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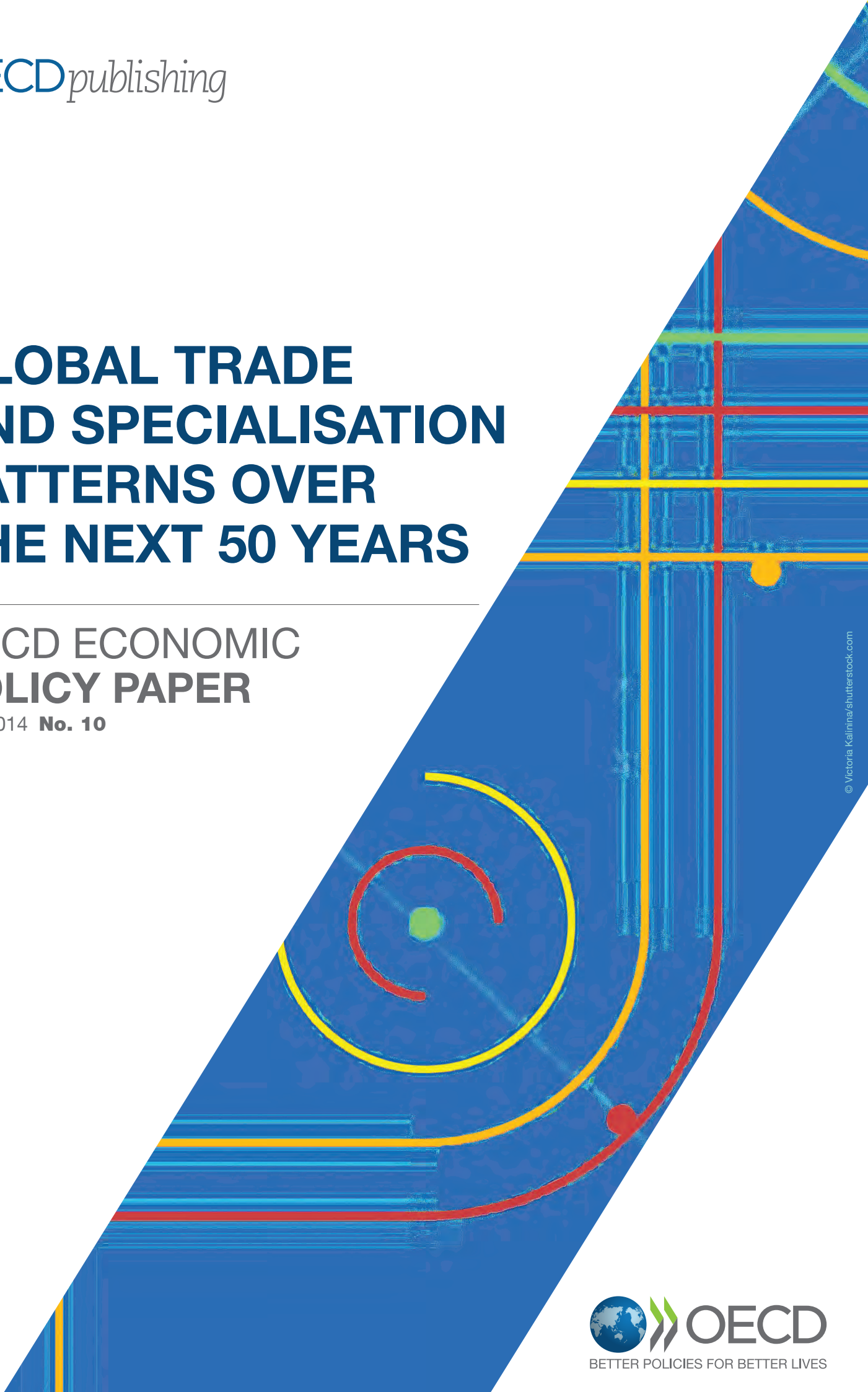

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Global Trade and Specialisation Patterns over the next 50 years

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Johansson A., P. Kowalski, E. Olaberría and D. Pellegrino (2014) "What explains the volume and composition of trade? Industrial evidence from a panel of countries", *OECD Economics Department Working Papers*, No 1128, OECD Publishing, Paris.

Johansson, Å. and E. Olaberría (2014), "Long-term Patterns of Specialisation and Trade", *OECD Economics Department Working Papers*, No. 1136, OECD Publishing, Paris.

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Abstract / Résumé

Global Trade and Specialisation Patterns over the next 50 years

This report presents descriptive evidence of specialisation trends and investigates empirically their causes and consequences, analysing the role of policies in this process. Then, based on the insights from the backward looking analysis, it draws global trade and specialisation scenarios up to 2060, taking into account international spillovers. The report highlights that comparative advantage in terms of factor endowments matters for trade specialisation, although framework and trade policies also play a role. For instance, tariffs on intermediate inputs are found to adversely affect trade with this adverse effect found to have increased over time, likely reflecting expanding global supply chains magnifying the impact of tariffs. The forward-looking analysis suggests that over the next 50 years, the geographical centre of trade will continue to shift from OECD to non-OECD regions, reflecting faster growth in these countries. Multilateral global trade liberalisation could raise world trade by 15% by 2060 relative to the status quo, whereas regional liberalisation among a core group of OECD countries only would raise world trade by 4% due to trade diversion.

JEL classification codes: F13; F14; F17; F43; F60.

Keywords: Long-term trade and specialisation patterns, trade liberalisation, intermediate input tariffs, global value chains.

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Profils des échanges mondiaux et de la spécialisation au cours des cinquante prochaines années

Ce rapport présente des données descriptives concernant les tendances en matière de spécialisation et examine empiriquement ses causes et conséquences tout en analysant le rôle des politiques publiques à cet égard. À partir des enseignements tirés de l'analyse rétrospective, il établit ensuite des scénarios d'échanges mondiaux et de spécialisation jusqu'en 2060 en tenant compte des retombées internationales qu'ils pourraient avoir. Le rapport souligne que la spécialisation commerciale dépend de l'avantage comparatif que représente la dotation en facteurs de production, bien que les politiques générales et les politiques commerciales aient aussi leur importance. Par exemple, les droits de douane prélevés sur les biens intermédiaires s'avèrent préjudiciables aux échanges, cet effet s'accentuant au fil des ans. Cette évolution témoigne vraisemblablement du fait que le développement des chaînes d'approvisionnement mondiales amplifie l'incidence des droits de douane. L'analyse prospective laisse supposer qu'au cours des cinquante prochaines années, le centre géographique des échanges s'éloignera encore des pays de l'OCDE au profit de pays d'autres régions dont la croissance s'accélèrera. La libéralisation des échanges mondiaux multilatéraux pourrait entraîner une augmentation des échanges mondiaux de 15 % d'ici 2060 par rapport à la situation actuelle tandis que la hausse induite par la libéralisation régionale dans un groupe composé des grands pays de l'OCDE ne serait que de 4 % en raison de la réorientation des courants d'échanges.

Classification JEL : F13; F14; F17; F43; F60.

Mots-clés : Profils des échanges et de la spécialisation à long terme, libéralisation des échanges, droits de douanes sur les biens intermédiaires, chaînes de valeur mondiales.

Global Trade and Specialisation Patterns over the next 50 Years1

Key messages

- **This report presents descriptive evidence of trade and specialisation trends and investigates the role of policies in shaping these trends.** Then it describes how global trade and specialisation patterns may look in 2060 if these past trends were prolonged. This trade scenario should not be interpreted as a forecast, but as a description of how global trade may develop if past trend were to continue.

- **Over the coming half century, world trade is expected to continue to outpace GDP growth.** However, the responsiveness of trade to GDP is expected to be lower than during the decades preceding the financial crisis, when world trade grew about twice as fast as GDP. The high responsiveness in the past was partly due to special factors such as the integration of large emerging economies into the world trading system, which relied largely on export led growth.

- **The geographical centre of trade will continue to shift towards emerging economies.** Fast GDP growth in China, India and other Asian countries is associated with gains in trade shares over the next half century. Thus, the share of global trade within the present OECD will decline from 50% in 2012 to 25% by 2060, while trade among Asian economies will increase from 6% to 16% by 2060.

- **China, India and other Asian economies will continue to strengthen their role in manufacturing trade with exports climbing up the global value added ladder**. For instance, by 2060 China and other Asian economies will account for the bulk of world exports in electronics. Significant shifts will also occur in services, with China and other emerging economies gaining large trade shares at the expense of the Euro Area, the United Kingdom and the United States.

- **In parallel with shifts in trade patterns the industrial structure in emerging economies will gradually become similar to that of the present OECD,** whereas it remains fairly unchanged in OECD economies. In emerging economies, past trends are expected to continue over the next 50 years and the industry mix will continue shifting towards services away from manufacturing, typically low-skilled (e.g. textile, food production, etc.), driven by income gains and changing consumption patterns.

- **The unbundling and offshoring of production during the past decades was skill-biased**. Sizeable reductions in the demand for low-skilled workers in manufacturing and other services occurred over 1995-2008 in OECD economies. By contrast, these sectors generated significant demand for low-skilled labour in non-OECD economies. On average, technological change accounted for a larger proportion of the shift in demand towards higher skills than globalisation, though distinguishing the two effects is difficult because trade integration and diffusion of technological change are related and mutually reinforcing phenomena.

- **The change in specialisation can also affect wage inequality**. Despite a greater supply of skilled workers in most countries resulting from increasing investment in tertiary education, the combination of increased high-skilled specialisation and the integration of a larger global supply of low-skilled workers contributed to increase wage inequality in some OECD and emerging economies over the period 1995-2009.

1. This report draws on "Long-term Patterns of Trade and Specialisation", Economics Department Working Papers, OECD Publishing, forthcoming. The report has benefitted from collaborative work with the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) and the Trade and Agricultural Directorate at the OECD.

- **Well-designed framework policies and institutions can facilitate trade and raise growth.** For instance, improving financial development (measured by the ratio of private credit to GDP) in the average country to the level of countries having relatively developed financial markets could increase total trade by 3%. But trade in industries that are highly dependent on external finance (e.g. electronics) could increase by some 6%.

- **Policies that try to promote trade and growth of specific industries by tariffs or quotas can cause waste and be increasingly counter-productive in the context of trade integration and expanding value chains**. For instance, tariffs can raise the cost of intermediate inputs affecting relative productivity and reducing trade. This effect is particularly strong in industries characterised by long global supply chains, such as electronics and the auto industry.

- **Gradually removing tariffs, regulatory barriers in services and agricultural support, as well as reducing transaction costs on goods (e.g. costs of handling at customs) could increase global trade and GDP over the next 50 years.** Specific scenarios of full regional liberalisation among a core group of OECD countries or partial global liberalisation could, respectively, raise trade by 4% and 15% and GDP by 0.6% and 2.8% by 2060 relative to the *status quo*, with the effects on GDP being larger if the feedback of increased openness for technological diffusion is taken into account. However, the gains would be distributed unevenly across countries, especially in a regional liberalisation scenario in which countries outside the free trade agreement would suffer.

