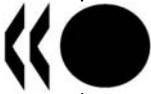


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Working Party of the Trade Committee

TRADE AND LABOUR MARKET ADJUSTMENTS

OECD Trade Policy Working Paper No. 64

by Samuel Hill, Molly Lesher and Hildegunn Kyvik Nordås

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ABSTRACT

This study describes developments in international trade and OECD labour markets and analyses possible linkages between them. It depicts recent developments in offshoring, trade in tasks and the integration of large emerging economies into the world market. The labour market in major OECD countries has been characterised by rising employment relative to the total population and declining unemployment rates during the past decade. Job security has not changed greatly between 1995 and 2005, but the wage share of national income has declined in many OECD countries. The report does not find evidence of a linkage between import penetration and overall employment or unemployment, but relatively small effects on productivity and employment patterns are found. A shift towards sourcing of imports from emerging markets slightly improves labour productivity and reduces labour demand in the import-competing sectors or activities. Offshoring of services has a relatively strong positive marginal impact on labour productivity, but the scale of offshoring is still modest. The labour market impact of offshoring is stronger in countries with high employment protection and high barriers to entrepreneurship. The study finally argues that offshoring is motivated by the need for flexibility and lower costs and helps firms remain competitive. Thus, offshoring may well relax the pressure to move the entire manufacturing production chain to low-cost countries.

Keywords: *Labour market adjustments, offshoring, emerging economies.*

JEL code: F16

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EXECUTIVE SUMMARY

A sharp rise in trade relative to GDP, new patterns of international specialisation - particularly offshoring and trade in tasks - and the integration of large emerging economies in world markets have raised concerns about labour market effects. This study provides an analysis of to which extent these three aspects of globalisation have affected employment, unemployment, job security and earnings security. The stage is set with a presentation of recent trends in international trade flows followed by an assessment of recent trends in labour market developments. The main contribution of the study is to analyse how trade and labour market developments are linked.

Starting with developments in international trade, its share of world GDP has grown rapidly since the 1960s and accelerated since the early 1990s. Merchandise trade increased from 71% of value added in goods-producing sectors in 1980 to 118% in 2005 in OECD, while trade in services remained stable at about 12% of OECD services value added during the same period. A rising share of trade relative to GDP implies that more firms are exposed to international competition in export markets as well as through increased import penetration.

International production sharing or offshoring is perceived to be an important driving force behind the rise of trade relative to GDP in the recent past, with machinery and equipment leading the way. International production sharing is difficult to measure precisely and several commonly used indicators are presented. The indicators agree that the rise in offshoring (in value terms) over the past decade or so has been quite modest. Developing countries have, however gained market shares, which may have reduced average prices of intermediate inputs.

China has emerged as an important manufacturing hub for multinational companies from all over the world. The country now ranks third after Germany and the United States among the world's leading exporters, but foreign companies account for about 60% of China's trade. On the services side India is emerging as an important exporter, but in 2004 it ranked only as number 11 in services exports with a global market share of 2.3%, while United States ranks number 1, accounting for about 15% of world total services exports.

The globalisation process has been driven by a combination of changes in technology, market reforms in OECD countries and trade liberalisation in non-OECD countries. Thus, it is worth noticing that a major driving force for the rising market shares of China, India and other emerging economies on the global market has been their own reforms, helped along by access to open markets in the OECD countries. China started its market opening process in late 1970s/early 1980s, while India's reforms are more recent. In both cases liberalisation was followed by rapid expansion of trade and income.

On the employment side, total employment has increased relative to the total population, the unemployment rate has declined somewhat and there are no major changes in job tenure during the period of a rising trade/GDP ratio since the early 1990s. Analysis suggests that job security has not changed greatly in OECD countries between 1995 and 2005, despite changing patterns of global trade. However, the findings differ slightly between different sectors and worker skill categories. Another notable trend is that the labour share of national income has declined quite sharply in a number of countries.

Having described the trends in world trade and labour markets over the past couple of decades, the study goes on to establish possible links between trade and labour market developments. Insights from trade theory predict that trade leads to international specialisation and therefore affects the sectoral composition of output and employment as well as factor prices, including wages, while the overall level of employment appears to be mainly determined by domestic institutional factors.

Technology also plays an important role for the composition of labour demand, productivity and wages and the impact of trade and technology is not always easy to distinguish. Furthermore, technology is a source of comparative advantage and therefore has both a direct effect on labour markets and an indirect effect through trade.

The regression results conducted in the study indicate that the marginal effects of growing import penetration are small and can be summarised as follows: First, regressions suggest that trade has had no significant effect on the *overall unemployment* rate of OECD countries. More data and evidence are required to determine the longer term effects of trade on labour demand both in OECD and developing countries.

Second, an aggregate measure of import penetration does not seem to have a significant impact on labour demand or productivity in the importing country, although a rising market share of non-OECD countries is found to improve average labour productivity slightly and reduce labour demand somewhat as well. It is also found that restrictive product market regulation dampens the productivity impact of import penetration and that high employment protection is associated with higher labour productivity. A possible explanation for the latter finding is that a high level of employment protection encourages investment in labour-saving technology.

Third, the impact of imports of intermediate inputs (offshoring) differs depending on whether the offshored inputs are from low-cost non-OECD countries or from OECD countries and whether goods or services are offshored. The most significant relationship was found between labour productivity and offshoring of services, where offshoring is associated with a relatively large and positive marginal effect on labour productivity. Offshoring of materials appears not to affect productivity or labour demand much, although offshoring of materials to non-OECD countries is associated with higher labour productivity and lower labour demand.

Fourth, importantly it is found that the relationship between offshoring, productivity and labour demand depends on the policy environment. Thus, the impact on labour productivity is found to be larger in countries with high barriers to entrepreneurship. For example services offshoring was found to be negatively related to employment when employment protection and entry barriers are high, but no significant effect was found otherwise.

Calculations of the contribution to employment creation of exports by skill category were conducted for Finland and the United Kingdom. Changes in domestic demand were by far the most important factor behind job creation, while improved labour productivity was by far the most important factor behind job destruction, although of course rising productivity generates higher income and better jobs. Nevertheless, increased exports is estimated to have raised labour demand by about 8% in Finland and 3% in the UK between 1995 and 2000 and by 14 and 9% respectively from 2000 to 2005 when both direct and indirect effects through backward linkages are taken into account. In both countries the employment effect was highest for low-skilled workers and lowest for skilled workers, although the differences between skill levels were small.

The empirical analysis of the relation between job security and trade is subject to considerable uncertainty, but it suggests that trade has contributed to rising volatility for unskilled workers, and that the impact differs between sectors and depends strongly on the elasticity of labour supply. The elasticity of labour supply in turn will depend on several factors, such as social security measures and demographic factors.

Trade appears to have contributed to a less equal distribution of income in OECD countries through relatively stronger demand for skilled labour, resulting in a higher skills premium. However, technical

progress pulls in the same direction and the relative importance of trade can still not be established with certainty. The fact that there are large differences among countries with similar factor endowments and trade patterns suggests that the issue is complex and that growing income inequality is not an inevitable side-effect of rising trade/GDP and integration of emerging countries into international markets.

The study has argued that in markets with fluctuating demand and lean supply chain management, firms need flexibility in production. Offshoring is a way of increasing flexibility and lowering costs. Restricting offshoring could well result in loss of competitiveness or automation of the tasks that would otherwise be offshored, rather than protecting good jobs. The remedies for ensuring that workers benefit from the improvements in labour productivity that has followed offshoring lie in the area of protecting employment rather than jobs e.g. by reducing the non-wage cost of employment lowering barriers to entry for entrepreneurs and improving the responsiveness of the education system to demand for skills from the business sector. The answer is not to reverse the open trade regime that the OECD countries introduced decades ago, and which has contributed to current prosperity.

INTRODUCTION

1. This report presents the results of the third Globalisation and Structural Adjustment project (GSAIII). The study has been undertaken jointly by TAD/TPLS and ELS/EAP. The empirical results of the project are also presented in Employment Outlook 2007 Chapter 3. This paper focuses more sharply on the trade aspects of the project, including a more detailed description and analysis of international trade and how trade policy and labour and product market regulation interact in shaping the labour market adjustments to increased international trade.

2. The next section of the report describes recent developments in trade patterns, focusing on offshoring and the integration of emerging economies in international markets. It does so at some length since trade in intermediate goods and services are found to be less dynamic than often claimed in the globalisation debate. It also describes and discusses the role of trade liberalisation and regulatory reforms in stimulating international trade and investment. The second section describes developments in the OECD labour markets during the same period, focusing on employment and job security. Section three brings together the previous sections by analysing how developments in trade and the labour market are linked. It aims at clarifying what role trade and regulatory policies have played in bringing about the structural changes described in the two previous sections and how trade and regulatory policies affect labour market adjustments to the rising trade/GDP ratio documented in the study. Section four discusses policy implications and concludes.

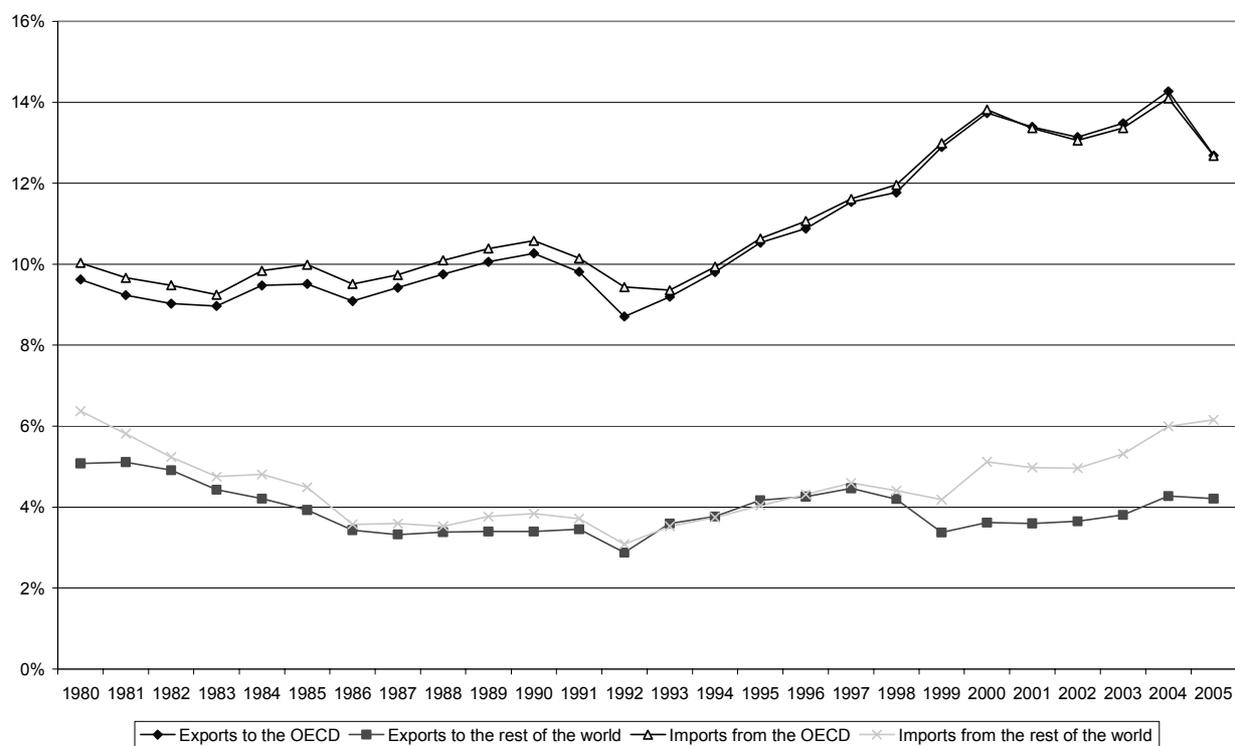
I. RECENT DEVELOPMENTS IN INTERNATIONAL TRADE

3. This section presents recent evidence on OECD trading patterns, paying particular attention to developments that may affect OECD labour markets the most profoundly. The descriptive statistics provide an indication of how much trade integration has progressed during the past several decades. In addition to quantifying the overall growth in trade flows, the composition of these flows is examined along three dimensions: (i) goods versus services trade; (ii) OECD versus non-OECD trading partners; and (iii) final goods and services versus intermediates.

1.1 Trends in the magnitude and composition of OECD trade

4. Countries that trade become more interconnected, a process that has accelerated globalisation in recent years. Just how much are OECD countries trading with each other and the rest of the world? United Nations data on the direction of goods trade indicate that intra-OECD goods trade has increased markedly recently after being relatively flat during the 1980s (Figure 1). By contrast, OECD trade with the rest of the world trended downward during the 1980s, in part due to the declining relative price of oil. More recently, OECD imports from non-OECD countries have risen rapidly, while OECD exports to these countries have been considerably less dynamic.

Figure 1. Intra-OECD goods trade and OECD goods trade with the rest of the world, 1980-2005
Percent of OECD GDP



Source: Comtrade Database; OECD Statistics Database.

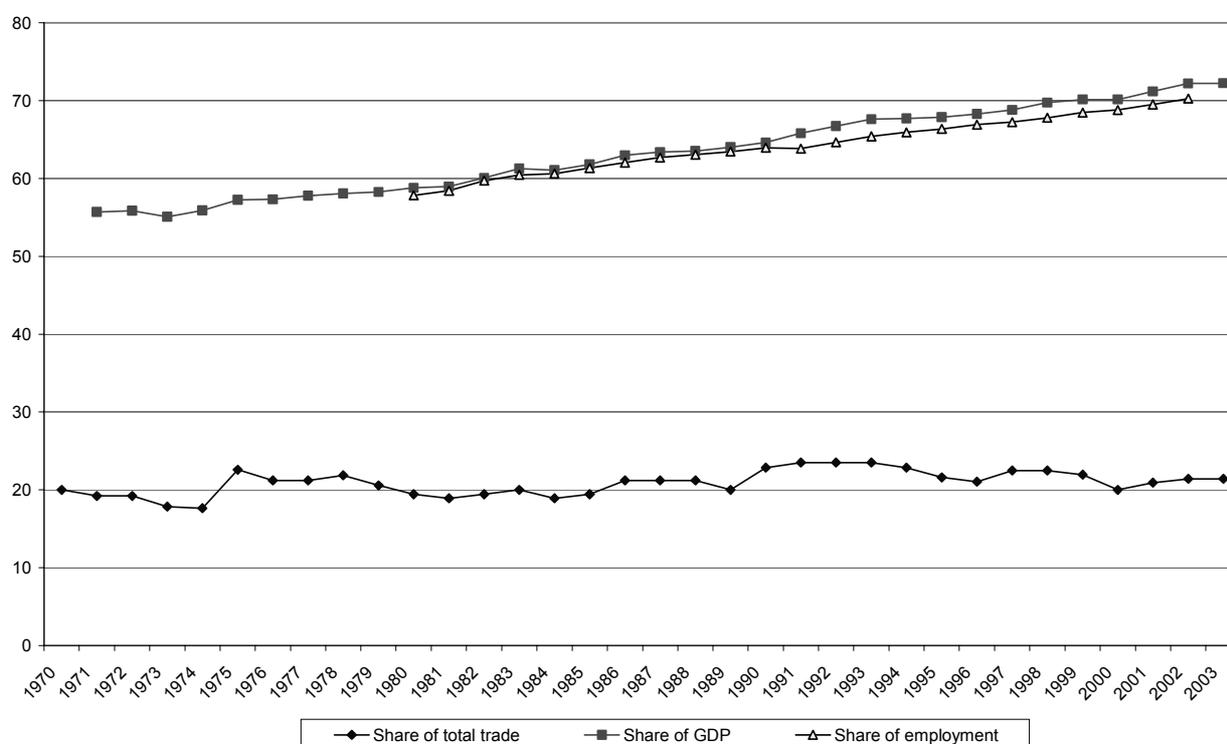
5. Among individual goods-producing sectors, machinery and equipment is by far the most exposed to international trade. Because parts and components often cross borders several times before they reach the final customer, total trade in parts and components is several times larger than value added in the sector. As a result, machinery and equipment alone accounted for almost 40% of the increase in world merchandise exports from 1970 to 2005.¹

6. Data from the World Bank indicate that OECD merchandise trade increased from 71% to 118% of value added in OECD goods producing sectors since 1980, whereas trade in services was largely unchanged at around 12% of services value added during the same period. Contrary to popular perception, the data show that services trade is not more dynamic than merchandise trade. Indeed, services share of total trade has remained fairly stable at about 20% since the 1970s, even as the services share of output and employment has steadily expanded (Figure 2). Furthermore data released in April 2007 from the WTO show that services trade grew less than merchandise trade during the period 2004-2006 and its share of total trade slipped to 18.7% in 2006.²

¹ Machinery and equipment refer to SITC rev 2 category 7. The authors calculated its contribution to total trade growth from the Comtrade database.

