**	(0.25)	(3.25)***
Model 2						
Import share	-0.00467	-0.0370	0.0291	-0.00377	-0.00191	0.0435
	(-0.20)	(-1.35)	(0.82)	(-0.13)	(-0.05)	(1.07)
Temp. contract*import share	0.00142	0.00308	0.00126	0.00929	0.0156	0.0160
	(0.48)	(0.49)	(0.35)	(0.9)	(1.84)*	(1.04)
Model 3						
Narrow offshoring	0.0395	0.0569	0.0620	0.0189	-0.165	0.0432
	(1.26)	(1.01)	(1.24)	(0.49)	(-0.92)	(1.19)
Temp. contract*narrow offsh.	-0.00408	-0.00424	0.00177	0.00979	0.0374	0.0151
	(-0.35)	(-0.09)	(0.14)	(0.58)	(0.46)	(0.88)
Model 4						
Material offshoring	0.00618	0.0173	0.0163	-0.00344	-0.117	0.347
	(0.23)	(0.31)	(0.47)	(-0.03)	(-1.42)	(1.18)
Temp. contract*material offsh.	-0.00143	0.0824	-0.0130	0.0398	0.190	0.0424
	(-0.08)	(0.58)	(-0.56)	(3.06)***	(1.28)	(2.37)**
Model 5						
Services offshoring	0.0476	0.514	-1.025	-0.00858	-0.0306	-0.0145
	(0.15)	(0.64)	(-1.91)*	(-0.49)	(-0.63)	(-0.76)
Temp. contract*services offsh.	0.0196	0.386	-0.0324	0.0425	0.137	0.0579
	(0.35)	(1.95)*	(-0.51)	(2.75)***	(1.33)	(2.55)**
Model 6						
Openness	-0.00097	-0.0177	0.0109	0.00117	-0.000862	0.0125
	(-0.08)	(-0.87)	(0.64)	(0.18)	(-0.02)	(1.58)
Temp. contract*openness	0.000800	0.0103	0.000318	0.00544	0.0329	0.0171
	(0.33)	(0.68)	(0.10)	(1.60)	(1.59)	(2.23)**

Notes: IV estimations, Endogenous: trade shares, interaction trade shares/temp. contract, Instruments: First and second difference of trade shares and interactions, t-statistics of robust standard errors in parentheses; *** significance at 1%, ** significance at 5%, * significance at 10%. Models include all covariates as in Table 6.18, these are not reported here to save space.

Generally, workers holding a temporary contract receive a lower real monthly wage than workers holding permanent contracts. This is in line with the empirical literature (e.g. Booth *et al*., 2002, Hagen, 2002). In this article, however, we are mostly interested in whether trade affects the labour market outcomes of temporary and permanent workers differently.

Trade-intensive industries are facing global competition and are, consequently, under constant pressure to adjust unit labour costs and employment levels such that they can compete on global market. While, in principle, all workers in an industry are equally likely to be affected from these constraints, there are several reasons to believe that workers on temporary contracts are affected differently than workers on permanent contract. Workers on temporary contracts are the least protected workers on the labour markets. Accordingly, they might have a stronger propensity to lose their job due to international competition. Due to their weaker bargaining

position they might also suffer from stronger wage reductions, in case employers adjust to globalisation pressure at the intensive margin.

The wage analysis shows that there is hardly any differential impact of trade between workers on temporary or permanent contracts at all. Looking at the full sample of manufacturing and services industries, only the interaction term of services outsourcing and temporary contracts is significant. While services offshoring and wages are unrelated for workers on permanent contracts, a 1% increase in the share of services outsourcing is associated with a wage increase of almost 4% for workers on temporary contracts.

Why is higher services offshoring associated with a higher wages for temporary workers? At least one explanation might be applicable, even though we cannot test it here. It could be that industries with strong services offshoring are characterised by labour churning among workers with temporary contracts. Newly hired workers may be able to negotiate a higher wage than permanent staff, particularly if they are also more skilled.

Looking at manufacturing industries only, the results show that the positive wage effect of services outsourcing on temporary workers only holds within export-intensive manufacturing industries. In manufacturing industries, which are not intensive in exports, service outsourcing has a small, negative impact on temporary workers (even though the coefficient is statistically insignificant).

Looking at services industries shows that rising exports, materials outsourcing, and services outsourcing are associated with higher wages for temporary workers (1%, 4%, and 4.3%, respectively), but not for permanent employees. Distinguishing between export-intensive and other industries does not provide new insights here.

In principle, it is not surprising that, except in services offshoring industries, the wage effects of trade do not differ between permanent and temporary workers. Limited contract duration may not necessarily be related to pay and the rigid German wage setting institutions may not allow strong differences. Rather, we would expect to see differences at the extensive margin, i.e. in employment stability. Accordingly, we now investigate whether trade affects the probability of job loss differently for temporary and permanent workers. As above, we define job loss as the transition from full-time employment in period *t-1* into unemployment in period *t*.

Looking first at the full sample, comprising workers in both manufacturing and service industries, our regressions do not detect a significant difference in job loss probability between temporary and permanent workers (see Table 6.20; Table 6.21 provides a summary of the relevant coefficients).

Yet, splitting up the sample between workers in export-intensive industries (as defined previously) and workers in other industries reveals large differences between these industries. As argued above, export-intensive industries are of particular importance for economic activity in Germany. Moreover, since they are also characterised by strong import shares, they are subject to a large degree of international competition and are, hence, likely to display stronger trade-related labour market effects. While there continue to be no significant differences between temporary and permanent workers in industries *not* intensive in exports, the results convey that in export-intensive industries the probability of job loss and the consequent transition into unemployment of temporary workers is positively associated with all trade measures, except services offshoring. Or, to put it differently, it appears that workers on permanent contracts are much better shielded from the forces of globalisation than their colleagues holding temporary contracts; at least in export-intensive industries. In fact, temporary workers are up to twice more likely to become unemployed than permanent workers when trade intensity rises by one percentage point.

Table 6.20. Temporary contracts and job loss: baseline regression results (manufacturing and services industries)

	(1)	(2)	(3)	(4)	(5)	(6)
Export share	1.074					
	(1.73)*					
Temporary contract*export share	1.002					
	(0.15)					
Import share		0.995				
		(-0.07)				
Temporary contract*import share		1.013				
		(0.82)				
Narrow offshoring			1.095			
			(0.48)			
Temporary contract* narrow offshoring			1.045			
			(0.65)			
Material offshoring				0.910		
				(-0.79)		
Temporary contract*material offshoring				1.016		
				(0.40)		
Services offshoring					1.394	
					(1.38)	
Temporary contract*services offshoring					0.979	
					(-0.16)	
Openness						1.046
						(1.36)
Temporary contract*openness						1.003
						(0.46)
Temporary contract	1.025	0.902	0.948	0.937	1.082	0.963
	(0.09)	(-0.38)	(-0.21)	(-0.21)	(0.27)	(-0.14)
Married	0.992	0.991	0.984	0.986	0.993	0.995
	(-0.03)	(-0.03)	(-0.06)	(-0.05)	(-0.03)	(-0.02)
Tenure	1.175	1.175	1.174	1.174	1.175	1.175
	(8.13)***	(8.17)***	(8.17)***	(8.14)***	(8.11)***	(8.14)***
Public ownership	1.426	1.367	1.404	1.373	1.412	1.397
	(0.65)	(0.57)	(0.62)	(0.58)	(0.63)	(0.61)
Firm size 2	1.022	1.020	1.017	1.013	1.000	1.025
	(0.11)	(0.10)	(0.09)	(0.07)	(-0.00)	(0.13)
Firm size 3	1.028	1.028	1.036	1.023	1.041	1.034
	(0.10)	(0.09)	(0.12)	(0.08)	(0.14)	(0.11)
Firm size 4	1.009	1.004	1.006	1.010	1.004	1.017
	(0.02)	(0.01)	(0.02)	(0.03)	(0.01)	(0.04)
Education medium	1.615	1.578	1.623	1.567	1.657	1.624
	(0.55)	(0.52)	(0.56)	(0.52)	(0.58)	(0.55)
Education high	9.803	9.468	9.759	9.417	10.05	9.981
	(1.27)	(1.28)	(1.29)	(1.28)	(1.31)	(1.29)
Experience	1.553	1.551	1.551	1.543	1.544	1.558
	(3.27)***	(3.26)***	(3.27)***	(3.22)***	(3.23)***	(3.30)***
Experience squared	1.008	1.008	1.008	1.008	1.008	1.008
	(4.25)***	(4.25)***	(4.26)***	(4.25)***	(4.27)***	(4.23)***
Industry production	1.000	1.000	1.000	1.000	1.000	1.000
	(-0.09)	(0.21)	(0.12)	(0.44)	(0.39)	(-0.10)
N	4840	4840	4840	4840	4840	4840

Notes: Logit estimation, displayed coefficients are odds ratios, t-statistics in parentheses; all models include year dummies, and industry dummies; *** significance at 1%, ** significance at 5%, * significance at 10%.

Table 6.21. Job loss regression by sector

	Manufacturing and services			Manu-facturing	Services
	All	Export intensive	Non-export intensive	All	All
Model 1					
Export share	1.074	1.056	1.109	1.104	1.230
	(1.73)*	(0.43)	(1.67)*	(1.27)	(2.71)***
Temp. contract*export share	1.002	1.326	1.012	1.027	1.009
	(0.15)	(3.91)***	(0.65)	(0.85)	(0.17)
Model 2					
Import share	0.995	0.779	1.035	1.235	0.961
	(-0.07)	(-1.31)	(0.34)	(1.65)*	(-0.27)
Temp. contract*import share	1.013	1.272	1.025	1.043	0.994
	(0.82)	(3.53)***	(1.19)	(1.12)	(-0.08)
Model 3					
Narrow offshoring	1.095	0.896	1.120	0.988	1.841
	(0.48)	(-0.20)	(0.50)	(-0.04)	(1.45)
Temp. contract*narrow offshoring	1.045	2.177	1.173	1.204	1.037
	(0.65)	(2.52)**	(1.56)	(1.69)*	(0.18)
Model 4					
Material offshoring	0.910	0.996	0.801	0.747	0.501
	(-0.79)	(-0.01)	(-1.60)	(-1.64)	(-1.65)*
Temp. contract*material offshoring	1.016	1.349	1.052	1.158	1.030
	(0.40)	(2.19)**	(0.95)	(1.31)	(0.25)
Model 5					
Services offshoring	1.394	4.147	1.370	0.497	2.145
	(1.38)	(1.77)*	(1.03)	(-0.35)	(2.35)**
Temp. contract*services offshoring	0.979	0.138	0.959	0.493	1.103
	(-0.16)	(-2.87)***	(-0.28)	(-0.55)	(0.47)
Model 6					
Openness	1.046	0.971	1.062	1.126	1.149
	(1.36)	(-0.27)	(1.35)	(1.87)*	(2.14)**
Temp. contract*openness	1.003	1.149	1.009	1.020	0.998
	(0.46)	(3.56)***	(0.92)	(1.09)	(-0.05)

Notes: Logit estimation, displayed coefficients are odds ratios, t-statistics in parentheses.
*** significance at 1%
** significance at 5%
* significance at 10%
Models include all covariates as in Table 6.20, these are not reported here to save space.

Looking at workers in manufacturing industries shows that temporary workers are 1.2 times as likely as permanent workers to become unemployed when the share of narrow outsourcing in their industry rises by 1%. In service industries we do not find any significant differences between temporary and permanent workers.[32]

Wrapping up, our results suggest that, in terms of job loss probability, workers on temporary contracts are more exposed to international competition than their colleagues holding permanent contracts, given that trade integration of the industry they are working in is sufficiently strong.

32. Note that, due to data limitations, we do not split the sample between export-intensive and other industries.

For temporary workers, the chance of losing their jobs as trade intensity increases is significantly higher than for permanent workers.

On the one hand, temporary contracts allow employers to flexibly react to changing market conditions. On the other hand, temporary contracts imply a significant insecurity for workers, which is strengthened by increasing globalisation. Hence, the two trends of increasing labour market dualism and rising trade integration seem to be forming a dangerous mix, which is worth keeping in mind when policy makers attempt to further soften employment protection legislation.

6.5. Conclusions and policy implications

The German economy is characterised by a high degree of foreign exposure through exports and imports. This chapter considers the link between trade and labour market outcomes in Germany. To that end we combine individual-level data from the German Socio Economic Panel for the period 1999 to 2007 with industry-level data on various aspects of trade – exports, imports and offshoring. We consider their effects on wages and the probability of moving into unemployment.

Our econometric analysis suggests that there is little impact of trade-related variables on individual-level wages, neither positive nor negative. Hence, once controlling for characteristics of the individual (such as education, tenure, work experience, etc.) the extent of exposure of an industry to international competition does not seem to matter much for wages. This is in line with literature for Germany and other countries. Lurweg and Uhde (2009) look at the openness of an industry (not distinguishing exporting, importing or offshoring as we do) and its relationship with wages, and find only small, if any, effects. More recently, a growing literature looks at wage effects of offshoring of material and services inputs, largely concluding that any effects, if they are present, are low (e.g. Geishecker and Görg, 2008 for Germany, Geishecker and Görg, 2009 for the United Kingdom, Liu and Trefler, 2008 for the United States). For an economy like Germany this may not be too surprising, as the wage setting is rather rigid and one may, therefore, expect adjustments to be through the extensive margin, i.e. employment levels.

We have, therefore, analysed this aspect in our paper. We find some important differences between manufacturing and services sectors, in particular with regard to exporting and offshoring. As regards exports, we find that exporting of final goods in the services industry is positively associated with the probability of becoming unemployed, and this effect is similar for all skill groups. By contrast, we do not find any strong evidence for such an effect for exporting in manufacturing industries. One possible explanation is that German services firms are finding it difficult to compete internationally with other services exporters that may be better placed in world markets, such as the world's top services exporters United States or United Kingdom. If this was the case, policy makers should be aware of this and think about ways of making German services more competitive on world markets. This seems an important issue for further research.

In the services sector, we find that offshoring of material inputs reduces an individual's probability of moving into unemployment. This seems to affect all skill groups equally. More specifically, the results of our estimation suggest that a percentage point increase in material offshoring reduces the risk of becoming unemployed by about 60%.[33] Material offshoring in

33. This result is in line with Bachmann and Braun (2011) who also find that outsourcing of materials increases employment stability in services industries.

manufacturing industries also reduces the risk of unemployment, but the effect is much lower. It is statistically significant only for medium skilled workers, where we find that a one percentage point increase in material offshoring implies a reduction in the probability of moving into unemployment by about 30%. These findings are in line with Bachmann and Braun (2011) for Germany, who also find that outsourcing of materials increases job stability in particular in services industries. They suggest that firms are able to benefit from productivity increases due to offshoring, which then translate into better employment opportunities for workers in the offshoring firms (cf. Görg *et al*., 2008; Amiti and Wei, 2009).

However, in the services industry, the probability of becoming unemployed increases with the extent of services offshoring, and this effect is stronger for high-skilled workers. We do not find this effect for manufacturing industries. This suggests that in services industries, offshoring of services activities substitutes for domestic labour, in particular of high skilled workers.[34] In terms of policy implications, this suggests that there may be substantial heterogeneity depending on the type of activity that is offshored abroad. This needs to be considered when judging the potential benefits or otherwise of offshoring for the German economy.

We also consider some of the labour market policies implemented in Germany in the last decade. We focus our analysis on the increasing use of temporary contracts, as this has not attracted as much attention as some of the other policies (e.g. wage restraint, short time work). While our analysis shows that temporary workers earn on average less than permanent workers (controlling for individual-level characteristics), we also investigate whether trade has any differential impact on temporary and permanent workers.

As regards the latter question, we find little evidence for this in the wage regressions. One striking finding is, though, that services offshoring is associated with higher wages only for temporary but not for permanent workers. One explanation may be that industries with high services offshoring are also those with high staff turnover, where temporary workers may be able to negotiate higher wages because of their flexibility. However, this clearly needs further research to understand the mechanism that is at work.

Looking at unemployment probabilities, we find that an increase in trade intensities is associated with a higher unemployment risk for workers on temporary contracts, in industries that are highly integrated internationally. Given the strong trend in Germany towards dual labour markets with permanent and temporary employees, and increasing levels of globalisation through trade and offshoring, this latter result may suggest a trend towards decreasing employment security for temporary workers. This is an important finding from a policy perspective, given the debate as to whether globalisation and employment insecurity are linked (Rodrik, 1997, Scheve and Slaughter, 2004). While a full answer to this issue would clearly need further research, these findings should be taken into account when policy-makers plan to further soften Employment Protection Legislation.

34. This is in line with recent examples cited by Grossman and Rossi-Hansberg (2008). They describe the offshoring from the United States of reading x-rays, software development and even heart surgery to India. These are all high skilled intensive services activities.

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Annex 6.A1

Calculation of outsourcing measures (imported intermediate inputs)

This definition of outsourcing measures follows the initial work by Feenstra and Hanson (1999) and work for Germany by Geishecker (2006). International Outsourcing is measured as the value of an industry's imported intermediate inputs from industries abroad as a share of the domestic industry's output. We can observe the amount of inputs that are imported for each industry from input-output tables for Germany. This enables us to observe the share of imports from an industry abroad that is used by the domestic industry in a given period (denoted *k* in the equation below).

Formally, outsourcing in domestic industry *j* in year *t* is defined as

$$OUT_{jt} = \sum IMP_{kt} / Y_{jt}$$

where *IMP* are imported intermediates in domestic industry j from foreign industry *k*, and *Y* is industry output.

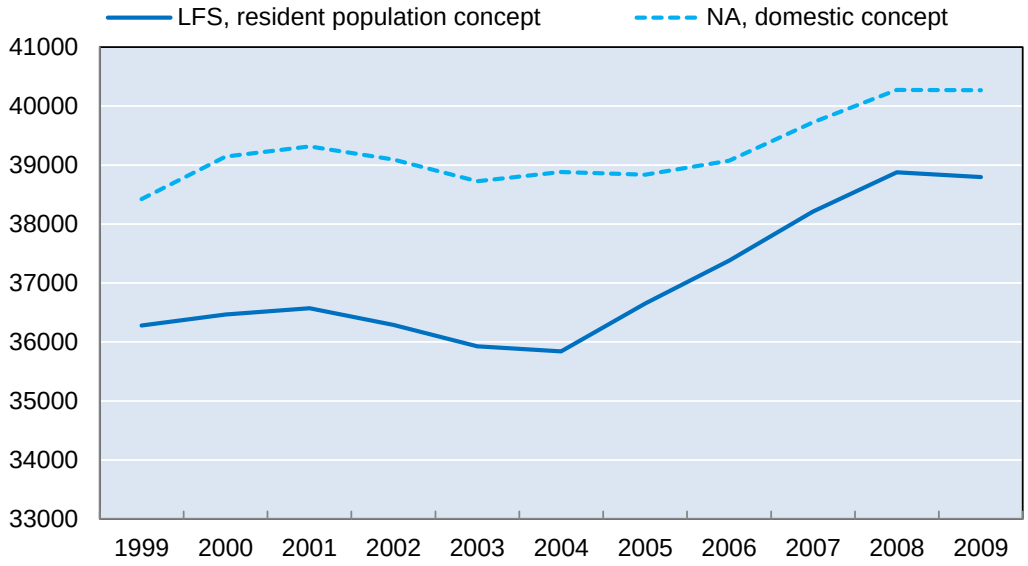
Based on this formula we calculate three different measures:

- Narrow offshoring: domestic industry j = foreign industry k.
- Other materials offshoring:
  a) For manufacturing industries: k is defined as all manufacturing industries excluding j.
  b) For services industries: k is defined as all manufacturing industries.
- Other services offshoring:
  c) For manufacturing industries: k is defined as all services industries.
  d) For services industries: k is defined as all services industries excluding j.

Data come from annual German input output tables from 1999 to 2007.[1]

1. *www-ec.destatis.de/csp/shop/sfg/bpm.html.cms.cBroker.cls?cmspath=struktur,sfgsuchergebnis.csp&pagenr=2*

Figure 6.A1.1. Total employment – comparison LFS and National Accounts



Source: Eurostat, based on LFS and National Accounts.

Data, variable definitions and summary statistics for econometric analysis

The econometric analysis is based on the German Socio-Economic Panel (SOEP), waves 1999 to 2009. We use all samples for the analysis. Yearly industry-level information about trade and offshoring is merged with the SOEP on basis of industry classification provided in the SOEP (NACE 1.1). Variables are defined as follows.

Variable	SOEP variable and modifications
Log real monthly gross wage	Gross monthly income (LABGRO$) deflated by CPI (German Statistical Office). Imputed incomes are *not* used.
Job loss	Dummy for job loss is set to 1 in period *t* if person is unemployed in *t* (LFS$) and was working full time in *t-1* (EMPLST$). For unemployed persons, no industry information is provided in period *t*. We replace the missing value in *t* by the values in *t-1*.
Married	Dummy = 1 if person is married ($FAMSTD)
Tenure	Number of years with employer ($ERWZEIT)
Public ownership	Dummy = 1 if employer is public service (OEFFD$)
Firm size	Firm size categories (ALLBET$): 1. less than 20 employees (omitted category) 2. greater/equal 20 and less than 200 employees 3. greater/equal 200 and less than 2000 employees 4. greater/equal 2000 employees
Education	Highest educational level obtained (ISCED$): 5. unqualified labour, up to secondary education (ISCED 1 & 2) 6. skilled labour, apprenticeship, vocational education (ISCED 3 & 4) 7. high-skilled labour, tertiary education (ISCED 5 & 6)
Experience	Years of work experience; one year of full-time work (EXPFT$) counts as one year, one year of part-time work (EXPPT$) counts as 0.5 year.
East Germany	Dummy for Eastern federal state (BULA$)
Industry production	Taken from input-output table provided by German Statistical Office (destatis)

Table 6.A1.1. Summary statistics

Variable	Observations	Mean	Standard deviation
Real gross monthly wage	132 150	2415.80	2155.947
Dummy: job loss	192 477	0.011	
Dummy: married	192 477	0.638	
Tenure	133 421	10.119	9.795
Dummy: public ownership	128 639	1.748	
Firm size (category 1 to 4)	127 899	2.425	1.194
Dummy: primary/secondary education	192 477	0.156	
Dummy: vocational education	192 477	0.524	
Dummy: tertiary education	192 477	0.265	
Work experience	186 431	15.623	12.171
Dummy: temporary contract	113 774	0.144	
Dummy: Eastern federal state	192 477	0.240	
Industry production	102 502	150445	78664.1

Special Section

Chapter 7

Trade in Tasks

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Organisation for Economic Co-operation and Development

*This chapter analyses the task content of goods and services and sheds light on possible structural changes following trade liberalisation. The task content of goods and services is estimated by combining information from the O*Net database on the importance of a set of 41 tasks for a large number of occupations and information on employment by occupation and industry. The study shows that tasks that can be digitised and offshored are often complementary to tasks that cannot. Therefore, the assessment of the offshorability of a job requires that one take into account all tasks being performed. The study finds that import penetration in services has a small, but positive effect on the share of tasks related to getting and processing information being performed in the local economy. In other words, offshoring complements rather than replaces local information processing.*

7.1. Introduction

Division of labour has been an important source of productivity gains since the first human beings engaged in hunting and gathering. Indeed, one of the most striking trends in economic development since pre-historic times is the deepening division of labour all the way from within self-sufficient households to global value chains. The development has taken place in fits and spurts following the opening of new transport routes, innovations in transport and communications technology and innovations in management and work organisation. The most recent turn in this spiral of expanding markets and deepening division of labour is trade in tasks facilitated by the proliferation of the internet and its rapidly growing capacity for information transmission.

A task is an activity that needs to be accomplished within a defined period of time. Production of goods and services consists of a number of individual tasks; the more complex the good or service, the more tasks are involved. As famously observed by Adam Smith when visiting a pin factory, a single worker "not educated to his business" could at best make 20 pins per day. However, with the introduction of division of labour breaking production of pins down to 18 distinct tasks performed by 10 different workers, output per worker per day increased to 4 800 pins, a productivity gain almost beyond imagination.

What, exactly, do workers of different occupations do when putting together a car, a T-shirt or an iPad; when underwriting a cross-border merger, writing a computer program or when preparing a meal? Do for instance machine operators perform the same tasks in the United States, German, Japanese and South African car manufacturing plants? To what extent can the bundle of tasks needed to produce a good or a service be unbundled? Which tasks can be automated and performed by computers or robots? Which tasks can be performed at a distance? Conversely, what holds bundles of tasks together? These are critical questions for understanding the driving forces and labour market implications of trade in tasks. This chapter sheds more light on how structural shifts in the composition of tasks being performed within countries and industries are related to international trade, particularly trade in services. The question as to which forces keep bundles of tasks together has largely been overlooked in the literature hitherto. We show that bringing this aspect into the analysis may change the results substantially.

A new approach to measuring trade in tasks

Measuring trade in tasks is easier said than done since tasks are not a well-defined statistical unit recorded in production and trade statistics. Trade policy analysts have therefore looked for indirect ways of measuring such trade. One approach has been to assess the tradability of jobs based on detailed studies of the job content in different occupations. A job can potentially be offshored if tasks that can easily be codified and digitised feature prominently among the duties performed by the worker. Matching indices of the importance of offshorable tasks by occupation with data on employment by occupation, it was found that between 20 and 29% of all jobs in major economies such as the United States, Canada and Australia could be offshored.[1] Furthermore, these jobs include medium to high-skilled professions that hitherto have been sheltered from international competition. These estimates caused alarm, raising fears that well-paying jobs that had previously been protected from international competition could at best face downward pressure on wages and at worst become trade-displaced.

1. See van Welsum and Vickery (2005), Blinder (2009) and Jensen and Kletzer (2010).

The most detailed information available on the task content of occupations is the Occupational Information Network (O*Net) database for the United States. O*Net is a project on occupational information sponsored by the US Department of Labour. The version of the database we have used covers 855 occupations[2]. We follow previous studies in using the typology of tasks derived from the "O*Net content model" under the category "occupational requirements", which characterises occupations by a set of standardised activities. Our list of 41 tasks reported in Table 7.1 comes from the sub-category "generalised work activities".

Table 7.1. Typology of tasks

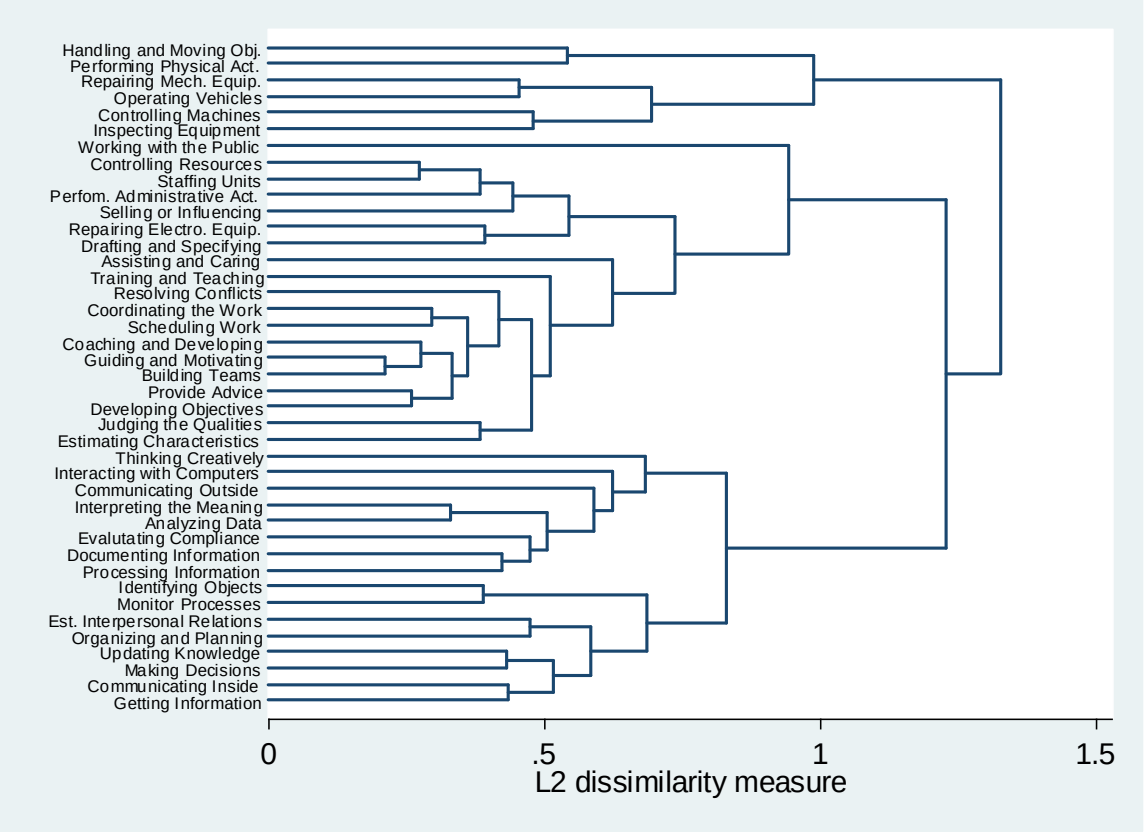
Tasks	ID
1. Getting Information	111
2. Monitor Processes, Materials, or Surroundings	112
3. Identifying Objects, Actions, and Events	121
4. Inspecting Equipment, Structures, or Material	122
5. Estimating the Quantifiable Characteristics of Products, Events, or Information	123
6. Judging the Qualities of Things, Services, or People	211
7. Processing Information	212
8. Evaluating Information to Determine Compliance with Standards	213
9. Analyzing Data or Information	214
10. Making Decisions and Solving Problems	221
11. Thinking Creatively	222
12. Updating and Using Relevant Knowledge	223
13. Developing Objectives and Strategies	224
14. Scheduling Work and Activities	225
15. Organizing, Planning, and Prioritizing Work	226
16. Performing General Physical Activities	311
17. Handling and Moving Objects	312
18. Controlling Machines and Processes	313
19. Operating Vehicles, Mechanized Devices, or Equipment	314
20. Interacting With Computers	321
21. Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment	322
22. Repairing and Maintaining Mechanical Equipment	324
23. Repairing and Maintaining Electronic Equipment	325
24. Documenting/Recording Information	326
25. Interpreting the Meaning of Information for Others	411
26. Communicating with Supervisors, Peers, or Subordinates	412
27. Communicating with Persons Outside Organization	413
28. Establishing and Maintaining Interpersonal Relationships	414
29. Assisting and Caring for Others	415
30. Selling or Influencing Others	416
31. Resolving Conflicts and Negotiating with Others	417
32. Performing for or Working Directly with the Public	418
33. Coordinating the Work and Activities of Others	421
34. Developing and Building Teams	422
35. Training and Teaching Others	423
36. Guiding, Directing, and Motivating Subordinates	424
37. Coaching and Developing Others	425
38. Provide Consultation and Advice to Others	426
39. Performing Administrative Activities	431
40. Staffing Organizational Units	432
41. Monitoring and Controlling Resources	433

Source: Based on the O*Net database.

2. We have worked with the O*Net Production database version 15.1.

The 41 tasks described in Table 7.1 are the basic building blocks of occupations and each occupation can be described as a matrix of tasks, telling us the proportion of each task in the occupation under consideration. While previous studies have identified the tradable amongst the 41 tasks and limited the analysis to the importance of these in employment, we take all 41 tasks into account in our analysis. By so doing we are able to study which tasks tend to be performed together across occupations and thus not only possible fragmentation of production but also the forces that keep tasks together, including economies of scope. Thus, while other studies assume that tasks are separable, we make the question of separability a central part of the analysis. A cluster analysis of tasks performed across occupations is a useful tool for assessing bundling of tasks. Figure 7.1 is a so-called dendrogram, which is simply a tree showing how tasks are clustered together statistically.

Figure 7.1. Dendrogram for the task content of occupations



Note: The dendrogram is obtained by applying hierarchical cluster analysis to the tasks by occupation dataset. Euclidian (L2) distance between clusters is calculated with the complete-linkage method.

The tree shows the hierarchy in the cluster analysis; the higher the value on the horizontal axis, the more dissimilar are tasks (in the sense that the same tasks tend not to appear together in occupations). Starting from the right, the two first branches divide the list of tasks (represented on the vertical axis) into two groups. The first group involves tasks related to "handling and moving objects" (312), "performing general physical activities" (311), "repairing and maintaining mechanical equipment" (324), "operating vehicles" (314) and "controlling machines and processes" (313). These tasks are rather manual and the cluster makes sense for all occupations involving manual work or mechanical work. All the other tasks are in a second

cluster. Following the tree from the right to the left, one can see how these other tasks bundled together are further subdivided in sub-groups.

An interesting finding coming out of Figure 7.1 is that some tasks we would not expect to be grouped together are indeed associated in the dataset. For example, "interacting with computers" (321) is in the same cluster as "communicating with persons outside the organization" (413).[3] "Interacting with computers" is also correlated with "processing information" (212) or "analyzing data" (214) as one would expect. But within the same cluster, we also find "interpreting the meaning of information for others" (411). This reveals that "working with computers" and "analysing data" - typically offshorable tasks in the literature - may be bundled with less offshorable activities involving "work with others" or "persons outside the organization".

Another interesting example is "establishing and maintaining interpersonal relationships" (414). Jensen and Kletzer (2010) regard it as negatively related to offshoring because it involves face-to-face contacts. On Figure 7.2, it appears bundled with another group of tasks where we find "getting information" (111), which is positively related to offshorability according to Jensen and Kletzer (2010).[4] The cluster analysis supports our hypothesis that tasks are bundled across occupations and that there may be economies of scope of keeping them together.

We will now calculate the task content of occupations, industries and trade. The first step is to calculate the proportion of tasks in each occupation. Here we follow the earlier literature[5] and calculate the task intensity as a Cobb-Douglas weighted average of two indices derived from the O*Net database: the relative importance of each task (on a scale between 1 and 5) and the level of the task (on a scale between 1 and 7), where the weight of importance is 2/3 and the weight of level 1/3, but including all 41 tasks.[6] The second step is to match data on employment by sector and employment by occupation. To illustrate how this works, consider the activity "interacting with computers" and the sector *construction*. Construction employs architects, engineers, carpenters, plumbers, electricians, drivers, managers and so on, each performing a set of tasks or activities. Interacting with computers is more important in some of these occupations than others. The total intensity of interacting with computers in construction is found by adding the index of its importance for each occupation, weighted by its employment share in the sector. The third step is to use the correspondence between sector classifications and goods and services classifications to establish which sector produces which goods and services and then estimate the task content of goods and services. Finally, having estimated the task content of goods and services, the task content of trade can be computed by combining the estimate of task content of goods and services in the exporting country with export values.[7] Note however that

3. This refers to the part of Figure 7.2 where the tree has 10 branches. The next section will present evidence for these 10 clusters and Table 7.2 provides their description.

4. Jensen and Kletzer (2010), in the same paper, propose to infer offshorability on the basis of geographic concentration in the US economy. We refer here to their use of the O*Net database.

5. Blinder (2009), Jensen and Kletzer (2010) and Firpo *et al*. (2011).

6. The correlation coefficient between the two indices is 0.91. Handel (2010) provides an assessment of the O*Net content model and notes that the two categories are largely redundant.

7. See Lanz *et al*. (2011) for the technical details. The task content of imports should be calculated using the task content of goods and services in the exporting country. This methodology avoids the so-called Leontief paradox, which in the case of trade in tasks arises from a false assumption that the occupational composition of employment by sector is the same across countries. Because of lack of comparable information, one is, however, forced to make the assumption that the task content of occupations is similar across countries.

the methodology sketched here does not distinguish between tasks *embodied in* traded goods and services and tasks performed directly across borders.

7.2. Up to the task: a descriptive analysis of task intensities by industry

This section presents an analysis of the task intensities of industries based on the methodology described above for the United States and the Members of the European Union, the only countries for which sufficient data are available. The data come from the Occupational Employment Statistics (OES) in the case of the United States and from the Labour Force Survey (LFS) in the case of the European Union. While our tasks data are limited to US occupations, we introduce a country dimension in the dataset by matching the task content of occupations with country data on occupations by industry. We use a common industry classification (ISIC Rev. 3) for which we have a correspondence with NAICS industries (US) and NACE industries (EU) but the calculation of the task intensity of industries relies on SOC for the United States and ISCO for the European Union.[8]

Table 7.2 below gives an overview of how industries are associated with a higher intensity for specific tasks. We have grouped the 41 tasks of Table 7.1 into the 10 clusters identified by the cluster analysis represented in Figure 7.1. For each cluster, the table indicates the three industries that are the most intensive in this group of tasks. We have separated the United States and European Union data and kept them in their original industry classification (NACE for the European Union and NAICS for the United States). The US industries are more disaggregated. The purpose of the table is not to compare the two lists (as the average intensity by industry is similar in the United States and the European Union), but rather to have an illustration of industry intensities in tasks at two levels of disaggregation.

Industries that are intensive in physical tasks (cluster 1) are, not surprisingly, manufacturing activities such as leather tanning and dressing or manufacture of wood products. But there are also services that can rely on physical tasks, such as postal services or the work done by domestic staff employed by households. Cluster 2 deals with the use of vehicles and mechanical equipment and we find land transportation or school bus transportation as industries intensive in such tasks. Mining activities also appear in this category. Cluster 3 encompasses tasks related to machines that are intensive in specific manufacturing industries. Tasks involving work with the public (cluster 4) are, on the contrary, in services industries such as retail trade, personal care services or hotels and restaurants. In cluster 5, associated with selling, we find retail trade at the 2-digit level and more specific types of stores at the 4-digit level.

8. The employment surveys in the European Union use the International Standard Classification of Occupations (ISCO) while the United States apply the Standard Occupation Classification (SOC) system. The structure of the two classifications is quite different, but when comparing our calculated task intensities by industry between the European Union and the United States, there is a good correlation with only a few outliers, making us confident that the United States and European Union data can be compared. Another issue is the transportability of job information across countries. Taylor (2007) finds that the task content of occupations is similar in countries as diverse as the United States, New Zealand, China and Hong Kong, China. This suggests that it is reasonable to make the assumption that the task content of occupations is the same across countries.

Table 7.2. Task intensities by industry: Top-3 industries for each cluster of tasks (European Union and United States)

Cluster	Tasks involved	Top 3 EU industries (NACE 2-digit)	Top 3 US industries (NAICS 4-digit)
1 - Physical tasks	Performing General Physical Activities	Tanning and dressing of leather	Seafood Product Preparation and Packaging
	Handling and Moving Objects	Activities of households as employers of domestic staff	Animal Slaughtering and Processing
		Manufacture of wood and of products of wood (except furniture)	Postal Service
2 - Tasks related to mechanical equipment	Operating Vehicles, Mechanized Devices, or Equipme	Mining of coal and lignite; extraction of peat	School and Employee Bus Transportation
	Repairing and Maintaining Mechanical Equipment	Other mining and quarrying	Waste Collection
		Land transport; transport via pipelines	Coal Mining
3 - Tasks related to machines	Inspecting Equipment, Structures, or Material	Manufacture of wood and of products of wood (except furniture)	Footwear Manufacturing
	Controlling Machines and Processes	Mining of coal and lignite; extraction of peat	Apparel Knitting Mills
		Tanning and dressing of leather	Machine Shops; Turned Product; Screw and Bolt Manufacturing
4 - Working with the public	Performing for or Working Directly with the Public	Retail trade	Gasoline Stations
		Other service activities	Beer, Wine, and Liquor Stores
		Hotels and restaurants	Personal Care Services
5 - Selling and controlling	Drafting and Specifying Technical Devices, Parts, and	Retail trade	Jewelry, Luggage, and Leather Goods Stores
	Repairing and Maintaining Electronic Equipment	Activities auxiliary to financial intermediation	Shoe Stores
	Selling or Influencing Others	Sale, maintenance and repair of motor vehicles	Clothing Stores
	Performing Administrative Activities		
	Staffing Organizational Units		
	Monitoring and Controlling Resources		
6 - Working with others	Estimating the Quantifiable Characteristics of Product	Education	Child Day Care Services
	Judging the Qualities of Things, Services, or People	Health and social work	Limited-Service Eating Places
	Developing Objectives and Strategies	Other service activities	Other Residential Care Facilities
	Scheduling Work and Activities		
	Assisting and Caring for Others		
	Resolving Conflicts and Negotiating with Others		
	Coordinating the Work and Activities of Others		
	Developing and Building Teams		
	Training and Teaching Others		
	Guiding, Directing, and Motivating Subordinates		
	Coaching and Developing Others		
	Provide Consultation and Advice to Others		
7 - Thinking creatively	Thinking Creatively	Education	Personal Care Services
		Computer and related activities	Independent Artists, Writers, and Performers
		Recreational, cultural and sporting activities	Performing Arts Companies
8 - Information processing tasks	Processing Information	Insurance and pension funding	Legal Services
	Evaluating Information to Determine Compliance with S	Computer and related activities	Accounting, Tax Preparation, Bookkeeping, and Payroll Services
	Analyzing Data or Information	Activities auxiliary to financial intermediation	Depository Credit Intermediation
	Interacting With Computers		
	Documenting/Recording Information		
	Interpreting the Meaning of Information for Others		
	Communicating with Persons Outside Organization		
9 - Identifying and monitoring	Monitor Processes, Materials, or Surroundings	Activities of households as employers of domestic staff	School and Employee Bus Transportation
	Identifying Objects, Actions, and Events	Land transport; transport via pipelines	Other Pipeline Transportation
		Manufacture of food products and beverages	Inland Water Transportation
10 - Getting information and communicating	Getting Information	Activities auxiliary to financial intermediation	Legal Services
	Making Decisions and Solving Problems	Insurance and pension funding	Agents and Managers for Artists and Other Public Figures
	Updating and Using Relevant Knowledge	Financial intermediation	Accounting, Tax Preparation, Bookkeeping, and Payroll Services
	Organizing, Planning, and Prioritizing Work		
	Communicating with Supervisors, Peers, or Subordinates		
	Establishing and Maintaining Interpersonal Relationships		

Cluster 6 is a broad category of tasks that have in common working with others. This is, therefore, the category of education, health and other service activities. Thinking creatively is a cluster by itself where education, recreational and cultural services are found. At a more disaggregated level, the industry of artists and performers makes an intensive use of such tasks. Cluster 8 includes information processing tasks that are often regarded as highly offshorable. Industries intensive in such tasks are insurance, financial intermediation and computer and related activities. Identifying and monitoring (cluster 9) is interesting because it appears more cross-cutting in terms of the industries involved. Most of them are related to transportation, but the manufacturing of food products and beverages is also an industry where monitoring processes are important. Lastly, cluster 10 concerns tasks aimed at getting information and communicating with others. Insurance and financial intermediation are the industries intensive in such tasks, as well as professional services (legal services and accounting), when looking at a more disaggregated level.

7.3. How are changes in task content of production related to international trade?

As noted, trade in tasks can only be measured indirectly. Trade is, however, most important for its impact on employment, income and structural changes. This section analyses first, the extent to which the task content of a country's production differs from the task content of its net exports for EU Members and the United States. Next, the extent to which the task content of local production varies systematically with import penetration is explored.

Figure 7.2 shows the contribution to total output by cluster of tasks and country in 2000. The clusters that account for the largest contribution in all countries are the "getting information and communicating" (cluster 10), "information processing tasks" (cluster 8) and "working with others" (cluster 6). It is recalled that cluster 10 contains "getting information", which other studies have considered one of the most tradable tasks, but also "establishing and maintaining interpersonal relationships" and "making decisions and solving problems", two tasks that are considered among the least tradable by other studies. Cluster 8 contains a number of information processing and handling tasks considered to be highly tradable by other studies, while cluster 6 contains many of the least tradable tasks.

Given the relative importance of clusters 10, 8 and 6, it is useful to focus on these three in the following assessment. Table 7.3 reports the respective task content of output and exports of countries for the years 2000 and 2008. There are only small changes in the task content of output from 2000 to 2008. It is also notable that the task content of exports is quite similar to the task content of production. For instance the share of "information processing tasks" varies from 17.6% of the total in Estonia and the Slovak Republic to 23% in Luxembourg in 2008. The content of this task embodied in exports is slightly lower than that embodied in output in all countries included, except Switzerland – where it is slightly higher – and the Netherlands and Luxembourg – where it is the same. The largest difference between the task content of output and exports for this task is found in the United States (18.6% versus 17%).

A higher task content of exports than output suggests comparative advantage in sectors using the task intensively. The sectors that use information processing tasks most intensively are insurance and pension funding, computer and related services and services auxiliary to financial intermediation (see Table 7.2 above). These are among the sectors in which Luxembourg and Switzerland feature the most prominently, and the finding is reassuring as far as the methodology is concerned. It is, however, important to bear in mind that the countries included in the analysis are quite similar in terms of GDP per capita and factor endowments, and that a broader sample of countries would probably exhibit larger differences between task content of trade and production.

Can anything be said about the relationship between the relative intensity of these three tasks clusters and exposure to international trade? To explore this question, the shares were regressed on import penetration of goods and services respectively, controlling for market size (represented by the natural logarithm of country output) and economic development (represented by the natural logarithm of country output per worker). Table 7.4 shows the regressions results for the three clusters "working with others", "information processing", "getting information and communicating". As the sample size is small, results should be interpreted with a large amount of caution.

Figure 7.2. Task content of output (2000)

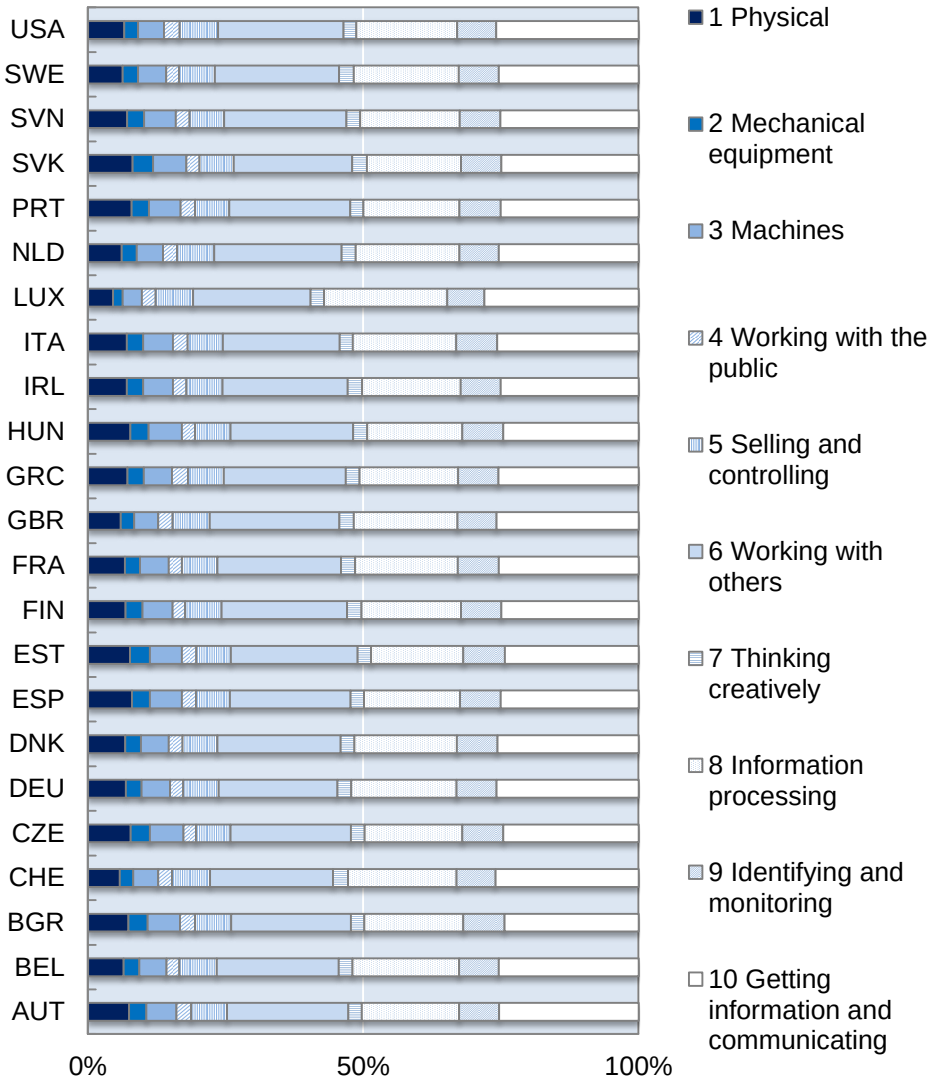


Table 7.3. Relative shares of three selected task clusters in output and exports (%)

	6. Working with others				8. Information processing				10. Getting information and communicating			
	2000		2008		2000		2008		2000		2008	
Country	output	exports	output	exports	output	exports	output	exports	output	exports	output	exports
Austria	22.1	21.3	22.0	21.5	17.6	16.8	18.5	17.5	25.3	24.6	25.6	24.8
Belgium	22.1	21.7	22.4	21.8	19.4	18.7	19.6	19.3	25.5	23.9	26.0	25.2
Bulgaria	21.8	24.9	..	..	17.9	12.6	..	..	24.4	24.6	..	..
Switzerland	22.3	21.6	21.9	21.0	19.7	20.1	19.9	20.2	26.0	25.8	26.2	25.8
Czech Republic	21.8	21.3	21.8	21.0	17.7	16.6	18.4	17.5	24.5	23.8	24.8	24.0
Germany	21.6	21.0	21.7	21.2	19.1	18.2	19.3	18.6	25.8	24.6	25.8	24.7
Denmark	22.3	21.6	22.5	21.7	18.6	17.6	19.0	18.5	25.6	24.6	25.7	25.0
Spain	22.0	21.5	..	..	17.4	16.1	..	..	25.0	24.4	..	..
Estonia	23.0	22.5	23.1	22.8	16.8	15.6	17.6	16.4	24.3	23.7	24.6	23.6
Finland	22.8	22.0	23.1	22.4	18.1	17.9	18.3	18.5	24.9	24.2	24.9	24.3
France	22.5	21.5	22.7	21.8	18.6	18.1	18.9	18.7	25.4	24.5	25.4	24.5
United Kingdom	23.6	22.8	..	..	18.9	18.8	..	..	25.8	25.2	..	..
Greece	22.2	22.3	22.4	21.9	17.9	16.2	18.0	17.0	25.5	24.9	25.5	25.1
Hungary	22.3	21.5	22.5	21.6	17.3	15.7	17.8	16.6	24.6	23.7	24.8	23.8
Ireland	22.7	21.8	..	..	17.9	18.6	..	..	25.1	24.8	..	..
Italy	21.2	20.8	21.6	20.9	18.7	17.2	18.6	17.6	25.7	24.6	25.5	24.4
Luxembourg	21.3	21.2	21.7	21.5	22.4	22.5	23.0	23.0	28.0	27.9	28.0	27.9
Netherlands	23.1	22.5	23.3	22.6	18.9	18.2	19.2	19.2	25.4	24.4	25.4	24.7
Portugal	22.0	21.7	..	..	17.4	15.5	..	..	25.1	24.1	..	..
Slovak Republic	21.5	21.1	21.7	20.9	17.1	16.5	17.6	16.5	24.9	23.6	24.6	23.6
Slovenia	22.2	21.5	22.2	21.5	18.1	16.6	18.3	17.1	25.1	24.0	25.2	24.1
Sweden	22.5	21.3	..	..	19.1	18.5	..	..	25.5	24.6	..	..
USA	22.8	22.5	22.7	22.2	18.3	16.7	18.6	17.0	25.9	24.5	25.7	24.4
Sample average	**22.2**	**21.8**	**22.3**	**21.7**	**18.4**	**17.4**	**18.9**	**18.2**	**25.4**	**24.6**	**25.5**	**24.7**

Table 7.4. Regression analysis: relationship between the output share of task clusters at the country level and import penetration

	6. Working with others	8. Information processing tasks	10. Getting information and communicating
Import penetration: goods	0.013	0.003	-0.011
	(0.017)	(0.018)	(0.011)
Import penetration: services	-0.034	0.119***	0.083***
	(0.024)	(0.024)	(0.015)
Output	0	0.001	0.001*
	(0.001)	(0.001)	(0.001)
Output per worker	0.003	0.009***	0.004**
	(0.003)	(0.003)	(0.002)
Year dummy: 2008	-0.002	-0.004	-0.003*
	(0.003)	(0.003)	(0.002)
Constant	0.196***	0.045	0.178***
	(0.028)	(0.028)	(0.018)
R-squared	0.075	0.793	0.789
Number of observations	38	38	38

None of the three clusters is significantly correlated with import penetration of goods. On the other hand, the shares of the clusters "information processing" and "getting information and communicating" are both significantly and positively correlated to import penetration of services. These two clusters are key for financial services and computer services and results indicate that tasks related to getting and processing information are complementary to services imports. Interestingly, variation in the share of cluster 6 "working with others" across countries appears not to be affected by any of the variables included in the analysis and the explanatory power of the regression is quite low. The variation across countries is also quite small in our sample, suggesting that "working with others", which is most important in sectors such as health and education, is unaffected by trade. The shift in the task composition towards cluster 10 is not surprising, since other studies have also found that import competition has this effect in some of the countries included in our sample. Also the shift towards cluster 8 is in line with a recent study from the United States (Crinò, 2010), but it is nevertheless surprising that import competition from services *increases* the share of information processing tasks in the economy.

7.4. Trade in tasks and structural changes: concluding remarks

This study has emphasised the importance of taking into account both the forces that contribute to unbundling and codification of tasks and the forces that keep tasks together when analysing the potential for trade in tasks. The productivity gains from fragmenting production into simple tasks were understood already centuries ago, famously described in Adam Smith's pin factory and developed further in the scientific management or Taylorism theory which was implemented for instance in Ford's car manufacturing plants, allowing mass production of affordable cars. However, when moving away from mass production of standard products to more sophisticated and differentiated products, Taylorism gave way to Toyotism, which was characterised by multi-tasked, multi-skilled workers working in teams. This way of organising production was considered better suited for an environment in which innovation and problem solving at source are important. Essentially, this study asks whether and to what extent the pendulum is swinging back towards Taylorism with the opening up to the possibility of trade in tasks.

We find that tasks tend to be clustered across occupations suggesting that there may be important economies of scope and synergies in keeping them together – and transaction and coordination costs in unbundling tasks. Econometric results suggest that the tasks embodied in services imports are complementary to tasks related to information gathering and processing performed in the home economy. Thus, trade in services is associated with shifts in the task content of domestic production towards information-intensive tasks at the expense of manual tasks in the United States and the European Union, although the magnitude of the effect is relatively small.

A possible explanation of the apparent complementarity between imported services and information-intensive tasks in OECD countries is that bundles of tasks or entire functions rather than individual tasks are outsourced and offshored. Functions that are typically outsourced include computer software development and maintenance, human resources, accounting and office cleaning, among others. But as more and more firms outsource these, a market is created for specialised suppliers of these services. What are non-core functions for some companies become the core of other companies, and the latter may innovate and transform these functions into a new industry. Computer services are one example, but even office cleaning has followed this path. In the past, most firms employed their own cleaning personnel who cleaned offices with water, soap, a mop and a vacuum cleaner. Specialised office cleaning firms, in contrast, enter the offices with an arsenal of specialised tools, machines and chemicals, providing

cleaning and environmental services – and employment opportunities for a broad range of occupations, including engineers and managers. Fragmentation of production is therefore not equivalent to fragmentation of jobs.

To conclude, trade in tasks is likely to have a similar impact as trade in other intermediate inputs – it improves productivity and induces shifts within firms and sectors in a similar way as technical change does, and will take place when such gains outweigh the cost of unbundling the tasks. The magnitude of structural shifts is difficult to assess, but the fear of massive job losses due to a surge in offshoring of individual tasks is probably overblown. More detailed analysis is necessary before any firm conclusions and policy implications can be drawn.

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Special Section

Chapter 8

Heterogeneous Migration and Offshoring Costs: Evidence on Spillover Effects*

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The focus of this chapter is on the relation between migration and offshoring. In particular, we are interested in "spillover effects" of migration and offshoring policies in a framework with multiple origin and multiple destination countries. There are two types of spillover effects that are particularly relevant from a policy perspective. First, what we define "domestic spillover effects", namely the effect on a change in the migration (offshoring) costs from a given sending country to a given receiving country on offshoring (migration). Second, what we define "direct international spillover effects", namely the cross-country impact of migration (offshoring) costs on migration (offshoring) employment. We find evidence that domestic spillover effects are empirically relevant. The policy implication is that a host government can influence (in particular, reduce) the number of migrant workers not only by acting directly on its migration policy, but also indirectly, by providing incentives for firms to source labor abroad via offshoring. This is especially relevant in light of the stylised fact that individual attitudes are more favourable towards trade than towards migration. Conversely, we find no evidence of direct international spillover effects. The fact that migration between a given origin country and a given destination country is not affected by the cost of migrating from other origin countries, but only by own migration costs, produces a second relevant policy implication: de jure discriminatory migration policies need not be de facto discriminatory.

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* This chapter builds on Beverelli *et al.* (2011). Gianluca Orefice was affiliated with the World Trade Organization in the early phases of this research project. The views presented here are those of the authors and do not reflect those of the institutions they are affiliated with. In particular, they are not meant to represent the positions or opinions of the WTO and its Members and are without prejudice to Members' rights and obligations under the WTO.

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8.1. Introduction

The reduction in the costs of relocating production activities abroad, and the increasing availability of low-wage migrant workers[1] in industrialised countries, allow firms to engage in offshoring or to hire immigrant workers when it is profitable to do so.[2] Given the common perception of negative effects of both migration (in terms of reallocation of jobs) and offshoring (in terms of relocation of production) on native employment, the labour market consequences of these two phenomena have been hotly debated in academia and public discussion.[3]

This chapter sets aside the effects on native employment, to focus on the relation between migration and offshoring. We discuss and empirically test the theoretical implications of a three-country model that features heterogeneous migration and offshoring costs. In particular, we are interested in "spillover effects" of migration and offshoring policies in a framework with multiple origin and multiple destination countries. There are two types of spillover effects that are particularly relevant from a policy perspective. First, what we define as "domestic spillover effects", namely the effect of a change in the migration (offshoring) costs from a given sending country to a given receiving country on offshoring (migration).[4] Second, what we define "direct international spillover effects", namely the cross-country impact of migration (offshoring) costs on migration (offshoring) employment.

The interest in domestic spillover effects is based on the stylised fact that individuals tend to be more pro-trade than pro-immigration (Mayda, 2008). Such differences in public opinion towards trade and immigration are reflected in policy outcomes, with immigration being much more restricted than trade. If domestic spillover effects are relevant, a host government can influence (in particular, reduce) the number of migrant workers not only by acting directly on its migration policy, but also indirectly, by providing incentives for firms to source labour abroad via offshoring.

The interest in direct international spillover effects, in turn, stems from another stylised fact concerning attitudes towards migration, namely that the public in host countries is more favourable to migration from certain sending countries than others. In particular, it has been shown that perceived cultural differences between immigrant and native born population are

1. Recent empirical evidence (Antecol *et al.*, 2003; Butcher and Di Nardo, 2002; Chiswick *et al.*, 2008) shows that immigrants earn a lower wage than native workers, after controlling for workers' characteristics.

2. Offshoring here is defined as the relocation of production processes abroad, leading to trade in intermediate goods across borders.

3. Offshoring is often perceived as a simple relocation of jobs abroad, reducing native employment. In fact, Görg and Hanley (2005), Amiti and Wei (2009) and Crinò (2010) find a mild negative effect of offshoring on domestic employment. But if the relocation of jobs results in a business increasing productivity (or innovation) – a result shown by Amiti and Wei (2009), Görg *et al.* (2008) and Görg and Hanley (2011) – sales can expand, increasing employment (Hijzen and Swaim, 2007). Similarly, migration has been considered for a long time as detrimental for native employment because of substitutability between native workers and migrants (Borjas, 2003; Aydemir and Borjas, 2006; Borjas *et al.*, 2008). But recently, some empirical evidence has reversed this conclusion arguing that migrant and native workers might be imperfect substitutes (D'Amuri *et al.*, 2010; Ottaviano and Peri, 2012) and a productivity gain in using immigrants in production could offset the direct negative effect on native employment (Peri, 2012).

4. Throughout the chapter, we refer to "origin" as a country that sends migrants abroad and receives offshoring activities, and to "destination" as a country that receives migrants and sends offshoring activities abroad.

among the main drivers of public resistance to immigration.[5] Moreover, ethnicity matters when it comes to attitudes, as shown by a large body of sociological research. As a consequence, the public (and representative governments) may prefer migration from culturally close or ethnically similar countries, at the expense of migration from culturally distant or ethnically dissimilar ones. For instance, Ford (2011) has shown that the British public is consistently more opposed to migrants from the "Indian sub-continent" (India, Pakistan and Bangladesh) and from the Caribbean, relative to migrants from Europe and Australia. International spillovers effects can answer the policy question of whether discriminatory migration policies (that is, policies that apply unequal treatment to migrants, depending on their country of origin) are effective in attracting relative more migration from most desired origin countries.

In the empirical application, we find evidence that domestic spillover effects are relevant. The fact that migration is positively affected by offshoring costs has an interesting policy implication: a host county can impact migration from a sending country by reducing the cost of offshoring to the same country. This can be relevant for governments that have their hands tied on migration policy (for instance, because of participation to international agreements on migration), and would like to discourage migration.

Moreover, we find no evidence of international domestic spillover effects. The fact that migration between a given origin country and a given destination country is not affected by the cost of migrating from other origin countries, but only by own migration costs, produces a second relevant policy implication: *de jure* discriminatory migration policies need not be *de facto* discriminatory.

The reminder of the chapter is organised as follows. The next section presents a brief overview of the theoretical model developed by Beverelli *et al.* (2011) and its predictions. Section 8.3 describes the empirical approach and the results. Section 8.4 concludes.

8.2. Theoretical predictions

This section sketches a three-country model of offshoring and migration that yields testable implications on direct effects, domestic spillover effects and international spillover effects of offshoring and migration costs.[6] The model consists of a small open economy, denoted as country *d*, and two other countries, denoted as country *i* and country *j*, which are recipient of offshoring (i.e. firms from *d* offshore some production activities in *i* or *j*) and sending of migrant workers to *d*.

Firms from country *d* produce a final consumption good *Y* using labour. The labour input is an aggregate of a large number of tasks *k*. Tasks, which are ordered on a [0, 1] continuum by increasing level of complexity, can be performed by three types of workers: natives from country *d*; immigrants and offshore workers from foreign countries *i* and *j*. Migrant and offshore workers from countries *i* and *j* are assumed to have the same productivity in the country of

5. Ivarsflaten (2005) and Sides and Citrin (2007) provide evidence that a preference for cultural unity is the strongest predictor of hostility to immigration in a wide range of European societies. The PEW Global Attitudes Report (2007) argues that opinions about immigration are closely linked to perceptions about threats to a country's culture. In 46 of 47 surveyed countries, those who favor stricter immigration controls are also more likely to believe their way of life needs to be protected against foreign influence. Importantly, such preferences need not be related to economic factors. In a pioneering experimental study mentioned by Ford (2011), Sniderman *et al.* (2004) have demonstrated that Dutch hostility to immigrants is greatly magnified simply by describing the migrant group in cultural rather than economic terms.

6. The reader interested in technical details can find them in Beverelli *et al.* (2011).

origin. This implies that the wage rate in the two countries is the same. However, there are migration and offshoring costs that are task- and country-specific. Firms from country *d* decide the allocation of tasks along the continuum based on cost-minimisation.[7]

To make sure that at least a task is assigned to native workers, cost functions are such that sufficiently high-end tasks will be performed by native workers. To address the point of how low- and medium-end tasks are allocated, we rely on the empirical results of Ottaviano *et al.* (2010), who find that easy tasks are covered by migrant workers rather than offshored. We therefore rule out configurations in which low-end tasks are offshored, leaving two possible orderings of tasks, respectively denoted as "ordering 1" and "ordering 2". In the first ordering, it is assumed that offshore workers, independently of whether they are from country *i* or from country *j*, have lower cost of performing more complex tasks than migrant workers. Intuitively, offshoring and migration costs along the task continuum are more determined by workers' characteristics than by countries' characteristics. In the second ordering, workers from country *j*, independently of whether they are migrant or offshore, have lower cost of performing more complex tasks than workers from country *i*. In this case, offshoring and migration costs along the task continuum are more determined by countries' characteristics than by workers' characteristics.

Accordingly, under ordering 1 the sequence of tasks is as follows: $Mi < Mj < Oi < Oj < N$, where M stands for migrants, O stands for offshored workers and N stands for natives. Under ordering 2, the sequence is $Mi < Oi < Mj < Oj < N$. For both models, it is possible to derive testable predictions on the effect of migration and offshoring costs on the employment levels of migrant workers and offshored workers. Such predictions are summarised in Table 8.1.

First, we ask how migration costs from country *i* affect the number of migrants from country *i* and how offshoring costs to country *i* affect the number of offshore workers in country *i*. As one would expect, these *direct effects* are negative under both orderings of tasks.

Second, we ask whether there is an effect of offshoring costs on the own number of migrants and of migration costs on the own number of offshore workers. These *domestic spillover* effects are only present in ordering 2, where, as one would expect, they are positive. A reduction in migration (offshoring) costs not only reduces migration (offshoring), as per direct effects, but also acts across policies.

Third, we ask whether there are cross-country effects of migration and offshoring costs (*international spillover* effects). Such spillover effects can be within-policy (direct effects) or across policies (indirect effects). As shown in Table 8.1, orderings 1 and 2 yield different predictions on direct international spillover effects and the same predictions on indirect effects. The former are predicted to be positive only in ordering 1. The latter are predicted to be null for offshoring costs and positive for migration costs.

7. It should be noted that in the model home firms are assumed to be able to discriminate between natives and immigrants, offering a lower wage per unit of labor to migrants than to native workers. As explained in the introduction, empirical evidence largely supports the idea that immigrants earn a lower wage than native workers, after controlling for workers' characteristics. This is not to claim that immigrants do not exert any downward pressure on wages of native workers, an issue that is still hotly debated in the literature, but that is left aside in this chapter.

Table 8.1. Testable predictions

Type of effect	Description: Impact of…	Sign	
		Ordering 1	Ordering 2
Direct	• Own migration costs on the number of migrants	–	–
	• Own offshoring costs on the number of offshore workers	–	–
Domestic spillover	• Own offshoring costs on the number of migrants	0	+
	• Own migration costs on the number of offshore workers	0	+
International spillover (direct)	• *j*'s migration costs on *i*'s number of migrants	+	0
	• *j*'s offshoring costs on *i*'s number of offshore workers	+	0
International spillover (indirect)	• *j*'s offshoring costs on *i*'s number of migrants	0	0
	• *j*'s migration costs on *i*'s number of offshore workers	+	+

8.3. Empirical evidence

To test the implications of the model, we estimate the following baseline regression equations, respectively a "migration equation" and an "offshoring equation":

$$\ln (NM)_{dit} = \alpha + \eta_t + x'_{dijt}\gamma + \varepsilon_{dijt} \quad (1)$$

$$\ln (NO)_{dit} = \alpha + \eta_t + x'_{dijt}\gamma + \mu_{dijt} \quad (2)$$

where *t* indexes time, *d* denotes the destination country (recipient of immigrants and source of offshoring), *i* and *j* respectively denote origin countries *i* and $j \neq i$, γ is a vector of coefficients to be estimated, *x* is a vector of bilateral migration costs *(mc)* and offshoring costs *(oc)*. In particular, *x* includes the cost of migrating from *i* to *d* (mc_i), the cost of offshoring from *d* to *i* (oc_i), the cost of migrating from *j* to *d* (mc_j) and the cost of offshoring from *d* to *j* (oc_j). The dependent variable of the migration equation is the (log of) the number of migrants from *i* to *d*. The dependent variable of the offshoring equation is the (log of) the number of offshore workers from *d* to *i*.[8] The baseline migration and offshoring regressions, that only include time fixed effects η_t, are progressively augmented with destination fixed effects, origin *i* fixed effects and *i-d* pair fixed effects.[9]

The main methodological issue is how to construct migration and offshoring costs for origin country *j*. Following the theoretical model, country *j* should be similar to country *i* in terms of nominal wage rate, and should differ from *i* only in terms of migration and offshoring costs. We

8. The dependent variables of regressions (1) and (2) are expressed as *ln(x+1)* in order not to lose zero observations. The number of zeros in the dataset used for regressions is however small.