- **Investment in education is crucial for trade and high-skill specialisation patterns over the coming decades.** In fact, slower educational upgrading in key emerging economies (*i.e.* China, India and Indonesia) than expected in the baseline scenario could reduce world exports by 2% by 2060, with decreases ranging between 6-11% in China, India and Indonesia. Lower up-skilling in emerging economies would also slow-down the restructuring towards higher value-added activities in these emerging economies.

1. Introduction

1. Global trade is undergoing rapid change through a fragmentation of production processes and the integration of emerging economies into the global market. These trends are affecting trade and industrial specialisation, demand for skills and relative wages, bringing benefits and creating new policy challenges. This report presents descriptive evidence of specialisation trends and investigates empirically their causes and consequences, analysing the role of policies in this process. Then, based on the insights from the backward looking analysis, it draws global trade and specialisation scenarios up to 2060, taking into account international spillovers.

2. Specialisation in a globalised world

2.1 Specialisation, trade and growth

2. Trade can increase growth and raise aggregate welfare in various ways:

- It induces a more efficient allocation of resources across firms and sectors and this reallocation generates efficiency gains. It also raises competitive pressures, and thereby reduces x-inefficiencies and stimulates innovation (Aghion and Howitt, 1998).

- It facilitates access to larger international markets, bringing about economies of scale and generating technological and knowledge spillovers with positive implications for growth (e.g. Rivera-Batiz and Romer, 1991, Dalum et al., 1999).

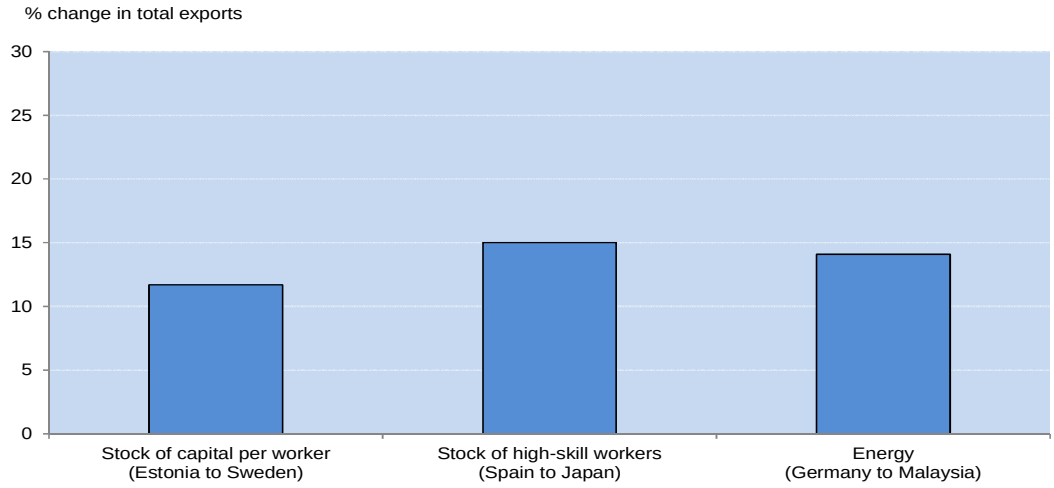
- It enables countries to specialise in a narrow range of goods and labour to specialise in certain tasks in which the country has a comparative advantage leading to higher productivity growth in the form of learning and scale effects (e.g. Krugman, 1980).

3. However, the benefits of trade are not equally distributed across and within countries. Trade encourages countries to specialise and since different goods and activities are associated with different technological and learning opportunities, those that specialise in dynamic and innovative industries are in a better position to achieve sustained economic growth than others (Grossman and Helpman, 1991; Hausmann et al., 2007; Amable, 2000).

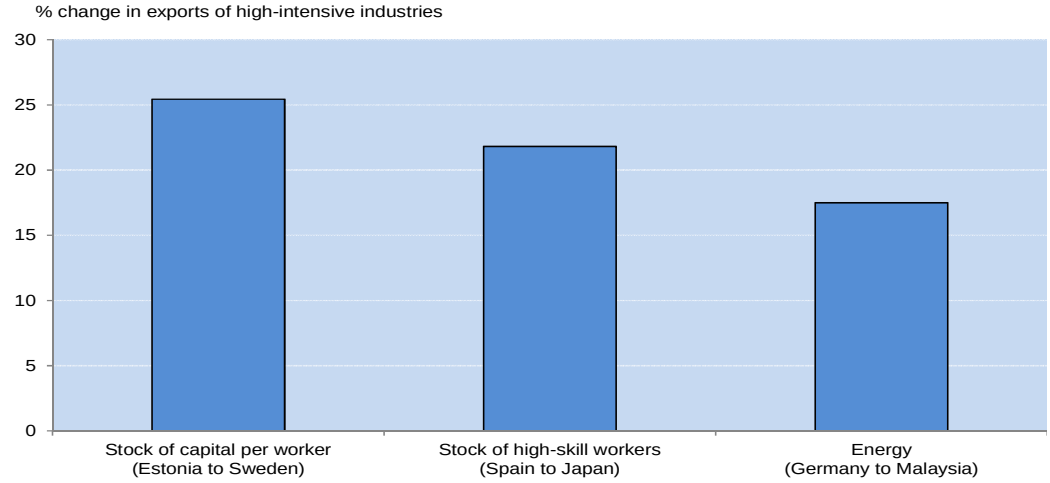
4. The products in which countries specialise are determined in part by the availability of inputs used in the manufacture of different products and access to different technologies. For example, for a given technology, specialisation is driven by differences in relative factor endowments (i.e. Heckscher-Ohlin, 1991; OECD, 2011a). Indeed, estimates suggest, for instance, that a country that is capital rich (i.e. at the 75th percentile of the cross-country distribution of capital per worker) will export around 12% more of all products when compared with a country at the median position of capital per worker (Figure 1A). But, exports of products that are capital-intensive (such as chemicals and plastics) can increase by around 25% (Figure 1B).

Figure 1. Factor endowments and patterns of exports

A. Effect of a change in factor endowments on total exports[1]



B. Effect of a change in factor endowments on exports of goods that are intensive in such factors[1,2]



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1. For each factor of production the figures show the percentage difference in gross exports between the country at the 75th percentile of the cross-country distribution of the relevant production factor among the countries included in the sample and the country at the median level of the cross-country distribution of the factor. The size of the change in the stock of capital per worker corresponds to a move from the level in Estonia to the level in Sweden, the change in human capital corresponds to a move from the level in Spain to the level in Japan, and the change in energy to a move from the level in Germany to the level in Malaysia.
2. In this figure products are termed intensive if they are at the 90th percentile of intensity in the distribution of the specific factor endowment.

Source: OECD calculations.

5. Besides factor endowments, public policies and institutions can influence trade and specialisation:

- They can affect trade and specialisation by altering the incentives for accumulation of production factors and technological innovation.

- Since industries differ in their need for well-functioning institutions and regulations to support production, cross-country differences in institutional settings will influence competitiveness by affecting relative productivity (Chor, 2010; Nunn and Trefler, 2013). For instance, well-functioning financial markets matter relatively more for industries that require external financing for investment than for other industries.

- Specific industrial and trade policies (e.g. tariffs) can facilitate growth of domestic industries by enabling the development of economies of scale. But they can create trade diversion by changing relative prices and influence specialisation and trade.

- Domestic policies and institutions create spill-overs to trading partners by changing countries' relative productivity in producing different goods (e.g. Helpman and Itskhoki, 2010). Domestic policies also affect trading partners via income and demand effects (Felbermayr et al., 2009). Finally, in an integrated global value chain, changes in policies that affect relative productivity generate cross-country spillovers by affecting the whole chain of suppliers through production linkages (Koopman et al., 2010; OECD, 2012b).

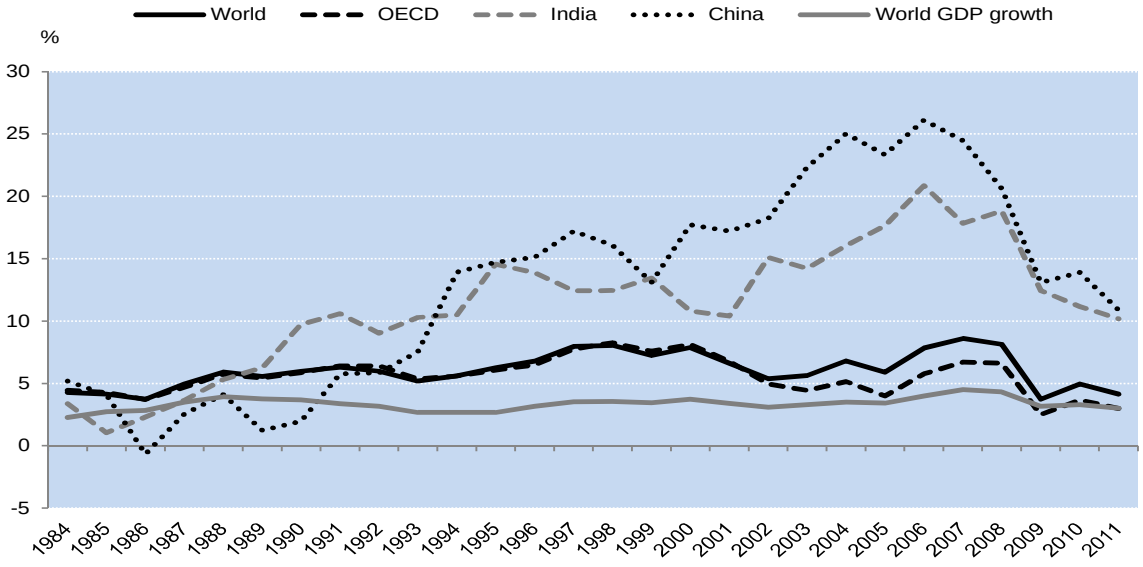
6. Changes in specialisation patterns can have implications for inequality by shifting the demand from one factor of production to another, leading to changes in relative wages across and within skill categories. By implication, public policies can influence the wage gap between skilled and un-skilled workers at home and abroad. For instance, policies that enhance access to higher education for a wider group of individuals can mitigate a rising wage gap in an environment characterised by increasing demand for high-skilled workers. Such policies could also generate spillovers to foreign countries by affecting relative wages of skilled to unskilled and trade patterns across countries.