² The data do not include sales of foreign affiliates neither for goods nor services.

Figure 2. The relative importance of services in GDP, employment and trade , 1970-2003
Percent of OECD total



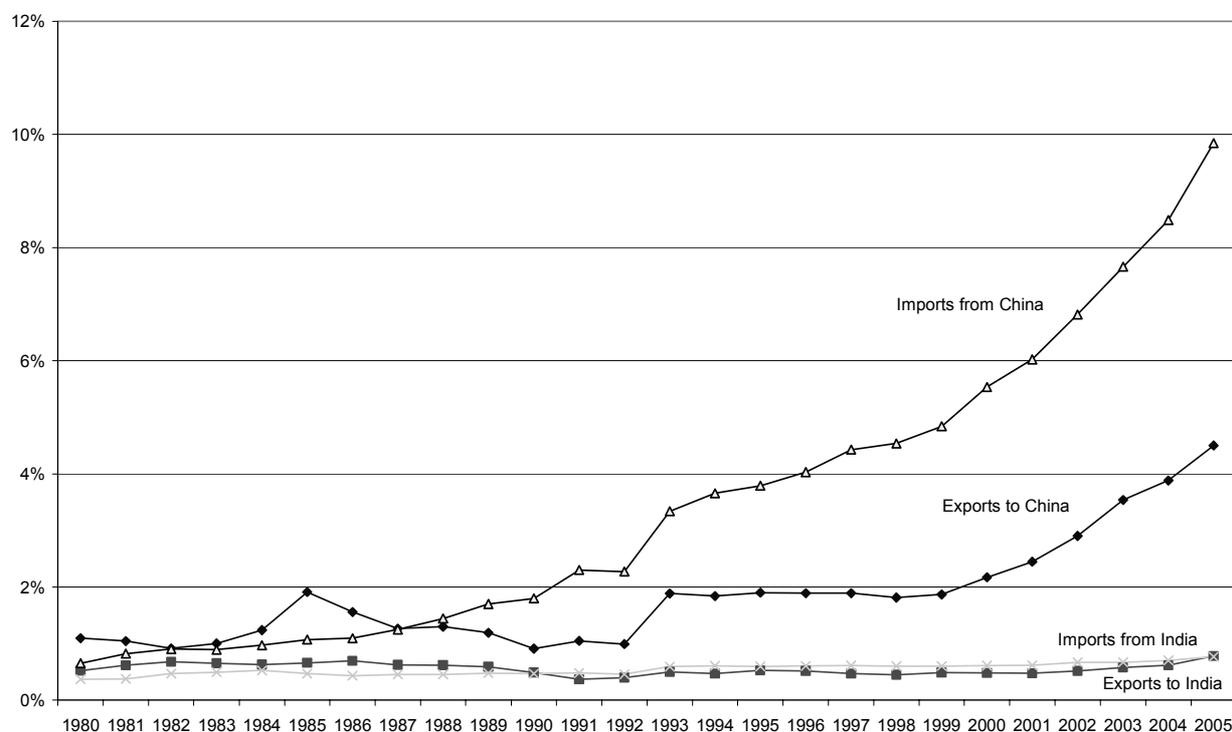
Source: World Development Indicators.

7. However, trade in computer and business services has grown faster than the average for services trade. OECD exports of computer services grew by 15.1% on average per year during the period 1999-2005, while exports of other business services grew by 10.9%. During the same period OECD imports in the same two sectors increased somewhat less dramatically at 8.9 and 6.3%, respectively. OECD countries combined run a significant trade surplus in both of these services categories and a small surplus for total services (OECD, 2006a). Taken together, these data suggest that aggregate measures of globalisation mask large differences across sectors.³

8. The data also indicate that there are large variations in the degree to which both OECD and emerging countries have integrated into and affected the global economy. For example, since the 1960s Japan's trade-to-GDP ratio has not changed much and remains among the lowest of the OECD countries, despite its liberal trade policies. In contrast, Korea's trade-to-GDP ratio has more than quadrupled. But in recent years, the impact of large emerging economies on OECD trade patterns – in particular Chinese manufactured goods and Indian business services – has attracted a great deal of attention. Figure 3 shows the evolution of OECD goods trade with India and China over the past 25 years.

3. Trade flows relative to GDP are substantially lower in the larger and more diversified OECD economies, particularly Japan and the United States, than in their smaller counterparts.

Figure 3. OECD goods trade with China and India, 1980-2005
Percent of OECD goods trade



Source: Comtrade Database.

9. In 1980, trade between the OECD and India and China was relatively small, representing only 2% of total OECD trade. These shares followed a relatively flat growth trajectory until the early 1990s. Since then, trade with China has grown strongly, especially OECD imports from China. China's share of total OECD goods imports grew from 2% in 1990 to 10% in 2005, with more than half of that growth occurring since China joined the WTO in 2001⁴.

10. Imports from China have been concentrated in labour-intensive industries, but they have become increasingly broad-based over time.⁵ Imports from China are still dominated by labour-intensive goods, but from 2000 onwards China has rapidly gained ground in electronics and ICT equipment; indeed, in 2005

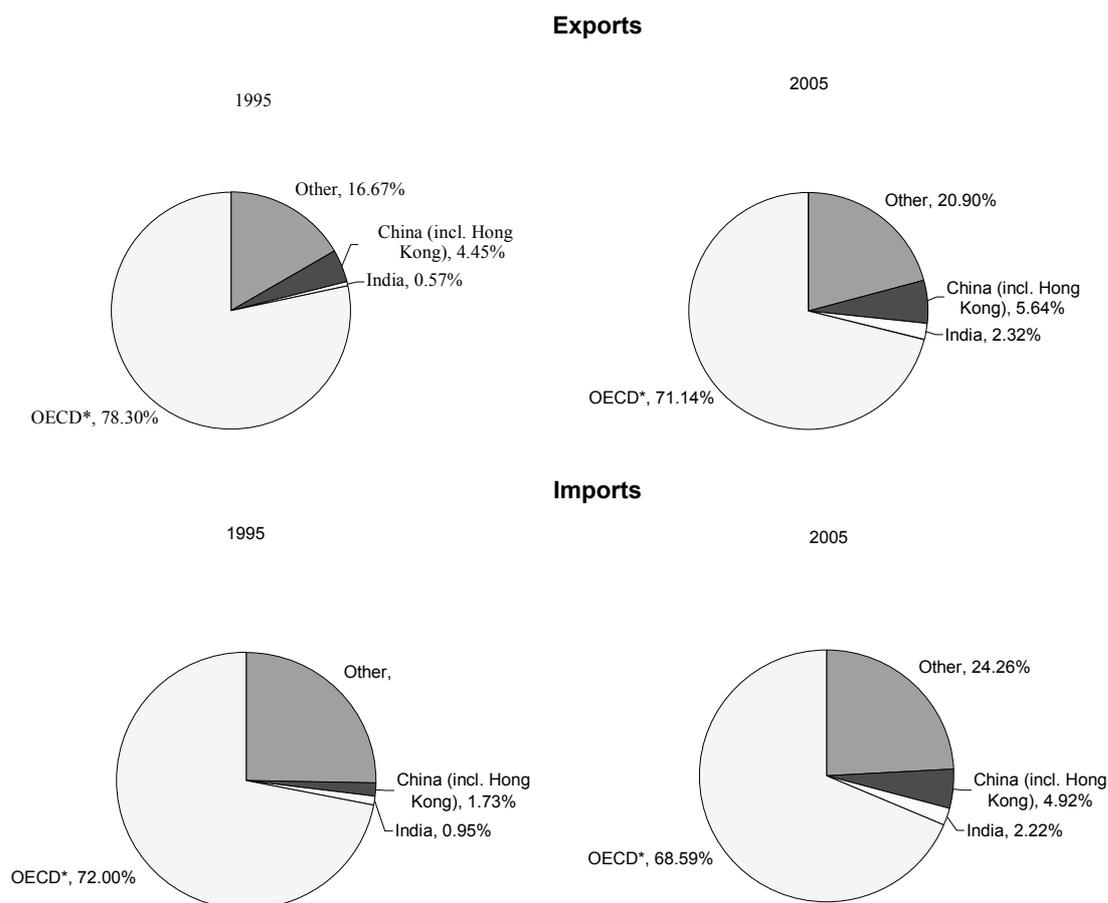
4. This growth reflects the emergence of China as an important manufacturing hub for multinational companies. Among the world's exporters, China ranked third, after Germany and the United States, with foreign companies accounting for 60% of its trade in 2006.

⁵ In 1990, only two 2-digit SITC (Rev 2) categories – explosives (57) and travel goods (83) – had gained a market share of 10% or more of OECD imports, both with a market share of about 22%. The market share in these two categories has since increased rapidly and reached as much as 33% and 57%, respectively in 2005. In 1991, clothing (84) and footwear (85) passed the 10% market share mark, further expanding to 31% and 44%, respectively in 2005. The number of 2-digit categories gaining a market share of more than 10% has increased steadily since the early 1990s, reaching 18 categories out of a total of 63 (all two-digit categories except category 9) in 2005, including several technology-intensive sectors.

China's market share in the office machinery sector had reached 30%, telecommunication equipment 25% and electronics 14%.

11. Goods trade with India has also increased since 1980, but its growth has been significantly more muted. However, to properly evaluate the impact of India on OECD trade patterns it is important to consider changes in services trade (Figure 4).

Figure 4. Trade in services share of selected countries in world services trade**



Notes: *Includes all OECD countries regardless of when Member countries joined the organisation. ** Includes all commercial services as defined by the IMF's Balance of Payments Manual (5th edition) except government services. The data are (i) estimated for the Slovak Republic (2005) and New Zealand (2005); (ii) missing for Belgium-Luxembourg (2005); and (iii) representative of a break in data continuity (*i.e.*, data beginning with the highlighted year do not form a consistent series with those from earlier years) for Japan (exports only) (1995), Denmark (2005) and India (2005).

Source: WTO Statistics database.

12. Figure 4 shows that even though the OECD's share of exports and imports of services in world trade has slowed somewhat in the period between 1995 and 2005, OECD countries are still by far the largest exporters and importers of services. Moreover, the OECD remains a net exporter of services. Since 1995, India's share of services has grown rapidly – albeit from a low base – but its share of world services exports was still only 2.3% in 2005. This is slightly less than half of China's share and much smaller than the 15% U.S. share of exports. Furthermore, India's share of services imports nearly equals its export share.

13. In open economies with competitive labour markets, real wages reflect the value of the marginal product of labour evaluated at world market prices. Trade thus impacts real wages through the relative price of exports and imports (*i.e.*, the terms of trade). A recent study by the IMF (2007) finds that for the OECD area, the accumulated gains in terms of trade for goods and services since 1980 have been 7%, while the improvement in terms of trade is about 12% for goods only. The price of exports has admittedly declined relative to output prices, but the price of imports has declined even more, leaving OECD countries with a net *gain* in terms of trade.

14. Emerging markets, in contrast, have generally experienced deteriorating terms of trade over the same period. Developing Asia, for instance, showed an improvement in terms of trade during the 1980s, but has since seen a decline, with accumulated terms of trade loss of 11.5% during the period 1980-2006 (or 0.5% for goods only). For the newly industrialised Asian countries, terms of trade for goods have deteriorated by 14% during this period, while services trade has contributed to reducing the overall terms for trade loss to 4.4%.⁶

15. Foreign direct investment has also been an important part of the globalisation process. Between 1970 and 2005, world FDI flows (in nominal USD terms) increased 55-fold, and it has grown significantly faster than world trade, which has grown 33-fold in nominal dollar terms over the same period. Although data are not readily available and estimates vary considerably, sales by foreign affiliates have outpaced cross-border trade in most sectors, including manufacturing. While the share of services in world trade has remained fairly constant, the sector has increased its share in FDI. In fact, in many OECD countries, the share of services FDI in the total FDI stock is similar to or even higher than the share of services in GDP.⁷ Further discussions of FDI flows and the role of multinationals in globalisation and labour market adjustments are found in ECO/GEN(2006)2, which is one of ECO's contributions to the Growth and Structural Adjustment Project (GSA I). Foreign direct investment is therefore not explicitly discussed at any length in this study.

1.2 International production networks and trade in intermediates

16. One of the distinguishing characteristics of the current phase of globalisation is the development of international production networks that distribute sequential stages in the production of a final good or service across production sites in different countries. These vertical trading chains can take many forms, involving both the foreign affiliates of multinational corporations and arm's length relationships with foreign suppliers (Antràs, 2003).

17. There are many ways in which the overall importance of vertical specialisation in production can be measured, and we present three measures in this section. The first is trade in intermediate inputs as a share of total trade. This should be seen as an upper boundary of the importance of production networks as products classified as intermediate are not always used in the production of goods and services and such trade is not necessarily part of international production networks. The second measure is the import content of exports, which comes closer to measuring international fragmentation as the imports embodied in

⁶ Terms of trade gains and losses are calculated by the authors from the IMF Economic Outlook Database, setting the terms of trade index to 100 in 1980. Newly industrialised Asian countries include Hong Kong, Korea, Singapore and Taiwan. The surge in commodity prices after 2006 has reversed some of these trends, however.

⁷ For Austria, Denmark, France, Germany, Luxembourg, Portugal and Switzerland the share of services in the total FDI stock exceeded 75% in 2003, the latest year for which data are available (calculated from the OECD Source database).

exports have crossed an international boundary at least twice.⁸ The third measure, the HIY index of vertical specialisation, measures the import content of exports and captures both direct and indirect imports (*i.e.*, the import content of intermediate inputs sourced from domestic suppliers). This measure was developed by Hummels, Ishii and Yi (2001), hence the name.⁹

18. An increase in the HIY index of vertical specialisation does not necessarily reflect increased exposure to international competition. As an example consider a German car manufacturer that sources engines in Germany and assembles cars also for the German market in the Czech Republic. A car engine worth, say, €2000 is then exported to the Czech Republic, installed in a car assembled there and imported back to Germany embodied in the car. In this case the engine will first be included in German export statistics and next in its import statistics, although it has in reality been produced in Germany for the German market. This roundtrip inflates the German gross trade flows by €4000. With this caveat in mind, we discuss each of the three measures of international production networks.