9. The inclusion of pair fixed effects largely addresses endogeneity concerns (see Baier and Bergstrand, 2007 for a detailed treatment of this issue).

follow various approaches to construct, for any origin country *i*, a 'fictitious' country *j*. In Table 8.2 below, we report the results of the preferred approach, where we use an average of the explanatory variables (migration and offshoring costs) across all countries *j* that are similar to *i* and more distant from destination country *d* than *i*.[10]

Another challenge is how to measure migration and offshoring costs. As a proxy for bilateral migration costs between *d* and any origin country *o*, we use the negative of the fitted values from a gravity regression that uses the ratio of total bilateral flows of migrants to resident population as a dependent variable. Similarly, we approximate offshoring costs by using the negative of fitted values from a gravity regression that uses bilateral offshoring flows (proxied by trade in parts and components) as dependent variable. In the gravity regressions, we use as explanatory variables geography, differences in labour costs (approximated by differences in GDP per capita), stock of migrants (only in the migration gravity) and stock of FDI (only in the offshoring gravity). We also include variables that capture the effect of policy choices on outcomes. In the migration regression, we include the variable PTA, a dummy equal to one if countries *d* and *o* have signed a preferential trade agreement (PTA) containing provisions on trade in services (GATS mode IV), or provisions on visa and asylum or provisions on labour market regulation. This variable reflects the effect of migration policies (within preferential trade agreements) on migration costs. In the offshoring regression, we include the variable BIT, a dummy equal to one if countries *d* and *o* have signed a bilateral investment treaty. This variable reflects the potential facilitation effect on offshoring of such treaties.

Data

Migration data are from the OECD's International Migration Dataset. We use the stock of foreign-born workers in destination country *d* from origin *o* as a measure of migrant employment. To build the proxy for migration costs, we instead use as dependent variable of the gravity regression the net inflows of foreign workers. As a measure for the number of offshore workers, we use the employment levels by multinationals affiliates from the OECD's Activity of Multinationals Dataset.[11] To build the proxy for offshoring costs, we instead use trade in parts and components from the UN Comtrade dataset.

Gravity-type data used in the gravity regressions, such as bilateral distance, are from the CEPII gravity dataset assembled by Head *et al.* (2010). Finally, data on the presence/content of a preferential trade agreement (PTA) or a bilateral investment treaty (BIT) between country *d* and country *o* used in the gravity regressions are, respectively, from WTO (2011) and from the UNCTAD website.

Results

The core empirical results are presented in Table 8.2.[12] Columns (1) and (2) report the results of migration regressions; columns (3) and (4) report the results of offshoring regressions. The difference between even- and odd-numbered columns is the inclusion of a different set of fixed

10. Other approaches are discussed in Beverelli *et al.* (2011). "Similarity" is defined by the similarity index proposed by Helpman (1987): $Si_{ijt} = 1 - \left(\frac{GDP_i}{GDP_i+GDP_j}\right)^2 - \left(\frac{GDP_j}{GDP_i+GDP_j}\right)^2$.

11. Unfortunately, the data do not allow including offshore employment through arm's length transactions. The authors fully acknowledge this limitation.

12. The reader is referred to Beverelli *et al.* (2011) for a discussion of the robustness of the results under alternative specifications.

effects. We discuss the direct effects, domestic spillover effects and international spillover effects in turn.

We find overwhelming evidence that direct effects are negative. Own migration costs *(mc_i)* reduce own migration and own offshoring costs *(oc_i)* reduce own offshoring. In particular, one standard deviation increase in the cost of migration reduces migrant employment by 2 to 2.8%; while one standard deviation increase in the cost of offshoring deters offshoring from *d* to *i* by 1.6 to 2.6%. These results are in line with economic intuition and with the predictions of models 1 and 2.

The effect of a change in offshoring costs *(oc_i)* on own migration is positive, and significant in the specification with pair fixed effects (column 2). When the cost of offshoring to country *i* increases, this not only reduces offshoring to that country, but has also an indirect dampening effect on migration from that country. This is consistent with the predictions of ordering 2. The effect of a change in migration costs mc_i on own offshoring, however, are not significantly different from zero, as predicted by ordering 1.

Neither the effect of a change in country *j* migration costs mc_j on migration from country *i* nor the effect of a change in country *j* offshoring costs oc_j on offshoring in country *i* are statistically different from zero, in line with the theoretical predictions of ordering 2.

Finally, consider indirect international spillover effects. The effect of a change in country *j* offshoring costs oc_j on migration from country *i* is not statistically different from zero, again in accordance to ordering 2. The effect of a change in country *j* migration costs mc_j on migration from country *i* is instead positive and significant, as predicted by both models.

Overall, we find strong support of negative direct effects of migration and offshoring costs on migration and offshoring, respectively. Domestic spillover effects are positive in the migration regression with pair fixed effects, but absent otherwise. International spillover effects are mostly absent, with the exclusion of positive indirect spillover effects for the offshoring regressions. We discuss the policy implications stemming from these results in the next section.

8.4. Conclusions and policy implications

This chapter has looked at the effects of migration and offshoring costs on employment levels of migrant workers and offshore workers. It has primarily focused on spillover effects of migration and offshoring policies. We have identified two broad types of such effects: domestic and international spillovers. Domestic spillovers refer to the impact of a change in the cost of migration (offshoring) on the number of offshored (migrant) workers. International spillovers act across national borders. They can be direct or indirect. The direct effects can be explained as follows: the number of migrant workers from a sending nation *i* to a destination nation *d* is potentially affected by the cost of migrating from all other nations that send migrants to *d*. The same applies to the number of workers that firms from country *d* employ as offshore labour in country *i*. The indirect effects can act not only across countries, but also across policies. The number of migrant workers from a sending nation *i* to a destination nation *d* is potentially affected by the cost of offshoring to other nations. Likewise, the number of workers that firms from country *d* employ as offshore labour in country *i* is potentially affected by the cost of migrating from other nations into country *d*.

As argued in the introduction, spillover effects are of considerable policy relevance, especially when it comes to the politically sensitive issue of migration. The first broad policy implication of our results derives from the evidence of positive domestic spillover effects. Since migration is positively affected by offshoring costs, a host country can impact migration from a

sending country *j* by reducing the cost of offshoring to the same country. This can be relevant for governments that have their hands tied on migration policy (for instance, because of participation to international agreements on migration, like the Schengen Treaty) and would like to discourage migration for political or other reasons.

The second broad policy conclusion is related to the weak evidence on cross-country direct spillover effects of migration costs. Since migration between a given origin country and a given destination country is not affected by the cost of migrating from other origin countries, but only by own migration costs, *de jure* discriminatory migration policies need not be *de facto* discriminatory.

Table 8.2. Results of migration and offshoring regressions

Country j's migration and offshoring costs constructed using unweighted average of similar countries[a] that are more distant from destination country d *than country* i

	Migration regressions		**Offshoring regressions**	
Model	**(1)**	**(2)[b]**	**(3)**	**(4)[b]**
Dependent variable	***ln(NM)***	***ln(NM)***	***ln(OS)***	***ln(OS)***
mc_i	-2.813***	-2.018**	-0.383	0.557
	(0.605)	(0.875)	(0.375)	(0.756)
mc_j	-0.202	-0.786	0.767*	1.100**
	(0.403)	(0.562)	(0.441)	(0.527)
oc_i	0.318	1.805***	-1.607***	-2.633***
	(0.337)	(0.420)	(0.481)	(0.793)
oc_j	-0.101	0.185	-0.831	-0.227
	(0.198)	(0.196)	(0.612)	(0.471)
Fixed effects				
Period	yes	yes	yes	yes
Destination country	yes	no	yes	no
Country *i*	yes	no	yes	no
Country *i* * Destination	no	yes	no	yes
Observations	2,814	2,814	379	379
R-squared	0.908	0.365	0.828	0.416
Number of id		416		71

Boostrapped and clustered standard errors in parentheses (clustered by countries *i-d* pair).
Coefficient on constant not reported.
*** p < 0.01; ** p < 0.05; * p < 0.1.
[a] Countries *i* and *j* are similar if GDP similarity index $SI_{ij} > 50^{th}$ percentile.
[b] Within estimation (id variable: countries *i-d* pair).

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Chapter 9

Trade and the Quality of Employment: Asian and Non-Asian Economies

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This paper compares the evolution of working conditions and core labour rights in Asian and non-Asian economies in the late 20th and early 21st century and analyses the relationship between labour conditions and international trade and investment flows. Labour conditions generally improved throughout the globalisation of recent decades. Real per capita income growth remains a powerful source of improved labour conditions, and the effect of trade on working conditions is mainly indirect through its impact on GDP. Trade has had both direct and indirect impacts on some labour rights, but the direct effects seem to have diminished by the early 21st century. We find no evidence that persistent differences in labour conditions between Asia and the rest of the world can be explained by differences in growth and international trade. We also find no evidence that countries with poor labour conditions attract disproportionate flows of foreign direct investment. Instead, FDI flows seem mainly influenced by considerations of market size, investment risks, and the share of trade in GDP. Even after holding those influences constant, the Asia region receives a comparatively small share of world FDI inflows. Finally, micro-studies confirm that multinational companies pay higher wages than host-country firms.

9.1. Introduction[1]

This paper focuses on how international trade and investment influence the *quality* of employment in countries. There will be little discussion of the relationship between trade and the level of employment – a topic that is addressed by other papers of this volume. Instead, the focus is on how global trade and investment influence *labour conditions* – the working conditions and core labour rights experienced by workers.

Economic theory has the most to say about how free trade should influence employment and wages. But since the writings of Adam Smith, economists have stressed that wages and fringe benefits provide incomplete measures of labour's compensation for work. Prospective employees consider both the monetary and nonmonetary benefits and costs of working conditions in making job choices. Yet, the effects of international trade and investment on nonmonetary working conditions rarely receive careful attention.

Modern discussions of labour conditions go well beyond monetary and nonmonetary working conditions, however. For over 25 years, international organisations have also stressed the advancement of a core set of labour rights – freedom of association, nondiscrimination, elimination of forced labour, and reduction of child labour. Increasingly, there is interest in whether trade and other mechanisms of globalisation advance or retard these rights, but theoretical discussions of trade provide little guidance on these questions. This paper explores the relationships between working conditions, core labour rights, and the growth of international trade and investment, emphasising differences between Asia and the rest of the world.

After comparing globalisation trends in Asia with other regions, we review how labour conditions changed during the globalisation of the late 20th and early 21st centuries, contrasting developments in Asian and non-Asian countries (Section 9.2). We then discuss the mechanisms through which trade might influence working conditions and labour rights and estimate the impact of trade flows on dimensions of employment quality (Section 9.3). This section also examines evidence on labour conditions in Asian export processing zones. Section 9.4 examines the links between direct foreign investment, the activities of multinational companies, and labour conditions. The final section presents our conclusions.

9.2. Labour conditions in Asian and non-Asian economies

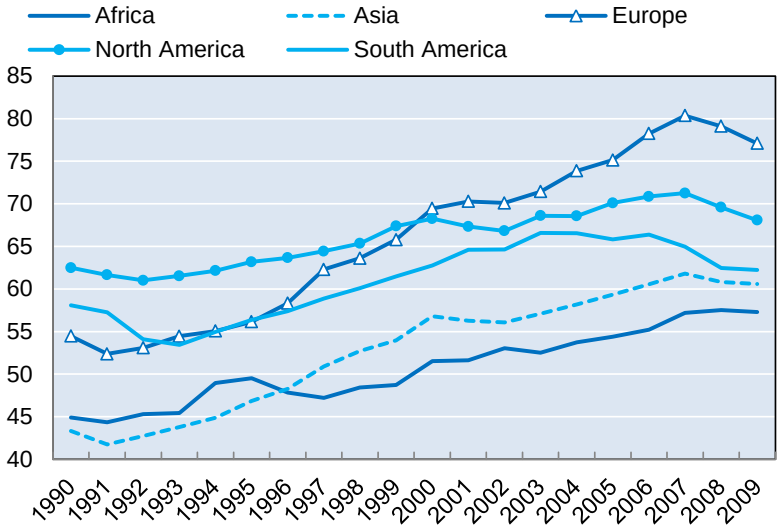
We begin by reviewing globalisation trends in Asia and four other broad regions between 1990 and 2008. For our primary interest in how cross-border economic activity influences working conditions and core labour rights, the evolution of international flows of economic activity is most appropriate. Trade policies enhance or retard these flows, however, and trade policy negotiations often provoke strong sentiments regarding the links between trade liberalisation and labour conditions. We therefore report measures of each of these dimensions of globalisation.

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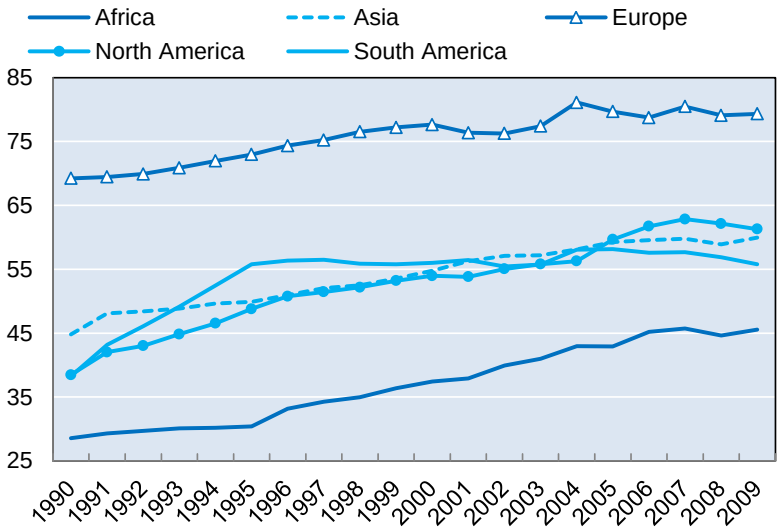
The index of international economic flows (Figure 9.1) is a weighted average of trade, foreign direct investment (FDI) stocks, portfolio investment, and income payments to foreign nationals, all as a percent of GDP. Higher values indicate greater economic integration. The index of trade restrictions (Figure 9.2) is a weighted average of the mean tariff rate, hidden import barriers, capital account restrictions, and taxes on international trade, scaled so that higher values imply greater globalisation (e.g. lower tariffs and/or fewer import barriers). As far as we know, this is the only measure of trade policies providing annual observations into the 21st century.[2]

Figure 9.1. Index of international economic flows, 1990-2008



Source: *http://globalization.kof.ethz.ch/*

Figure 9.2. Index of absence of trade restrictions, 1990-2008



Source: *http://globalization.kof.ethz.ch/*

2. These indices are respectively the KOF index of actual economic flows and index of trade restrictions. The data along with details on the construction of the indices are available at: *globalization.kof.ethz.ch/*

Over most of the 1990-2008 period, cross-border transactions have been highest in Europe and lowest in Africa (Figure 9.1). Asia is in an intermediate position, but below the Americas. The regional rankings show little change over two decades, because until 2006-07 the flows have increased in all regions. By this measure, however, the extent of international economic integration became more dispersed since 1995, with Europe pulling away from the Americas and Asia pulling away from Africa.

Turning to the evolution of trade restrictions in Figure 9.2, Europe (fewest restrictions on international commerce) and Africa (most restrictions) again represent the extremes. Asia and the Americas have an intermediate level of restrictions. Trade restrictions declined in all regions from 1990 until midway through the first decade of the 21st century.[3] Since then, but with differences in timing, trade restrictions have increased modestly in all regions. The flow and policy measures are closely related: the simple correlation between the two indices exceeds .89 in all regions. To summarise, whether measured by flows of international commerce or changes in trade policies since 1990, globalisation expanded in all regions until quite recently. Our main question in the rest of the paper is how advances in and retreats from globalisation influence labour conditions.

We first contrast working conditions and labour rights in Asian countries with those in the rest of the world at the end of the 20th century. We then examine how labour conditions changed in the first decade of the 21st century. Working conditions include measures of pay (annual compensation per manufacturing worker), work hours (weekly work hours, annual work hours, and percent working more than 40 hours per week), and job safety (fatal industrial accident rate in manufacturing). Labour rights include indicators of freedom of association (indices of civil liberties and collective bargaining rights, scaled so that low values indicate superior rights), child labour (labour force participation rate of children 10 to 14years old for 1995-2000 data and children 5 to 14 years old for post-2000 data), nondiscrimination (gender pay differential), and forced labour (number of types of forced labour and number of forced labourers). Some of these indicators exist only for one year or time period, and data availability varies widely for each country. For no measure of labour conditions do we have data from every Asian country,[4] for example. In the empirical analyses, the value of each country observation is weighted by its labour force. (See Appendix 9.A1 for further discussion of these measures and their sources.)

In the late 20th century, monetary compensation was comparatively low, and all measures of work hours were comparatively high in Asian countries (Table 9.1). Job safety (inversely indicated by the fatal job accident rate) was greater in Asian countries. Turning to measures of labour rights, both measures of freedom of association – the Freedom House index,[5] which includes but is not limited to workplace considerations, and the FACB index, which focuses on collective bargaining rights – indicate that freedom of association is stronger on average in non-Asian countries. (Recall that each of these indices is constructed so that lower scores denote superior rights.) Child labour force participation is roughly the same in each set of countries.

3. Recall that the index reported in Figure 9.2 is scaled so that higher values represent fewer restrictions.

4. Data on labour conditions are most frequently available for the People's Republic of China (PRC), India, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taipei, China and Thailand. (NB, here and below, the economy known as "Chinese Taipei" according to OECD standard usage, is referred to as "Taipei, China", according to ADB usage.)

5. The annual Freedom House index is not limited to worker freedom of association. However, an index of worker rights developed for a 2010 study (Freedom House 2010) was highly correlated with the general Freedom House index for that year. Therefore, the general index, which is available annually, appears to provide an adequate measure of worker rights. See Appendix 9.A1 for further discussion.

Both measures of forced labour are higher in Asian countries. On average, they have more varieties of forced labour and more people subject to forced labour. Finally, there is less gender wage discrimination in Asian countries.

Table 9.1. Labour conditions in Asian and non-Asian countries, late 20th century

	Asian	Non-Asian
Working Conditions		
Annual compensation (1995)	2 643	17 630
Hourly compensation (1997)	1.5	13.1
Weekly work hours (1995)	46.7	39
Annual work hours (1997)	2 123.5	1 909.7
Percent working over 40 hours (1995)	73.4	57.3
Fatal accident rate (2000)	5.5	5.9
Labour Rights		
Child labour force participation rate (2000)	10	9
Civil liberties Index (2000)	4.6	3.1
Collective bargaining rights (mid-1990s)	7.7	5
Net gender wage differential	-0.085	-0.105
Forced labour varieties (mid-1990s)	1.26	0.03
Number of forced labourers (mid-1990s)	5 312 927	39 670

Note: Labour force weighted estimates.
Source: See Appendix 9.A1.

We turn next to the question of how labour conditions *changed* during the first decade of the 21st century. Tracking the changes in conditions requires before and after data for a common set of countries – a requirement that further reduces sample sizes and eliminates meaningful comparisons for some measures. Nonetheless, previous studies find a broad improvement in working conditions and labour rights during the late 20th century (Flanagan, 2006, Chapter 2).

With the exception of work hours, data for the early years of the 21st century also show improving labour conditions around the world (Table 9.2, covering changes from 1999 to 2008).[6] Changes over the decade narrowed differences in pay between Asian and non-Asian countries but widened differences in work hours and civil liberties. During this period, per capita (PPP adjusted) GDP grew at virtually identical rates in the two sets of countries, but the trade share of GDP advanced more rapidly in Asian countries. The data send a clear message: *If* the postwar globalisation had a negative impact on labour conditions, its influence must have been overwhelmed by other factors.

There is considerable national variation within regional averages, and Table 9.3 reports data for several Asian countries. Nonetheless, one of the most striking patterns we observe is the rise in wages in Asia, especially that of its developing countries (Table 9.3A). For countries with available data over the first decade of the 21st century, only Cambodia saw a shrinking of its workers' compensation, while the rest averaged a decade-long continual rise in annual compensation of 10% per year. This is especially significant in improving labour conditions for the three most populous countries in the region: the People's Republic of China (PRC), India and Indonesia.

6. Some of the measures used earlier have changed, and others are no longer available. See Appendix 9.A1 for definitions on the measures used for 1999-2008.

Furthermore, the rise in annual compensation has been driven by increases in hourly pay, rather than in the total hours worked, which increased only very slightly in Indonesia (1%), Sri Lanka (0.4%) and the Philippines (0.1%). In fact, hours worked declined slightly from 2004 to 2008 not only for more developed countries such as Japan and Korea, but also for the PRC and India as well (Table 9.3B). It would be a cause of concern if total hours worked showed drastic reduction, given that pervasive underemployment remains a challenge to quality jobs in developing Asia. To illustrate this, in 2000 the share of employees working at least 40 hours per week is above 85% for Korea, and only less than half in Indonesia, a country where underemployment (rather than outright unemployment) has traditionally increased following cyclical downturns. The share of Indonesian workers who were full time increased slightly to 51.4% by 2005, but this is still far below the rates seen in developed Asia (Table 9.3C).

Other non-monetary measurements of labour conditions also show robust signs of improvements across Asia. For example, rates of fatal injuries have declined across the economies observed, with the exception of Myanmar (see Table 9.3D).[7] In Thailand, the reduction in fatal injury rates is notable, with the fatal injuries rate decreasing from 24.5 to 9.1 per one hundred thousand workers from 1992 to 2007.

Table 9.2. Labour conditions, recent developments in 21st century

	2008		% Change since 1999	
	Asian	Non-Asian	Asian	Non-Asian
Working Conditions				
Hourly compensation	3.7	19.43	236.6	152.6
Annual Work Hours	2 156	1 914	2.3	0.2
Job Accident Rate	4.3	n.a.	-22.2	n.a.
Labour Rights				
Child Labour**	14.8	14.2	-21.4	6.9
Civil Liberties	4.5	2	-8.1	-22.3

Note: Labour force weighted estimates. **: Child labour data come from ILO (2010), referring to children aged 5-14 years, and thus not comparable to Table 9.1.
Source: See Appendix 9.A1.

7. Myanmar more than doubled its reported rate of fatal injuries between 2000 and 2008: from 3 per 100 000 workers to 8.6 workers.

Table 9.3A. Average compensation

	Annual (USD)			
	2001[a]	Most recent	*Year*	Compounded annual growth rate, %
Bangladesh	631	1 016	*2010*	5.4
Cambodia	572	456	*2009*	-2.8
PRC	1 495	4 640	*2008*	17.6
Hong Kong, China	16 872	17 923	*2009*	0.8
India	1 161	2 027	*2007*	9.7
Indonesia	323	620	*2006*	13.9
Japan	32 506	41 423	*2009*	3.1
Kazakhstan	1 415	5 141	*2008*	20.2
Korea	16 964	30 598	*2008*	8.8
Kyrgyzstan	361	1 277	*2007*	23.4
Macau, China	7 188	13 496	*2010*	7.3
Malaysia (1)	2 527	3 599	*2007*	6.1
Philippines	1 151	1 661	*2008*	5.4
Singapore	21 154	33 737	*2009*	6
Sri Lanka	568	957	*2008*	7.7
Taipei, China	14 755	16 126	*2009*	1.1
Tajikistan	119	569	*2007*	29.8
Thailand	1 785	3 242	*2009*	7.7
Viet Nam	871	2 271	*2008*	14.7

Note: Average compensation for employees and wage earners across all sectors. (NB, here and below, the economy known as "Chinese Taipei" according to OECD standard usage, is referred to as "Taipei, China", according to ADB usage.") 1-Average monthly wages in manufacturing sector. a) 2001 data: Nepal-1999; Macau-2003, Malaysia-2004.

Sources: ILO-Laborsta, CEIC.

Table 9.3B. Hours worked

	Weekly				Average annual % change	
	2001(a)	2004 (b)	2008(c)		2001-04	2004-08
PRC (1)	45.4 a	45.5	44.6		0.2	-0.5
Hong Kong, China	46.5	47.1	45.6		0.4	-0.8
India (5)	46.7	47.0	46.9	c	0.2	-0.1
Indonesia	38.9	39.5	41.0		0.6	1.0
Japan (3)	42.2	42.0	40.7		-0.2	-0.8
Kazakhstan (1)	35.0	36.0	36.0		1.0	0.0
Korea	50.4	48.7	46.0		-1.1	-1.4
Kyrgyzstan (1)	35.7	36.3	35.7	c	0.6	-1.7
Macau, China	48.1	48.0	46.9		-0.1	-0.6
Malaysia	47.7	47.4	46.9		-0.2	-0.3
Philippines (4)	40.5	41.6	41.7	c	0.9	0.1
Singapore (1) (2)	46.2	46.3	46.3		0.1	0.0
Sri Lanka (1) (2)	50.3	47.0	47.7		-2.2	0.4
Taipei, China (1)	42.6	44.0	42.6		1.1	-0.8
Thailand (1)	42.4	48.9 b			7.7	

Note: 1-Employees or wage earners; 2- Hours paid for; 3-1998-2002 ISIC Rev.2; 4-1998-2000 ISIC Rev.2; 5 - Ave weekly hours worked in manufacturing sectors, employees and wage earners.

a) 2001 data: China-2003; Nepal and Viet Nam- 1999. b) 2004 data: Thailand-2003. c) 2008 data: India-2006; Kyrgyztan-2005; Philippines-2007.

Sources: ILO-Laborsta, CEIC.

Table 9.3C. Share of employees working at least 40 hours per week

	1995(a)		2000(b)		2005(c)		Average annual % change 1995-2000	Average annual % change 2000-05
Indonesia	46.4	a	48.7		51.4	c	1.2	1.8
Japan	51.4		70.2		67		7.3	-0.9
Korea	89.7		85		82.8		-1	-0.5
Macau, China	82.9	a	78.5		82.5	c	-1.3	1.3
Philippines (1)	64.8		66.1		62		0.4	-1.2
Sri Lanka	62.8	a	63.5	b	55.4	c	0.4	-3.2
Taipei, China (1)			92.6		93			0.1
Thailand	84.6		81.3				-0.8	

Notes: 1-Breaks in the series: Philippines-between 2002 and 2003; Taipei, China -between 2005 and 2006.
a) 1995 data: Indonesia, Macau, Sri Lanka-1996.
b) 2000 data: Sri Lanka-1999.
Sources: ILO Key Indicators of the Labour Market, CEIC, Authors' calculations.

Table 9.3D. Rate of fatal injuries

Per 100 000 employees	1992	2000a	2008b	Average annual % change 1992-2000	Average annual % change 2000-08
Hong Kong, China	10	8	6.8	-2.5	-1.88
Kazakhstan (1)	14.8	11.3	8.2	-2.96	-3.43
Kyrgyzstan (1)	9.5	7	5	-3.29	-3.57
Malaysia	7.7	11.3		5.84	
Myanmar		3	8.6		37.33
Singapore (1)	15	15.6	2.8	0.8	-7.46
Taipei, China	10.3	7.7		-3.16	
Thailand (1)	24.5	11.3	9.1	-6.73	-2.78
Per 1 000 000 hours worked	1992	2000	2008	Average annual growth 1992-2000	Average annual growth 2000-08
Japan	0.01	0.01	0	0	-12.5
Korea	0	0.06	0.05		-2.08
Philippines	0.08	0.04		-6.25	
Sri Lanka		0.01	0.01		-1.39

Breaks in the series: Bahrain-between 2007 and 2008; Kazakhstan-between 1996 and 1998 (No 1997 data); Kyrgyzstan-between 1996 and 1997; Singapore-between 1997 and 2008 (no data from 1998-2007); Thailand-between 1994 and 1995
* 2000 data: Myanmar-2003, Singapore-1997; ** 2008 data: Thailand-2007.
Source: ILO Laborsta.

This improvement in occupational safety is broadly accompanied by improvements in civil liberties in the developing Asian economies: in the decade of 1990-2000, nine economies showed improvements in civil liberty scores. These improvements were sustained through the decade of 2000-10, with only East Timor and Thailand were classified as having worsened civil liberties during the decade (Table 9.3E).

Perhaps more importantly, the incidence of child labour in Asia decreased from 2004 to 2008: from 18.8% to 14.8% of all children aged 5 to 14 years in the region. This is the more remarkable given that the rest of the world, especially Africa, saw a *rise* in the labour force participation of children aged 5-14 years during the same time frames. Again, this decline in child labour is broadly true for individual Asian countries. For the countries for which more

recent data is available, we see that overall, child labour decreased for Bangladesh, Lao, Philippines, Sri Lanka, Tajikistan and Viet Nam (Table 9.3F).

Nonetheless, these descriptions do not establish that globalisation *improves* labour conditions or even help us understand *how* globalisation *might* influence working conditions and labour rights. Having described the evolution of globalisation and labour conditions, we now analyse linkages between trade and labour conditions in the early 21st century.

Table 9.3E. Civil liberties

				Change	
	1972	1973	2010	1990-2000	2000-10
Bangladesh	4	4	4	-1	0
Brunei	5	5	5	0	0
Burma	5	5	7	0	0
Cambodia	5	5	5	-1	-1
PRC	7	7	6	-1	0
East Timor			4		1
India	3	3	3	0	0
Indonesia	5	5	3	-1	-1
Japan	1	1	2	1	0
Kazakhstan			5		0
Kyrgyzstan			5		0
Laos	5	5	6	-1	0
Malaysia	3	3	4	1	-1
Philippines	6	5	3	0	0
Singapore	5	5	4	1	-1
South Korea	6	6	2	-1	0
Sri Lanka	3	3	4	-1	0
Taipei, China	5	5	2	-1	0
Tajikistan			5		-1
Thailand	5	3	4	0	1
Viet Nam			5	-1	-1

Note: The political rights and civil liberties categories contain numerical ratings between 1 and 7 for each country or territory, with 1 representing the most free and 7 the least free.
Source: Freedom House *(/www.freedomhouse.org/template.cfm?page=439)*.

Table 9.3F. Percentage of children aged 5-14 engaged in child labour

	Base data	Year	Latest data	Year	Average annual change in percentage pts
Bangladesh	14.23	2002-03	12.80	2006	-0.36
Cambodia	44.80	2001			
India (2)	5.22	2001	11.80	2005-06	1.32
Indonesia	8.50	1998	6.90	2009	-0.15
Kazakhstan			2.20	2006	
Kyrgyzstan			3.60	2006	
Lao PDR (1)	31.10	2000	11.30	2006	-3.30
Philippines	11.00	2001	3.48	2009	-0.94
Sri Lanka	14.92	1999	8.20	2006	-0.96
Tajikistan (1)	12.40	2000	10.00	2005	-0.48
Thailand			8.30	2006	
Timor-Leste	4.20	2002			
Viet Nam (1)	24.40	2000	15.80	2006	-1.43

Note: 1-Base data: E.V. Edmonds (2008) 2-Base Data: National Commission for Protection of Child Rights (India) and Office of the Registrar General and Census Commissioner, India.
Sources: ILO SIMPOC; *www.childinfo.org.*

9.3. Trade and labour conditions

In recent decades, the question of how free trade may influence labour conditions has become a contest of ideas. Traditional trade theories imply that by pursuing comparative advantage, countries will move labour into sectors where its productivity and hence its (monetary plus nonmonetary) compensation is highest. This argument implies that countries with open trade policies should have superior labour conditions, *ceteris paribus*. At the other extreme are arguments that free trade will degrade labour conditions as international competitors seek to gain advantage by cutting labour costs.

If we are to isolate the effects of trade and other mechanisms of globalisation on labour conditions, we must first consider how working conditions and labour rights evolve in closed economies. Not surprisingly, the foremost influence on labour conditions is a country's level of development. Countries with higher income per capita tend to have higher wages, shorter hours of work and safer jobs. High-income countries also have stronger labour rights – stronger civil liberties and freedom of association, lower child labour force participation, and less forced labour. (Only a measure of discrimination – the net gender wage differential—is not significantly related to a country's level of development.) Over time, countries that grow most rapidly experience the most rapid advances in working conditions. To an important extent, the inequality in pay, nonmonetary working conditions and labour rights observed around the world result from differences in the level of economic development and national economic growth rates (Flanagan, 2006, Chapter 3).

Recognising the powerful influence of per capita GDP opens broad short-term and long-term policy menus for advancing labour conditions. In the short-run, severe recessions tend to degrade the labour conditions of the employed in addition to reducing employment and output. Deploying a nation's fiscal and monetary policy weapons to remove gaps between actual and potential GDP restores both the quantity *and quality* of jobs. In the long run, even under autarky, a country's labour conditions can improve with higher rates of technical progress, investments in physical and human capital, and the establishment of institutions that clarify property rights enforce contracts and reduce corruption, for example.

Stressing the important role of economic growth and development should not obscure the huge variance in outcomes around this relationship. Countries at a given level of development vary widely in their labour conditions. The fact that some countries have much better conditions while others have much worse conditions than one would predict from their level of development reflects a myriad of additional factors that influence labour conditions. The rest of this section analyses the influence of trade flows.

Direct and indirect effects of trade

International trade theories predict that free trade will improve a country's working conditions indirectly by increasing its per capita income. Whether comparative advantage or economies-of-scale motivates trade, a country's resources are used more productively in a free-trade environment than under autarky. The greater efficiency permits higher monetary and/or nonmonetary compensation. Transfers of technology that may accompany increased trade flows likewise raise productivity and compensation. In each case, free trade should improve working conditions to the extent that it raises per capita income.

To the extent that trade liberalisation raises per capita income, trade itself becomes one mechanism for improving a country's working conditions and labour rights. A large literature has explored and debated the lines of causality between openness to trade and per capita income. After sorting out the significant methodological issues involved in identifying a

relationship, key studies and literature reviews conclude that trade liberalisation tends to raise economic growth (Berg and Krueger, 2003; Wacziarg and Welch, 2003). This channel provides what we label the *indirect* effect of globalisation on labour conditions. Important distributional effects accompany the long-run gains from trade liberalisation, so that efforts to record the short-run impact of trade liberalisation on working conditions with aggregate data pick up some average of the impact on gainers and losers.

Arrayed against the predictions of trade theories are claims that international competitive pressures degrade working conditions and labour rights in countries with open trade policies. *How* trade would diminish working conditions is a matter of some mystery. Open trade policies raise foreign demand for a country's exports and for the services of workers who produce those exports. What then happens to wages and nonmonetary working conditions depends on labour supply conditions, which themselves are determined by the domestic labour market alternatives available to workers. Where there is substantial unemployment or underemployment, increased export demand will raise employment without necessarily improving pay and nonmonetary working conditions. This situation may be the norm in countries with significant reserves of underemployed rural agricultural labour or high urban unemployment rates. The additional employment derived from increased export demand will raise total wage income, while producing little change in the employment conditions of *individual* workers.

For economies with little unemployment, export firms will have to meet additional demand by attracting workers away from other jobs in agriculture, the informal sector, or elsewhere in the formal sector. As export firms improve working conditions to attract workers, non-export firms may improve working conditions in an effort to retain their workers. Labour market competition effectively spreads the benefits of increased export demand to other sectors. Trade liberalisation may also reduce the demand in import-competing industries, so to an extent, the positive impacts of trade on labour conditions rest on the mobility of resources from import-competing to export industries.

Convincing scenarios in which increased export demand degrades working conditions remain elusive. If increased export production raised monopsony power, trade liberalisation could produce such degradation. Nonetheless, it is hard to imagine how increased export production would reduce workers' choice of employers.

These conceptual arguments and the judgment that trade liberalisation does not raise monopsony power in export sectors are supported by comparisons of wages in export and non-export firms in both developing and industrialised countries. These studies invariably find that after controlling for industry and firm size, export firms pay higher wages than non-export firms, and the "export wage premium" is largest in less developed countries (Aw and Batra, 1998; Bernard and Jensen, 1995; Hahn, 2004; Van Biesebroeck, 2003). Particularly for the poorest countries, international competition does not lead exporters to reduce wages below national norms according to these studies. Since the studies rarely can control for all worker skills, the possibility that the employees of exporters have more education, training, and experience than the employees of non-exporting firms remains. Nevertheless, one can doubt that unobserved worker quality differences account for wage premia as large as 10-12% in Korea, 15-17% in Taipei, China and 40% in sub-Saharan Africa.

Trade and labour conditions in the late 20th century

Econometric analyses reported in an earlier study tested whether a country's openness to international competition was significantly related to labour conditions in the late 20th century, given a country's level of development. As implied by international trade theories, openness influenced working conditions only indirectly, by raising per capita income, in both

cross-section instrumental variables and fixed effects estimation. The openness measures, which tested for a direct effect, were not statistically significant. The latter finding also ruled out a significantly negative impact of international competition on working conditions. In short, trade liberalisation improved working conditions mainly by raising per capita income (Flanagan, 2006).

International trade theories offer no direct predictions on the relationship between free trade and the labour rights. Nonetheless, increased trade alters some of the incentives that influence core labour rights. Consider first the effects on child labour. Since child labour force participation falls as adult incomes increase, trade liberalisation should *reduce* child labour through the positive effects of free trade on per capita income. Increased trade carries with it a potential countervailing effect on child labour force participation, however. For a given level of family income, the relative return to current work versus schooling, summarised by the rate of return to schooling, will influence the extent of child labour. If reducing trade barriers raises the wage of unskilled work and reduces the return to schooling, the relative attractiveness of schooling to children and their families falls. (On the other hand, if trade expansion includes technology transfers that raise returns to schooling, incentives for children to attend and remain in school increase.)

Applying fixed effects analysis to country panel data for the period from 1980 to 1995, an earlier study found that both the adoption of free trade policies and increased trade shares were associated with lower child labour force participation rates after controlling for per capita GDP and institutional structure (Flanagan, 2006). Greater openness to international markets therefore reduces child labour in two ways. To the extent that trade raises per capita income, fewer families need to rely on child labour to obtain the necessities of life. Greater openness is also directly associated with lower child labour rates in addition to its indirect effect through income. We do not know the exact explanation for the direct effect, but the possibility that trade raises returns to schooling is one candidate. At the least, the finding of a significant direct effect undermines the hypothesis that free trade reduces the return to schooling for children and other low-skill workers.

This finding supports an important policy implication: using trade sanctions to induce countries to reduce child labour is counterproductive. Free trade reduces child labour; restrictions on trade will increase it by reducing the income that permits families to move their children from work to school and possibly by reducing returns to schooling. Policies that expand rather than reduce the choices available to families provide a more effective approach to reducing child labour.

In theory the linkage between trade and workers' freedom of association rights is ambiguous. An underlying question is how free trade influences the relative bargaining power of labour and management. On the one hand, a larger number of export firms or multinational companies are likely to reduce any employer monopsony power, thereby increasing workers' choice of employers and hence their bargaining power. On the other, competition from imports and the increased ability of local employers to outsource may reduce workers' bargaining power. In short, the net effect of open trade policies on bargaining power must be settled empirically. Using cross-section instrumental variables and fixed-effects analyses, a study of late 20th century experience found that countries with more open trade policies had superior civil liberties, and civil liberties improved more rapidly in countries that adopted open trade policies, *ceteris paribus*. There was no significant relationship between civil liberties and trade volumes, however (Flanagan, 2006, Chapter 4).

The leading theory of labour market discrimination predicts that increased competition to hire labour should erode discrimination by providing labour force minorities with additional

employment opportunities with employers who have less discriminatory tastes (Becker, 1957). To the extent that open trade policies increase the number of export firms and/or multinational companies competing for labour in local labour markets, employer discrimination may decrease. By providing opportunities beyond agriculture and the informal sector, globalisation also may increase the status and security that comes with higher income. Yet an earlier cross-section study found in both ordinary least squares and instrumental variables estimates significantly *larger* male-female wage differences in countries with open trade policies, *ceteris paribus*. (On the other hand, there was no statistically significant relationship with trade volumes.) The evidence from the very few other investigations of the issue is likewise mixed (Black and Brainerd, 2004; Berik *et al.*, 2003).

Finally, open economies appeared to have neither more nor less forced labour than closed economies after controlling for level of development, institutional structure, and for the possibility of reverse causation. Openness reduces forced labour indirectly by increasing per capita income.

Trade and labour conditions in the 21st century

The debate over the effect of international economic integration on labour conditions has continued into the 21st century, with particular interest in conditions in Asian countries. Both economic growth and trade expansion proceeded apace until the end of the century's first decade. Between 1995 and 2008, the average growth of (PPP adjusted) per capita GDP was similar – about 5.5% – for both Asian and non-Asian countries. When weighted by labour force size, however, growth was more rapid in Asian countries (8.7%) than in non-Asian countries (4.8%), reflecting in part the rapid growth in the PRC and India. These regional differences alone imply more rapid advancement of labour conditions in Asian than in the rest of the world during this period. Over the same period, the trade share of GDP grew much more rapidly in Asian countries. Within each set of countries, the growth in the trade share was more rapid in smaller countries.

We now turn to our regression analyses of links between trade and labour conditions, using a database of 58 countries at varying stages of development. We estimate the following cross-country regression model for each labour condition in 2005.[8]

$$LABOR\ CONDITION_i = a_0 + a_1\ lnGDPCAP_i + a_2\ TRADE_i + a_3\ ASIA + e_i \quad (1)$$

The independent variables in equation (1) are the natural logarithm of (PPP adjusted) per capita GDP, the TRADE share of GDP in each country i,[9] and a dummy variable for Asian nations. Although we are interested in how trade influences labour conditions, one must also consider the possibility a country's labour conditions influence its volume of trade as alleged by some critics of globalisation. With this ambiguity in mind, we provide instrumental variables estimates of the effect of trade on labour conditions.[10] When the coefficient, a_2, lacks statistical significance, trade has solely an indirect effect on the labour condition through its (unobserved)

8. Unreported cross-country estimates for years 2000 and 2008 produced similar qualitative results.

9. The multi-hurdle index of open vs. closed trade policies developed by Sachs and Warner (1995) is not available for the 21st century. In some regressions we used the index of global flows pictured in Figure 9.1 instead of TRADE, but this experiment produced no material change in the results.

10. The variables used to instrument the trade share variable – suggested by gravity models of trade – are dummy variables for small countries, island countries, and landlocked countries and the land to labour ratio.

effect on per capita GDP. Where a_2 is statistically significant, greater international economic integration has both direct (a_2) and indirect effects on the labour condition. Table 9.4 provides the coefficient estimates and robust standard errors, weighted by each country's labour force size.

Table 9.4. Trade and labour conditions, 2005

	ln Per capita GDP	Trade share of GDP	Asia	R^2	Countries
Working Conditions					
Hourly Pay (ln)	1.36	-0.00015	0.08	0.94	48
	(.11)*	(0.0035)	(0.26)		
Annual Work Hours	-152.05	0.85	-13.96	0.51	55
	(57.44)*	(-1.29)	(107.23)		
Labour Rights					
Civil Liberties	-0.46	-0.01	1.94	0.40	56
	(-0.63)	(0.02)	(1.28)		

Note: Instrumental variables estimates; labour force weights; robust standard errors.* p-value < .01 ** p-value < .05

The estimates first confirm the powerful effect of per capita GDP growth in improving both working conditions, and by implication, the costs of recessions in slowing or reversing such improvements. The GDP influence is not significant in the civil liberties regression, a result that changes in the unweighted regressions discussed in the next paragraph. These estimates also indicate that the trade expansion of the early 21st century had only indirect effects (i.e. via increased per capita GDP) on labour conditions. The fact that estimates of a_2, the direct effect of trade, are not statistically significant indicates that the net effect of the trade expansion on labour conditions is positive and results from the GDP-enhancing effects of increasing trade. Neither the direct nor the indirect effects of trade diminish labour conditions. The results for the ASIA dummy variable are uniformly not significant: After adjusting for international differences in per capita GDP and trade shares, labour conditions were no different in Asia and the rest of the world midway through the first decade of the 21st century.

We encountered two notable differences when we recomputed the regressions without labour force weights. First, the coefficient on *ASIA* was significantly positive in both the hours and civil liberties regressions. *Ceteris paribus*, Asian countries had longer work hours and fewer civil liberties, but only when each country's data were equally weighted. Second, higher trade shares were associated with lower pay. Apparently, these (unreported) results are concentrated in smaller Asian countries.

We also conducted random effects panel data analyses of the relationship between trade, per capita GDP and national labour conditions for the period from 1995 to 2008. In these analyses we alternately used the trade share of GDP and the index of global flows reported earlier in Figure 9.1 to measure globalisation. This work was challenged by the fact that we lacked convincing instruments for variations in these measures over time. To mitigate concerns about the direction of causality between trade and labour conditions, we lagged the globalisation measures. We also experimented with alternative functional forms.[11] Our panel analyses confirmed the importance of per capita income in improving labour conditions, but yielded no statistically significant findings of influence from the lagged trade or lagged globalisation

11. Weighted estimation was not available for random effects analysis.

indices. There was another parallel with the cross-section analysis: after controlling for the influence of per capita GDP and trade or global flows, the Asia region had systematically higher work hours, fewer civil liberties, and lower pay. These regional findings parallel the descriptive data reported in Section 9.2. The additional contribution of the regression analyses is to show that when each country's observations receive equal weight, regional differences in growth and trade do not fully account for the regional differences in labour conditions.

Labour conditions in Asian export processing zones

Export processing zones (EPZs) have grown tremendously over the past three decades. In 1975, only 25 countries in world had established EPZs but by 2006, 130 countries had done so, with the total numbers of EPZs increasing from 79 to approximately 3 500 globally. In particular, EPZs played a prominent role in the expansion of exports and export-led growth of developing Asia. In 2006, out of the 66 million workers estimated to work in these zones globally, roughly two thirds could be found in the PRC alone (Boyenge, 2007).

While many studies on EPZs exist, it is only relatively recently that an attempt was made by the ILO to create an international database on EPZs. This ILO Database on Export Processing Zones compiled various reports on EPZs into a comprehensive global database containing country-level data on employment, investment, and exports of EPZs and provides a useful baseline to examine the patterns of growth of these EPZs (Boyenge, 2007).

An analysis of the data shows that despite the seemingly small share of total employment accounted for by the EPZs, the zones produced a disproportionately larger share of exports. In many Asian countries, less than 10% of workers work in the EPZs, yet the share of EPZ in total exports are often multiple times the percentage of the workers. In mid 2000s, EPZs were estimated to produce the majority of exports in Bangladesh, Malaysia, Pakistan, Philippines and Viet Nam (Table 9.5). In addition, EPZs are often an important source of employment for women: in Bangladesh, Korea, Philippines and Sri Lanka, more than two thirds of the workers in the zones are women.

In the early days of the development of EPZs, there was much concern about the labour conditions in these zones given the prevalence of low-wage assembly work. Earlier research had highlighted lower average wages in EPZ than the average wages of the larger host economy. Indeed, even in Korea, wages in the zones were found to be lower than that outside as late as the mid-80s (Oh, 1993). However, the active labour movement in Korea during the same time period had pushed EPZ wages to double-digit growth, eventually lifting average EPZ wages above that outside. This reversal occurred also in Malaysia by the late 1980s, although the relative differences between EPZ and non-EPZ wages varied across sectors (Kusago and Tzannatos, 1998).[12]

Nonetheless, the literature suggests that by the late 20th century, overall average wages in many EPZs has caught up or even surpassed those offered outsize the zones. Once workers' characteristics are accounted for and opportunity costs of EPZ labour were considered, the wages in the EPZ do not appear to be systematically lower than outside (Robertson *et al.*, 2009). This growth in EPZ wages is also accompanied by relatively similar working conditions compared to similar factories outside the zones. In cases where basic pays were similar, workers in EPZs often received other incentives and overtime resulting in higher take home pay. This premium could be substantial. For example, on average Bangladeshi EPZ workers were paid

12. For example, Malaysian EPZ wages in textiles and electronics were higher than outside, but workers in food, beverage, tobacco and plastic products received lower wages than those not working in EPZs.

15% to 50% higher than their counterparts outside (ILO, 1998). The EPZ premium in Bangladesh varies by skill, with skilled workers earning more than double, and those who were helpers and apprentices earning lower pay than outside the zones (Figure 9.3). Some local EPZ firms in the PRC reported wages two or three times more than those paid by local non-EPZ firms (Perman *et al.*, 2005). Geography and technological sophistication seems to play a role, since those working in the Pudong New Area received much higher wages than workers outside the EPZ (Figure 9.3). Of course, individual experiences vary across sectors and countries, and the right to organise remains restricted in EPZs in many countries.

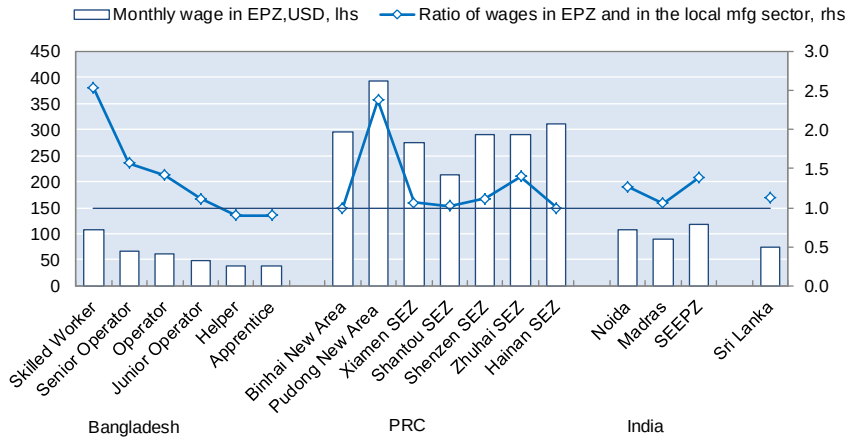
Table 9.5. EPZs in selected Asian economies

	No. of EPZs	No. of other types of econ zones	EPZ employment, % of total employment (2005-2006)	% Female	Investment (USD bln)	No. of firms	EPZ exports as % of total exports (1)
Bangladesh	8	5 341	7.26	85	1 035	252	75.6
Cambodia	3	..	0.25	..	..	..	..
PRC	15	149	5.28	..	17 030	43 360	*19.0*
Hong-Kong (China)	..	..	10.07	..	29 600	3 845	*34.7*
India	..	8	0.38	32	7 960	811	*4.9*
Indonesia	..	..	6.39	..	11 310	1 149	*21.5*
Japan	..	2	0.31	..	964 744	77	42.7
Korea, Rep. of	..	3	0.17	70	11 560	..	*10.8*
Macao (China)	..	..	55.16	..	5 378	3 100	80.0
Malaysia	13	200	4.89	54	5 512	3 000	83.0
Maldives	..	1	18.49	..	..	..	47.7
Mongolia	..	13	..	..	..	..	..
Nepal	1	..	..	..	..	..	..
Pakistan	22	4	2.07	..	3 873	300	*50.3*
Philippines	45	33	3.49	74	1 270	1 179	60.0
Singapore	7	35	..	..	6 400	7 000	..
Sri Lanka	12	4	5.46	78	287	223	38.0
Taipei, China	5	..	0.68	..	0	354	*12.4*
Thailand	10	22	1.14	..	1 442	1 357	*7.5*
Viet Nam	10	181	2.23	45	1 067	234	80-100

1-EPZ export shares for Bangladesh, Japan, Macao, Malaysia, Maldives, Philippines, Sri Lanka and Viet Nam are compiled by Boyenge (2007). The others are imputed by the authors using zone exports reported in Boyenge (2007) and merchandise exports reported by UNCTAD. For PRC, Boyenge (2007) reported an EPZ export ratio of 593.3, but the ratio of exports to official merchandise exports was 19.04 %; the authors find the latter estimate more plausible.

Sources: Boyenge (2007); UNCTAD (exports); data for Taipei, China's exports come from *www.cepd.gov.tw/encontent/*.

Figure 9.3. Wages in EPZs



Sources: ILO, CEIC, *cressence.org*, *understandchina.com*, *www.icrier.org*, *www.bbc.co.uk*, *www.wsws.org*, Aggarwal Aradhna (2007), Wage Board for Garments and Manufacturing Trade (Sri Lanka), respective central banks (exchange rates).

9.4. Foreign investment and labour conditions

With the relaxation of many capital controls, a significant increase in investment flows between countries accompanied the late 20th century globalisation. As with international trade, much of the growth regained ground lost during the retreat from the late 19th century globalisation. A parallel growth of multinational companies (MNCs) accompanied the resurgence of foreign direct investment.

These developments raise two sets of questions about the relationship between foreign investment and labour conditions. First, do labour conditions influence FDI inflows? Do cheap labour, poor labour conditions and weak support of labour rights attract FDI? And if labour conditions influence FDI flows, how important is their influence relative to other influences, such as market size and investment risks? These issues are addressed in an econometric analysis of the determinants of FDI flows.

Second, irrespective of what attracts FDI to a host country, how do the human resource management policies of MNCs influence host country labour conditions? In particular, do MNCs degrade labour conditions in host countries? This question is best addressed by micro studies comparing the working conditions at MNCs with comparable host-country firms. The rest of this section examines evidence on each of these issues.

Labour conditions and FDI flows

The 19th century globalisation included significant international capital flows, but most FDI flowed from capital-rich European countries to less-developed countries, where capital was scarce and its marginal value was accordingly high. Following the interwar retreat from global economic activity, international capital flows regained their earlier peaks during the 1990s, but with a distinctive change in the destination of investments. Most capital no longer flows toward the least developed nations where capital is scarce. Capital-poor developing countries received less than a quarter of world FDI flows during the late 20th century (Table 9.6). Instead, "capital transactions seem to be mostly a rich-rich affair, a process of 'diversification finance' rather than 'development finance' (Obstfeld and Taylor, 2003, p.175). Only in the early 21st century did the share flowing to developing countries begin to increase, although it had reached only a

third of FDI inflows by the end of the century's first decade. The entire continent of Africa received less than 4% of world inflows in 2007-09 – little different from the 1990s. While the volume of FDI received by Asian countries increased throughout the period, their *share* of FDI inflows changed little over the past 20 years and their share of the flows to developing countries declined (Table 9.6).

Table 9.6. Foreign direct investment inflows, 1990-2009

Share of World FDI Inflows, percentages

	1990-92	1999-2001	2007-09
World	100.0	100.0	100.0
Developed countries	75.3	78.1	60.7
Developing countries	24.3	21.1	33.6
East Asia	6.3	8.2	9.9
South Asia	0.3	0.5	2.5
South-East Asia	7.4	2.2	3.2

Source: UNCTAD, World Investment Report 2010, Annex Table 1.

Even this snapshot of FDI flows undermines the notion that countries with inferior labour conditions attract international investment flows. With most FDI now flowing between industrialised nations, which offer superior labour conditions, efforts to find cheap labour and weak labour standards cannot be the primary factor motivating the international distribution of FDI.

We have explored this implication more formally in a panel data analysis of the distribution of world FDI inflow shares across countries between 2003 and 2009, a time period governed by the availability of some key variables (*X)*. Our strategy is to estimate a baseline model and then to see if the explanatory power of the model improves with the addition of measures of labour conditions (*Z*). We also include geographical dummy variables (*GEO*) to test for the effects of being in Asia and in the PRC.

$$FDI\ Share_i = \alpha + \beta_j \sum_j^J X_{ji} + \gamma_k \sum_k^K Z_{ki} + \delta_l \sum_l^L GEO_{li} + \varepsilon_i \qquad (2)$$

The baseline analysis of equation (2) assumes that investors seek to maximise their expected return and tests the hypotheses that these returns depend on market size, investment risks, the availability of complementary inputs, and a country's openness to international trade. In measuring market size, we capture both the number of potential consumers (Population) and their income (Per capita GDP).

Our preferred measure of investment risk is a Euro money country credit-worthiness scale reported in the *World Competitiveness Yearbook* (*WCY*). Higher scale values imply lower risk and hence higher FDI shares. We also tested for the influence of several institutional and regulatory factors that might influence the costs of doing business in a country. The ratio of government consumption expenditure to GDP is frequently used in growth studies as a proxy for the degree of government intervention in the economy, but this variable was not statistically significant in our analyses. Other variables were based on *WCY* survey responses of business executives' perceptions of the regulatory environment, personal security, the protection of property, and bribery and corruption. As discussed below, two of these measures – survey responses to the statements "Bribing and corruption do not exist" (Bribe) and "Labor regulations do not hinder business activities" (Labor Regulation) – were significantly related to

a country's share of world FDI inflows in some regressions. Each of these variables is measured on a 0 to 10 scale with higher values indicating stronger agreement with the statements.

The regressions also tested for complementary between FDI and land (the area of a country in millions of square kilometers) and with the skill of the labour force. Skill is measured variously by the percent of the population achieving at least tertiary education, executive survey responses indicating whether "skilled labour is readily available," and (inversely) by the percent of the population over 15 years old that is illiterate. The trade share of GDP (lagged one year) tests for the effects of international economic integration on a country's FDI inflow share.

The analysis finds that countries with large markets, low investment risks, and a large trade share of GDP attract larger shares of FDI inflows (Table 9.7, regression 1). FDI and land appear to be complements. We found no significant correlation between any of the measures of labour skill and FDI inflow shares and we have dropped skill measures from the analysis. At least in the early 21st century, there was no evidence that FDI was attracted to countries with abundant unskilled labour, *ceteris paribus*. The result also does not provide a general confirmation for the notion that when trade and FDI transfer skill-intensive technologies developed in industrialised countries, the demand for and returns to skilled labour in developing countries increase. [Recent studies of Brazil and Mexico have found such effects (Arbache, Dickerson and Green, 2004).] The overall regression fit is good, with the model accounting for more than 60% of the variance in FDI inflow shares among 55 countries between 2003 and 2009. [13]

The baseline model highlights factors that would tend to reduce FDI shares in Asian countries and factors that would tend to raise them. Relative to the rest of the world, Asian countries on average have lower GDP, higher investment risks, and more concerns about bribery. On the other hand, average population size and trade share are larger in Asia. Nonetheless, the baseline model does not capture all the factors producing relatively lower FDI inflow shares in Asia. When a dummy variable for Asian countries is added to the baseline regression model, the result is significantly negative and the statistical properties of the regression improve (Table 9.7, regression 2). Even after holding the effects of the independent variables constant, the Asian region receives a comparatively smaller share of world FDI inflows.

We made a preliminary assessment of the effect of national labour regulations on FDI by adding the Labor Regulation variable to the baseline specification (Table 9.7, regression 3). The coefficient was significantly positive, meaning that countries in which business executives believe that labour regulations do not hinder economic activity receive a larger share of world FDI, other influences equal. Unlike other measures of labour regulation by country, this variable is available for several years, but it provides no indication of which labour regulations concern potential foreign investors the most. We also tested for the influence of a country's labour conditions on FDI by adding measures of working conditions and labour rights to the baseline econometric model. In these regressions, high FDI shares are not significantly correlated with poor labour conditions – low pay, long work hours, and limited freedom of association rights.

13. Initial results from ordinary least squares regression suggest patterns of significance similar to that obtained from these panel procedures with random effects.

Table 9.7. FDI share regressions, 2003-2009

	1	2	3	4	5	6
Per capita GDP	.367	.348	.326	0.374	0.351	0.351
	(.227)	(.208)*	(.191)*	(0.234)	(1.89)*	(0.231)
Population	.630	.786	.841	0.625	0.835	0.637
	(.081)***	(.070)***	(.068)***	(0.083)***	(0.069)***	(0.085)***
Investment Risk	.021	.019	.020	0.021	0.019	0.022
	(.010)**	(.009)**	(.009)**	(0.101)**	(0.009)**	(0.009)**
Bribe	.076	.106	.084	0.076	0.086	0.063
	(.046)*	(.046)**	(.044)*	(0.046)	(0.044)*	(0.047)
Area	.00006	.00004	.00002	0.0005	0.00001	0.00005
	(.00002)***	(.00002)**	(.00002)	(0.0002)***	(.00002)	(0.00002)**
Trade share (lagged)	.376	.565	.569	0.371	0.564	0.359
	(.137)***	(.153)***	(.153)***	(0.137)***	(.153)***	(0.137)***
Labour Regulation			.105		0.102	0.049
			(.055)*		(0.056)*	(0.057)
Asia		-.834	-1.020		-1.044	
		(.266)***	(.260)***		(0.261)***	
PRC				0.225	0.514	0.119
				(0.303)	(0.233)	(0.326)
R^2	.609	.660	.674	0.609	0.677	0.609
Observations	350	350	350	350	350	350
Countries	55	55	55	55	55	55

Note: Random effects estimation. Robust standard errors in parentheses. See text and Appendix 9.A1 for variable definitions. ***p-value <.01 **p-value <.05 *p-value <.10.

In the recent years, the rise of the PRC as a major exporter and major FDI destination also brings up the question whether the "Chinese effect" would alter the previous findings on the patterns of FDI shares. However, additional robustness checks (Table 9.7, regressions 4-6) indicate that this is not the case. The coefficient on the PRC dummy variable is not significant across any of the regressions once other characteristics of the country are accounted for. In other words, the empirical results suggest that FDI inflows to the PRC not because the PRC is a special case, but rather due a combination of the size of its population, openness, and other characteristics.

The evidence on patterns and determinants of FDI inflows has a bearing on two views of why companies locate production abroad in the first place. One view holds that foreign investment is attractive when it offers specific location advantages, such as mineral deposits or cheap labour. This view apparently underlies assertions that poor labour conditions attract foreign investment. An alternative view holds that multinational companies transfer important productive inputs that host countries lack – unique technology, managerial skills, and superior knowledge of organisational design and production methods (Hymer, 1960; Caves, 1996;

Markusen, 2002). MNCs need such firm-specific "knowledge capital" if they are to overcome their lack of familiarity with local regulations, marketing practices, human resource management policies and other aspects of management that are sensitive to differences in local cultures. Under the knowledge-capital view, the possession of firm-specific assets that can profitably be combined with local inputs in host countries drives foreign investment – not an effort to exploit local inputs.

The fact that neither broad patterns of FDI inflows nor statistical analyses of the determinants of those inflows reveal evidence of significant links between foreign investment and labour conditions supports the "knowledge capital" hypothesis over the "location advantage" hypothesis of investment motivation. The difference in these views is also important for understanding the impact of MNCs on host-country labour conditions – the topic of the next section. Combining such firm-specific assets with local inputs should raise, not lower, the productivity of host-country affiliates. In short, the knowledge capital scenario explains why MNCs might offer higher wages than their host-country competitors.

Why are the results of the analysis of FDI inflows so inconsistent with the location-advantage hypothesis? Poor labour conditions signal low productivity as well as low wages, and not all investments thrive in a low-productivity environment. Moreover, countries with poor labour conditions tend to be countries in which direct risks to investment are high. Risks of expropriation and repudiation of contracts are highest in countries with few civil liberties, for example. These risks effectively counter whatever advantages cheap labour might provide.

Multinational companies and labour conditions

The impact of a multinational company on working conditions in a host country depends on the extent to which it must compete with other MNCs or host country firms for its workers and on the local elasticity of labour supply. If multinationals establish inferior conditions in newly-constructed plants, they will face recruiting and retention difficulties when competing with other firms for labour. If they instead acquire local companies and try to worsen working conditions, they will encounter increased quit rates as workers leave to join host country firms offering superior conditions.

Whether the arrival of MNCs can improve working conditions depends on labour supply conditions in the host country and the human resource management policies of the firm. In markets with a limitless supply of labour available at the current wage, increased labour demand from MNCs or host country firms will raise employment, but not wages. When workers require inducements to overcome the costs of changing employers, however, labour supply is less elastic, and increases in labour demand from MNCs will raise both wages and employment. When firms compete for labour, the effect of increased demand on wages depends on what workers are willing to accept – not on what firms may wish to pay.

If MNCs do not compete with other firms for labour services, they may force labour conditions below competitive levels. Firms in isolated locations, such as some mining districts, may have such "monopsony" power, but situations in which labour has no choice of employers seem too rare to accept monopsony as a general phenomenon. Indeed, by *adding* to the number of employers in a labour market, the arrival of MNCs should improve labour conditions by reducing monopsony power in host-country labour markets.

The conclusions of the research community on the impact of MNCs on wages are nicely summarised in the following statement: "It seems to be a universal rule that, in every country, foreign owned firms and plants pay higher wages, on average, than domestically owned ones.

That is true not only in developing countries, but also in high income countries, such as Canada, the United States and the United Kingdom." (Lipsey and Sjoholm, 2001). The persistence of higher pay in MNCs implies that labour productivity in foreign affiliates must systematically exceed productivity in host-country firms. Comparisons of value added per employee confirm this implication. According to United Nations data for the mid-1990s, foreign-affiliate productivity exceeded domestic firm productivity by 37% (Hong Kong), 65% (Malaysia), 137% (PRC) and 373% (Taipei, China). Significant but smaller productivity premia for foreign affiliates were recorded in most major European and North American countries (UNCTAD, 2002, Annex Table A.1.5).

Table 9.8. Ratio of compensation in MNEs and local manufacturing

	2000(a)		2008(b)		Average annual % change
Bangladesh	21.29		19.28		-1.2
Brunei	8.48	a	15.23		11.4
China	7.24		3.10		-7.1
Hong Kong, China	2.24		2.27	b	0.2
India	11.63		11.43	b	-0.2
Indonesia	20.58		13.56		-4.3
Japan (1)	1.36		1.14		-2.0
Korea (1)	2.01		1.73		-1.7
Malaysia	2.66	a	2.29		-3.5
New Zealand (1)	1.24		1.08		-1.6
Philippines (1)	4.99		3.22		-4.4
Singapore (1)	1.46		1.27		-1.6
Sri Lanka	21.25		11.39		-5.8
Taipei, China (1)	1.73		1.69		-0.2
Thailand	4.02		4.05		0.1
Viet Nam	3.62		6.87		11.2

Note: MNE wage def: Average monthly compensation per worker paid by the foreign affiliates of the US MNEs per year 1-Manufacturing wage data - Average direct pay per employee (BLS); or the other countries - data were obtained from ILO-Laborsta or CEIC.

a) 2000 data: Brunei-2001, Malaysia-2004.

b) 2008 data: Hong Kong-2007, India-2007.

Sources: BEA, BLS, ILO and CEIC

Some of the superior productivity and pay of foreign affiliates reflects differences in industry, firm size, and use of skilled labour. Nevertheless, many studies find that foreign-affiliate pay premia (on the order of 3% to 5%) remain after controlling for differences in the characteristics of these MNCs and host-country firms. The premia themselves may reflect the tendency of MNCs to provide more specific training than host-country firms and other unobserved workforce or management quality differences between foreign and domestic firms.

9.5. Concluding comments

During the late 20th and early 21st century, a broad improvement in working conditions and labour rights around the world accompanied a significant expansion of international trade and investment. Some of the improvement would have occurred anyway to the extent that countries advanced their per capita income without the larger trade flows. But to the extent that trade itself raises per capita income, it advances both working conditions and labour rights. In this

sense, the improvements in labour conditions during the post-war globalisation are consistent with the general predictions of international trade theories. Moreover, we do not find evidence that countries with poor labour conditions acquire larger trade shares, *ceteris paribus*.