2.2 Recent trends in trade and specialisation

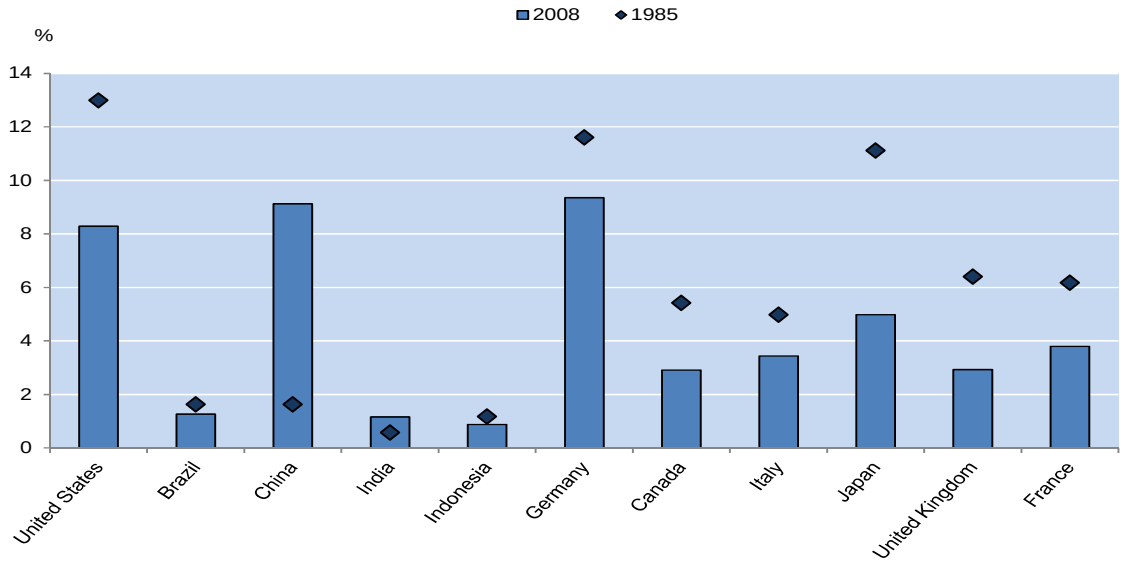
7. Over the past decades economic integration increased and world trade intensified. World trade grew faster than world GDP, particularly after 1990, indicating that the responsiveness of trade to GDP increased – some studies suggest that the elasticity rose to above 3 after mid-1980s from around 1.5 in the earlier years (Freund, 2009; Box 1). The surge in world trade was partly driven by the integration of China and India into world markets. The growth of trade was significantly higher in China and India than globally and in OECD countries (Figure 2). This rapid growth in trade was matched by a shift in market shares in world trade from OECD economies towards some emerging economies. Over 1985 to 2008, China's share in world exports of goods increased from 2% to nearly 10% and India's market share doubled, though from low initial levels, whereas it more than halved in some OECD countries (e.g. Japan and the United Kingdom).

Figure 2. Trade has increased rapidly in China and India

A. Annual growth of exports of goods and services and annual growth in world GDP (5-year moving averages), %



B. Market share in world exports, 1985 and 2008, %



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Source: World Bank development indicators and OECD Trade indicators database.

8. One major event contributing to the rapid increase in trade during the last decade was the opening up of China's market to international trade following its membership in WTO in 2001, with associated reductions in trade barriers. Generally, the easing of trade barriers and technological improvements in transportation and communication facilitated trade integration (OECD, 2003; OECD, 2005; Hummels, 2007). There is evidence showing that reductions in tariffs have increased trade and that policies aimed at facilitating trade by reducing hurdles in border procedures (e.g. formalities and procedures, fees and charges, advance rulings, etc.) can boost gross trade (Moïse et al., 2011).

Box 1. Responsiveness of trade to income

The relationship between trade and GDP has been the focus of an intense debate in recent years. Between 1970 and 2008, the share of world trade in world GDP increased significantly (Figure below). A more rapid growth in trade than GDP indicates that the responsiveness of trade with respect to income is greater than one. There are different hypotheses for the high responsiveness of trade to GDP heading up to the financial crisis, notably:

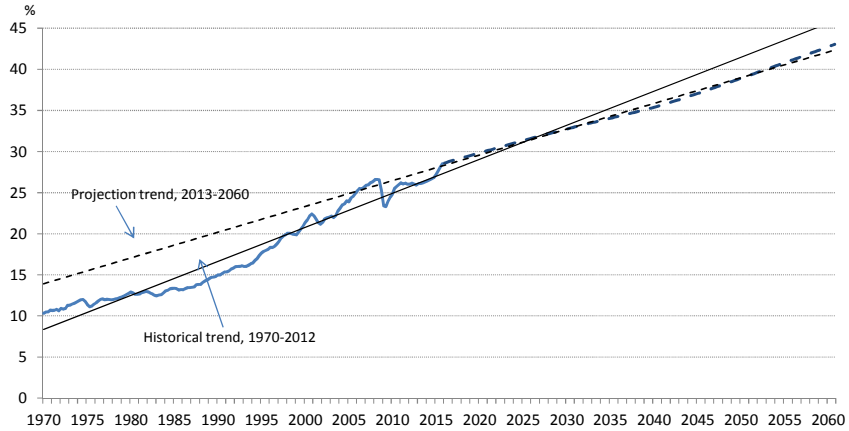
- **Integration of emerging economies***:* Integration of large emerging economies (e.g. China) into the world trading system, which relied largely on export led growth, temporarily increased the trade-to-GDP elasticity.
- **Global value chains:** Ongoing geographical fragmentation of production chains with increased sourcing of foreign intermediate inputs increased global trade (Escaith et al, 2010).

During the recent financial crisis, the responsiveness of trade to GDP dropped sharply. It recovered after 2009 but remained flat over the past two years. A series of hypotheses for the slowing in the responsiveness prevail:

- **Temporary shocks:** Natural disasters in Japan and Thailand, as well as tensions between Japan and China, have been restricting trade growth after the crisis.
- **Increased protectionism:** Tariff, non-tariff measures and anti-dumping actions were included in some stimulus packages to favour domestic goods and services. However, evidence suggests that these changes did not play a large role for the trade slow-down (Bems, Johnson and Yi, 2012).
- **Trade credit:** Some studies found that the lack of credit adversely affected trade volumes during the crisis (Chor and Manova 2012; Bems, Johnson and Yi, 2012), while others found no evidence of this (Levchenko et al., 2010; Behrens et al., 2011). Even though supply of trade credit from Europe was reduced after the crisis, this was partly substituted by credit from other regions.
- **Composition of demand:** Trade in durable goods fell more than services during the crisis, and since GDP consists mostly of services the decrease in trade was greater than the one in GDP (Bussiere et al., 2011; Bricongne et al., 2012; Eaton et al., 2011; Borchert and Mattoo, 2009). The recovery has seen stronger growth in services than in trade-intensive sectors, contributing to the slowdown in the responsiveness of trade to GDP.

Responsiveness of trade to GDP, 1970-2060

Ratio of world trade in goods and services to world GDP, %



Source: OECD Economic Outlook Database and long-term trade projections

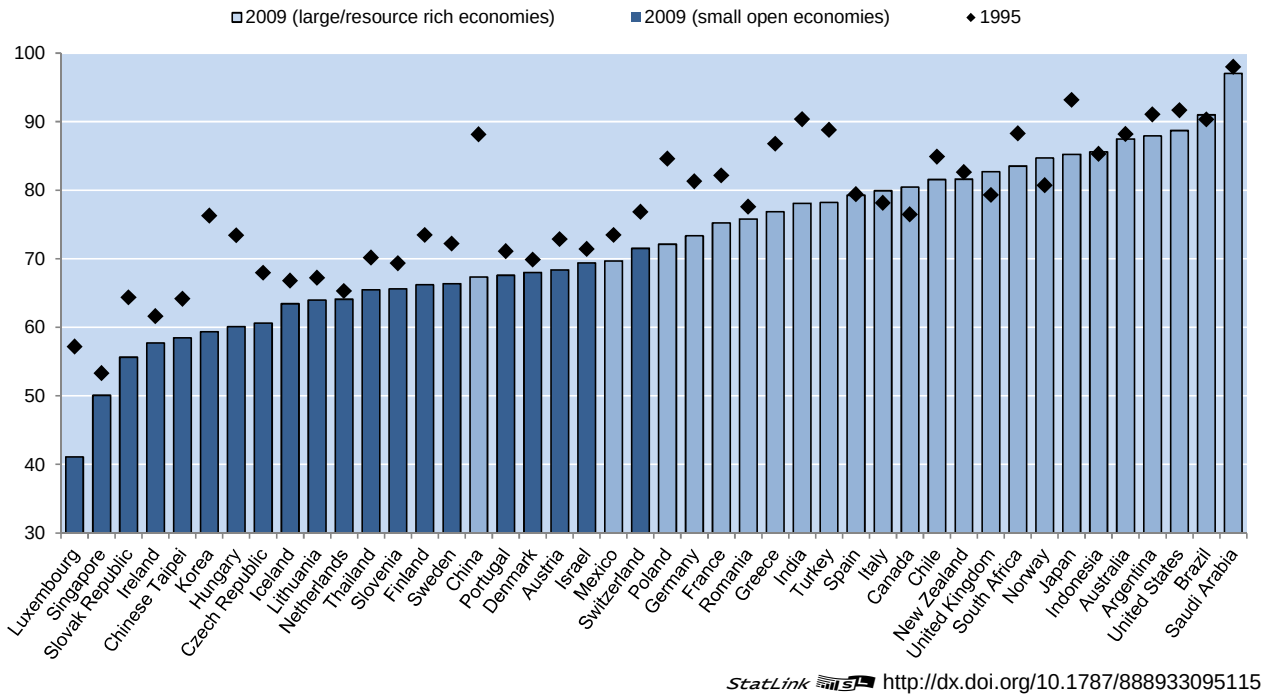
Looking ahead in the scenario presented in Section 4, world trade as a ratio of world GDP is expected to grow at a slower pace over the next 50 years when compared with its pace over 1970-2007 (see Figure above). This implies a lower responsiveness of trade to GDP than in the period 1970-2007. This partly reflects that world growth over the next half century is expected to be less export-led and partly because the intensity of fragmentation of global value chains is hypothesised to slow down as there are likely physical limits on how much a product can be fragmented (Fontagné and Fouré, 2013).

2.2.1 The changing nature of specialisation

9. In parallel with increasing trade in final goods, trade in intermediate inputs steadily grew over the past decade, reflecting intensified internationalisation of production. The sourcing of intermediate inputs from foreign countries increased in the supply chains of many industries, thereby reducing the domestic value-added content of exports. Imports of intermediate inputs represent more than 50% of trade in goods and around 70% of trade in services (Miroudot et al., 2009) and, in many countries, an increasing share of the intermediate foreign imports ends up in the production of final goods exports. As a consequence, the contribution of domestic factor inputs to exports has decreased in most countries, particularly in smaller (more open) economies as compared with larger or resource rich economies (Figure 3).