19. Starting with the first measure, the share of intermediate goods in total trade has remained flat for the past decade. For the OECD as a whole, intermediate goods accounted for 47% of non-oil exports and 43% of non-oil imports in 2005, compared to 48% and 45%, respectively, in 1996.¹⁰ Such trade is relatively more important in OECD exports to non-OECD countries and accounted for 52% of such non-oil exports. A recent study using OECD input-output tables for the period 1970-2000 to estimate the share of intermediate goods in total trade also draws the conclusion that the intermediate share of total trade has not increased since 1970 (Chen *et. al.*, 2005).¹¹

20. This pattern does not necessarily mean that offshoring has not increased over time. One possibility is that intermediate inputs have increasingly been sourced from lower-cost countries and that the relative prices of intermediate imports may have declined while volumes have increased. Non-OECD countries have indeed gained market share in intermediate inputs in OECD countries over the past decade (from 25% to 28.5%), and their market share is highest in parts and components for capital goods other than transport equipment, where non-OECD countries' share of OECD imports has increased from 25% in 1996 to 36% in 2004. It is also the case that intermediate goods have increased their share of non-OECD countries non-oil exports and imports. Interestingly, this share peaked in 2001, and has since fallen back substantially.¹²

⁸ This measure was first developed by Hummels *et al.* (1998) and is calculated as the fraction of gross production (that is, imported intermediate services \times exports \times 2). The authors calculated the index using the 2006 edition of the OECD Input-Output Table Database. While this measure can be calculated for individual sectors, the vertical specialisation index discussed below can only be applied to the total economy.

⁹ The vertical specialisation index is calculated as: $uA^m[I-A^d]^{-1}X/X_k$, where $u = 1 \times n$ vector of 1's, A^m = the $n \times n$ import coefficient matrix, I = the identity matrix, A^d = the $n \times n$ domestic coefficient matrix, $X = n \times 1$ vector of exports, and X_k = total country exports.

¹⁰ The shares are calculated from Comtrade data using the Broad Economic Categories (BEC) classification. Intermediate goods are defined as categories 22 (industrial supplies, nec), 42 (parts and accessories of capital goods other than transport equipment) and 53 (parts and accessories of transport equipment). The sum of these three categories is divided by total merchandise trade less oil (HS96 category 27).

¹¹ The advantage of using input-output tables is that goods can have multiple uses and input output tables report how imports are actually used.

¹² Intermediate goods share of non-oil exports of non-OECD countries increased from 33% in 1997 to 66% in 2000 and then fell back to 47% in 2005. The corresponding figures for imports are 40, 78 and 52%. The figures are calculated by authors from Comtrade data and categories are defined as in footnote 10.

21. However, South-South trade in parts and components has increased almost four-fold in nominal dollar terms between 1997 and 2005, while South-South imports increased almost five-fold during the same period. The share of intermediates in South-South non-oil trade increased from 32% to 49% for exports and from 32% to 53% for imports during the same period.¹³ These trends combined suggest that international production networks have become more complex over time. Both developed and developing countries produce parts and components and engage in intermediate and final assembly, and changes in OECD trade in intermediate inputs over time do not capture the whole fragmentation and offshoring story.

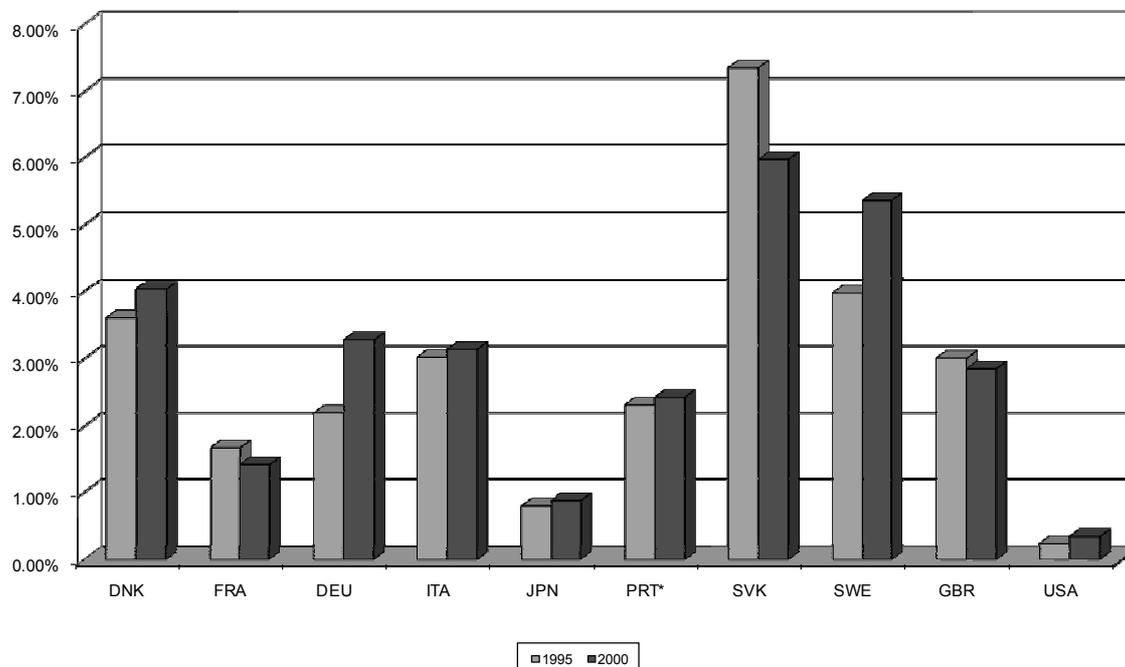
22. For services a similar classification into final and intermediate services has not been made. However, computer services and other business services are mainly used as intermediate inputs and their share in total OECD trade in services had reached about 23% in 2005.¹⁴ Exports of business services amounted to \$440 billion while imports reached \$395 billion. Improvements in IC technologies (*e.g.* the internet) appear to be increasing the viability of services offshoring (Van Welsum and Vickery, 2005), and Freund and Weinhold (2002) show that internet penetration has a positive and significant effect on services trade. However, the scale of services offshoring to date remains quite modest.¹⁵ This is further illustrated by the share of imported intermediate services embodied in exports in 1995 as compared to 2000 depicted in Figure 5. The imported services content embodied in exports is small, but it is larger for small countries and it has increased in most countries between 1995 and 2000, but in France, the Slovak Republic and the United Kingdom offshoring of services using this measure actually fell slightly from 1995 to 2000.

¹³ The shares are calculated by authors using the Comtrade database.

¹⁴ Computer services refer to sector 262 in the Balance of Payments Manual of the IMF (BPM5) while other business services refer to sector 268. Source of data: OECD Source database.

¹⁵ The shares of trade in intermediate services are generally higher for small countries, such as the Slovak Republic and Sweden, than they are for large countries, such as Japan and the United States. This may be due, in part, to the fact that larger countries can achieve economies of scale more easily than small countries and can thus retain more stages of production at home.

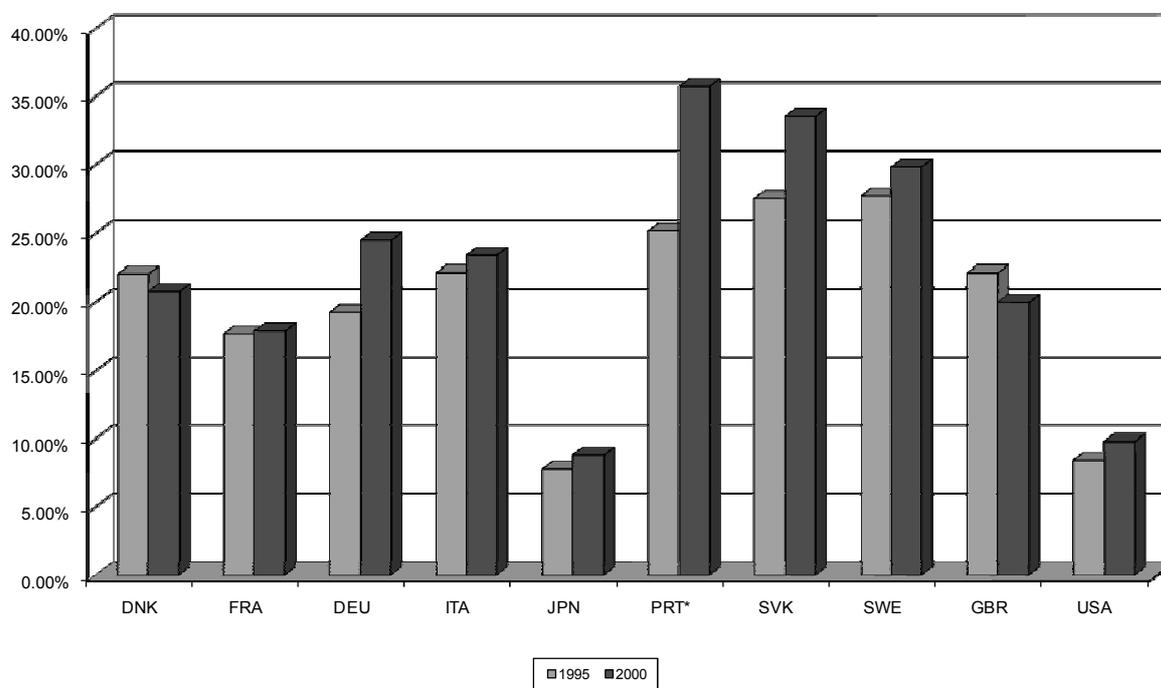
Figure 5. Offshoring of services (value of imported intermediate services embodied in exports)
Share of export value



* Data for Portugal represents 1995 and 1999.

23. Turning to the HIY index, which includes both direct and indirect import content of exports, this index rose rapidly in the OECD countries during the 1970s and 80s, and has continued to rise, albeit at a slower pace during the 1990s. Hummels *et al.* (2001) find that the index increased by 28% between 1970 and 1990 in 14 countries and accounted for 30% of total export growth for these countries.¹⁶ Using the same source – the 2006 OECD Input-Output Database – and the same method of calculating offshoring, Figure 6 presents more recent data on trade in intermediates for 10 OECD countries. Again the data show that the increase in the intensity of offshoring has slowed in recent years, and for Denmark and the United Kingdom the index has actually declined.

¹⁶. The sample includes 13 OECD countries and Chinese Taipei.

Figure 6. Offshoring in select OECD countries, 1995 and 2000

* Data for Portugal represents 1995 and 1999.

Source: Authors' calculations, OECD Input-Output Database.

Box 1: Why do firms outsource?

This box presents the results of a survey in Finland. Outsourcing is defined as purchasing a task from outside suppliers while offshoring is defined as purchasing a task from a foreign supplier. Offshoring is thus a subset of outsourcing. It is first noted that since the late 1980s, firms have become more focussed and concentrated on core activities. Multi-sector companies have sold out non-core activities and often the seller has become an important customer of the sold out company. Second, it is noted that many traditional manufacturing companies have come to consider non-manufacturing activities as their core competencies. In the words of the study ... "many traditional manufacturing companies seek to do everything but manufacture. Instead they try to design products, market them and perhaps perform final assembly." [p. 58]. Third, it is noted that multinational companies increasingly require their external suppliers to operate worldwide. Fourth, standard operation methods of manufacturing firms minimise inbound and outbound stocks, which requires flexibility in production as short delivery time causes increased variation in output. Acquiring additional capacity while maintaining flexibility in production was cited as the most important motivation for outsourcing.

The survey revealed that 2/3 of all companies with more than 10 employees outsourced tasks to other companies, but only 15% of all manufacturing firms and about 6% of services firms offshored tasks. The tasks that are most likely to be outsourced are services, but only 2.7% of all companies offshore services.

About 80% of all firms cited acquiring additional capacity as a major motive for outsourcing production, closely followed by increasing flexibility and cost savings (about 75%). For R&D the most important motivation for outsourcing was acquiring technology (75%), closely followed by increasing flexibility and cost savings.

The motives for offshoring of production and R&D are similar, but here cost savings rank on top with more than 80% citing this as an important reason compared to about 65% citing increased flexibility as a motive for offshoring production and more than 80% for offshoring R&D. Taking advantage of target country's logistics location was the third most important motive for offshoring production, while entry to market or improved consideration of customer needs was cited as the second most important motive for offshoring R&D.

Source: Secretariat of the Economic Council, Finland (2006).

1.3 The role of trade policy in the globalisation process

24. In order to derive policy conclusions from the empirical analysis of the relation between trade and labour market developments it is important to have a sense of the extent to which the developments in international trade and investment discussed above are driven by policy changes. This section presents measures of countries' trade policy stance, which are used in the empirical section in order to assess their role in labour market adjustments to trade.

25. A recent study by the WTO documents that tariff reductions on industrial goods were one of the early harvests of the GATT. Already after the Kennedy Round (finished in 1967) the average tariff rate for the United States, Japan, EEC(6) and United Kingdom had come down to 5.5% and after the Tokyo Round (finished in 1979) the average for the same four had come down to 3.1% (WTO, 2007). The OECD average tariffs on intra-OECD trade in manufactured goods stood at about 2% in 2005. Tariffs on non-OECD imports are somewhat higher, but still well below 5% on average.¹⁷ With such relatively small changes in tariffs, the surge in trade relative to GDP starting in the early 1990s is unlikely to have been driven by tariff cuts in the OECD countries.

26. In emerging markets in contrast, applied tariffs have come down significantly during this period. For instance average applied tariffs on imports of manufactured products declined from about 40% in 1992 to less than 10% in 2005 in China and from more than 75% in 1990 to less than 20% in 2005 for India.

¹⁷ Data on tariffs in this section is from the TRAINS database if not otherwise stated.

Another important dimension of policy reform particularly in China has been the liberalisation of investment policies. These changes have been critical in attracting multinational corporations that play a major role in driving trade in both intermediate and finished products. Moreover, trade and FDI reforms have gone hand-in-hand with domestic policy reforms, which have increased competition in major markets and reduced non-tariff barriers, although there is room for further progress, particularly in India (WTO, 2006; OECD, 2007a).

27. In OECD countries regulatory reforms are probably important determinants of recent developments in trade and investment patterns. Regulatory reforms in key infrastructure sectors have for instance probably reduced trade costs significantly. A useful measure of such reforms is the product market regulatory indicators developed by Nicoletti and Conway (2006). These indicators take values between 0 and 6 (6 is the most restricted) and contain various measures of market entry regulation, public ownership and market structure in airline services, telecommunications, electricity, gas, postal services, rail and road transport. The unweighted average value of this indicator declined from 5.1 in 1980 to 2.2 in 2003.

28. Pro-competitive regulatory reforms are also important for trade and FDI flows as well as the speed of adjustment to new market conditions. For instance barriers to entry and exit are likely to slow down the adjustment process and to impede entrepreneurs from taking advantage of the opportunities that more open markets bring. Regulatory barriers to entry in the services industries as measured by the OECD product market regulation indices have been fairly low in most OECD countries throughout the period for which data are available. The unweighted average index fell from 1.9 in 1998 to 1.5 in 2003, while the unweighted overall product market indicator (including various barriers to entry and competition) fell from 2.1 in 1998 to 1.5 in 2003.

29. The World Bank's Doing Business Indicators, which are available for the years 2003 through 2006, cover the entire economy. These data show that no country in the sample except Kenya has increased the number of procedures to start a business; none except Namibia has increased the number of days it takes to process these procedures; but the cost of starting a business relative to the country's GDP per capita has increased in 14 countries. The minimum capital requirement refers to statutory minimum capital requirement needed for a registered business, measured as a share of GDP per capita. Table 1 presents the maximum, minimum and unweighted average values of entry barriers for OECD countries.