Our analyses do not reveal evidence that countries with poor labour conditions attract disproportionate shares of FDI. Market size and investment risk are the dominant influences on FDI. After accounting for their influence, actual labour conditions play a negligible role in the destination of FDI inflows. Perceptions of the constraints imposed by national labour regulations can influence a country's FDI share, however. Our review of the growing literature on the impact of multinational companies on host-country labour markets finds no evidence that multinationals depress wages. Instead, the evidence seems consistent with the "knowledge capital hypothesis" that foreign firms bring firm-specific technical and managerial advantages that produce the higher productivity that supports higher wages.

Finally, we note that international trade and investment flows represent only two of the globalisation mechanisms influencing labour conditions and international inequality. This paper has not discussed the historically important role of international labour markets in altering global working conditions. Economic historians have found convincing evidence that most of the transatlantic convergence in real wages during the first wave of globalisation was attributable to migration flows rather than trade flows (Hatton and Williamson, 1998, 2008; O'Rourke and Williamson, 1999).

Concerns about the consequences of migration for the wages of (some) native workers ultimately led major destination countries to adopt significant immigration restrictions, some of which have now been in place for over a century. Meanwhile, incentives to move from poorer to richer countries remain at least as large as they were during the first wave of globalisation. Limiting the role of international labour markets slows the improvement of working conditions and some labour rights in developing countries. International migration can raise the wage incomes of both migrants and the nonmigrants who remain behind. Immigration barriers also slow the advance of key human rights. By thwarting a mechanism for raising family incomes, immigration restrictions slow the decline of child labour in developing countries. By limiting the range of global employment choices, the barriers also make it difficult for individuals or groups to escape the effects of domestic discrimination. The forced labour associated with trafficking in human beings is also directly traceable to barriers to legal migration across national boundaries.

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Appendix 9.A1.

Sources and concepts

This paper considers three dimensions of working conditions—pay, hours of work, and job safety – and four dimensions of labour rights – child labour, employment discrimination, freedom of association, and forced labour. For the data sources for analyses of the late 20th century, see Flanagan (2006, Appendix A). Analyses for the first decade of the 21st century use the data base in IMD, *World Competitiveness Yearbook*, downloaded from the IMD website. This database includes data acquired from international organisations and national governments as well as special survey data acquired by IMD from cooperating research institutes around the world. Annex IV of the *World Competitiveness Yearbook* provides a complete guide to all sources. To this database we added variables provide by the International Labour Organization (ILO). This Appendix notes conceptual differences in data for the late 20th and early 21st century.

We use the *annual* compensation per worker in manufacturing to measure pay in the late 20th century (UNIDO, 2002). This measure includes direct wages plus contributions by employers to social security programs. For the early 21st century, pay consists of *hourly* earnings per worker in manufacturing. Three measures of work hours are analysed in the late 20th century: The proportion of employees who usually work more than 40 hours a week; weekly hours of work in manufacturing; and annual work hours for all employees. The early 21st century analysis uses the last measure.

Efforts to measure job safety for a broad sample of countries encounter significant barriers. In contrast to data on pay and work hours, there is no general measure of job safety available for a large sample of countries. This paper uses the rate of *fatal* on-the-job injuries per 100 000 employees, available from the ILO. (Data on nonfatal accidents are even scarcer.) Among countries that publish industrial accident data, reporting practices vary widely. Data may variously be acquired from establishment surveys, the records of labour inspectors, insurance records, or other administrative sources. Some countries count reported injuries, while others report only compensated injuries. We have adjusted the ILO data to a common base (100 000 employees), but the remaining variation in reporting practices indicate that changes over time within a country are likely to be more informative than cross-country comparisons.

Thanks largely to the efforts of social scientists, indicators of labour rights now exist for a substantial cross-section of countries, but measures pertinent for only two of the four core labour rights – workplace freedom of association and child labour – are available for multiple years. Most of our analyses of freedom of association rights use a broad measure of civil liberties developed by Freedom House (*www.freedomhouse.org/*). The Freedom House index evaluates actual national practices rather than constitutional guarantees and ranges from 1 to 7 with the *lowest* scores indicating the strongest liberties. A recent study (Freedom House, 2010) permits an evaluation of how well the general civil liberties index captures workers' freedom of association. For 2010 only, Freedom House developed a five-point measure of worker rights for each country, with the *highest* scores indicating the strongest rights. The cross-country correlation between that index and the general civil liberty index in 2010 is -.91 (where the negative sign reflects the different scaling of the two measures). For the mid-1990s only, there

is an index of workplace freedom of association and collective bargaining rights (Kucera, 2002). The index reflects an evaluation and weighting of 37 potential interferences with rights to form and operate unions, bargain collectively, and strike. The index ranges from 0 to 10, with low numbers reflecting superior workplace freedom of association rights.

Of the four core labour rights, nondiscrimination in employment is the most controversial to measure. Differences in worker qualifications account for some group differences in outcomes, but not all qualifications can necessarily be observed or measured. Some imprecision in purported measurements of discrimination always remains. We measure labour market discrimination as the percentage difference between male and female wages that remains *after* adjustments for gender differences in schooling, experience, and other performance-related variables. The focus on gender provides a benchmark for discrimination that is widely available. The data come from a meta-analysis of 263 published papers offering 788 estimates of gender pay differentials in various years from the 1960s through the 1990s in 63 countries (Weichselbaumer and Winter-Ebner, 2003). The meta-analysis generated estimates of *net* gender wage differences for each of the countries, after controlling for year and characteristics of the study. The estimated country effects constitute the measures of discrimination used in this study. Only one observation per country is available—dated here as 1985, about the middle of the period covered by the studies in the meta-analysis.

We rely on two approaches adopted by other social scientists to measuring the prevalence of forced labour. The first approach estimates the number of forced labourers. One study estimates 27 million forced labourers worldwide in the late 1990s and provides tentative country-by-country estimates with many caveats (Bales, 2000, 2004a, 2004b). We use the mid-point of his published range for each country. (Later, the ILO published a much lower estimate of 12.3 million victims of forced labour worldwide based on double-sampling of reports between 1995 and 2004 (ILO, 2005). The ILO report stated reasons why this figure might be an underestimate. The ILO did not report estimates by country, so their approach could not be incorporated in our analyses.) The second approach counts the *varieties* of forced labour found in a country, as indicated in qualitative reports by the US Department of State and human rights organisations. Ranging from 0 to 8, this variable is available only for the late 1990s (Busse and Braun, 2003).

Chapter 10

Regional Trade Agreements and Domestic Labour Market Regulation[+]

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and

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This paper discusses the relationship between labour market regulation and regional trade agreements from both a legal and an economic angle. We examine empirically whether regional trade liberalisation is associated with deterioration of domestic labour standards beyond those reflected in the 1998 ILO Declaration on the Fundamental Principles and Rights at Work ("race to the bottom"). Using a panel of 90 developed and developing countries, covering the years from 1980 to 2005, we find that after the entry into force of a regional trade agreement (RTA), labour standards applying to employment protection and unemployment benefits are sometimes significantly weakened. We show that such a lowering of protection levels occurs only in high income countries and that this effect mainly stems from RTAs among such countries rather than with low or middle income countries.

Concern about competitive pressure to weaken domestic labour regulation is reflected in a variety of undertakings in RTAs not to administer labour laws with a view to improving one's competitive position in trade or foreign direct investment (FDI). The above-mentioned empirical findings indicate that such provisions could potentially become relevant, and that this is more likely to be the case for high income members of RTAs. Our analysis, from a legal point of view, of relevant institutional and procedural mechanisms indicates however that enforceability of the relevant provisions is weak for most of the existing legal texts.

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10.1. Introduction

Increasing economic integration among countries has contributed to increasing concerns about a 'race to the bottom' in labour standards, i.e. a vicious circle of ever lower labour standards in order to remain competitive in global markets. Indeed, to the extent that labour standards increase production costs they will have repercussions on relative prices and thus possibly trade flows. Accordingly, when border protection is reduced, governments may feel tempted to boost the competitive position of domestic producers by reducing the cost of regulation born by their enterprises even if this implies a lowering of the levels of protection that regulation is meant to provide to workers. In the absence of internationally agreed rules on domestic regulation, races to the bottom could arise, just like tariff or subsidy wars could arise in the absence of relevant multilateral rules on trade policies (Copeland, 1990; Bagwell and Staiger, 2002).

The concern that openness may compel individual governments not to raise or even to lower labour standards has led to calls for tying labour provisions to trade arrangements between countries. According to the International Labour Organization (ILO) (2009), labour provisions in trade agreements have substantially increased in prevalence over the past 25 years. Many of these labour provisions make reference to internationally recognised core labour standards. In particular, explicit reference is often made to the 1998 ILO Declaration on the Fundamental Principles and Rights at Work, with stipulations requiring the improvement of freedom of association and collective bargaining rights, the abolition of forced and child labour, and non-discrimination.[1] ILO (2009) also indicates that in recent years, preferential trade agreements increasingly contain provisions making reference to domestic labour regulation.

In this paper we take a deeper look at the latter type of provisions and analyse them in detail. We pay particular attention to provisions implying commitments to prevent undercutting of domestic labour standards below levels prevalent upon entering the trade agreement and those reflecting commitments to strive to improve upon prevalent standards.[2] Such provisions have the characteristic to take as a reference point the level of protection provided by domestic labour standards at the time of signing the trade agreement. They discipline deviations that lower those protection levels and encourage deviations in the direction of increasing protection levels. Those provisions therefore do not explicitly encourage harmonisation of standards and existing differences in protection that reflect cross-country differences in productivity or income levels can be maintained.[3] The discussion in this chapter focuses on relevant provisions in Regional Trade Agreements (RTAs) concluded by the United States, by the European Union and those concluded in the Asian-Pacific region. It turns out that different players appear to have different preferences as to which type of provisions they refer to in their RTAs.

Provisions referring to labour standards are most frequent in RTAs involving the United States and the European Union, and they tend to be introduced on the behest of their

1. The term "core labour standards" often used in the relevant economic literature typically refers to the principles and rights stipulated in the 1998 ILO Declaration.

2. Although those provisions do not explicitly refer to ILO Conventions, the question nevertheless arises how the obligations of Parties to the relevant trade agreements relate to the obligations the same States have as a member of the ILO and as party to possibly relevant ILO Conventions. This question is not further examined in this paper. For a discussion regarding the coherence of trade-related labour provisions with ILO standards see Gravel, Kohiyama and Tsotroudi (2011).

3. See Brown, Deardorf and Stern (2011) for a discussion of cross-country heterogeneity of standards for economic efficiency.

parliaments.[4] Labour movements and other stakeholders in the United States and the European Union often demand the inclusion of references to labour standards in RTAs. It is our assumption that one of the objectives behind such requests is to protect overall domestic labour market conditions. Such RTAs usually include a commitment to adhere to the ILO Fundamental Principles and Rights at Work, and in addition commit the parties to prevent the undercutting of domestic labour standards, or to improve upon prevailing domestic standards.[5] It is therefore our interpretation that, for the European Union and United States, provisions preventing a lowering or encouraging an improvement of existing standards aim at labour market conditions going beyond international 'core' labour standards as reflected in the Fundamental Principles and Rights at Work.

In our empirical work we examine whether "race to the bottom" concerns are justified by examining whether regional trade liberalisation has gone hand in hand with a weakening of labour market regulation other than that based on core labour standards. Our analysis therefore fills a gap in the by now relatively large empirical literature on the relationship between labour standards and trade that has tended to focus on core labour standards. In this paper, we use a recent dataset from the Fondazione Rodolfo Debenedetti (FRDB) that contains data on employment protection legislation (EPL) and unemployment benefits (UB) for the period 1980 to 2005. Both types of measures represent labour regulations that impact the working conditions and possibly production costs in a country. Particularly in a context of trade among developed countries, these variables are likely to be more pertinent for determining comparative advantage than core labour standards, as developed countries tend to take similar approaches to implementing the latter. We use panel regression techniques to examine whether increased trade within RTAs is associated with lower labour standards, in the sense of lower employment protection legislation or lower unemployment benefits. We include the usual control variables in our regression and also examine whether the effect of trade within RTAs differs across countries of different income levels. Our analysis has a number of limitations. It suffers from the endogeneity problem that is typical for this type of empirical work, but we try to address this as well as we can with standard techniques. Our data do not allow us to analyse whether inclusion of labour provisions in RTAs has an impact on the relationship between trade and labour standards. This is the case, because most relevant RTAs have been concluded too recently. Last but not least, labour provisions in private sector initiatives, such as codes of labour practice of multinational companies, are also not at all covered in this chapter.

The paper is organised as follows. Section 10.2 provides an overview of the type of labour provisions currently found in Regional Trade Agreements. Particular emphasis is given in this discussion to labour provisions referring to domestic (rather than international) labour market regulation. Section 10.3 provides an overview of the existing economic literature on international and domestic labour standards and trade. This overview reveals that few contributions have explicitly examined whether trade within RTAs leads to weaker domestic labour market regulation. In section 10.4, we present evidence on the evolution of trade within RTAs in the past decades and the evolution of employment protection legislation and unemployment benefits across countries and over time. We then present findings of a dynamic

4. See Elliott (2011) and Bourgeois, Dawar and Evenett (2007).

5. All EU Member States have ratified the conventions referred to in ILO Fundamental Principles and Rights at work. Although it has only ratified two of the eight conventions of the ILO Fundamental Principles and Rights at Work, the US tends to apply domestic laws that are equivalent to the relevant conventions, albeit with some differences with regard to freedom of association. Both the EU and the US therefore appear to be substantially committed to the Fundamental Principles and Rights at Work that reflect core labour standards.

panel analysis estimating the impact of trade within RTAs on these two types of labour variables. We find that increased regional trade has indeed gone hand in hand with a weakening of domestic labour market regulation, albeit only in our sample of industrialised countries. Section 10.5 discusses whether current provisions in RTAs have the potential to be effective to avoid the observed weakening of labour standards. Section 10.6 concludes.

10.2. References to labour provisions in RTAs

This section describes and analyses the legal provisions referring to labour standards in trade agreements. While references to ILO's fundamental principles and rights at work have been well-researched and discussed elsewhere (Doumbia-Henry and Gravel 2006), our study focuses on references to domestic labour market regulation and their impact.

We start our examination with three general comments before analysing in more detail examples from RTAs of major trading nations. The section concludes with a general typology on which we will then base our econometric study. Different institutional and procedural mechanisms foreseen for implementation purposes, including dispute settlement provisions and the thorny issue of sanctions in case of infringements and non-compliance will be discussed in Section 10.5.

Generalities

First, references to labour standards can be found in at least three types of international economic law instruments, namely in various types of trade agreements, in unilateral trade preference schemes under the Generalized System of Preferences (GSP), and in bilateral investment protection treaties (BIT). Our study focuses on labour provisions contained in RTAs (including bilateral agreements) notified to the WTO under GATT-Article XXIV. We note, however, that some of the more recent agreements are of a comprehensive nature and go far beyond trade in goods. Among others, the United States – Peru agreement which entered into force on 1 January 2009 also covers trade in services including the movement of natural persons, government procurement, environment, competition policy and investment. As will be seen in Section 10.5, the institutional arrangements and the various dispute settlement mechanisms in this agreement, including Arbitral Panels and Private Commercial Dispute Settlement, extend to most of these subjects. Our legal analysis of the normative value of labour provisions in RTAs thus automatically extends to some of these areas as well.

Secondly, in 2009, the ILO reported that "labour provisions adopted in trade arrangements have multiplied over the past 25 years".[6] This study estimated that 37 out of 186 bilateral and regional trade agreements in force and notified to the WTO contained labour provisions,[7] and underlined that this represented a considerable increase from only four such agreements in 1995. According to the same ILO report, 60% of these provisions made specific references to ILO Conventions or to the ILO 1998 Declaration. Also, 46% were found to be "conditional" (foreseeing sanctions or positive incentives), while 54% were "promotional" (involving

6. ILO (2009), p. 63.

7. The WTO Secretariat lists trade-related agreements notified by its Members and in force. The database is available at *http://rtais.wto.org/ui/PublicMaintainRTAHome.*aspx (accessed 28 April 2011). It should be pointed out that a comparison between ILO and WTO databases is subject to limitations since, in the latter, labour provisions are only counted if they have been mentioned explicitly under the WTO transparency mechanism. As a result, numerous FTA labour provisions – even the most well-known ones, such as those in Northern American FTAs – are not covered by this approach.

monitoring and capacity building). Moreover, the most widespread type of reference was "the requirement not to lower the level of protection of their national labour law in order to encourage trade and investment."[8]

Using a different approach for identifying labour provisions, the WTO Secretariat arrives at a number of 17 out of 202 in force in 2011, with only ten having developing countries as treaty partners. With one exception all of these 17 agreements entered into force in the 21st century. This makes any empirical impact assessment difficult, and it may also help to explain the almost total absence of case law.[9] It is worth while pointing out, also, that the RTAs concluded by the United States and the European Union are one of the main drivers behind the observed increased frequency of labour provisions in RTAs.[10]

Our third general remark concerns the many different approaches to labour provisions in trade agreements. Bartels (2009) provides an overview of the RTAs in force, showing that there is no clear pattern. Dawar (2008) underlines that, even among developed countries, the practice is far from being universal. Though the United States and the European Union regularly include such references into their new agreements, this is not done in a consistent way. Other industrialised countries – except perhaps New Zealand – are more reluctant. Bartels (2009) noted that Australia rejects such a linkage as a matter of principle; it has only in its FTAs with the United States (2005) and later with Chile (2009) accepted to insert a reference to labour standards; Japan and Switzerland seem to have similar views on the matter. These countries rarely include references to labour standards in their RTAs. Norway and Iceland, which might have been more pro-active in this field, have concluded most of their RTAs together with Switzerland and in the framework of the European Free Trade Agreement (EFTA). This may explain why no EFTA RTA contains specific commitments on labour standards.[11]

On the other side and rather as an exception for FTAs among industrialised countries, the recent Japan – Switzerland agreement (2009) has a relatively stringent formulation in this respect:[12]

> Art. 101. "The Parties recognise that it is inappropriate to encourage investment activities by relaxing domestic health, safety or environmental measures or *lowering labour standards*. To this effect, each Party *should not waive or otherwise derogate* from such measures and standards as an encouragement for establishment, acquisition or expansion of investments in its Area." (emphasis added).[13]

8. ILO (2009), p. 71.

9. Under NAFTA/NAALC, though, more than 35 cases have been filed so far.

10. See Horn, Mavroidis and Sapir (2010) for a similar view. Ebert and Posthuma (2011) also emphasise the role of Canada, Chile and New Zealand in the shaping of labour provisions in Regional Trade Agreements.

11. The EFTA-Hong Kong FTA which was signed in June 2011 contains (promotional) labour provisions in a separate side agreement. The entry into force of this agreement was pending at the time of writing this paper.

12. A similar provision is contained in the Japan-Philippines FTA.

13. A very similar provision is contained in the Japan-Philippines FTA. The EFTA-Hong Kong FTA which has been concluded but not yet entered into force has (promotional) labour provisions attached to it in a separate side agreement. See at: *http://www.efta.int/free-trade/free-trade-agreements/hong-kong/labour-agreement.aspx* (Accessed 02.04.2012).

RTAs among developing countries tend to place social policies in a development context. There are very few references to labour provisions, sometimes by way of a fleeting reference to ILO core labour standards, but no mutually binding commitments, let alone enforcement mechanisms. Where there are references to labour provisions, they underline the primacy of domestic regulation.

In the absence of any concerted drive, let alone a multilateral framework guiding the interface between labour standards and trade agreements, this variety of situations is hardly surprising.

United States

Basically on the insistence of Congress as the ratifying authority for all trade agreements, the US Government has included labour in its trade negotiating agenda since at least 1974.[14] Improvements in labour protection by other countries were sought unilaterally, bilaterally and at the regional and multilateral level. The biggest effort was made in the context of various US trade preference schemes, for instance for Ecuador (Elliot, 2004). At the regional level, it is in the first RTA to which the United States became a party that substantial labour provisions were introduced for the first time in a side agreement, i.e. in the North American Free Trade Agreement (NAFTA 1994). Since then the United States has incorporated different labour provisions in all of its RTAs. In the multilateral trading system, however, all attempts made by the United States and other developed countries have so far remained unsuccessful.

By April 2011, ten US agreements were notified to WTO and in force. The following table summarises the types of references to labour standards contained in the other nine agreements.

This table shows that the labour provisions in US agreements are often a mixture of duties ("prevent child labor") and of commitments to avoid a "race to the bottom" ("enforce labor laws in a manner affecting trade"). A feature also found in some of the more recent US treaties with developing countries are various active cooperation mechanisms implemented through labour councils mandated to seek 'opportunities to improve labor standards.'

The most elaborate labour provisions in any of these agreements remain those in the North American Free Trade Agreement (NAFTA). Social matters are linked to the trade provisions through a side agreement called the North American Agreement on Labor Cooperation (NAALC). Regarding the levels of protection, Article 2 provides that all three trading partners shall ensure high levels of labour standards:

> "Affirming full respect for each Party's constitution, and recognising *the right of each Party to establish its own domestic labor standards, and to adopt or modify accordingly its labor laws and regulations*, each Party *shall ensure that its labor laws and regulations provide for high labor standards*, consistent with high quality and productivity workplaces, and shall continue to strive to improve those standards in that light."

The NAALC does not define how "high" these standards have to be, nor does it prescribe any particular type of improvements. At the domestic level, all the signatories have to do is to "continue to strive to improve" their own standards.

14. See Elliott (2011) for a more extensive discussion.

Table 10.1. Labour Provisions in RTAs to which the United States is a party, April 2011[15]

RTA Parties	Type of agreement [a]	Date of entry into force	Place and types of labour provisions
North American Free Trade Agreement (NAFTA)	FTA&EIA	01-Jan-94	Side agreement: Ensure high levels of labour standards and strive for a continuous improvement of domestic standards (further described below).
US - Australia	FTA&EIA	01-Jan-05	Main agreement: 'A Party shall not fail to effectively enforce its labour laws, through a sustained or recurring course of action or inaction, in a manner affecting trade between the Parties.' (Art.18.1)
US - Bahrain	FTA&EIA	01-Aug-06	Main agreement: Similar provisions as for US – Australia (e.g. Art.15.2). The promotion of labour standards is laid down in a 'Labor Cooperation Mechanism' while implementation is regulated in an Annex.
US - Chile	FTA&EIA	01-Jan-04	Main agreement: Similar provisions as for US – Australia (e.g. Art.18.2), including through a 'Labor Cooperation Mechanism' (Annex to Art.18.5).
US - Jordan	FTA&EIA	17-Dec-01	Main agreement: 'each Party shall strive to ensure that it does not waive or otherwise derogate from, or offer to waive or otherwise derogate from, such [labor] laws as an encouragement for trade with the other Party' (Art.6.2). Joint Committee to consider 'opportunities to improve labor standards' (Art.6.5).
US - Morocco	FTA&EIA	01-Jan-06	Main agreement: Similar provisions as for US – Jordan (e.g. Art.16.2), including through 'Labor Cooperation', especially to prevent child labor (compliance with ILO Convention 182).
US - Oman	FTA&EIA	01-Jan-09	Main agreement: Each Party shall 'strive to ensure' compliance with the *ILO Declaration on Fundamental Principles and Rights at Work and its Follow-up* (1998) (Article 16.7), including through a Labor Cooperation Mechanism (Annex 16-A).
US - Peru	FTA&EIA	01-Feb-09	Main agreement: 'Neither Party shall waive or otherwise derogate from, or offer to waive or otherwise derogate from, its statutes or regulations […] in a manner affecting trade or investment between the Parties, where the waiver or derogation would be inconsistent with a fundamental right set out in that paragraph.' (Art.17.2.2). A 'Labor Affairs Council' (Art.17.5) is to 'oversee the implementation', and a 'Labor Cooperation and Capacity Building Mechanism' is to ensure compliance with ILO Convention 182 (Art.17.6).
US - Singapore	FTA&EIA	01-Jan-04	Main agreement: Similar provisions and institutional arrangements as for US – Oman (Chapter 17 and Annex 17A).

a) The database which is regularly updated and available on-line contains four types of agreements: Free Trade Agreements (FTA), Customs Unions (CU), Economic Integration Agreements (EIA) and "Partial Scope" Agreements (PS).

Source: WTO RTA Database (*rtais.wto.org/UI/PublicAllRTAList.aspx* accessed 19 April 2011). Content description by the authors.

Most RTAs explicitly reserve the right of the Parties to establish their own labour standards and – except for references to ILO – exclude common standards applicable to each signatory's domestic labour legislation. A significant provision found in several RTAs is an explicit recognition that the administration of labour standards implies a considerable degree of discretion which by itself cannot be viewed as having a trade-distorting effect. For example, Article 17.2.1(b) of the United States – Singapore FTA foresees that:

15. The US – Israel FTA which was signed and entered into force back in 1985 – as the first FTA entered into by the United States – contains no specific labour provisions in either the main text or in an annex.

> "each Party retains the right to exercise discretion with respect to investigatory, prosecutorial, regulatory, and compliance matters and to make decisions regarding the allocation of resources to enforcement with respect to other labor matters determined to have higher priorities. Accordingly, the Parties understand that a Party is in compliance with subparagraph (a) where a course of action or inaction reflects a reasonable exercise of such discretion, or results from a bona fide decision regarding the allocation of resources."

The treaty text acknowledges that social protection can be relevant for trade and for investment decisions. However, with the qualifying verb "strive to", the admonition not to weaken domestic legislation or to diminish adherence to international standards stops short of clearly committing the parties not to lower their own standards:

> (Art. 17.2.2) "The Parties recognize that it is *inappropriate to encourage trade or investment* by weakening or reducing the protections afforded in domestic labor laws. Accordingly, each Party shall *strive to ensure* that it does not waive or otherwise derogate from, or offer to waive or otherwise derogate from, such laws in a manner that weakens or reduces adherence to the internationally recognized labor rights referred to in Article 17.7 as an encouragement for trade with the other Party, or as an encouragement for the establishment, acquisition, expansion, or retention of an investment in its territory." (emphasis added)

Recent developments concern the three FTAs with Colombia, Korea and Panama, which had been signed back in 2006 and 2007 but ratified by the US Congress only in October 2011.[16] One reason for the delay in ratification was the need felt by Congress to further negotiate labour provisions as originally foreseen in the legal texts. One example was the modalities laid down in the "Labor Action Plan" with Colombia on the right to collective bargaining, the prevention of violence against labor leaders and impunity from prosecution.[17] Also after signature, an example concerning Panama arose because of new concerns such as a lack of workers' protection in export processing zones.[18]

16. Of these three agreements only the United States – Korea treaty (KORUS) was in force at the time of writing this article. For the texts cf. United States – Colombia: *http://www.ustr.gov/sites/default/files/uploads/agreements/fta/colombia/asset_upload_file993_10146.pdf*; *KORUS: http://www.ustr.gov/sites/default/files/uploads/agreements/fta/korus/asset_upload_file934_12718.pdf; US - Panama http://www.ustr.gov/trade-agreements/free-trade-agreements/panama-tpa/final-text*; all three texts accessed 02.04.2012).

17. An example mentioned apparently concerned the use in Colombia of cooperatives to avoid a direct employment relationship and thereby circumvent workers' rights to bargain collectively. See "USTR Seeks To Clarify Colombian Commitments Under Labor Action Plan" *in* World Trade Online posted 28 April 2011.

18. On 30 March 2011 Deputy United States Trade Representative Miriam Sapiro announced that Panama's National Assembly was about to "ensure labor rights are respected in export processing zones and to eliminate restrictions on collective bargaining in companies less than two years old." (See *www.ustr.gov/about-us/press-office/speeches/transcripts/2011/march/statement-deputy-us-trade-representative-miri-0* accessed 29 April 2011).

The recent three agreements reaffirm the parties' obligations as members of the International Labour Organization (ILO). They refer specifically to the abolition of child labour. At the same time they confirm the right of each party to maintain its own procedures and confidentiality provisions.[19] The standard formulations and institutional arrangements in these three FTAs resemble the earlier agreements listed above, including "Labor Affairs Councils". In the agreements with Colombia and Panama, a "Labor Cooperation and Capacity Building Mechanism" is foreseen which will "take into account each Party's economy, culture, and legal system."[20] The same agreements prescribe a cooperative consultative mechanism before a labour-related dispute could be taken up under the formal dispute settlement mechanism.[21]

European Union

In 1995 the European Union started to systematically include labour clauses in all future international trade agreements, including regional trade agreements, "by way of co-operation, entailing where necessary, financial and technical assistance". Such labour standards may be part of "social chapters" containing mandatory promotion and protection of general human rights.[22]

By April 2011, 27 RTAs to which the EC is a party were in force and had been notified to the WTO. When looking at these treaties a first, interesting point is that only a few FTAs of the EU contain references to domestic labour standards – even those concluded after 1995 and with developing countries. Quite a few regulate residence and working permits for immigrants hailing from partner countries, but without having to specify that local labour standards will prevail. For instance, the EC – Montenegro FTA provides in Article 49.1(b) that:

> "the legally resident spouse and children of a worker legally employed in the territory of a Member State, with the exception of seasonal workers and of workers coming under bilateral Agreements within the meaning of Article 50, unless otherwise provided by such Agreements, shall have access to the labour market of that Member State, during the period of that worker's authorised stay of employment."

Besides such "labour market access" commitments which are not directly relevant for our study a few provisions on labour are worth noting here.

Interestingly, it is the oldest FTA of the EC which is still in force and which in its main text has a very clear, and never repeated commitment in respect of labour standards (EC – Overseas Countries and Territories (OCT), Art.52):

> "The internationally and nationally recognised *core labour standards must be respected*, in particular the freedom of association and protection of the right to organise, application of the right to organise and to bargain collectively, the abolition of forced labour, the elimination of worst forms of child labour, the minimum age for admission to employment and non-discrimination in respect to employment." (emphasis added)

19. In respect of labour-related "communications from persons of a Party" based on Art.19.5.3 in the United States-Korea draft FTA, an exchange of letters between the Korean and United States chief negotiators dated June 30, 2007 confirms "for greater certainty" that neither party will be obliged to "to establish new procedures that duplicate existing channels for reviewing such communications."

20. For Colombia, see Art. 17.6.2(c). The procedures for this mechanism are laid down in Annex 17.6. For Panama, see Art. 16.6.2(c) and Annex 16.6.

21. See Art.17.7.7 (for Colombia) and Art.16.7.7 (for Panama).

22. Bartels (2009), pp. 361-63.

Table 10.2. Labour Provision in RTA's to which the EC is a party, April 2011

RTA parties	Type of agreement	Date of entry into force
EC - Albania	FTA & EIA	01-Dec-2006 (Goods) 01-Apr-2009 (Services)
EC - Algeria	FTA	01-Sep-2005
EC - Andorra	CU	01-Jul-1991
EC - Bosnia and Herzegovina	FTA	01-Jul-2008
EC - Cameroon	FTA	01-Oct-2009
EC - CARIFORUM States EPA	FTA & EIA	01-Nov-2008
EC - Chile	FTA & EIA	01-Feb-2003 (G) 01-Mar-2005 (S)
EC - Côte d'Ivoire	FTA	01-Jan-2009
EC - Croatia	FTA & EIA	01-Mar-2002 (G) 01-Feb-2005 (S)
EC - Egypt	FTA	01-Jun-2004
EC - Faroe Islands	FTA	01-Jan-1997
EC - Former Yugoslav Republic of Macedonia	FTA & EIA	01-Jun-2001 (G) 01-Apr-2004 (S)
EC - Iceland	FTA	01-Apr-1973
EC - Israel	FTA	01-Jun-2000
EC - Jordan	FTA	01-May-2002
EC - Lebanon	FTA	01-Mar-2003
EC - Mexico	FTA & EIA	01-Jul-2000 (G) 01-Oct-2000 (S)
EC - Montenegro	FTA & EIA	01-Jan-2008 (G) 01-May-2010 (S)
EC - Morocco	FTA	01-Mar-2000
EC - Norway	FTA	01-Jul-1973
RTA parties	**Type of agreement**	**Date of entry into force**
EC - Overseas Countries and Territories (OCT)	FTA	01-Jan-1971
EC - Palestinian Authority	FTA	01-Jul-1997
EC - South Africa	FTA	01-Jan-2000
EC - Switzerland - Liechtenstein	FTA	01-Jan-1973
EC - Syria	FTA	01-Jul-1977
EC - Tunisia	FTA	01-Mar-1998
EC - Turkey	CU	01-Jan-1996

Source: WTO RTA Database (*rtais.wto.org/UI/PublicAllRTAList.aspx* accessed 29 April 2011).

The same agreement is quite explicit on the cooperation activities designed to improve working conditions (Art.8):

"The Community shall cooperate with the OCTs in relation to labour standards. Cooperation in this area shall mainly consist of:

(a) exchanges of information on respective labour laws and regulations;

(b) assistance in the formulation of labour legislation and strengthening of existing legislation;

(c) educational and awareness-raising programmes aimed at eliminating child labour;

(d) enforcement of labour legislation and regulations."

The FTA with South Africa recognises that social progress is a condition to economic development. It envisages a dialogue on social issues with a reference to the relevant ILO standards (Art.86.2):

> "The Parties consider that economic development must be accompanied by social progress. They recognise the responsibility to guarantee basic social rights, which specifically aim at the freedom of association of workers, the right to collective bargaining, the abolition of forced labour, the elimination of discrimination in respect of employment and occupation and the effective abolition of child labour. The pertinent standards of the ILO shall be the point of reference for the development of these rights."

A clause designed to prevent a "race to the bottom" – and which comes surprisingly close to the wording of the so-called non-violation clause in GATT-Article XXIII –is found in Art.135.3 of the EC – Chile FTA addressing trade in financial services:[23]

> "Nothing in this Title shall prevent a Party from applying its laws, regulations and requirements regarding entry and stay, work, labour conditions, and establishment of natural persons provided that, in so doing, it does not apply to them in such a manner as to nullify or impair the benefits accruing to the other Party under the terms of a specific provision of this Title."

The EC – Jordan FTA has a similar provision for the cross-border supply of services (Art.42):

> "For the purpose of this title, nothing in this Agreement shall prevent the Parties from applying their laws and regulations regarding entry and stay, work, labour conditions and establishment of natural persons and supply of services, provided that, in so doing, they do not apply them in a manner as to nullify or impair the benefits accruing to any Party under the terms of a specific provision of the Agreement."

In respect of foreign direct investment, the Preamble to the EC – Cameroon FTA mandates that:

> "the Parties shall not encourage foreign direct investment by making their domestic environmental, labour or occupational health and safety legislation and regulations less stringent or by relaxing their domestic labour legislation and regulations or regulations designed to protect and promote cultural diversity."

The RTA concluded with the CARIFORUM States to which we dedicate the remainder of this Subsection is so far the only comprehensive regional Economic Partnership Agreement (EPA).[24] This 1953 pages long treaty contains no separate chapter dealing with labour issues. Nonetheless, references to labour standards literally abound in this agreement, often overlapping or repeating each other. This starts with the Preamble calling for the signatories to respect basic labour rights "in line with the commitments they have undertaken within the International Labour Organization." The main implementation measures foreseen for that purpose are a strengthening of the technological and research capabilities of the CARIFORUM States (Art.7). The core labour standards referred to are "further elaborated, in accordance with the Declaration, in ILO Conventions concerning freedom of association, the elimination of forced

23. See Bagwell *et al.* (2002) for a discussion on the possible relevance of GATT-Article XXIII for "races to the bottom" in labour standards.

24. Official Journal of the European Union (L 289/I/3) 30.10.2008.

labour, the abolition of child labour and the elimination of discrimination in the work place" (Footnote to Art.69.5 lit.b). The investment chapter provides that investors will act in accordance with the ILO Declaration on Fundamental Principles and Rights at Work (1998), so as not to "manage or operate their investments in a manner that circumvents international environmental or labour obligations" (Art.72 lit.b and c). Article 73 (Maintenance of standards) is probably the most explicit commitment in any RTA to avoid a "race to the bottom" by way of arrangements with foreign direct investors:

> "The EC Party and the Signatory CARIFORUM States shall ensure that foreign direct investment is not encouraged by lowering domestic environmental, labour or occupational health and safety legislation and standards or by relaxing core labour standards or laws aimed at protecting and promoting cultural diversity."

Article 191.4 emphasises that "labour standards should not be used for protectionist trade purposes" (without defining "protectionist"). Article 191.1 specifies that the labour standards referred to are:

> "freedom of association and the right to collective bargaining, the abolition of forced labour, the elimination of the worst forms of child labour and non-discrimination in respect to employment."

Article 192 actually mandates 'race to the top' improvement efforts on all sides, albeit on a "best endeavour" basis:

> [each Party] "shall ensure that its own social and labour regulations and policies provide for and encourage high levels of social and labour standards consistent with the internationally recognised rights set forth in Article 191 and *shall strive to continue to improve those laws and policies*." (emphasis added)

Article 193 provides that:

> "the Parties agree not to encourage trade or foreign direct investment to enhance or maintain a competitive advantage by:
>
> (a) lowering the level of protection provided by domestic social and labour legislation;
>
> (b) derogating from, or failing to apply such legislation and standards."

Finally, an interesting reference to the ILO is made in the context of the consultation and monitoring process:

> (Art.195.3) "On any issue covered by Articles 191 to 194 the Parties may agree to seek advice from the ILO on best practice, the use of effective policy tools for addressing trade-related social challenges, such as labour market adjustment, and the identification of any obstacles that may prevent the effective implementation of core labour standards."

It remains to be seen whether this new pattern in EC trade agreements will be confirmed, first in the other Economic Partnership Agreements yet to be concluded, and in other RTAs later on. Obviously, contractual freedom allows for these and even more concise and mandatory provisions - the only limit being the non-discrimination rule each WTO Member has to abide by (Horn *et al.* 2010). The impact question of this extensive set of labour standard references will be discussed in Section 10.5.

Asia and Pacific

Interestingly, and perhaps tellingly, there are no substantive labour provisions in the recent RTAs concluded in the Asia and Pacific region. In order to compare labour provisions in Asian agreements with EU and US RTAs we will now look at the treaties concluded by the Association of South East Asian Nations (ASEAN) and some developed countries in the region.

Using, again, April 2011 as a temporal benchmark there were six agreements in force and notified to the WTO with all ASEAN countries as parties.

Table 10.3. RTAs in the Asian and Pacific Region, April 2011

RTA Parties	Type of agreement	Date of entry into force
ASEAN - Australia - New Zealand	FTA & EIA	01-Jan-2010
ASEAN - China	PSA & EIA	01-Jan-2005 (Goods) 01-Jul-2007 (Services)
ASEAN - India	FTA	01-Jan-2010
ASEAN - Japan	FTA	01-Dec-2008
ASEAN - Korea, Republic of	FTA & EIA	01-Jan-2010 (Goods) 01-May-2009 (Services)
ASEAN Free Trade Area (AFTA)	FTA	28-Jan-1992

Source: WTO RTA Database (*http://rtais.wto.org/UI/PublicAllRTAList.aspx* accessed 29 April 2011).

None of these regional trade agreements contains specific provisions on labour which are relevant for our study. The ASEAN – Japan agreement establishes economic co-operation programmes, for example, on intellectual property and on agriculture, but there is no mention of labour. The ASEAN – Korea treaty on trade in goods explicitly reserves domestic labour legislation. In respect of movement of natural persons, the ASEAN-Australia-New Zealand Agreement recognises in Chapter 9, Article 1(d), the need to "protect the domestic labour force and permanent employment in the territories of the Parties".

Looking back into the past, we found that the "Arrangement on Labour between New Zealand and the Kingdom of Thailand" (2005) had already provided a rather stringent formulation of commitments on labour standards:[25]

> (Art. 1.3) "Each Participant will ensure that its labour laws, regulations, policies and practices are not used for trade protectionist purposes."
>
> (Art. 1.4) "Each Participant will not seek to gain trade or investment advantage by weakening or derogating from its labour laws and regulations."

25. Concluded as part of New Zealand - Thailand Closer Economic Partnership Agreement. Available at: *www.mfat.govt.nz/Trade-and-Economic-Relations/Trade-Relationships-and-Agreements/Thailand/Closer-Economic-Partnership-Agreement-text/0-labour.php* (Accessed 29 April 2011).

As noted by ILO (2009), however, this Arrangement on Labour also explicitly provides that "[it] will not legally bind the Participants" (Section 4.1). At any rate, the arrangement has apparently been superseded by the ASEAN – Australia – New Zealand Agreement (2010).

A recent bilateral memorandum of understanding with a commitment not to undercut social protection has been concluded between New Zealand and the Philippines as a side agreement to the ASEAN-Australia-New Zealand Agreement (2010).[26] This agreement on labour cooperation is to "improve working conditions and living standards" and to uphold high level standards of labour laws, policies and practices "in the context of economic development and trade liberalization". It foresees a long list of cooperative activities and establishes a Labour Committee, and a consultative mechanism. The provision which is to prevent a "race to the bottom" reads as follows:

> (Art.2.4) "The Parties recognise that it is inappropriate to set or use their labour laws, regulations, policies and practices for trade protectionist purposes."
>
> (Art.2.5) "The Parties recognise that it is inappropriate to encourage trade or investment by weakening or reducing the protections afforded in domestic labour laws, regulations, policies and practices."

A definition of "trade protectionist purposes" is lacking, and according to Article 6 there is no obligation to provide information 'contrary to the public interest or the laws'. Even so, such a commitment to shield social policies from competitive pressures arising from trade liberalisation is remarkable, because of the challenges to enforce compliance by the other party or to withstand such pressures if they were to come from competition with large trading partners and low labour standards.

ILO (2009) noted that developing countries had not agreed on substantive commitments in respect of labour standards in agreements between them. Indeed, "South-South" RTAs rather aim at "cooperation in labour matters" without clear terms of reference.[27] Joint projects, exchange of information, and amicable consultation are frequently mentioned as examples for such cooperation. Cases in point besides the ASEAN FTAs are the RTAs mentioned in the ILO Report concluded by China and other Asian countries which contain provisions "[n]ot to encourage trade or investment through weakening labour laws."[28] Section 10.5 will discuss the practical implications of such provisions.

The Trans-Pacific Strategic Economic Partnership (2006) between Brunei Darussalam, Chile, New Zealand and Singapore has a similar objective in its Memorandum of Understanding on Labour Cooperation. This agreement is to provide a "forum to discuss and exchange views on labour issues of interest or concern with a view to reaching consensus on those issues" (Art.1.b). The parties first insist on their "their sovereign rights to set their own policies and national priorities and to set, administer and enforce their own labour laws and regulations". Accordingly, institutional mechanisms do not reach beyond co-operation, consultation and dialogue. But they also reaffirm their obligations and commitments under the ILO and add a commitment to fight protectionism. The formulation adopted here is almost identical as the above-quoted New Zealand – Philippines side agreement:

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26. Available at*:* *www.asean.fta.govt.nz/assets/Downloads/Instruments/moa-labour-nz-philippines.pdf* (accessed 29 April 2011).

27. ILO (2009), pp. 70-71.

28. ILO (2009), Table 3.5, p. 72.

(Art.2.5) The Parties recognise that it is inappropriate to set or use their labour laws, regulations, policies and practices for trade protectionist purposes.

(Art.2.6) The Parties recognise that it is inappropriate to encourage trade or investment by weakening or reducing the protections afforded in domestic labour laws.

Intermediate conclusion: three approaches to labour references

This overview illustrates that the present legal status of labour provisions in RTAs remains unclear, despite more frequent and more focused provisions. Stringent references are still relatively sparse, and totally absent in RTAs between developing countries. In our concluding section we will try to assess, on the basis of our econometric study, whether and which types of provisions may impact on the development of labour relations in both developed and developing countries.

By way of a mid-way conclusion we see three types of (not mutually exclusive) references to domestic labour standards in RTAs:

1. *Commitments to strive to improve domestic standards* are prevalent in RTAs to which the United States is a partner.
2. *Commitments not to lower existing domestic standards* are a formulation also favoured by the European Union seeking to avoid a "race to the bottom".
3. *Commitments to basically implement existing domestic standards* are a kind of bottom line which developing countries have come to accept as a least constraining formulation, albeit within the overarching objective of their economic development.

In addition, many RTAs provide for technical assistance to strengthen adherence to ILO and to national standards in developing countries.

10.3. Trade and labour market regulation: existing empirical evidence

A commitment "not to lower" existing domestic standards to encourage trade and investment could well indicate an expectation that some treaty members may feel tempted to lower standards in the absence of such a commitment. The existence of such provisions therefore, arguably, reflects recognition on trade negotiators' side of the existence of pressures for a "race to the bottom". Along similar lines, it could be argued that commitments to "strive to improve domestic standards" reflect concerns about "regulatory chilling", i.e. concern that governments will be reluctant to raise such standards in open economies. One of the objectives of this paper is to evaluate whether concerns about "races to the bottom" and "regulatory chilling" are justified in the context of labour market standards.

The empirical work presented in this paper, therefore, adds to a growing body of literature analysing the relationship between trade and labour standards. Though growing, the existing evidence is still relatively thin, largely due to the lack of reliable data. A large part of the literature focuses on the impact that labour standards have on trade (and aspects that influence trade), while a few authors have treated labour standards as endogenous to trade and have analysed whether trade influences labour standards.

The relevant studies (discussed below) differ along a range of dimensions which makes comparisons of outcomes difficult. As usual in this type of literature, periods analysed tend to differ which may be one factor explaining different outcomes. The variable used to measure

trade also differs across studies. Most studies focus on exports, but while some take all exports into account others focus on labour intensive exports - the presumption being that those are more likely to be affected by labour costs and thus labour standards. Studies also differ in the variable they use to measure labour standards, one difference being whether the measure used focuses on ratification of standards or on the outcome of labour market legislation. Another difference is that some papers focus on so-called core labour standards, based on the ILO Fundamental Principles and Rights at Work, while others work with different measures reflecting domestic labour market legislation.

Do labour standards affect trade flows?

The choice of labour standard measure is often linked to the country sample covered by the analysis. While measures for core-labour standards tend to be used in studies focusing on north-south trade, other measures are preferred in studies covering only or mainly developed countries. The latter may reflect that a majority of developed countries have ratified most if not all ILO Fundamental Principles and Rights at Work. Differences in those labour standards are thus unlikely to explain differences in trade patterns across developed countries. Given that in this paper we are interested in capturing possible "race to the bottom" dynamics, in our econometric work we will use measures for labour market regulation that go "beyond" core labour standards.

Variables other than those measuring core labour standards have to our knowledge so far mainly been used in papers that treat labour standards as exogenous and trade flows as the endogenous variable. Van Beers (1998) examines the effect of labour standard stringency on bilateral trade flows for a sample of 18 OECD countries. He uses an outcome measure based on data collected by the OECD on government regulations concerning working time, employment contracts, minimum wages and workers' representation rights.[29] Using a gravity model the author empirically examines whether high-standard OECD countries exhibit lower exports in labour-intensive goods than countries with lower standards. Van Beers (1998) finds no significant impact of labour regulation stringency on exports of labour-intensive commodities. However, if bilateral trade flows are also distinguished according to differences in skill-intensities a significant negative impact is found on exports of both labour-intensive and capital-intensive commodities that are produced with relatively more high-skilled labour.[30]

Dehejia and Samy (2008 and 2008b) and Bonnal (2010) use similar outcomebased measures for labour standards to analyse the effects of labour standards on trade. Dehijia and Samy (2008) examine the question in the context of a gravity equation and with the use of six different outcome-based measures for labour standards: the percentage of total public expenditure of GDP, an index of labour market well-being, actual weekly hours worked, trade union density rates, the number of strikes and lockouts, and occupational injuries. Overall, their results point to an association between improved export performance and lower labour standards when the occupational injuries variable is used. For most of the other labour standard variables, findings indicate a stronger export performance when standards are higher. In another study (Dehejia and Samy, 2008b), the authors address the same question using a different modelling framework (i.e. a Heckscher-Ohlin framework). In that study, the authors also distinguish between trade

29. See OECD (1994) and the presentation of relevant data in Table 1 of van Beers (1998).

30. The author suggests that this may reflect a relative inelasticity in the labour demand for skilled labour, which would have the consequence that a higher share of the costs of labour standards is born by employers. More stringent standards would then have a stronger effect on skill intensive production than on low-skill intensive production.

within the European Union and trade with external partners. The results point to a negative effect of labour standards on extra-EU exports. In the case of intra-EU trade, the authors find little evidence of a negative impact of labour standards on export performance, with some evidence of positive effects. Bonnal (2010) examines the impact of labour standards on export performance using a subset of the outcome-based labour standard measures used in Dehejia and Samy (2008a, 2008b), i.e. work injuries and the rate of strikes or lockouts. The author uses a dynamic panel model approach to account for the possible endogeneity of labour standards. Results point to labour standards actually improving export performance using both measures of standards.

Last but not least, Huberman and Messner (2008) distinguish short-term from long-term effects of labour market regulation in a study using a much longer time series. The authors investigate the effects of labour standards on the ratio of exports to imports of 17 Old World countries and six New World countries between 1870 and 1914. They consider four dummy measures of labour standards for accident compensation, factory inspections, maximum work hours for women, and minimum age for child labour. The empirical results of a dynamic fixed effects and mean group model suggest that the impact of labour regulation on trade can be negative but without persistent long-term effects. In particular, exports are not harmed if new labour regulation covers existing practices, but are negatively affected when firms and workers have to adjust to new labour standards.

Does trade threaten or encourage the implementation of core labour standards?

Only a few authors have examined whether trade is associated with lower labour standards in econometric work that treats labour standards as the dependent variable. Most of the relevant literature focuses on the role of core labour standards.[31] Technically, the difference between the studies discussed above and those discussed in this subsection is, that "trade" now becomes the explanatory variable and "standards" the dependent variable. The fact that the trade variable is sometimes put at the left side of the econometric equation and other times on the right hand side, makes the endogeneity problem very explicit. Most studies discussed in the following paragraphs have tried to address this, often by using instrumental variable (IV) techniques. The discussion below also shows that the inclusion of GDP per capita (and thus potentially the interactions between trade and growth) affects outcomes.

Neumayer and De Soysa (2006) reverse the (Kucera and Sarna, 2006) model, and treat violations of freedom of association and the effective recognition of the right to collective bargaining (FACB) as the endogenous variable in a gravity model. Explanatory variables include trade openness, FDI penetration, an indicator variable for economic freedom, the share of the labour force employed in the industrial sector, percentage of value added by the manufacturing sector, per capita income, indicator variables for whether a country has ratified the ILO Conventions on FACB, a measure of democracy, a variable measuring the political orientation of government, and also dummy variables indicating the kind of legal system in place. They conduct IV estimations to control for the possibility of endogeneity of some of the key variables, including trade openness. Initial results for both, simple OLS and IV estimations for a sample of 139 developing and developed countries, show that greater trade openness is associated with lower FACB rights violations. In a restricted sample of only developing countries, the authors get similar results.

31. See Mah (1997), Busse (2002), Kucera and Sarna (2006), and Bakhshi and Kerr (2010) for econometric studies that use measures of core labour standards as possible determinants of trade flows.

Busse (2004) uses three core labour standard outcomes - forced labour and union rights, discrimination, and child labour - as the dependent variable in an econometric analysis for a sample of developing countries. When regional dummy variables are used, OLS regressions point to a positive and significant impact of trade openness on gender equality and likewise a positive and significant impact on child labour (which is akin to a decline in child labour). The author expands the analysis to a short panel and uses Fixed Effects (FE) estimation and a time dummy to account for time-varying factors. Results for the trade variable are mixed, but once a lag for the trade variable is introduced in lieu of the current measure, positive and significant effects are repeated for discrimination and child labour. In addition, results point to a negative and statistically significant impact on forced labour and union rights.

Edmonds and Pavcnik (2006) empirically examine the impact of trade openness on child labour prevalence in developing countries. Initial estimates suggest that greater openness is associated with less child labour, however, the authors point to this finding reflecting income effects. When cross-country differences in income are accounted for, the authors find no significant impact of trade openness on child labour for their sample of developed and developing countries. The same story emerges when the authors account for the possible endogeneity of income, restrict the sample to non-OECD countries, or when trade openness is measured as unskilled labour-intensive exports (relative to GDP).

The findings of Mosley and Uno (2007) are rather nuanced. They come to the conclusion that economic integration has mixed effects on labour rights of 90 developing countries between 1986 and 2002. Trade openness is negatively and significantly related to the rights of the workers, while FDI inflows have a positive impact. In addition, the empirical evidence highlights the importance of domestic institutions (proxied by a democracy and civil conflict indexes) as well as labour rights in place in neighbouring countries, once external debt, human right NGOs, GDP per capita, economic growth, population size and region dummies are included in the model specification.

Greenhill *et al.* (2009) use a very different model and evaluate the so-called "California effect" associated with labour standards on the same panel of developing countries. They argue that, similar to the transmission of environmental standards, labour standards can be transmitted from importer to exporter countries depending on the export destinations. In particular, they suggest that it is not the overall level of trade openness that matters, but rather the level of labour standards in place in the trading partners.[32] Based on a lagged spatial dynamic panel model, their results suggest that high labour standards in developing countries are associated with high labour standards in exporting countries, although this effect is weaker in terms of labour practices than labour laws. Overall, these findings suggest that importing countries are potentially able to influence positively or negatively the labour laws of the exporting country.

32. In this chapter, the authors explicitly take the role of labour provisions in RTAs into account and – following (Hafner-Burton, 2005) – they distinguish between RTAs which promote "soft" or "hard" standards in terms of human rights principles. Their findings suggest that RTAs with "hard" provisions lead to more stringent labour laws, while "soft" provisions reduce the level of labour practices. The countries covered by the database used in Hafner-Burton (2005) only overlap partly with the countries in our dataset and we therefore could not use the interesting information on "soft" and "hard" standards in our analysis, as it would have reduced the country coverage significantly.

10.4. Regional trade and the level of labour and social protection

In this chapter we are interested in examining whether trade based on regional trade agreements may trigger races to the bottom and/or regulatory chilling effects. Our empirical exercise, therefore, falls into the last group of empirical studies discussed above, i.e. those taking labour standards as the dependent variable. Regional trade figures prominently among our explanatory variables. Given that industrialised countries have been and continue to be very active in concluding regional trade agreements, we try to find out whether and how trade within RTAs has affected labour standards in those countries. We thus focus on measures of specific labour standards that go beyond the Fundamental Principles and Rights at Work and fall under what is more commonly called "labour market regulation". We will look in particular at variables related to labour protection.

Our empirical analysis is therefore closely related to the papers by Fischer and Somogyi (2009) and Olney (2011). Both papers analyse how globalisation effects employment protection legislation in OECD countries. Fischer and Somogyi (2009) find that the economic forces of globalisation and international competition lower employment protection of both regular and temporary employment. Olney (2011) focuses on FDI and finds evidence that countries are competitively undercutting each other's labour standards in order to attract foreign investment. The empirical exercise presented below differs from these two papers because of the larger country coverage and its focus on regional trade.

Data description

Data used in our econometric exercise consists of a panel of 90 developed and developing countries (list of which can be found in the Appendix Table A1.1) that has been created by the *Fondazione Rodolfo Debenedetti (FRDB) Database on Structural Reforms* (2010). The data set contains information on employment protection legislation and unemployment benefits for these countries over the 1980 to 2005 time period. Employment protection legislation measures from the FRDB Database include the advance notice employers are required to give after nine months, four, and twenty years of service. It also includes the amount of severance pay given in the three scenarios. Unemployment benefits are measured by Gross Replacement Rates (GRR) – that is, the percentage of earnings that are replaced by benefits after one year of unemployment, and after two years of unemployment. Also available is unemployment benefit coverage – the share of unemployed persons who receive benefits. Appendix Table 10.A1.2 provides core statistics for all nine variables used in this paper.

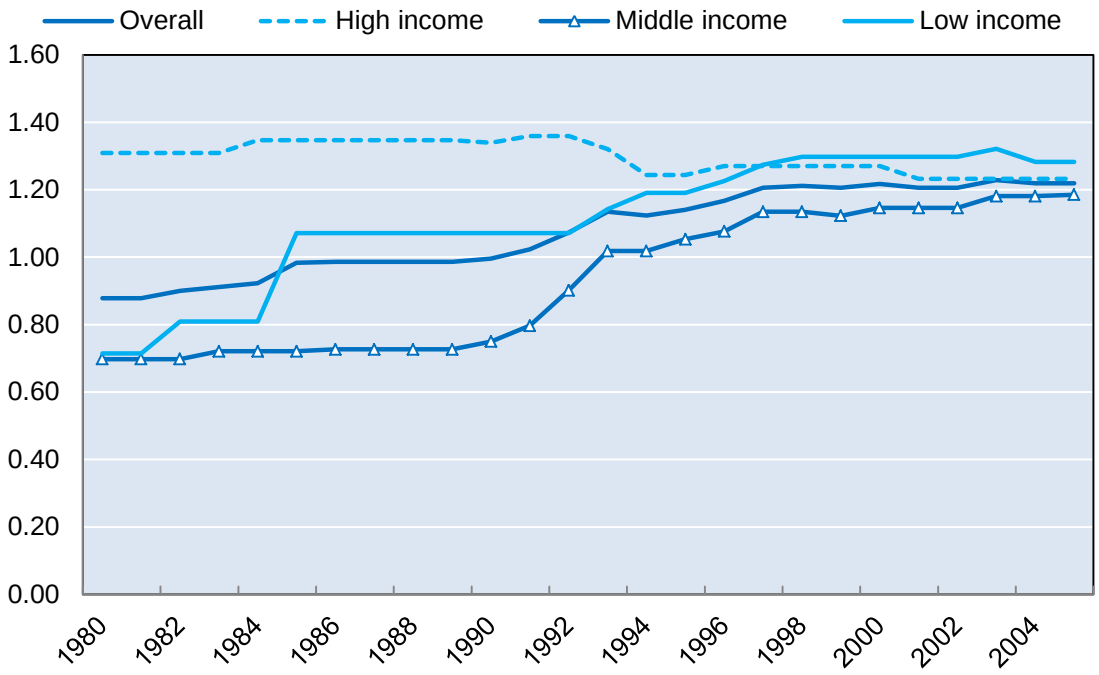
Figure 10.1 below illustrates how domestic labour regulation changes over time and across countries (grouped by income) using the example of the average notice period (measured in months) given four years of service. Note the relatively larger dispersion in experience at the beginning of the period, followed by what appears to be a converging pattern. High income countries are found to have the highest average notice period at the beginning of the period, with a declining tendency in the latter part of the period. Low and middle income countries start with relatively lower notice periods, but show an increasing trend over the period with increases being stronger in low income countries. Overall, the figure reflects a pattern of convergence, with the increases in labour protection in low and middle income countries being larger than the declines experienced in high income countries.

The story is somewhat different when in the case of average severance pay over the period. The dispersion of experience at the beginning of the period is relatively large, and is even larger at the end of the period. Low and high income countries start the period with similar levels that are below the levels observed in middle income countries. This is followed by large

increases experienced by low income countries, and relative stagnation for high income countries. By the end of the period, severance pay for high income countries is the lowest (just under one month) and that for middle income countries is the highest (2.8 months).

In the case of unemployment benefits measured by gross replacement ratios (share of wages covered by benefits after one year of unemployment) there is considerable variation in experience across country groups, and this variation appears to persist over the period. Low income countries start the period with very low gross replacement ratios (0.01), and this persists into 2005 (0.03), with only a moderate increase occurring in the early 1990s. Middle income countries show gross replacement ratios similar to low income countries in 1980, but show a considerable improvement over the period. There is a noticeable jump in replacement ratios for middle income countries in the early 1990s, probably largely attributable to the collapse of the Soviet Union. During the Soviet era, with only a few exceptions, unemployed workers did not receive compensation in the former Sovet Union (Gregory and Collier, 1988). Following the dissolution in 1991, former Soviet countries established laws on unemployment benefits. By the end of the period, middle income countries have gross replacement ratios of around 0.2. High income countries have large GRRs that persist over the period, starting at around 0.34 in 1980 and showing a GRR of 0.39 in 2005. A noticeable feature, however is that GRRs peaked for high income countries in 1999 (0.44), followed by a steady decline in subsequent years to pre-1999 levels.

Figure 10.1. Average notice period (4 years of service), 1980-2005



Source: FRDB Database on Structural Reforms (2010).

In this chapter, we are particularly interested in how labour protection evolves in the context of trade within RTAs. In order to measure this variable, we use the WTO RTA database to identify RTAs and the year of their ratification. We face three problems in determining the amount of trade within the RTA. First, while it is simple to measure trade among members of an RTA it is not easy, and in many instances impossible, to measure which trade among those members actually benefits from preferential treatment as a consequence of the RTA. Second, we

face the same endogeneity problem as the studies discussed in Section 10.3, namely that labour market regulation may have an effect on actual trade. And third, we face an additional endogeneity problem, because the ratification of an RTA is likely to affect trade among RTA partners.

We try to solve these endogeneity problems by constructing our RTA-trade variable in the following way. First, we construct a variable indicating the presence of an RTA for each country pairing at each time period. Thus if an RTA was signed between two countries in 1994, for example (i.e. Canada and Mexico with the signing of NAFTA), the variable would indicate "0" for these two countries for 1980 to 1993, and a "1" for 1994 until the end of the period. We then weigh this indicator variable by export shares in 2005 for each country pairing being a party of the relevant RTA, where export shares correspond to the share of RTA exports as a percentage of total exports.[33] Note that we use export shares in 2005 as a base year for all countries and throughout our analysis. In addition we use one year lags, indicating that we measure the effect of the conclusion of an RTA on labour market regulation in the following year. Accordingly, our RTA variable is constructed using the following equation:

$$TP_{it} = \sum_{j}^{N} RTA_{ijt} \times TradeShare_{ij2005}$$

$$\text{with } i \neq j$$

where RTA_{ijt} is a dummy variable taking the value of 1 if there is a RTA between country *i* and *j* at time *t*.

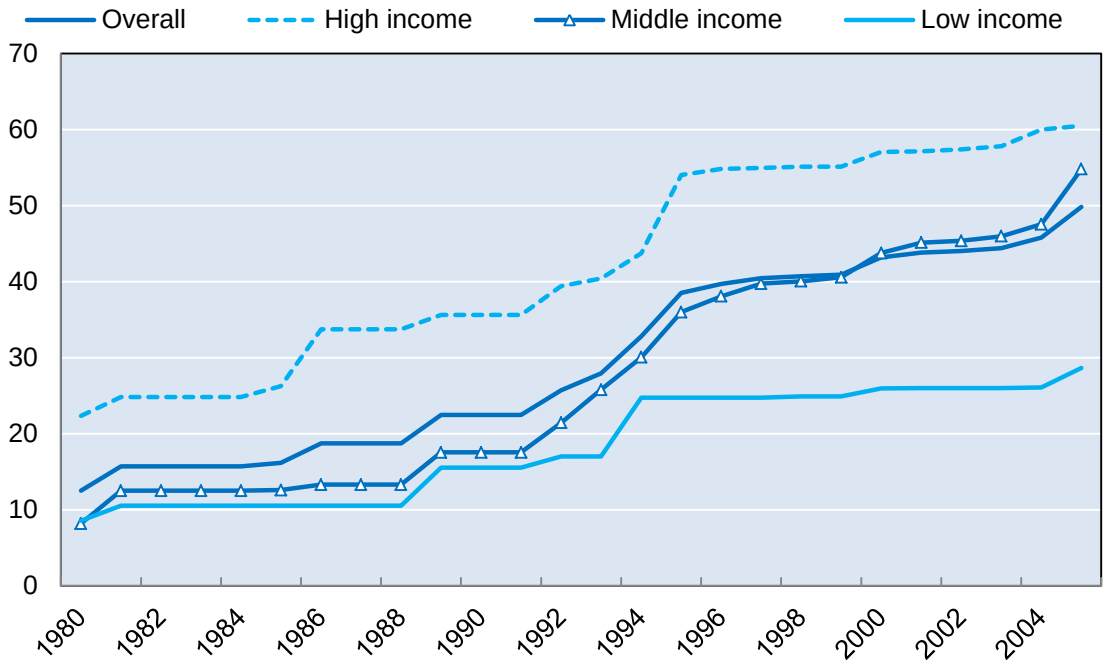
Figure 10.2 below shows the average share of exports between members of RTAs over the time period, based on our RTA variable and broken down by income groups. We can see quite readily that trade within RTAs has grown considerably for all countries over the period – in 1980, intra-RTA exports accounted for 12.5% of all exports, increasing to 49.8% in 2005. High income countries show higher RTA trade over the entire period, and also show considerable growth. Low and middle income countries both show relatively low RTA trade in 1980 (8.2% and 8.6% respectively). While middle income countries show considerable growth in RTA trade, the increase is relatively modest for developing countries overall. In 2005, 54.8% of exports by middle income countries were taking place in the context of RTAs, compared to a more modest 28.6% in developing countries.

Overall the description of our dataset presented above illustrates that trade within RTAs has increased significantly over our observation period and that this has on average been the case for countries of all income groups in our dataset. The data on labour market regulation do not provide any clear evidence of a general race to the bottom. Only in high income countries there appears to be a pattern of a reduction in labour protection. In low and middle income countries, instead, labour protection has tended to increase over time. Overall our data, therefore, rather seem to reflect a "race to the middle" than a race to the bottom.[34]

33. Using this variable, we control to a certain extent for MFN trade.

34. Standard statistics for our main variables can be found in the Appendix.

Figure 10.2. Average exports within RTAs, 1980-2005



Estimation Procedure

Econometric Methodology

In order to assess whether regional trade has played any role in the changing pattern of labour market regulation in our sample, we use a panel regression covering up to 74 countries from 1980 to 2005.

The linear econometric specification reads as follows:

$$L_{it} = c + \alpha TP_{i,t-1} + X_{it}\beta + D_i\gamma + T_t\delta + u_{it}$$

where L_{it} represents a measure of labour standards in country *i* at time *t* (e.g. notice period, severance pay or gross replacement ratio) and TP_{it} is the portion of trade flows attributable to preferential trade agreements between countries *i* and *j* at time *t*. Other exogenous control variables are included in the matrix X_{it} (real GDP per capita, employment in the industry sector, manufacturing value added, political rights, civil liberties and democracy indexes, chief executive years in office), while country (e.g. regional and income group dummies) and time effects are represented by D_i and T_t, respectively. Finally, u_{it} represents the idiosyncratic error term.

In order to determine whether random or fixed effects should be considered, we perform the standard Hausman test.[35] For all specifications considered, the Hausman test suggests that the random effect specification is preferred over the fixed effect. This result can partially be explained by the nature of the dependent variable. Since the level of labour standard is relatively non-time varying, the standard deviation within countries is always statistically smaller than the variation between countries (see the Standard Deviation Decomposition Table). Therefore, the individual effects, whether fixed or random, already captured a high share of within variation.[36]

Estimation results

In a first set of estimations we regress different measures for labour market regulation on our full set of control variables. The RTA variable is based on imports from partners who are members to an RTA concluded by the country, the labour market regulation of which figures as the dependent variable. We always include the log of GDP per capita in our regressions in a simple form and also squared. This is to control for the interaction effect between trade and growth highlighted in Edmonds and Pavcnik (2006). In fact, it will be interesting to observe how the significance of the GDP per capita variable evolves as we change specification of our regressions. Two additional economic controls are included: level of industrial employment and the share of manufacturing value added in GDP. We expect both variables to be positively correlated with labour market protection. Our regressions also include a set of political control variables as it is expected that labour market regulation is more protective in countries with a more stable political environment or a stronger protection of civil or political rights. The four control variables included are: political rights, civil rights, years in office, and democracy. Sources of data are described in Appendix Table 10.A1.3.