Figure 3. Value-added in gross exports varies across countries and industries

Share of domestic value added in gross exports across countries 1995 and 2009, %



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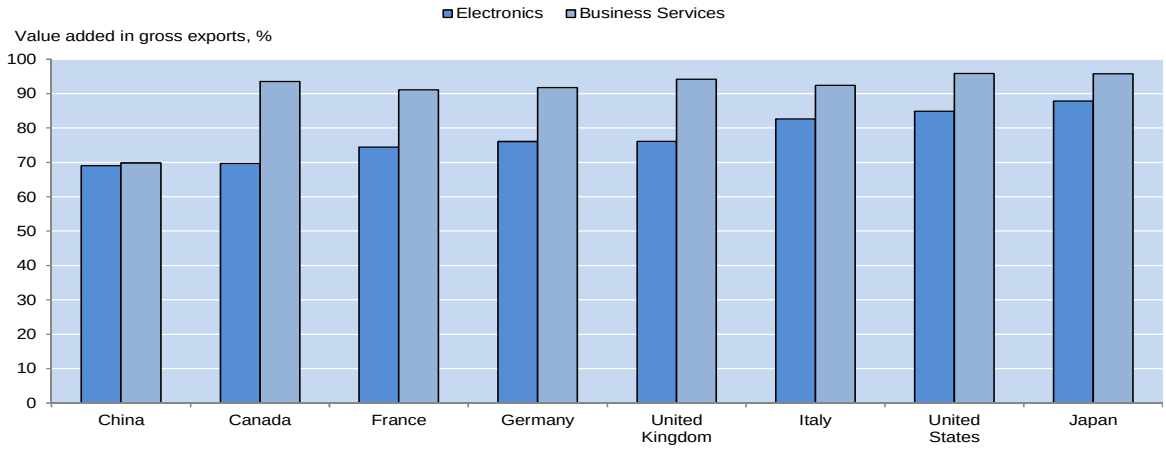
Source: OECD-WTO TiVA Database.

10. Differences in value-added content of exports across countries reflect cross-country differences in the sectoral composition of trade. On average across countries, value creation tends to be higher in services than in manufacturing, reflecting a lower content of foreign intermediate inputs in services than in manufacturing production (Figure 4A). By implication the degree of international fragmentation of manufacturing is greater than in services. In fact, the length of the value chain (measured by the number of production stages), particularly the foreign part of the supply chain, is longer in industries such as communication and electronics, motor vehicles, basic metals and textiles as compared with wholesale and retail trade and other business services (Figure 4B).

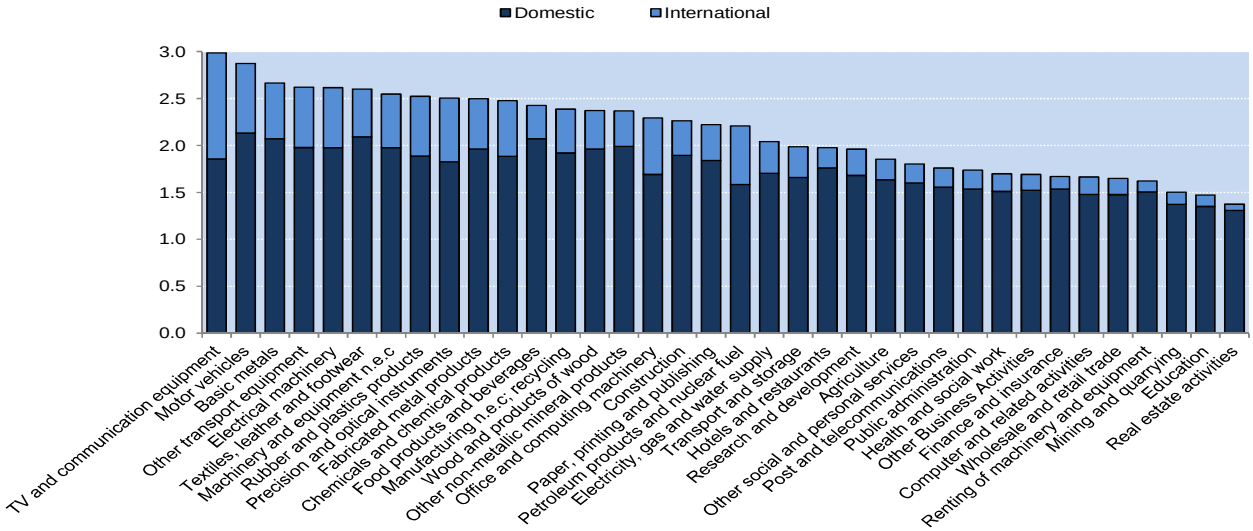
Figure 4. The number of foreign production stages in the supply chain varies across industries

A: Domestic value added in gross export in electronics and business services, 2009



B: The length of the production chain across industries[1]

Average across 58 economies



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1. The minimum value of the index is 1 when no intermediate inputs are used to produce a final good or service (total production). International denotes the foreign part of the value chain, while domestic denotes the home part of the value chain. The index calculates backward linkages in the production relying on input-output tables that link trade and production internationally (for details on the method see OECD 2012a).

Source: OECD-WTO TiVA Database and OECD (2012a).

11. The increasing importance of global value chains has led to new ways of considering the production process in terms of specialisation in tasks and business functions rather than in specific products (e.g. Grossman and Rossi-Hansberg, 2006; 2008; Baldwin and Robert-Nicoud, 2010; Lanz et al., 2011). Two countries can specialise in the same industry, but they may do it at different stages of the production chain (e.g. upstream or downstream) or in different functions. Thus, the ability of a country to create value-added from trade not only depends on the structure of trade, but increasingly on its comparative advantage in tasks within the supply chain that are associated with high value-added. Recent studies suggest that most of the value is created in upstream (innovation, R&D, design, etc.) and

downstream (marketing, branding, logistics, etc.) activities, while pure manufacturing and assembly stages typically add little value (OECD, 2012a). To a certain extent, the shift to reallocate tasks geographically has been facilitated by the development of ICT (Lanz et al., 2011). Therefore, this phenomenon is likely to be encouraged by rising investment in certain types of knowledge-based capital.

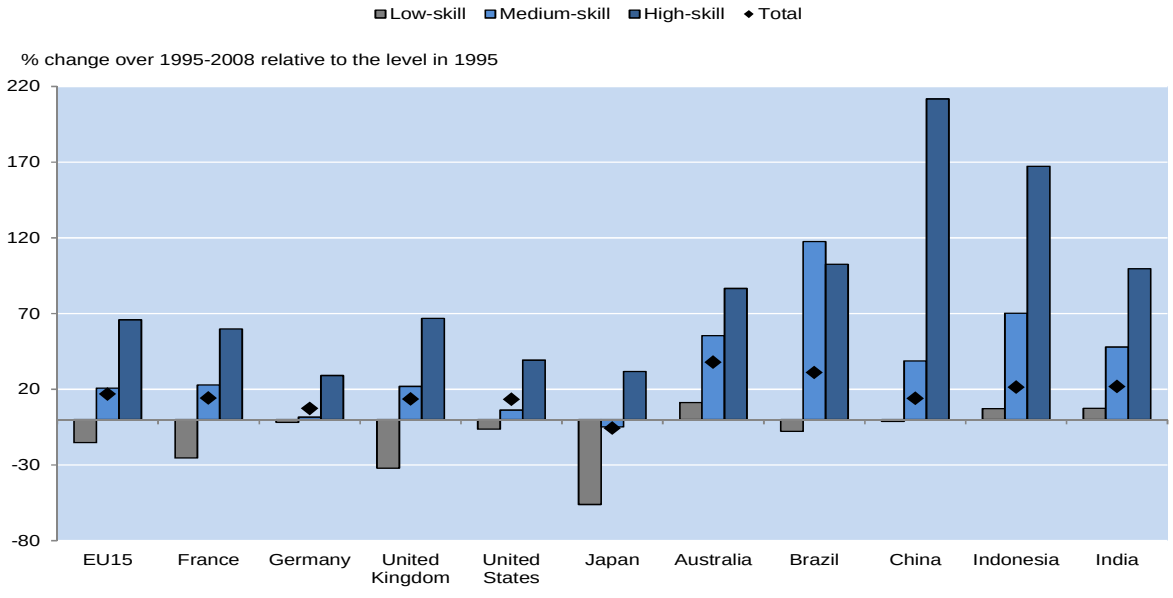
2.2.2 Implications for skills

12. The fragmentation of production in the past decades may have implications for the demand of different types of skills across countries reflecting both the relocation of business activities and trade in tasks. In an integrated global supply chain, firms relocate part of the production process to countries where the availability and costs of the production factors are most favourable to these specific activities. Countries tend to carry out activities within a specific supply chain in which the local value-added content is intensive in their relatively abundant factor or skill, and this has consequences for the distribution of demand for different skills across countries. Here, the changing demand for labour over the past decade (characterised by skill type and sector of employment) was quantified, for a given output level, by means of a structural decomposition, based on the modelling of the input-output structure of the world economy (Los et al., 2014). The decomposition takes into account that the demand for a final good produced in one country does not only induce the need for different skills in the country of completion, but also in various industries in other countries that are providers of intermediate inputs.

13. One stark trend that emerges over the period 1995-2008 from this decomposition is a comparatively stronger increase in the demand for high and medium-skilled than for low-skilled workers (Figure 5). The increase in the demand for high-skilled workers was notably strong in some emerging economies, but this partly reflects an increase in demand from an initially low level. By contrast, the demand for low-skilled workers was in general weaker than total labour demand. It declined in several OECD countries, particularly in Japan, France and the United Kingdom, while it remained broadly unchanged or slightly increased in some emerging economies.

Figure 5. Final demand developments implied that demand for high-skill labour rose across most countries over 1995-2008

% change in demand for skill types over 1995-2008 relative to the level of the specific skill in 1995



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Source: Los et al. 2014.

2.2.2.1 Technology, trade and changing consumer preferences influence the demand for skills

14. One explanation for the declining demand of lower skills in advanced economies focuses on the integration into the world market of less-developed economies, which are relatively abundant in low-skilled workers, and the accompanying outsourcing of production from richer to lower-income countries (e.g. Feenstra and Hanson, 1996). However, these trade models cannot explain the generalised increase in the demand for higher skills (and wage differentials) across both advanced and emerging economies (Feenstra and Hanson, 1996; Van Reenen, 2011; Kierzenkowski and Koske, 2012). Instead, the increasing demand for high-skilled labour is often attributed to the introduction of new technologies and a shift in the production technology that favours skilled over unskilled labour by increasing its relative productivity and, therefore, its relative demand (e.g. Katz and Murphy, 1992; Autor et al., 1998; Greenwood, 1999; Acemoglu and Autor, 2011). Skill-bias technological change and trade are related since trade may induce skill-biased technological change, while technological change may enable trade. This makes it difficult to fully disentangle their effects on demand for skills (Autor et al., 2003; Acemoglu, 2003). Finally, changing consumer preferences and consumption patterns can shift the demand for different types of goods and affect demand for skills across countries (Los et al., 2014).