Table 1. Regulatory barriers to entry, OECD countries

	Procedures (#)			Time (days)			Cost (% of GDP per capita)			Min capital (% of GDP per capita)		
	Max	Min	Avg.	Max	Min	Avg.	Max	Min	Avg.	Max	Min	Avg.
2003	15	2	7.6	114	2	34.4	36.8	0	10.1	247.4	0	54.6
2006	15	2	6.7	47	2	18.4	26.8	0	7.5	299.7	0	41.9

Source: World Bank Doing Business (2006)

30. The large variation in barriers to entry even in the OECD area is noticeable, and the variation is even larger when non-OECD countries are taken into account.¹⁸ We notice that the average barrier to entry

¹⁸

Among the OECD countries, Australia, Canada and New Zealand had the lowest number of procedures for starting a business in both 2003 and 2006, while Greece had the highest number. Australia had the shortest time for starting a business, while the longest time was recorded in Spain for both years. Denmark had the lowest cost of starting a business, while Turkey had the highest in both years. The minimum capital requirement for starting a business is highest in Korea for both years, while an increasing number of countries have no minimum capital requirements (Australia, Canada, New Zealand, United Kingdom and USA in 2003 and by 2006 France, Ireland and Japan had also abolished minimum capital requirements).

has declined during the relatively short period between 2003 and 2006. Barriers to exit also vary significantly among countries, but the average has not changed markedly since 2003.

31. Most studies analysing the impact of trade barriers, economic development, comparative advantage and demand factors on international trade have focused on one particular driving force, controlling for other variables. Thus, analyses of the *relative* importance of trade policy and other factors as determinants of international trade flows are scarce. An exception is the work by Baier and Bergstrand (2001; 2007). Their first study finds that income growth explains 67% of the increase in 16 OECD countries' trade between 1958 and 1988, 25% was explained by tariff rate reductions and 8% by declining transport costs while income convergence was not found to make a significant contribution to growth in trade. In the later study the focus was on the impact of regional trade agreements (RTA). The evidence on the trade-enhancing impact of such agreements has been mixed. One reason for lack of conclusive evidence is a problem of endogeneity as the determinants of trade may also determine which countries enter RTAs with each other. Controlling for endogeneity, Baier and Bergstrand (2007) find that after ten years an RTA on average doubles members' bilateral trade.

32. To summarise this section, there has been a significant change in trade and investment patterns over the past couple of decades, particularly since the early 1990s. The changes are characterised by a rising share of trade relative to GDP in most countries, particularly China. The rising trade-to-GDP ratio is largely driven by fragmentation of production. However, while the share of intermediate inputs in OECD countries' trade has remained fairly stable over the past decade, South-South trade in intermediate goods has increased sharply and emerging economies have increased their market share for intermediate inputs in OECD countries. Furthermore, contrary to popular perception, services trade has remained flat as a share of total trade for decades.

33. The driving forces for these changes appear to be trade liberalisation in emerging economies, regulatory reforms in OECD countries and technical changes, notably in ICT, that have improved supply chain management substantially and allowed countries to specialise not only in sectors but also in tasks for which they have comparative advantage. Liberalising emerging countries have in turn had the advantage of meeting largely open markets in the OECD countries for most manufactured products, although significant trade barriers have remained in textiles and clothing.

II. RECENT LABOUR MARKET DEVELOPMENTS

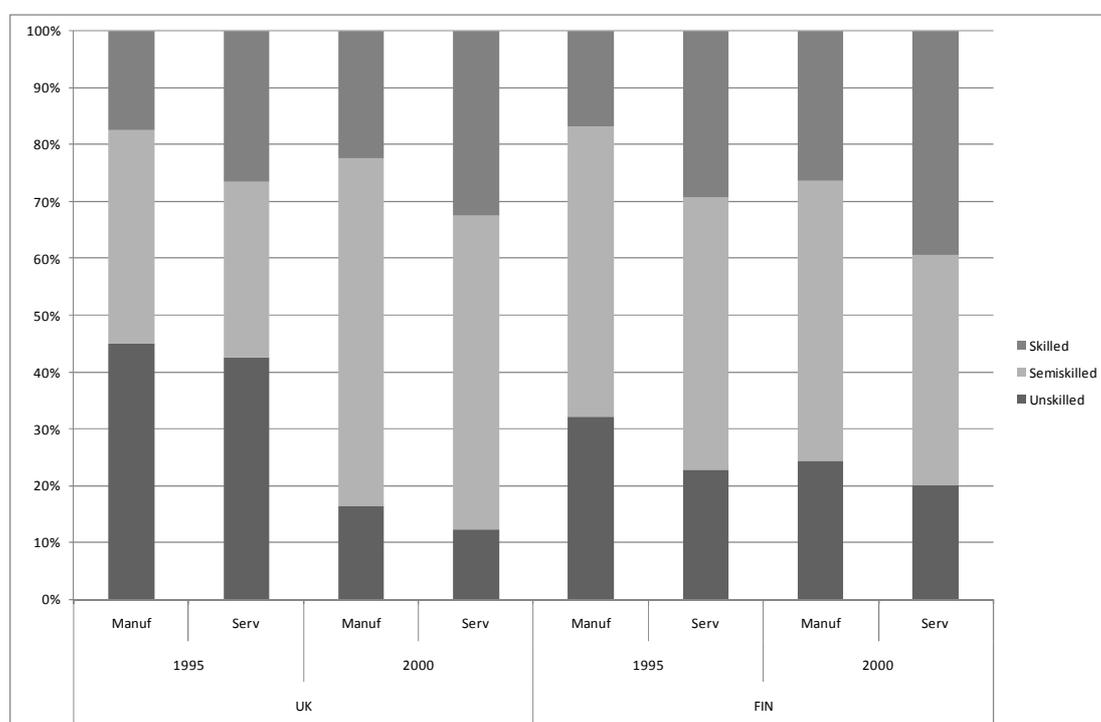
2.1 Employment patterns

34. The rising trade share of GDP during the most recent decade has taken place in an environment of rising employment/population ratios and a declining average unemployment rate in OECD countries. Thus, the average unemployment rate in the OECD fell from 7.8% in 1994 to 6.7% in 2005. However, this average masks large differences among countries, regions, and skill categories of workers. As already observed in Figure 2, the employment share in the services sectors has increased steadily over the past couple of decades, from 58% in 1980 to 70% in 2002 for the OECD as a whole.

35. Another important development is a structural shift towards more skills-intensive production technologies in both goods and services. This goes together with a continuous rise in educational attainment in all OECD countries. In Japan, for instance, the share of unskilled labour in total employment has declined dramatically from 1970 to 2002, from 46% to 14% in manufacturing and from 25% to 7% in services, while the share of employees with tertiary education increased from 14% to 29% in

manufacturing and from 24% to 46% in services during the same period (Ahn, Fukao and Ito, 2007). Comparable data on employment by skill level is not readily available for all OECD countries. Figure 7 compares the composition of employment in manufacturing and services in 1995 to 2000 for the United Kingdom and Finland. These two countries represent a large industrial and a small, technology-intensive, country.

Figure 7. Employment by skill level, 1995 and 2000, UK and Finland¹⁹



Source: OECD

36. Finland experienced a relatively large shift from unskilled to semiskilled and skilled workers during the 1990s following dramatic changes in its industrial structure and trade patterns. The shift in employment shares towards more skilled workers reflects higher educational attainment in both countries. Educational attainment has improved the most in Finland where the share of the labour force with tertiary education increased from 20.7% in 1995 to 31.6% in 2001. The corresponding increase for the United Kingdom went from 22.3% to 26.8%.²⁰ In Finland, the share of skilled workers in employment is larger than the share of skilled persons in the labour force, indicating that unemployment is concentrated among low-skilled workers, while in the United Kingdom the share of skilled workers in the labour force is about the same as in employment.

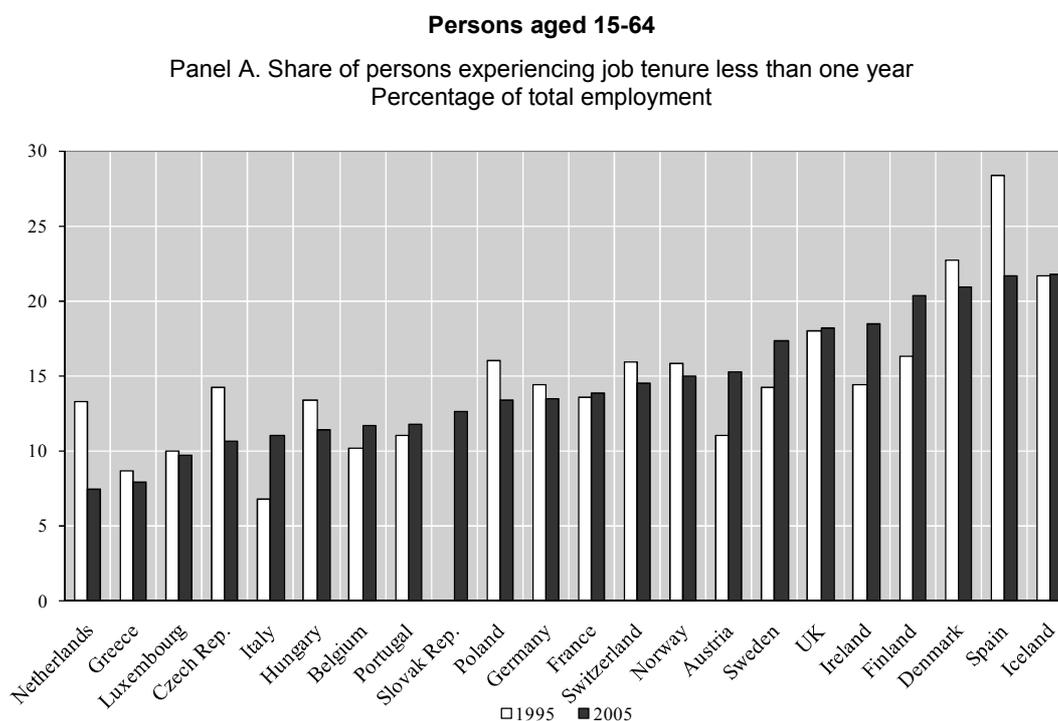
¹⁹ Unskilled is defined as workers with less than upper secondary education, semiskilled as workers with upper secondary education and skilled workers have tertiary education.

²⁰ Data on education attainment are from World Development indicators <http://devdata.worldbank.org/dataonline/>

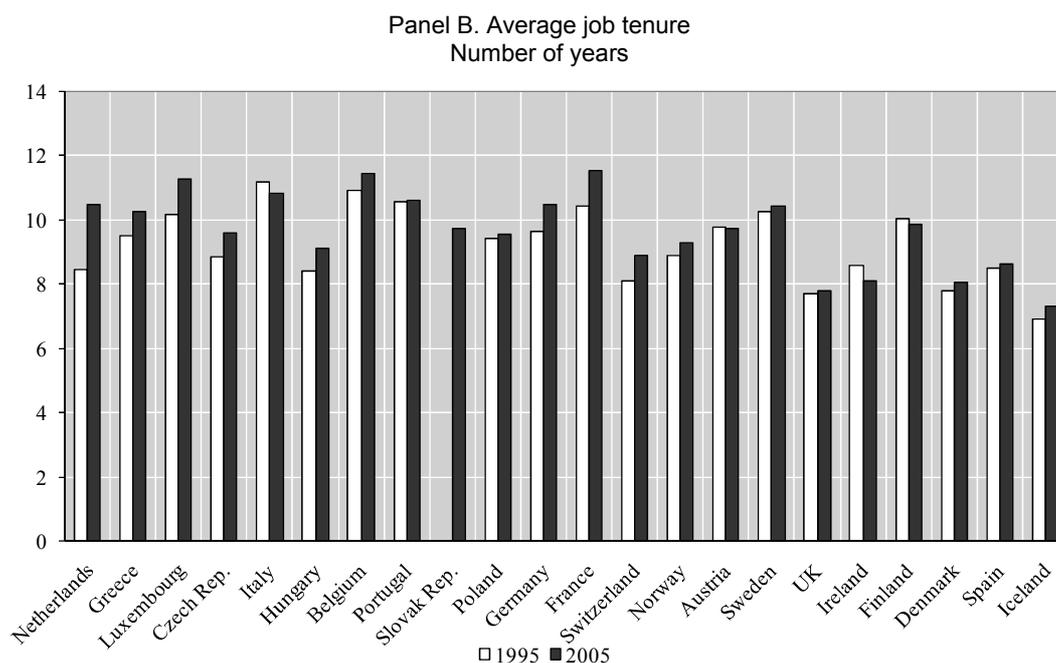
Job security

37. There is an ongoing debate as to whether jobs have become less secure over time. Figure 8 shows developments in two commonly used indicators of labour turnover and job stability (the share of workers with less than one year of job tenure and average tenure) during the past decade. Both measures suggest that overall job stability has not changed much.²¹ In the Netherlands, the Czech Republic and Spain job security increased, while in Italy jobs became less secure. For the other OECD countries for which data are available there were only minor changes.

Figure 8. Share of employed persons experiencing job tenure less than one year and average job tenure in OECD countries, 1995 and 2005



²¹. Both measures are likely to be affected by the demographic structure of the labour force. However, calculating these two indicators for prime-age men also indicated no clear trend in job stability.



a) 1996 for Switzerland; 1997 for the Czech Republic, Hungary and Poland.

b) Countries shown in ascending order of the share of employed persons experiencing job tenure less than one year in 2005.

Source: OECD database on job tenure.

38. Another indicator of job security or labour market volatility is the wage elasticity of labour demand. If this elasticity increases (in absolute terms) this means that demand for labour responds more strongly to changes in relative wages and thus makes workers more vulnerable to shocks that affect unit labour costs. As explained by Rodrik (1997) higher demand elasticities imply that labour carries a larger share of the burden from changes in production costs, even for changes that are not related to wages.

39. There is evidence that labour demand elasticity has indeed increased over the past decades. Slaughter (2001) calculated labour demand elasticities for the United States during the period 1961 to 1991 and found that demand for production labour has become more elastic during this period in the manufacturing sector as a whole, and in five out of the eight manufacturing industries analysed. However, he also found that demand for non-production workers has not become more elastic during the same period in any of the eight industries.

40. We extended this analysis to include 11 OECD countries and 21 sectors, including services, and analysed the period 1980-2002. Figure 9 shows the estimated elasticities. The estimates suggest that the elasticity of labour demand has significantly increased (in absolute value). The results are robust to various

specifications of labour demand.²² The estimated elasticities range from about 0.2, in absolute value, at the beginning of the sample to around 0.5 towards the end of the period, *i.e.* close to the usual range found in earlier studies of between 0.3 and 0.7 (Hamermesh, 1993). When we estimate the elasticity of labour demand separately for the manufacturing and the services sectors we find a very similar pattern for the manufacturing sector, as for the overall economy, but no clear evidence of an increase in the elasticity of labour demand in the services sector.²³

Figure 9. Labour demand elasticity (conditional)

Trend in the conditional wage elasticity of labour demand, three-year moving average on five-year differences, 1980-2002



Source: OECD estimates.

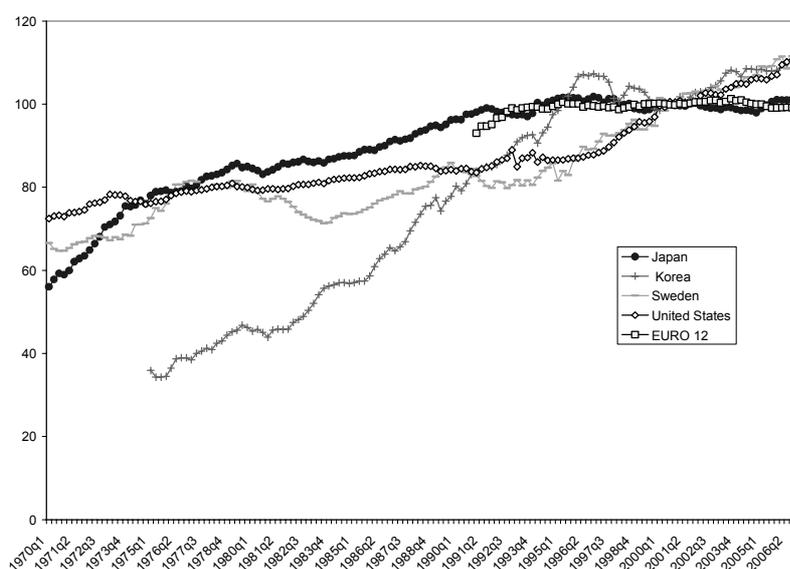
Trends in overall earnings and earnings inequality

41. Figure 10 shows quarterly data on real compensation per employee in the private sector in selected countries during the period 1970 -2006. Real compensation has stagnated in Japan and the Euro area since the early 1990s, while compensation has grown rapidly in Korea, although the Asian crisis in 1997 induced a temporary setback.