In the Tables 10.4 to 10.6 below, we report the findings for a first set of regressions figuring eight different dependent variables: notice period after nine months, four years and 20 years of service; severance pay after nine months, four years and 20 years of service; and gross replacement ratio of unemployment benefit after 1 and 2 years of unemployment. The first column in the table shows results for regressions using fixed effects. Column (2) and (3) reflect findings when a random effects specification is used. The difference between the two columns is that in the (3) column, regressions included regional dummies. Tables 10.4 to 10.6 report estimated coefficients for our main variable of interest, i.e. the RTA variable, and our set of economic controls.[37]

35. The test consists of comparing the difference between the parameters estimate associated with the random and fixed effects. Under the null hypothesis, the difference is not statistically different from zero. More specifically, the random specification is efficient and consistent, while the fixed effect is consistent but less efficient. Under the alternative hypothesis, the parameters of both specifications are statistically different from each other. The random effects are inconsistent, while the fixed effects remain consistent.

36. This specific feature of the dependent variable also rules out the use of a dynamic panel specification. In fact, the inclusion of a lagged dependent variable leads to high multi-collinearity affecting the level of significance of the remaining parameters. In order to mitigate any potential endogeneity between the dependent variable and the time-varying explanatory variables, some specifications includes the lagged values of the control variables.

37. The full set of regressions are available in Häberli, C., M. Jansen and J.-A. Monteiro (2012), "Regional Trade Agreements and Domestic Labour Market Regulation", *Employment Working Paper,* No. 120 (Geneva: International Labour Office).

Table 10.4. Regional trade and notice periods

	(1) Fixed Effects	(2) Random Effects	(3) Random Effects
	Dependent variable: Notice period after 9 months		
Regional trade flows			
RTAs*Imports$_{t-1}$	-0.404***	-0.367**	-0.375**
	(0.155)	(0.147)	(0.149)
Economic controls			
ln (GDP p.c.)$_{t-1}$	1.719***	1.361***	1.578***
	(0.559)	(0.472)	(0.512)
(ln (GDP p.c.))$^2_{t-1}$	-0.084***	-0.070***	-0.078***
	(0.029)	(0.026)	(0.027)
ln (Industrial Employment)$_{t-1}$	0.097*	0.073	0.081
	(0.051)	(0.050)	(0.052)
ln (Manufacturing VA/GDP) $_{t-1}$	0.121	0.144***	0.130*
	(0.074)	(0.071)	(0.075)
	Dependent variable: Notice period after 4 years		
Regional trade flows			
RTAs*Imports$_{t-1}$	-0.111	-0.071	-0.079
	(0.136)	(0.132)	(0.132)
Economic controls			
ln (GDP p.c.)$_{t-1}$	1.797***	1.550***	1.726***
	(0.556)	(0.483)	(0.515)
(ln (GDP p.c.))$^2_{t-1}$	-0.095***	-0.082***	-0.091***
	(0.029)	(0.026)	(0.027)
ln (Industrial Employment)$_{t-1}$	0.048	0.033	0.034
	(0.052)	(0.049)	(0.052)
ln (Manufacturing VA/GDP) $_{t-1}$	0.133*	0.135*	0.134*
	(0.076)	(0.073)	(0.077)
	Dependent variable: Notice period after 20 years		
Regional trade flows			
RTAs*Imports$_{t-1}$	0.122	0.195	0.131
	(0.144)	(0.145)	(0.142)
Economic controls			
ln (GDP p.c.)$_{t-1}$	2.453***	2.253***	2.423***
	(0.635)	(0.590)	(0.604)
(ln (GDP p.c.))$^2_{t-1}$	-0.138***	-0.118***	-0.136***
	(0.035)	(0.033)	(0.033)
ln (Industrial Employment)$_{t-1}$	-0.004	-0.001	-0.013
	(0.060)	(0.057)	(0.059)
ln (Manufacturing VA/GDP) $_{t-1}$	0.155	0.117	0.15
	(0.097)	(0.094)	(0.096)

Note: Robust standard errors in parentheses. All regressions also include political controls, country dummies and time effects. For this table and all subsequent tables in this chapter:

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

Table 10.5. Regional trade and severance pay

	(1) Fixed Effects	(2) Random Effects	(3) Random Effects
	Dependent variable: Severance pay after 9 months		
Regional trade flows			
RTAs*Imports$_{t-1}$	0.007	0.032	0.031
	(0.102)	(0.107)	(0.106)
Economic controls			
ln (GDP p.c.)$_{t-1}$	-1.404***	-1.092***	-1.317***
	(0.435)	(0.406)	(0.433)
(ln (GDP p.c.))$^2_{t-1}$	0.078***	0.060***	0.074***
	(0.025)	(0.023)	(0.024)
ln (Industrial Employment)$_{t-1}$	0.027	0.018	0.016
	(0.066)	(0.062)	(0.062)
ln (Manufacturing VA/GDP) $_{t-1}$	0.327***	0.311***	0.316***
	(0.087)	(0.086)	(0.084)
	Dependent variable: Severance pay after 4 years		
Regional trade flows			
RTAs*Imports$_{t-1}$	-0.202	-0.098	-0.155
	(0.307)	(0.313)	(0.307)
Economic controls			
ln (GDP p.c.)$_{t-1}$	-0.391	0.744	-0.096
	(0.650)	(0.669)	(0.689)
(ln (GDP p.c.))$^2_{t-1}$	-0.007	-0.066*	-0.02
	(0.040)	(0.038)	(0.042)
ln (Industrial Employment)$_{t-1}$	-0.173	-0.15	-0.163
	(0.136)	(0.105)	(0.110)
ln (Manufacturing VA/GDP) $_{t-1}$	0.549***	0.497**	0.508**
	(0.200)	(0.205)	(0.198)
	Dependent variable: Severance pay after 20 years		
Regional trade flows			
RTAs*Imports$_{t-1}$	-3.293**	-2.665*	-3.084**
	(1.524)	(1.424)	(1.442)
Economic controls			
ln (GDP p.c.)$_{t-1}$	7.934**	11.529***	8.971***
	(3.205)	(3.534)	(3.116)
(ln (GDP p.c.))$^2_{t-1}$	-0.584***	-0.762***	-0.630***
	(0.182)	(0.200)	(0.181)
ln (Industrial Employment)$_{t-1}$	-1.347***	-1.138**	-1.207***
	(0.463)	(0.454)	(0.450)
ln (Manufacturing VA/GDP) $_{t-1}$	0.112	-0.033	-0.009
	(0.856)	(0.795)	(0.814)

Note: Robust standard errors in parentheses. All regressions also include political controls, country dummies and time effects.

Table 10.6. Regional trade and gross replacement ratios

	(1) Fixed Effects	(2) Random Effects	(3) Random Effects
	Dependent variable: Gross replacement ratio after 1 year		
Regional trade flows			
RTAs*Imports$_{t-1}$	-0.103***	-0.087**	-0.087**
	(0.039)	(0.037)	(0.038)
Economic controls			
ln (GDP p.c.)$_{t-1}$	-0.024	0.032	0.031
	(0.105)	(0.097)	(0.104)
(ln (GDP p.c.))$^2_{t-1}$	0.003	0.003	0
	(0.006)	(0.006)	(0.006)
ln (Industrial Employment)$_{t-1}$	0.005	0.013	0.012
	(0.010)	(0.011)	(0.012)
ln (Manufacturing VA/GDP) $_{t-1}$	-0.042**	-0.063**	-0.052***
	(0.017)	(0.017)	(0.017)
	Dependent variable: Gross replacement ratio after 2 years		
Regional trade flows			
RTAs*Imports$_{t-1}$	-0.017	0.006	-0.012
	(0.026)	(0.026)	(0.024)
Economic controls			
ln (GDP p.c.)$_{t-1}$	0.238*	0.146	0.235*
	(0.139)	(0.116)	(0.120)
(ln (GDP p.c.))$^2_{t-1}$	-0.012	-0.005	-0.012*
	(0.007)	(0.007)	(0.007)
ln (Industrial Employment)$_{t-1}$	0.008	0.009	0.011
	(0.007)	(0.007)	(0.008)
ln (Manufacturing VA/GDP) $_{t-1}$	-0.051***	-0.061***	-0.058***
	(0.015)	(0.014)	(0.014)

Note: Robust standard errors in parentheses. All regressions also include political controls, country dummies and time effects.

Two findings deserve to be highlighted. First, GDP per capita tends to be significant in our regressions and has a positive sign indicating that countries strengthen labour protection as they become richer. Yet this positive relationship weakens as countries become richer as reflected in the negative significant sign in the squared GDP per capita variable. Second, the RTA trade variable is significant, notwithstanding the presence of the GDP per capita variable, in three out of eight regressions, i.e. in the regressions figuring notice period after nine months of service, severance pay after 20 years of service and gross replacement ratio after one year of unemployment. In all three cases the sign of the estimated parameter is negative.

Results do not differ significantly for random or fixed effects specifications. All control variables are either insignificant or tend to be significant with the expected sign, one exception being the significant and negative relationship between the share of manufacturing in GDP and gross replacement ratios. Among the policy controls, civil rights stand out as the variable systematically having a positive and strongly significant correlation with labour market protection.

The regression using gross replacement ratios after two years as a dependent variable performs generally badly, which may be linked to the fact that very few countries in our sample provide any employment benefits at all after such a long period of unemployment. The findings concerning notice periods in severance pay may reflect that for workers employed for 20 years and more, severance pay reflects the highest burden for employers in case of separation. For workers who have only stayed with a company for a short time, the notice period may represent a higher cost than the severance pay. To lower the burden of labour protection on employers,

notice periods may therefore be the more obvious target in the case of relatively short working relationships and severance pay in the case of long relationships. In other words, our findings may be a reflection of the fact that a call for more flexible labour markets in the light of globalisation will mainly affect notice periods after nine months of service and severance pay after long periods of service.

In the following, we will focus on the three variables for which we found significant results in our first set of regressions: notice period after nine month of services, severance pay after 20 years of services and gross replacement ratios after one year of service. In order to examine whether regional trade has a different effect on low, middle or high income countries, we split the original RTA dummy into three elements: one that takes positive values for high income countries being members in an RTA, one that takes positive values for middle income countries that are members in an RTA and one reflecting low income countries.

The results illustrated in the table below are quite striking: the GDP per capita variables now become insignificant. The RTA dummy is highly significant, but only for high income countries. The sign is always negative and parameter size has increased significantly. Regional trade thus appears to be strongly correlated with shorter notice periods, lower severance pay and lower gross replacement ratios in high income countries. For middle income countries, the RTA variable is only significant for the notice period variable and its sign is positive, i.e. regional trade is correlated to higher labour protection in middle income countries. For low income countries, instead, we do not find a relationship between regional trade and labour market regulation. In conjunction with the finding that the GDP per capita variables become insignificant, this could indicate the existence of a regulatory chilling effect, i.e. low income countries do not increase labour protection even if they grow.

Table 10.7. Regional trade and labour domestic market regulation, by income group

Dependent variable:	(1) Notice period after 9 months	(2) Severance pay after 20 years	(3) Gross replacement ratio after 1 year
		Random effects	
Regional trade flows			
RTAs*Imports$_{t-1}$*High Inc.	-1.287***	-9.652***	-0.184***
	(0.250)	(1.989)	(0.047)
RTAs*Imports$_{t-1}$*Middle Inc.	0.417**	2.534	-0.001
	(0.170)	(1.990)	(0.046)
RTAs*Imports$_{t-1}$*Low Inc.	-0.357	-2.444	-0.028
	(0.444)	(3.108)	(0.085)
Economic controls			
ln (GDP p.c.)$_{t-1}$	0.663	2.268	-0.103
	(0.480)	(2.906)	(0.108)
(ln (GDP p.c.))$^2_{t-1}$	-0.024	-0.24	0.008
	(0.025)	(0.169)	(0.006)
ln (Industrial Employm.)$_{t-1}$	0.026	-1.623***	0.005
	(0.055)	(0.465)	(0.012)
ln (Manufact. VA/GDP)$_{t-1}$	0.156**	0.195	-0.047***
	(0.071)	(0.819)	(0.017)
Constant	-3.155	-2.619	0.633
	(2.361)	(14.644)	(0.497)
Observations	968	968	952
Number of id	74	74	73

Note: Robust standard errors in parentheses. All regressions also include time effects, political controls, country dummies and regional dummies.

The race-to-the-bottom argument is often used in conjunction with the phenomenon of North-South trade, the idea being that trade with countries having lower labour standards puts high labour standards countries under pressure to reduce their own standards. To check whether it is indeed the case that the above findings are driven by North-South trade, we split our RTA dummies into further subgroups. In particular, we are interested in finding out which type of RTAs drive the negative coefficients for high income countries reported in the table above.

The findings reported in Table 10.8 below do not support the idea that the weakening of labour market regulations in industrialised countries is driven by trade with low income countries. On the contrary: the only type of RTAs for which we consistently find highly significant negative coefficients are RTAs among high income countries. According to the findings reported below, it is competition among countries of a similar level of income that appears to put the highest pressure on labour market regulation in the rich world.

Table 10.8. Regional trade and labour market regulation by income group combinations

Dependent variable:	Notice period after 9 months			Severance pay after 20 years			Gross replacement ratio after 1 year		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	FE	RE	RE	FE	RE	RE	FE	RE	RE
Regional trade flows									
RTAs*Imp$_{t-1}$*H-H	-1.458***	-1.401***	-1.451***	-7.247***	-6.734***	-6.993***	-0.279***	0.193***	-0.249***
	(0.301)	(0.267)	(0.284)	(2.056)	(1.892)	(1.920)	(0.062)	(0.057)	(0.061)
RTAs*Imp$_{t-1}$*H-L	27.228*	-21.598	-25.517*	390.770***	322.675***	341.194***	-14.137***	-13.928***	-14.227***
	(15.144)	(14.132)	(14.481)	(126.928)	(118.189)	(119.785)	(41.67)	(4.009)	(4.039)
RTAs*Imp$_{t-1}$*H-M	2.775	1.697	2.435	-59.930***	-48.908***	-52.142***	1.393***	1.081**	1.309***
	(1.814)	(1.654)	(1.708)	(16.207)	(15.115)	(15.290)	(0.517)	(0.484)	(0.508)
RTAs*Imp $_{t-1}$*L-H	-33.838***	-2.072	-3.729	-	-63.088*	-80.681**	0.263	-1.438***	0.196
	(7.069)	(3.535)	(4.086)	305.658*** (64.457)	(38.289)	(33.387)	(1.140)	(0.524)	(0.546)
RTAs*Imp $_{t-1}$*L-L	-0.490***	-0.242	-0.392**	2.597*	-0.967	-0.718	0.047	-0.032	-0.009
	(0.169)	(0.224)	(0.170)	(1.500)	(2.520)	(3.474)	(0.038)	(0.067)	(0.045)
RTAs*Imp $_{t-1}$*L-M	4.185***	2.091*	0.855	5.076	-12.65	-8.707	-0.820***	-0.297	-0.321
	(0.760)	(1.169)	(1.842)	(6.552)	(10.824)	(9.747)	(0.155)	(0.221)	(0.230)
RTAs*Imp $_{t-1}$*M-H	0.051	0.04	0.045	3.151	2.858	3.717	0.128	0.092	0.099
	(0.235)	(0.219)	(0.220)	(3.085)	(3.182)	(3.130)	(0.085)	(0.078)	(0.080)
RTAs*Imp $_{t-1}$*M-L	6.957*	6.311	5.988*	63.939***	46.246**	56.389***	0.028	-0.141	-0.159
	(4.208)	(3.884)	(3.560)	(19.289)	(21.257)	(17.489)	(0.350)	(0.435)	(0.468)
RTAs*Imp $_{t-1}$*M-M	0.870*	0.960*	1.162**	-7.883	-1.442	-7.335	-0.283**	-0.274**	-0.188
	(0.487)	(0.495)	(0.564)	(5.095)	(5.219)	(4.673)	(0.124)	(0.126)	(0.119)
Economic controls									
ln (GDP p.c.)$_{t-1}$	1.285**	0.538	0.912*	0.056	3.224	1.722	-0.012	0.012	0.018
	(0.591)	(0.464)	(0.534)	(3.329)	(3.682)	(3.390)	(0.127)	(0.112)	(0.128)
(ln (GDP p.c.))$^2_{t-1}$	-0.058*	-0.017	-0.038	-0.117	-0.266	-0.191	0.002	0.004	0.001
	(0.032)	(0.026)	(0.029)	(0.209)	(0.215)	(0.209)	(0.007)	(0.007)	(0.007)
ln (Ind. Employm.)$_{t-1}$	0.009	-0.002	-0.009	-2.121***	-1.700***	-1.690***	-0.006	0.01	0.007
	(0.053)	(0.052)	(0.054)	(0.509)	(0.494)	(0.475)	(0.010)	(0.011)	(0.011)
ln (Manufact. VA/GDP) $_{t-1}$	0.159**	0.166**	0.156**	0.073	-0.143	-0.19	-0.042**	-0.060***	-0.051***
	(0.071)	(0.068)	(0.071)	(0.867)	(0.813)	(0.824)	(0.017)	(0.017)	(0.017)
Country dummies	No	No	Yes	No	No	Yes	No	No	Yes
Constant	-5.941**	-2.534	-4.301*	13.931	-3.827	-1.437	0.081	-0.259	0.121
	(2.817)	(2.137)	(2.578)	(15.137)	(16.451)	(15.536)	(0.544)	(0.480)	(0.564)
Observations	968	968	968	968	968	968	952	952	952
R-squared	0.214			0.265			0.12		
Number of id	74	74	74	74	74	74	73	73	73

Note: Robust standard errors in parentheses. Political controls, time effects, country dummies and regional dummies are included.

10.5. Institutional framework: Do references to labour standards in RTAs influence domestic regulation?

The last two sections look at the economics of labour standard references in RTAs. We have found that there is indeed evidence of lowering of labour protection within regional trade areas, but only in high income countries. Besides, such standard lowering appears to take place mainly in the context of RTAs between rich countries. In middle-income countries, instead, regional trade is positively or not at all correlated with labour protection. In the case of low income countries we did not find any evidence for a lowering of labour protection related to RTA trade, but our findings could be interpreted as evidence for a regulatory chilling effect.

Unfortunately data limitations do not allow us to examine whether the inclusion of labour market provisions in RTAs has had a direct influence on the relationship between regional trade and domestic labour market regulation. Our analysis, however, indicates that inclusion of references to domestic labour market regulation can be justified on economic grounds. Interestingly, though, on the basis of our analysis we would expect that commitments not to lower existing domestic standards ("type 2" references in Section 10.2) are most likely to become relevant for high income countries in particular in the context of RTAs among high income countries. Commitments to strive to improve domestic standards ("type 1" references) would, instead, mostly be relevant for low income – rather than middle income – countries that are members of an RTA. Finally, given that our measure for labour protection is based on legal texts and not on their actual implementation, our econometric work does not allow for robust conclusions concerning "type 3" references in RTAs to simply apply existing domestic labour standards.

We now turn to the question of which RTA commitments relating to domestic labour standards might be the most effective ones to avoid the observed weakening (or non-improvement, or non-observance) of such standards. In other words, what is the relative value of these provisions? Our starting point is a recognition that the ultimate value test for labour references lies to a large extent in treaty implementation.[38] We therefore look at how different implementation issues are being dealt with in selected RTAs – besides the various cooperation mechanisms also described in Section 10.2.

We first recall from our earlier findings that a prominent provision in many treaties is a commitment by each trading partner to "strive to ensure" higher standards ("type 1" reference).[39] We find that this does not in itself ensure positive action. However, when we compare US and EU treaties on a timeline we find that even the comparatively older US treaties involving labour provisions are formulated more stringently than the ones concluded later on by the EU.[40] Provisions enjoining all parties not to lower existing domestic standards ("type 2") are mostly found in relatively recent treaties, whereas the older ones usually refer to core labour

38. See also Horn, Mavroidis and Sapir (2010) for a discussion of the enforceability of labour provisions in EU and US preferential trade agreements.

39. Perhaps a trifle optimistic, Elliott suggests that, in view of the large adherence in Latin America to core labour standards, such a provision "would approximate a commitment to international standards for most of the region […] [despite the fact that the US itself is] "the clear outlier on ratification, if not on compliance with the broad principles embodied in the standards" (Elliott, 2004, p. 658).

40. It might be worth noting that, looking at the various efforts and mixed results achieved by the US in the past decades, Aaronson (2005) considers it a "laggard" (p. 178) in a perspective of global Corporate Social Responsibility (CSR). According to the author, it is important that American firms "uphold such [American] values as they produce goods and services abroad, [When firms act irresponsibly] America's foreign policy interests can be compromised" (p. 175).

standards and cooperation programmes. The impact of the newer treaties on domestic labour regulation remains thus to be seen.

RTAs also increasingly contain provisions foreseeing commitments by all Parties to enforce their own domestic labour legislation ("type 3" references). In this context the priorities of developing countries are on economic development and on the primacy of domestic standards over international ones; they agree, for example, that "economic development must be accompanied by social progress" (EC – South Africa RTA, see Section 10.2).

When we now look at the implementation value of these different types of provisions we have to acknowledge that, on the face of it, quite a few of these treaties contain relatively weak commitments. Many RTAs among developing countries do not contain any references. Even the most substantive provisions merely enjoin the parties to "strive to ensure" adherence to domestic standards, or they commit them to undefined standard improvements (parties "shall ensure" that their labour legislation provides for high levels of labour standards). "Type 3" looks even more innocuous: to apply one's own legislation. In other words, even the relatively stringent formulations found in the NAFTA/NAALC look like just a commitment to apply one's own laws – this might well be because the United States as the main driver has not even ratified the relevant international norms. Moreover, on the question of enforcement the NAALC makes it very clear that "[n]othing in this Agreement shall be construed to empower a Party's authorities to undertake labor law enforcement activities in the territory of another Party".[41]

Nonetheless, our assumption is that even a pledge to just apply domestic standards can be important when it comes to implementation, because many (developing) countries do have high levels of labour standards but find it difficult to enforce them at the national level or through the traditional ILO mechanisms – perhaps especially with more open borders. For instance, most countries prohibit child labour at least in its worst forms, but not all are successfully enforcing their own legislation. In these circumstances and depending on implementation provisions, therefore, references in RTAs could bring about improvements simply by helping to ensure adherence to existing domestic legislation.

If we further compare US and EU treaties we find that the former have relatively stronger formulations aiming at adherence to labour standards, but do not automatically ensure such adherence in a more effective way. As in other politically sensitive areas and on a more conjectural level the size of the trading partner might also have a certain bearing on the normative value of labour provisions in RTAs.

It could be argued that a RTA would hardly be a good forum to negotiate new labour standards, even more so since the competent authorities for labour issues are not the lead agencies in a RTA. To aim at effectively preventing a "race to the bottom" thus seems to be a more realistic objective for a trade agreement than to play an active role in social policy improvements.

Might there also be a regulatory race between the EU and the US as the main drivers of the trade and labour agenda? Our assumption is that both seem to be aware that their RTAs fall somewhat short of their own expectations. Also noteworthy is the fact that on both sides of the Atlantic the calls for more stringent provisions come from the legislative bodies rather than from the executives.

In 2007, the European Parliament commissioned a study on the enforcement performance of social and environmental norms in RTAs concluded by the EU. In their analysis of the respective effectiveness of their social and environmental norms, Bourgeois *et al.* (2007)

41. Part Six, General Provisions Article 42.

compare these RTAs with those of the United States. They conclude that despite the comparatively higher stringency of the US agreements, the actual outcomes of the two approaches are not very different. Nonetheless, for future RTAs of the European Union, including for the EU-MERCOSUR FTA still under negotiation, the authors generally recommend following the more stringent formulations in the US treaties and expanding the effective sanctions foreseen in the EU treaties. For the question of labour standards they also submit a template text inspired by the NAALC side agreement and which takes the latter's implementation experience into account. According to that text, all labour provisions would be enforceable and subject to mediation and regular dispute settlement under a (separate) supervisory body. Furthermore, specific provisions in respect of labour standards would allow independent investigation and monitoring as well as public participation concerning the initiation of reviews of violations. The authors also recommend that "sanctions should be foreseen, although the choice between imposing trade measures and fines needs further assessment".[42]

The debate in the United States is evolving even more rapidly. In a 2009 report of the US Government Accountability Office (GAO), the view is expressed that environmental and labour provisions in four examined RTAs (with Jordan, Singapore, Chile, and Morocco) fail to satisfy the concerns of US lawmakers in respect of their impact on domestic labour standards. Demands for further changes by US policymakers come as a surprise to nobody. As we have already noted, labour issues are among the reasons why the three most recent RTAs with Korea, Columbia and Panama have so far failed to find acceptance in the US Congress. Clearly, the search for a level-playing field, as seen by US lawmakers but which can also find acceptance in partner countries, is far from being over.

In the remainder of our impact analysis, we focus on three implementation aspects: public participation, dispute settlement procedures, and sanctions.

Public participation

When looking at other RTAs in force we see perhaps the highest normative value as a contribution to effective labour standards in the public participation opportunities established in agreements such as NAALC. Indeed, numerous advocacy groups are today capable of using precisely such transparency tools for the purpose of ensuring adherence to domestic legislation in their own countries. For this reason we do not necessarily agree with the Canadian Association of Labour Lawyers (CALL) which has argued that:

> "workers and unions that are the victims of governmental failure to enact and enforce labour laws protecting freedom of association, in the face of free trade and economic integration, have virtually no recourse under the NAALC other than to make submissions to the [National Administrative Office] NAO of a signatory government which can only recommend ministerial consultations with the offending signatory government."[43]

The NAALC is administered by the Commission for Labor Cooperation with its own ministerial Council and a Secretariat. It foresees public participation for "persons with a legally recognised interest under its law in a particular matter" (Art.4.1). The parties have an obligation to provide for a (qualified) access to tribunals for such persons:

42. See Scherrer *et al.* (2009) for similar findings and recommendations.

43. See the Public Comments made in the context of the Four Year Review, published by the Secretariat of the Commission on Labor Cooperation, available at *new.naalc.org/index.cfm?page=255* (accessed 30 April 2011).

> "Each Party's law shall ensure that such persons may have recourse to, as appropriate, procedures by which rights arising under:
>
> 1. its labor law, including in respect of occupational safety and health, employment standards, industrial relations and migrant workers, and
>
> 2. collective agreements, can be enforced." (Art.4.2)

There are two types of procedures: "citizen submissions" i.e. the possibility of submissions by NGOs or other persons claiming that a party is not effectively enforcing its domestic laws, and a mechanism of intergovernmental enforcement. However, submissions relating to the labour agreement are lodged with the concerned National Administrative Office (NAO) established by the NAALC, and this NAO is under no obligation to take the matter any further. While consultations may be held for all NAFTA matters, formal dispute settlement is only available in cases of a trade-related failure to enforce social legislation, and when that failure represents a "persistent pattern" of behaviour.[44]

EU RTAs have so far not included formal and elaborate procedures for a joint mechanism on public participation for labour issues, even though implementation of commitments in the EU – CARIFORUM RTA appears to be somewhat inspired by the NAALC. As we have seen in Section 2, Article 192 recognises the right of the CARICOM States "to regulate in order to establish their own social regulations and labour standards in line with their own social development priorities" – but it also obliges them to "provide for and encourage high levels of social and labour standards" and to "strive to" continue to improve those laws and policies.[45] However, implementation follows different avenues: (a) consultations, including with the ILO acting as an intermediary[46] (b) measures to combat child labour under the general exceptions clause in Article 224 used to protect public security and public morals[47] and (c) through dispute settlement. It is too early to assess the impact of this treaty which was only provisionally applied as from 29 December 2008.[48]

Dispute settlement procedures

This brings us to dispute settlement. At the outset it should be recognised that social and in particular labour policies are among the most sensitive issues in any country and society. Nevertheless, we find that quite a few RTAs other than the NAALC have dispute settlement provisions potentially applicable to labour-related disputes.

The most stringent example of an RTA providing for both trade and financial sanctions in case of infringements is the already discussed NAALC. At the same time and as we have seen above, in the eyes of the Canadian Association of Labour Lawyers even this treaty is 'seriously flawed' and has failed to deliver expected results. While the draft United States – Peru FTA foresees Cooperative Labor Consultations in Article 17.7, a complaining party may defer the matter to dispute settlement procedures under Chapter 21, i.e. only if formal consultations under

44. Bartels (2009), p. 355.

45. Art. 192 *in fine*.

46. Art. 195/3: "On any issue covered by Articles 191 to 194 the Parties may agree to seek advice from the ILO on best practice, the use of effective policy tools for addressing trade-related social challenges, such as labour market adjustment, and the identification of any obstacles that may prevent the effective implementation of core labour standards."

47. Footnote (1) in Art.195/1.

48. Official Journal of the European Union (L 352/62) 31.12.2008.

Article 21.4 or the meetings held in the ambit of the Labor Affairs Council under Article 17.5.2 have failed to result in a satisfactory solution:

> (Art.17.7.6) "If the consulting Parties have failed to resolve the matter within 60 days of a request under paragraph 1, the complaining Party may request consultations under Article 21.4 (Consultations) or a meeting of the Commission under Article 21.5 (Intervention of the Commission) and, as provided in Chapter Twenty-One (Dispute Settlement), thereafter have recourse to the other provisions of that Chapter. The Council may inform the Commission of how the Council has endeavoured to resolve the matter through consultations."

In most other agreements already in force there seem to be few if any formal dispute settlement cases in case of disagreements over labour standards in the framework of a trade agreement. Available literature has not provided us with evidence of litigation being used as an avenue for strengthening labour standards or avoiding a 'race to the bottom'. This may be partly due to the relatively recent nature of these RTAs. Other reasons might be the multiple limitations and qualifications for rights and intervention possibilities of trading partners. Moreover, the need for a complainant to prove a negative trade impact of a labour standard modification is likely to be difficult. It might be worth noting in this context that NAALC in Article 30.2 provides that "Roster members shall have expertise or experience in labor law or its enforcement, or in the resolution of disputes arising under international agreements, or other relevant scientific, technical or professional expertise or experience", including when it comes to formal litigation under NAFTA.[49]

Like many others, the EC – CARIFORUM agreement does not exclude recourse to dispute settlement. For all social aspects including labour issues, Article 195 (Consultation and monitoring process) provides in paragraph five that if "the matter has not been satisfactorily resolved through consultations between the Parties pursuant to paragraph three any Party may request that a Committee of Experts be convened to examine such matter". Under Part III (Dispute avoidance) a conflict on social aspects may only be referred to formal dispute settlement if the above-mentioned consultation procedures fail to produce a mutually acceptable solution after nine months (Art.204.6). In such a case the complaint will go straight to mediation (Art.205) or arbitration (Art.206ss). As pointed out for the NAALC, at least two members of the arbitration panel shall have specific expertise in the field (Art.207.4).

Some agreements especially between developing countries either implicitly exclude labour matters from formal dispute settlement, or they do so by recognising the primacy of national standards. Others establish special consultative mechanisms with a view to avoiding formal litigation. To the extent that they contain certain limited commitments on labour, most agreements, however, do not establish formal litigation procedures, if only as a matter of last resort.

Sanctions: preference withdrawals and fines

Finally we turn to the even more delicate question of sanctions. Ultimately, and depending on the wording in the agreement, there are two possible forms of consequences in cases of (established) infringements of RTA obligations in the field of labour. Based on the idea that such infringements also constitute a change in the economic parameters underlying the agreement, the other party (or parties) may (a) withdraw certain concessions under the RTA and/or (b) levy a fine on the trade partner having violated its own labour regulation, for the

49. See NAFTA Article 2009.2.a with a more general wording.

duration of the violation. Needless to say both forms of compensation or retaliation are highly sensitive and controversial from a political viewpoint.

Here we note that among all the WTO-notified RTAs in force, the NAFTA/NAALC is the only RTA foreseeing retaliation measures by way of a suspension of concessions (i.e. withdrawal of preferential tariffs)[50] as well as through "monetary enforcement".[51] Except for the standard safeguard provisions (emergency actions) and/or a reference to the antidumping and countervailing measures in the WTO agreement, the other agreements are either silent or do not describe the avenues open for cases of infringements specifically on the labour clauses.[52]

The NAALC foresees two in-built limitations for both suspensions of trade concessions, and for monetary sanctions:

1. Any suspension of benefits must be no greater than the amount sufficient to collect the 'monetary enforcement assessment' imposed under Article 39.4 by an arbitral panel (Art.41 NAALC); and
2. all monetary enforcement assessments (no greater than .007% of total trade in goods between the Parties) would be reinvested in technical co-operation activities.[53]

Many facets in the relationship between labour standards and trade agreements can only be outlined here. They would require extensive empirical research and case law information. For the time being, quite a few questions remain. For instance, what happens if domestic labour standards are waived for a specific FDI project, or for exports to a third party? Are the commitments by one country under different RTAs just a problem of coherence, or a possible source of conflicts making manufacturers subject to different labour standards for different export markets?

10.6. Conclusions

This discussion has shown that an increasing number of RTAs contain labour provisions making reference to domestic labour standards. Those provisions appear in addition or in lieu of references to international labour standards, like references to the ILO Fundamental Principles and Rights at Work. We have distinguished three types of references: (i) commitments to strive to improve domestic standards (ii) commitments not to lower existing domestic standards (iii) commitments to actually implement existing domestic standards.

In the econometric work presented in this paper we asked the question whether type-1 or type-2 references to domestic labour provisions can be justified on economic grounds. We do this by testing whether regional trade is systematically associated with a lowering of domestic labour standards or with a regulatory chilling effect. We have found that countries with a higher share of trade within RTAs are characterised by lower levels of labour protection, but that this is

50. See Article 2019 (Non-Implementation-Suspension of Benefits).

51. Annex 39.3 (see below).

52. The FTAs recently concluded between the United States, Colombia, Korea and Panama contain detailed chapters on labour, including a so-called "labor cooperation mechanism" (see Section 10.2). All three texts on labour remain silent on the application of specific sanctions in cases of violations.

53. (Annex 39.3) "All monetary enforcement assessments shall be paid in the currency of the Party complained against into a fund established in the name of the Commission by the Council and shall be expended at the direction of the Council to improve or enhance the labor law enforcement in the Party complained against, consistent with its law."

only the case for high income countries. Besides, it is regional trade among rich countries that appears to be an important driver behind this finding. In middle-income countries, instead, trade is positively or not at all correlated with labour protection. In the case of low income countries we did not find any evidence for a lowering of labour protection, but our findings could be interpreted as evidence for a regulatory chilling effect. This leads to the question on the enforceability of existing provisions. In particular, the question arises whether "commitments not to lower existing standards" are enforceable if the country lowering its standards is a high income country. It also raises the question whether "commitments to strive to achieve higher standards" can be enforced in the case of low income countries.

If labour provisions are included in RTAs to impede that increased regional trade leads to regulatory chilling or race to the bottom effects, then the wording of type-1 and type-2 references mentioned above, rather literally reflects such objectives. Our analysis, however, suggests that on the basis of the current design of RTAs, such provisions are unlikely to have a bite. Among the WTO-notified RTAs in force, only the North American Agreement on Labor Cooperation, a NAFTA-side agreement, allows the use of dispute settlement procedures and even of certain (limited) sanctions related to infringements of specific labour provisions. The NAALC contains references to commitments to strive to improve domestic labour standards but no binding commitments not to lower existing domestic standards. The NAALC and the more recent US treaties as well as the recent EU-CARIFORUM Agreement also contain procedures that provide for public participation related to issues of labour law enforcement.

The findings in our paper suggest that further analysis on actual use, and in particular on the enforceability of RTA provisions related to domestic labour market regulation may be a worthwhile investment. We see in the procedures related to public participation opportunities for ensuring adherence to or even improving labour standards. The challenges are multiple, ranging from the difficulties to prove that a lowering of domestic labour standards has occurred as a result of a RTA to evaluating the effect of such policy changes on trade flows. Ongoing work in international institutions and academia on measuring the trade effects of non-tariff barriers could be very instructive for overcoming the latter challenge.

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Appendix 10.A1

Table 10.A1.1. Country coverage of data set

High income	Middle income		Low income
Australia	Albania	Jamaica	Bangladesh
Austria	Algeria	Jordan	Burkina Faso
Belgium	Argentina	Kazakhstan	Cameroon
Canada	Azerbaijan	Latvia	Cote d'Ivoire
Denmark	Belarus	Lithuania	Ethiopia
Finland	Bolivia	Malaysia	Ghana
France	Brazil	Mexico	India
Germany	Bulgaria	Morocco	Kenya
Greece	Chile	Paraguay	Kyrgyz Republic
Israel	China	Peru	Madagascar
Italy	Colombia	Philippines	Mozambique
Korea, Rep.	Costa Rica	Poland	Nepal
Netherlands	Czech Republic	Russian Federation	Nicaragua
New Zealand	Dominican Republic	South Africa	Nigeria
Norway	Egypt	Sri Lanka	Pakistan
Portugal	El Salvador	Thailand	Senegal
Singapore	Estonia	Tunisia	Tanzania
Spain	Georgia	Turkey	Uganda
Sweden	Guatemala	Ukraine	Uzbekistan
Switzerland	Hungary	Uruguay	Viet Nam
United Kingdom	Indonesia	Venezuela	Zimbabwe
United States			

Table 10.A1.2. Mean and standard deviation decomposition for the dependent variables

Variable		Mean	Std. Dev.	Min	Max	Observations
Notice period after 9 months	overall	0.872	0.698	0.000	3.000	N = 968
	between		0.649	0.000	3.000	n = 74
	within		0.233	-0.328	2.586	T-bar = 13.08
Notice period after 4 years	overall	1.117	0.756	0.000	3.000	N = 968
	between		0.712	0.000	3.000	n = 74
	within		0.235	-0.150	2.831	T-bar = 13.08
Notice period after 20 years	overall	1.883	1.725	0.000	9.367	N = 968
	between		1.756	0.000	9.367	n = 74
	within		0.315	-0.439	4.454	T-bar = 13.08
Severance pay after 9 months	overall	0.500	0.725	0.000	3.500	N = 968
	between		0.752	0.000	3.000	n = 74
	within		0.209	-0.423	2.577	T-bar = 13.08
Severance pay after 4 years	overall	2.183	2.215	0.000	16.000	N = 968
	between		2.032	0.000	11.692	n = 74
	within		0.508	-1.509	6.491	T-bar = 13.08
Severance pay after 20 years	overall	8.387	9.654	0.000	46.833	N = 968
	between		8.619	0.000	44.933	n = 74
	within		2.519	-3.041	25.054	T-bar = 13.08
Gross replacement ratio after 1 year	overall	0.209	0.226	0.000	0.780	N = 952
	between		0.216	0.000	0.709	n = 73
	within		0.065	-0.056	0.534	T-bar = 13.04
Gross replacement ratio after 2 years	overall	0.084	0.166	0.000	0.660	N = 952
	between		0.150	0.000	0.555	n = 73
	within		0.044	-0.062	0.366	T-bar = 13.04

Table 10.A1.3. Data sources

Variable	Source
Notice period	FRDB Database on Structural Reform
Severance pay	FRDB Database on Structural Reform
Unemployment benefit	FRDB Database on Structural Reform
Real GDP per capita	World Development Indicators
RTA	World Trade Organization
Trade (export and import)	United Nations Comtrade
Employment in industry (% of total employment)	World Development Indicators
Manufacturing valued-added (% GDP)	World Development Indicators
Political rights index on a 1-to-7 scale, with 1 = highest degree and 7 = lowest	Freedom House
Civil liberties index on a 1-to-7 scale, with 1 = highest degree and 7 = lowest	Freedom House
Chief Executive Years in Office	Database of Political Institutions 2009, Philip Keefer, World Bank
Combined Polity Score of democracy(Polity IV)	Integrated Network for Societal Conflict Research

Chapter 11

Trade, Employment and Inclusive Growth in Asia

Douglas H. Brooks and Eugenia C. Go

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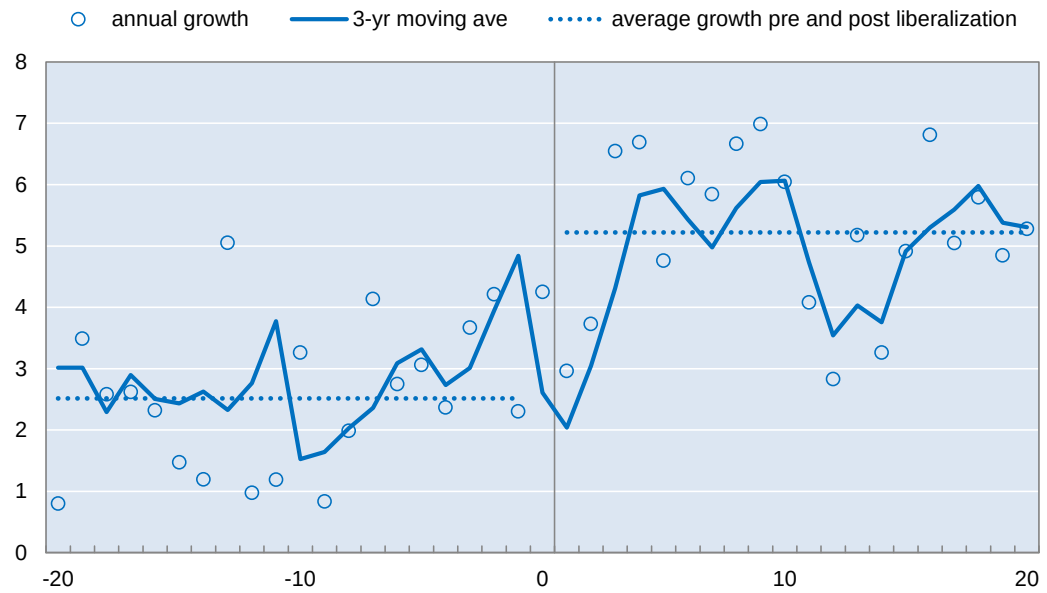
This chapter reviews the relationship between trade and employment in the context of Asia's experience and expected developments in the labour market in the region. Asian economies have undergone massive structural transformation together with trade policy reforms, making possible the rise of "factory Asia". While trade has been beneficial for the region's growth and employment conditions, the latter gains have only been empirically observed for the formal sector. The relationship between trade and Asia's large informal sector remains poorly understood. This poses considerable challenges in designing appropriate safety nets for trade related adjustment measures. In the long run, the continued expansion of tradable tasks and goods as determined by technological developments, human capital investments, and the changing demography of the region will shape the comparative advantage of Asia.

11.1. Introduction[1]

In Asia, and particularly in East Asia, trade has played a prominent role in the region's phenomenal economic growth and development in recent decades. Official unemployment rates remained generally low despite the wrenching structural transformations associated with the rapid growth, in part because of the flexibility and rapid technological change spawned by trade liberalisation and expansion. As the region now adjusts to slower growth in major export markets and maturing domestic economies with rising inequality in many cases, linkages between trade and inclusive growth are increasingly attracting attention.

Wacziarg and Welch (2008) suggest that over the 1950-98 period, countries that liberalised their trade regimes experienced average annual growth rates that were about 1.5 percentage points higher than before liberalisation, in part resulting from physical capital accumulation. A similar analysis for 113 economies over 1950-2009 finds a 2.1% growth rate improvement following trade liberalisation, while for developing Asia (Figure 11.1) a 2.7 percentage point improvement in average growth is found, indicating that openness appears much more highly correlated with growth in Asia than the world average. The growth difference pre and post liberalisation is even more remarkable in light of the fact that Wacziarg and Welch (2008) classified India and the People's Republic of China (PRC) – the fastest growing countries in the region - as closed, which we have followed for comparison purposes.

Figure 11.1. Openness and growth in Asia



Notes: The data refer to 21 Asian economies: Armenia; Azerbaijan; Bangladesh; PRC; Georgia; Hong Kong, China; India; Indonesia; Japan; Korea; Malaysia; Nepal; Papua New Guinea; Philippines; Singapore; Sri Lanka; Taipei, China; Tajikistan; Thailand; Turkmenistan; and Uzbekistan. Please note that the economy known as "Chinese Taipei" according to OECD standard usage, is referred to here and throughout this chapter as "Taipei, China", according to ADB usage.

Source: Authors' calculation based on the methodology of Wacziarg and Welch (2008) and data from Penn World Tables 7.0.

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The trade and *growth* nexus is reasonably well-established, but the relationship between trade and *employment* is more complex. The short-run dynamics centre on such matters as job creation versus destruction and the wage effects, but long run data show weak effects on aggregate employment, and mixed results on sectoral wage and employment effects. Recent decades witnessed evolving employment patterns not just due to the global crisis, but also tremendous shifts in patterns of employment in the Asia-Pacific region, as PRC integrated with the global economy and production networks evolved. Exports of manufactured goods have continued to grow, even as structural transformation has raised services' share in regional economies. Wages have risen and enhanced trade has not resulted in deterioration of labour conditions in Asia. The increased trade has thus been correlated with employment growth, better conditions and higher wages. There has been increased demand for skilled labour, and gains for countries from regional integration.

11.2. Trade and employment in Asia

For a region that has successfully relied on trade for much of its dynamic growth in recent decades, the link between trade and employment generation is something that warrants close scrutiny for its impact on the inclusiveness of growth. This has become more urgent in light of the changing trade patterns that are occurring and are expected to occur in the context of global rebalancing. Such changes will inevitably have impacts on economic structure, employment and labour market institutions of developing Asian economies, and to inequalities within and between these economies.

It is difficult in analysis to disentangle the effects on inclusive growth of trade (and FDI) from other factors such as skill-biased technological changes, institutional and regulatory reforms, changes in employment patterns and in family formation and household structures, and changes in tax and benefit systems. There is little evidence of a direct effect of globalisation on wage inequality, yet technological change has boosted wages at the higher end of the scale. Regulatory reforms aimed at promoting growth and productivity have had a positive impact on employment, but at the same time can be associated with increased wage inequality. A rise in the supply of skilled workers is a major factor in reducing wage differentials and promoting employment. In view of the sizeable adjustment costs for trade-displaced workers, governments need to implement labour market policies that promote job creation, upgrade skills, and steer workers toward more productive jobs.

Employment and unemployment

In a model of trade in intermediate inputs and equilibrium unemployment due to imperfect matching between workers' qualifications and jobs, Jansen and Turini (2004) find that steady-state unemployment is lowered after trade integration. The increased demand allows firms to resist larger shocks, leading to a lower rate of job destruction in the resulting steady state. This consequently induces an indirect positive effect on job creation.

Exploring results for a set of 25 liberalisation episodes, Wacziarg and Wallack (2004) find liberalisation has weakly negative effects on the extent of intersectoral labour shifts at the economy-wide, 1-digit industrial level. On the other hand, the extent of post-reform labour shifts appears to be only weakly related to the degree of labour market flexibility. Broad-based reforms that include domestic deregulation and privatisation can therefore have greater effects on intersectoral labour movements than trade reform in isolation. Closer inspection reveals that comparative advantage applies more in terms of *intrasectoral* firm heterogeneity and less in terms of *intersectoral* differences when discussing the effects of trade liberalisation. This suggests that in a region of rapid structural change such as Asia with most employment informal

in nature, support for labour mobility both into formal sectors and positions, and into newly emerging sectors, depends on constant policy vigilance.

Gilbert (2011) found that growth of trade in Asia has been dominated by improvements in export performance in PRC, India, Korea, Thailand and Viet Nam, resulting from productivity growth in established market segments. On the other hand, increasing economic integration in the region appears to be a factor both in improving export performance for some economies (such as India, Korea and Viet Nam) and in insulating the region from economic shocks. In this context he predicts a gradual shrinking of the unskilled/skilled wage gap, driven largely by more rapid growth of skilled than unskilled labour. In his analysis, most skilled labour will likely be absorbed into services and manufacturing, with the strongest manufacturing growth in the transportation equipment and auto sectors. He also finds that Pakistan and (to a lesser extent) Bangladesh become, unlike other developing Asian economies, less engaged in international trade over time, resulting in part from lower rates of human capital accumulation. Thus, an international crowding out effect may occur.

The global financial crisis beginning in late 2008 resulted in a rise in unemployment in many countries. Official unemployment rates have been rising across developing Asia, and official employment statistics often mask rising underemployment. In addition, given Asia's reliance on exports, the slow recovery in G-3 economies and continued risk of spillovers from difficulties in the eurozone still pose a threat to employment recovery in Asia. This is particularly the case for manufacturing employment, since exports of manufactured goods constitute a large share of total exports from Asia – and above 70% for Korea, Malaysia, Philippines and Singapore.

While the direct unemployment effects in Asia of the 2008 global financial crisis were quite mild when compared to the 1997 Asian financial crisis, the newer composition of exports was an important determinant of the employment effect. For example, Vere (2011) found that although the labour force in Hong Kong, China grew by 9.0% between 2000 and 2009, employment in the import and export sector increased only 5.5% – a slower rate than the overall growth of Hong Kong's labour force.[2] By contrast, employment increased substantially in Hong Kong's finance, insurance, real estate and business services sector. Though the finance sector and the import and export sector have both been important sources of economic growth for Hong Kong, the finance sector (which does not appear in import/export statistics) has been much more important in terms of creating jobs and employment. Nevertheless, the import and export sector is still important in absolute terms. The import and export sector, combined with wholesale and retail trade and the restaurant and hotel sector, employs one-third of Hong Kong's labour force.

At the same time, the effects of trade liberalisation on employment in Asia have frequently been context-specific. Using input-output tables over 1990-2005, Aswicahyono, Brooks and Manning (2011) find that because of slower growth in manufacturing exports and the shift away from light industry in Indonesia, in 2005 fewer jobs were created through exports in manufacturing industries than before the 1997-98 Asian financial crisis. The current protracted global slowdown is potentially costly in such situations due to the elastic supply of unskilled labour. However, there has been an increase in jobs in the services sector, partly because of indirect service connections with the main export industries. This could be enhanced through greater domestic and international competition in services, but the main constraints to job creation through exports appear on the production supply side, especially those related to poor infrastructure, an uncertain investment climate, and tight labour regulations.

2. Part of the observed effect may be due to difficulties in measuring service exports and associated employment.

In Japan, Kiyota (2011) found that demand for worker-hours from exports increased but is not large enough to offset the decreases in demand for worker hours from slower domestic final demand. The demand for employment from exports has increased since 1985 in both manufacturing and non-manufacturing. This implies that manufacturing exports affected non-manufacturing employment indirectly through inter-industry linkages.

Using state and industry-level data on unemployment rates and trade protection from India, Hasan *et al.* (2012) find that unemployment declines with trade liberalisation, at least in certain contexts. In particular, urban unemployment declines with trade liberalisation in states with more flexible labour markets and larger employment shares in net exporting industries. They also find that although workers in industries experiencing greater reductions in trade protection were less likely to become unemployed, especially in states with flexible labour regulations and net export industries, the full benefits of trade reforms cannot be reaped in the Indian context without further domestic labour market reforms.

Examining the Indonesian agricultural sector through a computable general equilibrium (CGE) model, Vanzetti and Oktaviani (2011) suggest that the employment effects of trade shocks are quite small, partly because the highly protected (rice and) sugar sector has so far been exempt from tariff reductions. On the other hand, Ernst and Peters (2011) using a dynamic social accounting matrix find that the impacts of the ASEAN–China FTA on employment is relatively small and slightly negative. They suggest that supportive industrial policies (e.g. FDI policies, innovation, R&D) and related labour market policies (e.g. skills development) could be put in place in a targeted way to counter adjustment costs.

In Bangladesh, a CGE analysis by Raihan (2011) finds that bilateral and regional FTAs would be beneficial in terms of impact on employment (with sectoral implications).

Wages and returns to labour

The experience of East Asia in the 1960s and 1970s supports the theory that greater openness to trade tends to narrow the wage gap between skilled and unskilled workers in developing countries. Later, the entry of China and other large low-income Asian countries into world markets for labour-intensive manufactures and, perhaps, the advent of new technology biased against unskilled workers, changed the environment for the trade-employment nexus when Latin America tried to replicate East Asia's experience (Wood, 1997).

As global production networks have expanded, trade in intermediate inputs is a potentially important explanation for the increase in the wage gap between skilled and unskilled workers. It has much the same impact on labour demand as does skill-biased technical change – both will shift demand away from low-skilled activities, while raising relative demand and wages of the higher skilled. Similarly, foreign outsourcing is associated with increases in the share of wages paid to skilled workers in Japan and Hong Kong, China (Feenstra and Hanson, 2004).

In Indonesia, Vanzetti and Oktaviani (2011) find that employment tends to rise with output in the primary agricultural sector, but real wages for skilled and unskilled workers can still move in different directions depending on the rate of inflation. Fortunately, necessary adjustments in a growing economy like Indonesia are much easier to accommodate than in a stagnant or shrinking one.

Amoranto, Brooks and Chun (2011) study the impact on employment and wages of liberalisation in service subsectors (banking, distribution and telecommunications) in the Philippines from 1991 to 2004. They find liberalisation may have harmed more vulnerable populations that are less educated, and created greater opportunities for employment in good jobs for higher-skilled males (particularly relative to females). This suggests a need for policies

to support education as the Philippine economy shifts from primary and secondary sector production, to services, which typically requires a higher skilled and more educated labour force. Greater disaggregation of the data by gender, education, occupation, and employment status in their study highlights the complexity of designing effective programs to redress distributional imbalances that accompany liberalisation and structural transformation.

In some countries, there is concern that heavy dependence on foreign workers could suppress domestic real wages with adverse implications for economic restructuring and productivity growth, and for improvement of economic well-being for domestic workers. Looking at Malaysia (the biggest net importer of labour in Asia as a per cent of labour force), Athukorala and Devadason (2011) find a statistically significant negative impact of foreign worker presence on real wages, but the impact is small. Their results suggest that variables relating to the structure and performance of domestic manufacturing are far more important than foreign worker dependence in explaining real wage behaviour.

Conversely, changes in wage rates can influence competitiveness. Using selected Asian countries (98 industries in nine Asian countries) in the decade following the 1997 Asian crisis, Jinjarak and Naknoi (2011) illustrate that the degree of competitiveness is determined by foreign-domestic wage inflation differentials, changes in the relative cost of capital, the growth rate of TFP and foreign-domestic inflation differentials in the import sector. But rising wage inflation may not result in a loss of competitiveness if it occurs in the sectors of which labour intensity is low and consumption expenditure share is small.

Working conditions

The globalisation of recent decades, including outsourcing, has generally led to improved labour conditions. The effect of trade on labour conditions has been mainly indirect, through its impact on GDP (Flanagan and Khor, 2011). Asia generally scores lower on most measures of working conditions and labour rights than other regions, but some differences with the rest of the world have been narrowing. This evidence seems consistent with the "knowledge capital hypothesis" that foreign firms bring firm-specific technical and managerial advantages that produce the higher productivity which supports higher wages and improved nonmonetary employment conditions. This was particularly well-documented in the case of foreign investors in Asia's manufacturing activities related to vertical production chains, which are geared towards exports and tend to pay higher wages and provide better working conditions.

Employing a measure for violations of free association and collective bargaining (FACB) rights constructed by Kucera (2002), Neumayer and Soysa (2006) found that countries that are more open to trade have fewer core labour rights violations than relatively closed ones. They argue that of particular note, while globalisation may not be beneficial for outcome-related labour standards, it is likely to promote the process-related standard of a right to FACB. Another study however documents that union strength as measured by union density and union influence in several Asian economies has been in decline since the late 1980s (Kuruvilla *et al.*, 2002), making it difficult for them to effectively exert influence. Jansen and Lee (2007) explain that the general decline in the bargaining power of labour is due to globalisation, which effectively brought competition to domestic labour indirectly through imports, and directly through improvements in ICT which increased the scope of trade in tasks. Nonetheless, the waning influence of unions generally has not been reflected in poorer working conditions.

Robertson *et al.* (2011) describe an ILO monitoring and training program of Cambodian apparel factory compliance with international core labour standards and Cambodian labour law. They show that institutions regulating working conditions can have a positive impact on economic efficiency. The Better Factories Cambodia (BFC) program achieved a record of

compliance above that attained by reputation-sensitive buyers in global supply chains, and achieved improved compliance among factories lacking a reputation-sensitive buyer by threatening public disclosure of noncompliance. The program also helped factories identify labour management practices that were more efficient than standard practices in the Cambodian apparel industry, with lasting effects.

In China, it is commonly argued that the massive structural transformation put into motion by the gradual liberalisation in 1979 and the greater integration into world markets has finally reached the Lewis turning point and is popularly termed as 'the end of cheap China.' The shortage of labour has in turn led to steep wage increases and improved working conditions, with strong implications for the country's export structure. Nonetheless, Du and Cai (2011) found that huge disparities in working conditions remain between migrant and urban workers. In particular, the close link between the domestic labour market and external demand brings added uncertainty for workers, especially the migrants (Du and Cai, 2011). This has been observed even though direct employment effects in trade related sectors may look small in the context of the large Chinese labor market. Although workers benefit from growing wages, enterprises in labour intensive sectors may be more vulnerable when facing outside shocks since their profit margins are largely determined by labour costs. Bankruptcy would see migrant workers suffer from unemployment without reliable access to social safety nets. On the other hand, increasing labour costs combined with liberal reforms in other factor markets, can push the economy to shift toward higher value-added industries, if accompanied by more investment in human capital.

Most of the findings relating trade and working conditions pertain to the formal sector. This issue is of particular relevance for developing Asia where the informal sector was measured at 67% of employment as of 2008 (ADB, 2011c).[3] The informal sector produces goods and services which are often linked to those in the formal traded sector, either as inputs, or finished or intermediate goods which compete with those produced in the formal sector, or purely nontraded consumption goods. Unfortunately, the factors driving the heterogeneity of results remain poorly identified, much less, understood. Nonetheless, a survey by Munro (2011) finds that increased openness can expand informality in the short term, although country specific characteristics appear to be the primary determinant of whether this actually occurs.

A study on India by Marjit and Maiti (2005) on the other hand documents how trade improves the welfare of those working in the informal sector. The nature of the formal/informal production structure in West Bengal underwent transformation following increased exposure to international trade primarily through expanded export markets. There is a clear trend showing the breakdown of independent entrepreneurship of marginal producers who are becoming tied suppliers to bigger, formal enterprises. As export markets expand, the division of labor alters, with informal rural industries exhibiting increasing dynamics of tying, technology adoption and growth.

11.3. Changing landscape of labour markets in Asia

Demand and supply for final goods and services change constantly during the ordinary course of business and these variations feed into the labour market. Consistent with Heckscher-Ohlin and Stolper-Samuelson predictions, the labour intensive sectors of developing Asia benefited from opening up to trade, with consequent improvements in employment as well as labour conditions (ADB, 2011a; Flanagan and Khor, 2011).

3. The figure represents only a minimal decline from the 1990 estimated level of 68.9%.

More enduring shifts in the demand for labour have however been unfolding, and are expected to persist as technological developments continue to bring communication and coordination costs down, making global production fragmentation more economical over a wider range of products, tasks and regions.

Part of the changing context is the proliferation of bilateral and regional trade arrangements (RTAs), which can transform economies. Such integration efforts can facilitate trade or increase the complexity faced by exporters and can lead to trade expansion or trade diversion. Moreover, they can influence comparative advantage with consequences for economic specialisation and the international division of labour.

Not all RTAs are alike and the quality of an agreement matters. In some arrangements implementation and enforcement is difficult, which reduces the attractiveness of the enlarged market. RTAs can also be characterised by the issues that they cover (particularly whether investment is included), their rules of origin, etc. They also may differ by the rationale for the RTA. More often than not, they are negotiated in response to other countries' RTAs, to keep exporters from being disadvantaged in external markets. Labour standards in RTAs were a sensitive issue when they were first raised, but have now become more accepted and even encouraged, as witnessed by growing interest in Trans-Pacific Partnership (TPP) agreements. Policymakers may also find that having labour and environmental standards in a trade agreement makes it easier to get necessary support from constituents and political allies.

Unlike other regions, the political push in Asian RTAs has been to support the economic integration process spurred by international production networks. Problems associated with the current approach, including exceedingly complicated rules of origin requirements, suggest a strong incentive to expand and consolidate. In November 2010 the APEC Summit approved paths to creation of an eventual "Free-trade Area of the Asia-Pacific" (FTAAP) in 2020. According to Petri, Plummer and Zhai (2011), the FTAAP would yield significant gains, with trade creation outweighing trade diversion in all scenarios examined. Their forecast shows that excluded countries can still benefit via growth and welfare spillovers. The welfare gains per job transferred in these scenarios are very high, suggesting the agreements present potential "win-win" scenarios, provided that appropriate compensation policies are in place. This reinforces the perception that trade liberalisation can generate large gains but effective complementary strategies need to be developed to facilitate structural change and protect the most vulnerable.

Besides RTAs, geography and developments in ICT also made the East Asian economies the quintessential success story of the production fragmentation which started on a region-wide basis in the mid 1980s. Countries in the region moved away from their import substitution strategies, and embarked on unilateral liberalisation in competition for foreign investments and the jobs that come with these (Baldwin, 2006). Practically, the whole of East Asia is involved in worldwide vertical production chains and has given rise to the commonly used term 'factory Asia'.[4] According to Athukorala (2011), exports and imports of parts and components comprised 17.3% and 29% of manufactured exports and imports respectively in developing Asia in 1992-1993. This expanded to 34% and 44.2% respectively in a span of just 15 years.[5]

4. See Ferrarini (2011) for an analysis of the density of vertical trade networks in East Asia for electronics and automotives parts and components trade.

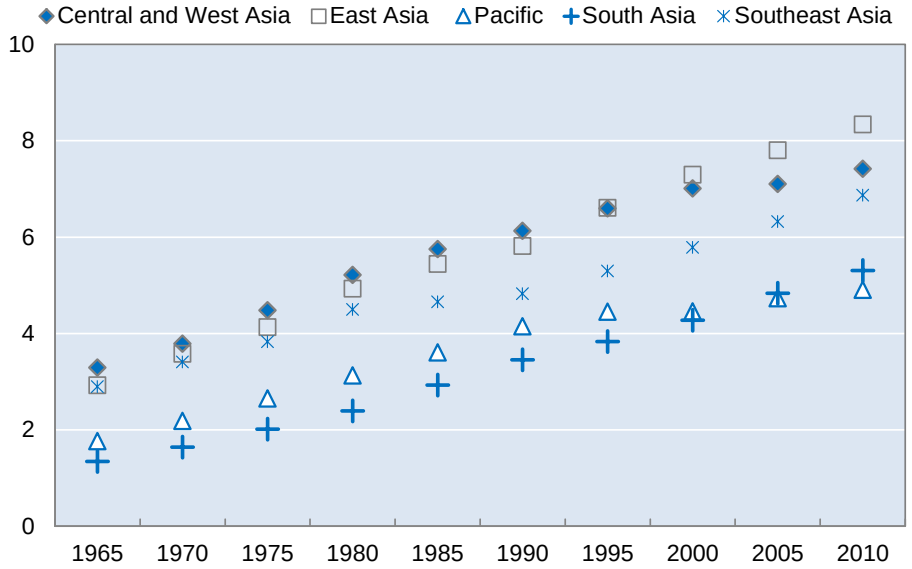
5. Developing Asia in this context comprises PRC; Hong Kong, China; Taipei, China; Korea; ASEAN6 and India.

More recently, production fragmentation has expanded beyond goods to encompass provision of services, termed as business process offshoring (BPO). Asian countries have been particularly adept at reaping benefits of this development, collectively accounting for over 90% of the world market in IT-BPO, particularly PRC (25.9%), India (44.8%), and the Philippines (21.7%) (BSP, 2011).[6]

Production fragmentation in both goods and services is expected to continue and even expand to encompass more activities as technology continually develops. From the point of view of firms, lower trade and coordination costs effectively enlarge the pool of labour that can feasibly be engaged. This in turn means domestic labour resources increasingly come into direct competition with labour from other parts of the world. Autor *et al.* (2003) distinguished among five categories of jobs: requiring expert thinking; requiring complex communication; non-routine manual labour; routine cognitive processes; and routine manual labour. Of these, the last two categories are the most likely to be outsourced. Thus far, developing Asia has been perceived as a winner of these developments as attested to by factory Asia and the dominance of Asian countries in capturing BPO investments.

These demand side developments in the labour market were accompanied by changes in the labour supply conditions of the region. Labour supply in Asia-Pacific has grown from about a billion in 1980 to about 1.8 billion in 2011. The quality of the labour force has likewise been continually improving as can be appreciated from Figure 11.2. The average years of schooling of the population aged 15 and above increased substantially in all sub regions of Asia and the Pacific since 1965. A successful structural transformation has simultaneously taken place as massive shares of the working population were transferred from the generally low productivity agricultural sector to higher productivity manufacturing and service sectors as shown in Figure 11.3.

Figure 11.2. Average years of schooling in Asia and the Pacific, 1965-2010

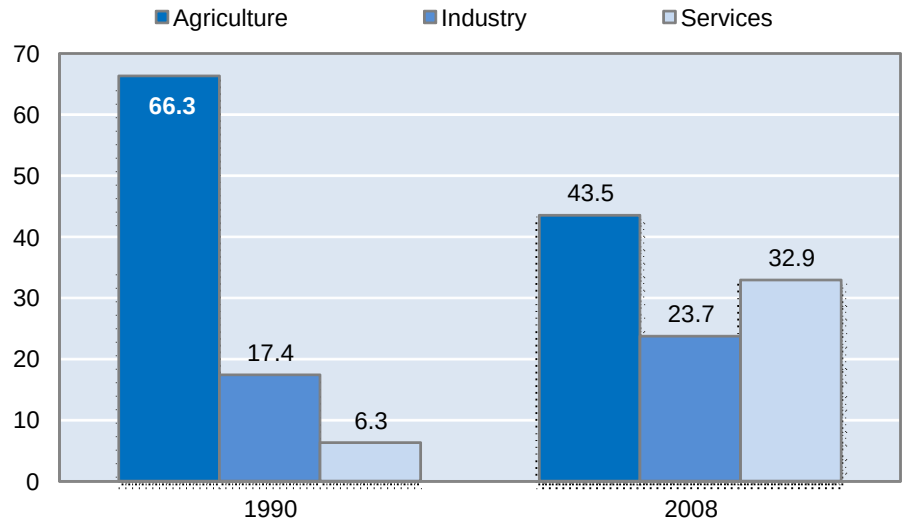


Note: Averages were weighted using size of labour force.
Source: Authors' calculations based on Barro and Lee (2010), World Development Indicators and Directorate General of Budget, Accounting and Statistics for population aged 15 and over.

6. BSP uses the term business process "outsourcing" to refer to trade in tasks. We follow the advice of Grossman and Rossi-Hansberg (2006) that since the focus is on international trade in tasks, the proper terms is "offshoring".

Labour supply conditions in the region are however undergoing enduring shifts as Asia continues its demographic transition. In some economies such as PRC; Hong Kong, China; Korea; Malaysia; Singapore; Sri Lanka; Taipei, China and Thailand, the period of reaping demographic dividends is gradually coming to an end, and is shifting into one where the dividend might soon become a tax as populations age and dependency ratios rise (ADB, 2011a; World Population Prospects, 2010; DG-BAS, 2011). On the other hand, younger countries such as Cambodia, India, Pakistan and the Philippines (ADB, 2011a) are likely to retain their comparative advantage in labour intensive products and services.

Figure 11.3. Employment shares of agriculture, industry and services in Asia and the Pacific, 1990 and 2008



Source: ADB Key Indicators (2011).