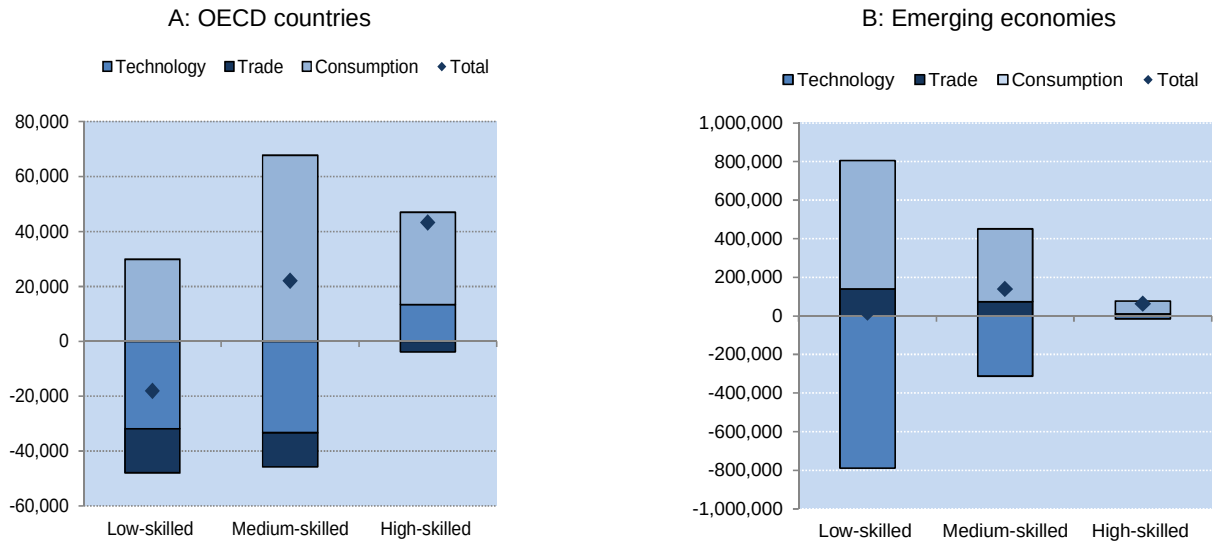
15. Results from the structural decomposition of world output bring the following insights on the relative importance of these three forces:

- **Consumption, including changes in its structure increased demand for all skill categories** (Figure 6). While consumption tends to have increased the demand for high-to-medium skilled labour relatively more than that for low-skilled in OECD economies, the opposite happened in emerging economies. The extent to which this trend will continue is uncertain, given the likely shifts in consumption towards services in emerging economies.

- **Technological change played a key role in explaining the fall in demand for low and medium-skilled workers** (Figure 6). The types of jobs lost differ across advanced countries. In the United States about 85% of the jobs lost due to technology were medium-skilled, while in European countries (EU-15) most of the lost jobs were instead low-skilled. By contrast technological change resulted in an increased demand for high-skilled workers in OECD economies.

- **Trade effects were comparatively smaller than those in consumption and technology, and had opposite effects on skill demand in OECD and emerging economies.** As a result of trade, emerging economies experienced increased demand for low-to medium-skilled jobs, and the OECD economies experienced a fall in demand for these skills. Sectors that are more open to trade and integrated in long supply chains tend to see comparatively greater reallocation effects. Electronics industries in European countries lost around 2 300 000 low to medium-skilled jobs over 1995-2008 and out of those nearly 50% were lost due to trade related changes, while in market services only 20% of low to medium skilled job losses were due to trade (Figure 7). Similarly, China experienced relatively larger trade-induced increases in demand for low-to medium skilled workers in the electronics sector than in market services.

Figure 6. Change in number of jobs due to technology, trade and consumption, 1995-2008 (thousands)[1]



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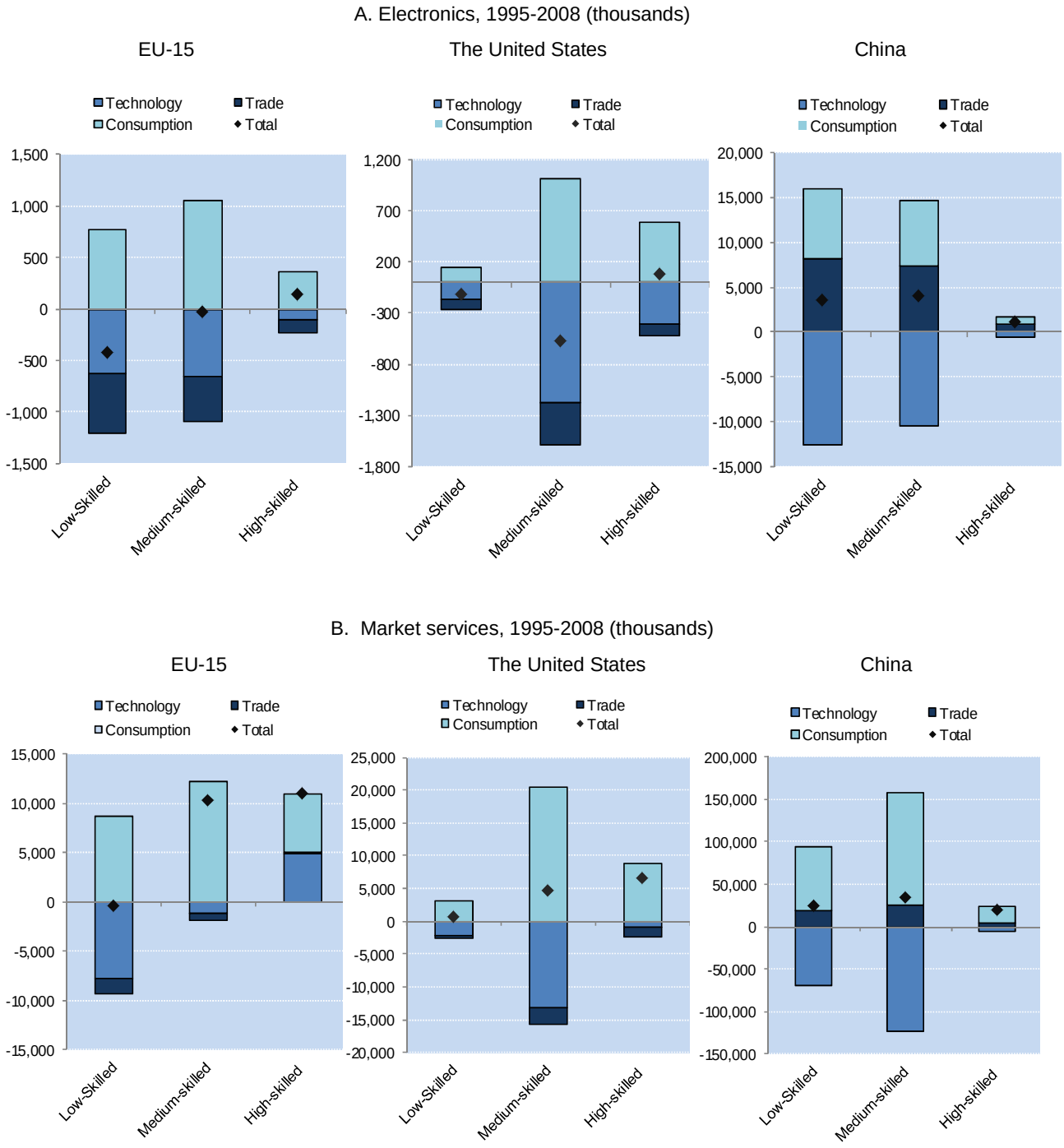
1. Advanced economies include EU-15, the United Kingdom, The United States, Japan and Australia while emerging economies include India, Indonesia, Brazil and China.

Source: Los et al. 2014.

Figure 7. Proximate determinants of the change in number of jobs by skills in electronics and market services



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Source: Los et al. 2014.

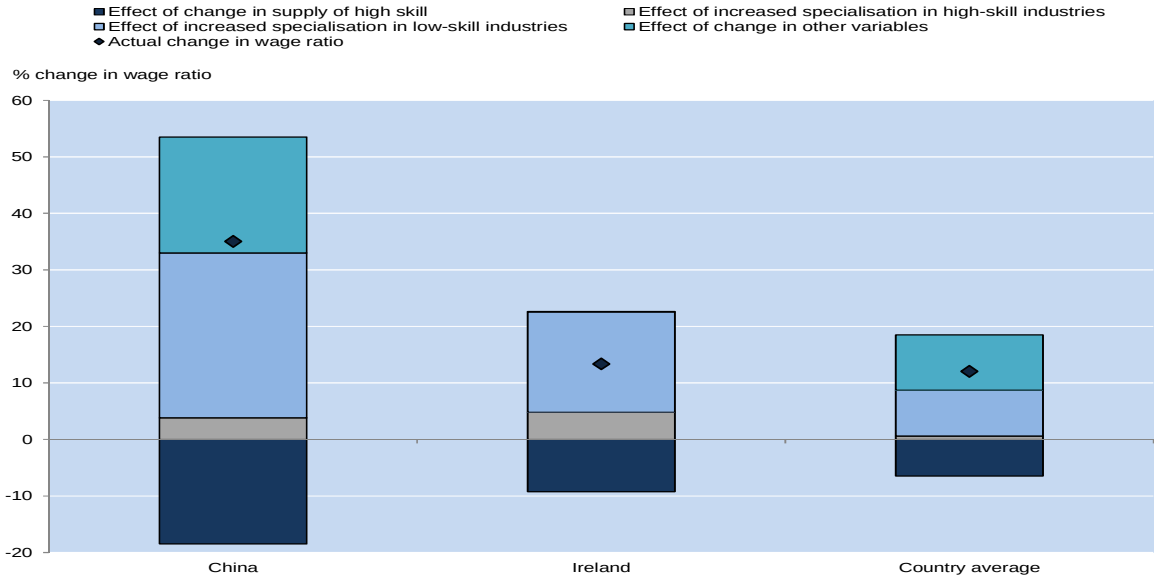
2.2.3 Implications for wage inequality

16. A shift in the demand of labour towards higher skills can contribute to raise wage inequality, especially when this is not matched by a sufficiently rapid increase in the supply of skilled workers. In parallel with the tendency for labour demand to shift towards higher skills, some OECD countries in fact saw a rise in labour income inequality between the mid-1990s and the mid-2000s measured as the ratio of the 90th to 10th percentile of labour earnings (Koske et al., 2012). An increase in inequality also occurred in some non-OECD emerging economies measured as the ratio of hourly labour compensation of high-skilled relative to low-skilled workers. By contrast, in several countries inequality remained broadly unchanged or it even declined, consistent with earlier studies.