²² Conditional labour demand controls for output. In this specification the only way wages can affect labour demand is through substitution of labour for other factors of production. Unconditional labour demand allows wages to affect labour demand through both the substitution channels and through changes in total output.

²³ Due to limited data availability for individual services industries, any estimates for the services sector are not representative for the services sector as a whole as they are based on small samples. Industry accounted for about 26 % of total employment on average in the OECD area in 2002 (World Development Indicators). See OECD Employment Outlook 2007 Chapter 3 for further details.

Figure 10. Real compensation per employee, private sector, selected countries
Index, 2000 = 100



Source: OECD Economic Outlook database

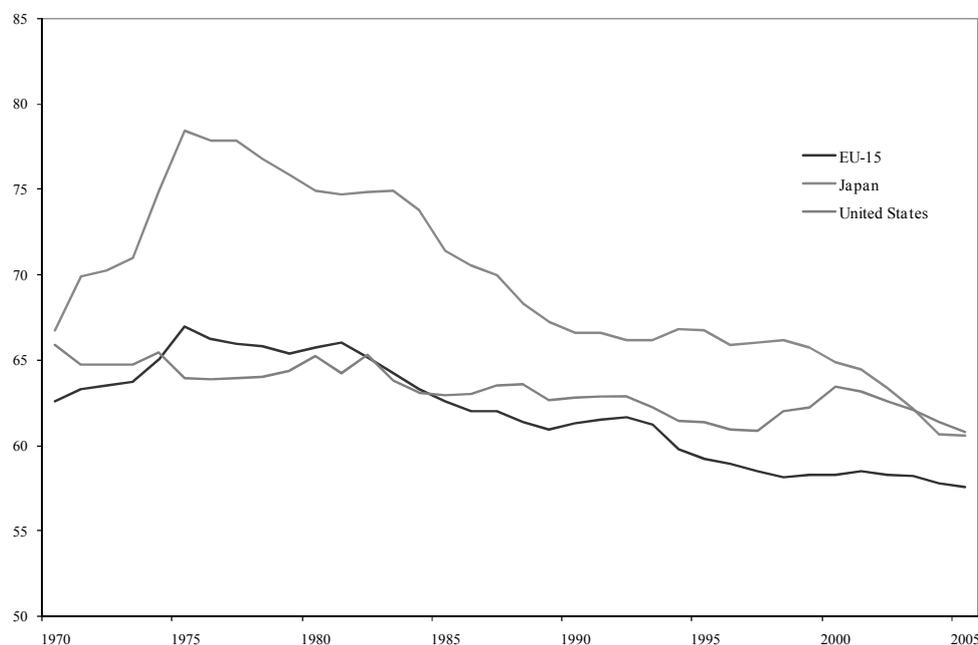
42. Figure 11 shows that the wage share of total income in the business sector has declined quite sharply since 1980 in the EU15, Japan and the United States. Of the 24 OECD countries for which this statistic can be calculated for the post-1990 period, almost all show some decline in the wage share and the decline is sharp in quite a few countries.

43. Earnings inequality has also been rising among workers. In 17 of the 20 countries for which data are available, the earnings of workers at the 90th percentile of the earnings distribution have risen relative to those of workers at the 10th percentile since the early 1990s, although often by only a modest amount (OECD, 2006). When decomposing the overall change into the contributions of increased dispersion in the upper and the lower halves of the distribution, essentially all of the increase in earnings dispersion since the mid-1980s has occurred in the top half of the earnings distribution, rather than uniformly across the distribution, as had previously been the case. The less detailed OECD data confirm that the cumulative increase in average inequality in the OECD since 1980 is almost exclusively due to more rapid growth in 90th percentile wages than in 50th. However, earnings inequality has not increased since 1980 in France and Japan.²⁴

²⁴ The OECD data on earnings inequality only reflect trends in the dispersion of earnings among full-time workers. In both France and Japan, there is considerable concern about the possibility that labour market inequality is rising along other dimensions (e.g. between permanent and temporary workers or between full- and part-time workers). See OECD Employment Outlook 2007, Chapter 3 for further details.

Figure 11. Wage share in national income, selected countries

Share of total wages and salaries in total value added in volume, business sector, percentage



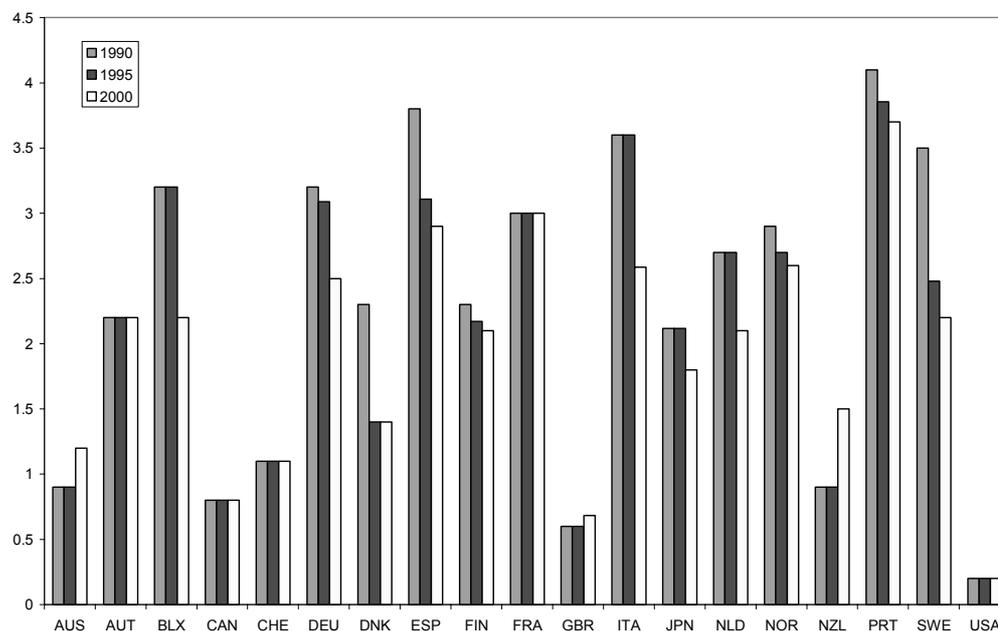
a) Total labour compensation, including employers' social security and pension contributions and imputed labour income for self-employed persons.

b) GDP-weighted average of the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Spain, Sweden and the United Kingdom.

Source: OECD Economic Outlook database.

2.2 Labour market regulation

44. It is finally useful to have a sense of developments in labour market regulation during the period of interest. Figure 12 below presents developments in the index for employment protection legislation (EPL). The EPL index is a composite of indicators on regulatory restrictedness related to hiring, firing and use of temporary and fixed term contracts. It contains information on procedures, notification and severance pay related to no-fault individual dismissals. In addition there are separate indicators for procedures related to collective dismissals. On temporary work the index contains information on maximum number of successive contracts, maximum duration, and types of work which temporary employment agencies are allowed to offer. The EPL takes values between 0 and 6, the higher the value the stronger is employment protection. We note that there are large variations among countries as far as employment protection is concerned, but not so much variation across time. This is a variable that has been found to affect labour market flexibility and it is therefore natural to control for the EPL when we explore the relation between trade and labour market adjustments in the next section.

Figure 12. Employment protection legislation index, select OECD countries

Source: OECD Employment Outlook Database

45. To summarise this section, on the positive side, total employment has increased relative to the total population, the unemployment rate has declined somewhat and there are no major changes in job tenure during the period of a rising trade/GDP ratio since the early 1990s. However, the labour share of national income has declined quite sharply in a number of countries and it appears that job security has declined somewhat at least for unskilled workers in the manufacturing sector.

III. HOW ARE TRADE AND LABOUR MARKET DEVELOPMENTS LINKED?

3.1 Predictions from trade theory

46. Trade theory predicts that trade will impact the industrial composition of employment. With open economies, countries specialise and become net exporters in sectors in which they have comparative advantage, while becoming net importers in sectors for which they do not have comparative advantage. This implies a reallocation of factors between sectors. Moreover, the gains from trade stem precisely from the reallocation of resources, including labour, towards their most productive use. When employment shrinks in the least productive activities and grows in the more productive activities, there may be dynamic gains from trade as well. If the most productive activities have a stronger growth potential than the sectors that shed labour, the average growth rate of the economy will rise as resources are reallocated.²⁵ Total employment, in contrast is according to trade theory not affected by trade, but is determined by domestic labour market conditions.

²⁵ See Nordås *et al.* (2006) for further discussions on dynamic gains from trade.

47. At the industry level, a negative correlation between import penetration and employment is predicted when trade is driven by comparative advantage and resources flow from import-competing to exporting sectors. Since workers' skills are often sector-specific and sometimes even firm-specific, the reallocation of resources is not painless for individual workers and adjustment costs can be considerable. Therefore, it is useful to establish empirically the linkages between job flows and trade in order to develop appropriate policies to ensure that the gains from trade as well as the adjustment costs are shared in a socially desirable way.

48. While trade is not expected to affect total employment, it may affect wages. When trade is driven by comparative advantage based on differences in relative factor endowments (the Hecksher-Ohlin model), the relatively abundant factor gains and the scarce factor loses. In most OECD countries the relatively abundant factors are human and physical capital, while the relatively scarce factor is unskilled labour. Thus, whenever an OECD country engages in trade driven by comparative advantage with an emerging economy, unskilled workers are expected to lose, while owners of human, physical and financial capital are expected to gain.

49. However, the Hecksher-Ohlin model does not fit the empirical facts well (Feenstra, 2003).²⁶ It turns out that differences in technology between countries need to be taken into account in order to capture observed patterns of trade and specialisation.²⁷ As a result, the relationships among trade, factor prices and factor demand become more complex, but it is nevertheless the case that earnings are based on productivity, valued at international prices in open markets. As mentioned in Section 1, terms of trade have moved in OECD's countries' favour over the recent past. And even in the absence of favourable terms of trade movements, real earnings rise with improvements in productivity, as for instance emerging Asia has experienced.

50. Not all trade is based on comparative advantage. In trade between similar countries, notably within the OECD, product differentiation and economies of scale are a driving force in their own right. When economies of scale are present, international trade broadens both consumer choice of goods and services and firms' supplier base, particularly in smaller countries where the extent of specialisation otherwise would be limited by the size of the domestic market. Thus, even if countries were exactly the same in terms of factor endowments and technology, they would still gain from trade. Trade based on product differentiation alone leads to reallocation of factors between firms within a sector rather than between sectors. The most productive firms will expand into export markets, while less productive firms that service the home market only will contract since they face increased international competition. The least productive firms will exit (Melitz, 2003). Presumably there is a better match between skills required in the old and new jobs of workers moving within a sector than between sectors, and adjustment costs may therefore be smaller.

51. When product differentiation is combined with comparative advantage, the labour market implications are more pronounced. Offshoring is a case in point. When production of parts, components, modules and the performance of tasks are distributed among different countries based on their comparative advantage, the labour market consequences differ from those predicted by traditional (neoclassical) trade theory. When tasks vary in terms of capital and skills intensity, the demand for skilled labour may increase on both sides of the offshoring transaction. High-income countries with a relative abundance in skills will

²⁶ In Feenstra's advanced textbook in international economics he states that "...the Hecksher-Ohlin model is hopelessly inadequate as an explanation for historical or modern trade patterns unless we allow for technological differences across countries." [p. 1]

²⁷ I.e. Ricardian comparative advantage needs to be taken into account, suggesting that technical differences persist even in open economies. Technology diffusion is in other words not automatic between trading partners.

offshore the least skills-intensive tasks first. This will shift relative labour demand from low-skilled to high-skilled workers. However, from the developing trading partner's point of view, the tasks being offshored may well be skills-intensive relative to its endowments. Consequently, labour demand may shift in the direction of skilled labour there as well and offshoring may induce a global shift in labour demand towards more skilled workers. This effect has, for instance, been documented in trade between the United States and Mexico (Feenstra and Hanson, 1997; 2003).

52. The complexities of modern trade and investment patterns cannot easily be captured in the traditional two-country, two-sector, two-factor models. Markusen and Venables (2007) have developed a multi-sector, multi-country model of trade and investment that provides richer and arguably more realistic predictions. One important insight from this model is that there is not necessarily a one-to-one relationship between the gains from trade and trade volumes. Consumer needs and preferences are presumably more similar than countries' resource endowments and technical capacity. Therefore, the difference between free trade world market prices and autarky domestic prices is larger the further away from the world average relative factor endowments a country is, and gains from trade will consequently be larger. However, countries close to the world average may well have higher trade volumes when their trade is driven by product differentiation and economies of scale.

53. Another important insight is that the relationship between trade costs and trade is non-linear. A reduction in trade costs can trigger deepening specialisation, for instance fragmentation of production and export platform foreign direct investment, and not merely an expansion of existing trade flows. This will boost trade relative to GDP. Furthermore, as discussed in Section 2, relatively small changes in trade costs and improvements in communication and supply chain management technology can trigger trade expansion at the extensive margin (Yi, 2003). Reducing tariffs from a low rate, say below 5%, to zero may for instance have a relatively large effect on trade if costly customs procedures are also substantially reduced or eliminated.

54. While most countries gain from trade liberalisation and technical changes that induce vertical specialisation or offshoring, one group of countries may lose. These are countries that had a comparative advantage for integrated production in the sector that has become fragmented, but do not have a particular advantage either for components nor assembly. We now turn to an empirical analysis of the relationship between the observed changes in trade patterns and labour market developments.

3.2 Empirical evidence on the relationship between trade, employment and wages

Does trade affect unemployment?

55. As already noted in Section 2, total employment has increased and the rate of unemployment has declined in the OECD area since the early 1990s. In order to explore possible linkages between openness and unemployment, we correlated the unemployment rate with a number of measures of openness (export share of GDP, import share of GDP, total trade as a share of GDP, services trade as a share of GDP and trade taxes as a share of total government tax revenue). We also regressed the unemployment rate on all these variables, using country fixed effects. The partial correlations between these and unemployment were all less than 0.1 in absolute value and none were statistically significant.²⁸

²⁸ The partial correlation coefficients were estimated on a dataset of all the OECD countries with annual observations during the period 1970-2005. Unemployment data and data on real compensation of workers are from the OECD Economic Outlook database, trade indicators are from the World Development Indicators.

56. A more detailed analysis of individual job separations finds that international competition does increase the probability of job-to-unemployment transition as well as the job-to-inactivity transition. When controlling for job tenure and workers' skills, it is found that the impact is only significant for workers with less than 5 years tenure and for low-skilled workers. For medium and high skilled workers in stable jobs, foreign competition had no impact on the probability of involuntary job separation.²⁹ We conclude that there is no evidence that trade has an effect on the unemployment rate, as expected. However, increased foreign competition has increased the probability of involuntary job separation among unskilled workers with low job tenure somewhat, at least in the 13 European countries that were covered by the analysis.

Does trade affect real wages?