It used to be simpler to predict what all these developments would mean for labour markets in Asia and the Pacific. The traditional Ricardian models make broad, widely accepted predictions about factor returns when North-South trade is involved. These predictions largely remain valid for the meantime as most trade in final goods and services occurs between north and south. Even so, the model could not account for increasing inequalities between skilled and unskilled workers brought about by skill-biased technical change that occurs in developed and developing countries alike. Moreover, South-South trade has been rising steadily, independent of the parts and components trade (Athukorala, 2011), and is expected to intensify as a result of the global rebalancing process. Other developing countries in the region often express fear of competition from other developing countries such as PRC and India that have seemingly limitless armies of workers willing to provide cheap labour. As wages in the PRC rise rapidly, manufacturing firms requiring less sophisticated logistic arrangements are also moving low skill production processes into other lower wage economies such as Viet Nam and Cambodia. Finally, while trade models such as Krugman's new trade theory and Melitz's heterogeneous firms model are better at predicting trade patterns between relatively similar countries, they do not concentrate on factor rewards useful for welfare distribution predictions (WTO, 2008).

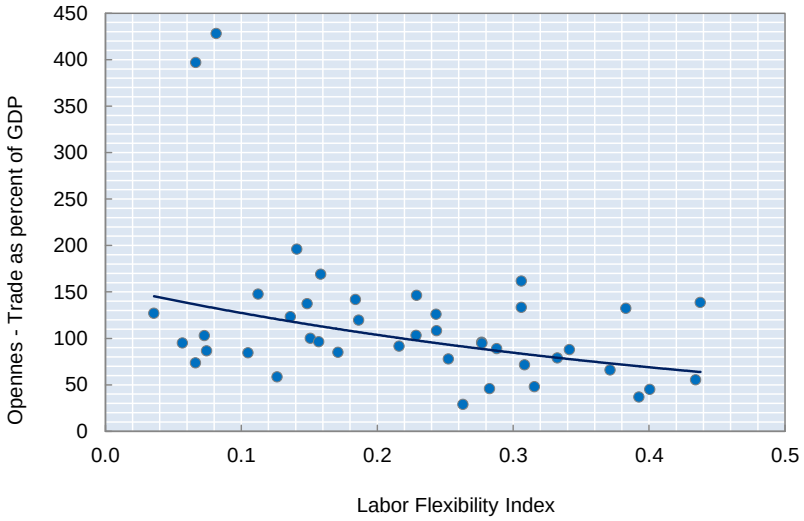
Nonetheless, some broad implications can be drawn. First, the aging countries in the region would probably gradually shift production to products and services that require relatively lower labour intensities than are produced now. This means that the workforce must be sufficiently skilled to work with greater or more sophisticated capital equipment. Second, younger countries can anticipate that their comparative advantage will continue to lie in the production of labour

intensive goods and tasks over the short term although skills for this production will become increasingly important. Moreover, important considerations to these general propositions are: (i) the demographic shift in Asia and the Pacific is occurring amidst a more drastic aging process in developed countries, and increasing labour force in Africa although the region will account for over half of world population well into the first half of the 21st century; and (ii) technological developments will further expand the extensive margin of tasks and goods that are currently traded.

11.4. Labour markets institutions

The effects of trade reforms on the labour markets in Asia and the Pacific vary across institutions and the underlying demand and supply conditions. Labour market institutions are shaped by efficiency needs, political motivations, and the legal tradition in a country (Botero *et al.*, 2004). The inability of cross country studies to come up with robust conclusions on the effects of trade on employment has often been attributed to the dissimilarities of labour market institutions in countries. This is because institutions affect labour costs, investment decisions of firms and labour in terms of both physical and human capital, and the speed of adjustment. For example, Chang *et al.* (2008) found that characteristics of labour market institutions are key determinants of whether a country is able to reap growth benefits from trade reforms. In general, liberal labour markets tend to go with more open economies. Figure 11.4 shows a positive correlation for Asia and the Pacific between the openness of countries and flexibility of their labour markets. Nonetheless, labour institutions in the region vary. While Figure 11.5 indicates that labour institutions in Asia and the Pacific are on average more flexible compared to other regions, Table 11.1, which summarises the labour flexibility into a single index for selected countries in Asia and the Pacific reveals the diversity within the region.[7] The labour market environments in small island Pacific countries and highly trade oriented economies such as Singapore and Hong Kong, China are the most flexible while there are others that nominally are among the most rigid in the world such as Indonesia and Tajikistan.

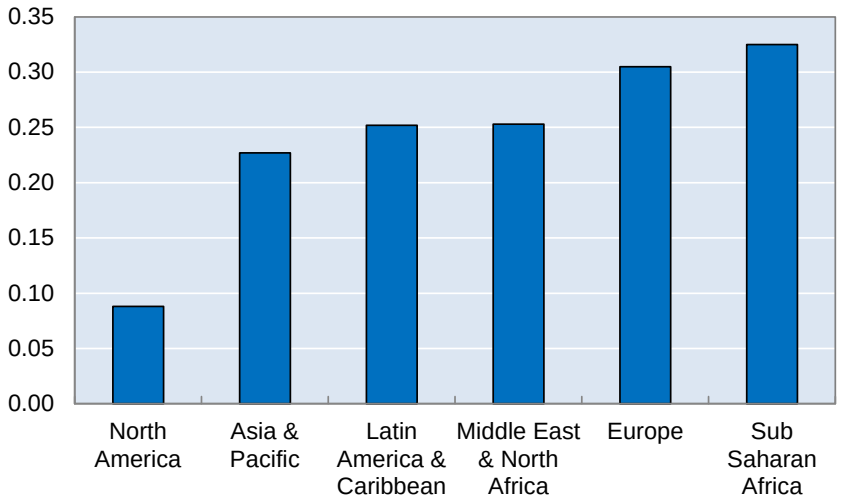
Figure 11.4. Labour flexibility and openness in Asia and the Pacific



Note: Openness is measured as the average share of trade to GDP for 2005 to 2009.
Source: Authors' calculations based on the Penn World Tables 7.0, and *Doing Business 2012*, World Bank.

7. Please refer to the Labor Annex of the World Bank *Doing Business 2012* Report for the different aspects by which labour market flexibility were measured.

Figure 11.5. Labour flexibility index



Notes:
(1) An attempt to include freedom of association and collective bargaining indicators based on the ratification of ILO Conventions 87 and 98 resulted in the same patterns.
(2) The five broad categories received equal weights.
(3) The index takes a value of 0 to 1, with lower values denoting more flexible labour markets.
(4) Regional averages are un-weighted.

Source: Authors' calculations based on the Labor Annex of the *Doing Business 2012*, World Bank.

Table 11.1. Labour flexibility index in Asia and Pacific

Economy	Labour Flexibility Index	Global rank	Economy	Labour Flexibility Index	Global rank
Marshall Islands	0.04	1	Kiribati	0.23	66
Micronesia, Fed. Sts.	0.06	2	Kyrgyz Republic	0.24	74
Tonga	0.07	5	Vanuatu	0.24	75
Hong Kong, China	0.07	6	Afghanistan	0.25	77
Brunei Darussalam	0.07	7	Japan	0.26	86
Georgia	0.07	8	Timor-Leste	0.28	96
Singapore	0.08	9	Azerbaijan	0.28	97
Samoa	0.10	13	India	0.28	98
Palau	0.11	14	Philippines	0.29	99
New Zealand	0.13	19	Cambodia	0.31	108
Mongolia	0.14	23	Viet Nam	0.31	109
Malaysia	0.14	24	China, PRC	0.31	112
Papua New Guinea	0.15	26	Bangladesh	0.32	116
Bhutan	0.15	27	Lao PDR	0.33	123
Australia	0.16	30	Korea, Rep. of	0.34	130
Maldives	0.16	32	Sri Lanka	0.37	139
Solomon Islands	0.17	37	Taipei, China	0.38	146
Thailand	0.18	48	Pakistan	0.39	151
Fiji, Rep. of	0.19	52	Nepal	0.40	154
Kazakhstan	0.22	64	Indonesia	0.43	163
Armenia	0.23	65	Tajikistan	0.44	166

Note: Ranking pertains to 183 countries.

Source: Authors' calculations based on *Doing Business 2012*, World Bank.

Employment regulations

Among employment protection policy tools, minimum wages most visibly affect labour costs. The World Bank *Doing Business 2012* report, however suggests that it is not a binding concern in Asia and the Pacific since none of the countries have ratios of minimum wages to value added per worker that are above one.[8] Instead, hiring and firing restrictions pertaining to approval or notification of third party, separation pay, premia for over time and holiday work, and limits on the number of work hours appear to be more binding factors in determining labour costs as these regulations accrue to the cost structure of firms hiring labour.

At the same time, these policies affect the manner and speed with which labour markets are able to respond to changing demand and supply conditions. In particular, employment laws pertaining to job security and hiring restrictions were found to have a slowing effect on the adjustment process in labour markets (Jansen and Lee, 2007), while hampering growth potential by restricting the movement of resources to the most productive sectors of the economy (Chang *et al.*, 2004). Exploiting information on India's labour force size and federal system of government, Hasan *et al.* (2007) focus on job security and hiring provisions and find labour demand elasticities to be higher in states with more flexible labour institutions implying higher employment effects of trade reforms.

Employment policies also affect physical and human capital investments of both firms and employees. Protected labour markets usually imply higher bargaining power for workers, which translates to more incentive to acquire firm-specific skills. Tang (2011) demonstrated that this can become a source of comparative advantage as countries begin to export more firm specific goods. The wider implication is that countries with more flexible labour institutions specialise in sectors with higher demand and production volatility (Cuñat and Melitz, 2011). However, as in the infant industry policy approach, there remains a real danger that such strategies lock-in or encourage industrial protection policies that fail to graduate industries to a state where comparative advantage becomes intrinsic. Moreover, these studies have yet to be set in a dynamic context which may produce different policy implications once gyrations of the job markets are taken into account. Acquisition of highly firm- or sector-specific skills may also not be a prudent strategy given the emerging consensus that education geared towards continued learning for increased adaptation capabilities will be more important as increased volatility becomes a common trend in job markets (Jansen and Lee, 2007; Baldwin, 2006). Finally, extremely inflexible labour market institutions coupled with relatively lenient regulations on the movement of capital, even within a country, may encourage firms to invest more on capital equipment to the extent that capital and labour are substitutable.

Needless to say, all these have implications on the hiring decisions of firms, and hence on employment levels and working conditions. High labour costs and slow adjustment capabilities are factored into a firm's hiring function even during times of economic expansion. Firms may hire less during good times in anticipation of facing high dismissal costs during times of slowdown. The net effect may either be a lower overall level of employment or poorer quality employment through increasing resort to casual employees or informal sector workers to the extent that they are legal, or to the extent that prohibitions applying to the sector are poorly enforced. This issue is of particular relevance for developing Asia where the informal sector constitutes a major component of the labor force.

8. Only a few Asia-Pacific countries – Republic of Fiji, Nepal, Philippines, Solomon Islands and Vanuatu – have ratios above 0.60.

Ultimately, labour market institutions will also have consequences for the survival of domestic firms if foreign competition is introduced while labour market institutions slow down the necessary reallocation of factors of production.

Collective relationship regulations

Collective relationship regulations govern "the bargaining, adoption, and enforcement of collective agreements, the organisation of trade unions, and the industrial action by workers and employers." (Botero *et al.*, 2004, p.1339). It is easy to appreciate that policies governing collective relationships also affect labour costs and adjustment processes. In general, negotiating as a union strengthens the bargaining power of labour relative to a situation where markets are given free rein in determining working conditions and wages. This can easily be the case in countries like the Philippines where increasing monopolisation of economic sectors translates to growing influence of capital relative to labour (Felipe and Lanzona, 2006).

In most cases, owners of capital and labour, while not necessarily adversarial, have opposing objective functions. As such, some resources must be spent in facilitating agreement between the two groups. Still, regulations pertaining to FACB can be a way of facilitating efficient negotiations through better information, communication and trust (Freeman, 2007), easing the process through which an efficiency wage (or "efficiency compensation package") can be achieved. Indeed, using a panel of 162 economies, Kucera and Sarna (2006) found that FACB can have positive effects on manufacturing exports. A recurring concern about policies governing FACB, however, is their effect on employees and labour who are not part of the labour union.

Social security regulations

Credible social security mechanisms are an important component of any labour adjustment process in ensuring that the costs imposed by the adjustment process on individuals do not become oppressive. They also facilitate the transfer of labour from a losing sector or firm to the expanding branches of an economy. This is a policy area where attention is warranted as only a handful of developing countries in the region currently have social safety nets in place with meaningful coverage for employment related shocks.

Nonetheless, setting up employment security instruments affects labour costs. Most social security mechanisms are administered by the state, with financial contributions from both employees and employers. Asher (2010) demonstrated that similar set-ups apply in Asia and the Pacific, although the burden sharing varies across countries. In addition to government contributions, India and Singapore impose high burdens on both the insured and the employer, while PRC places a higher burden on the employer, which increases labour costs from a firm's perspective.

Social safety nets, when effectively designed and implemented, ease the adjustment process for labour, and to a certain extent, on firms. However, the sharing of burden among employers, employees and government must be carefully engineered such that the perceived additional costs on the part of employers do not end up discouraging job creation.

11.5. Adjustment costs

While the relationship between trade and employment is rarely a zero-sum game, and is frequently observed to yield efficiency gains, its impact on equity is less established, particularly in cases where politically contentious trade liberalisation poses a threat to vested interests. In the short run the attendant adjustment process following trade liberalisation can be

painful and unevenly distributed at the individual level. Capital is significantly more mobile than labour, and skill biased technological change brought in by foreign direct investments into developing countries has increased demand for skilled workers. This has meant that labour tends to bear the brunt of adjustment costs, and income inequality between skilled and unskilled workers can be exacerbated rather than narrowed as would be predicted by Ricardian models. Moreover, the greater costs fall on unskilled labour as the transition from lower skilled work to higher skilled work occurs.

Trade can support inclusive growth if workers and firms can adjust and shift into sectors with growing demand and adopt new technology. The utility of trade reforms cannot be seen in the abstract, but depends on policies and factors in other areas (e.g. labour mobility costs, the upgrading or retooling of skills, etc.). More broadly, the net effect of trade reform on the poor comes both from these employment effects and from the impact on prices that they pay for goods. In general, if the relative prices of goods accounting for a large share of the consumption of poor households fall, trade reforms can be deemed pro-poor.

Limitations in the extent to which increased market openness can contribute to recovery from the recent global recession and creation of employment opportunities is reflected in the extent to which job creation has not kept pace with the recovery in trade. Can policy help to address impediments to structural adjustment, and thereby increase the potential for employment opportunities in expanding areas of the economy? In the long term, how can trade policy promote positive and sustainable economic and labour market outcomes? Trade and employment can complement each other when markets are flexible.

While transfer payments can mitigate adjustment costs, targeting the losers is usually difficult and programs such as retraining or social protection are commonly preferred. Moreover, the mechanisms for transferring some of the gains from winners to losers are still inadequate. Politically difficult reforms are needed to manage the shift of labour and firms toward winning sectors to maximise the net gains. Finally, there is skepticism about government's ability to effectively and efficiently implement such programs in some Asian countries. Trade-displaced workers can differ from other job losers in terms of industrial occupation, skill level, age, gender, *etc.* and can be concentrated in certain areas or sectors, warranting special attention or facilitating compensatory targeting. But the priority should be a comprehensive policy framework that includes elements aimed at enhancing the mobility of workers, developing labour force skills, employment-oriented social assistance, and social safety nets.

Labour experiences the adjustment costs in the forms of unemployment, underemployment, lower wages, and job search frictions (Francois *et al.,* 2011). The need to manage the adjustment costs is imperative given the findings that openness has led to more volatile labour markets and more elastic demand for labour (Jansen and Lee, 2007). This is made even more urgent in Asia by the erosion of traditional social protection systems based on family and community ties accompanying rapid urbanisation (Park, 2010). Finally, having a credible adjustment system in place will be valuable in overcoming resistance to trade reforms that will yield long term gains overall despite short term costs to some sectors and individuals. A credible system can also be a means of effecting *Pareto* improvement- with the winners using some of their gains to compensate the losers from the trade reforms.

Job security regulations, insurance and social security

A significant amount of adjustment can be accommodated by ordinary labour-market churning, and more so in cases of rapid growth and structural transformation, as in Asia. But the post re-employment earnings for workers displaced from high-import-competitive

manufacturing can be significantly lower. Policies should aim to effectively reduce the costs of adjustment borne by a relatively small number of workers with minimal impact on the public budget, minimal distortions, and should be simple enough to be practical. Among possible policy options could be enhanced unemployment benefits, (re)training subsidies, and wage insurance.

While mostly well-intentioned, some labour protection policy tools are short sighted and in the long run may serve to prolong the duration of the adjustment process, thereby making it even more costly for the economy. Common examples are job security regulations such as severance pay and notification requirements prior to dismissals. Figure 11.6 shows that such policy tools are in use in most economies in Asia and the Pacific. Moreover, while dismissal notification regulations in the region is slightly less stringent than the world average, the same cannot be said of the average severance pay, costing around fifteen salary weeks.

Studies have shown that such regulations are indeed effective in preventing the dismissal of workers and can be a means of protecting workers from short term labour demand volatility (Francois *et al.,* 2011). They are however far from effective in dealing with enduring changes in the structure of demand for labour, which has been occurring and is expected to continue. Moreover, short term protection is often achieved at the cost of growth potential of an economy, and job creation potential in the expanding sectors of the economy. In the final analyses, such policies end up protecting jobs rather than workers (Blanchard, 2005).

Nonetheless, the popularity of job security regulations is easy to appreciate, especially from the point of view of developing countries, as it places the direct administrative and monetary costs of the adjustment process almost entirely on the employer. The indirect costs such as opportunity costs in terms of growth, and potential tax revenues from the expansion of industry winners are not immediately or overtly apparent to voters.

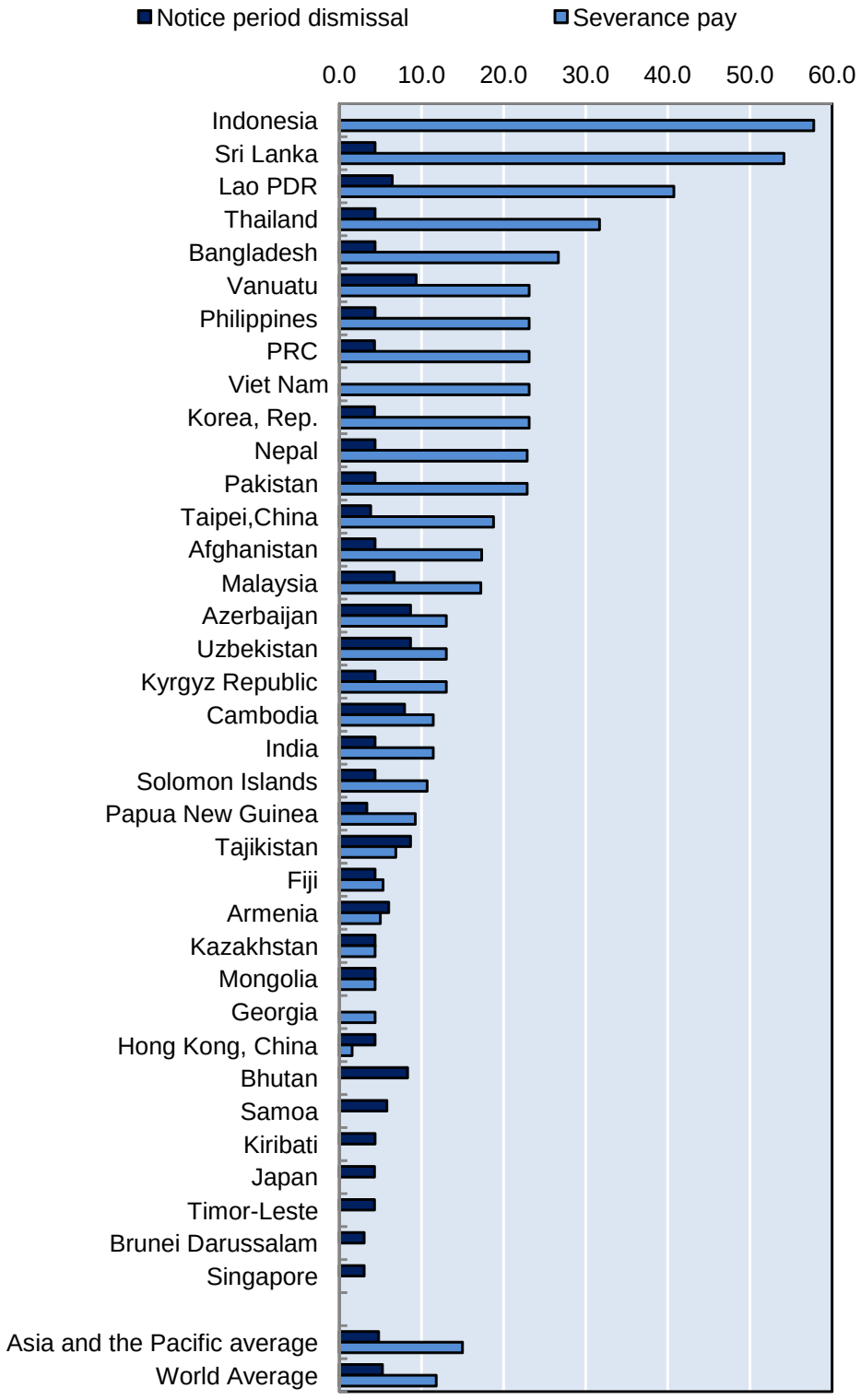
Economists generally agree that unemployment insurance (UI), wage and employment subsidies, retraining programs and job search services are more economically sound mechanisms for worker protection. These tools tend to be less distortionary, although the extent of their effectiveness in addressing the problems of adjustment is highly dependent on their design.

Unemployment insurance eases the adjustment process by smoothing the consumption patterns of workers over their lifetimes. This is operationalised by contributions from employees during their employment lifetime and disbursing benefits during periods of unemployment. Worker related social safety nets such as UI are mostly government administered with partial contributions from both the worker and the employers. UI designs vary according to contribution, coverage, eligibility criterion (nature of dismissal), compensation (full or partial), and length of eligibility for benefits. Studies have demonstrated that variations in designs along these parameters have palpable effects on how long unemployment spells last and the incentive of workers to actively seek re-employment (Vodopivec, 2009).

Only a handful of developing countries in Asia and the Pacific have UI schemes in place. The work of Scholtz (2009) identified six economies in East Asia and Southeast Asia with such schemes – PRC; India; Korea; Taipei, China; Thailand and Viet Nam. Kuddo (2011) also identified Armenia, Azerbaijan, Kazakhstan and Kyrgyz Republic as having UI schemes in place although formal sector coverage is less than 30% for Armenia and less than 10% for the others. Many countries also have some broad social security insurance in place that may cover worker disability, injury, and even unemployment (Asher, 2010). Coverage is however mostly limited to the work force in the formal sector which in a number of big Asian countries such as

Bangladesh, PRC, India, Indonesia, Pakistan, Nepal and Thailand still form a minority of the workforce (ADB, 2011b, 2011c).

Figure 11.6. Severance pay and notification requirements for worker dismissal



Note: Average figures are not weighted
Source: World Bank, *Doing Business 2011*.

The limited coverage of UI in the region can be explained by the limited administrative and institutional capacities of developing countries. Monitoring and administration is made particularly onerous by the large informal sector in Asia and the Pacific. Vodopivec (2009) suggests ways to overcome these constraints:

(i) institute an unemployment insurance savings account (UISA), where employees draw unemployment benefits from savings required as a fraction of their earnings;

(ii) contributions solely come from employees and employers;

(iii) use working in the formal sector as the sole disqualifying criteria for continuing benefit eligibility; and

(iv) piggy backing on existing social security schemes for administration of the UISA.

The first two solutions are intended to address the moral hazard problem inherent in insurance schemes and budget constraints of developing country governments, while the latter two are geared towards overcoming the administrative challenge posed by operating a comprehensive UISA system. These suggestions can be used as a basic framework to introduce UI or UISA systems in countries in the region. Nonetheless, it remains unclear how the large informal sector in Asia and the Pacific can benefit from such a scheme. The poor have high discount rates and it is therefore not easy to induce them to save. It is likewise impractical and costly for the government to enforce contributions from employers in the informal sector. An alternative is for government to collect the unemployment savings and pay interest rates for these contributions, but this would still be insufficient to have a near universal coverage. Policy makers may need to consider if other social safety net mechanisms such as conditional cash transfers might be more feasible given current circumstances. In the long run, the solution would still be to create an environment conducive to formalising the informal sector or in policy interventions designed to facilitate the formalisation.

Education, training and job search assistance

The general implication drawn from the increased volatility of market demand for human capital in the developed world has been to increase the flexibility of the working populations towards continuous learning (Jansen and Lee, 2007; Baldwin, 2006). But what are the human capital investment implications for the labour force in developing countries of Asia and the Pacific?

The question can be approached from two perspectives – the short term and the long term. In the short term, the most feasible response is retraining and job search assistance. In the longer term, the answer lies in the education system with due consideration to demographic trends.

Retraining can address some of the mismatch between labour demand and supply. This means that government bodies involved in such programs must monitor emerging labour market trends in domestic and world markets. Training institutions often fall into the trap of offering the same types of skill-training due to inertia, lack of strategic planning and coordination with other relevant government or private sector institutions, or resource challenges. Nonetheless, it should be easier for coordination and planning to take place in countries where governments actively pursue industrial policies. This was precisely the approach taken by Korea in designing its technical and vocational education and training (TVET), which has been a widely recognised success (ADB, 2011c).

Firms can also be tapped to conduct training during periods of economic expansion. Hahn and Park (2011) find that firms engaged in exporting activities in Korea increased productivity by investing in skill upgrading for their workers. In house training discourages firms from

dismissing workers during short term demand fluctuations, but the incentive for firms to engage in employee training is contingent on expectations of future expansion.

Assistance for job seekers is another measure that can mitigate information asymmetry and job search friction, thereby reducing transactions costs. Such interventions rise in relevance as the process of job destruction and creation increasingly proceeds faster. There is ample demand for such services as attested to by the proliferation of recruitment and headhunter services. Empirical studies on the industry are scarce, but these services seem to work better for more highly skilled workers. Recruitment services for low skilled jobs in developing Asian countries are strewn with anecdotes of abuse from excessive fee demands from recruitment agencies to outright human trafficking. This suggests an important role for governments in either regulating the industry or bringing information costs lower by making them more readily accessible to a wider population.

Service sector

The manufacturing sector as a source of employment will likely continue playing an important role in Asia and the Pacific. The population in the region is expected to expand from 3.9 billion now to 4.7 billion in 2050 (UN Population Prospects, 2011). No other region is as dense a market. Per capita income is expected to continue to grow and together with this, demand. Increased demand is particularly expected from traditionally current account surplus economies such as PRC, Malaysia, Singapore and Taipei, China, as they encourage their domestic populations to expand consumption.

Just the same, services are expected to grow in importance as a source of employment because of increasing expansion of task trade. Although it remains significantly below that of merchandise, trade in services has been continually increasing. Moreover, the sector has been a growing share of the economies in Asia and the Pacific as demonstrated in Figure 11.3. Hong Kong, China and Singapore are in fact already overwhelmingly dominated by the services sector.

The expansion of the services sector can also have positive impacts on employment through its productivity and efficiency effects. Services lubricate the economy by bringing down transactions costs. Francois *et al.* (2011) for example, stressed the importance of well functioning financial services in facilitating credit access for the private sector to move into expanding sectors in the economy. This suggests a possible reform agenda for some big Asian countries that have highly restrictive trade regimes on services. In particular, PRC, India, and Malaysia registered the highest restrictiveness index for the banking and insurance services among 55 countries for which Dihel and Shepherd (2007) computed these indices.

Infrastructure

Brooks and Menon (2008) highlighted that the expansion of infrastructure played an important role in making Asia a success story of liberalisation. Like services, infrastructure brings down transaction costs in an economy, enabling movement of production resources and products from places of surplus to places of scarcity. This eases the process of adjustment in the labour market. Labour resources are able to move (at least domestically) easily to places where jobs are plentiful. This is something that is nearly taken for granted in rich countries with good transport infrastructure and systems, where it is common to encounter workers who live in one metropolis and work in another.

Communications infrastructure has also played an important role in job search practices around the world and in substantially bringing down information costs for firms looking for

workers and for workers seeking employment. Some examples are how mobile telephony facilitated job search and entrepreneurship for housekeepers, porters, and hairdressers in Thailand, Pakistan and the PRC (Bhavani *et al.*, 2008).

However, the state of infrastructure development in economies in Asia and the Pacific varies widely. The World Bank's logistics performance index ranks infrastructure in Singapore; Hong Kong, China and Taipei, China as among the best in world, while those of Sri Lanka, Bhutan and Nepal are among the worst. Many economies lie in between. There are admittedly cases when overinvestment in infrastructure crowds out needed investments in other areas, but the poor quality of infrastructure in many countries in the region suggests that infrastructure investments still have large marginal benefits to their economies and the potential to boost trade and employment.

Sequencing issues

Trade liberalisation has typically proceeded by opening up competitive industries while attempting to protect politically or socially sensitive industries. Moreover, the degree of openness in terms of the manufacturing sector is generally more advanced than the services sector. This makes it difficult to establish a general ideal sequence as counterfactuals are hard to come by.

The PRC's experience with liberalisation is perhaps the closest example to a natural experiment available. The creation of isolated special economic zones (SEZs) in the 1980s and 1990s, where liberalisation was carried out resulted in huge employment in those cities and the influx of lower wage rural workers into the higher wage SEZs (Ebenstein, 2011). The success of the SEZs and other test cases convinced the government that the experiment could be extended country wide. However, such experiments as a norm are not feasible for other countries without such strong central governments. Instead, sequencing takes the form of staged liberalisation in most countries, leaving out sensitive sectors for later liberalisation. The sensitive sectors remain protected through tariffs, non tariff measures, or safeguard mechanisms such as those provided for in Article XIX of the General Agreement on Tariffs and Trade, or Article 5 of the Agreement on Agriculture. Ideally, these measures are in place to help economies and industries transition toward areas of comparative advantage. Successful stories of transition are however few and far between as a good adjustment process requires sound institutional foundations to carry out effective planning and implementation, which can be a daunting task for many developing countries. As a result, instead of buying time for losing industries to decline with minimal social consequences, or make necessary investments to boost competitiveness, protection measures further lock economies into protecting losing industries, often at substantial costs. Such policies subsequently prevent labour resources from making the adjustments as well.

While economically controversial, there may be valid reasons for protecting certain industries when their values are poorly reflected by markets and for other socioeconomic reasons. G33, an alliance coordinated by Indonesia for agricultural negotiations in the WTO, for example, cites livelihood security, food security and rural development as the rationale for retaining protection tools such as special safeguard mechanisms and special products' status for agricultural products. On average, 12% of Asia's labour force is rural, but country variations can range to over 60% as in the case of Afghanistan, Tajikistan, Nepal, Cambodia, Lao PDR and Myanmar.[9] Even rich countries defend the 'multifunctionality' of agriculture as a

9. Refers to average weighed by total labor force in each economy.

justification for protection. Policy makers however need to be clear on the extent to which a society is willing to restrain the adjustment process to protect these sectors.

11.6. Conclusion

It is widely accepted that Asia's economies have benefitted from trade liberalisation. The region's experience with trade-related effects on employment are however more ambiguous. This is partly because of the difficulty of disentangling the effects from other major developments in the global labour market brought about by geopolitical and technological developments. Studies attempting to investigate the relationship between trade and employment have thus far revealed that both positive and negative effects of trade on employment levels tend to be weak at the aggregate level, and that stronger effects are observed in the inter-sectoral reallocations of labour. During an earlier period, trade openness led to the narrowing of the wage gap between skilled and unskilled workers in East Asia as predicated by standard trade models. Later periods have however seen the trend diverge from traditional expectations as skill-biased technical change led to increasing wage inequality across countries. Meanwhile, a cross country study by Khor and Flanagan reveals that in many cases, trade has been good for labour conditions (Flanagan and Khor, 2011).

This review of the relationship between trade and employment is occurring in the context of many enduring shifts in regional and global labour markets. Asia's rapid growth has been accompanied by, and based on, rapid structural transformation. The proliferation of RTAs, expansion of production value chains, increasing task trade, improving quality of labour supply and continuing demographic transition pose considerable challenge to policy makers on the appropriate interventions to preserve the region's hard won gains and the expansion of good quality jobs with a view towards poverty eradication.

Realising the gains from trade undoubtedly involves labour reallocation, and trade displaced workers can face considerable costs during the adjustment process. The labour reallocation can be supported on the basis of efficiency as human resources are shifted from lower productivity to higher productivity activities. It can also contribute to equity when it prevents losses from being concentrated among lower income or otherwise disadvantaged workers, and when gains make growth more inclusive.

Market-opening measures must therefore be well-integrated and complemented by adjustment policies to achieve balance. Exporters may not create enough new jobs to replace those lost in import-competing firms, and the adjustment processes and their sequencing following trade reform or trade shocks are not always smooth. In addition, countries may need to provide adequate protection to individuals against external shocks emanating from openness. While openness provides an absorptive buffer against internal shocks, and can help countries to recover from external shocks, it also makes countries vulnerable to economic problems in their trading partners. Unskilled workers are continually disadvantaged by skill-biased technical change and more mundane advances in mechanisation. But they also benefit from the lower prices of imported consumer goods that greater trade brings. As indicated, labour policy based on empirical analysis and recognition of trade dynamics becomes extremely important to take advantage of flexibility in the labour market to ensure losses will be outweighed by gains wherever possible. Changing trade patterns and the economic context in which they take place will require continuous adaptations.

Policy responses do not need to consist of direct financial transfers (which may be politically unpopular) to displaced workers. Thus far, countries in Asia and the Pacific tend to rely heavily on job security regulations particularly on severance pay, which have acted to slow adjustment processes in the labour markets. But other active labour market programs that may be more

effective and less rigid include such elements as basic job-search services for all job losers, training, employment subsidies, or mobility and transition assistance. Careful targeting in delivery of services either through public employment services or private employment service providers will be important to contain costs and maximise impact. Deregulation in the formal sector can even improve the condition of informal workers, provided that the informal sector is supported in the process, including having capital allowed to flow to it.

Resource constraints will be a constant challenge for the developing countries of the region as they try to implement adjustment programmes. Redistribution of gains from trade is also made more difficult by the fact that capital is mobile relative to labour. It can therefore become more difficult to tax capital income especially for developing countries that have unsophisticated tax systems. Rodrik and Ypersele (2001) propose international tax coordination as a possible solution to this.

There is some fear in the current slowdown (as in previous cases) that trade policy will be viewed as the politically easy default approach to restimulating economies. This might suggest that we need less intervention at the border (i.e. lower tariffs and less customs red tape) with a more active public sector in other areas (i.e. improvements in infrastructure such as ports, rails and roads, and greater investment in human capital). But the crisis also brings a chance to enact politically difficult policies, including reform of inflexible labour markets, broadening access for Asia's huge informal sector, addressing youth unemployment, implementing social safety nets, etc. (ADB, 2011c). The increasing share of the service sector in economies of the region also suggests its potential to further expand and create high quality employment. This, together with expansion of infrastructure services and development of human capital will facilitate a greater ability to adjust to changing labour market situations.

Technology and demography will dictate the direction of the region's comparative advantage in the near future. Technology is changing the geography and scope of the production of goods and services. On the other hand, the region is aging although there is considerable diversity in the aging timing and structure. This makes it hard to predict with a high degree of confidence where the future comparative advantage of the region will lie, especially after the younger Africa and older Europe and North America are included in the equation. Broad implications that good quality basic education is essential and shifts towards education that increase the adaptability of workers, can however be drawn. Meanwhile, job search services, retraining or short-term TVETs (technical and vocational education and training) may be used to address less enduring shifts in labour markets.

Asia's rapid structural transformation continues driving changes in trade and employment patterns. Including the region's massive informal sector in the benefits of growth remains a challenge that is heavily tied to developments in labour markets. For a region so dependent on trade, and with the majority of the world's workers and the world's poor, the links between trade, employment and inclusive growth will remain critical for the foreseeable future.

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Chapter 12

An Updated Assessment of the Trade and Poverty Nexus in Latin America

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Despite the growing political priority given to making trade work for the majority in Latin America, a notable gap exists in the knowledge about the distributive impacts of trade integration. This study attempts to fill this gap: it surveys the most recent contributions to the mainstream trade economics literature, assesses their relevance for Latin America and concentrates on specific quantitative empirical available on the region. It concludes that despite the impossibility to rigorously and unambiguously assert that trade openness is conducive to growth and poverty reduction, the preponderance of evidence supports this conclusion. However, the majority of empirical studies also show that the impact of trade on growth and poverty is generally small and that the causes of indigence are to be found elsewhere. Likewise, it is extremely arduous to find evidence that supports the notion that trade protection is good for the poor.

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12.1. Introduction

In the last two decades, Latin American countries undertook significant structural reforms with the objective of facilitating economic growth, development and poverty reduction. Trade liberalisation featured prominently in the reform process and was pursued through a multi-polar integration strategy including unilateral liberalisation and reciprocal negotiations at the multilateral, regional and bilateral levels (IDB, 2002).

Trade liberalisation initiatives are not new for the region. Indeed, they materialised in two successive waves of reforms documented by Devlin and Estevadeordal (2001) and Giordano and Devlin (2011). However, in both episodes trade liberalisation were not systematically accompanied by complementary policies to help countries maximise and better distribute the benefits of trade reforms. Therefore, making trade work for poverty reduction is emerging as a key priority for the region.

Latin America is one of the most unequal regions of the world. Most of the wealth is concentrated on the richest tenth of the population, earning around half of total income, while the poorest tenth earn only less than 2%. Inequality holds not only with respect to income distribution but also with regards to access to education, health, credit and other assets that are crucial determinants of national development, social cohesion and individual well-being. This explains why Latin America, despite of being comprised mostly of middle-income countries, suffers from high levels of poverty. Indeed, high inequality in the region is one of the main causes of persisting poverty.

Income inequality has on average been growing during the last three decades. The pace of this increase, however, slowed slightly during the 1990s and reversed in the 2000s. This trend was the result of inequality rates falling in the most unequal economies such as Brazil, but rising for some of the less unequal economies, including Uruguay, Venezuela and, most strikingly, Argentina. It is therefore of the utmost importance to understand what has been the contribution of trade liberalisation to these changing patterns of growth, inequality and poverty. Even more so, if due consideration is given to the fact that on average Latin American countries are still relatively closed to international trade and that, in the coming decades under the pressure of globalisation, they are expected to open up even further, and adjust to compete in an increasingly dynamic global environment.

Meanwhile, putting trade integration at the service of development has also emerged as a priority at the multilateral level. The name of the ongoing round of multilateral trade negotiations, the Doha Development Agenda, is indeed very telling of the importance of making trade work for the poor. The launching of the Aid for Trade initiative at the 2005 Hong Kong Ministerial Conference underscores the consensus of the members of the World Trade Organization (WTO) about the need to formulate and monitor policies aiming at better distributing the benefits of trade liberalisation. For Latin America, mobilising aid for trade and harnessing trade liberalisation for development is a centerpiece of the development strategy (IDB, 2006).

Despite the growing political priority given to making trade work for the majority in the region, a notable gap exists in the knowledge about the distributive impacts of trade integration. As Bardhan (2006) puts it: “Many people have strong opinions about globalization and all of them are concerned with the well-being of the world’s poor. The strength of their conviction is often in inverse proportion to their robust factual evidence”. Giordano (2007) highlights some of the most striking knowledge gaps prevailing in Latin American policy circles.

This study attempts to fill this gap by reviewing the relevant literature on the distributional effects of trade liberalisation in Latin America. It focuses more specifically on the impact of trade on growth, employment, wage inequality and poverty. Macro methods focus on cross-country comparisons to evaluate the impact of trade on growth and its effects on income distribution and poverty at the national level. But emphasis will be put on the newest micro-based approaches that rely on household level data to evaluate the impacts of specific trade reforms on relative prices and wages and to assess how this translates into changing inequality and poverty outcomes. The study is organised as follows:

Section 12.2 reviews some of the most renowned surveys on trade, inequality and poverty. As stated by Goldberg and Pavcnik (2004): "the number of literature reviews alone is so large by now, that it seems that a review of the literature reviews would be appropriate". Given this state of affairs, the following sections will only cover a selective illustrative sample of the literature, essentially the newest empirical contributions that focus on Latin America, restricting the scope of the investigation to the analysis of trade liberalisation, in an attempt to disentangle this discussion from the wider debate on globalisation.

Section 12.3 discusses the methodological foundations of the analytical debate. It first reviews the concepts of globalisation, trade integration, inequality and poverty and discusses issues related to their measurement. Subsequently it examines the causal links among them and illustrates the main mechanisms through which trade liberalisation can affect poverty.

Section 12.4 reviews the empirical evidence on trade, growth, inequality and poverty. It starts by briefly sketching the cross-country evidence and the wider debate on trade and growth. This controversial empirical literature based on aggregate data found it problematic to identify a robust relationship between trade reforms and poverty reduction. The remainder of the section therefore focuses on the micro evidence on trade, inequality and poverty in Latin America.

Finally, section 12.5 discusses some of the recent literature on trade and complementary policies.

12.2. An overview of the literature

In setting out the range of analytical tools available for evaluating the poverty impacts of economic policies, Bourguignon and Pereira da Silva (2003) noted that: "while there is a wide range of methodologies available for assessing the micro-economic impacts of micro policies and similarly many tools for assessing the impact of macro policies on macro-economic variables, there is a gap in understanding the micro implications of macro policies, including trade policy". Accordingly literature surveys have recently moved from macro/top-down to micro/bottom-up approaches.

Bhagwati and Srinivasan (2002) and Berg and Krueger (2003) assess the importance of trade policy for poverty reduction from a macro perspective. The latter focus mainly on the links between trade and growth to determine the changes in poverty by evaluating the variations in per-capita income. They conclude that generally openness to trade is an important contributor to growth and that growth associated with trade liberalisation is as pro-poor as growth in general.

Winters, McCulloch and McKay (2004) and Ravallion (2004b) deepen the scope of the debate. They conclude that, although there are many causes for optimism that trade liberalisation will contribute to poverty reduction, once it is properly measured, the impact is not expected to be substantial. They stress that it is hard to make an explicit theoretical or empirical generalisation on whether trade liberalisation can facilitate poverty alleviation. The ultimate outcome depends on a wide set of country-specific factors, such as the importance of

local institutions in determining the transmission of border prices to local levels, the rigidities of labour markets, the strategic responses of households at the micro level and the existence of concurring factors that need to be controlled with a wide set of complementary policies.

Hertel and Reimer's (2004) survey places particular emphasis on a new generation of empirical studies, which strive to elicit the disaggregated micro household and firm impacts of macro trade policy. They highlight the critical role of factor market adjustment. Most of the evidence points to the dominance of earning-side impacts over consumption impacts, which is problematic since household surveys are notable for their under-reporting of income. From the perspective of the poor, the market for unskilled labour is the most important. In fact, they argue that the poverty impacts of trade policy often hinge crucially on how well the increased demand for labour in one part of the economy is transmitted to the rest of the economy via increased wages, employment or both. Therefore, the authors recommend further econometric research aimed at discriminating between competing factor mobility hypotheses.

Goldberg and Pavcnik (2004) shed more light on trade-related labour market adjustment. Their survey focuses on the short- to medium-run changes in relative prices and wages, rather than on the dynamic indirect relation linking trade, growth, income inequality and poverty. They also narrow the appraisal of the empirical evidence, concentrating on recent major trade liberalisation episodes that occurred in developing countries. They find that, despite measurement problems, identification difficulties and conflicting evidence on some issues, the empirical literature has established some consistent patterns that seem common across countries and trade liberalisation episodes. Given the fact that the most heavily protected sectors in developing countries employ a heavy proportion of unskilled labour, it should not come as a surprise that trade liberalisation has a negative impact on unskilled workers in the short and medium run. The empirical work surveyed consistently documents a lack of major labour reallocation across sectors. Nevertheless, they confirm that the effects uncovered are small and can explain only a small fraction of the general increase in wage inequality.

Harrison (2005) summarises the results of a research project that gathers cross-country and country-specific case studies on the two faces of globalisation, i.e. trade and financial integration. The conclusion succinctly summarises the emerging consensus on the indirect relation between trade and poverty and its policy implications. Since the poverty outcome of trade integration depends from a broad set of interrelated factors, a wide set of complementary policies should flank trade liberalisation initiatives. Considering that trade liberalisation generates winners and losers, it is crucial to provide opportunities to potential winners, particularly through the generation of expanded market access and policies aiming at sustaining their competitiveness. Likewise, it is crucial to provide transitional support to potential losers, particularly in the form of measures facilitating the exit from contracting sectors and the relocation to expanding ones, along with safety nets aiming at protecting the most vulnerable.

Turning to *ex-ante* evaluations, two international research projects led by Cline (2004) and Hertel and Winters (2005) offer comprehensive assessments of the poverty impacts of the Doha Development Agenda negotiated under the WTO. Both projects are illustrative of the most recent vintage of macro-micro methodologies that couple computable general equilibrium (CGE) evaluations accounting for commodity, terms of trade and factor market effects with poverty incidence analysis based on household surveys. Bouët (2006) aptly summarises the results of eleven studies pertaining to this new generation of models. He shows that the welfare gains that may be expected from a highly hypothetical "full" liberalisation scenario (the complete removal of trade distortions across the board) vary from 0.2% to 3.1% and that the number of people who may be lifted out of poverty ranges from 72 million to 446 million. These rather contrasted figures have spurred some criticism on the efficiency of CGE models to

produce reliable *ex-ante* predictions of the poverty impacts of trade reforms (see, for example, Ackerman, 2005). A careful analysis of the underlying factors explaining diverging results from these "black-boxes" reveal the crucial importance of assumptions relating to simulated scenarios, underlying data, behavioural parameters and theoretical specifications of the models.

There are only a handful of essays that attempted to summarise the literature on trade and poverty in the region. Their conclusions are generally aligned with those of global studies.

Bouzas and Ffrench-Davis (2003) review the literature on globalisation and equity, placing emphasis on financial and macroeconomic issues. They conclude that there is little consensus in the literature as to what accounts for the increase in inequality and poverty in Latin America. More generally, they underline the importance of country-specific analysis as they show that the empirical work reviewed frequently reaches opposite conclusions, as in the case of Morley (2000 and 2001) who finds a negative correlation between trade and equity and Behrman, Birdsall and Székely (2003) who do not find any correlation between these two phenomena. There seems to be more consensus on the importance of domestic policies and institutions in transmitting the effects of globalisation. The authors advocate for the need of more research and suggest to adopt a more balanced and careful approach than the one that prevailed in academic and policy circles in the last two decades. A similar conclusion is reached by Ventura-Dias (2005) in the case of Brazil, which focuses on the narrower issue of trade liberalisation.

Nissanke and Thorbecke (2010) discuss nine case studies regarding the impacts of globalisation on inequality and poverty in Latin America, ranging from broad macroeconomic regional analyses to micro-oriented specific studies of Central and South America. They conclude that the impacts of globalisation on poverty and inequality are extremely complex and context specific. Gasparini *et al.* (2011) systemically review the patterns and recent trends on income inequality in Latin American countries for the period between 1992 and 2006 using survey data from Socioeconomic Database for Latin America and the Caribbean. They conclude that unequal income distribution was and still is a pervasive and crucial problem facing countries in the region. Despite the difference among different countries, one pattern shared by most countries in the region is the increase in income inequality in the 1990s and the decrease in the 2000s. The recent fall in income inequality is significant and widespread, but it seems that no fundamental or policy changes can account for this new trend.

This overview of the literature reviews on trade and poverty at the global and regional level reveals a gap in the knowledge base with which policymakers address this emerging priority (Giordano, 2007). The starting point to elucidate the trade-poverty nexus is therefore to shed some light on the complex phenomena under study and to sketch an analytical framework that links all the variables at play. This is the objective of the next section.

12.3. Defining the scope of the trade-poverty nexus

Most economists accept that in the long run open economies tend to produce better outcomes than closed ones. But a consensus has not been reached on how exactly economic openness should be measured and on the exact meaning of better outcomes from an equity and poverty perspective. Even less clear is the causal direction of the relationship between these two sets of variables.

Measuring trade, inequality and poverty

The concept of trade openness is the object of an unsettled debate. In fact the impact that trade might have on poverty and inequality highly depends on how each variable is measured. As Harrison (2005) points it out, measures of export activity are generally associated with

poverty reduction, while removal of protection or import shares are frequently associated with increasing poverty.

Trade integration - Openness to trade can be measured using direct policy measures such as tariffs and equivalents of other trade protection instruments or indirect outcome-based measures such as trade openness, i.e. the share of imports plus exports on GDP (see also Hausmann and Klinger, 2006). Most of the recent studies favour the use of direct policy measures considering that trade shares are determined by trade policies, geography, country size and macro-economic policies (Harrison 2005). However, Berg and Krueger (2003) point out several problems that arise in measuring openness looking directly at instruments that restrict trade, such as tariffs and non-tariff barriers (NTBs). Simple and aggregate averaging does not capture the relative importance of different categories of goods. At the same time, NTBs are extremely hard to measure. Measures of trade protection in the services sector are often not available.

Goldberg and Pavcnik (2004) argue that the use of tariffs provides advantages as they can be comparable across time and vary substantially across industries during trade reforms. They maintain however, that even though the measurement of openness through tariff changes represents improvements over previous measures, it depends strongly on the specific country and its use of tariffs.

Ad Valorem Equivalent (AVE) tariffs have therefore been considered a more accurate measure of openness than nominal *ad valorem* tariffs as they provide reliable estimates of price or quantity distortions caused by trade policies. This issue is particularly relevant for CGE models that rely heavily on the correct measurement of trade protection. Indeed, the shrinking gains from trade liberalisation documented by Bouët (2006) are in large part due to the incorrect measurement of trade protection, the lack of consideration of trade preferences and the use of *ad-hoc* aggregation procedures. A robust identification procedure of AVEs, such as that used in Giordano (2007 a and b) reveals a high sensitivity of CGE model results to the assumptions made on trade protection measures, particularly in the agriculture sector.

Kee, Nicita and Olarreaga (2005) made a valuable contribution to overcome aggregation problems in both tariff and NTBs. They built two average *ad valorem* measures of protection for each trade restrictive policy instrument, which combined totalise the level of protection that a given country imposes on imports. Accordingly the Tariff Trade Restrictiveness Index is a weighted sum of protection levels built upon tariff rates and NTBs, import level data and the elasticity of the demand for imports. By taking into account the sensitivity of imports to changes in protection levels, the approach goes beyond the conventional methodology used in the calculation of import-weighted tariff rates and reduces the possibility of trade protection underestimation. However, this index has not been used in poverty related studies so far.

Inequality.- Turning to the next variable at hand, the effects of trade liberalisation on inequality also depend on how this is measured, which is not an easy task considering that the concept is in itself controversial. Ravallion (2003) emphasises the importance of distinguishing the concepts of relative and absolute inequality. Relative inequality depends on the ratios of individual incomes to the overall mean: if all incomes grow at the same time, relative inequality remains unchanged. Absolute inequality, on the other hand, depends on absolute differences in levels of living standards.

The perceptions that inequality raises because of trade openness often referred to inequality measured in absolute terms. However, as illustrated by Goldberg and Pavcnik (2004), most of the recent work on developing economies has focused on the relative version of inequality and still found that trade reforms coincide with an increase in relative inequality, which implies an even larger increase in absolute inequality.

In addition to the debate on the correct measurement of inequality at the individual, household or national level, a recent debate has underlined the lack of consensus on how to measure inequality at the global level (see for example: Lindert and Williamson, 2001; O'Rourke, 2001; Cornia, 2003; Wade, 2004; and Sala-i-Martin, 2006). Three different measures are commonly used: i) inequality among countries considering each country as a single observation; ii) weighted inequality between countries, considering the size of the population as weights; and iii) inequality among individuals without considering their country of origin. Conflicting measures have produced contrasting views on the impact of trade integration on inequality, as reported by Milanovic (2005).

Poverty. Finally, there is an unsettled debate on how to measure poverty, which generally focuses on three alternative measures: the head-count, the poverty gap and the severity of poverty index. The head-count is defined as the prevalence or incidence of poverty and is measured by the fraction of the total population living below the poverty line (defined either as a minimum income or a consumption level). The poverty gap is the mean shortfall from the poverty line, expressed as a percentage of the poverty line and reflecting the depth of poverty as well as its incidence. The severity of poverty index is computed as the degree of inequality among the poor.

The measurement of poverty and its association with macro phenomena such as growth or trade openness is also controversial for the very nature of the underlying data. Poverty measures are usually extrapolated from household surveys. As stressed by Deaton (2003), national accounts and micro household data are oftentimes difficult to reconcile, and the latter are in most of the cases plagued by errors, omissions and under-reporting bias. Synthetic measures, such as the poverty elasticity of trade opening often touted to support strong arguments about the distributive impact of trade liberalisation should therefore be considered with caution.

Deaton (2003) and Ravallion (2003, 2004a) point out that an operational definition of poverty raises not only important measurement issues but also philosophical questions. Defining and measuring poverty is a very controversial issue because, besides being a subjective notion, the perception of poverty varies among and within countries. According to Ravallion (2003), those who say that globalisation is good for the poor tend to be absolutist while many of the critics of globalisation appear to think of poverty in more relative terms, which is by nature similar to a measure of inequality. Recent contributions to the literature are therefore progressively adopting alternative conceptualisations of well-being, deprivation and poverty, which increasingly capture the multi-dimension characteristics of poverty.

How to measure trade openness, inequality and poverty is therefore a very controversial issue in itself. Each measure entails a number of assumptions that may have an impact on the results of the empirical analysis. In fact, each measure provides information on a specific aspect of the multifaceted and multidimensional poverty phenomenon. It is therefore useful to precisely track the links among trade integration and the complex dimensions of inequality and poverty.

Sketching a conceptual causal framework

Standard international trade theory provides several explanations of how trade liberalisation can stimulate growth. Once a country opens up its economy, it has the possibility to access new markets, new technologies and appropriate intermediate and capital goods, which in turn cause increases in production, scale economies and competitiveness. The workhorse of the theory of long-run economic growth is the neoclassical model based on Solow (1963). In this framework, the level of GDP per capita in the steady state depends on anything that affects the level of productivity, such as distortions that affect the allocation of resources, as well as the

determinants of the level of steady-state capital stock, such as the savings rate. By allowing a more efficient allocation of resources, openness raises the steady-state level of income and the growth rate for any country out of equilibrium.

Endogenous growth theory emphasises that trade liberalisation can promote economic growth in the long run through dynamic effects (Wacziarg, 2001; Wacziarg and Welch, 2003). This theory highlights the importance of technology diffusion that brings together trade and learning by doing. Moreover, it stresses that openness allows specialisation of industries with scale economies and therefore boosts growth in the long run (see for example: Lucas, 1988; Grossman and Helpman, 1991; or Krugman and Venables, 1993).

Despite the effort found in the literature to demonstrate that openness leads to economic growth, empirical findings are ambiguous. From the static point of view, general second-best theory suggests that in presence of other distortions in the economy, free trade may not be the best option for growth. Open economies may also have a tendency to stagnate in industries without learning by doing; for example, when comparative advantages reside in activities of little value added. At the same time, economic models with increasing returns to scale and externalities may generate situations in which factors of production flow out of the poor areas to the rich ones, generating the so called "growth traps" (Easterly, 2001).

Nevertheless, it is widely agreed that the best way for a country to reduce poverty rates is to grow. Trade liberalisation might have an impact on growth and thereby an indirect effect on poverty reduction. As Sala-i-Martin (2007) puts it: "growth of *per capita* GDP shifts the mean of the income distribution to the right. If the dispersion (or inequality) of the distribution does not change, the poverty rate automatically declines. Poverty can also decrease if, for a given mean income, the dispersion of the distribution, that is inequality, declines". In other words, even though trade-induced growth can worsen inequality, it has to be very strongly so if it is to increase poverty.

Winters (2000a) developed a conceptual framework decomposing the links between trade policy and poverty through changes in relative prices, wages, public finance and other general equilibrium effects.

Prices, income and consumption patterns. Trade liberalisation policies can affect households and markets through the effect that tariff changes have on relative prices. If the price of a given good increases, this would have a positive effect on the households that produce such good and a negative effect for the ones that consume it. Thus, the net effect will ultimately depend on whether household members are net consumers or producers. Several studies, which are discussed in greater detail later, show how changes in prices due to trade reforms can affect the poor. In the case of Mexico, Nicita (2004) shows how international prices affected domestic prices differently depending on the household income level and geographical location. De Janvry *et al.* (1995) use a household survey of the *ejidos* (common lands) in Mexico and find that a significant number of maize producers do not produce for the market and consequently have not been directly affected as producers by falling prices following the implementation of NAFTA. On the contrary, significant gains accrued to consumer who benefited from falling food prices. The extent to which the majority of the poor in Latin America are connected to local and international markets is just beginning to be explored (IDB, 2007)

Wages and employment. Another mechanism by which trade liberalisation can directly affect the poor is through the effect it has on wages and employment. In theory, developed countries are relatively abundant in skilled labour, while developing countries are relatively abundant in unskilled labour. According to a simple version of the standard two-factor, two-country Heckscher-Ohlin model, developing countries will specialise in the production of

unskilled-labour-intensive products, while developed countries will specialise in skilled-labour intensive products. According to the Stolper-Samuelson theorem that links product prices to factor returns, the price decrease in the import sector will reduce the wages of skilled workers (used intensively in the import-competing sector) and benefit the unskilled workers (used intensively in the export sector). Because the model assumes that the factors of production can move across sectors within a country, the price changes affect only the economy-wide returns to factors of production. Thus, trade liberalisation should be associated with reductions in poverty and inequality in the developing countries. However, the increase in the skill premium and evidence of rising wage inequality in many developing countries in the aftermath of trade liberalisation, contradicts the prediction of the Stolper-Samuelson theorem.

Several explanations have been offered to reconcile empirical findings with the theory in Latin America (Perry and Olarreaga, 2006). On one hand, labour in developing countries is not as mobile as the model assumes. Trade specialisation according to comparative advantage causes an increase of unskilled labour income only if unskilled workers are able to move out of contracting sectors into expanding ones. Labour market rigidities may have prevented this outcome (Goldberg and Pavnik, 2004).

Another reason is that Latin American countries, Colombia and Mexico for instance, protected the sectors that employed mainly unskilled labour prior to the liberalisation episodes. Many studies in the literature point at this last argument as one of the reasons why Latin American experiences do not match the theory (see for example: Revenga, (1997); Harrison and Hanson, (1999a); Attanasio, Goldberg and Pavcnik, (2004); among others).

In the presence of extreme factor endowments, Davis (1996) shows that the distributive impact of trade liberalisation depends on the correct comparison of factor endowments, which is not the global economy but the cone of diversification within which one produces. In the face of the emergence of countries like China and India which export a great amount of goods produced with an intensive use of unskilled labour, Latin America may no longer have a comparative advantage based on a relatively abundant unskilled labour force (see for example: Wood, 1997; Leamer *et al.*, 1999; and Gourdon, Maystre and de Melo, 2006).

Likewise, the initial unequal distribution of factor endowments and the endogenous emergence of institutions that advantage the elite class may explain the persistence of inequality and poverty in the region (Engerman and Sokoloff, 2002).

Government Revenue and Expenditure – Trade liberalisation can also affect poverty through government revenue and expenses. Given that in developing countries a considerable amount of government's revenues comes from trade taxes, trade reforms may produce an important fall in net revenues, thereby restricting the fiscal policy space. But trade reforms can also have a positive effect on government revenues through the expansion of the taxation of increased production driven by exports. The question is therefore how the fiscal effects of trade reforms translate into inequality and poverty. As maintained by Emini, Cockburn and Decaluwe (2005), the impact of the adoption of an alternative tax may be detrimental for the most vulnerable groups, particularly the poor. The authors evaluate the effects of replacing tariffs with value added or consumption taxes and in, both cases, the substitution effects cause an increase in poverty. This issue is particularly important in Latin American where several countries are facing the challenge of adapting their fiscal policies to a more open trading environment, while trying to preserve or even increase the progressiveness of the fiscal regime (see: Pauvonic, 2005; Barreix, Villela and Roca, 2004 and 2006).

Firm heterogeneity. The incorporation of heterogeneous firms and monopolistic competition into international trade models has changed the way scholars conduct empirical research in

international trade (Melitz, 2003). Harrison *et al.* (2011) focus on the recent theoretical and empirical literature that explores the impacts of trade on inequality using these new models, extended approaches of comparative advantage, models taking into account labour market frictions and models of incomplete contracts. They find that the new mechanisms help to explain the well-documented rising inequality in low-income countries, which is in contradiction to the implication of the traditional Heckscher-Ohlin model. Likewise, Singh (2010) reviews the literature on the links between trade and economic growth undertaking an extensive account of the microeconomic evidence based on firm or industry level data. He concludes that most macroeconomic studies find supportive evidences for the positive and significant impacts of trade on output and growth. However, microeconomic studies find more support to the effects of productivity on trade rather than the opposite direction.

Uncertainty and other dynamic general equilibrium effects. The static analysis considered so far abstracted from the possibility of dynamic general equilibrium effects. In a world with uncertainty, it is possible that trade liberalisation affects the likelihood of falling or indeed emerging from poverty. First, by increasing trade exposure and generating volatility, trade liberalisation changes the risk of being exposed to exogenous shocks that may have an impact on poverty (Krebs, Krishna and Maloney, 2005). Moreover, by restricting the possibility of using trade policies to compensate adverse exogenous shocks, trade liberalisation may limit the capacity of governments to react to unexpected shocks. Second, as previously noted, trade liberalisation may be coupled or even induce skill-biased technical change, which in turn may have adverse distributional effects. Finally, short-run adjustment costs may be magnified in presence of labour markets rigidities and can cause negative impacts on poverty (Banerjee and Newman, 2004). All these issues that seem to bear a relation with the distributional impact of trade liberalisation in Latin America are explored with greater detail below.

Winners and losers from regional integration. Linking trade integration to growth, inequality and poverty is an elusive endeavour; understanding the distributive impact of preferential opening is even harder. Yet, in Latin America, regional integration has shaped the way through which the economies opened up to international trade. Venables (2003) provides a framework to explain how the real income effects of regional integration are distributed amongst member countries. He argues that countries with "extreme" comparative advantages do worse than those with comparative advantages intermediate between the partner and the rest of the world. His analysis warns of the dangers of south-south integration, showing that it may draw manufacturing production into richer countries at the expense of the poor members of the region. It also suggests that low-income countries with prevailing incidence of poverty may be better served by north-south integration with high-income countries. In Latin America, the asymmetric distribution of the benefits of regional integration is emerging as one of the most hotly debated issues. Hence, there is growing consensus on the need to compensate asymmetries by complementing integration at the regional level with local development and productive integration policies at the national level (Giordano, Lanzafame and Meyer Stamer, 2005).

The debate surrounding the measurement of the key variables at play in the trade-poverty nexus and the variety of channels through which multilateral and regional trade liberalisation is causally connected with poverty reduction, suggests that the assessment of the distributive impact of trade integration is mainly an empirical question, which is explored in the next section.

12.4. Evidence on trade, inequality and poverty in Latin America

Finding criteria to organise the empirical literature on the trade and poverty nexus is not an easy task: as contributions vary in several dimensions, there is neither an obvious nor an ideal taxonomy. With some degree of arbitrariness, the literature has been organised in four main categories according to the methodology used to explore each dimension of the trade and poverty nexus.

Trade and growth

Some of the early contributions to the trade and growth cross-country literature find a positive correlation. Dollar (1992) classifies Latin America as only moderately open with respect to Asia and concludes that shifting to a level of openness and exchange rate stability comparable to the latter would allow the region to increase *per capita* growth by 1.5 percentage points. Sachs and Warner (1995) include thirteen Latin American countries in their panel and show that in the period 1970-1989 open economies performed better than closed ones. However, in Latin America, which started the liberalisation movement later, results are mixed and rather inconclusive: Argentina, Costa Rica, Ecuador, El Salvador, Guatemala and Uruguay are found to grow more after the liberalisation episode, while the opposite holds in Brazil, Colombia, Mexico, Nicaragua and Paraguay. Building on Leamer (1988), Edwards (1998) attempted to refine the openness measure using nine alternative indicators and included ten Latin American countries in the panel. He finds that trade openness favours growth, that poor countries catch-up (trade openness allow them to grow faster) and that physical and human capital accumulation has an important positive role, while political instability is detrimental.

These studies were subsequently criticised for the measurement of openness and difficulties in justifying the causality direction. It is not clear if trade opening causes economic growth or if the opposite holds: countries open up to international trade once they reach a relatively high level of economic growth. Rodriguez and Rodrik (2001) were at the forefront of the critique. They objected to the choice of the openness indicators, maintaining that they are weak measures of the incidence of trade barriers, and they challenged the econometric strategies used, arguing that they produced biased interpretations. Moreover, they pointed out that the trade liberalisation episodes were significantly correlated with other macro- and micro-economic reforms, like the deregulation of foreign direct investment and labour markets, all very relevant features of Latin American structural reforms.

Dollar and Kraay (2002) tried to correct such methodological issues. They find "no evidence whatsoever of a significant negative relationship between any measure of openness and average income of the poor". They maintain that the scope of their database covering 76 countries and their empirical techniques correct the shortcomings of the studies by Spilimbergo *et al.* (1999), Barro (2000) and Lundberg and Squire (2000) who found a positive correlation between trade openness and inequality. As it will be stressed later, in line with Leamer *et al.* (1999) they find nevertheless that cropland *per capita* is associated with higher inequality. In line with Lindert and Williamson (2001), Dollar (2004) therefore attempts to close the debate on trade and growth noting that: "even though no one study can establish that openness to trade has unambiguously helped [the poor], the preponderance of evidence supports this conclusion. […] As far as we can tell, there are no anti-global victories to report for the postwar Third World".

However, as newer data become available the terms of the debate may change again. This is particularly important in the case of Latin America, which on average opened up to trade in the nineties, a period not covered by the empirical studies reported so far. Although it does not explicitly address the distributive question, the contribution by Estevadeordal and Taylor (2007)

stresses the importance of correctly identifying the period of the analysis, what they call the post-GATT "great liberalisation" period. Noting that the empirical basis for judging recent trade reforms is remarkably weak, they use a model-based econometric technique, which highlights the role of tariffs on capital goods, compiles a new set of disaggregated tariff measures and employs a treatment-and-control empirical analysis of pre- versus post-1990 performance of liberalising and non-liberalising countries. They find evidence that liberalising tariffs on imported capital goods did lead to faster growth, and by a margin consistent with theory.

Despite its liveliness and uncertain final outcome, the relevance of the trade and growth debate is of limited relevance for Latin America. It certainly provides support to the notion that trade protectionism is not a recipe for poverty reduction, but it offers little guidance on how to make trade integration work for the poor. Therefore the use of case studies, which rely on highly disaggregated data and take into account country-specific factors, can provide clearer answers on the likely impacts of trade liberalisation on growth, inequality and poverty.

Trade and wage inequality

Shifting the focus from trade and growth to trade and wage inequality, Milanovic and Squire (2005) shed new light on the debate. They use data covering the last two decades and show that increasing trade integration leads to rising inequality in poor countries and falling inequality in rich countries. They stress the lack of labour mobility and the power of unions to explain why increasing openness to trade is associated with rising wage inequality between industries in poor countries. Easterly (2005) argues that these findings are coherent with his "productivity" view, whereby exogenous differences in productivity lead capital to flow from poor to rich countries and exacerbate inequality in poor countries. Considering that in Latin America wage inequality accounts for a large share of income inequality, there is an abundant literature that explored how labour markets adjust to trade liberalisation using country case studies.