17. The findings from the structural decomposition suggest that skill-biased technological change is one key factor behind the steady demand for better-educated workers, in line with existing empirical studies (e.g. Katz and Murphy 1992; Autor et al., 1998). Other studies also highlight the structural transformation from manufacturing to services as an important force behind the increase in the wage premium in the United States (e.g. Blum 2008; Mollick 2012). Drawing on this literature, OECD evidence shows that specialisation contributes to explain cross-country differences in wage gaps between skilled and unskilled workers, after controlling for other influences notably the supply of skilled workers and a proxy for technological change (Johansson and Olaberría, 2014). Parallel evidence also shows that skill-biased technological change is a major determinant of the widening of the ratio between the 90th and 10th percentiles of labour earnings (Braconier et al., 2014). Within countries, specialisation in high-skilled industries is associated with a widening of the wage gap between skilled and unskilled labour, while specialisation in low-skilled industries is associated with a narrowing of the wage gap. Consistent with existing evidence (e.g. OECD, 2011b), an increase in the supply of skilled workers is found to mitigate the wage gap between skilled and unskilled labour as well as between the 90th and 10th percentiles of labour earnings (Braconier et al., 2014).

18. As illustrated in Figure 8 the estimates suggest, for example, that the increase in the value-added share of the four industries most intensive in high-skilled labour observed in China from 1995 to 2009 widened the wage gap between skilled and unskilled labour by 4%. At the same time, the decrease in the value-added share of the four industries most intensive in low-skilled labour further widened the wage gap by 30%. The relative increase in the supply of skilled labour over 1995-2009 was not sufficient to offset the widening of the wage gap between skilled and unskilled labour resulting from the rise in demand for skilled labour.

Figure 8. Impact of specialisation and supply of skills on wage gaps between skilled and unskilled labour, 1995-2009[1]



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1. The bar shows the decomposition of the contribution to the change in the wage gap between skilled and unskilled labour over 1995-2009 of changes in the supply of high-skill labour, the demand for high-skill workers, the demand for low-skill workers and other variables. The triangle shows the actual change in the wage gap between skilled and unskilled labour over the estimation period 1995-2009. High-skilled (low-skilled) specialisation is measured as the sum of value added of the four industries that are the most intensive in the use of high-skilled (low-skilled) labour as percent of total value added (see Johansson and Olaberría, 2014 for details).

Source: OECD estimates.

3. Policies, trade and specialisation

19. Policies and institutions can influence trade and specialisation. The main justification behind policy attempts to affect specialisation by supporting specific industries is the presence of externalities, scale effects or market failures preventing an efficient allocation of resources such as labour and capital (e.g. Harrison and Rodriguez-Clare, 2009). A key caveat is that any policy involving "picking winners" is difficult to implement. Given this difficulty, industrial policies often cause waste (e.g. some activities would have been undertaken even in the absence of policies), lock in inefficient activities and encourage rent-seeking. This section focuses on a subset of policies that the existing literature has identified as important drivers of bilateral trade including selective trade and industrial policies (e.g. tariffs), financial development and product and labour market regulations (Nunn and Trefler, 2013; Haussman et al., 2007; Nicoletti et al., 2003).

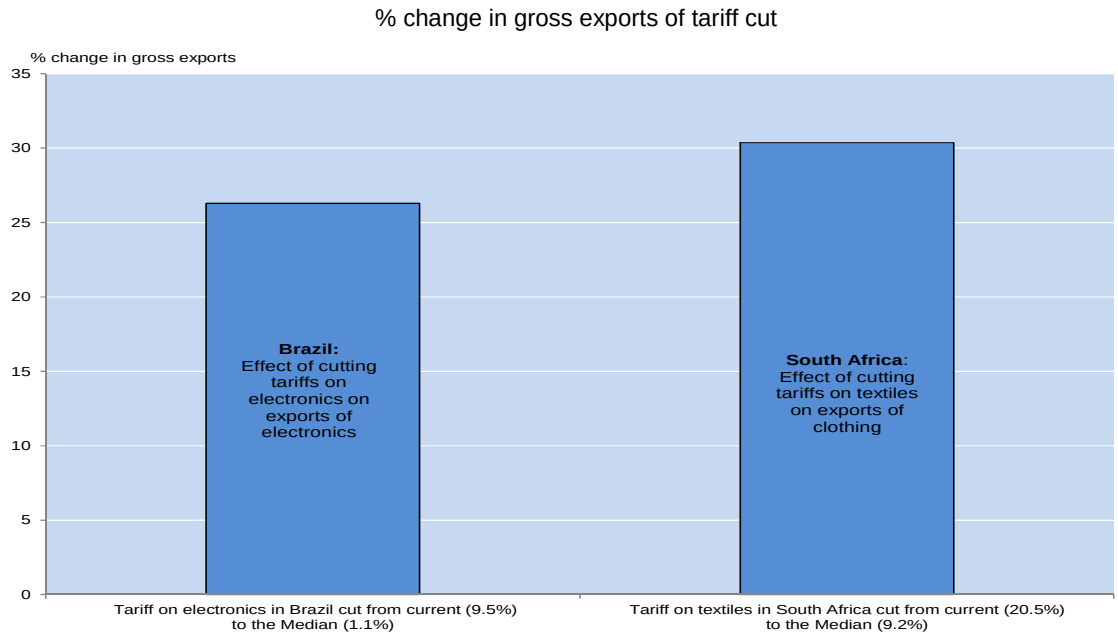
3.1 Unbundling of production can magnify the adverse effect of tariffs

20. Frequent justifications for tariffs are that they can allow domestic industries to grow by enabling the development of economies of scale, which promotes efficiency (e.g. infant industry argument); they can prevent "dumping" in the home country of foreign goods at a price below cost; and, in some countries, particularly emerging economies, they constitute an important source of government revenue. However, tariffs generally have an adverse effect on trade and aggregate welfare since they distort production and raise consumer prices. As a revenue source, other taxes may be more efficient than tariffs. For instance, since tariffs influence both production and consumption decisions they create larger inefficiencies than

consumption taxes (Emran and Stiglitz, 2005). Tariffs can also influence trade patterns and the industrial structure by raising the cost of intermediate inputs.[2] Apart from imposing costs on firms, intermediate input tariffs can limit the access to more varieties and to high quality intermediate inputs and, thereby further reduce competitiveness in international markets (e.g. Grossman and Helpman, 1991; Amiti and Konings, 2007).

21. Intermediate input tariffs can have adverse effects on both industry structure and trade (Johansson et al., 2014). For instance, OECD estimates suggest that if tariffs on electronics (a sector that relies heavily on imported inputs from the same industry) were to be reduced in a country where such tariffs are high (e.g. Brazil) to the median level in the sample of countries included in the analysis, electronic exports could increase by 26% (Figure 9). Furthermore, intermediate input tariffs do not only affect exports in the same industry, they also have a sizeable negative effect on exports of downstream industries. For instance, if a country with high tariffs on textiles (e.g. South Africa) were to reduce them to the median level in the sample of countries included in the analysis, exports of clothing from this country, whose inputs embed more than 40% of textile products, could increase by more than 30%.[3]

Figure 9. Cuts in tariffs on key intermediate inputs boost trade in the same and in downstream industries[1]



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1. The left bar shows how much Brazilian electronics exports could increase if Brazil (the country with highest tariffs on electronics in 2007) would decrease its tariffs on electronics to the median in the distribution of the countries included in the analysis. The right bar shows how much South African clothing exports could increase if tariffs on textiles were cut to the median among the countries included in the analysis (see Johansson et al., 2014 for details).

Source: OECD estimates.

22. The adverse effect of input tariffs on trade has grown over time. This may reflect the increasing importance of global value chains, with the unbundling of production magnifying the impact of tariffs and

2. Tariff rebates on intermediate inputs or refunds when the goods are exported exist in some countries. However, often these schemes entail administrative procedures and documentation that in some cases can be more costly than paying the tariff (OECD, 2010a).

3. These effects may appear large, but it should be noted that the tariff reductions in the example are sizeable, around 10 percentage points.

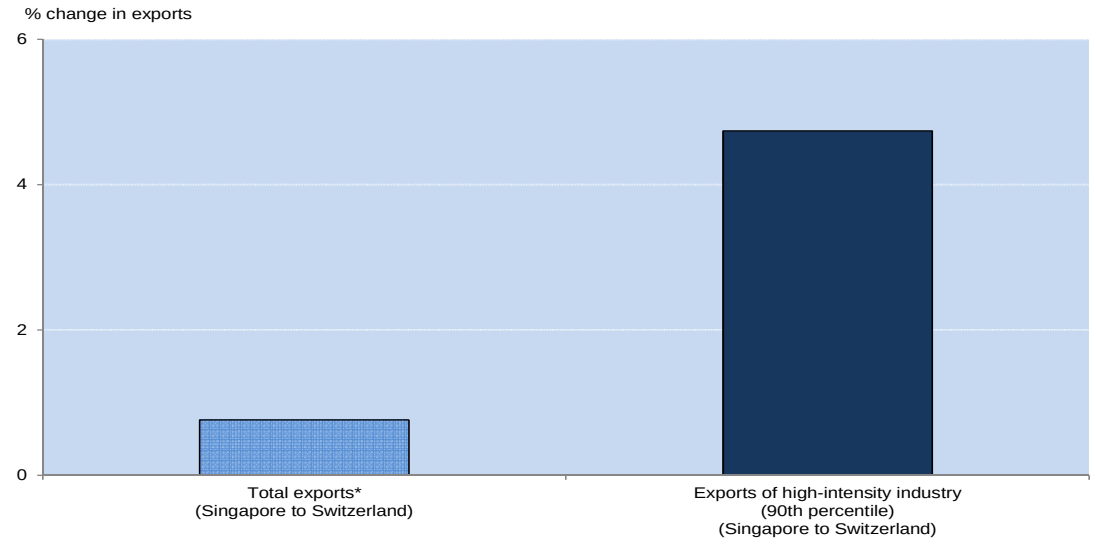
generating cross-country spillovers that go beyond the effect of tariffs on trade with direct trading partners (Koopman et al., 2010; OECD, 2012b). In an integrated value chain, imposing tariffs at one stage on a foreign product affects the whole chain of suppliers through backward and forward linkages. Koopman et al., (2010) calculate so-called "tariff-magnification ratios" for manufacturing products and show that taking into account tariffs along all stages of the supply chain raises significantly the effective tariff protection.