57. Data on real compensation of employees is available for most OECD countries for the period 1970-2005, where compensation is reported as an index which takes the value 100 for all countries in the year 2000. In order to explore the extent to which trade affects real wages, annual changes in this index were correlated with both the levels and annual changes in openness indicators.³⁰ Here we find that there is a negative correlation between changes in real compensation and changes in openness. The coefficients suggest that an increase in the trade/GDP ratio of 10% is associated with 1% lower real wage growth. Openness explains only about 4% of the variation in real wage growth among OECD countries, however.

58. A more detailed analysis using household data supports this finding. These data allowed econometric analysis at the level of the individual worker. Industry-specific exchange rates were used as a proxy for foreign competition. It was found that a depreciation (appreciation) of the industry-specific exchange rate of 1 % increases (reduces) average annual earnings by about 0.01 %.³¹

3.3 How does trade affect reallocation of workers?

59. The most direct and measurable effect of trade on employment, and the effect that tends to grab the headlines is the relationship between import penetration and jobs in a given sector. If imports replace locally produced goods or services, local employment could decline in the sector. However, as already noted, when trade is driven by economies of scale and product differentiation, local firms will specialise on a narrower product range within a sector, export a larger share of their output at the same time as imports gain a larger market share at home. In that case there will be reallocation of workers within the sector, but the net effect at the sector-level is an empirical question that can be determined by unconditional labour

²⁹ The measure of foreign competition used in these regressions was industry-specific exchange rate. It is calculated as the trade-weighted real exchange rate for the industry in question. Since sectors differ as to which are the most important trading partners, the trade-weighted real exchange rates will differ across sectors. For example British car manufactures will be more affected by changes in the £/€ exchange rate than the £/Renminbi exchange rate, while the opposite is true for the electronics industry. See Kline et al. (2003) for further discussion on the use of industry-specific exchange rates as a measure of foreign competition. The analysis uses the European Community Household Panel, which is a longitudinal survey of households and individuals conducted by EUROSTAT covering the period 1994-2001 for 13 European countries. The details of this analysis are presented in OECD Employment Outlook 2007, chapter 3.

³⁰ We did first difference, country fixed effect regressions on the real compensation index and the same measures of openness as in the regressions on unemployment.

³¹ A depreciation of the exchange rate makes imports relatively more expensive and thus improves the competitiveness of local firms, while an appreciation has the opposite effect. The technical details of this analysis are explained in OECD Employment Outlook 2007 Chapter 3.

demand regressions. Such regressions explore the change in labour demand as a function of factor prices, and measures of foreign competition.³²

60. Labour market policies as well as product market regulation affect how fast labour demand adjusts to changes in factor prices. The employment protection legislation index and indices of entry barriers presented in Section 2 are introduced in the regressions to capture how these variables shift sectoral labour demand. Entry barrier and employment protection legislation variables are finally interacted with import penetration, while tariffs are interacted with employment protection legislation. This enables us to explore the extent to which labour demand responds to changes in international competition differently depending on labour market legislation and product market regulation.

61. Another channel through which import penetration can affect jobs is increased competition and thereby pressure to reduce costs. This effect will most likely manifest itself as an increase in labour productivity and can be studied empirically using conditional labour demand, which captures how producers chose their input mix to minimise unit costs. The regressions control for output and thereby do not capture the impact of trade on total production. We introduce the same control and policy variables for these regressions as for the unconditional labour demand regressions. The results of both conditional and unconditional labour demand are reported in Table 2. Panel A presents the results of regressions in 5-year differences to control for the effect of business cycles, while Panel B represents results for fixed effect OLS regressions. Ideally, 5-year differences should be used for all regressions, but the policy variables we are interested in only have observations for a few years since the late 1990s.

Table 2. Regression results, labour demand, import penetration and regulation

	Panel A. Panel data, five-year difference-variables, 1987-2003							
	Conditional				Unconditional			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wage	-0.23***	-0.23***	-0.25***	-0.24***	-0.01**	-0.01	-0.01**	-0.01
Capital stock	0.11	0.13	0.09	0.10	0.03	0.04	0.04	0.01
Price material inputs	0.19***	0.18***	0.21***	0.20***	0.05	0.09	0.06	0.10*
Output	0.20***	0.18***	0.22***	0.20***				
R&D intensity	-0.15**	-0.14***	-0.16**	-0.14***	-0.13*	-0.21***	-0.13*	-0.21***
Import penetration	0.00		0.00		-0.00		0.00	
Import penetration, High		-0.05**		-0.05**		-0.02**		-0.01*
Import-share non-OECD			-0.05***				-0.08**	
Import share non-OECD, high				-0.01				-0.01*
Employment protection	0.00		0.00		-0.4***		-0.04***	
Employment protection, high		-0.05***		-0.04***		-0.03***		-0.03***
Observations	1825	1825	1805	1805	1175	1185	1175	1175
R-squared	0.25	0.27	0.27	0.29	0.23	0.28	0.24	0.23

³²

Firms are assumed to choose inputs and production levels so as to maximize profits. Technically speaking labour demand is derived from setting the partial derivative of the profit function with respect to employment to zero, which yields labour demand as a function of factor prices, controlling for the capital stock. Import penetration and various labour and product market policy variables are introduced as shift parameters. See OECD Employment Outlook chapter 3 for further details on the methodology. This paper extends on the Employment Outlook chapter by introducing relevant policy variables and interaction terms between policy variables and openness.

	Panel B, OLS regressions, fixed effects, Panel 1998, 2003			
	Conditional		Unconditional	
	(1)	(2)	(3)	(4)
Wage	-0.54***	-0.47**	-0.14	-0.09
Capital stock	0.04	0.11	0.06	0.13
Price material inputs	0.10	0.05	-0.27	-0.30
Output	0.52***	0.52***		
R&D intensity	0.31	0.97	-0.62	0.12
Import penetration (m)	-0.05	-0.15**	-0.09*	-0.20**
Product market regulation (pmr)	0.14***	0.13***	0.08*	0.06
Interaction import m* pmr		0.04**		0.04
Observations	316	316	316	316
R-squared				
within	0.56	0.63	0.20	0.29
between	0.91	0.89	0.56	0.68
Overall	0.91	0.90	0.53	0.66

Note: ***, **, * represent statistical significance at a 1, 5 and 10% level respectively.

62. Conditional labour demand measures how import penetration and other variables of interest shift labour demand for a given output level. It is therefore essentially a measure of how labour productivity relates to international competition. If labour demand per unit of output declines, labour productivity increases. It is first noted that R&D intensity is negatively associated with conditional labour demand, suggesting that resulting technology is labour-saving. Import penetration has no significant impact on labour productivity when included in the regressions as a continuous variable (column 1). However, when replacing import penetration with a dummy that takes the value of unity when import penetration is larger than average and zero otherwise, there is a small negative impact on conditional labour demand and hence a positive impact on labour productivity (column 2). This implies that the relationship between labour productivity and import penetration is non-linear and before a certain threshold level is reached there is no discernible impact.³³ A similar result is found for the relationship between employment protection and conditional labour demand. There is a statistically significant negative relationship (and positive for productivity) when employment protection is high, but not when it is below average.

63. Although the aggregate level of import penetration does not matter for labour productivity unless it is high, the sourcing of imports may matter. In order to investigate to what extent the rising share of emerging economies in OECD imports has a different impact on labour demand than imports on average, the share of imports coming from non-OECD countries was introduced as a separate variable (column 3). When sourcing shifts towards developing countries, there is a significant positive impact on labour productivity (i.e. labour demand per unit of output declines). However the results presented in column 4 suggest that when import penetration is already high, it does not matter where imports come from. This latter finding suggests that countries that are already open are less affected by the integration of emerging economies in the international economy.

64. The results are similar for unconditional labour demand, suggesting a small negative shift in labour demand when import penetration is high and when sourcing of imports shifts towards non-OECD countries. It is worth noting that employment protection shifts labour demand downwards at all levels of protection, although the shift is small.

³³ An interaction term between import penetration and employment protection was introduced in order to investigate whether labour demand elasticities are different, but the interaction term turned out to be insignificant (regression not reported in the table).

65. Panel B explores the impact of product market regulation on conditional and unconditional labour demand. As argued in Section 1.3 above, tariff barriers had already been reduced to 2-5% during the Tokyo Round of WTO negotiations, and remaining trade barriers are mainly non-tariff measures, the effects of which can be instrumented by product market regulation indices. Data on product market regulation is available for 1998 and 2003 only. We used fixed effect regressions in order to control for unobserved, time-invariant country and sector characteristics. Product market regulation tends to shift conditional labour demand upwards. Hence the more regulated are markets, the lower is labour productivity. Furthermore, the results presented in column (2) suggest that the labour market impact of increased import penetration depends on the level of product market regulation. The more restrictive the product market regulation, the smaller the change in labour productivity following an increase in import penetration. The product market regulation indicator observed in our dataset ranges from 0.9 to 3.9. The marginal impact of an increase in import penetration in the least restrictive countries is thus $-0.15 + 0.04 \cdot 0.9 = -0.114$, while in the most restrictive countries the marginal impact will be $-0.15 + 0.04 \cdot 3.9 = 0.006$, or next to no impact.

66. The results reported in Panel B for suggest that unconditional labour demand is mainly determined by sector-specific characteristics picked up by the fixed effects, while import penetration appears to have a negative impact. We also included the other policy variables discussed in section 1.3 into the OLS regressions. However these did, , not produce significant and robust results as the number of observations became too small. The World Bank Doing Business indicators could only be used in cross-section regression for 2003, while the indicators that apply to services only turned out to have too few observations for meaningful results.

Is offshoring different?

67. The labour market impact of offshoring is explored by estimating conditional and unconditional labour demand in a similar way as above. The measure of foreign competition introduced here is imports of intermediate inputs relative to value added in the sector. These measures are estimated from the OECD input-output tables from 1995 and 2000 and capture the substitution of local for foreign value added in the production of goods and services. A distinction is made between narrow and broad offshoring, where broad offshoring includes all imported intermediate inputs used in a sector, while narrow offshoring includes imported intermediate inputs from the same sector only (*i.e.* in the diagonal cells in the input-output matrix). We also distinguish between offshoring of goods and services and between intermediate imports from OECD and non-OECD countries.³⁴

68. While imports of final goods can indirectly impact productivity through increased competition, imports of intermediate inputs also directly impact productivity by replacing local intermediate inputs with lower-cost or better inputs.³⁵ One would therefore expect that offshoring is negatively related to conditional labour demand (or equivalently, positively related to labour productivity). Lower costs may increase demand for the final output and thereby expand output, an effect that is allowed for in the unconditional labour demand regressions. The relationship between unconditional labour demand and offshoring is therefore not determined *a priori*. The speed to which markets adjust to the opportunities that offshoring brings depends on employment protection and other regulatory measures, and we introduce these as separate variables and as interaction terms with import penetration in the same way as in the regressions reported in Table 2.

³⁴ Market shares of OECD countries of the product in question are applied in order to split total intermediate imports between OECD and non-OECD sources.

³⁵ Assuming that the firms minimise costs/maximize profits, they would presumably not offshore unless imported inputs are cheaper, better, or both than local inputs.

Table 3. The estimated relation between offshoring and labour demand

All industries							
Panel A. Conditional							
	(1)	(2)	(3)	(4)	(5)	(6)	
Wage	-0.48***	-0.30 ***	-0.47***	-0.46***	-0.45***	-0.69***	
Price material inputs	0.41***	0.29***	0.38***	0.36***	0.35***	0.27***	
Output	0.14***	0.13***	0.18***	0.12***	0.13***	0.14***	
Capital	0.28***	0.24***	0.28***	0.27***	0.28***	0.57***	
R&D	0.10*	0.09*	0.11*	0.08	0.08	0.10*	
Offshoring broad	0.02**						
Offshoring narrow		-0.04***					
Offshoring materials			0.03**			-0.01	
Offshoring services			-2.38***			-0.53	
Offshoring broad OECD				0.09***			
Offshoring broad non-OECD				-0.36***			
Offshoring materials, broad, OECD					0.10***		
Offshoring materials, broad, non OECD					-0.40***		
Offshoring services, broad, OECD					-1.55		
Offshoring services, broad, non-OECD					0.61		
Entry barriers						-0.00	
Interaction Entry*offshoring services						-0.26***	
Observations	253	251	253	253	253	223	
Adj. R-squared	0.40	0.43	0.42	0.44	0.44	0.58	
Panel B. Unconditional							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Wage	-0.28**	-0.39***	-0.24*	-0.27**	-0.26**	-0.33***	-0.32**
Price material inputs	0.17	-0.09	0.02	0.13	0.13	-0.01	0.0
Capital	0.27***	0.25***	0.13***	0.27***	0.27***	0.48***	0.54***
R&D	0.08	0.09	0.29	0.06	0.06	0.07	0.07
Offshoring broad	0.05***						
Offshoring narrow		-0.05***					
Offshoring materials			-0.05***			0.01	0.01
Offshoring services			-0.73			0.54	1.04
Offshoring broad OECD				0.12***			
Offshoring broad non-OECD				-0.40***			
Offshoring materials, broad, OECD					0.12***		
Offshoring materials, broad, non OECD					-0.40***		
Offshoring services, broad, OECD					-0.31		
Offshoring services, broad, non OECD					-2.24		
Employment protection (epl)						0.0	
Interaction epl services offshoring						-0.50***	
Entry barriers							0.0
Offshoring services, broad_entry							-0.27**
Observations	253	251	193	253	253	231	223
Adj. R-squared	0.33	0.39	0.41	0.38	0.38	0.51	0.53

Note: ***, **, * represent statistical significance at a 1, 5 and 10% level respectively.

69. Panel A presents the results of the conditional regressions, which can be interpreted as the relationship between offshoring and labour productivity. The first column presents the core regression where the shift variable is broad offshoring of goods and services. All the variables have the expected sign and offshoring in this case is related to a statistically significant positive shift in conditional labour demand – or a reduction in labour productivity. The marginal effect is, however, small. The second column indicates that narrow offshoring is positively related to labour productivity, although again the marginal

effect is relatively small. When distinguishing between goods and services offshoring, only services offshoring is statistically significant and is relatively strongly related to (an increase in) labour productivity (conditional labour demand declines). When distinguishing between sourcing from OECD and non-OECD countries, it is found that broad offshoring to non-OECD countries has a statistically significant positive impact on labour productivity, while no effect was found for broad offshoring to OECD countries. When distinguishing between both services and material offshoring and geographical sourcing, material offshoring to non-OECD countries had the strongest (positive) impact on labour productivity.

70. Employment protection legislation and entry barriers did not have a significant impact on conditional labour demand, but the interaction term between services offshoring and entry barriers is significantly and negatively related to conditional labour demand (or positively related to labour productivity). In other words, the productivity effect of services offshoring is stronger in countries with high entry barriers. A possible explanation is that high entry barriers are less likely to encourage creative destruction and more likely to induce cost-cutting in existing firms in the event of increased foreign competition. Another intuitively plausible explanation is that less flexible markets induce firms to outsource and offshore. If the survey discussed in Box 1 is representative, firms offshore in order to gain flexibility in production. The less flexibility regulation allows, the stronger the motive for offshoring. If so, causality may run both ways.

71. Panel B presents the regression results for unconditional labour demand, where output is allowed to adjust to changes in the composition of intermediate inputs. Here it is indicated that broad offshoring increases total employment in the sector slightly, while the opposite is true for narrow offshoring. When distinguishing between material and services offshoring, only material offshoring is statistically significant, while when distinguishing between OECD and non-OECD sources of inputs, non-OECD offshoring has the largest impact, although the effect is only statistically significant for broad offshoring. Finally, when distinguishing between both goods and services and OECD and non-OECD sources, only offshoring of materials is statistically significant and offshoring to OECD countries increases labour demand while offshoring to non-OECD countries has a negative effect (column 5).