This debate is grounded on earlier contributions that focused on the experience of advanced economies, stating that unskilled workers in industrial economies would be affected by competition from low-wage countries, causing wages to fall relative to those of skilled workers (see for example Leamer, 1993 and 1994; and Wood, 1994). But it appears that, following trade liberalisation, wage inequality increased in developing countries and emerging evidence is suggesting that low-wage countries experience a similar rise in wage inequality, which happens to be inconsistent with the predictions of the neoclassical Hecksher-Ohlin-Samuelson framework (see: Robbins, 1996; Londoño and Szekély, 2000; and Wood, 1997).

In the case of developing countries, Rama (2003) shows that although wages grow faster in developing economies that do integrate with rest of the world, openness to trade nevertheless has a negative short-run transitory effect. Moreover, the effects of integration are not symmetric and wage inequality in developing countries is explained by a skill-biased wage premium. But foreign direct investment seems to be a more powerful driver of skill-biased wage inequality than trade integration. Indeed, Behrman, Birdsal and Szekély (2003) analysed a panel of 18 Latin American countries in the period from 1977 to 1998 and found that trade openness had no significant effect on wage differentials, which are explained by other factors such as domestic financial reforms, capital account liberalisation, tax reforms and technological progress.

Several theoretical studies attempted to explore how trade integration may contribute to skill-biased technological change and wage inequality. Acemoglu (2003) shows that trade opening may induce an increase in skill-biased technological change, creating a powerful force towards higher skill *premia* in both, skill-abundant and skill-scarce countries. Thoenig and Verdier (2003) show that skill-biased innovation may be a defensive strategy to adapt to

globalisation. Feenstra and Hanson (2003) show that trade of intermediate goods has the same impact on labour demand as does skill-biased technical change. Following Acemoglu's framework, Berman *et al.* (1998) and Berman and Machin (2000), on a sample of developed and developing countries, found that there has been a pervasive skill-biased technological change around the world, including in middle-income countries. Latin American countries are not the exception, rather the contrary. Sánchez-Páramo and Schady (2003) describe the evolution of relative wages in Argentina, Brazil, Chile, Colombia and Mexico and find strong and consistent evidence of skill-biased technological change (except in the case of Brazil). At the same time, in their study, trade appears to be an important transmission mechanism as the increases in the demand for skilled workers took place at a time when countries considerably increased the penetration of imports.

The latest trade theory incorporating heterogeneous firms and labour market frictions has spurred a number of studies on the effects of trade on income and inequality. Among others, Davis and Harrigan (2011) combine firm heterogeneity and efficiency wages at the firm level to show that international trade tends to eliminate the "good jobs", which are with firms that have low probabilities to catch low-productivity workers and thus have to pay higher wages. As a result, trade openness lowers wages and wage inequality. Egger and Kreickemeier (2009) introduce workers' fair wage preferences into a general equilibrium framework with heterogeneous firms and justify the simultaneous occurrence of increasing profits and increasing unemployment in the process of globalisation. Helpman *et al.* (2010) develop a new framework that incorporates firm and worker heterogeneity, search and matching frictions in the labour market, and screening of workers by firms. Their model finds that trade liberalisation raises wage inequality and unemployment in both developed and developing countries. In general equilibrium, risk adversion intensifies these effects because risk-adverse workers require a premium for the risk of wage inequality and unemployment origin in heterogeneous firms. Amiti and Davis (2012) build a general equilibrium model featuring firm heterogeneity, trade in final and intermediate products, and firm-specific wages. They conclude that trade liberalisation enhances wages for workers in firms that are exposed to globalisation and reduces wages in those that are either marginalised from the global economy or oriented toward the domestic market.

Recent studies have also revisited and extended the classic comparative-advantage framework by taking into account a continuum of skill levels. Ohnsorge and Trefler (2007) model two-dimensional worker skill heterogeneity (for example, quantitative and communication skills) in a continuum of industries, which require different skill bundles. In their model, even though workers are perfectly mobile, wages will differ across and within industries because of worker heterogeneity. Blanchard and Willmann (2010) lay out a model in which heterogeneous workers self-select into a continuum of occupational tasks depending on the wage structure and individual specific costs of education. They demonstrate that trade liberalisation can lead to crowding out of the middle occupations towards the skill acquisition extremes in one country and expansion of middle-income industries in another. Costinot and Vogel (2010) arrive at similar conclusion using a model with a continuum of goods, each of which is produced with labour alone and differ in their skill intensities.

Since the mix of countries in aggregate studies may be a crucial factor leading to different results, it is worth surveying some recent case studies dealing with these issues. They focus mainly on Mexico, Colombia, Argentina and Brazil, with scattered contributions on a handful of other countries. They present a fairly heterogeneous body of contrasting evidence.

Mexico. Hanson and Harrison (1999b) examine the implications of the 1985 trade reform on relative wages and employment, showing that wages of the more educated and more

experienced workers rose. They find that the trade reform did play a role but other factors such as foreign direct investment, export orientation and technological change were also important (Feenstra and Hanson, 1997). This confirms the earlier findings of Harrison and Hanson (1995) who developed a model of trade and foreign direct investment to study the effect of the latter on the relative demand for skilled labour. Using state-level data for the period 1975 to 1988, they find a positive correlation between FDI and the relative demand for skilled labour that explains a large portion of the increase in the skilled labour share in total wages, consistently with the hypothesis that outsourcing by multinationals has been a significant factor in the increase of the relative demand for skilled labour. Cragg and Epelbaum (1996) and Revenga (1997) provide further evidence along these lines.

Robertson (2000) recaps the evidence on the Mexican case arguing that trade liberalisation and labour deregulation led to an erosion of rents in protected industries which were less skilled-intensive, while foreign investments increased the demand for highly skilled labour. But Acosta and Rojas (2002) argued that technological change effects dominate trade-induced effects. Finally, Hanson (2005) goes one step further as he controls for regional disparities differentiating states with high and low exposure to globalisation. His results are in line with previous studies, but he shows that income inequality is explained by the fact that relative labour incomes in states exposed to globalisation grew 10% faster than those in low-exposed states, where poverty rose relatively to high-exposure states by 7%.

Frías *et al.* (2011) explore the relationship between exports and wage premia, defined as wages above what workers would receive elsewhere in the labor market. They construct a new combination of employer-employee and plant-level data and decompose plant-level average wages into a component reflecting skill composition and one reflecting wage premia. An exogenous shock, the peso devaluation of late 1994, leads to different changes in export level of firms within the same industry. Their estimations show that about two thirds of the higher wages in larger, more productive plants are explained by higher levels of wage premia, and that nearly all of the differential within-industry wage change caused by the export shock is explained by changes in wage premia. The authors conclude that wage premia, rather than sorting on individual ability, are the reason that explains the well-documented correlation between exporting and wages in Mexico. Frías *et al.* (2012) focus on the effect of exporting on the shape of within-plant wage distributions. They find that exporting raises within-plant wage dispersion, but not uniformly between all the quantiles, with little effect at the low end of the wage spectrum. Verhoogen (2008) proposes a new mechanism linking trade and wage inequality: export-led quality upgrading, whereby more productive plants produce higher-quality goods than less productive ones using a higher-quality workforce, which requires higher wages. During trade liberalisation, only the most productive plants can enter the export market, upgrade quality and raise wages relative to less productive ones. Therefore, he explains why within-industry wage inequality rises in Mexico in a period of trade expansion.

Most of the literature has focused on wage earners and largely ignored the self-employed workers. To fill this gap, Popli (2010) analyses income inequality and poverty among the Mexican self-employed workers over the period of 1984 to 2002. He finds that in the first decade following trade liberalisation, inequality and poverty among the self-employed workers have increased. As the economy stabilised and economic growth resumed, inequality started to diminish but poverty kept increasing. He decomposes the inequality and poverty indices into within and between group components and finds that rising returns to skilled labour, regional differences regarding the impact of liberalisation and sectoral shifts in employment are important factors that explain the development of both inequality and poverty.

Colombia. Attanasio, Goldberg and Pavcnik (2004) carry out an empirical investigation using detailed micro level data from 1984 to 1998, concluding that trade reforms affected wage inequality through their impact on skilled-biased technical change, industry wage premiums and informality. The increase in the skill premiums was primarily driven by skilled-biased technological change (as in Kugler, 2002). However, they argue that wage inequality may have been in part motivated by tariff reductions and increased foreign competition, as the sectors with the largest reductions in tariffs were those with the sharpest contraction of sector-specific wage *premia*, in non skilled labour-intensive sectors and in those sectors that had lower average wages previous trade reforms. The overall effects of the trade reforms on wage inequality are in any case small (see also Bussolo and Lay, 2003). Goldberg and Pavcnik (2003) provide additional empirical evidence on the widely unknown relation between trade opening and informality, showing that labour market institutions play a crucial role. In fact they document that firms responded to the trade chock by increasing informal employment, but only in the period before the labour market reforms, when they had to face rigidities and imperfections.

Eslava *et al.* (2011) investigate the impacts of Colombia's trade reform between 1988 and 1998 on its labour reallocation using the National Household Surveys data. They find that workers employed in less protected sectors earn lower wages and are less likely to be employed in the formal sector after controlling for individual characteristics, year and sector effects. These negative effects of trade liberalisation are wider for less-educated workers. The findings also apply to displaced workers caused by trade reforms within the first two years after the shock, but their situations recover after three years of displacement, which is faster than what is observed in the US and other developed countries. Trade reforms hurt those currently employed but facilitate reallocation for those who experience unemployment. Overall, trade liberalisation reduces household income only for female-headed households in the first two quintiles of the income distribution.

Argentina. Bebczuk and Gasparini (2001) provide an overview of inequality trends in the period of trade adjustment and document a dramatic increase in the relative wage of skilled workers that is indirectly attributed, among other things, to trade opening. Galiani and Sanguinetti (2003) endeavour to track the causality link between the two phenomena using aggregate industry level and micro household surveys data. They find a positive correlation between college wage *premia* and import penetration. As in other countries, however the direct trade-related effect explains only a small part of wage inequality. Galiani and Porto (2006) attempted to pursue a stronger identification strategy, one that is similar to Attanasio *et al.* (2004) but compares two episodes of trade reform. They evaluate the shift from high protection to liberalisation in the 1970s, compared with slowdown of reforms in the 1980s and multilateral and preferential opening in MERCOSUR in the 1990s. They find that the large tariff cuts (70%) of the 1970s explain up to 25% of the observed surge in wage inequality, while the moderate tariff cuts (12%) of the 1990s explain only 10% of the wage premium. They conclude that tariff reforms contributed partially to the observed increase in wage inequality, but other concurrent factors linked to the globalisation process played a significant role, a conclusion stressed by Acosta and Rojas (2002).

Assuming a theoretical structure allowing for labour skill upgrading instead of quality upgrading, Bustos (2011a) studies the impacts of Brazil's tariffs cuts on the labour demand of Argentinean firms during the MERCOSUR creation period (1992 to 1996). Firms starting to export after trade liberalisation experienced faster increases in technology investment and skill upgrading than those that focused on the domestic market. Specifically, new and continuing exporters as well as foreign owned firms spent 53% to 69% more on technology than non-exporting domestic firms. Trade liberalisation had heterogeneous effects on firm skill intensity. Firms above the median size upgraded skills and firms below the median size

downgraded skills in response to tariff reductions in Brazil. Along the same line, Bustos (2011b) focuses on technology upgrading caused by trade liberalisation. He finds that firms in industries facing higher reductions in Brazil's tariffs increase investment in technology and upgrade technology faster. The bigger the size of the firm, the higher this effect of tariffs is.

Brambilla *et al.* (2010) investigate the linkages between exports, destination markets and utilisation of skilled labour by firms. Their theoretical model suggests that firms exporting to high-income countries will hire more skilled workers and pay higher wages than firms that export to low or middle-income countries, and domestic firms. They test this hypothesis using a panel data of Argentinean manufacturing firms ranging from 1998 to 2000. They find that the exogenous Brazilian currency devaluation of 1999 led to changes in the export levels and destinations, which helps to explain the causal effect of exporting to high-income countries on skill utilisation.

Chile. In the case of Chile Beyer, Rojas and Vergara (1999) and Pavcnik (2000) found evidence of skill-biased wage *premia*, but while the former attributes it mainly to trade liberalisation, the latter stresses the role of investments, foreign technical assistance and patented technologies.

Brazil. The results for Brazil, which accounts for a great proportion of the poor in the region, depart from those obtained in other countries and provides fruitful ground for evaluating the conditions under which trade reforms do not have an adverse effect on industry wage differentials. Evidence produced by Arbache and Corseuil (2004) and Arbache, Dickerson and Green (2004) found results in line with other Latin American case studies. But Pavcnik *et al.* (2004) show that while industry wage *premia* are in fact an important component of worker earnings, their structure is relatively stable over time, and they find no statistical association with changes in trade policy. They conclude that trade liberalisation in Brazil did not significantly contribute to increased wage inequality between skilled and unskilled workers. Likewise, Goldberg and Pavcnik (2003) found no significant effects of trade opening on informality. Gonzaga *et al*. (2006) go even further: using a wide set of instruments to test the trade transmission mechanism they conclude that trade liberalisation reduced wage disparities in Brazil.

Ferreira *et al.* (2007) combine the methodology used by Pavcnik *et al.* (2004) and Gonzaga *et al.* (2006) to study net trade-induced changes in industry-specific wage and skill *premia*. Their main finding for the period from 1988 to 1995 is that trade liberalisation in Brazil did in fact contribute to the observed reduction in wage inequality in the entire Brazilian economy, not just in manufacturing. Unlike in other countries of the region, pre-liberalisation tariffs adjusted by import penetration were highest for skill-intensive goods and fell more than those protecting other goods. This led to a decline in their relative prices and, consistently with the Stolper-Samuelson theorem, this decline led to a reduction of skilled wages and to a movement of workers away from previously protected industries. Menezes-Filho and Muendler (2011) compare resource allocation, especially labour, before and after the trade liberalisation of the 1990s by tracking individual workers across jobs using economy-wide linked employer-employee data. They find that tariff reductions lead to worker displacements, particularly from more protected industries. But neither exporting firms nor industries with comparative advantage absorbed trade-displaced workers for several years. In fact, exporters hired fewer workers than the average employer after the trade reforms.

Trade and poverty in partial equilibrium

The most widely used methodology to assess the direct impact of trade liberalisation on poverty relies on partial equilibrium estimates coupled with cost-of-living simulations (see

Porto, 2003). The methodology tracks two transmission channels: on one hand trade reforms cause the relative prices of traded goods to change, on the other these price variations affect households as consumers and income earners. This approach has the merit of being based on an intensive use of household data information and the shortcoming of abstracting from general equilibrium effects such as terms of trade effects, consumption effects (households pay different prices for traded and non-traded goods) and labour income effects (factor demand and wages adjust in response to the trade shock). Price shocks that originate the effects on the poverty head count ratio may be observed *ex post* in time series or predicted *ex ante* with partial or general equilibrium model simulations.

Argentina. Porto (2003) examines the implications of national and foreign trade reforms on poverty in Argentina. The former includes the removal of import tariffs while the latter refer to the elimination of agricultural subsidies, tariffs and non-tariff barriers in developed countries. His results indicate that from an initial head count ratio of 25.7% in 1999, a combination of national and foreign trade reforms would cause a decline in poverty ranging from 1.6 to 4.6 percentage points, depending on assumptions relating to the deepness of trade liberalisation. Effects induced by foreign reforms are found to be much larger than national reforms. In later work, Porto (2006) applies the same methodology to assess the effects of preferential opening in MERCOSUR. He finds that regional integration had pro-poor distributive effects because tariff reduction was greater in relatively skilled intensive sectors. The average compensating variation for the poor amounts to up to 6% of initial expenditure, whereas for the middle-income households the gain amounts to around 3%.

Mexico. Nicita (2004) applies the same technique to study *ex post* the effects of trade liberalisation in Mexico between 1989 and 2000, taking into account regional differences. He finds that trade liberalisation, which lowered the relative prices of non-animal agricultural products, reduced the cost of consumption but put pressure on households' agricultural income, thereby widening the income gap between urban and rural areas. While all income groups have benefited, richer households have benefited more in both absolute and relative terms: real income increased by 6% in richer households and by 2% in the poorer. Similarly differences are found in the geographic distribution, with the states closest to the northern border gaining three times more relative to the least developed southern states. From a poverty perspective, trade liberalisation had the direct effect of reducing the head count ratio by about three percentage points.

Colombia. Relying on a standard partial equilibrium methodology, Goldberg and Pavcnik (2005) limit the analysis to urban poverty and do not find any correlation between trade and poverty. Poverty in urban areas is highly correlated with unemployment, employment in the informal sector and non-compliance with minimum wages. In the period under scrutiny (1986-1994) most of the reduction on urban poverty is accounted for by within-group changes in poverty, rather than movements of individuals out of groups with high poverty rates, such as unemployed, informal workers or minimum wage earners. It is therefore not surprising that they fail to find any evidence of a link between trade and urban poverty. They note, however, that in Colombia agriculture trade liberalisation has been limited and that it may bring about a significant effect on poverty in the short and medium run, a finding confirmed by Giordano, Mendez-Parra and Watanuki (2007 b).

Brazil. Krivonos and Olarreaga (2005) assess the impact that a potential liberalisation of sugar regimes in OECD countries could have on household labour income and poverty in Brazil. They estimate the extent to which world prices are transmitted to 11 Brazilian states in order to capture the fact that some local markets may be relatively isolated from changes in world prices. They then proceed to estimate the impact that changes in domestic sugar prices

have on regional wages and employment, depending on worker characteristics. They measure the impact on household income of a 10% increase in world sugar prices. Their results suggest that workers in the sugar sector and in sugar producing regions experience wage increases and expand employment opportunities. More interestingly, households at the top of the income distribution experience larger income gains due to higher wages, whereas households at the bottom of the distribution experience larger income gains due to movements out of unemployment.

Menéndez *et al.* (2009) study the impact of trade liberalisation and international trade on poverty and income inequality across Brazilian states from 1987 to 2005 using panel regression techniques. Trade liberalisation is measured by the weighted average of national industry-level tariffs, where the weights are the initial shares of employment by industries within each state. International trade is measured by import penetration (imports as a percentage of output plus net imports), export exposure (exports as a percentage of output) and trade openness (the ratio of imports plus exports on GDP). For each state, they apply the Gini and the Theil indices to measure inequality and headcount index and the poverty gap for poverty. They find that poverty and inequality are higher if the state is exposed to a lower tariff level. This means that, at the state level, trade liberalisation might contribute to poverty increases. For urban areas, the negative effect of trade liberalisation is even higher and statistically more significant. However, in the rural world, trade liberalisation seems to have reduced inequality and did not have any significant effect on poverty. Import penetration has effects similar to trade liberalisation, while on the contrary, rising export exposure appears to have significantly reduced household welfare.

Borraz *et al.* (2012) assess the linkages between trade liberalisation, poverty and inequality in Brazil for the 1991-2006 period through the price and income transmission channels proposed by Porto (2006) and complemented by Nicita (2009). They find that: i) the consumption effect of tariff reduction through the prices of the tradable goods is positive for all individuals and is higher for poor individuals than for richer ones; ii) the consumption effect through non-tradable goods prices is negative but small (i.e. the typical household is worse-off compared to the pre-liberalisation scenario), but the aggregate consumption effect is positive and pro-poor; iii) the impact on labour income is negative but close to zero, which is consistent with evidence that labour force mobility across industries after trade liberalisation in Brazil is limited (Goldberg and Pavcnik, 2003); iv) the headcount poverty ratio decreased during the trade liberalisation episode; and v) contrary to previous studies (Gonzaga *et al.*, 2006; Ferreira *et al.*, 2010), they find that tariff reduction cannot be associated with increased inequality and had no statistical impact on Gini coefficients.

Peru. Field and Field (2010) analyse household responses to changes in relative prices of traditional versus export-oriented products with a panel of rural households between 1994 and 2004. They find that changes in relative prices lead to the production of new agricultural products, and the magnitude of the response was mitigated by households' lack of land ownership and access to regional and local markets. Consumption of the households that adopted export-oriented crops increases in proportion to the increase in the fraction or amount of land devoted to exportable products. These households were less likely to be below the poverty line at the end of the period.

Chile. Finot *et al.* (2011) study the effects of trade opening on household welfare for Chile between 1999 and 2006 following the methodology laid out in Porto (2006). They focus on the short-term effect by only analysing the price channel (the direct effect on the tradable good price and indirect effect on the non-tradable good price) and ignoring the dynamic effects of labour market changes. Like other studies on short-term pass-through, they relax the perfect competitive market assumption of Porto (2006) and estimate the coefficient of the international

price pass-through to the domestic market. They find that tariff reduction between 1999 and 2006 was favorable in terms of income for all households and yielded a short-term benefit equivalent to 0.15% of total household income. However, the lower-income households have experienced a greater variance in the observed impacts on the prices of their baskets than higher-income households. They nevertheless conclude that trade liberalisation had a clear pro-poor property.

Uruguay and Paraguay. Using the same methodology as Borraz *et al*. (2012), Borraz *et al.* (2011) study the cases of Uruguay and Paraguay in the context of MERCOSUR. In the case of Uruguay, they find that tariff reduction decreased the prices of tradable goods and benefited the lower-income segment of the population more than the higher-income one. The impact on the non-tradable goods prices is pro-rich. Trade liberalisation had a positive impact and a pro-poor effect on labour income. Considering all three effects together, the average income increased across the entire income distribution during the trade liberalisation period, but there is no evidence of absolute pro-poor or pro-rich pattern: the poverty level decreased, but the income inequality did not change significantly. In the case of Paraguay, trade liberalisation only mildly benefited the lower-income segment of the population. The impact through the prices of non-tradable goods is only mildly pro-rich. Tariff reduction negatively affected the labour income in the whole population. The loss is bigger for those with higher wage. Overall, the average income of the whole population decreased during the liberalisation process. Trade integration did not clearly reduce the poverty headcount ratio, but it led to smaller income inequality.

Partial equilibrium associated with cost-of-living national case studies are illustrative of the simplest methodology available to track the trade and poverty nexus in household surveys. The growing evidence accumulated on Latin America is suggestive of the wide range of poverty effects generated by trade integration. These studies have the advantage of being easier to understand than more complex models and allow the consideration of detailed market structure and behavioural heterogeneity. However, they fall short of accounting for the general equilibrium effects that reverberate across sectors and national markets.

Trade and poverty in general equilibrium

Computable general equilibrium simulations allow the consideration of complex relations among sectors and agents in the economy. CGE models are typically based on neoclassical theories of firm and household behaviour and operate on a time frame long enough to achieve market equilibrium. While most are perfect competition and comparative static in nature, imperfect competition and dynamic versions are increasingly used to address specific issues (see Reimer, 2002 and Permartini and Teh, 2005).

A shortcoming of many CGE studies is that standard models typically lack sufficient disaggregation to fully trace the impact of policy simulations on poverty. In order to address this shortcoming, the most readily available technique is the association of a CGE simulation with a subsequent tracking of distributional effects in household surveys (Decaluwé *et al*., 1999). Almost all CGE applications performed to date in multi-region global models that include Latin American countries or in single-country models focusing on specific Latin American countries follow this so called “micro-macro” approach.

The most comprehensive assessment of the distributive impact of trade integration with CGE models in Latin America is provided by Vos, Ganuza, Moreley and Robinson (2006). Building on a previous collection of studies coordinated by Vos, Taylor and Paes de Barros (2004), which dealt with the broader impact of economic liberalisation, this collection of 16 comparable country case studies assesses the poverty effects of a wide array of scenarios such as unilateral

tariff reductions, export subsidies, exchange rate devaluations and export promotion. The studies also consider a hypothetical "full" multilateral WTO liberalisation scenario, whereby tariffs and domestic support subsidies are completely eliminated, and a preferential Free Trade Areas of the Americas (FTAA) integration scenario where tariffs are eliminated on a preferential basis among the countries of the Western Hemisphere. The results show that in almost all cases unilateral liberalisation increases output and either wages or employment, depending on the assumptions made on the labour market closure. Labour inequality rises in almost all cases, particularly between skilled and unskilled workers, but does not lead to inequality in per capita income because of offsetting positive employment effects. As these counterfactual results contrast with the historical evidence surveyed in previous sections, they suggest that other disturbances had a significant role in the post liberalisation adjustment.

Unilateral trade reform scenarios lead to small positive poverty reduction effects in all countries but Ecuador. The WTO and FTAA scenarios are pro-poor in the majority of the experiments but cause a modest increase of poverty in Costa Rica (only WTO), Ecuador, Paraguay and Venezuela, mainly due to the regressive outcome of agriculture liberalisation that is not compensated by expansion in other sectors. In these experiments, labour markets parameters are crucial to explain the inequality and poverty effects of trade liberalisation. In particular, average wage increase changes in the remuneration structure and quantity adjustment in the form of reduced unemployment explain, in this order, most of the pro-poor trade effects.

The production of CGE based micro-macro poverty assessments is expanding in Latin America, as shown by IDB, ECLAC and CEPII (2007). This is fortunate because the high aggregation of the models used in multi-country projects prevents a detailed analysis of the countries of the region, as they are generally limited to the larger countries such as Brazil, Mexico and Argentina (see, for example, Hertel and Winters, 2005 and Polaski, 2006). Likewise, highly aggregate studies are often based on oversimplified simulation scenarios that prevent an accurate exploration of trade policy chocks and their distributive impacts.

This is particularly important in agriculture trade liberalisation simulations, which are key for poverty reduction in the region because the sector is plagued by residual pockets of protectionism at the multilateral level (Falconi, Giordano and Sumpsi, 2005, Schejtman and Berdegué, 2006). In an attempt to provide a more accurate assessment of the likely poverty impacts of the Doha Development Agenda for a wide set of Latin American countries, Giordano (2010) reviews the available literature and compile macro-micro CGE evaluations based on detailed "realistic" scenarios (based on proposals of the European Union, US, G-20 and others) coupled with country and sector case studies analysing the poverty impacts of trade protectionism. The case studies attempt to assess the extent to which international prices are transmitted to regional households. They show that agriculture protectionism is highly detrimental for the poor in the region and that the Doha Development Agenda is an opportunity for poverty reduction in Latin America. This is confirmed by Lara and Soloaga (2007) and Gomez and Soloaga (2007) who, in the case of Bolivia and Nicaragua respectively, find that an ambitious Doha scenario may contribute to poverty reduction, while a limited one may have a regressive outcome. Moreover they show that domestic investments in complementary agriculture extension may have a greater impact than trade liberalisation.

A precise measurement of trade liberalisation is also crucial to assess the poverty impact of preferential integration. In the case of Costa Rica in the Central American-United States Free Trade Agreement (CAFTA), Sánchez (2007) uses a dynamic CGE model coupled with micro-simulations and models the impact of tariff phase-out schedules and tariff-rate-quotas. He shows that trade liberalisation may boost growth by two percentage points annually, which in turn may generate a small decline in the poverty head count. Using a disaggregated rural

economy-wide modelling approach, Taylor *et al.* (2010) examine how agricultural tariff removal as called for in CAFTA affects the rural welfare in El Salvador, Guatemala, Honduras, and Nicaragua. The disaggregated modelling approach takes into account two critical characteristics of Central America countries, the heterogeneity of rural households and the diversification of these households' activities and income sources. The simulation results show that agricultural tariff reduction leads to lower nominal incomes for nearly all rural household groups. However, consumption costs decline substantially too. The net effect on rural households' welfare of agricultural trade liberalisation in Central America is found to be positive in most cases.

Giordano, Mendez Parra and Watanuki (2007b) evaluate a wide set of Andean trade and integration options and the impact of the Andean-US bilateral agreements. The results indicate that the impact of the trade agreements with the United States, the European Union and MERCOSUR is unambiguously expansionary, although the gains are modest. The impact of a bilateral agreement with the US is pro-poor for signing countries (Peru and Colombia) as it reduces poverty and narrows inequality, while the opposite holds for Bolivia if it does not join the agreement, and even more so if it loses current preferential access to the US market. Labour income gains via job creation are the primary drivers of inequality and poverty reduction, particularly in rural areas. Wong and Kulmer (2011) examine the impact on poverty and income distribution of a free trade agreement between Ecuador and the European Union. The scenario in which the European Union expands the generalised system of preferences and expands market-access for bananas generates the greatest export growth. However, the three provinces specialised in the exports of banana expand their welfare, at the expenses of other agricultural sectors. This sector-unbalanced growth would lead to increased poverty and unequal income distribution. Tellería *et al.* (2011) analyse the possible effects on Bolivia of joining the agreement negotiated between the Andean countries and the European Union. They find that being part of the agreement allows Bolivia to benefit from the wide-ranging preferences offered by the EU. However the gains are largely limited to higher-income population and may not alleviate inequality.

Finally, in the case of Brazil, Ferreira Filho and Horridge (2005) highlight the importance of moving away from the representative household hypothesis considering higher within-country heterogeneity. The model distinguishes 10 different labour types and has 270 different household expenditure patterns. Income can originate from 41 different production activities located in 27 different regions in the country. The CGE model communicates to a micro-simulation model that has 112 055 households and 263 938 individuals. Poverty and income distribution indices are computed over the entire sample of households and individuals before and after the policy shocks. The results show that trade policy shocks do not generate dramatic changes in the structure of income distribution and poverty. The simulated effects on poverty and income distribution are in fact positive but rather small. The benefits are nevertheless concentrated in the poorest households.

Cicowiez *et al.* (2010) access the effect of both world and domestic trade reform in Argentina on poverty and income inequality by combining results from a global economy-wide model, a national CGE model, and micro-simulations. The results show that global trade liberalisation (including subsidies and import taxes, but not export taxes) of all goods leads to a decrease in both poverty and income disparities in Argentina. However, liberalisation only in the agriculture sector does not diminish them. The elimination of export taxes, either on all goods or only in agriculture, causes an increase in the poverty headcount and inequality. The increase is even higher if Argentina eliminates export taxes unilaterally.

This succinct review of the newest contributions to the micro-macro poverty literature does not aim at surveying all available studies, a task that largely exceed the scope of this paper. It rather intends to highlight the need of more research specifically focused on Latin America and the advisability of moving away from misleading simplifications of the trade policy shocks, particularly those that simulate unrestricted liberalisation across the board or do not accurately take into account the existence of a complex web of trade preferences.

12.5. Trade integration and pro-poor complementary policies

Despite the complexity of finding a clear connection between trade liberalisation and poverty reduction in both theoretical and empirical studies, there is a nearly general consensus among academics that protectionism is not a suitable policy tool for eradicating inequality and poverty. It is also widely acknowledged that trade liberalisation is a means to achieve growth with poverty reduction and not an end in itself. Trade integration alone is in fact not sufficient to generate sustained growth, even less to promote development with equity and poverty reduction. Indeed, the literature reviewed so far very often emphasises the fact that the distributive outcome of trade integration is inextricably intertwined with a wide array of structural and policy determinants.

Empirical evidence on the interaction between trade integration and complementary policies is very recent and limited. In a panel of more than 100 countries, Bolaky and Freund (2004) find that trade opening promotes economic growth only in countries that are not excessively regulated. Indeed, trade openness is associated with lower levels of living standards in excessively regulated economies. They argue that in highly regulated countries, trade fails to generate growth because resources are prevented from flowing to the most productive sectors and firms, and trade is likely to occur in goods that do not display comparative advantages.

Chang, Kaltani and Loyaza (2005) extend the scope of the analysis and provide empirical evidence of why trade-induced growth performance depends on macroeconomic, structural and institutional characteristics that make a country able to adjust to a more open trading environment. They interact trade openness with proxies of educational investment, financial depth, inflation stabilisation, public infrastructure, governance, labour market flexibility and flexibility of entry and exit of firms from the market. They find that trade liberalisation promotes growth, except in those countries in which complementary areas are distorted. Using econometric analysis, López (2011) examines the complementarity between trade policy and public social spending in the reduction of poverty and income inequality in eight Latin America countries. He finds that the benefits of trade liberalisation, especially for low income and middle income households, are related to the amount of social capital provided by the State. However, non-social capital spending mainly benefits high income population and has no complementarity with trade policy.

Against this background, multilateral institutions are increasingly putting emphasis on the need to flank trade liberalisation with complementary domestic policies, encompassing macro-and micro-economic interventions, institutional reforms and social policies. For example, the OECD Trade and Structural Adjustment report (2005) recommends adopting macroeconomic policies that promote stability and growth, labour market policies that facilitate workers mobility across occupations, companies, industries and regions, an efficient institutional and regulatory framework, and trade and investment policies that support structural adjustment and are implemented gradually in order to enable affected parties to adapt and avoid policy reversal. Referring more specifically to Latin America, in its contribution to the WTO Aid for Trade Task Force, the Inter-American Development Bank (2006) set the contours of a pro-poor trade agenda for the regions. In this light the most pressing challenges that the region

faces are to: i) increase welfare through trade performance; ii) equitably distribute the gains from trade; iii) adapt to the complexity of modern trade agreements; iv) promote ownership of trade reforms; iv) further expand trade-related institutional capacity; v) secure adequate funding for trade-related assistance; and vi) implement complementary domestic policies to secure an efficient and socially equitable transition to freer trade.

Since the launch of Aid for Trade initiative a number of contributions have outlined the importance and potential role of Aid for Trade in supporting economic development of poor countries.

Higgins and Prowse (2010) conclude that the focus of Aid for Trade programming should be threefold. First, it should support trade and integration polices that enable governments to expand revenues, which in turn support a countries' poverty reduction efforts. Second, it should support trade expansion that creates and increases incomes for poor people. Third, it should mitigate and compensate for the adverse impacts of trade changes, particularly when they affect poor people.

OECD (2009 and 2011) focus on the policy implications of the Aid for Trade agenda, identifying the main objectives of any initiative, i) increasing trade, ii) diversifying exports, iii) maximising linkages with the domestic economy, and iv) increasing adjustment capacity. In the process of achieving these goals, special attention needs to be directed to the benefit of the poor from Aid for Trade policies. Various diagnostic tools, such as stakeholder consultation, benchmarking, the Diagnostic Trade Integration Studies (DTIS) method and value chain analysis, can be used to identify the constraints that prevent developing countries from expanding trade.

12.6. Conclusion

Summarising the findings of more than one hundred essays on the trade and poverty nexus is a daunting task. This survey focused on the most recent contributions available in the mainstream trade economics literature, attempted to assess the relevance of the literature for Latin America and concentrated on specific quantitative empirical work on the region. It addressed the issue of how changes in relative prices due to unilateral, multilateral and preferential trade liberalisation affect growth, wages and income inequality and poverty. It did not address certain aspects such as the links of trade with gender, small and medium enterprises, local development or the political economy, which bear an important relationship with the trade and poverty nexus. The reason is that the underlying rationale of this research was to restrict the analysis to theoretical and quantitative empirical work, leaving the investigation of more complex qualitative issues for future undertakings.

Despite the move towards more open trade regimes, Latin American economies are still relatively closed to international trade. Under the pressure of globalisation, it is likely that in the coming years the region will need to open further and adjust to compete in an increasingly challenging global environment. Latin America being one of the most unequal regions of the world, the assessment of the trade and poverty nexus is crucial to devise policies aiming at better distributing the gains from trade. Latin America-specific research on this topic will provide policymakers and stakeholders with evidence necessary to underpin a debate which seems to be nurtured more by anxiety than rigorous knowledge.

In this light, it is useful to refer to a few conclusions with the aim of building up a solid base for policy debates and future research.

There is a gap in the availability of methodologies to explore the link between macro policy reforms like trade liberalisation and micro-economic determinants of welfare and poverty. It is therefore crucial to invest in the generation of data and research techniques, to adapt the research agenda to the specificity of Latin America and to consider qualitative issues that are difficult to measure. Meanwhile, normative statements referring to the trade policy nexus should cautiously consider the limitations of current positive knowledge.

Trade openness, inequality and poverty are wide multidimensional concepts. Measuring and attributing causal relations among these variables without carefully qualifying the specific dimensions explored or the particular transmission mechanisms at play may be misleading. It is important to disentangle the specific dimension of the trade and poverty nexus from the wider debate on globalisation and financial integration, the competing concepts of relative and absolute inequality and the objective and subjective dimension of poverty and deprivation.

Despite the impossibility to rigorously and unambiguously assert that trade openness is conducive to growth and poverty reduction, the preponderance of evidence supports this conclusion. However, the majority of empirical macro studies also show that the impact of trade on growth and poverty is also generally small and that the causes of indigence are to be found elsewhere. But it is in fact extremely arduous to find evidence that supports the notion that trade protection is good for the poor. The question is therefore how to make trade and growth more pro-poor and not how to devise improbable alternatives to trade integration aiming at improving the livelihood of the poor.

Specific evidence on Latin America reveals that deductive generalisations of the neoclassical trade theory and global cross-country empirical studies may be of little help in understanding the trade and poverty nexus in the region. Several factors may explain why the integration of Latin America into the global economy may not necessarily bring about rising wages of unskilled workers and poverty reduction. The most compelling arguments are related to the existence of rigidities in the labour markets, the historical pattern of protection that created rents in unskilled intensive sectors, the emergence of low wage countries such as China and India that shifts the comparative advantage of Latin American economies, and institutional factors that protract the effects of an initial unequal distribution of factor endowments against the poor.

Trade liberalisation may in fact be associated with rising inequality. But country case studies present contrasting indications. Although there is some evidence of rising inequality in the aftermath of trade opening, such as in the case of Mexico, Colombia, Argentina and Chile, it seems that the specific effects of trade liberalisation are small or indirect. Skill-biased technical change, often directly related with the increase of foreign direct investment or with capital account liberalisation, seems to have a stronger explanatory power than trade liberalisation. There is also little evidence that trade opening has generated more informality. On the other hand, the case of Brazil, where trade liberalisation seems to have contributed to the reduction of wage inequality, is illustrative of the conditions under which trade reforms may have progressive distributive effects.

The empirical analysis addressing the direct effect of trade integration on poverty reveals a similar landscape. Trade integration seems to be good for the poor but the effects are small. Generalisations should be taken with a great deal of caution because this is a domain where data may present considerable shortcomings. In any event it seems that foreign trade reforms are more important for poverty reduction than unilateral ones or than the national component of reciprocal trade reforms. The countries of the region may therefore expect further contributions of trade integration to poverty reduction, particularly from the liberalisation of the agriculture sector where the greatest pockets of residual protectionism are still concentrated. However, predicting *ex ante* the pro-poor effects of trade reforms is an extremely sensitive task highly

dependent on the quality of the data and the correct specification of the simulation instruments. It is hard to overstate the importance of strengthening the capacity of policymaking in this area.

Finally, considering that the trade and poverty nexus depends on a number of interconnected factors a consensus is emerging on the need to flank trade integration initiatives with a wide array of complementary policies. There is in fact increasing evidence that the outcome of trade opening may be regressive in the presence of distortions in complementary areas such macroeconomic policies, infrastructure, regulations, financial depth, labour markets, governance and human capital.

It is therefore of the utmost importance to mainstream trade into the development agenda of Latin American countries and to align consensus, policy priorities and financial resources with the objective of making trade work for the poor.

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Chapter 13

Regional Integration and Employment Effects in SADC

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UNCTAD

The African Union (AU) is pursuing an integration agenda for the African continent. Trade is seen as an important element to create productive employment and to reduce poverty. The Southern African Development Community (SADC) is one of the regional economic communities recognised by the AU as building blocs and comprises 15 countries with the common objective of regional integration. Trade between the member countries is relatively high compared to other regions in Africa and is disproportionately high in processed and more sophisticated products. Employment effects of further regional integration are assessed using a global general equilibrium model. Using data on skilled and unskilled labour use by sector, an assessment is made of the likely employment impacts within the region. The results vary considerably across countries and sectors, particularly in the sugar, textiles, motor vehicles, electronics and manufacturing sectors. Further regional integration is expected to increase real wages and/or employment, although once again to varying degrees across countries. Some countries have high tariffs on textiles, some manufactured goods and wood and paper products and would face substantial structural adjustment if these tariffs were eliminated. Workers in these industries would be obliged to seek work in the service sector. The results emphasise the essentially positive effect of regional integration in SADC and the importance of labour market policies to complement trade policies in order to address employment concerns.

* The views expressed are those of the authors and do not necessarily reflect those of the UNCTAD or partners of the ICITE initiative. David Vanzetti is also affiliated to Australian National University. Contact: Ralf.Peters@unctad.org

13.1. Introduction

The African Union (AU) Summit of Heads of State and Government in January 2012 focused on the theme of "Boosting Intra-Africa Trade". Africa is pursuing an integration agenda as a collective development and transformation strategy leading to the eventual creation of a continental market. In 2012, Heads of State agreed to establish a Continental Free Trade Area by 2017 with the option to review to target date according to progress made. Trade is seen as an important element to create productive employment and to reduce poverty.[1] Currently, intra-Africa trade is only 10% of the continent's total trade. To facilitate convergence towards achievement of a continental common market AU Heads of State recognised eight regional economic communities as building blocks. The Southern African Development Community (SADC) is one of these eight regional communities.

SADC comprises 15 countries with the common objective of regional integration. The 15 countries are Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, United Republic of Tanzania, Zambia and Zimbabwe. Some members have eliminated or reduced their tariff barriers between the member countries as early as 2000. Compared with other regional economic communities in Africa, the share of intra-SADC trade at 11% of the region's total trade is relatively high.

Not so obvious are the associated employment effects. One of the challenges for policy makers is to increase productivity without increasing unemployment. At a sectoral level it is clear that employment in some sectors has fallen as a result of integration while it has increased in others. This is desirable if displaced workers are able to gain employment in more productive sectors, but less desirable if it leads to an extended period of unemployment, or employment in a less productive sector. McMillan and Rodrik (2011) warn that structural change in Africa has been growth reducing in recent decades with labour moving into low productivity sectors.

Recently, a renewed interest in regional integration among southern countries and south-south trade in general has emerged. Prominent in the discussion is the different composition of the export baskets of regional and global exports. Some developing countries export more sophisticated products to the south while exports to the north are often dominated by raw materials. With regional integration efforts in the south like SADC, it is hoped that the associated trade creation contributes to positive structural change.

The purpose of this note is to examine the trade, output and employment effects of regional integration in the SADC region. While trade and tariff data are readily available, there is relatively little information on non-tariff barriers and employment in each sector. South Africa and some other SADC countries started already in 2000 to reduce preferential tariffs on imports from SADC. Others only started to reduce tariffs in 2008 and tariffs on sensitive products remained. We assess the impact of actual and potential further liberalisation since 2008. The GTAP (Global Trade Analysis Project) model, a global computable general equilibrium (CGE) model, is used to analyse the effects of the regional integration. The modelling is based on input-output tables, derived from national accounts that specify the use of labour, capital, land and intermediate inputs in the production of final goods.

The next section provides a review of SADC's objective and implementation and of data on trade and employment in the SADC member countries. Section 13.3 outline data and methodologies for analysing these effects. This involves using a general equilibrium model to

1. See, for example, AU "Declaration on Employment and Poverty Alleviation in Africa", AU Summit 2004.

identify the likely employment effects of trade liberalisation. A regional integration scenario is described, and the results of simulations are presented and discussed in Section 13.4. Implications are drawn in the final section. The conclusion from the CGE modelling is that trade is beneficial for employment, but the effects are uneven. Policies that promote internal migration, both within member countries and within SADC as a whole, could be beneficial. We conclude that labour market policies are important to complement trade policies in order to address labour market concerns.

13.2 Background of SADC

SADC, formerly known as the Southern African Development Coordination Conference (SADCC) which was established in 1980, aims to strengthen socio-economic cooperation and integration as well as political and security cooperation of southern African states. Main objectives of SADC comprise achieving development and economic growth, alleviating poverty, promoting employment, enhancing the standard and quality of life, and supporting the socially disadvantaged through regional integration. To achieve these objectives, SADC shall inter alia support development of economic, social and cultural ties across the region, and of policies aimed at the progressive elimination of obstacles to the free movement of capital, labor, goods and services.

Integration in the SADC region is also an important component for Africa's continental integration.[2] Trade liberalisation leading to the formation of regional free trade areas, and progressing towards customs unions and common markets, would serve as stepping stones for the formation of a continental African Common Market and Economic Community. The decision and desire of African countries for achievement of continental integration through trade, economic, social and culture spheres has been embodied in the 1980 Lagos Plan of Action, the 1991 African Economic Treaty and the 2000 Constitutive Act of the African Union adopted by African countries. In a bid to bring about greater rationalisation among Africa's multiple regional and sub-regional groupings, the AU Heads of States recognised eight regional economic communities as building blocks to facilitate convergence towards achievement of a continental common market and economic community. SADC has been recognised as one of these building blocks for continental integration.

The progress in establishing a free trade area (FTA) or customs union attained so far by the eight regional economic communities has been mixed. SADC does not belong to the groups having made the most progress such as the Common Market for Eastern and Southern Africa (COMESA) and the Economic Community of West African States (ECOWAS); nor does it belong to those making limited progress such as Arab Maghreb Union (AMU). Only limited steps have been made across Africa to implement the commitments in the regional economic communities for elimination of non-tariff barriers (NTBs), adoption of common external tariffs and common policies.

The SADC regional integration programme includes the establishment of the FTA by 2008, a Customs Union by 2010, a Common Market by 2015 and later a monetary union and a single currency. The free trade area in SADC was launched on time in 2008, with all member states (except Seychelles, Angola and DRC), removing tariffs on 85% of their products. The remaining 15% consisted of sensitive products, and tariffs on these were scheduled to be liberalised by 2012. Early in 2009, SADC member States decided to postpone the 2010 target for establishing a customs union. Some member States expressed inability to phase down tariffs on sensitive products by the target date of 2012, owing to negative effects on their economies of

2. This section is based on UNCTAD and AU (2012).

the global economic crisis. Thus, while SADC has largely achieved a free trade area in goods, and is negotiating a services agreement, there are doubts about its ability to pursue the implementation of monetary union and a single currency by the due dates.

SADC trade integration also faces challenges derived from overlapping memberships of several member States in COMESA, the East African Community (EAC), the Southern Africa Custom Union (SACU) or the Economic Community of Central African States (ECCAS). To address issues of overlapping membership and to ensure harmony in regional integration, the Tripartite Summit between SADC, COMESA and EAC was set up. In 2008, there was an agreement on a single free trade agreement covering the 26 member countries. In 2012, Heads of State at the African Union summit decided to finalise the Tripartite FTA initiative by 2014. This zone would cover more than half of Africa's population and account for more than half of its GDP.

Economic situation and implementation

The fifteen SADC member countries have a population of 253 million with a GDP of USD 564 billion. Regional integration in Southern Africa is characterised by the dominance of South Africa, which accounts for about two-third of SADC's GDP. SADC comprises a diverse group of countries with a GDP per capita reaching from USD 201 in DRC and USD 408 in Mozambique to USD 7 255 in South Africa, USD 7 403 in Botswana and USD 7 488 in Mauritius.[3]

The overall contribution of economic activities to GDP in SADC is dominated by South Africa's economic structure, which is relatively strong in manufacturing. In SADC as a whole, agriculture contributes 9%, industry (including mining) 36% and services 55%. Generally in Africa, agriculture contributes more to GDP (17% overall). Beyond South Africa, within SADC there is considerable variation among the member States. In DRC, agriculture contributes 43% to GDP and manufacturing only 5%. On the other extreme is Mauritius with a contribution of 4% from agriculture and 19% from manufacturing.[4] Commodities play an important role in many SADC countries. For example, Angola exports substantial quantities of oil and Botswana is a major producer of diamonds. With the exception of South Africa and Mauritius, it can generally be stated that the degree of industrialisation is relatively low in SADC countries.

Implementation of the SADC FTA began in 2000 following the signing of the SADC Trade Protocol (in 1996). Among the member States, the liberalisation of tariffs has taken place at different rates. In general, the more developed countries have reduced tariffs at a faster rate. South Africa, Botswana and Namibia removed most tariffs between 2000 and 2005 (Figure 13.1). Other countries such as Mauritius have gradually reduced their tariffs each year between 2000 and 2008. For least developed countries such as Mozambique and Zambia, tariff reductions were generally introduced during 2008-09 (Figure 13.2). Angola and DRC will be joining the FTA in the near future. Table 13.1 shows tariffs of those countries that had not removed their tariffs in 2007, the base period for the scenario analysed here. For these countries, tariffs on imports from within the region are similar to tariffs on imports from outside the region.

As noted above, tariffs are being liberalised in a stepwise fashion with tariffs on sensitive products being reduced later in the process. Sensitive and excluded products include motor

3. *Source*: UNCTADStat, USD at current prices and current exchange rate in 2010.

4. Data based on World Bank Development Indicator 2011, last available year. The 43% in DRC appears high. However, the data show that the economic structure varies significantly in SADC countries.

vehicles of various kinds (Chapter 87, 7.5% to 15% tariffs), vehicle components (Chapter 98, 26% tariffs) and some items of clothing such as worn overcoats (Chapter 63, 60% tariffs).[5] These were scheduled to be removed by 2012, although it is not clear whether this timetable will be met.

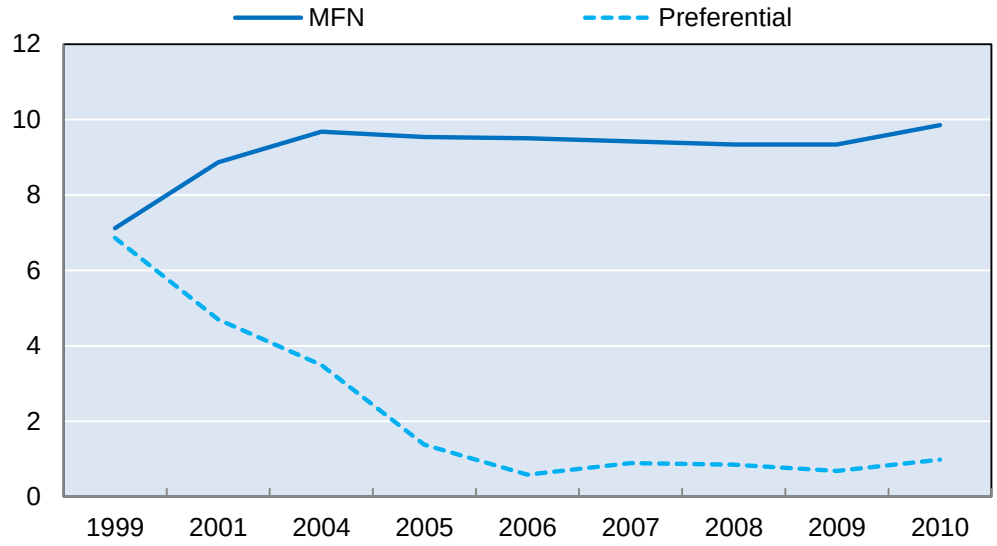
Table 13.1. SADC tariffs in 2007

	Tariffs on imports from SADC countries	Tariffs on imports from non-SADC countries
	%	%
DRC and Angola	9.8	8.0
Mozambique	5.6	8.1
Tanzania	3.8	9.6
Zambia	6.7	7.8
Zimbabwe	15.2	14.8

Source: GTAP v8 database. Trade-weighted applied tariffs.

In 2010, average trade-weighted effectively applied tariffs in SADC on imports from SADC trade partners were 1.4%. MFN tariffs for the same trade basket would be 7.6%. Several countries such as Botswana and Lesotho had basically zero tariffs on imports from SADC. Other countries such as Mauritius and South Africa had very low average trade-weighted tariffs of 0.7% and 0.2%, respectively. Mozambique had reduced its tariffs on imports from SADC to 1.0%. For the other countries in Table 13.1, recent tariff data are not available.[6]

Figure 13.1. Average MFN and SADC preferential tariffs South Africa 1999-2010

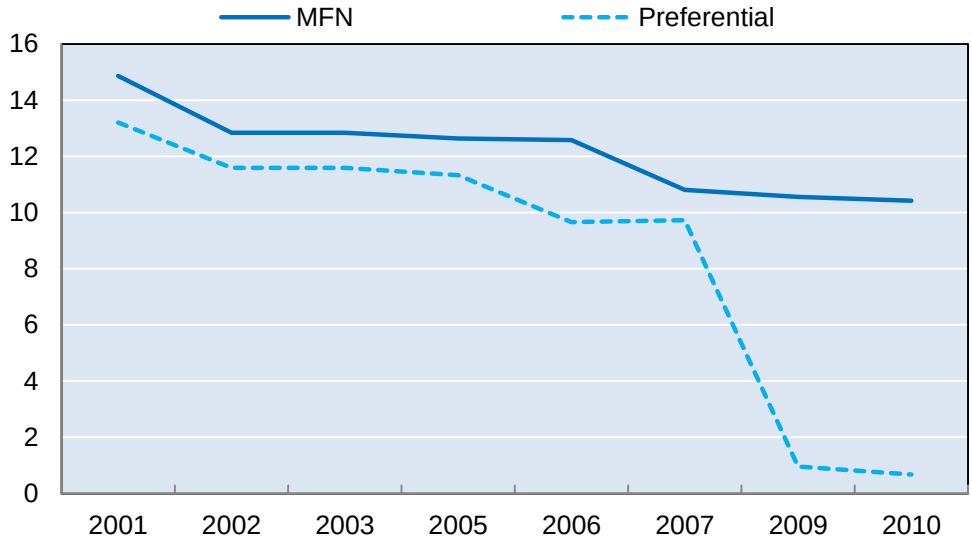


Source: UNCTAD Trains.

5. SADC website on trade: *www.sadctrade.org/*

6. Data in this paragraph are based on UNCTAD Trains data accessed through WITS.

Figure 13.2. Average MFN and SADC preferential tariffs Mozambique 1999-2010



Source: UNCTAD Trains.

Trade

Exports of SADC countries are concentrated on destinations in the European Union and other high income OECD markets though this concentration is diminishing. Exports of non-agricultural products to Brazil, Russia, India and China (BRIC) have increased significantly especially between 2005 and 2010. The share of intra-regional SADC trade in the region's total trade has not changed much during the integration period and reached 11% in 2010 for both intra-SADC exports (Table 13.2) and imports. As noted above, compared with other regional economic communities in Africa this share is relatively high. For example, in COMESA the share is only 6% and in Arab-Maghreb Union (AMU) only 5%. Intra-Africa trade is 10% of total trade for the continent, much lower than, for example, intra-Asia trade which is about 50% (developing counties only), or NAFTA and intra-EU trade. The literature has discussed various reasons for the relatively low intra-Africa trade including low complementarity of production structures, trade barriers, and lack of infrastructure and integration into value chains (e.g. UNCTAD, 2009).

Table 13.2. Total exports from SADC

	2000	2005	2010
	USD billion	USD billion	USD billion
World	52.2	102.1	170.3
	%	%	%
World	100.0	100.0	100.0
SADC	12.6	9.7	10.9
Rest of Africa	2.4	3.1	3.2
European Union	37.9	34.0	23.0
Other high income OECD	27.9	29.2	26.4
BRICs	7.8	13.0	28.8
Rest of the World	11.3	11.0	7.7

Source: UNCTADStat.

Africa's exports are highly concentrated on a few products, mainly primary commodities and some manufacturing. Relative to other regions the high concentration, e.g. measured by a concentration index, is very evident. Even more worrying is the upward tendency in the concentration index (UNCTAD and AU, 2012). The index increased from 0.31 in 2002 to 0.47 in 2008 for Africa as a whole and from 0.18 to 0.35 in SADC, representing a considerable movement towards greater concentration in exports. Similarly, intra-African trade is highly concentrated.

Intra-regional trade is higher for agricultural products than non-agricultural goods (Table 13.3). Nonetheless, agricultural products are still mainly exported to the European Union. Agricultural exports to other high income OECD countries and to BRIC countries are low. These markets attract relatively higher shares of non-agricultural exports. The United States, for example, imports relatively labour intensive textile products from the SADC region, often under its preferential market access programme AGOA. The category "non-agriculture" as defined in the WTO also comprises minerals and other raw materials that are often relatively less labour intensive than agriculture and manufactured products.

Export markets vary considerably between SADC members. While more than 60% of Botswana's exports go to the European Union, the comparable EU export shares are much lower for Swaziland, Tanzania and Zambia (Table 13.4).

Overall, world exports are comprised of 12% raw materials, 21% intermediate goods, 31% consumer goods and 31% capital goods. SADC exports are much more concentrated on raw material (29%) and intermediate goods (41%) than on consumer and capital goods (17% and 12%, respectively). Compared to trade with non-SADC partners, trade within SADC is relatively high in intermediate, consumer and capital goods (Annex Table 13.A1.1).[7] Interestingly, von Uexkull (2012, this volume) finds that at the firm level, regional exporters are similar to global exporters in terms of employment, productivity and wages.

Table 13.3. SADC exports in agriculture and non-agriculture in 2010, by destination

	Agriculture	Non-agriculture
	USD billion	USD billion
World	17.2	153.1
	%	%
World	100.0	100.0
SADC	17.3	10.1
Rest of Africa	5.5	2.9
EU	40.2	21.1
Other high income OECD	12.5	28.0
BRICs	9.8	31.0
Rest of the World	14.7	6.9

Source: UNCTADStat.

7. ILO, 2010 analysis the effects of integration in the ECOWAS region and uses a similar methodology. They also find different revealed comparative advantages by trading partners.

Table 13.4. Total exports by country and distribution by destination, 2010

	World	SADC	Rest of Africa	European Union	Other high income OECD	BRIC	Rest of world
	USD billion	%	%	%	%	%	%
Angola	46.4	4.6	0.2	8.5	32.0	53.5	1.2
Botswana	4.7	18.8	0.0	61.0	12.0	1.8	6.3
Democratic Republic of the Congo	4.9	25.5	0.5	12.5	11.1	49.3	1.1
Lesotho	1.2	6.5	0.0	11.7	81.8	0.0	0.1
Madagascar	1.3	4.3	2.3	56.4	18.1	12.3	6.6
Malawi	1.1	19.4	12.1	36.7	17.5	5.3	8.9
Mauritius	2.0	7.9	8.4	61.7	16.1	1.5	4.4
Mozambique	2.2	19.6	0.3	63.1	0.2	9.1	7.8
Namibia	6.0	17.0	0.4	38.5	24.6	12.5	7.0
Seychelles	0.4	8.1	4.1	63.0	10.6	2.2	12.0
South Africa	85.8	10.3	4.8	28.0	24.4	20.8	11.7
Swaziland	1.8	13.5	11.3	25.6	31.2	4.1	14.3
United Republic of Tanzania	4.1	13.0	13.3	17.3	15.2	26.3	14.9
Zambia	7.2	18.3	1.7	4.4	51.6	20.5	3.6
Zimbabwe	2.5	54.7	1.2	20.3	7.9	8.3	7.8
SADC	170.3	10.9	3.2	23.0	26.4	28.8	7.7

Source: UNCTADStat.

Composition of trade

Regional export baskets can differ substantially from global trade. A major interest in regional integration among southern countries and south-south trade more generally is that it is considered as a step towards industrialisation, which could lead to the creation of productive employment. According to the Heckscher-Ohlin model north-south trade leads to the specialisation of the south in products that are intensive in its abundant factors, land and unskilled labour, while the north specialises in goods that are intensive in human and physical capital. Such a specialisation it is often argued would prevent developing countries from industrialisation. South-south trade, however, could lead to exports of more sophisticated products that contribute to structural change.

An indicator for the sophistication of products has been developed by Rodrik and Hausmann (2006). The index "Prody" measures the sophistication of a country's export package by comparing it essentially with the GDP per capita associated with the basket. Hausmann, Hwang and Rodrik (2007) show that a country's relative level of export sophistication has an impact on subsequent growth: the higher the level of sophistication, the higher the growth rates. South-south exports were initially associated with greater skill content and higher sophistication than exports from the south to the north (e.g. Amsden, 1976 and subsequent literature). However, more recent studies show that the opposite is possible (OECD, 2006). For example China imports a lot of raw material from Africa (south-south) and exports more sophisticated consumer goods to the United States.

Linking the Prody index with SADC's intra-regional and external trade reveals that the intra-regional trade appears more sophisticated than external trade.[8] Within trading blocs, the difference in sophistication between intra-bloc and external trade is higher for the poorer countries. Klinger (2009) shows that this is also the case in SACU where South Africa has in fact a higher relative level of sophistication in its outside exports than in its exports to SACU.

Another concept to measure the potential contribution of exports of certain products to future development is the "connectedness". Hidalgo *et al.* (2007) provide a metric that tries to measure the learning potential of goods to develop capabilities for future structural transformation and productivity growth. If a country's export package consists of products that are in the "product space" near to other products, the theory suggests that it is easier to diversify in the near future. Similar to the results for sophistication, poorer developing countries export more connected products to the south than to the north, while this difference is smaller for higher income countries. South Africa, however, exports more connected products to other developing countries than to developed countries (Klinger, 2009).

Thus, there is some indication that regional integration could have a positive impact on structural change in SADC. Other arguments for regional integration are that it provides larger markets that attract foreign direct investment and foster greater competition. This could have a positive impact on growth, which in turn could contribute to create productive employment. The allocation effect, where resources are used more efficiently, could add to the potential growth effect of regional integration. The employment impact of the allocation effect depends directly on the labour intensity in the sectors. The impact of trade liberalisation in SADC on trade flows and employment via the allocation effect is analysed with a general equilibrium model in the next section.

Table 13.5. Labour intensity

	Exports to	
	SADC	**RoW**
Botswana	0.67	0.23
Madagascar	0.22	0.27
Mozambique	0.35	0.22
Mauritius	0.30	0.25
Malawi	0.31	0.26
Tanzania	0.12	0.27
Zambia	0.19	0.07
Zimbabwe	0.18	0.20
South Africa	0.12	0.16
Rest of South African Customs	0.25	0.24
Democratic Republic of the Congo and Angola	0.10	0.14

Source: Calculation based on GTAP 8 data.

The differences in the labour intensity between regional and global exports and changes of the export orientation resulting from regional integration can have a direct impact on employment and poverty alleviation. Export growth of products that use unskilled labour intensively can have a higher poverty reducing effect than export growth of capital intensive

8. The Prody of exports to the world is 13 030 and for exports to SADC 81 428.

products. For SADC, Kweka *et al.* (2004) find that regional integration has led to higher trade and that this trade has a higher anti-poverty impact as it involves the poor more directly.

The composition of exports along the line of sophistication and connectedness or raw materials, intermediate, consumption and capital goods does not determine the labour intensity. Raw materials can be labour intensive (e.g. agricultural products) or capital intensive (e.g. large scale mining). The labour intensity of exports varies across countries. Botswana, for example has a higher labour intensity in its exports to SADC than in its exports to the rest of the world. South Africa's labour intensity of exports is, however, higher for its exports to the rest of the world. Exports of highly labour intensive goods create jobs, though not necessarily high quality jobs. Many agricultural sectors are examples of sectors with a high labour intensity but low productivity and correspondingly low wages. In addition, the number of jobs created by exports of certain goods depends on the level of value added. iPhone exports from China to the United States provide an example for a product with high export value but relatively little value added in the exporting country.

13.3. General equilibrium model analysis: data and methodology

A computable general equilibrium model is an economic model that uses actual economic data to estimate how an economy might react to changes in policy such as a trade policy change. Elasticities capture behavioural responses such as a change in demand resulting from price changes.

Labour-output ratios

Table 13.A1.7 shows labour-output ratios by sector for most SADC members using data taken from the Global Trade Analysis Project version 8 database. These data are based on the value of labour, not numbers of workers, so the value of labour understates the number of workers where wages are below average. The data are taken from input-output tables derived from the national accounts of the individual countries. Although these are the latest numbers available through version 8 of the GTAP database, the primary data vary in terms of timeliness, as the accounts are based on a census taken at intervals.

It is clear that primary agriculture is a labour intensive industry in the SADC region. Mozambique, Tanzania and DRC are examples of countries with high labour-output ratios in primary agriculture. Given that wages are low in the agricultural sector, which is characterised by an informal labour force, it is apparent that labour productivity per worker is low relative to the rest of the economy. Data on the contribution of agriculture to GDP and employment in agriculture as a share of total employment confirm the relatively low productivity. In Mozambique and Zambia, for example, 81% and 72% of employees contribute only 28% and 22% to each country's GDP, respectively.[9] The extractive industries (e.g. mining) have low labour-output ratios. The service industries tend to have relatively high labour-output rations.

One impact of trade on employment operates through changes in output. To the extent that trade influences output, changes in employment can be related to trade. However, there are many other factors affecting output other than trade, such as domestic consumption, production shocks caused by droughts and floods, and a range of domestic policies. In addition, the link between output and employment is not fixed, with wages and interest rates, technology and

9. World Development Indicators, 2011. Data availability for individual countries varies. The reference year for Mozambique is 2003 and for Zambia 2000.

labour market policies having an influence. Therefore, it is difficult to derive a direct link between trade policy, such as regional integration, and employment.

Successful integration into the global economy is part of every development success story of recent decades. Trade allows developing countries to access technologically advanced capital goods and inputs and at the same time extends demand for their export products far beyond the narrow boundaries of the local market. The empirical analysis has, however, difficulties in identifying a clear link between liberalisation and employment creation. McMillan and Verduzco (2011), for example, fail to find a correlation between trade liberalisation and industrial employment over a long period, 1980 to 2006, in a dataset including many developing countries. Hoekman and Winters (2007) conclude in their literature overview that "the direct effects of trade reform on aggregate employment are muted". For OECD countries, it has been shown that neither the share of the working-age population that is employed nor the rate of unemployment are correlated with trade openness. However, other papers including several studies in this volume find a positive correlation and show that trade has a positive impact on employment creation. ICITE is an important initiative helping to shed more light on the relationship.

Methodology

One way to gauge the link between regional integration and employment would be to look at sectoral employment in 2000 before tariff reduction within the region and now, when integration is well advanced. For example, prior to removing tariffs South Africa exported virtually nothing to Namibia and imported USD 200 000 in just 15 of 99 HS chapters, mainly fish (HS chapter 3) and other products of animal origin (HS chapter 5). By 2007, imports amounted to USD 131 million from 27 chapters. However, some 99% of these imports by value were pearls, precious stones, metals, coins, etc. (HS chapter 71). Diversification may have increased, but so had concentration.

Unfortunately, trade data do not tell us much about production and employment. For this we turn to a general equilibrium model that links trade flows to production and the use of labour, capital and land. The link between trade and employment is assessed here by using the GTAP version 8 database with 2007 tariffs and simulating removing the remaining tariffs within the region (i.e. those imposed by the countries listed in Table 13.1 as shown earlier). This shows the expected trade and employment effects in each member country of removing just the tariffs.

The GTAP model is used to measure the impact on real wages and employment of changes in trade policy following regional integration. GTAP is ideal for modelling preferential trade agreements because it contains bilateral trade and tariff data. It is a multi-country and multi-sectoral CGE model and fully documented in Hertel and Tsigas (1997). For each country or region, there are multistage production processes which combine primary factors of land, labour, capital and natural resources with intermediate inputs, assuming a constant elasticity of substitution technology. Returns to factors, i.e. income, are taxed by the government, saved or spent by the single representative household. While there is no substitution between intermediate inputs and primary factors or among the intermediate inputs, there is substitution between different sources of intermediate inputs, namely domestic and imports from each region. The regions are linked together by imports and exports of commodities. Similar commodities, which are produced by different countries, are assumed to be imperfect substitutes

for one another. The degree of substitution is determined using Armington elasticities (the elasticities of substitution between imports and domestic goods).[10]

The degree of substitution between primary factors (capital, labour, land, etc.) varies between sectors, with primary agriculture characterised by low substitutability, and manufacturing much higher. The elasticities are shown in Table 13.6. For a given sector, such as rice, the elasticity is the same between all primary factors and across all countries. The substitutability between labour and capital is the same as between skilled and unskilled labour. Table 13.6 also shows the Armington elasticities.