3.2 Sound public institutions can enhance trade in industries with long value chains

23. Sound public institutions that facilitate contract enforcement, adequately secure property rights, and ensure an impartial judiciary, allow trading partners to overcome trade frictions (e.g. Anderson and Van Wincoop, 2004; Acemoglu et al., 2007; Nunn and Trefler, 2013). Thus, the quality of institutions can enhance aggregate growth by increasing trade. It allows industries that depend more on a large set of intermediate inputs (e.g. through long value chains) or on non-contractible inputs (e.g. intangibles assets) to grow faster (e.g. Nunn and Trefler, 2013; Levchenko 2007). For instance, evidence shows that regulatory quality (measured by the World Bank's index on regulatory quality) can boost trade of industries that rely on a large variety of inputs (Johansson et al., 2014). Estimates suggest that improving the regulatory quality from the median to the level of countries with relatively good institutions (i.e. at the 75th percentile of the distribution of countries included in the analysis) could increase exports in industries that rely on a wide variety of inputs (e.g. basic metals or electronics) by around 5% (Figure 10A). The effect on total exports is, however, modest. Furthermore, the same change in regulatory quality increases total imports on average by 3%, reflecting that the ability to source intermediate inputs and to integrate into global production chains are facilitated by high-quality institutions.

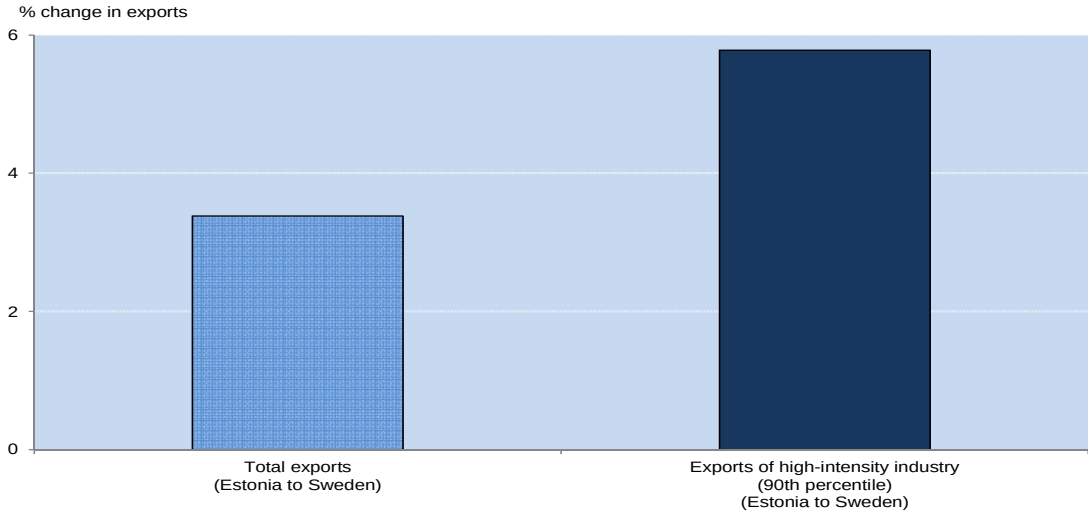
Figure 10. Policies and institutions influence trade

A. Effect of a change in the quality of institutions on total exports and on exports of goods which are strongly dependent on sound institutions[1, 2]



* Effect not statistical significant

B. Effect of a change in financial development on total exports and on exports of goods which are strongly dependent on finance[1]



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1. The right bars show the percentage change in the value of gross exports of the industry at the 90th percentile level of sensitivity on the policy, when comparing the country at the median with the country at the 75th percentile of the country-level distribution of the policy.

2. Financial development is measured by domestic credit to the private sector as a share of GDP from the World Bank Development Indicators and quality of institutions is measured by the indicator of regulatory quality sourced from the World Bank Governance Indicators. The intensities capture the sensitivity of different industries to the relevant policy and are based on different sources (Johansson et al. 2014 for details).

Source: OECD estimates.

3.3 Financial development can alleviate cash constraints and facilitate trade and growth

24. Well-functioning financial systems can promote long-term growth by reducing information and transactions costs, providing appropriate incentives for business governance and easing external financing constraints that impede firm growth and the efficient allocation of resources (e.g. Levine, 2005; Andrews and Criscuolo, 2013). More developed financial systems can also increase the volume of trade (Chor and Manova, 2012), which in turn can raise growth by, for instance, facilitating access to technology. Firms' ability to export and imports depends on trade costs, including financial costs. By lowering the cost of trade, well-functioning financial system can increase the number of potential trading partners and the volume of trade. Financial development can also affect specialisation by promoting faster growth in industries that depend more on external financing (e.g. Rajan and Zingales, 1998; Beck, 2002). The need for external finance tends to be greater in the start-up phase of firms and particularly in industries with large initial investment and continued investment requirements combined with long cash harvest time (e.g. electronics, pharmaceuticals) (Rajan and Zingales, 1998). These industries also tend to be comparatively more innovative than other industries, adding to aggregate growth.

25. Estimates suggest that financial development (measured by the ratio of private credit to GDP) enhances trade, particularly in goods whose production is highly dependent on external finance (Johansson et al., 2014). For instance, if financial development were to increase from that of the median country to the level of the country at 75th percentile among the countries included in the analysis (e.g. from Estonia to Sweden), this would increase total exports by 3% (Figure 10B). However, this change could increase exports of industries that are highly dependent on external finance (e.g. electronics) by 6% (Figure 10B). The same increase in financial development could increase imports by as much as 4%. Thus, well-functioning financial markets can create spillovers to trading partners.

3.4 Market rigidities hinder specialisation

26. The capacity of countries to reap the full benefits of trade integration by adapting their industrial structure depends on their ability to reallocate resources across sectors and firms. Several studies have found that well-functioning financial, labour and product markets improve the ability to continuously reallocate resources towards their effective use (e.g. Levine, 1997; Andrews and Cingano, 2012; Barone and Cingano, 2011; Arnold et al., 2008), with positive implications for growth.

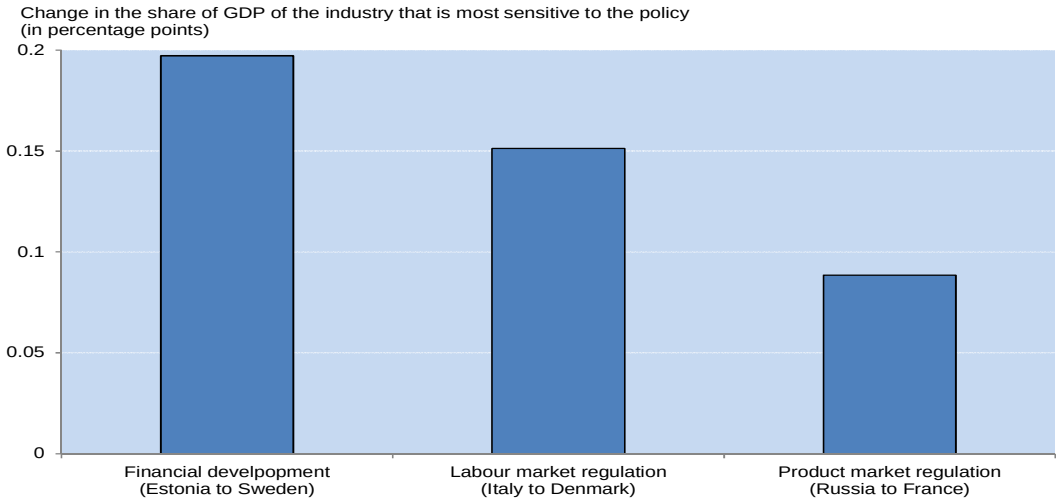
27. Well-developed financial institutions can enhance the allocation of resources to their most productive use (Levine 1997), and they can also promote faster growth in industries more dependent on external funds. In fact, OECD estimates suggest that financial development would increase the value-added share of industries highly dependent on external finance (Johansson and Olaberría, 2014). For instance, if financial development were to increase from that of the median country to the level of the country at the top quartile (e.g. from Estonia to Sweden), the value-added share of industries highly dependent of external finance would increase by 0.2 percentage points (Figure 11). This change may seem small, but considering that the value added share of GDP, for example, of the electronics industry (which is highly dependent on external financing) is on average 1.5% across countries, the change is sizeable.

28. Burdensome product market regulation hampers the ability of firms to adjust to rapid change by hindering growth of the most efficient firms and preventing the exit of inefficient ones (Andrews and Cingano, 2012). For example, in industries (e.g. pharmaceuticals, electronics, hotels and restaurants) with naturally higher reallocation needs (measured by firm turnover) stringent regulations can reduce the efficiency of these industries disproportionately. Estimates suggest that a reduction in the stringency of product market regulations from the top quartile (e.g. Russia) to the median (e.g. France) would increase the value-added share of industries with a structurally high turnover by 0.1 percentage points (Figure 12; Johansson and Olaberría, 2014). If firms and industries that require higher firm turnover are also more dynamic and fast-growing, flexible regulations can shift resources to these sectors away from more stagnant ones, with positive growth effects (Andrews and Criscuolo, 2013). However, it is important to recognise that flexible regulations can also promote sectors with high turnover that lack dynamism and have low productivity growth (e.g. hotels and restaurants).

29. Employment protection legislation – through its impact on hiring and firing costs – can also affect specialisation by reducing the ease of reallocating workers across firms and sectors, with adverse productivity effects. However, employment regulations, by reducing (involuntary) labour turnover, can also enhance an individual's incentive to invest in firm-specific human and social capital (e.g. Dess and Shaw, 2001) and thereby raise a firm's productivity growth. Recent studies emphasise that, ceteris paribus, industries that naturally require greater job reallocation grow faster (and account for a greater share of GDP) in countries with easier labour market regulations (Cunat and Melitz, 2012), a prediction that is supported by available empirical evidence (e.g. Chor, 2010; Kowalski, 2011). New estimates suggest that easing labour market regulations (measured as OECD's indicator of employment protection on regular contract) from the top quartile (e.g. Italy) to the median (e.g. Denmark) would increase the value-added share of industries with a structurally high job turnover by 0.15 percentage points (Figure 11). The overall effect of greater specialisation on growth in sectors with high job-turnover depends on the characteristics of these industries, with some of these industries being more likely to add to growth than others.

Figure 11. Policies and institutions influence industrial value-added shares

Effect of a change in policy or institutions on industrial value-added share[1, 2]



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1. The bars show the percentage point increase in the value-added shares of the industry at the 90th percentile level of sensitivity to the policy/institution, when comparing the country at the median with the country at the 75th percentile of the distribution of the policy.
2. Financial development is measured by domestic credit to the private sector as a share of GDP from the World Bank Development Indicators, labour market regulation is measured by the OECD index of employment protection legislation and product market regulation is measured by the OECD index of regulation in product markets (see Johansson and Olaberría, 2014 for details).

Source: OECD estimates.

3.5 Raising skills can facilitate knowledge-intensive specialisation and affect inequality

30. By improving the level and quality of education countries can strengthen their relative comparative advantage in knowledge-intensive sectors and thereby increase trade in goods with higher value-added. It could also facilitate specialisation in higher value-added activities within a supply chain, as higher-value-added activities are often concentrated in those parts of the value chain making intensive use of human capital and knowledge-based capital (OECD, 2013a). Estimates suggest that improving the stock of human capital (measured by average years of schooling) from the position of the median country to that of the country at the 75th percentile of the distribution (corresponding to an approximate three years' increase in average years of schooling), could increase total exports by 15% (Figure 1A). This effect can be up to 21% in industries that are intensive in high-skilled labour (at the 90th percentile), such as electronics (Figure 1B). Thus, a greater stock of human capital could raise trade and facilitate climbing the value-chain towards higher skill and higher value-added activities, with positive effects on growth.