72. The regulatory measures did not have any statistically significant impact on labour demand on their own, but when interacted with services offshoring there was a negative relation. This finding indicates that the stronger the employment protection and the higher the entry barriers in the economy, the more will services offshoring reduce labour demand. Reverse causality cannot be ruled out, however. If so, stronger employment protection and higher entry barriers may increase firms' propensity to offshore in order to remain competitive in a market with uncertainties about output demand. Remaining competitive in such circumstances means having flexibility as far as production volume is concerned as illustrated in Box 1.

Trade employment and structural changes – input-output analysis of Finland and the UK

73. Another method of assessing the relationship between trade and employment where also the contribution of exports to job creation can be analysed, is to calculate employment multipliers from input-output tables. Input-output tables provide information on the distribution of output on domestic and foreign demand and interrelationships between sectors through backward and forward linkages. In addition the tables provide information on imports of final and intermediate goods. The input-output tables are complemented with data on employment by skill level. Unfortunately these are only available for the United Kingdom and Finland for the years and sector classification of the input-output tables. Evidence from other studies under this project suggests that they are representative for the OECD area.³⁶

³⁶ See Ekholm and Hakkala (2007), and Ahn *et al.* (2007).

74. It is important to notice up-front that the analysis cannot derive causal effects, but nevertheless provide useful insights on the contribution of exports and offshoring to changes in employment patterns relative to changes in productivity and domestic demand. The input output table is first aggregated into seven sectors: primary, other manufacturing, machinery manufacturing, construction, transport and distribution services, business services and social services.³⁷ Employment by skill level and sector in 1995 and 2000 is presented in Table 4.

Table 4. Employment by sector and skill level, UK and Finland, thousand employees

Panel A UK

	Primary	Other Manufacturing	Machinery	Construction	Transport & distribution	Business services	Social services	Total
1995								
Low	377.2	1469.9	743.8	696.8	3587.8	1457.7	2763.2	11096.4
Medium	184.3	1105.1	740.7	1075.5	2187.9	1387.6	2102.6	8783.8
High	83.3	452.9	406.4	289.4	609.6	1243.9	3023.8	6109.3
Total	644.8	3027.9	1890.9	2061.8	6385.2	4089.2	7889.6	25989.4
2000								
Low	155.2	506.9	269.4	282.0	1227.5	395.4	862.8	3699.2
Medium	274.1	1692.4	1209.5	1557.6	4660.9	2594.5	4038.2	16027.2
High	96.6	574.2	491.3	361.0	857.8	1920.4	3834.1	8135.4
Total	525.9	2773.5	1970.2	2200.6	6746.3	4910.3	8735.1	27861.8
Percentage change 1995-2000								
Low	-58.8%	-65.5%	-63.8%	-59.5%	-65.8%	-72.9%	-68.8%	-66.7%
Medium	48.7%	53.1%	63.3%	44.8%	113.0%	87.0%	92.1%	82.5%
High	16.0%	26.8%	20.9%	24.7%	40.7%	54.4%	26.8%	33.2%
Total	-18.4%	-8.4%	4.2%	6.7%	5.7%	20.1%	10.7%	7.2%

³⁷

Primary includes ISIC rev 3 sectors 01-14 (agriculture, forestry, fisheries, mining), other manufacturing includes sectors 15-28 (food, beverages, tobacco, textiles, clothing, wood, pulp and paper, printing, petroleum refining, chemicals, rubber and plastic, non-metallic mineral products, basic metals, fabricated metals), machinery contains sectors 29-37 (machinery), construction includes sectors 40-45 (electricity, gas, water, construction), transport and distribution services include sectors 50-63 (retail and wholesale trade, travel, hotels and restaurants, transport), business services include sectors 64-74 (finance, insurance, real estate, computer services, R&D, other business services). Finally social services comprise ISIC sectors 75-97 (public administration, health, education, other community, social and personal services).

Panel B. Finland

	Primary	Other Manufacturing	Machinery	Construction	Transport & distribution	Business services	Social services	Total
1995								
Low	75.9	102.4	29.8	48.0	125.9	68.0	103.2	553.2
Medium	74.4	141.1	69.7	64.6	207.8	120.7	296.1	974.4
High	10.5	38.3	31.0	26.4	47.1	68.2	266.6	488.1
Total	160.9	281.9	130.5	138.9	380.8	256.9	665.9	2015.7
2000								
Low	55.7	85.9	31.1	55.1	142.2	67.4	101.3	538.7
Medium	76.4	153.5	83.6	86.9	231.3	116.8	286.1	1034.5
High	18.8	69.5	56.8	33.1	108.7	152.2	354.3	793.3
Total	150.9	308.8	171.5	175.1	482.1	336.4	741.7	2366.5
Percentage change 1995-2000								
Low	-26.6%	-16.2%	4.5%	14.9%	12.9%	-0.9%	-1.8%	-2.6%
Medium	2.7%	8.8%	19.9%	34.5%	11.3%	-3.2%	-3.4%	6.2%
High	78.5%	81.4%	83.4%	25.5%	130.6%	123.3%	32.9%	62.5%
Total	-6.2%	9.6%	31.5%	26.0%	26.6%	31.0%	11.4%	17.4%

Source: European Labour Force Survey and OECD

75. In all sectors in both countries there is a shift from low-skilled to medium and high-skilled labour demand (see footnote related to Figure 7 for definition of skills categories). Total employment has increased by about 7% in the UK and 17% in Finland, but employment of low-skilled workers has declined in absolute terms in both countries, sharply so in the UK and modestly so in Finland. The two countries differ on the relative shifts towards medium and high-skilled workers, however. In the UK, employment of medium-skilled workers increases the most, while high-skilled workers see by far the largest gains in Finland.

76. How much of these structural changes can be associated with developments in international trade? The question is addressed by first estimating the employment impact of changes in exports from 1995 to 2000. Technically this is done by estimating the change in labour demand by sector and skills category resulting from the observed change in exports from 1995 to 2000, keeping everything else constant.³⁸ Thus, unit labour demand and the backward and forward linkage structure are kept at their 1995 levels. The technique captures both direct and indirect effects of a change in export demand through the linkages between the exporting sectors and their suppliers. The results are presented in the first column in Table 5. In Finland export demand has contributed quite strongly to job creation in manufacturing and to a lesser extent in the primary sectors and business services. For the other sectors job creation due to changes in export demand stem from indirect effects through backward linkages from other sectors as exports actually declined in real terms in construction, transport and travel services and social services. In the UK changes in export demand have also contributed to job creation, but to a smaller extent than in Finland, and in manufacturing other than machinery, there is a negative employment effect. Perhaps surprisingly, in both countries job creation due to changes in export demand in terms of percentage changes has been strongest for low-skilled labour.

³⁸ Final domestic demand is deflated by the GDP deflator, while exports are deflated by the export price index from the OECD Economic Outlook database in order to compare real values in 1995 and 2000.

77. Our second experiment was to estimate the employment effect of changes in exports during the period 2000 to 2005. For this purpose we used data on trade in goods from the UN Comtrade database and for trade in services from OECD statistics on trade in services and deflated the figures by the export price index for goods and services. The employment effect was found by estimating the effect of this change in final demand keeping domestic demand, technical coefficients and direct labour inputs constant at the 2000 level. The results are presented in the second column in Table 5. Exports grew faster during this period than the five-year period before, and the employment effect is also larger in both countries. While the skills composition of job creation is similar to the previous period, there are some noticeable differences in sectoral composition. In particular exports have contributed strongly to job creation in manufacturing in the UK, and business services in Finland.

78. We finally estimated the employment effect of offshoring between 1995 and 2000. Here we kept final demand, direct labour input and the technical input-output coefficients constant at 1995 level and changed the foreign market share of intermediate demand to the 2000 level. The estimates thus capture the direct and indirect impact of changes in offshoring on employment, everything else equal. The results are presented in the third column in Table 5. As one would expect, the employment effect is negative, but the overall changes are not very large. In both countries low-skilled labour are affected the most, but also medium skilled and to a lesser extent high-skilled workers were affected by offshoring. Among sectors the largest impact is in the primary sectors. It is also noticeable that in the UK there is a small but positive impact of offshoring on job creation in business services.

Table 5. Estimated employment effects of exports and offshoring, % change, Finland and the UK

	Change in exports 1995-2000		Change in exports 2000-2005		Change in offshoring 1995-2000	
	Finland	UK	Finland	UK	Finland	UK
By skills						
Low	9.5	3.4	15.8	9.3	-4.2	-0.5
Middle	8.6	3.0	14.6	8.9	-2.9	-0.5
High	6.0	2.5	13.3	8.0	-1.4	-0.1
Total	8.2	3.0	14.4	8.7	-2.9	-0.4
By sector						
Primary	15.6	6.7	18.9	19.6	-21.8	-5.6
Manufacturing other	19.2	-6.6	21.7	24.6	-4.2	-2.0
Manufacturing machinery and equipment	45.1	3.5	26.0	20.7	-4.8	-3.4
Utilities and construction	1.5	0.9	9.3	3.3	-0.4	0.0
Travel, transport and distribution services	2.1	8.0	14.0	4.4	0.1	-0.1
Business services	5.9	6.6	30.6	16.5	-1.2	0.4
Social services	0.4	1.0	2.0	0.6	-0.3	0.4
Total	8.2	3.0	14.4	8.7	-2.9	-0.4

79. Comparing Tables 4 and 5, it is clear that exports and offshoring explains only a small fraction of total job creation and destruction during the period in question. The by far most important factors behind the changes in employment between skills categories and sectors are changes in domestic demand and direct labour inputs per unit of output, i.e. labour productivity.

80. Feenstra and Hong (2007) did similar calculations using Chinese input-output tables and found that export growth can explain about a third of job growth in China during the period 1997-2002. But also

in China domestic demand and productivity improvements accounted for the largest changes in job creation and job destruction respectively.³⁹

Summary

81. The findings on the relationship between trade and employment can be summarised as follows:

- Our study did not find any statistically significant relationship between overall employment or the unemployment rate and trade;
- The rising share of non-OECD countries in OECD imports, particularly services offshoring, is found to improve labour productivity in OECD countries. The impact on labour productivity is larger the stronger is employment protection and barriers to entrepreneurship. A likely explanation is that labour productivity needs to increase more in order to remain competitive in the face of foreign competition the higher the cost of hiring and firing;
- Import penetration is not found to have a significant impact on labour demand in general, but offshoring of materials to non-OECD countries has a negative impact on employment in the offshoring sector.
- Services offshoring may negatively impact employment in the sector in question when employment protection and entry barriers are high, but not otherwise.
- The major impact of services offshoring to non-OECD countries appears to be an increase in productivity and probably competitiveness in the offshoring sector.

82. Combining these findings it appears that the rising share of imports relative to GDP and the rising market share of emerging markets have reduced costs in OECD countries, indirectly through more competition and directly through lower costs of inputs. Whether or not the improvements in labour productivity (i.e. lower labour demand per unit of output) result in lower total employment in the sector in question appears to depend on employment protection and barriers to entry. Both strong employment protection and high barriers to entrepreneurship tend to protect those that already have a job and incumbent firms, while making it more difficult for newcomers to enter. Another possible and not mutually exclusive explanation is that regulation related to employment and start-ups induce incumbent firms to invest in labour-saving technology in the event of increased competition from imports.

83. Finally, the relatively small marginal effect of trade and offshoring on unconditional labour demand reflects the importance of intra-industry trade in the OECD area, where resource re-allocation largely takes place among firms within sectors.

3.4 Does trade affect job security?

84. As documented in section 3 above, average job tenure has not changed much in OECD countries over the past decade, and the unemployment rate has come down somewhat. The indicator of job security that we found has increased during the period of rising trade to GDP is the elasticity of labour demand in manufacturing. There are furthermore reasons to believe that the two trends are related. The labour demand elasticity depends on the labour share of total industry revenue, the elasticity of substitution between labour and all other factors of production (given the level of output) and the demand elasticity for the industry's output. Figure 11 above shows that labour share of income has indeed declined, which contributes to a higher absolute value of the elasticity of labour demand. It is also reasonable to expect that

³⁹ Feenstra and Hong (2007) used compensation of employees combined with information on average wages to estimate employment effects, while we have used information on employment by skill level directly.

the elasticity of demand for the final output will increase with trade as competition between local and foreign products may increase both in the home market and in export markets.⁴⁰

85. Although trade probably does increase competition in product markets, there are other forces that work in the opposite direction. Increasing product differentiation and the carving out of niche markets is one factor that may have pulled in the other direction. If firms' profit margins are an indicator of the level of competition in the product market, markets may not have become very much more competitive. In the US, for instance, profit margins in domestic non-financial corporations have fluctuated with the business cycle, but there is not a downward trend.⁴¹

86. Slaughter (2001) investigated whether trade is responsible for the increase in the elasticity of labour demand for production workers in manufacturing during the period 1961-1991. He found that various indicators of openness did raise the elasticity (absolute value), but the results were not robust to the inclusion of time trends. Labour demand elasticity has in other words increased over time, and so has trade, but there is no robust linkage between them at least in the US during the time investigated. It was further found that for non-production workers, the elasticity of labour demand has not increased. Studies from other countries and more recent periods have not settled the matter. Bruno et al. (2004) find that import penetration raised the elasticity of labour demand in the United Kingdom, but had no such impact in other OECD countries.

87. The elasticity of conditional labour demand was estimated for the period 1980-2002 for this study, and as indicated in Figure 9 above it has increased.⁴² It was also found that there is a statistically significant association between the average conditional labour demand elasticity and narrow offshoring in manufacturing. These findings are confirmed by econometric analysis, based on labour demand models containing an interaction term between the wage variable and an indicator variable of openness. Three different indicator variables are used: (i) high and low import penetration; (ii) high and low offshoring intensity; and (iii) depreciating and appreciating industry-specific exchange rate.⁴³ The results are reported in Table 6.⁴⁴ The regression results suggest that industries characterised by relatively high levels of offshoring (broad and narrow) have significantly more elastic labour demand than industries where offshoring is less prevalent.

⁴⁰ The labour demand own-price elasticity for an industry is defined as follows: $\eta_{LL} = -(1-s)\sigma_{LL} - s\eta$ where s is the labour share in total industry revenue, σ is the constant output elasticity of substitution between factors LL and η is the demand elasticity for the industry's output. In Figure 9 above only the first term in the equation is estimated, i.e. conditional labour demand elasticity.

⁴¹ BEA (2007) http://www.bea.gov/scb/pdf/2007/04%20April/D-pages/0407Dpg_D.pdf The US is considered one of the most competitive markets in the world, so the profit margin in the US is likely to be at the lower end among OECD countries.

⁴² See Employment Outlook 2007 Chapter 3 for further details.

⁴³ As the indicator variables are time invariant, their independent effects drop out of the estimation model after differencing.

⁴⁴ As there is no natural cut-off for the import penetration and the offshoring indicators, the indicator variables were defined so as to split the sample approximately in half.

Table 6. Globalisation and the absolute elasticity of labour demand

Differences in absolute elasticity between industries facing high and low levels of foreign competition, 1987-2003.

	Import penetration			Industry-specific exchange rate		
	Low	High	Difference	Appreciation	Depreciation	Difference
All industries	0.264***	0.110***	0.154**	0.254****	0.218***	0.035
Manufacturing	0.306**	0.211***	0.095	0.228***	0.219***	0.008
	Narrow offshoring			Broad offshoring		
	Low	High	Difference	Low	High	Difference
All industries	0.198	0.611***	0.413***	0.259*	0.475***	0.216*
Manufacturing	0.188	0.384***	0.196***	0.488**	0.353*	0.135

Note: * significant at 10% level, ** significant at 5% level, *** significant at 1% level. The coefficients are OLS estimates of conditional labour demand models which include an interaction term between an indicator variable of foreign competition which equals one if competition is high and zero otherwise.