In this application, the standard model is used with the exception that alternative labour market closures, described below, are used for unskilled labour. Skilled labour and capital are assumed to be mobile in each country but in a fixed supply, with no international mobility. Labour cannot move across borders. This is the standard GTAP assumption.

There is no attempt to phase in the tariff changes or trace the time profile of the impacts. Thus, we only compare the new steady state after the implementation period with the initial status quo. The focus here is on removing the tariffs that were in place in 2007. This includes tariffs that have been removed recently (e.g. in Mozambique), tariffs that still exist in some LDCs, and tariffs on sensitive products that were exempt from immediate reduction. To the extent that those tariffs would not be removed, we overestimate the gains. In the other hand, we ignore non-tariff barriers and other quantitative restrictions such as import bans or quarantine restrictions.

Table 13.6. Elasticity of substitution

	Between primary factors	Between domestic and imported goods
Rice	0.53	3.60
Other crops	0.26	2.78
Vegetables	0.26	1.85
Sugar	0.72	2.70
Plant based fibres	0.26	2.50
Livestock	0.26	2.22
Fishing	0.20	1.25
Resources	0.26	3.32
Meat	1.12	4.15
Other processed agriculture	1.12	2.14
Textiles	1.26	3.82
Wearing apparel	1.26	3.70
Chemicals	1.26	3.30
Metal manufactures	1.26	3.55
Wood & paper products	1.26	3.10
Manufactures	1.26	3.58
Electronics	1.26	4.40

Source: GTAP database V8.

10. More information on the use of Armington elasticities in the GTAP model can be found in several papers on the GTAP consortium web site, here: *www.gtap.agecon.purdue.edu*

Simulations with alternative labour market assumptions

In this analysis we are interested in the labour market effects of trade liberalisation. To gauge this we use three alternative closures or assumptions about how the labour market works. The standard (fixed) closure assumes that the quantity of skilled and unskilled labour in each country is fixed. In other words, there is no change in unemployment. Thus, all the adjustment occurs in real wages. An alternative (flexible) closure assumes real wages of unskilled labour are fixed and the adjustment occurs in employment. The final (rigid) assumption is a combination of the two, with some adjustment in both the price and quantity of unskilled labour. This assumption is undoubtedly more realistic, but it raises the question of what response can be expected. In the absence of definitive data, an elasticity of one is assumed. This means the change in employment in the economy is approximately equal to the change in the real wage. The three scenarios are listed in Table 13.7.

Table 13.7. Estimated impacts for elimination remaining intra-regional tariffs

Scenario	Closure	Assumption
Fixed	Quantity of labour is exogenous	No change in employment
Flexible	Real wages of unskilled labour is exogenous	Surplus unskilled labour is available. No change in skilled labour.
Rigid	Real wages and employment endogenous	Real wages and employment of unskilled labour can adjust

13.4. Results

Regional trade liberalisation among developing countries can lead to increasing or decreasing demand for labour intensive goods and hence the demand for labour can increase or decrease. The effect on wages and employment depends on the labour market structure. If the supply of labour is fixed, an increase in demand is expressed as an increase in real wages. If labour is in surplus, the increase in employment has a significant effect on national welfare (Table 13.8). This is because the resource base of primary factors is expanded, rather than merely reallocated to better use. The flexible scenario generates the greater welfare gains because real wages are fixed and the increase in demand for labour is assumed to be totally accommodated by changes employment rather than in real wages.

Table 13.8. Welfare: estimated annual impacts for elimination of remaining intra-regional tariffs under alternative labour market assumptions

	Fixed	Flexible	Rigid
	USD m	USD m	USD m
Botswana	-12	12	0
Madagascar	-2	-1	-2
Mozambique	156	445	303
Mauritius	-1	4	1
Malawi	-43	-32	-37
Tanzania	-5	8	1
Zambia	-24	34	5
Zimbabwe	425	821	631
South Africa	418	693	555
Rest of South African Customs Union	31	55	43
Democratic Republic of the Congo and Angola	-74	-4	-38

Source: GTAP v8 simulations.

The contribution to welfare of the increase in employment is shown in Table 13.9. There is no contribution under the fixed scenario, but significant contributions under the flexible and rigid scenarios. For example, one-third of Mozambique's welfare gains of USD 303 million are explained by increased employment under the rigid scenario. However, labour doesn't capture all the gains. Under the rigid scenario, total welfare increases USD 147 million over the fixed scenario, but the contribution of labour accounts for just USD 109 million of this. Holding down real wages benefits consumers and owners of other factors such as capital and land.

The changes in wages for unskilled and skilled labour are shown in Table 13.10. The greater the degree of liberalisation undertaken, the greater the wage increases. For most countries, these changes are positive, although Malawi is an exception. In the fixed scenario, wages of skilled and unskilled tend to move together. This does not happen under the flexible employment scenario because there is no change in wages for unskilled workers by assumption.

Table 13.9. Endowment effects: the contribution of increase in employment to welfare

	Fixed	Flexible	Rigid
	USD m	USD m	USD m
Botswana	0	21	10
Madagascar	0	1	0
Mozambique	0	217	109
Mauritius	0	5	3
Malawi	0	7	3
Tanzania	0	10	5
Zambia	0	49	24
Zimbabwe	0	289	146
South Africa	0	155	77
Rest of South African Customs Union	0	21	11
Democratic Republic of the Congo and Angola	0	44	22

Source: GTAP v8 simulations.

Table 13.10. Real wages for skilled and unskilled labour

	Unskilled			Skilled		
	Fixed	Flexible	Rigid	Fixed	Flexible	Rigid
Botswana	0.1	0.0	0.0	0.0	0.3	0.1
Madagascar	0.0	0.0	0.0	0.0	0.1	0.1
Mozambique	5.4	0.0	2.6	6.6	9.9	8.3
Mauritius	0.1	0.0	0.1	0.1	0.2	0.1
Malawi	0.3	0.0	0.2	-0.8	-0.6	-0.7
Tanzania	0.1	0.0	0.1	0.2	0.3	0.3
Zambia	0.8	0.0	0.4	1.2	1.5	1.4
Zimbabwe	18.0	0.0	8.0	24.2	30.6	27.6
South Africa	0.1	0.0	0.1	0.2	0.2	0.2
Rest of South African Customs Union	0.3	0.0	0.2	0.3	0.4	0.4
Democratic Republic of the Congo and Angola	0.1	0.0	0.1	0.2	0.3	0.3

Source: GTAP v8 simulations.

Labour use by sector

Perhaps of greater interest is employment by sector in each country. This is shown for unskilled and skilled labour for the rigid scenario in Annex Tables 13.A1.2 and 13.A1.9. The most striking estimate concerns manufacturing employment in Mozambique, which rises six fold. This comes from a very low base. Manufacturing accounts for less than 1% of output in Mozambique and the value of labour employed in the sector amounts to only USD 14 million. It appears that the manufacturing sector relocates from Malawi and Zimbabwe, where employment in the sector falls by a quarter and a half respectively. Zimbabwe has high tariffs (164%) in this sector, especially on imports from Mozambique, across the border. The tariff of most significance appears to be HS630900, "Worn clothing and other worn textile articles traded in bulk or in bales, sacks or similar bulk packings".

The apparel sector sees significant gains in Mozambique and Malawi while Tanzania increases employment in textiles. Apparel is generally considered to be more labour intensive and less skilled than textile production, although it is further down the supply chain. However, the input-output data do not show this for SADC countries. The electronics industry is one where employment is likely to increase in Malawi, Botswana and Zimbabwe.

Table 13.11. Change in employment of unskilled labour under the rigid scenario

Botswana	0.28
Madagascar	0.01
Mozambique	4.30
Mauritius	0.10
Malawi	0.28
Tanzania	0.09
Zambia	0.63
Zimbabwe	..
South Africa	0.13
Rest of South African Customs Union	0.25
DRC & Angola	0.13

Source: GTAP v8 simulations.

Also of interest is the employment of unskilled labour in agriculture, as it is this group that includes many of the rural poor. In Mozambique, there are declines in rural employment as these workers move out of sugar production and migrate to the manufacturing sector. In other countries there is not much movement in primary agriculture except perhaps in the "Other crops" sector in Malawi and South Africa. There are increases in employment in processed agriculture in Zimbabwe and South Africa. There are similar percentage changes in skilled labour but these don't amount to much in absolute terms because the initial level of skilled labour in agriculture is low.

Because percentage changes can be deceptive, absolute changes in unskilled employment, by value, are shown in annex table 13.A1.10. The greatest changes are in Mozambique manufacturing and Zimbabwe metals manufacture. There are also large changes in the services sector where jobs diminish elsewhere in the economy.

The results are not sensitive to values of the elasticity of substitution between primary factors. For example, doubling the sugar elasticity in Table 13.6 from 0.72 to 1.44 increases the change in the use of unskilled labour in the sugar sector in Malawi from 15.29% to 15.65%. Nor are the results sensitive to the elasticity of substitution between intermediate inputs. Increasing this from 0 to 1 for sugar, leads to a change in employment of 14.71. Welfare increases only marginally.

Regional trade liberalisation usually leads to trade creation among member states and trade diversion regarding trade with non-members. An increase in exports to members and rising output lead to positive employment effects. Due to the changes in relative prices and the corresponding trade diversion effect and the impact on tariff revenue, the effect on welfare is, however, not necessarily positive in all countries.

13.5. Implications and conclusions

The African Union is pursuing an integration agenda. To facilitate convergence towards achievement of a continental common market the AU recognised eight regional economic communities as building blocs, SADC being one of them. SADC countries share the common objective of regional integration. Compared with other regional economic communities in Africa, the share of intra-SADC trade is relatively high at 11% of the total trade for the region but could be increased with continued economic integration. This note analysed the impact on trade flows and employment of further regional trade liberalisation in SADC. A general equilibrium model has been used to assess the likely employment and trade effects.

The CGE results suggest that where high tariffs are removed, substantial changes in production and employment in a specific sector may occur. These changes bring benefits, but will inevitably result in temporary dislocation and some adjustment costs. No attempt has been made here to measure the costs of adjustment, but it is worth noting that the tariff changes are generally phased in over a number of years, and that during that time the economy might grow significantly. The employment effects from the elimination of intra-SADC tariffs are positive but small in all SADC member countries. The welfare effect, taking into account the costs of production and reduction of tariff revenues, is positive for SADC as a group but varies for individual countries depending on the labour market assumption.

The alternative closures emphasise the importance of using all available resources. Unemployed resources impose a significant opportunity cost on the economy. Governments can play a role by implementing labour market policies that enhance mobility between sectors and ease the burden of temporary unemployment. This policy mix can include education, training, infrastructure, and providing information about where new jobs are likely to be. Social security systems could mitigate the costs for individuals to adjust. This analysis goes some way towards indicating where the demand for skills is likely to be following tariff reductions.

Furthermore, it has been shown that intra-SADC trade is in more sophisticated products than SADC's external trade. Regional integration could thus have a positive impact on structural change. Other arguments for regionalism such as development of larger markets that could attract foreign direct investment and foster greater competition have not been analysed or discussed in detail in this note. Also, a possible positive impact on the productivity of firms cannot be captured by a standard CGE model.

The approach used here has further limitations. Apart from the usual concerns about data quality, the analysis is dependent on input-output tables that can become out of date in a growing economy. Parameter values that are applied globally in the model may not be specific to individual countries. Furthermore, no account is taken here of whether employees in one occupation, such as agriculture, could be productive in another specific occupation, such as apparel. Some jobs may not lend themselves to mobility.

Despite these limitations the analysis identifies some important aspects of regional trade in SADC. Trade liberalisation in SADC is likely to lead to more employment and to have a positive impact on structural change. The effects of the tripartite free trade agreement need to be analysed separately. However, SADC and the tripartite FTA are important building blocs for Africa's continent-wide economic integration.

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Annex 13.A1

Table 13.A1.1. SADC countries' exports by destination and product group, average 2007-10

Country	Product group	Total exports	SADC	Other SSA	EU	Other HiOECD	BRIC	RoW
		%	%	%	%	%	%	%
Botswana	Raw materials	65.6	2.6	0.0	59.1	0.5	2.1	1.2
	Int. goods	22.6	8.9	0.0	1.3	9.1	0.8	2.5
	Cons. goods	8.6	6.5	0.0	1.4	0.5	0.0	0.1
	Capital goods	2.8	2.6	0.0	0.1	0.0	0.0	0.0
	Total	100.0	20.9	0.1	62.0	10.2	2.9	3.9
Madagascar	Raw materials	17.3	0.3	0.1	11.6	1.5	2.9	1.0
	Int. goods	8.2	0.7	0.4	2.9	0.2	1.3	2.8
	Cons. goods	65.6	2.0	0.5	41.9	15.3	0.6	5.3
	Capital goods	7.0	0.9	0.4	1.5	1.4	0.8	2.0
	Total	100.0	4.0	2.4	58.3	18.4	5.5	11.3
Malawi	Raw materials	72.4	10.7	0.3	32.2	10.3	4.9	13.9
	Int. goods	12.8	5.6	0.8	4.2	0.5	1.2	0.4
	Cons. goods	12.9	6.8	0.7	2.8	1.8	0.2	0.6
	Capital goods	1.9	1.6	0.0	0.1	0.1	0.1	0.0
	Total	100.0	24.7	2.0	39.3	12.7	6.4	15.0
Mauritius	Raw materials	6.2	0.3	0.1	2.3	1.3	0.5	1.7
	Int. goods	22.7	3.7	0.5	15.7	1.9	0.2	0.7
	Cons. goods	60.4	6.1	0.8	44.6	7.0	0.2	1.7
	Capital goods	4.7	0.7	0.2	1.5	-0.1	0.2	2.1
	Total	100.0	10.9	1.6	64.1	10.1	1.1	12.2
Mozambique	Raw materials	16.7	3.0	0.0	5.9	1.0	3.1	3.7
	Int. goods	59.6	11.9	0.2	28.3	0.1	1.7	17.3
	Cons. goods	7.0	5.4	0.1	0.5	0.1	0.0	0.9
	Capital goods	4.3	2.1	0.1	0.5	0.3	0.0	1.2
	Total	100.0	22.6	0.5	45.3	1.5	4.8	25.2
Namibia	Raw materials	50.2	10.3	0.0	26.6	9.6	3.1	0.5
	Int. goods	21.2	4.4	0.1	8.2	4.3	1.2	3.1
	Cons. goods	23.0	22.4	0.1	0.2	0.1	0.0	0.2
	Capital goods	5.1	3.4	0.0	1.1	0.1	0.0	0.4
	Total	100.0	40.9	0.3	36.2	14.2	4.3	4.2
Seychelles	Raw materials	0.6	0.1	0.0	0.2	0.0	0.0	0.4
	Int. goods	15.0	0.1	0.1	12.4	1.4	0.1	0.9
	Cons. goods	27.9	0.4	0.0	27.0	0.1	0.0	0.3
	Capital goods	1.5	0.2	0.0	1.0	0.1	0.0	0.1
	Total	100.0	0.9	0.1	40.9	1.8	0.1	56.1

Table 13.A1.1. SADC countries' exports by destination and product group, average 2007–10 (continued)

Country	Product group	Total exports	SADC	Other SSA	EU	Other HiOECD	BRIC	RoW
		%	%	%	%	%	%	%
South Africa	Raw materials	28.0	1.0	0.4	9.8	3.8	8.3	4.6
	Int. goods	41.3	3.4	1.6	9.8	17.2	4.0	5.2
	Cons. goods	15.8	4.0	1.1	3.3	5.1	0.2	2.2
	Capital goods	15.0	3.6	1.2	6.5	1.6	0.5	1.6
	Total	100.0	12.0	4.3	29.5	27.7	12.9	13.6
Swaziland	Raw materials	5.7	5.6	0.0	0.0	0.0	0.0	0.0
	Int. goods	76.9	62.5	0.0	13.8	0.1	0.0	0.0
	Cons. goods	13.5	12.9	0.0	0.1	0.4	0.0	0.0
	Capital goods	3.9	3.8	0.0	0.0	0.0	0.0	0.0
	Total	100.0	85.0	0.0	13.9	0.5	0.0	0.6
Tanzania	Raw materials	39.8	0.7	1.4	10.8	8.4	14.1	4.3
	Int. goods	40.6	11.4	4.6	2.3	16.7	3.1	2.6
	Cons. goods	14.3	3.7	6.5	1.8	0.9	0.2	1.1
	Capital goods	3.9	0.9	1.6	0.7	0.2	0.1	0.4
	Total	100.0	16.8	14.2	15.9	26.3	17.6	9.2
Zambia	Raw materials	14.2	6.3	0.1	1.6	4.9	1.1	0.2
	Int. goods	76.4	9.0	0.7	2.4	43.2	10.2	10.8
	Cons. goods	7.3	3.6	0.1	0.7	1.8	0.8	0.4
	Capital goods	1.6	1.4	0.0	0.1	0.1	0.0	0.0
	Total	100.0	20.4	0.9	5.2	50.0	12.1	11.4
Zimbabwe	Raw materials	33.3	11.6	0.2	7.5	0.5	3.9	6.4
	Int. goods	33.3	27.2	0.3	1.9	2.7	0.4	0.3
	Cons. goods	33.3	21.8	0.7	6.2	1.9	0.3	0.3
	Capital goods	0.0	4.6	0.0	0.5	0.4	0.1	0.3
	Total	100.0	65.2	1.3	16.1	5.5	4.7	7.4
SADC	Raw materials	29.4	2.0	0.3	12.2	3.8	7.0	4.1
	Int. goods	41.0	5.4	1.4	8.9	16.3	3.8	5.2
	Cons. goods	17.0	5.2	1.0	4.5	4.3	0.2	1.8
	Capital goods	11.9	3.2	1.0	4.9	1.2	0.4	1.3
	Total	100.0	15.8	3.8	30.7	25.6	11.4	12.7

Source: UN Comtrade, average 2007-10.

Table 13.A1.2. Mozambique tariffs on imports from SADC members, by sector

	Botswana	Madagascar	Mozambique	Mauritius	Malawi	Tanzania	Zambia	Zimbabwe	South Africa	Rest of SACU	DRC & Angola
	%	%	%	%	%	%	%	%	%	%	%
Rice	0	0	0	0	7.5	0	0	0	3.77	0	0
Other crops	0	0	0	0	0.48	0	5.1	0.54	6	9.93	0
Vegetables	0	0	0	0	17.99	18.27	0	20	18.98	11.27	0
Sugar	0	0	0	0	7.5	6.12	0	7.5	7.5	0	0
Plant based fibres	0	0	0	0	0	0	0	0	0	0	0
Livestock	0	0	0	0	10.11	19.8	9.72	6.65	10.33	3.43	0
Fishing	0	0	0	0	0	0	0	0	4.54	0	0
Resources	0	0	0	5.47	0.91	1.96	1.4	0.22	1.04	0	0
Meat	19.4	0	0	0	0	0	0	19.99	18.18	19.91	0
Other processed agriculture	0	0	0	8.55	9.56	17.49	18.64	18.11	16.38	18.06	0
Textiles	19.98	4.45	0	20	8.11	19.35	7.43	11.51	14.13	7.21	14.39
Wearing apparel	20	12.65	0	20	20	20	0	20	19.95	20	0
Chemicals	2.55	11.43	0	16.97	14.9	11.79	18.5	4.85	6.97	6.41	0
Metal manufactures	0	10.68	0	7.88	9.63	10.2	6.77	0.01	5.35	7.3	0
Wood & paper products	0	9.46	0	8.08	2.36	12.99	0	6.69	9.25	9.68	0
Manufactures	8.61	3.13	0	6.23	6.22	4.98	2.61	8.68	6.22	10.18	7.46
Electronics	13.32	11.56	0	11.56	8.87	11.06	0	12.94	8.6	10.33	11.56

Source: GTAP V8.

Table 13.A1.3. Tanzania tariffs on imports from SADC members, by sector

	Botswana	Madagascar	Mozambique	Mauritius	Malawi	Zambia	Zimbabwe	South Africa	Rest of SACU	DRC & Angola
	%	%	%	%	%	%	%	%	%	%
Rice	0	0	0	7.5	0	0	0	3.77	0	0
Other crops	0	0	0	0.48	0	5.1	0.54	6	9.93	0
Vegetables	0	0	0	17.99	18.27	0	20	18.98	11.27	0
Sugar	0	0	0	7.5	6.12	0	7.5	7.5	0	0
Plant based fibres	0	0	0	0	0	0	0	0	0	0
Livestock	0	0	0	10.11	19.8	9.72	6.65	10.33	3.43	0
Fishing	0	0	0	0	0	0	0	4.54	0	0
Resources	3.76	0	5.47	0.91	1.96	1.4	0.22	1.04	0	0
Meat	0	0	0	0	0	0	19.99	18.18	19.91	0
Other processed agriculture	0	0	8.55	9.56	17.49	18.64	18.11	16.38	18.06	0
Textiles	0	0	20	8.11	19.35	7.43	11.51	14.13	7.21	14.39
Wearing apparel	0	21.98	20	20	20	0	20	19.95	20	0
Chemicals	0.79	0	16.97	14.9	11.79	18.5	4.85	6.97	6.41	0
Metal manufactures	3.55	1.56	7.88	9.63	10.2	6.77	0.01	5.35	7.3	0
Wood & paper products	0	4.42	8.08	2.36	12.99	0	6.69	9.25	9.68	0
Manufactures	1.37	4.59	6.23	6.22	4.98	2.61	8.68	6.22	10.18	7.46
Electronics	0	0	11.56	8.87	11.06	0	12.94	8.6	10.33	11.56

Source: GTAP V8.

Table 13.A1.4. Zambia tariffs on imports from SADC members, by sector

	Botswana	Madagascar	Mozambique	Mauritius	Malawi	Tanzania	Zimbabwe	South Africa	Rest of SACU	DRC & Angola
	%	%	%	%	%	%	%	%	%	%
Rice	0	0	0	0	0	0	0	0	0	0
Other crops	0	0	3.63	0	0	1.18	0	8.56	0	0
Vegetables	5.25	0	0	0	0	5	0	5.73	0	0
Sugar	0	0	0	0	0	5	0	5	5	0
Plant based fibres	0	0	5	0	0	0	0	0	0	0
Livestock	0	0	0	0	0	3.66	3.29	1.91	0	0
Fishing	0	0	0	0	0	0	0	2.11	0	0
Resources	0.01	0	2.85	0	0	0.01	1.15	2.69	0	0
Meat	0	0	0	0	0	0	0	5.84	0	0
Other processed agriculture	4.94	0	3.58	0	0	13.73	37	18.34	5.66	0
Textiles	6.07	0	1.91	0	0	20.83	12.85	14.19	13.67	0
Wearing apparel	12.73	0	5	0	0	25	25	23.2	19.02	0
Chemicals	1.9	0	1.43	0	0	4.86	0.92	2.39	4.65	0.1
Metal manufactures	3.1	0	0.09	0	0	4.58	3.81	1.86	4.82	4.19
Wood & paper products	3.52	0	1.83	0	0	11.86	1.87	7.22	3.2	4.98
Manufactures	5.42	0	2.18	0	0	2.17	1.89	3.24	3.03	0.89
Electronics	5	0	5	0	0	2.56	0	2.03	2.24	5

Source: GTAP V8.

Table 13.A1.5. Zimbabwe tariffs on imports from SADC members, by sector

	Botswana	Madagascar	Mozambique	Mauritius	Malawi	Tanzania	Zambia	South Africa	Rest of SACU	DRC & Angola
	%	%	%	%	%	%	%	%	%	%
Rice	12.49	0	15	0	0	0	0	12.36	10	0
Other crops	4.84	0	5.62	0	0	50	0	11.94	0	0
Vegetables	17.14	0	22.88	0	0	0	0	24.92	0	0
Sugar	0	0	24.97	0	0	0	0	20.04	0	0
Plant based fibres	0	0	2.5	0	0	0	0	2.5	0	0
Livestock	5	0	28.48	0	0	0	0	9.79	16.82	0
Fishing	0	0	17.96	0	0	0	0	13.88	6.52	0
Resources	5.57	0	9.19	0	0	5.02	0	23.82	7.5	0
Meat	8.38	0	40	0	0	35	0	22.56	32.83	0
Other processed agriculture	33.29	0	18.89	0	0	24	0	27.89	10.36	0
Textiles	89.82	0	18.5	0	0	36	0	24.14	35.63	24.92
Wearing apparel	55	0	60	0	0	58	0	57	40	58
Chemicals	6.19	0	3.14	0	0	17.13	0	9.84	12.76	8.36
Metal manufactures	5.02	0	12.78	0	0	15.02	0	15.91	20.09	21.27
Wood & paper products	8.18	0	23.77	0	0	19.18	0	23.11	11.46	21.44
Manufactures	27	0	163.99	0	0	11	0	16.29	19.57	30.93
Electronics	19	0	16	0	0	12	0	13.16	13	5

Source: GTAP V8.

Table 13.A1.6. DRC and Angola tariffs on imports from SADC members, by sector

	Botswana	Madagascar	Mozambique	Mauritius	Malawi	Tanzania	Zambia	Zimbabwe	South Africa	Rest of SACU
	%	%	%	%	%	%	%	%	%	%
Rice	0	0	0	0	10	0	0	0	6.7	4.15
Other crops	0	0	2.93	0	6.95	0	2	8.22	5.47	4.7
Vegetables	0	0	12.27	0	15.33	0	0	15.33	12.51	13.95
Sugar	0	0	14.29	0	20	16.88	0	0	4.96	2.67
Plant based fibres	0	0	2	0	0	0	0	0	2	0
Livestock	0	0	0	0	0	0	6.74	4.61	6.17	5.09
Fishing	0	0	0	0	0	0	0	0	19.39	19.58
Resources	1.55	14.97	0.57	0	0	0	0	5.14	17.98	23.36
Meat	13.57	0	0	0	0	0	0	9.4	10.43	12.83
Other processed agriculture	6.55	0	15.75	0	10	17.12	19.3	18.78	22.38	22.01
Textiles	20	0	6.2	6.93	14.27	12.86	0	18.83	8.13	13.47
Wearing apparel	20	0	14.88	19.64	0	19.65	0	15.58	14.34	14.11
Chemicals	11.18	0	8.75	7.3	8.97	15.47	9.71	15.75	9.03	11.99
Metal manufactures	8.74	0	4.2	10.85	14.34	2.51	4.14	8.48	11.02	6.88
Wood & paper products	14.87	0	7.33	13.36	17.91	9.01	14.54	19.64	13.51	15.05
Manufactures	3.54	6.3	6.05	4.04	7.39	5.07	1.18	10.15	3.17	7.29
Electronics	5.3	0	8.38	11.91	5	10.54	4.86	5	3.97	7.76

Source: GTAP V8.

Table 13.A1.7. Labour output ratios for SADC members, by industry

	Botswana	Madagascar	Mozambique	Mauritius	Malawi	Tanzania	Zambia	Zimbabwe	South Africa	Rest of SACU	DRC & Angola
Rice	20	29	43	0	31	30	18	0	6	15	0
Other crops	18	66	54	39	32	46	45	12	14	27	50
Vegetables	25	62	49	52	49	50	51	11	16	30	55
Sugar	0	31	14	23	16	13	21	6	7	16	25
Plant based fibres	0	57	40	0	48	26	42	11	7	25	58
Livestock	24	31	49	32	37	47	29	11	10	18	46
Fishing	0	16	23	13	47	45	5	0	10	7	8
Resources	8	16	63	10	28	64	19	11	10	14	12
Meat	23	18	4	27	10	29	13	1	4	23	22
Other processed agriculture	19	18	15	19	11	10	17	13	10	21	20
Textiles	38	14	14	21	9	9	9	19	14	21	24
Wearing apparel	41	15	21	26	14	6	12	8	18	27	28
Chemicals	23	14	20	49	10	3	34	0	7	51	44
Metal manufactures	80	12	10	13	29	4	2	11	12	14	11
Wood & paper products	26	14	17	29	13	15	22	39	15	29	30
Manufactures	23	14	16	17	21	4	11	15	9	20	16
Electronics	11	0	0	18	11	4	22	17	9	19	16
Transport & communications	26	20	13	19	29	23	31	23	16	22	20
Business services	35	49	27	34	51	24	33	25	24	34	32
Services and activities NES	33	18	27	45	37	20	24	30	31	46	45
Total	30	23	27	29	31	25	22	18	19	29	31

Source: GTAPv8 database. Various years. Rest of SACU includes Namibia, Lesotho and Swaziland.

Table 13.A1.8. Change in unskilled labour use for SADC members, by industry, rigid scenario

	Botswana	Madagascar	Mozambique	Mauritius	Malawi	Tanzania	Zambia	Zimbabwe	South Africa	Rest of SACU	DRC & Angola
	%	%	%	%	%	%	%	%	%	%	%
Rice	0	0	-7	0	3	0	0	1	4	0	3
Other crops	0	0	-2	0	5	0	0	1	1	1	0
Vegetables	0	0	-2	0	0	0	-1	5	0	1	0
Sugar	0	-1	-13	0	15	0	3	3	0	-2	0
Plant based fibres	-1	0	-11	0	4	4	-1	0	-1	-3	0
Livestock	0	0	-2	0	1	0	0	5	0	0	0
Fishing	-0.04	-0.04	1.74	0	-1.68	0.04	-1.23	18.47	0.07	1.6	-0.06
Resources	-0.58	0.07	-6.35	0.01	3.27	-0.05	0.47	-0.92	0.02	-1.34	0.51
Meat	-0.17	-0.01	-6.12	-0.05	-1.27	0.17	-0.17	13.66	0.39	-0.46	0.83
Other processed agriculture	0.2	0.04	-3.69	-0.11	-1.17	-0.18	-0.36	11.18	1.11	3.6	-1.36
Textiles & apparel	38.51	0.18	-20.7	0.18	0.71	8.62	-2.46	-18.52	0.28	-1.59	0.05
Wearing apparel	-1	0	-11	0	3	1	-2	6	0	-3	0
Chemicals	0	0	-12	0	2	1	-5	4	0	0	-1
Metal manufactures	-2	0	-18	1	-6	0	4	32	-1	-3	1
Wood & paper products	0	0	-1	0	1	-1	-3	-11	1	6	-1
Manufactures	-1	0	654	0	-29	1	-4	-50	0	2	1
Electronics	30	1	5	0	4	8	-3	35	2	5	0
Transport & communications	0	0	9	0	1	0	1	26	0	0	0
Business services	0	0	7	0	-1	0	1	20	0	-1	0
Services and activities NES	0	0	5	0	-1	0	2	33	0	1	0

Table 13.A1.9. Change in skilled labour use for SADC members, by industry, rigid scenario

	Botswana	Madagascar	Mozambique	Mauritius	Malawi	Tanzania	Zambia	Zimbabwe	South Africa	Rest of SACU	DRC & Angola
	%	%	%	%	%	%	%	%	%	%	%
Rice	-0.13	0.02	-9.3	-0.46	3.18	-0.26	-0.25	-7.88	3.69	-0.29	2.61
Other crops	0.19	0.06	-3.03	0.01	5.18	-0.12	-0.5	-3.42	1.07	0.62	-0.01
Vegetables	0.08	0	-2.94	0.04	0.65	-0.02	-0.92	0.83	0.17	0.71	-0.52
Sugar	0.38	-0.68	-16.16	0.07	15.99	-0.35	1.89	-8.34	0.39	-2.5	-0.2
Plant based fibres	-0.88	-0.03	-12.64	0.4	4.39	3.49	-0.95	-3.9	-1.49	-3.25	-0.06
Livestock	-0.06	-0.05	-3.72	0.05	1.36	0.25	-0.55	0.8	0.22	-0.31	0.02
Fishing	-0.06	-0.04	0.65	-0.01	-1.52	0	-1.42	14.59	0.04	1.56	-0.09
Resources	-0.61	0.06	-7.63	-0.01	3.5	-0.1	0.22	-5.04	-0.01	-1.4	0.47
Meat	-0.29	-0.06	-11.63	-0.12	-0.33	-0.03	-1.23	-5.66	0.24	-0.7	0.62
Other processed agriculture	0.08	0	-9.34	-0.18	-0.23	-0.38	-1.43	-7.72	0.96	3.34	-1.56
Textiles & apparel	38	0	-26	0	2	8	-4	-34	0	-2	0
Wearing apparel	-1	0	-17	0	4	1	-4	-14	0	-3	0
Chemicals	0	0	-18	0	3	1	-6	-16	0	0	-1
Metal manufactures	-2	0	-23	1	-5	0	3	7	-1	-3	0
Wood & paper products	0	0	-7	0	2	-1	-4	-28	0	6	-1
Manufactures	-1	0	605	0	-28	0	-5	-60	-1	2	1
Electronics	30	1	-2	0	5	7	-5	10	1	5	0
Transport & communications	0	0	0	0	2	0	0	-3	0	-1	0
Business services	0	0	0	0	0	0	0	-2	0	-1	0
Services and activities NES	0	0	-2	0	1	0	1	6	0	0	0

Table 13.A1.10. Absolute change in unskilled labour use for SADC members, by industry, rigid scenario

	Botswana	Madagascar	Mozambique	Mauritius	Malawi	Tanzania	Zambia	Zim-babwe	South Africa	Rest of SACU	DRC & Angola
	USD m	USD m	USD m	USD m	USD m	USD m	USD m	USD m	USD m	USD m	USD m
Rice	0	0	-3	0	0	0	0	0	0	0	0
Other crops	0	0	-11	0	18	-1	-2	1	5	1	0
Vegetables	0	0	-5	0	0	0	-1	0	2	1	-7
Sugar	0	-1	-1	0	2	0	1	0	1	-1	0
Plant based fibres	0	0	-2	0	1	1	0	0	0	0	0
Livestock	0	0	-3	0	1	1	0	1	1	0	1
Fishing	0	0	1	0	0	0	0	0	0	0	0
Resources	-1	0	-19	0	2	-1	1	-1	1	-3	9
Meat	-0.2	0	-0.18	-0.01	-0.08	0.21	-0.05	0.14	1	-0.3	1.21
Other processed agriculture	0.24	0.09	-4.11	-0.14	-0.44	-0.54	-0.92	10.22	28.06	11.57	-9.62
Textiles & apparel	26.26	0.14	-1.35	0.31	0.03	1.37	-0.64	-8.14	2.83	-1.72	0.11
Wearing apparel	-0.57	0.13	-0.86	0.38	0.24	0.26	-0.63	0.2	5.14	-3.66	-0.33
Chemicals	-0.01	0.03	-2.13	0.67	0.59	0.16	-1.51	0.02	10.03	-0.72	-7.11
Metal manufactures	-15.07	0	-26.48	0.27	-1.58	0.09	2.4	50.03	-58.85	-5.87	2.17
Wood & paper products	0.16	0.07	-0.13	-0.03	0.13	-0.54	-2.84	-6.29	13.83	6.45	-2.85
Manufactures	-0.84	0.02	138.04	0.05	-14.47	0.14	-3.52	-42.73	-20.33	4.15	6.43
Electronics	0.44	0	0.02	-0.04	0.03	0.05	-0.49	0.57	3.71	0.89	0.2
Transport & communications	-0.37	0.15	11.56	0.17	0.58	0.86	7.45	23.96	-2.06	-0.89	4.68
Business services	0.16	0.27	12.09	0.21	-0.92	0.68	5.6	14.69	24.79	-2.85	9.43
Services and activities NES	1.96	0.13	48.04	0.46	-2.9	3.86	23.43	143.52	80.77	6.51	20.34

Chapter 14

Regional Trade and Employment in ECOWAS

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This study deals with the effects of regional trade in the ECOWAS region on decent employment. The first part analyses the composition of regional versus global trade in terms of its linkages with three dimensions of decent work: Number of jobs, labour productivity, and employment and income security. It argues that regional trade has an important role for all three dimensions, but that effects vary substantially across countries. Following recent trends in international trade literature, the second part looks at firm level data to identify differences in the employment characteristics of domestic firms, regional exporters, and global exporters. It finds that both regional and global exporters are larger, have higher labour productivity, and pay higher wages compared to domestic firms, but are not significantly different from one another in these categories. This means that regional exporters create high quality jobs, but in the context of firm level trade models it also suggests that they continue to face high trade costs which may prevent less productive firms from entering the regional market.

14.1. Introduction[1,2]

In 2010, Economic Community of West African States (ECOWAS) adopted its "West African Common Industrial Policy". One of its key objectives is to increase the share of intra-regional trade from currently around 12% of total trade to 40% in 2030, with a vision to "maintain a solid industrial structure, which is globally competitive, environment-friendly and capable of significantly improving the living standards of the people by 2030" (ECOWAS, 2010). This is the latest step in a long history of ambitious attempts for regional integration in West Africa, and it follows a global trend towards regionalisation of trade integration.

The increasing interest in regional integration is often attributed to the disappointing progress of multilateral trade negotiations in the WTO. But there also appears to be a widespread notion that regional trade – in some way – is "better" for developing countries than trade with the rest of the world. For example, the recently published fourth report on Assessing Regional Integration in Africa (African Development Bank, African Union, UN Economic Commission for Africa, 2010) emphasises the importance of regional trade for development and poverty reduction in Africa. At the same time, aid for trade projects are increasingly taking a regional focus, for instance by providing technical support for regional institutions, cross-border transport corridors, and other trade facilitation measures. Undoubtedly, trading with regional neighbours is an important part of a country's overall trade expansion. But is there indeed something intrinsically different to regional trade compared to trade with the rest of the world in terms of its development potential? If so, what are these differences and how can they be exploited in order to maximise the development impact of trade?

The purpose of this chapter is to shed light on one key aspect of these questions for the ECOWAS region: The contribution of regional trade to the creation of decent jobs. The concept of decent work underlines that beyond the quantity of jobs created, there is also an important quality dimension, which includes (but is not limited to) the productivity of work, the wage earned, and the security of employment. To the extent possible, these qualitative aspects of employment will be considered in the analysis of regional trade in ECOWAS.

This chapter is structured as follows. Section 14.2 gives a brief overview of the history of regional integration in West Africa and the current level of regional trade. Section 14.3 takes a classical trade perspective on revealed comparative advantage. The idea is that comparative advantage can differ for the same country depending on the partner it is trading with, and therefore, the composition of exports may be different for regional than for global trade. This section analyses the differences between regional and global trade composition with respect to their likely impact on key aspects of decent employment creation. Section 14.4 follows a more recent strand of trade literature which, rather than looking at comparative advantage, focuses on

1. The author is grateful to Marion Jansen for overall guidance of this research project and comments on an earlier draft. Very useful comments and advice from Ian Gillson, Ralf Peters, David Vancetti, Clara Weinhardt, David Kucera, and participants of the conference "Trade, Jobs and Growth in Africa" in September 2011 are also gratefully acknowledged. Valeria Groppo provided excellent research assistance for most of the information presented in section 14.2.

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2 This chapter was originally published as ILO Employment Working Paper No. 114, 2012, available here: *www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_175415.pdf*

differences at the firm level to explain exporting behaviour. This section uses World Bank firm level survey data from seven ECOWAS countries to analyse whether and how regionally exporting firms are different from globally exporting firms in terms of their employment characteristics. It also relies on anecdotal evidence collected through structured interviews conducted by the author with exporting firms in Senegal and Benin in 2011. Section 14.5 concludes.

14.2. Background: regional trade in ECOWAS

The ECOWAS region includes fifteen countries in West Africa. It can be sub-divided in two groups: The eight *Union Economique et Monetaire Ouest Africaine* (UEMOA) members (Benin, Burkina Faso, Cote d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo), who adopted the CFA franc as a common currency, and non-UEMOA members Cape Verde, Ghana, Guinea, The Gambia, Nigeria, Liberia and Sierra Leone.

ECOWAS was established in 1975 as a free trade area. In 2000, UEMOA also became a customs union, which was eventually extended to cover all of ECOWAS. However, the actual implementation of both internal liberalisation and the common external tariff has been very slow and many member countries in practice still do not fully comply with their obligations. A particular challenge is the integration of Nigeria, which maintains a very complex tariff structure with high tariff peaks and complete import bans on a number of products.

A number of regional institutions were created to support and govern the regional integration process, including the ECOWAS Commission, Community Parliament, Court of Justice, and the ECOWAS Bank for Investment and Development. Beyond trade policy, additional integration steps were undertaken in a number of areas. For example, in 2004 the cross-border Initiative Programme (CIP) was launched to support projects in areas such as security and conflict prevention, health and education, agriculture, trade and transport. Furthermore, citizens of nine member countries are using the ECOWAS passport, which allows them to travel to any country of the region without a visa.

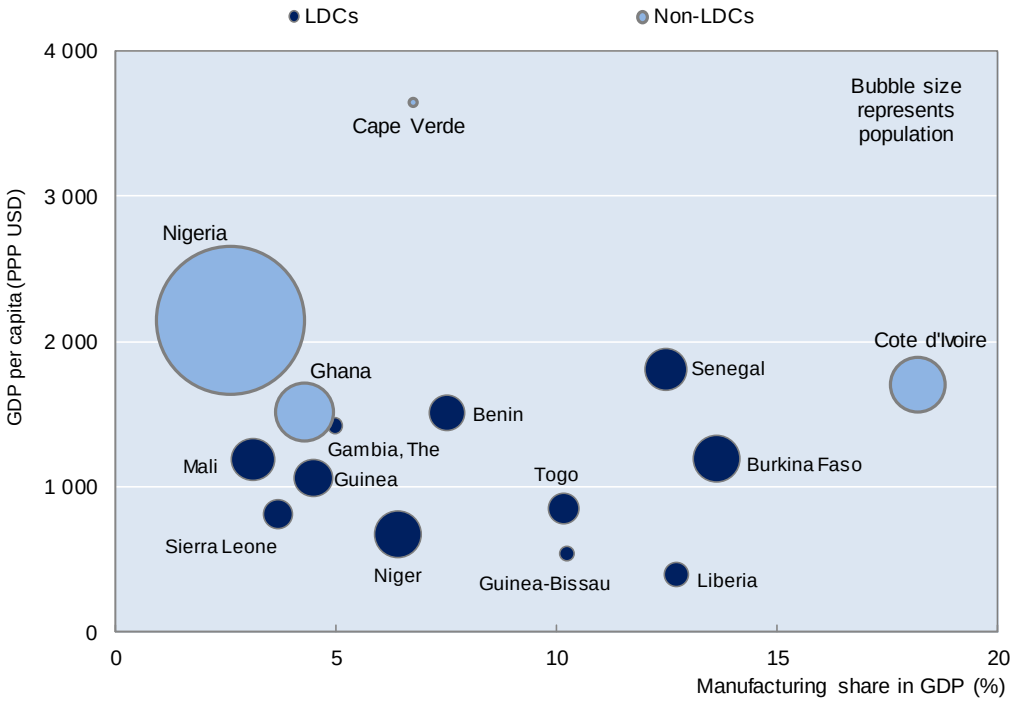
Since the signature of the Cotonou agreement in 2000, ECOWAS countries are also engaged in the negotiations for an Economic Partnership Agreement (EPA) with the European Union. The 2006 formal review of the negotiation process already found a lack of progress and persistent disagreement, especially with respect to the agreement's development provisions and the amount of resources for financial assistance. Given the delays and difficulties in the negotiation process, the European Commission adopted a two-stage approach, asking non-LDC countries to sign 'interim EPAs' limited to trade in goods in order not to lose their privileged market access to the EU (LDCs enjoy duty free market access anyway under the "Everything but Arms" (EBA) initiative). Of the four non-LDC members, Ghana and Cote d'Ivoire signed an interim EPA while Nigeria fell back to less favourable EU market access under the Generalized System of Preferences (GSP). Cape Verde, after its graduation from LDC status in 2008, obtained an extension of EBA until the end of 2011. It has now been approved for EU market access under GSP+, a special market access status granted by the EU to developing countries that commit to international standards on human and labour rights, as well as environmental protection and good governance.

Critics argue that the EPA process can have a negative impact on regional integration by further complicating the negotiations, imposing deadlines and procedures that are not appropriate for the regions' characteristics (d'Achon and Gerard, 2010) (Gonzalez, 2007). Arguably, the introduction of reciprocal free trade with the European Union before the consolidation of the regional market also carries the risk of 'diverting' trade from regional

markets to EU markets (d'Achon and Gerard, 2010). ECOWAS members have therefore declared that they see progress with regional integration as a prerequisite for the implementation of an EPA with the European Union (ECOWAS, 2005).

As illustrated in Figure 14.1, ECOWAS members are a rather heterogeneous group of countries. Nigeria is by far the largest member both in terms of its population and its economic weight. Per capita GDP (PPP) in the region ranges from USD 396 (Liberia) to USD 3 650 (Cape Verde). With the exceptions of Cape Verde, Nigeria, Ghana, and Cote d'Ivoire, all ECOWAS members are classified as Least Developed Countries. In terms of economic structure, only a few member countries have developed sizeable manufacturing industries, while most others depend primarily on agriculture, services, and – in some cases – oil and mineral extraction. Mali, Niger, and Burkina Faso are landlocked, while all other member countries have access to the sea, although port infrastructure is not well developed in some of them. Cape Verde is a small island economy.

Figure 14.1. Size and economic structure of ECOWAS members



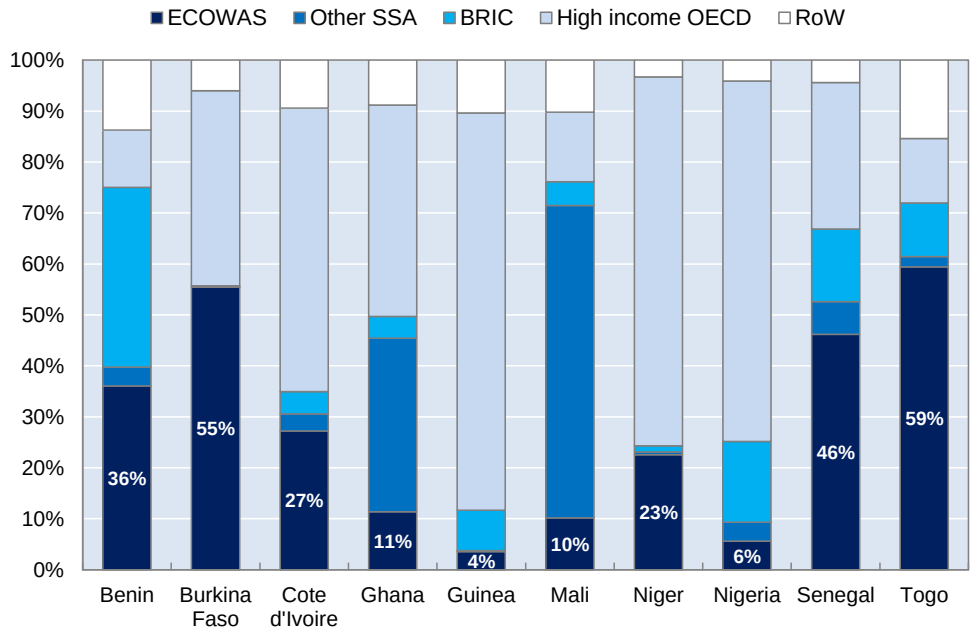
Source: All data from World Bank, World Development Indicators.

Despite the above described political efforts, the share of regional trade in ECOWAS has remained more or less constant at a rather low level over the past two decades (between 10% and 15% of total exports go to regional markets with some fluctuation, but no clear trend)[3]. However, this aggregate figure is very much dominated by Nigeria's heavy weight in the regions total exports. These consist mainly of oil and are to a large extent directed to the global market. For other member countries, regional trade plays a much more important role. Figure 14.2 shows export shares by destination for all ECOWAS countries with data availability in the COMTRADE database between 2004 and 2008. Calculations are made over the average for all years with available data in order to get a consolidated trend and reduce the impact of

3. Author's calculation based on COMTRADE data.

short term fluctuations. Data for 2010 is not yet available for most countries, and 2009 was excluded as an outlier given the impact of the global economic crisis on trade during that year. A few product groups that comprise mainly re-exports of (sometimes used) goods are omitted from the calculations in order to reduce distortions through non-domestically produced goods to the extent possible[4]. The same trade data is underlying all graphs presented in section 14.3.

Figure 14.2. Export shares by region for ECOWAS countries



Source: Author's calculation based on data from COMTRADE.

In this breakdown, only Nigeria and Guinea have single digit shares of exports to ECOWAS. For other countries in the region, this ratio can be as high as 59% (Togo), 55% (Burkina Faso), or 46% (Senegal). The remainder of the paper is dedicated to the analysis of the employment effects of this regional trade, compared to trade with other parts of the world, and thus attempts to give an estimate of the potential for enhanced regional trade to contribute to the creation of decent jobs in the region.

4. The omitted product groups are the following two digits chapter from the 2002 UN Harmonized System:

HS84 - Nuclear Reactors, Boilers, Machinery And Mechanical Appliances; Parts Thereof

HS85 - Electrical Machinery And Equipment And Parts Thereof; Sound Recorders And Reproducers, Television Image And Sound Recorders And Reproducers, And Parts And Accessories Of Such Articles

HS86 - Railway Or Tramway Locomotives, Rolling-Stock And Parts Thereof; Railway Or Tramway Track Fixtures And Fittings And Parts Thereof; Mechanical (Including Electro-Mechanical) Traffic Signalling Equipment Of All Kinds

HS87 - Vehicles Other Than Railway Or Tramway Rolling-Stock, And Parts And Accessories Thereof

HS88 - Aircraft, Spacecraft, And Parts Thereof

HS89 - Ships, Boats And Floating Structures

HS90 - Optical, Photographic, Cinematographic, Measuring, Checking, Precision, Medical Or Surgical Instruments And Apparatus; Parts And Accessories Thereof

HS93 - Arms And Ammunition; Parts And Accessories Thereof

14.3. The classic trade perspective: regional vs. global comparative advantage and linkages with employment

Classic trade perspective

In a classic Heckscher-Ohlin perspective on trade, a country's export composition is determined by its comparative advantage, which in turn depends on its factor endowments relative to that of its trading partners. Thus, comparative advantage of a given country may vary depending on the trading partners' factor endowment. This would imply that the product composition of regional trade can be quite different from that of global trade, with potential repercussions on its impact on employment.

The 2011 World Trade Report (WTO, 2011) analyses the issue of product composition differences between regional and global trade empirically across broad categories of products (manufactures, parts and components, other). It concludes that while there does not appear to be a general global pattern, many regional trading areas reveal substantial differences in product composition between global and regional trade. For instance, the share of intra-regional trade within the Andean community is found to be much higher for manufactures than for other export products. ASEAN is found to have a particularly high share of intra-regional trade for parts and components. The numbers presented for ECOWAS suggest that intra-PTA trade accounted for 8%[5] of total exports of member countries, but 38% of their manufacturing exports and 32% of exports in parts and components.

A number of empirical studies have investigated the impact of regional trade on product composition and its economic and social impacts in more depth for other regions of the world. For example, (Kweka and Mboya, 2004), in a case-study of Tanzania, find that regional integration within SADC and EAC led to an increase in trade and that regional trade had a higher anti-poverty impact as it involved the poor more directly by providing them employment and sales opportunities. For Bolivia, (Nina and Andersen, 2004) find that the export profile shifted from global markets towards the Andean Community and MERCOSUR partners, and at the same time export composition changed from minerals towards vegetable fats, foods and beverages. This supported the diversification of the country's export portfolio. (Sanguinetti, Siedschlag and Martincus, 2010) find evidence that regional integration in MERCOSUR reshaped manufacturing production structures according to regional comparative advantage.

On the theoretical side, (Venables, 2003) argues that specialisation will occur according to regional rather than global comparative advantage as a consequence of regional integration. He points out that this can lead to divergence in terms of the economic structure between regional trading partners, with industrialisation only in the more advanced ones. (McLaren, 2002) points out that preferential liberalisation within a region is likely to induce investment decisions that result in specialisation towards trade with regional partners (which may pose an obstacle to multilateral liberalisation). Both arguments are consistent with the idea of differences in product composition between global and regional trade, and add a dynamic perspective on the interaction between regional integration and comparative advantage.

Annex 14.A1 presents a breakdown of ECOWAS members' exports by destination region and broad product categories. It confirms the findings of the above described literature in the sense that for most countries, the composition of exports to ECOWAS partners is quite different

5. These figures are based on 2007 data from COMTRADE. Due to differences in country coverage and statistical methods applied for cleaning the data, they are not fully consistent with the COMTRADE data presented in this paper.

to that of exports to other African countries (other SSA), major emerging markets (BRIC = Brazil, Russia, China, India), high-income OECD countries (hiOECD), and the rest of the world (RoW). The main exception here is Nigeria, whose exports to all regions are strongly dominated by crude oil. This being said, there does not appear to be a clear-cut pattern across countries in terms of what is exported regionally and what is exported globally.

For some countries, the share of manufactured goods is substantially higher among ECOWAS exports than among exports to global markets:

- Benin exports manufactured Food, Beverages and Tobacco (including substantial amounts of cigarettes) and some construction materials (mainly steel and cement) to ECOWAS, while exports to BRIC and RoW consist mainly of agricultural products (Cotton, some cashew nuts).
- Cote d'Ivoire exports mainly refined petroleum products[6] to ECOWAS. Exports to hiOECD comprise agricultural (cocoa), mining (crude oil) and food products (cocoa butter).
- Ghana exports manufactured wood, plastic and textile products to ECOWAS. Exports to other SSA are dominated by semi-processed gold to South Africa. Exports to other regions comprise a large percentage of traditional agricultural exports, mainly cocoa.
- Senegal exports refined petroleum products, construction materials (steel and cement) and food products to the ECOWAS region. Exports to BRICs are dominated by refined petroleum products, while exports to hiOECD comprise mainly fish and other seafood.
- Togo, the country with the highest share of intra-ECOWAS exports (59%), exports construction (steel and cement) and packaging material as well as some food products (margarine, flour, mineral water) to ECOWAS. Export to other regions comprise mainly agricultural (cotton, cocoa) and mining (phosphates) products.

On the other hand, a number of ECOWAS countries have higher shares of agricultural and fishery products among their regional exports that among their global exports:

- For Burkina Faso, exports to all regions are dominated by one agricultural product, cotton. Exports to ECOWAS also comprise a few food and tobacco products (cigarettes, sugar, vegetable oil), while hiOECD also contain some semi-processed gold.
- Guinea has very low regional exports, about half of which are in fish. Exports to other regions are dominated by aluminium and gold in different degrees of processing.
- For Mali, agricultural products (live animals) are the main export items to ECOWAS. Agricultural products (in this case, mainly cotton) also play an important role in its export portfolio to BRIC, hiOECD and RoW. The main export item, however, is semi-processed gold, which is exported to South Africa and hiOECD.
- Niger exports agricultural products (live animals, onions) to ECOWAS and uranium ore and semi-processed gold to hiOECD.

The following sections of this chapter analyse how the compositional differences in regional versus global trade are related to various aspects of decent work.

6. The classification used for these statistics follows the ISIC Rev.2 industrial classification, which categorises refined oil as a manufactured product while crude oil is classified as a mining product. It should be cautioned though that a substantial share of the value added in export products in this category is likely to be constituted by the value of the mineral, not by the additional processing step of refining.

Employment intensity

This section compares regional to global export composition in terms of direct employment effects, to the extent possible given the scarcity of employment data for the region. Obviously, such a comparison misses out on important secondary effects through intermediate inputs, as well as income induced effects. For a thorough analysis of these effects, country specific work in the framework of a multiplier or CGE model would be highly desirable. However, in the case of many ECOWAS countries, this is still prevented by a lack of reliable data. For the purpose of this paper, the analysis of export composition by employment intensity is therefore restricted to a comparative perspective on direct employment effects. This is a useful short-term measure of the impact of different types of trade on the labour market, but it misses out on the quality of the jobs created. This will be addressed in the following sections of this paper.

Detailed country specific data on the employment intensity of output by industry is not available for most ECOWAS countries[7]. Therefore, global vs. regional export composition is classified in terms of the industry specific labour cost share (labour costs / total cost), which can be extracted from a Social Accounting Matrix (SAM). This measure depends not just on employment intensity, but also on the level of wages in a given industry. It should be interpreted as a general measure of how much of the value generated by a given sector accrues to wage earners. It does not contain any information on the distribution of wages. This dimension is only introduced indirectly through the breakdown between skilled and unskilled labour.

SAMS are available from the GTAP database for Nigeria and Senegal, as well as for the rest of West Africa combined. The latter is based mainly on weighted averages between the Nigerian and Senegalese data. As the purpose of this exercise is to classify and compare the structure of trade according to employment intensity rather than a cross-country comparison of production technology, the average labour cost shares across the three SAMs are used for all countries. While this may be less accurate for each specific country, it does ensure comparability of results across countries in the sense that differences will only be determined by the export structure. The SAMs break the economy down into 58 sectors, and for each sector provide a figure on total output, as well as on the input costs for skilled and unskilled labour. By matching this indicator with the industry composition of exports to different destinations, the data underlying Figure 14.3 is calculated, which shows the share of skilled and unskilled labour costs in exports to each destination[8].

Figure 14.3 illustrates that the labour cost share for exports to ECOWAS is quite heterogeneous across countries in the region. Seven out of ten countries have a labour cost share (skilled and unskilled) of exports to ECOWAS below 10%, and in most cases substantially below the mean for exports to all regions. However, the remaining three countries – Niger, Mali, and Burkina Faso - have a wage share in exports to ECOWAS of more than 40%, and way above their average for all regions. The main driver of these differences is the fact that wage shares in output are far higher in agriculture than in any other activities (see wages shares by sector reported in Annex 14.A2). This explains the high wage share for exports from Mali,

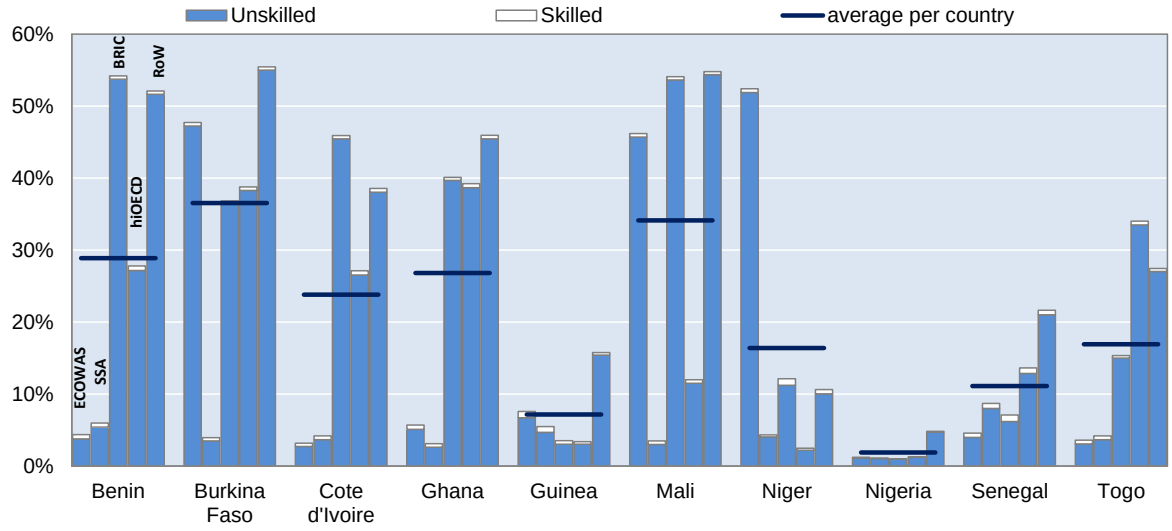
7. While the UNIDO Industrial Statistics Database covers a number of ECOWAS countries, it only covers manufacturing sectors and thus does not allow a comparison with agricultural and mining activities in terms of the employment intensity of sales.

8. The export labour cost share of exports by country *i* to destination *j* $ELCS_{i,j}$ is thus calculated as follows, where LCS_g is the labour share (labour cost/output) for GTAP sector g (58 sectors in total), $X_{i,j,g}$ are exports by country *i* to destination *j* in sector g, and $totalX_{i,j}$ are total exports of country *i* to destination j:

$$ELCS_{i,j} = \sum_{g=1}^{58} \left[\frac{X_{i,j,g}}{totalX_{i,j}} * LCS_g \right]$$

Niger and Burkina Faso, whose regional exports are dominated by agricultural products. On the other hand, manufacturing products tend to have much lower wage shares, which explains the low average wage share of regional exports for countries like Benin, Cote d'Ivoire, Ghana, Senegal and Togo, whose exports have a higher share of manufactures. The very low wage share of Nigeria's exports to all regions is explained by the low wage share for oil extraction, an illustration of the often mentioned jobless growth that is associated with commodity exports. This also applies to Guinea.

Figure 14.3. Average share of skilled and unskilled labour cost in exports by destination region



Source: Author's calculation, based on trade data from COMTRADE and GTAP.

The results illustrate that the direct employment effects of an expansion in regional trade are likely to differ substantially across the region. Agriculture exporters are likely to experience a much more substantial immediate employment effect from regional trade than countries with a regional comparative advantage in manufactures or mineral fuels. The flipside of high labour intensity in agriculture is often found to be very low labour productivity. Thus, while expansion of regional trade would have stronger employment effects than global trade in these countries, the jobs created are likely to be rather low-wage. Policies and programmes that promote agricultural productivity would in these cases be appropriate complementary measures to expanding regional trade.

In the short run, regional trade is likely to lead to the creation of fewer, but more productive jobs than global trade in regional exporters of manufacturing products such as Benin, Cote d'Ivoire, Ghana, Senegal and Togo. The labour cost share in manufacturing is not just determined by a higher capital/labour ratio, but also by more intensive use of intermediate inputs, and thus a lower share of value added per unit of sales. However, to the extent that intermediate inputs are produced domestically, they will have additional indirect employment effects. As mentioned above, it would be highly desirable to analyse these based on country specific multiplier effects in a SAM framework.

Employment intensity is generally very low for mineral exporters such as Nigeria and Guinea. Both countries have very low shares of exports to ECOWAS. For these countries, significant efforts to promote export diversification in more employment intensive sectors will be necessary for trade to contribute more significantly to decent work creation. Exploring

potential areas of regional comparative advantage and promoting regional integration could be an important part of an employment friendly export diversification strategy.

Prospects for productivity growth

This section applies a more dynamic lens to look at another key aspect of decent work: labour productivity. It analyses trade composition according to a measure of its potential to contribute to productivity growth. Previous research has argued that some export products have higher prospects for long term growth than others because they have more potential to increase productivity. For example, (Sachs and Warner, 1997) find that natural resource exports are associated with slower growth than other products. (Hausmann, Hwang and Rodrik, 2007) argue that the productivity growth prospects are higher for countries that export "rich country" goods (defined as products exported mainly by countries that are now rich). Based on this assumption, they construct a measure called PRODY which is defined as the average per capita GDP (PPP) of countries exporting the product, weighted by their share in total exports of this product. They present evidence that a higher average PRODY of a country's exports is associated with faster productivity growth in the future.

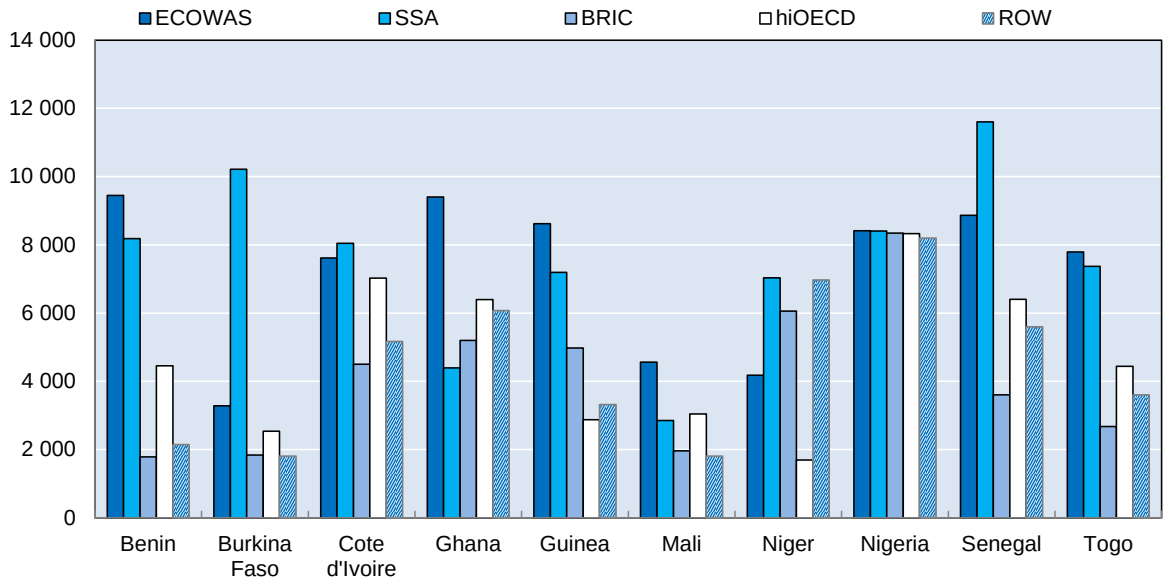
The PRODY approach has been criticised by other authors, namely for its failure to account for cross-country differences in product quality (Xu, 2007) (Minondo, 2010) and international production networks (Newfarmer, Shaw, Brenton, and Walkenhorst, 2009). (Harrison and Rodriguez-Clare, 2010) also argue that the PRODY measure may be rather noisy because it also reflects capital intensity of exports and is thus correlated with any exogenous conditions that favour the accumulation of capital. While these factors may create considerable problems for comparisons across heterogeneous countries and in the presence of sophisticated transnational production networks, it should not have a substantial effect on the within country comparison of exports to different destinations undertaken in this paper.

Figure 14.4 shows the weighted average PRODY for exports of ECOWAS countries by destination region. For Benin, Ghana, Senegal, and Togo, who export mainly manufacturing products to the ECOWAS region, PRODY scores on regional exports are quite high and substantially above those for global exports. To some extent, a similar pattern can also be observed for Cote d'Ivoire.

For agricultural exporters Niger, Mali and Burkina Faso, the overall PRODY levels are lower, but the PRODY values for exports to ECOWAS are again higher than those to hiOECD. This is partially explained by the relatively high PRODY on exports of live animals. Burkina Faso exhibits a very high PRODY for export to other SSA, but these exports are very close to zero in value. Similarly, Niger has high PRODYs, but very low export values for other SSA, BRIC and RoW. For Mali, PRODY values for exports to ECOWAS are also substantially higher than to other regions.

The PRODY methodology attaches a rather high value to crude oil because it is exported by a number of countries with high per capita GDP. This also explains the rather high average PRODY for Nigeria's exports. Given the past experience of oil and other mineral exporting countries in Africa, it seems questionable whether the high PRODY value for these products is justifiable in terms of their contribution to overall productivity growth. Guinea's metal exports to BRIC, hiOECD and RoW lead to a relatively low PRODY. Part of the reason for the high PRODY in Guinea's exports to the ECOWAS region, which are quite low in value, is the high PRODY for fish.

Figure 14.4. Average PRODY values of exports by destination region



Source: Author's calculation, based on trade data from COMTRADE and PRODY dataset from Dani Rodrik's Harvard homepage.

The PRODY levels for regional exports vary substantially across countries and are typically higher for regional exporters of manufactures than for agricultural exporters. However, the analysis presented here suggests that for most ECOWAS countries, regional exports have relatively higher potential to contribute to productivity growth than exports to other main destinations, and thus an expansion of the regional trade share is likely to promote the creation of higher quality jobs.

In some cases, the PRODY results seem to almost mirror inversely the results for direct employment effects. This points to a common problem in dealing with questions of industrial development and structural change in developing countries: A potential short-term trade-off between high employment intensity in agriculture and higher labour productivity and productivity growth potential in manufactures. Both are important development aims, and a successful development strategy will need to find the right balance between promoting enhanced productivity in agriculture and at the same time developing manufacturing sectors. Understanding and exploiting the potential of regional trade can play an important role for both aims.

Export diversification

To conclude the analysis of regional trade composition and its linkages with employment, this section reviews the significance of regional trade for another key aspect of decent work: job and income security. The global economic crisis of 2008/9 has demonstrated that trade can act as a transmission channel of economic shocks with strong repercussions to the labour market, especially for those without access to adequate social protection (Jansen and von Uexkull, 2010). A large body of literature argues that in order to better shield themselves against such shocks, developing countries need to diversify their exports (Lederman and Maloney, 2007) (Hesse, 2009) (Jansen, 2004) (Malik and Temple, 2006) (Haddad, Saborowski and Lim, 2010). This section therefore discusses the contribution of regional trade to export diversification in the ECOWAS region.

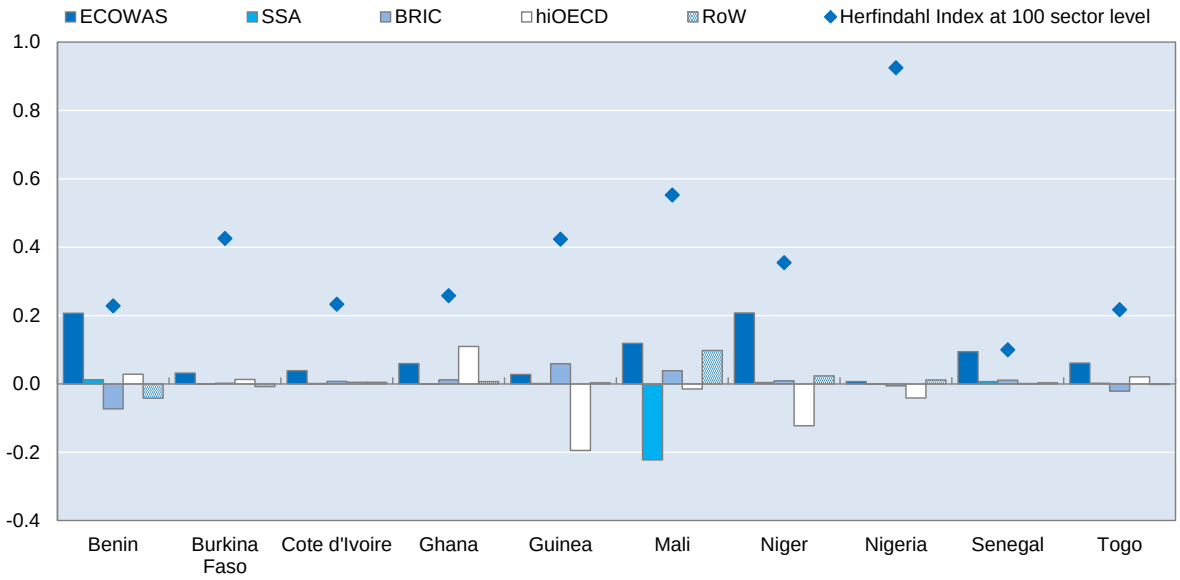
A standard way to measure export diversification is to calculate a Herfindahl index. This index is defined as the sum of squares of the share of each product exported in total exports. This number would be equal to one for a country that exports only one product, and will approach zero if exports are split very evenly among a very high number of products[9]. Figure 14.5 presents the Herfindahl indices for ECOWAS countries, as well as a measure of the contribution of each destination region to export diversification. The bars represent the hypothetical change in the Herfindahl index if exports to the respective region were to be removed from the data. Thus, a high bar indicates that exports to a region make an important contribution to export diversification; if exports to this region were removed, the overall Herfindahl index would be substantially higher. The magnitude of this indicator is determined mainly by two factors: First, the level of diversification within exports to that region, and second, the complementarity of exports to the region with exports to the rest of the world. This measure can be negative if exports to a certain region are very concentrated in a few sectors, indicating that the overall export portfolio would be more diversified if exports to that particular region were dropped from the calculation.

Figure 14.5 shows substantial variation in the degree of export diversification. Nigeria has by far the highest Herfindahl index, which is not surprising given its strong concentration on oil exports. Guinea also has a relatively high concentration index, and so do primarily agricultural exporters Burkina Faso, Mali and Niger. Regional exporters of manufactures (Benin, Cote d'Ivoire, Ghana, Senegal, Togo) are more diversified.

The comparison of regional contributions to export diversification shows unambiguously that regional exports increase the level of diversification, and quite strongly so in most cases. Except for Ghana, Guinea and Nigeria, the contribution to export diversification of exports to the ECOWAS region is higher than for exports to any other region. The largest contributions are for Benin, Mali, Niger, and Senegal. Thus, regional exports contribute substantially to economic diversification in most ECOWAS countries. This is the case for both manufacturing and agricultural exporters. Export diversification is likely to enhance these countries' resilience against economic shocks, increase their growth prospects, and reduce the exposure of workers to job and income insecurity.

9. A crucial factor in calculating the Herfindahl index is the level of product aggregation of the underlying data: A Herfindahl index calculated across the close to 6 000 products of the six digit level of the Harmonized System (HS) will measure something very different than the same index calculated across more aggregated industrial sectors. Differences will arise in particular for countries that export a high number of products (low Herfindahl at HS6 level) that fall into just a few sectors (high Herfindahl at sectoral level). Both can be interesting, and there is no clear-cut better or worse: The question is whether one is more interested in developing new products within similar sectors, or progress in developing entirely new industries. For this note, a middle ground is used and the Herfindahl index is calculated over the 100 industrial sectors of the 2 digit level of the Harmonized System. This means that, for instance, all cereals fall into the same product group, but are separate from other agricultural products. There are a few different categories for textiles of different degrees of finishing (plus one for footwear and one for headwear), but for example no differentiation between shirts, pants, or coats.

Figure 14.5. Herfindahl index of export concentration and contribution of different regions to export diversification



Source: Author's calculation, based on trade data from COMTRADE.

14.4. A "New New Trade Theory" approach: firm-level employment characteristics of regional exporters

Heterogeneous firm models

In a seminal paper, (Melitz, 2003) proposed a trade model that, instead of focusing on comparative advantage, introduces heterogeneous firms and focuses on differences between exporters and non-exporters at the firm level. In Melitz' dynamic industry model, only the most productive firms find it profitable to become exporters while less productive producers remain in the domestic market due to fixed costs of exporting. Subsequent extensions of the model that have introduced labour market frictions and search costs (e.g. Helpman, Itskhoki, and Redding, 2010) explain the often observed empirical finding that exporters tend to be larger, more productive, and pay higher wages than non-exporters (e.g. Bernard and Jensen, 1999; Seker, 2009).

Recent extensions to Melitz type models suggest that firm level characteristics may differ depending on the type of export markets they serve. For example, in (Helpman, Melitz and Rubinstein, 2008), export markets can differ in terms of trade costs. The higher the trade costs to access a specific market, the higher is the threshold for firm productivity above which market entry is still profitable. Empirically, (Eaton, Kortum, Kramarz and Sampognaro, 2011) observe that the wage premium for French firms increases significantly with the number of markets a firm exports to, and with exporting to more remote markets.

The above described findings suggest that regional exporters may differ from global exporters in terms of size, productivity and employment characteristics. If for some reason regional trading costs were lower (e.g. due to proximity, common language, preferential markets access), one would expect that less productive firms may find it profitable to export regionally, but not globally. In the framework of the above mentioned papers, this would imply for regional exporters to fall in between domestic firms and global exporters in terms of size, productivity,

and wages. It would also imply that even within the same industry, employment effects of regional trade may differ from employment effects of global trade.

Empirical application to ECOWAS

In order to empirically analyse potential differences between regional and global exporters, a pooled firm level dataset for ECOWAS countries is constructed with data from the World Bank's Enterprise Surveys. Comparable firm level data is available for seven ECOWAS countries, with the surveys carried out between 2007 and 2010, as shown in Table 14.1. This leads to a sample of 2 815 firms, although response rates vary for different parts of the survey.

The survey covers both manufacturing and services firms, including micro enterprises, but no mining or agricultural companies. Sample size varies between countries, with larger economies showing a larger sample size. The surveys are typically stratified by industries, and weights are provided that are also meant to control for non-response. However, it is not clear whether the weighting method is suitable for cross-country comparisons. Furthermore, some observations receive weights up to 237 times the minimum weight, which creates substantial problems with outliers if the weights are applied. Therefore, the summary statistics below were calculated with unity weights for each observation. This implies that the sample is not representative of the underlying economies in terms of the distribution across industries and any potential sampling bias arising from non-response. However, the results are valid as a comparison of companies based on their exporting characteristics within this subsample of the seven economies.

Table 14.1. Pooled World Bank enterprise survey data

	Year	Number of purely domestic firms	Number of exporting firms	Number of indirect exporters	Total number of firms
Benin	2009	120	14	16	150
Burkina Faso	2009	341	23	28	392
Côte d'Ivoire	2009	485	20	20	525
Ghana	2007	541	26	49	616
Mali	2010	296	36	26	358
Niger	2009	122	18	9	149
Senegal	2007	558	40	27	625
Total		2 468	177	175	2 815

Source: Author's calculations based on World Bank Enterprise Survey Data.

Based on their survey responses, firms can be classified according to their exporting status. The survey contains information on the share of total production that is sold domestically, exported through intermediaries, or exported directly. All companies with more than 0% of directly exported sales are classified as exporters. While this may appear a rather generous definition, it is consistent with the theoretical framework presented above that assumes that firms have to overcome a fixed cost to enter export markets. Once this investment has been made and a share of production – even if it is small – is exported, the firm is classified as an exporter. On the other hand, a firm that exports only indirectly may be able to avoid making these upfront investments itself by exporting through a larger supplier and is therefore not classified as an exporter. However, results for these indirect exporters are shown separately from results for purely domestic firm in the following analysis. As shown in Table 14.1, this

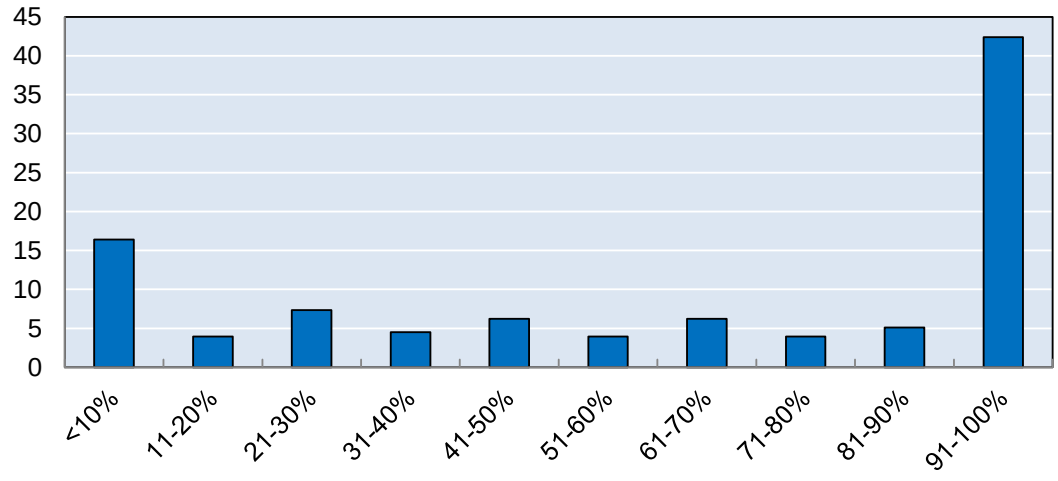
splits the total sample of 2 815 firms into 2 463 purely domestic firms, 177 direct exporters, and 175 firms that only export indirectly.

The exporting firms in the sample are subdivided once more into regional and global exporters. This classification is based on a question in the survey that asks firms what share of their exports goes to "neighbouring countries within Sub Saharan Africa". Obviously, this is an imperfect definition of regional trade and possibly subject to some differences in interpretation among respondents. If it is interpreted strictly, this definition would not classify all within-ECOWAS trade as regional because not all member countries share a border. On the other hand, it may also include exports from Senegalese firms to Mauritania and from Niger to Chad, which are not ECOWAS members. Mali and Niger also share a border with Algeria and Niger with Libya, but neither is classified as a Sub Saharan country, so these exports should not be included. In any case, the classification of regional exports remains rather conservative and probably does not cover all ECOWAS trade, but gives a reasonable sample of firms whose exports are restricted to the geographical proximity of their home country.

The distribution of firms based on their regional export share is shown below in Figure 14.6. Over 40% of exporting firms in the sample have a regional export share above 90%. These firms are classified as regional exporters, and all others as global exporters. The rational for this rather low cut-off line is similar to that for the classification of exporters vs. non-exporters and lies in the theoretical foundation that once a firm has overcome the costs of exporting beyond the boundaries of the region (even in small quantities) it can be considered a global exporter.

The global exporters are distributed rather evenly between different shares of regional versus global exports, except for a significant clustering around the other extreme of the distribution of firms whose exports are destined entirely outside of the region. The clustering of firms at the extremes of the distribution indicates substantial segmentation between regional markets and the rest of the world.

Figure 14.6. Distribution of exporting firms in the sample by regional export share (n=177)

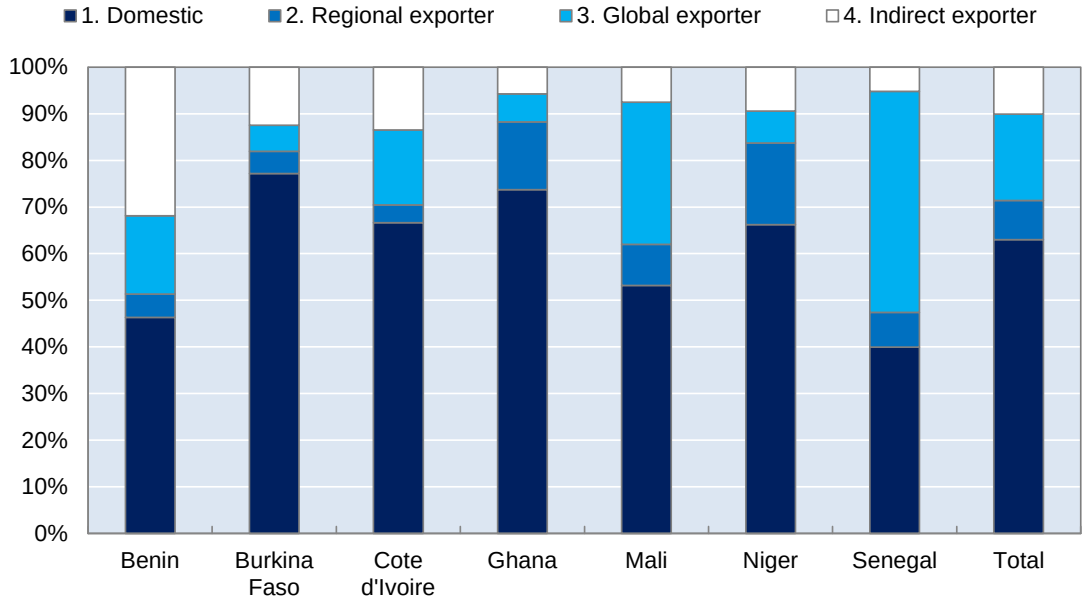


Source: Author's calculations based on World Bank Enterprise Survey Data.

Figure 14.7 shows the distribution of firms in the sample by category across countries. For all countries, purely domestic firms are by far the largest group, ranging from 80% (Benin) to 92% (Cote d'Ivoire). Regional exporters only account for a relatively small share of total firms, but there is substantial heterogeneity between countries, ranging from 1.5% (Cote d'Ivoire) to

7.4% (Niger). These findings are consistent with the underlying theoretical framework of entry costs into exporting, which restricts most firms to their home market.

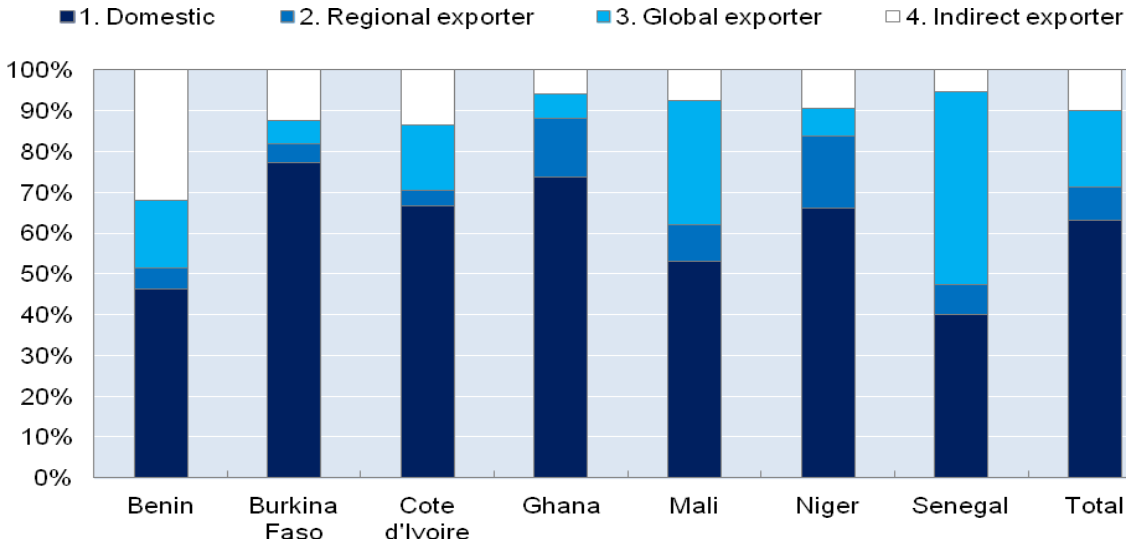
Figure 14.7. Firm type distribution by country



Source: Author's calculations based on World Bank Enterprise Survey Data.

Despite their relatively small numbers, exporting firms account for a significant share of employment in all countries. Figure 14.8 shows that the share of employment within the sample in purely domestic firms ranges from 40% (Senegal) to 77% (Burkina Faso), and firms classified as regional exporters account for between 4% (Cote d'Ivoire) and 17% (Niger) of employment by firms in the sample.

Figure 14.8. Employment distribution by firm type and country



Source: Author's calculations based on World Bank Enterprise Survey Data.

To the extent possible, the data was cleaned from obvious outliers. Two observations with extreme values for employment were removed from the sample for the calculation of these and all following statistics. In both cases, firms reported employment above 100 000 three years before the survey and less than 100 in the survey year. Remaining employment statistics were reviewed thoroughly and do not appear to be affected by obvious outliers. The single largest employer after removal of the above mentioned firms has 3 000 employees.

Unfortunately, data consistency is much weaker for sales and other accounting statistics reported by firms. In this case, five extreme values were removed. Nevertheless, some values remain questionable due to large discrepancies between sales reported for the survey year and the value reported for three years before or impossibly high or low values for sales/worker. The standard treatment for this problem in the literature is to construct averages over the log of the figures, which greatly reduces the weight given to extreme values in the calculation of the mean. This has two advantages: First, it reduces the noise resulting from very high values that are due to data entry or other errors. Second, it produces summary statistics that are more representative of the typical firm in the distribution and less influenced by few very large firms. Given that the sample combines firms of very different sizes, this is desirable for obtaining representative results. For easier readability, the log was reversed after calculation of the averages presented in the next section. This is what the expression ln-average refers to in the titles and explanations of subsequent figures[10].

Firm level characteristics

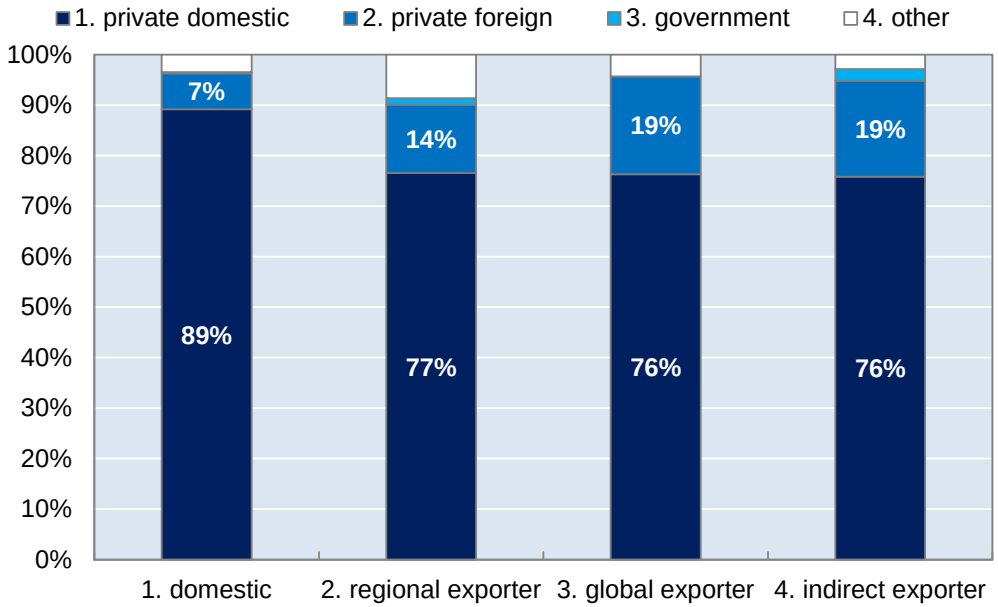
Figure 14.9 characterises firms by ownership status. Non-surprisingly, there is a higher share of foreign ownership among exporters than among non-exporters. This share is slightly higher for global (19%) than for regional exporters (14%). This seems intuitive given that Foreign Direct Investment often flows into export oriented firms, but overall, the share of foreign ownership does not appear to be very high in the region. Regional exporters exhibit a higher share of "other" types of ownership, but unfortunately the questionnaire does not specify what is meant by this. Government ownership is very rare across all firm types.

With respect to the sectoral distribution of firms, the share of service providers is significantly larger among domestic firms (53%) than among exporting firms, but nearly identical between regional (24%) and global (24%) exporters and only slightly higher among indirect exporters (29%) (Figure 14.10). This is not surprising given that many services are non-tradable. Annex 14.A3 presents a more detailed perspective on the distribution of firms in the sample across sectors. It shows that the industry distribution of regional and global exporters is in fact similar. The industries that more than 5% of regional or global exporters in the sample are classified into are identical with only two exceptions: More global than regional exporters are in the textile sector, and more regional than global exporters are in the furniture sector. This is remarkable with respect to the previous finding of rather different product composition among regional and global exports. Apparently, while these differences are quite prominent at the macro level and in particular for the distribution of exports across broad economic categories (agriculture, mining, manufacturing, *etc.*), they are much less pronounced within the manufacturing and tradable services sectors. This suggests that within these sectors, firms' decisions on whether to export regionally or globally (or both) are not necessarily determined by the type of product they produce. The finding supports the usefulness of a model based on

10. Formally, the ln average of – for instance – total sales is thus defined as $lnAVGY = e^{\sum_{i=1}^{n}\left(\frac{\ln(Y_i)}{n}\right)}$, where Y_i is sales of firm i and n is the total number of firms in the sample.

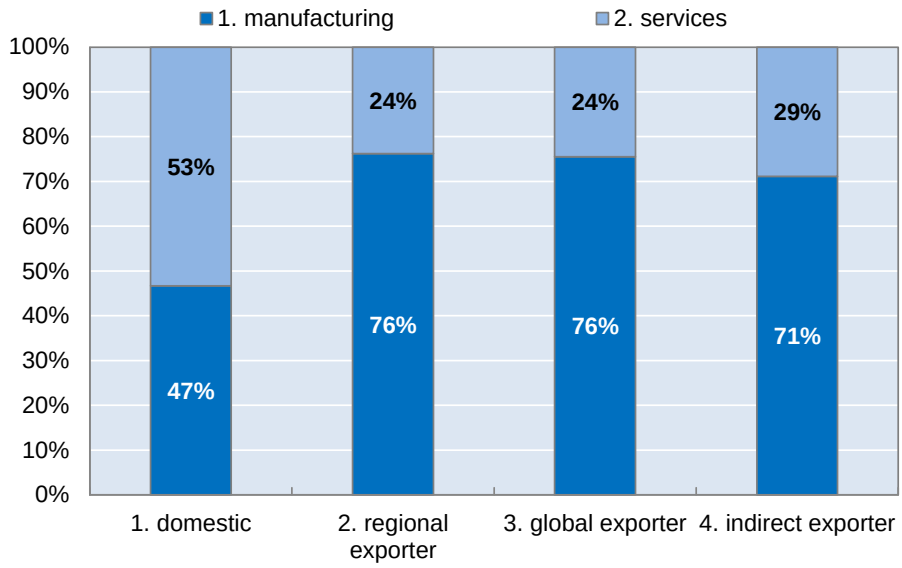
firm-level rather than industry characteristics for explaining export behaviour among these firms.

Figure 14.9. Ownership distribution by firm type



Source: Author's calculations based on World Bank Enterprise Survey Data.

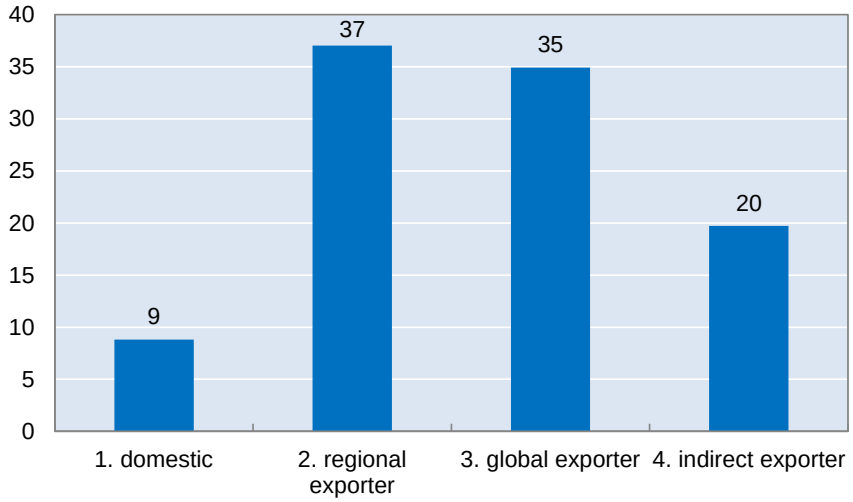
Figure 14.10. Sectoral distribution by firm type



Source: Author's calculations based on World Bank Enterprise Survey Data.

Figure 14.11 presents summary statistics on the ln-average number of full-time employees by firm. Consistent with previous research, exporters are much larger in terms of employment than non-exporters. However, there does not appear to be a significant size difference between regional and global exporters. Indirect exporters fall in between domestic firms and direct exporters.

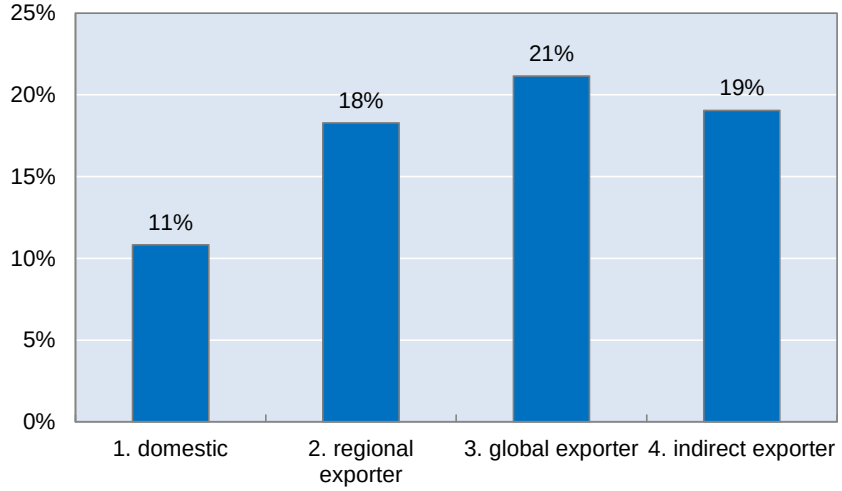
Figure 14.11. Ln-average permanent full-time employees by firm type



Source: Author's calculations based on World Bank Enterprise Survey Data.

Figure 14.12 shows the average shares of temporary employment by firm type. This variable is an important indicator of decent work as temporary employees often face substantial vulnerability and less access to social protection then their colleagues with permanent work contracts. The share of temporary employees is higher for exporters than for non-exporters, but again there does not appear to be a significant difference between regional and global exporters. Entrepreneurs in Senegal and Benin interviewed in the context of this research indicated that exporters often use temporary workers to react to sudden orders from large international buyers, which would otherwise exceed their capacity.

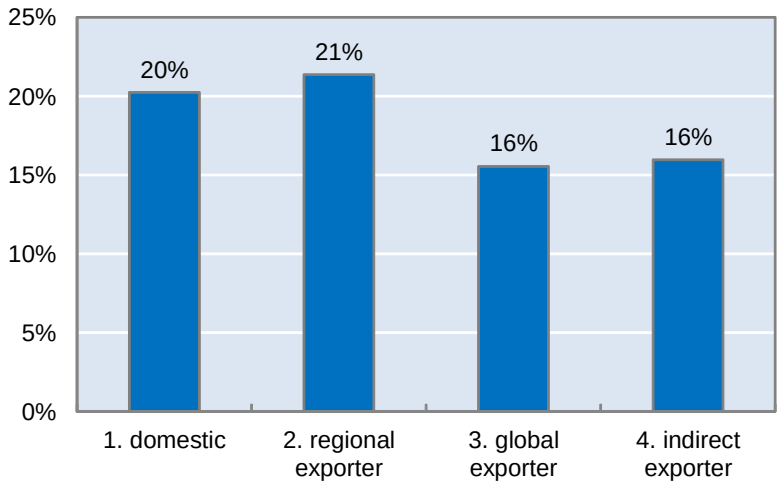
Figure 14.12. Average share of temporary/total employees by firm type



Source: Author's calculations based on World Bank Enterprise Survey Data.

The World Bank surveys also ask firms for their employment three years ago. This information is exploited in Figure 14.13 for all firms who report data for both observation points. Regional exporters reveal the highest average employment growth rate (21%), followed by domestic firms (20%) and global and indirect exporters (16%).

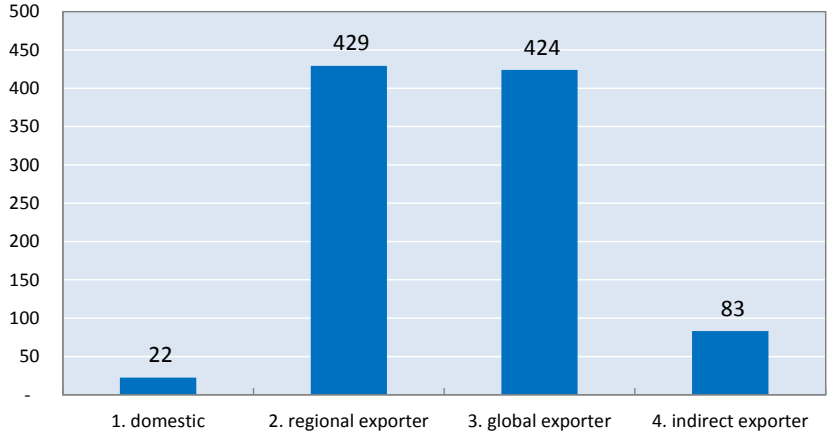
Figure 14.13. Percentage changes in ln-average employment over three years by firm type (only firms reporting data for both observation points)



Source: Author's calculations based on World Bank Enterprise Survey Data.

Figure 14.14 shows the ln-average of value added (sales – cost of inputs) by type of firm. As with employment, direct exporters are substantially larger than non-exporters and indirect exporters fall in between. However, there again does not appear to be a significant difference between global and regional exporters.

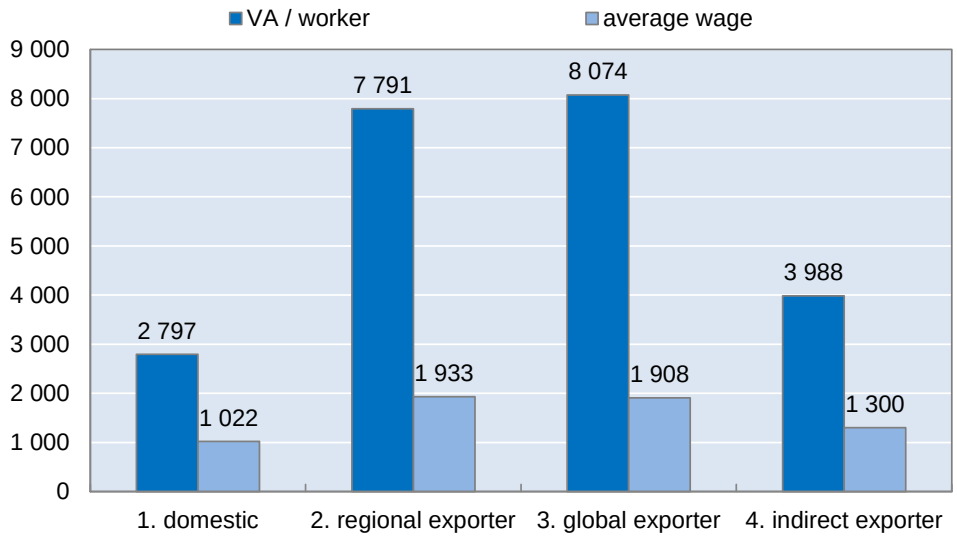
Figure 14.14. Ln-average value added by firm type, thousand USD



Source: Author's calculations based on World Bank Enterprise Survey Data.

Finally, Figure 14.15 shows ln-average results for firm level productivity in terms of value added per worker as well as the average wage paid (total wage costs/total employment). Both regional and global exporters are found to be much more productive than domestic firms, with indirect exporters again falling in between. However, as with the previous indicators, there is no significant difference between regional and global exporters. The same applies to average wages, although the dispersion in this case is less pronounced; both regional and global exporters pay average wages roughly twice as high as domestic firms. Unfortunately, the survey does not contain sufficient information on labour force composition to determine whether this wage premium is determined by worker characteristics (e.g. because exporters hire more skilled workers), or whether it represents a wage premium due to the higher productivity of the firm.

Figure 14.15. Ln-average value added/worker and average wage by firm type



Source: Author's calculations based on World Bank Enterprise Survey Data.

To confirm that the above reported findings are actually driven by firm-specific characteristics rather than country- or industry differences, a simple OLS regression is used with employment, VA, VA/worker, or average wage in log form as the dependent variable and dummy variables for exporting status, country location, and ISIC 2 digit industry. The results are reported below in Table 14.2. For all four variables, they confirm that global and regional exporters are significantly larger (in terms of value added and employment), more productive, and pay higher wages than domestic firms, but that there is no significant difference between regional and global exporters.

Table 14.2. OLS Regression results on firm level characteristics

	ln (employment)	ln (VA)	ln (VA / worker)	ln (average wage)
Domestic	-1.02	-1.96	-0.67	-0.46
	(0.00)**	(0.00)**	(0.00)**	(0.00)**
Regional exporter			Dropped	
Global exporter	0.11	0.36	0.14	0.09
	(0.54)	(0.32)	(0.57)	(0.67)
Indirect exporter	-0.37	-0.98	-0.31	-0.22
	(0.03)*	(0.004)*	(0.19)	(0.25)
Control variables			Country, ISIC 2 digit sector	
Constant	3.71	13.85	9.76	7.92
	(0.00)**	(0.00)**	(0.00)**	(0.00)**
Observations	1 957	1 002	1 000	1 960
R-squared	0.30	0.46	0.32	0.17

p values in parentheses

* significant at 5%; ** significant at 1%

Source: Author's calculations based on World Bank Enterprise Survey Data.

Interpretation

The firm level characteristics described in the previous section confirm that exporters in the ECOWAS region tend to be bigger, more productive, and pay higher wages than non-exporters. There has been relatively high employment growth across firm groups, and in particular for regional exporters and domestic firms. Exporters exhibit a higher share of temporary workers than non-exporters.

Perhaps surprising is the high degree of similarity between regional and global exporters. The only significant difference in firm level characteristics appears to be slightly faster employment growth for regional exporters.

The interpretation of these findings is double-edged; on one hand, it is certainly good news and an encouragement for regional integration that regionally exporting firms contribute significantly to the creation of jobs with wage and productivity levels on pair to those of global exporters.

However, in the context of the above described firm level models of international trade, the reason for productivity differences between exporters and non-exporters is typically the presence of high trading costs, which only the most productive firms are willing to incur due to prospects for higher profits in international markets. In this scenario, the findings shown above would suggest that firms face similarly high trading costs to regional as to global markets. This, however, is somewhat at odds with the observation in Figure 14.6 that almost half the firms in the sample export to regional markets only. After all, if trading costs were the same, these firms should also be able to access global markets, especially given that regional and global exporters are found to produce similar products. A possible explanation could be that while investments required to access global markets are of a similar magnitude, they may be of a different nature than those required to access regional export markets. Accessing both regional and global markets at the same time would then require a double investment which few firms are prepared to undertake.

To shed light on this question and to better understand the real-life stories behind the data, structured interviews were conducted with both globally and regionally exporting firms in Senegal and Benin in February 2011[11]. It focuses in particular on differences in the constraints faced by exporters to regional and to global markets, and how these differ from one another. While the sample of firms is rather small and evidence remains anecdotal (a total of ten companies from the processed food, palm oil, fresh fruit, handicraft, clothing, and cosmetics industries), main results were also confirmed through discussions with employers' federations and export promotion bureaus in both countries as well as an exporter network in Senegal.

Most companies mentioned difficulties to access finance as a major obstacle to their operations, regardless of the destination of their exports. However, beyond that, answers regarding main constraints differed greatly from regional to global exporting. For global exports, most firms mentioned that they would have to make very high up-front investments in machinery and production procedures in order to comply with buyers standards in international markets (in particular Europe and the United States). Companies that were currently exporting only to the region were usually reluctant to undertake these investments and argued that there would be few spillovers with their regional exports. In one case, a company even reported

11. The questionnaire used for those interviews can be found on page 36ff of *ILO Employment Working Paper* No.114 (2012) available here: *www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_175415.pdf*

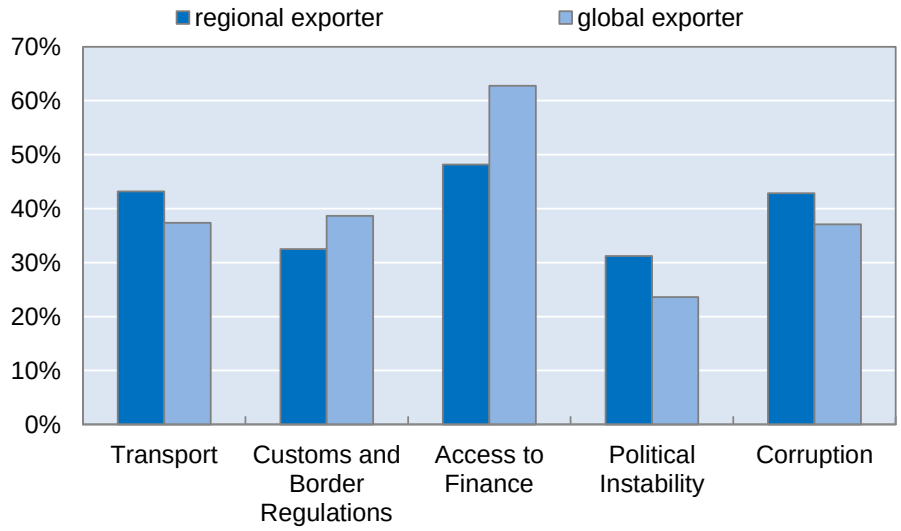
running two completely separate plants to produce the same product, one in compliance with buyer standards for the US market, and one for regional exports only.

On the other hand, global exporters were less concerned with transport logistics and getting their products to market than regional exporters. Several companies reported that shipping a container from Benin or Senegal to a European or American port was less cumbersome for them than shipping it across a land-border to a neighbouring country. The main obstacles mentioned were poor infrastructure as well as harassment, long waits and charges at intra-ECOWAS borders and sometimes even along the road. Companies frequently complained about arbitrary charges at the border and customs charges on products that should not carry any customs duty under the ECOWAS agreements. One company director pointed out that due to the EU's "Everything but Arms" initiative, market access conditions were more favourable for his products in Europe than within the region.

In summary, interviews with exporters confirmed that up-front costs to reach foreign markets are in fact high, but rather different between global and regional exporting. Thus, a company may indeed face the choice between engaging in one or the other type of trade, but find it too costly to invest in both. While this hypothesis cannot be explicitly tested in the available firm level data, the survey contains a number of questions that ask firms to rank the severity of constraints (unfortunately, compliance with standards is not among the issues covered). Figure 14.16 reports these indicators for the sample of firms presented above. While the differences are not very pronounced, regional exporters do in fact more frequently rank transport, political instability (which may to some extent reflect the reliability of political commitments in ECOWAS) and corruption as an obstacle. Global exporters are more likely to complain about customs procedures, but the relatively high share of regional exporters complaining about this remains remarkable given that ECOWAS is – at least on paper – a customs union.

Finally, global exporters are more likely to rank access to finance as a major or very severe obstacle. It seems unlikely that global exporters find it indeed more difficult to raise a given amount of money from a bank than a comparable regional exporter. More likely, this ranking reflects a higher demand for external finance among global exporters. This adds an interesting perspective to the structure of trade costs; while the necessary investments in upgrading of machinery and processes required for global exporting typically have to be made up-front, high costs associated with transport, border crossing, *etc.*, which are most common at the regional level accrue with each individual shipment. This could explain a higher demand for external finance among global exporters, and it could also mean that the decision between regional and global exporting by firm may to some extent be determined by their access to external finance: If finance is readily available, firms may more readily decide to undertake the large upfront investments associated with global exporting.

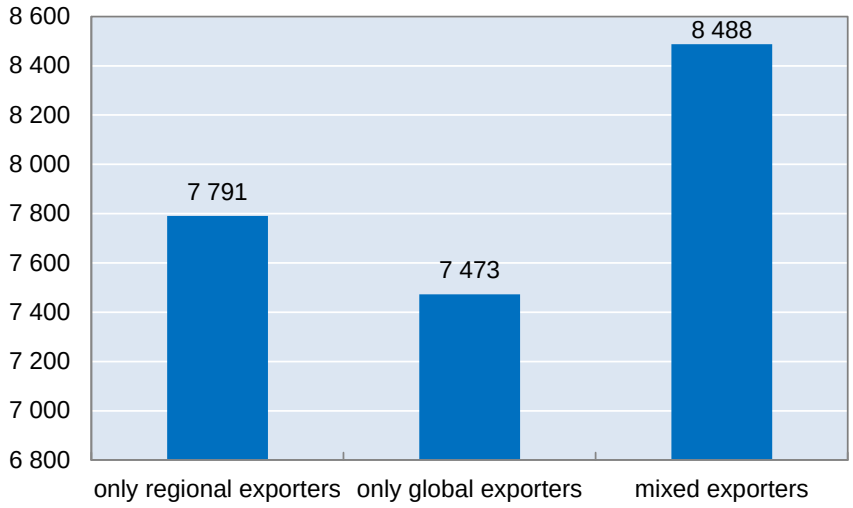
Figure 14.16. Share of firms ranking an issue as a major or very severe obstacle



Source: Author's calculations based on World Bank Enterprise Survey Data.

If it is indeed correct that regional and global exporting entails different types of costs, which would add up for a firm exporting to both regional and global markets, a heterogeneous firm model would predict that only the most productive firms would find it profitable to invest into accessing both the regional and the global market. This hypothesis can be tested by further subdividing the group of global exporters in the data between firms that export only to global markets and firms that export to both the regional and global markets. Figure 14.17 presents the results. It appears that indeed, firms exporting to both regional and global markets are more productive than firms exporting to only one or the other, confirming the hypothesis. This finding also highlights the particular challenges faced by landlocked countries in the region; exporters from these countries will have to deal with both the regional and the global trading costs in order to access overseas markets, and are thus likely to face an even higher productivity threshold below which exporting is not profitable.

Figure 14.17. ln-average value-added per worker, by firm type



Source: Author's calculations based on World Bank Enterprise Survey Data.

14.5. Conclusions

This paper has analysed the impact and potential of regional trade in the ECOWAS region for the creation of decent employment from two different perspectives. First, following classic trade models, product composition of regional versus global exports and their linkages with decent employment were analysed. This revealed that regional comparative advantage is quite different from global comparative advantage for most countries in the region, but there are different pattern of regional vs. global comparative advantage across countries with different implication for employment:

- For regional exporters of agricultural products like Mali, Niger, and Burkina Faso, an expansion of regional trade could be expected to have a relatively strong direct employment effect. The flipside is that these jobs would probably have relatively low productivity levels. Direct employment creation from regional trade is likely to be lower, but in more productive jobs for regional exporters of manufactures (Benin, Cote d'Ivoire, Ghana, Senegal, Togo), and very low for mineral exporters (Guinea, Nigeria).
- The PRODY methodology to analyse export composition with respect for its potential for future productivity growth suggests that regional exporters of manufactures on average have higher potential for productivity growth than agricultural exporters in the region. However, in both cases, the composition of regional exports suggests higher potential for productivity growth than the composition of global exports.
- For all countries (except Nigeria), regional trade is found to contribute significantly to export diversification, and it thus plays an important positive role to reduce these countries' vulnerability to external shocks that may result in job and income insecurity for workers.

The second part of the paper focuses on differences at the firm level between domestic firms, regional and global exporters. The findings suggest that exporting firms in ECOWAS are larger, more productive, and pay higher wages than non-exporters, but regional and global exporters are remarkably similar in terms of these categories. Regional exporters did exhibit slightly faster employment growth in the years prior to the survey. These findings are good news in the sense that they show that regional exporter do create productive jobs. However, in the context of heterogeneous firm trade models, these findings on firm level characteristics suggest that trade costs in the region are similarly high as global trade costs, although they appear to be of a very different nature. Thus, the costs of exporting to regional and global markets seem to add up, which explains the relatively high number of firm that export to only one or the other market, but not to both. This suggests that lowering regional trade costs has strong potential to allow more firms in the region to benefit from the opportunities of regional trade and create jobs.

In conclusion, regional trade for most ECOWAS members is quite different from global trade in terms of its impact on decent employment creation, but it is not generically "better" or "worse". Instead, the employment effects of regional trade expansion can be expected to be quite heterogeneous across countries in terms of both the number and quality of jobs created. If these effects are well understood, ECOWAS countries are in a better position to combine the potential of both global and regional trade in a way that fosters decent work creation, and to implement targeted and coherent supplementary policies that maximise the benefits of trade. For example, regional exporters of primarily agricultural products can expect a relatively strong employment effect of regional trade, but would be well advised to support this through policies that enhance the productivity of agricultural employment. Regional exporters of manufacturing, on the other hand, can expect creation of higher productivity jobs from regional than from global trade, but these may be more limited in number. For oil and mineral exporters, diversification into new export products with higher employment effects is key.

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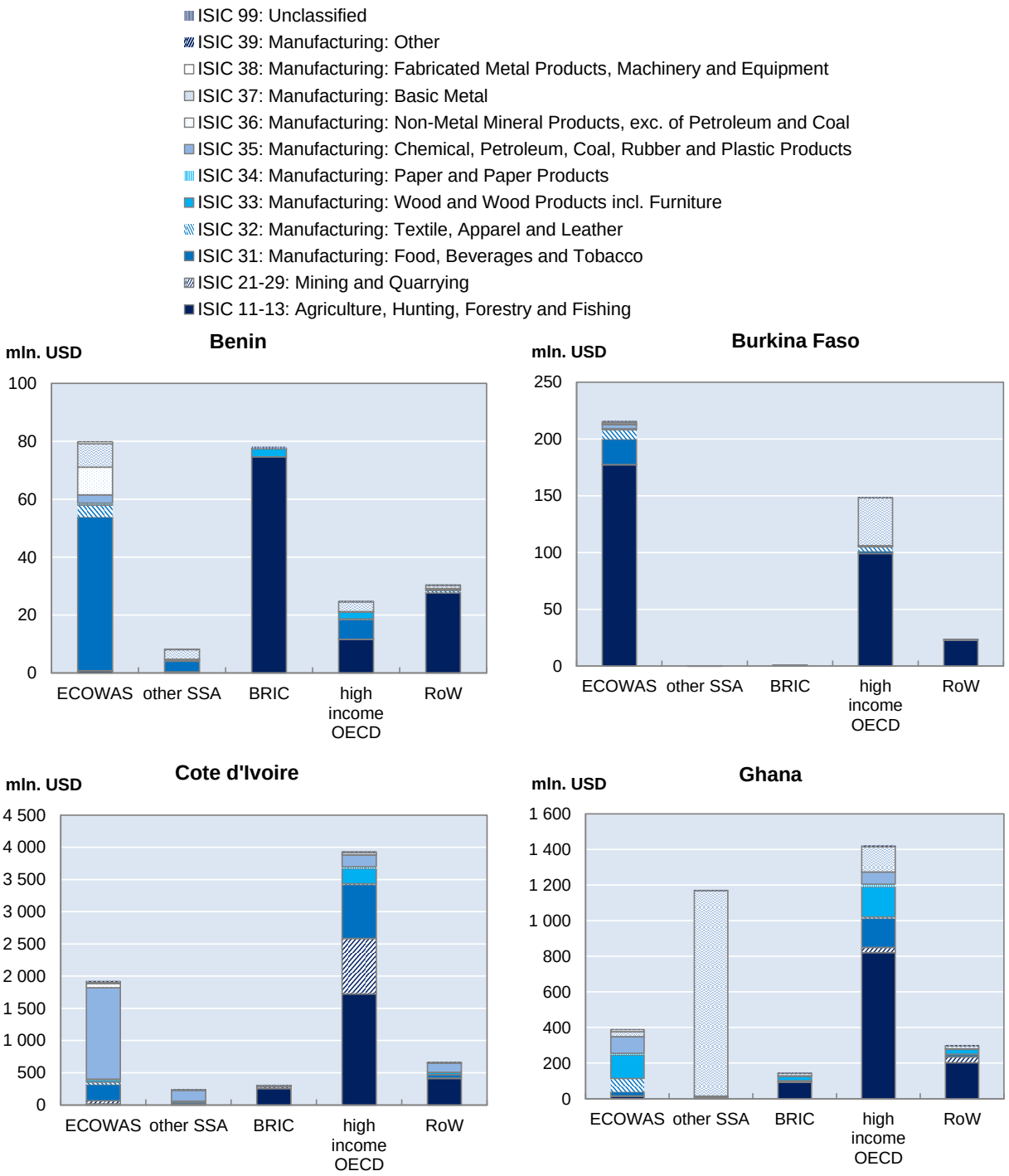
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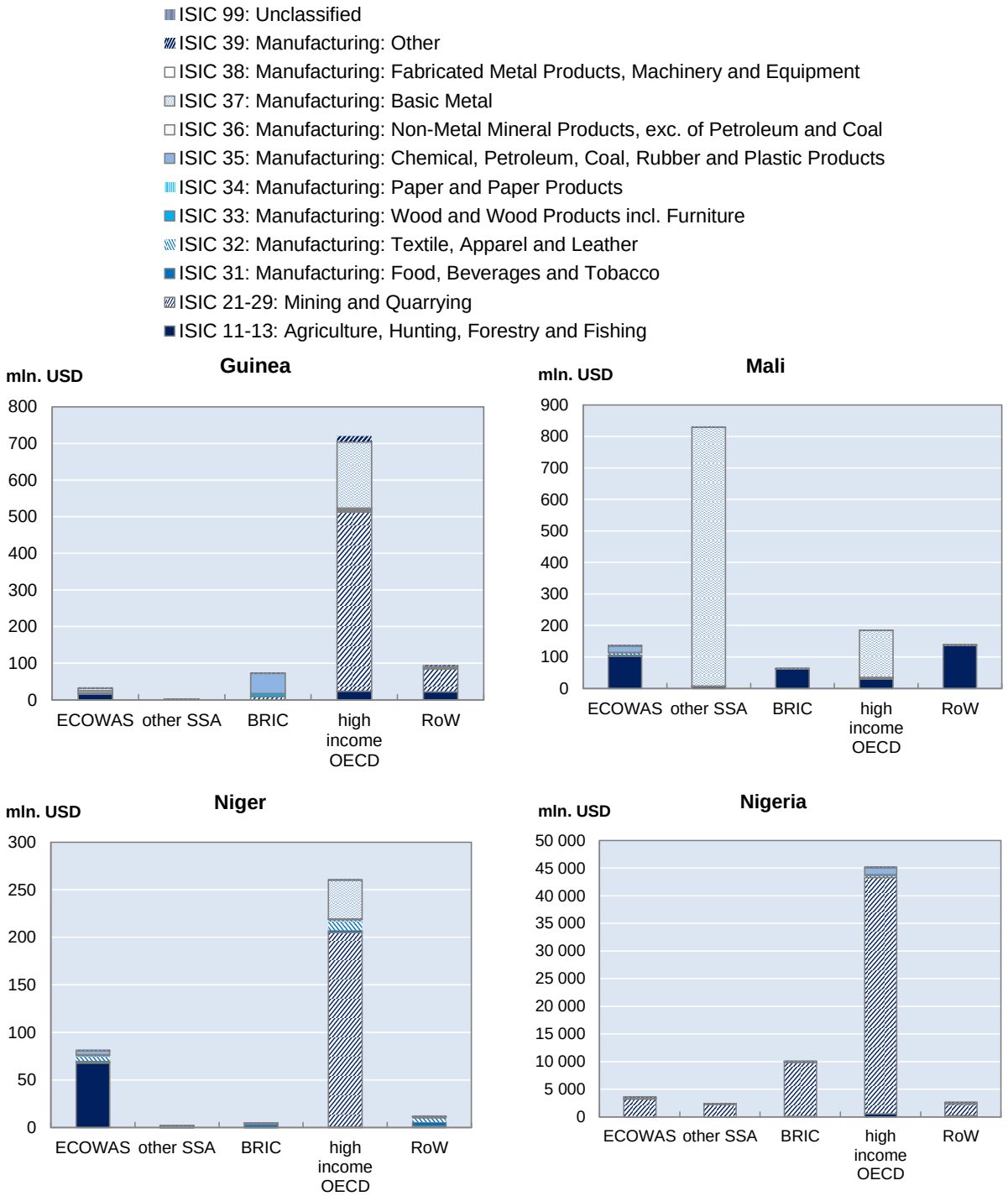
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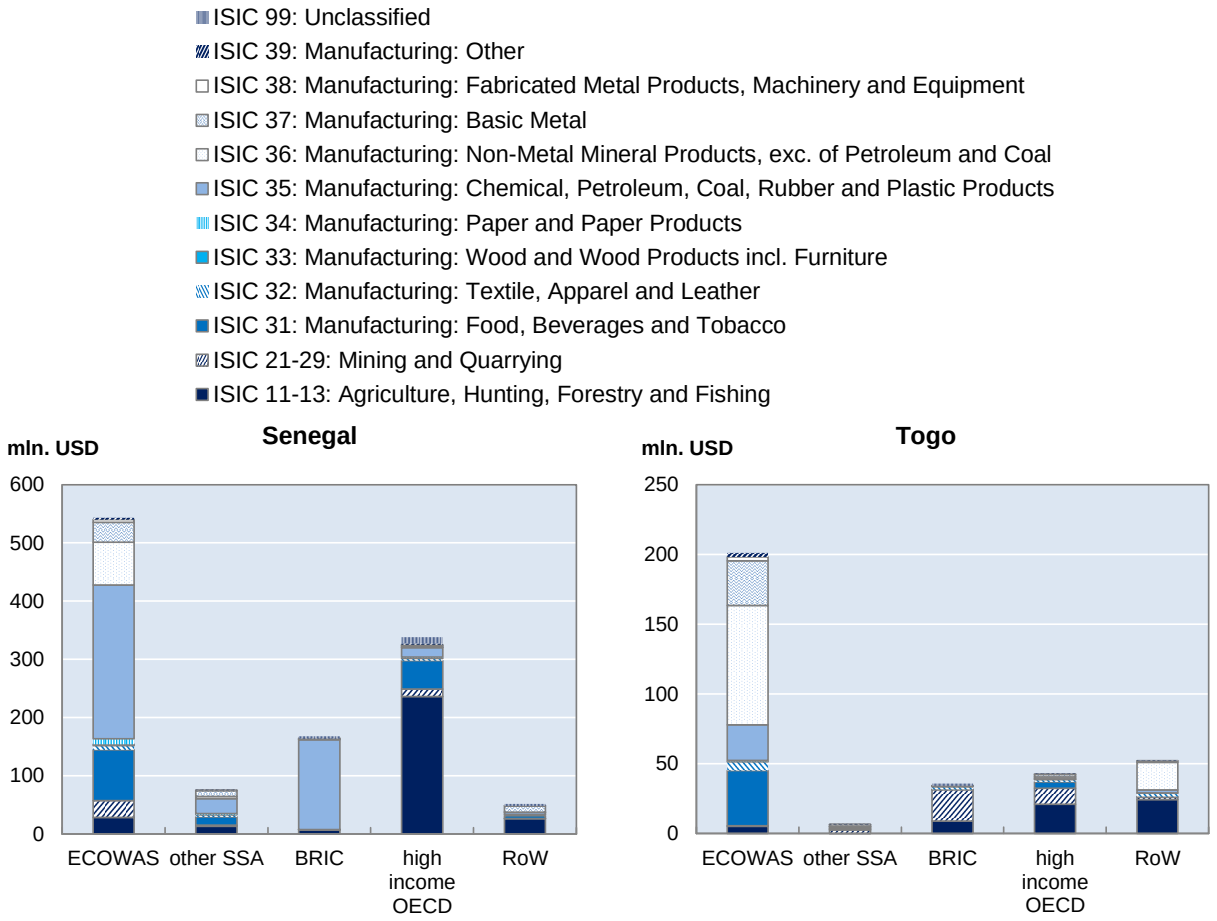
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Annex 14.A1.

Figure 14.A1.1. Export composition by destination of exports for ECOWAS countries



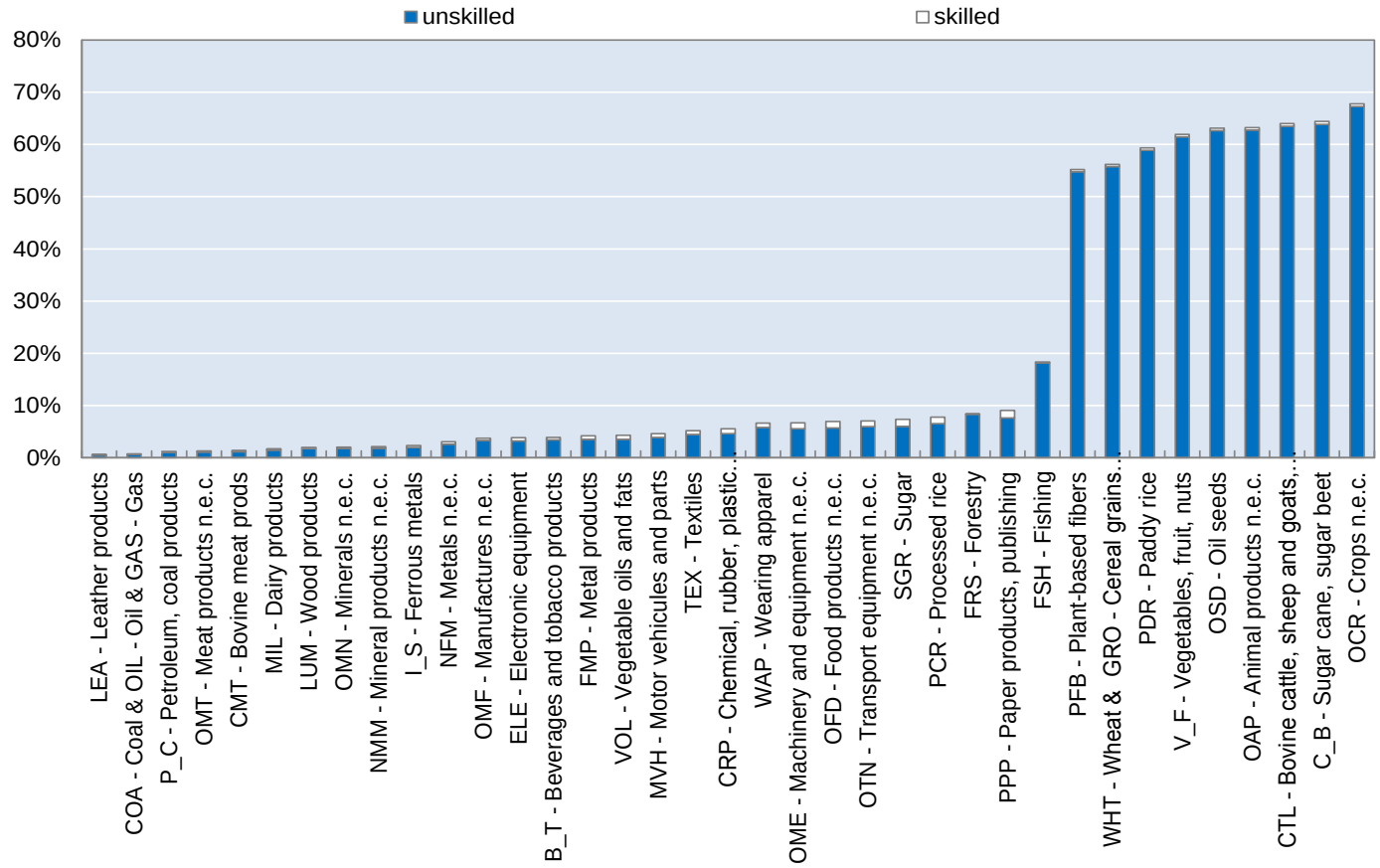

ISIC 99: Unclassified
ISIC 39: Manufacturing: Other
ISIC 38: Manufacturing: Fabricated Metal Products, Machinery and Equipment
ISIC 37: Manufacturing: Basic Metal
ISIC 36: Manufacturing: Non-Metal Mineral Products, exc. of Petroleum and Coal
ISIC 35: Manufacturing: Chemical, Petroleum, Coal, Rubber and Plastic Products
ISIC 34: Manufacturing: Paper and Paper Products
ISIC 33: Manufacturing: Wood and Wood Products incl. Furniture
ISIC 32: Manufacturing: Textile, Apparel and Leather
ISIC 31: Manufacturing: Food, Beverages and Tobacco
ISIC 21-29: Mining and Quarrying
ISIC 11-13: Agriculture, Hunting, Forestry and Fishing
Guinea
mln. USD
800
700
600
500
400
300
200
100
0
ECOWAS
other SSA
BRIC
high income OECD
RoW
Mali
mln. USD
900
800
700
600
500
400
300
200
100
0
ECOWAS
other SSA
BRIC
high income OECD
RoW
Niger
mln. USD
300
250
200
150
100
50
0
ECOWAS
other SSA
BRIC
high income OECD
RoW
Nigeria
mln. USD
50 000
45 000
40 000
35 000
30 000
25 000
20 000
15 000
10 000
5 000
0
ECOWAS
other SSA
BRIC
high income OECD
RoW



Source: Authors' calculation based on data from COMTRADE, average between all years with data availability between 2004 and 2008.

Annex 14.A2

Figure 14.A2.1. Average wage shares from GTAP Nigeria, Senegal and West Africa SAMs



Source: Author's calculation based on data from GTAP.

Annex 14.A3.

Table 14.A3.1. Sectoral distribution of firms in sample by exporting status

	1. domestic (n=2017	2. regional (n=80)	3. global exporter (n=94)	4. indirect exporter (n=149)
ISIC sector				
15 - Manufacture of food products and beverages	12.2%	7.5%	17.0%	10.7%
17 - Manufacture of textiles	0.9%	2.5%	5.3%	2.7%
18 - Manufacture of wearing apparel; dressing and dyeing of fur	9.7%	7.5%	12.8%	24.8%
19 - Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	1.1%	0.0%	4.3%	0.0%
20 - Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	2.4%	3.8%	4.3%	1.3%
21 - Manufacture of paper and paper products	0.3%	3.8%	1.1%	0.7%
22 - Publishing, printing and reproduction of recorded media	3.9%	3.8%	4.3%	4.0%
23 - Manufacture of coke, refined petroleum products and nuclear fuel	0.3%	0.0%	0.0%	0.7%
24 - Manufacture of chemicals and chemical products	2.5%	10.0%	6.4%	6.0%
25 - Manufacture of rubber and plastics products	0.7%	13.8%	6.4%	3.4%
26 - Manufacture of other non-metallic mineral products	1.3%	1.3%	2.1%	0.7%
27 - Manufacture of basic metals	0.5%	2.5%	0.0%	4.0%
28 - Manufacture of fabricated metal products, except machinery and equipment	3.4%	5.0%	2.1%	3.4%
29 - Manufacture of machinery and equipment n.e.c.	0.6%	3.8%	3.2%	3.4%
30 - Manufacture of office, accounting and computing machinery	0.0%	0.0%	0.0%	0.0%
31 - Manufacture of electrical machinery and apparatus n.e.c.	0.3%	2.5%	2.1%	2.7%
32 - Manufacture of radio, television and communication equipment and apparatus	0.1%	0.0%	0.0%	0.7%
33 - Manufacture of medical, precision and optical instruments, watches and clocks	0.2%	0.0%	0.0%	0.0%
34 - Manufacture of motor vehicles, trailers and semi-trailers	0.1%	0.0%	0.0%	0.7%
35 - Manufacture of other transport equipment	0.1%	0.0%	0.0%	0.7%
36 - Manufacture of furniture; manufacturing n.e.c.	5.6%	8.8%	4.3%	0.7%
37 - Recycling	0.0%	0.0%	0.0%	0.0%
40 - Electricity, gas, steam and hot water supply	0.0%	0.0%	0.0%	0.0%
41 - Collection, purification and distribution of water	0.0%	0.0%	0.0%	0.0%
45 - Construction	4.9%	2.5%	2.1%	1.3%
50 - Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	4.8%	1.3%	1.1%	2.7%
51 - Wholesale trade and commission trade, except of motor vehicles and motorcycles	9.4%	8.8%	7.4%	10.1%
52 - Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	21.8%	2.5%	4.3%	6.7%
55 - Hotels and restaurants	6.0%	2.5%	4.3%	2.7%
60 - Land transport; transport via pipelines	1.5%	2.5%	3.2%	2.7%
61 - Water transport	0.1%	1.3%	1.1%	0.0%
62 - Air transport	0.3%	1.3%	0.0%	0.0%
63 - Supporting and auxiliary transport activities; activities of travel agencies	0.7%	0.0%	0.0%	1.3%
64 - Post and telecommunications	0.8%	0.0%	1.1%	1.3%
65 - Financial intermediation, except insurance and pension funding	0.0%	0.0%	0.0%	0.0%
72 - Computer and related activities	2.0%	1.3%	0.0%	0.0%
74 - Other business activities	0.8%	0.0%	0.0%	0.0%

Source: Author's calculation based on data from GTAP.

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