88. The empirical analysis of the relation between job security and trade is subject to considerable uncertainty, but it suggests that i) trade has contributed to rising volatility for workers, ii) the impact differs between sectors and depends strongly on the elasticity of labour supply as well. The elasticity of labour supply in turn will depend on several factors, such as social security measures, demographic and cultural factors.

Can trade explain growing income inequality?

89. Section 2 of this study presents evidence that income inequality has increased over the past 25 years in most, but not all OECD countries. The labour share of national income has declined, in some countries quite sharply, earnings inequality has increased, and real compensation per employee has stagnated in some OECD countries. To what extent can these trends be explained by the rising trade/GDP ratio? There are several possible channels through which trade may affect income distribution. First, the Heckscher-Ohlin trade model predicts that the relative abundant factor of production gains from trade, while the scarce factor loses. In many OECD countries the abundant factors are skilled workers and capital, while the scarce factor is unskilled workers. Trade driven by comparative advantage based on differences in factor endowments would consequently contribute to a rising skills premium and increased return on capital, and thus a less equal income distribution in most OECD countries.

90. However, as discussed above, the Heckscher-Ohlin model does not fit observed trade patterns well and the linkage between trade and income distribution is not as clear-cut when other major driving forces for trade such as technology, product differentiation and economies of scale are taken into account. Technology is a source of comparative advantage in its own right (i.e. the Ricardian model of international trade), it is an important determinant of the skills-structure of labour demand (i.e. skills-biased versus deskilling technology), and it is an important factor behind the rising trade/GDP through its impact on cross-border transaction costs:

- Differences in technological capacity *e.g.* resulting from accumulated knowledge and country-specific factors create comparative advantage;
- Trade has allowed specialisation in skills-intensive goods, services and tasks and hence helped absorb the rising number of labour market entrants with higher education in OECD countries, and more recently also some non-OECD countries;
- Technology has facilitated such trade;

- Skills-biased technological progress has shifted labour demand towards higher skills in most countries;
- The skills premium depends on supply and demand of skilled workers. Demand is determined by technology and trade, supply is determined by among other things the quality of education, including access to higher education and training.

91. Since technology is a driving force both for trade and labour market developments, it is difficult to distinguish between the direct effect of technology on labour markets and the indirect effect through trade. The rising share of trade to GDP since the early 1990s would not have been possible without the development and diffusion of new technology, while technology is also a source of comparative advantage.

92. The ICT sector illustrates the complexity of the interaction between trade and technology. Production of computers is among the most fragmented of all sectors together with other electrical machinery. Technological development in the sector as well as efficient international production networks have contributed to a sharp fall in the quality-adjusted relative price of computers, which has stimulated their adoption in all sectors of the economy. The adoption of ICT in turn has facilitated cross-border trade in services, as well as international production sharing in other manufacturing sectors (due to computerised supply chain management systems). Finally ICT appears to be complementary to skills, shifting labour demand towards skilled workers and increasing the skills premium (Jorgenson, 2001).

93. A closer look at the relationship between technology and labour demand reveals that recent technological developments, mainly ICT, are complements to non-routine jobs and tasks, particularly at the high-skill end, and a substitute to routine tasks. This can explain the fact that the rise in inequality is entirely in the upper half of the income distribution. Non-routine jobs and occupations such as professional services and management are found at the upper end of the income distribution, but there are also non-routine tasks at the lower end of income distribution. Examples are nannies, hair-dressers and other personal services. In the middle of the income distribution are workers performing semi-skilled routine tasks, mainly in manufacturing. ICT shifting away labour demand from routine tasks in the middle of the income distribution towards non-routine tasks at both ends of the income distribution, but most strongly at the upper end of it, is compatible with the patterns of growing income inequality observed over the past 15-20 years discussed in Section 2.1. Trade reinforces this development since the tasks that can be most easily codified and automated are also the tasks that are most easily traded or offshored.⁴⁵

94. The April 2007 issue of the IMF's Economic Outlook devoted a chapter to the issue of declining labour share of GDP. They estimated the impact of changes in terms of trade, offshoring and immigration on the labour share of national income and found that the relative price of exports has increased and the relative price of imports has declined. Since exports are relatively capital and skills-intensive while imports are relatively more unskilled labour-intensive, the (positive) terms of trade effect has contributed to the declining share of labour in national income. Offshoring and immigration were found to have a negative impact on the labour share of national income, but the impact of offshoring was not robust to the inclusion of a time trend.⁴⁶ In conclusion it was found that improving terms of trade and immigration has

⁴⁵ The interaction between trade and technology cannot fully explain developments in income inequality, however. Since there are quite substantial variations between OECD countries with similar technologies, labour market institutions such as degree of unionisation, minimum wages, the extent of performance pay and the relative power of shareholders and management in private companies are also likely to play an important role. See Autor *et al* (2006) for a recent study and Lemieux (2007) for a review.

⁴⁶ The study applied a translog cost function to estimate the impact on labour controlling for terms of trade effects, investment, ICT investments, the tax wedge and unemployment benefits. When distinguishing between skilled and unskilled workers, a simultaneous equation system was used.

contributed to more unequal distribution of income in OECD countries, but technology (either as measured by ICT investment or a time trend) has made a larger contribution.

95. Case studies conducted for the OECD GSA-3 project investigate the impact of offshoring on labour demand by skills groups in more detail. It is found that in Japan offshoring has contributed to skills upgrading in the manufacturing sector. In particular, it is shown that offshoring to low-income countries has a strong negative impact on labour demand in the lowest skill group and a strong positive effect on labour demand in other skill groups. Outsourcing to China has had a negative impact on labour demand for low-skilled workers and a positive impact on labour demand for semi-skilled workers while the results for outsourcing to ASEAN show the opposite result. Korea's main destination of offshoring is Japan, and such offshoring has shifted labour demand away from skilled workers towards semi-skilled workers (Ahn, Fukao and Ito, 2008). For the Nordic/Baltic region the results are more mixed and differ between countries and sectors (Ekholm and Hakkala, 2008).

96. In conclusion trade has probably contributed to a less equal distribution of income in OECD countries. However, the relative importance of trade compared to other factors can still not be established with certainty. The fact that there are large differences among countries with similar factor endowments and trade patterns suggests that the issue is complex and that growing income inequality is not an inevitable side-effect of rising trade/GDP and integration of emerging markets into international markets.

97. To summarise the empirical findings of section III, labour market responses to trade in OECD countries largely take the form of employment shifts within sectors towards higher skill levels. The impact on relative wages depend on both supply of skilled workers (education and training) and labour market institutions. Adjustment costs also depend on labour market institutions and product market regulation. In particular, the less flexible the labour market, the stronger are the incentives to offshore in order to obtain production flexibility in the face of increased competition and rapidly changing markets.

IV. POLICY IMPLICATIONS

98. Offshoring of goods and services has raised new concerns that trade may be shifting jobs abroad, including in previously protected white-collar services. This study has argued that the major driving force for the recent surge in the trade/GDP-ratio has probably not been trade liberalisation in OECD countries, since tariffs were already low long before the rapid trade expansion started. The most likely driving forces are trade liberalisation and market reforms in emerging markets, developments in technology, particularly ICT, and regulatory reforms in OECD countries. Nevertheless, open markets in OECD countries have been important for the integration of emerging economies in international markets, triggered by their own reforms. The recent surge in trade appears in other words to be a result of a combination of technology and emerging markets following where OECD countries led the way decades ago.

99. Thus, the "globalisation-genie" is already out of the bottle, and has contributed to higher income both in emerging and OECD countries. The genie can probably not be put back in without substantial cost. Given the technological changes that have led to leaner and more efficient ways of organising production, it is also necessary to assess what would be the alternatives to offshoring. If offshoring of tasks were curbed, would jobs at home remain secure? This question is difficult to answer in a scientific way, but there are at least two possible scenarios to the contrary.

100. First, as China, India and other emerging markets gain prominence in a number of tasks and processes, curbing offshoring could result in the relocation of the entire production chain, or at least a larger part of it to emerging economies. Our empirical analysis clearly shows that offshoring, particularly of services, improves labour productivity and reduces unit costs in offshoring industries. Furthermore, the case study reported in Box 1 indicates that firms outsource tasks in order to gain sufficient flexibility in a market where demand fluctuates and minimising inventories has become the industry norm. Introducing policy measures that increases the costs of offshoring may prove a double-edged sword reducing local companies' competitiveness.

101. Second, as has been elaborated by Van Welsum and Vickery (2005), the services that lend themselves to offshoring are services that can easily be codified and transmitted electronically, that do not require face-to-face communication and thus do not involve much tacit knowledge. Services characterised by these properties are also the services that lend themselves most easily to automation. The alternative to offshoring in a longer time perspective could therefore be automation, in the same way as has happened to routine tasks in manufacturing. In fact, many services have already been automated, *e.g.* automatic teller machines and internet-banking in the financial services sector, booking of airline tickets, automatic check-outs in retail stores etc. A combination of advances in technology, high labour costs and competitive pressure from emerging markets could accelerate this process if improving productivity through offshoring were made more difficult or costly.

102. Although the gains from trade, including offshoring, have been amply documented, and in the aggregate jobs and incomes have continued to grow in most OECD countries during the integration of emerging markets in the world economy, undesirable social consequences cannot be denied. The most serious concerns are probably growing income inequality and growing vulnerability for some groups, notably unskilled manufacturing workers and workers with low job tenure. The latter are likely to be new entrants to the labour market. The rest of this section discusses how these problems can be addressed within open markets.

103. The empirical results of our study show that in countries with high employment protection or high barriers to entrepreneurship, offshoring is associated with a stronger negative shift in unit labour demand or equivalently a larger positive shift in labour productivity, than in countries with less restrictive regulation. This could mean that firms operating in more strictly regulated markets are more reluctant to recruit new workers and more inclined to meet increased foreign competition through labour-saving technology. It could even be the case that they are more inclined to offshore (*e.g.* there could be reverse causality). A key question is then how firms can maintain flexibility in adjusting output to demand fluctuations without undermining workers' rights.

104. A useful way of thinking about this issue is to distinguish between protection of workers and protection of jobs. In societies where it is common that workers stay within the same firm for the duration of their careers, linking social security such as health insurance and pension to the job was not a problem. But in a more dynamic market where workers change jobs more frequently both voluntarily and because of lay-offs, such arrangements implies that workers shoulder a larger share of the risk and uncertainties that go with more dynamic markets. Reforms to ensure that health insurance, other social insurance and pensions follow the worker would contribute to reducing workers' vulnerability in countries where this is not already the case.

105. Recent research suggests that the cost of moving between jobs can be substantial, particularly when moving involuntarily from one sector to another (Artuc *et al.* 2007). Such costs can be eased by reducing the number of workers that have to move *involuntarily* and by reducing the cost for the individual worker should he lose his job. Workers would presumably move more easily and voluntarily from contracting sectors, firms or tasks to expanding ones if they possess skills to which returns are at least as

high in the expanding activities as in their current job. Raising the level of general skills applicable in several sectors or tasks would probably increase the labour supply response to shifts in labour demand.

106. Education and training are also key policy areas for obtaining a more equal distribution of the gains from trade. A more equal distribution of skills, which is a relatively abundant factor in most OECD countries, would improve income distribution. Making sure that everybody has access to education and training where their talents can be developed would make sure that skills become more equally distributed.⁴⁷

107. It is not only the quantity of skills that matter for a more equitable integration of emerging economies in international markets - the composition of skills matters too. In a number of OECD countries the business sector complains about difficulties in finding adequately trained engineers, to name but one skills category where there seems to be a mismatch between skills required by the business sector and skills provided by the education system. A closer dialogue and interaction between the business sector and education authorities could be considered in order to obtain a better match between the skills required by business and the skills provided by the education system. This is already common practice in many OECD countries, but there is probably room for improvement.

108. Finally, the quality of the education system matters. The OECD Program for International Student Assessment (PISA) suggests that some of the leading industrial nations are being outperformed by *e.g.* Central and Eastern European countries, Korea and Hong Kong in mathematics and problem solving.⁴⁸ Thus, Korea has become a leading industrial nation and exporter at the technology-frontier in *e.g.* electronics based on its acquired relative abundance in human capital. China and India, in contrast are still very far from catching up with leading OECD countries as far as relative skills endowments are concerned. One measure of skills accumulation is the enrolment rate in tertiary education. In 2004 the average gross enrolment rate in OECD countries was 71% as compared to 19% in China and 12% in India. The fear of a reversal of comparative advantage in high-technology industries is therefore overblown. It needs to be kept in mind that it is *relative* factor endowments and *relative* differences in technology that matter for comparative advantage.

109. Lowering the cost of involuntary job separation and reemployment would probably require some kind of adjustment assistance. Research on data that allows for matching individual workers and firms over a long time period, shows that job security as measured by job tenure has increased in the manufacturing sector, but declined slightly in the services sector in Norway. Yet, the need for adjustment assistance is more likely to occur in the manufacturing sector. The reason is that a slightly declining tenure in the services sector is due to job changes, particularly among younger workers (the increase in the job change rate was found to be inversely related to age), while the increase in job tenure in the manufacturing sector is due to downsizing and a policy of laying off workers based on seniority (Bratberg *et al.*, 2006). There are not very many studies that analyse data at this level of detail, but if Norway is representative, the finding suggests that older workers in the manufacturing sector may face the largest trade related adjustment costs.⁴⁹

⁴⁷ This is the channel through which Galor and Zeira (1993) in a seminal paper demonstrate that a more equal income distribution yields higher growth.

⁴⁸ The PISA evaluations compare the knowledge and skills of 15-year olds in key subjects such as science and language skills.

See http://www.pisa.oecd.org/document/50/0,2340,en_32252351_32236173_37627442_1_1_1_1,00.html

⁴⁹ Detailed discussion of the nature of such adjustment assistance is beyond the scope of this study and outside the expertise of TAD, but the 2007 Employment Outlook chapter 3, which was part of the GSA III project, discusses this at further length.

110. Bearing in mind the differences among age groups regarding labour market flexibility, life-long learning policies could probably improve flexibility and reduce adjustment costs both for individual workers and for the economy as a whole. This is for instance a component of the European Union's recently developed common principles of "flexicurity", a term that was coined for describing the Scandinavian way of combining employment security for the worker with the necessary flexibility for firms to adjust to changing competitive pressure and changing technology.⁵⁰ The European Union encourages its member countries to develop their own policies reflecting their different national situations. Eight common principles are suggested, including flexible and reliable contractual arrangements, comprehensive lifelong learning strategies, effective, active labour market policies and modern social security systems. The principles emphasise the need for reducing the divide between insiders and outsiders, providing easy entry points to the labour market for outsiders and secure transition from job to job (European Commission, 2007).

111. To conclude, the rising trade/GDP and the growing importance of emerging economies in world markets have quadrupled the global labour force between 1980 and 2005 (IMF, 2007). This development has been driven by technology and trade- and market liberalisation in emerging markets and to a much lesser extent by trade liberalisation in OECD countries. During the period of rising trade shares and integration of emerging markets in the world economy, the OECD countries have experienced rising incomes and improvements in total employment as a share of the total population. Nevertheless, growing income inequality and more volatile labour markets for some skills categories can to some extent be attributed to trade. The study has argued that the remedies for ensuring that workers benefit from the improvements in labour productivity that have followed offshoring lie in the area of protecting employment rather than jobs, lowering barriers to entry for entrepreneurs and improving the responsiveness of the education system to demand for skills from the business sector. The answer is not to reverse the open trade regime that the OECD countries introduced decades ago.

⁵⁰ The Danish flexicurity model has according to a recent study (Zhou, 2007) been costly to implement and under different institutional settings the tax wedge necessary to finance it may discourage job creation.

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