31. Studies suggest that encouraging more students to pursue tertiary education has ambiguous effects on the wage gap between skilled and unskilled workers. These reforms tend to widen income dispersion by increasing the number of high-wage earners (OECD, 2012c). However, research suggests that this effect may be more than offset by a decline in the returns to higher education relative to lower levels of education as the relative supply of higher skilled workers increase (Koske et al., 2012). Lower relative returns could reduce investment in tertiary education and the supply of skilled workers putting downward pressures on the wage gap. At the same time, continued knowledge-driven growth could mean that the demand for skilled labour may outstrip the supply of skills, and this may lead to a rise in earnings inequality (Braconier et al., 2014). Furthermore, education policies that promote equity and support disadvantaged students in achieving better academic outcomes may also help reduce income inequality in the future (OECD, 2010b; Braconier et al., 2014).

4. Trade and specialisation scenarios to 2060

32. Scenarios of likely developments in trade and specialisation over the next 50 years are based on a framework that combines long-term macro projections for the world economy with a detailed sectoral trade model that replicates the key stylised facts concerning the driving forces of trade and specialisation patterns described in the previous sections (see Box 2). This framework embodies different channels through which structural and trade policies can influence economic behaviour and performance, notably the model is calibrated on the current trade policy stance (e.g. it accounts for implemented and agreed regional trade agreements). This section first discusses a baseline scenario for global trade and specialisation up to 2060. Alternative scenarios are then described, focusing on how trade policies and accumulation of human capital in emerging economies can affect trade volumes, trade specialisation, GDP and real income.

Box 2. The modelling framework for the long-term global trade scenarios

The methodology used to design trade scenarios to 2060 combines two models: the long-run growth model in the OECD Economic Outlook (Johansson et al., 2013; OECD, 2013b) and a version of MIRAGE, a multi-country, multi-sector dynamic model, developed by the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) (Fontagné and Fouré, 2013).

Macro projections are based on OECD's long-term projections for GDP, saving, investment and current accounts (OECD, 2013b and Johansson et al., 2013) for OECD and non-OECD G20 countries, complemented with projections by Fouré et al., 2012 for other countries. These projections are consistent with the ones reported in Braconier et al., 2014. The trade model is a computable general equilibrium (CGE) model designed to analyse the evolution of bilateral trade patterns and sectoral specialisation in the global economy. For tractability, the 147 countries and 57 industries covered in the CGE trade model are aggregated into 26 regions and 25 sectors respectively (Chateau et al., 2014 for more details). The combination of aggregate projections, which are based on a growth model, with the more detailed description of behaviour of consumers and firms provided by the CGE model allows highlighting how countries' specialisation is shaped by global trends (e.g. ageing, skill enhancement, capital investment, technology diffusion, etc.) and how structural and macro policies implemented in each country will affect future trade and specialisation patterns, taking into account inter-linkages across countries.

Policies and institutions can affect trade and specialisation. Reflecting this, both the aggregate and the sectoral model used in the analysis embody different channels through which public policies can influence economic behaviour and performance. Growth projections account for the impact of developments in labour market and retirement policies (such as reforms to lengthen working lives in line with gains in longevity) on unemployment and labour force participation, regulatory and competition policies on productivity (such as continuing liberalisation of product markets), expansion of educational systems on human capital formation, as well as for the influence of fiscal consolidation (which is assumed to stabilise debt at or below 60% of GDP) in advanced economies and enhanced welfare policies in emerging economies (i.e. resulting in increased social spending) on savings, investment and current accounts. Besides affecting trade and specialisation through growth, a number of these structural and macro policies will also have implications for specialisation by affecting the allocation of resources across sectors. These allocative effects are only partially taken into account in the analysis.

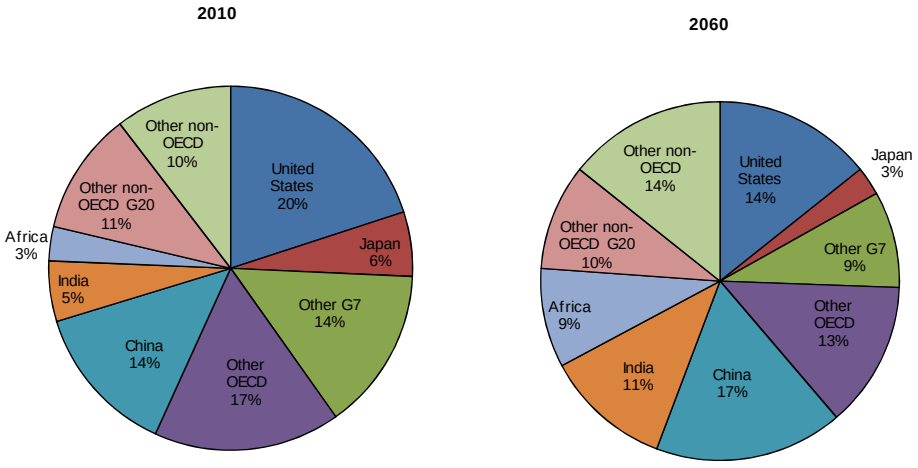
The projections also consider the impact of trade policies on trade and specialisation through their impact on factor prices and trade costs. More specifically, the CGE model relies on detailed data on bilateral protection and trade cost, including tariffs, regulatory barriers in services (i.e. ad valorem tariff equivalents) and agricultural support (e.g. decoupling subsidies from production). The model is calibrated on the current trade policy stance at disaggregate detailed sectoral level for the countries covered in the model. The projections also account for implemented and agreed regional trade agreements (e.g. enlargement of the European Union, ASEAN, etc.) in the baseline. Furthermore, the CGE baseline projections assume that international transaction costs for goods will gradually fall over time reflecting technical progress in handling at customs.

4.1 Global growth will be sustained by emerging economies

33. Over the next half century, world GDP is projected to grow on average at around 3% per year with declining rates in many countries. Up until 2030, world growth will be sustained by a rising weight of China and India with high, albeit declining, growth. After 2030 fast growth in Africa is expected to support world growth. The OECD trend GDP growth is projected at about 2% annually until 2060, and growth in emerging economies will continue to outpace the OECD, but the difference will narrow over coming decades as income levels in emerging economies catch up to those in the OECD. As a result, the next 50 years will see changes in country or region shares in global GDP (Figure 12). The faster growth rates in emerging economies imply that the combined GDP of present non-OECD economies will account for around 60% of world GDP at current PPPs by 2060, up from about 40% in 2012.

Figure 12. Major changes in the composition of world output over the next 50 years

Percentage of world GDP (current PPPs), %[1]



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1. World GDP refers to 147 countries

Source: Calculations based on the long-term model and MAGE.

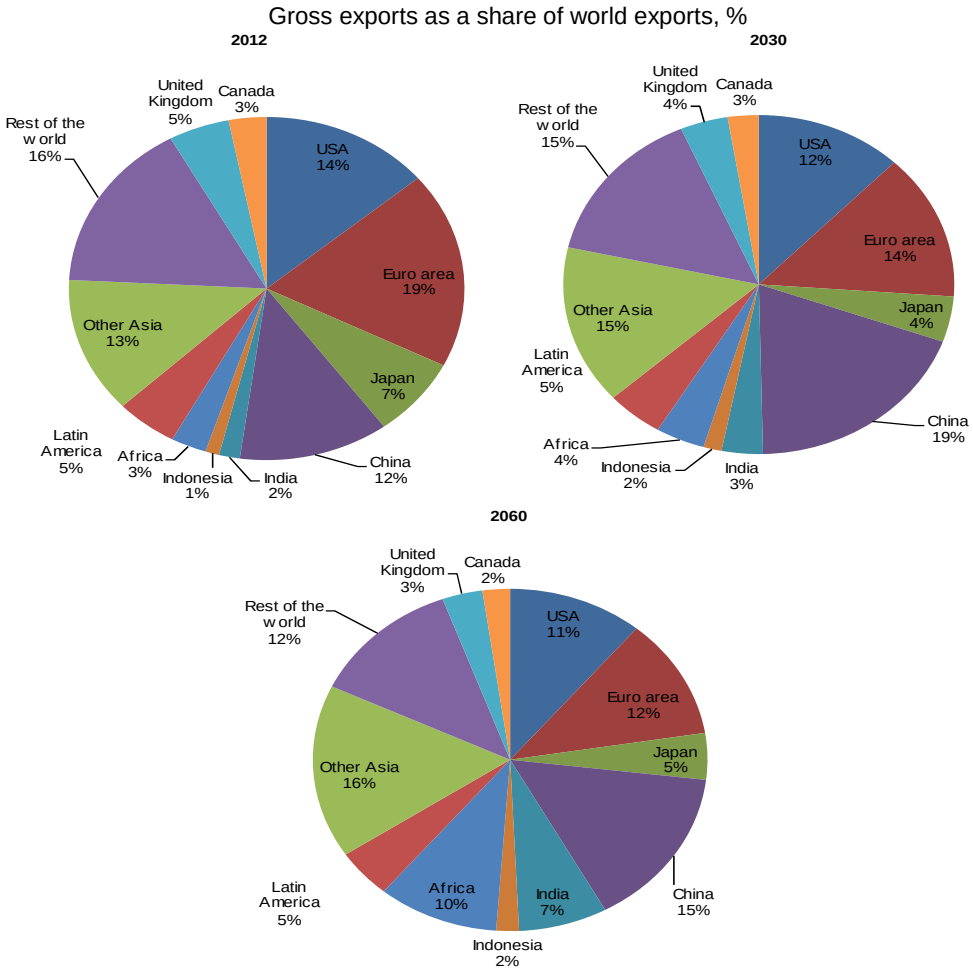
4.2 Continuing globalisation over the next half century

34. Growth in trade (gross exports of goods and services) is expected to continue to outpace GDP growth over the next 50 years with world trade estimated to grow at around 3.5% annually (compared with 6.9% over the period 1990-2007). Projections imply that the trade elasticity with respect to GDP is expected to be lower than in the decades before the financial crisis. The lower elasticity partly reflects that the contributors to world growth over the next half century will rely less on export-led growth than in the past decades. It also partly reflects that the intensity of fragmentation of global value chains is hypothesised to slow down as there are likely physical limits on how much a product and task can be fragmented (Fontagné and Fouré, 2013).

35. In terms of geographical distribution, there will be large shifts in trade patterns, reflecting among other things uneven developments in income across the globe as well as changes in the composition of the consumption basket and relative productivity (Figure 13). China and India are projected to gain market shares in world trade over the next half century, although the rapid growth in China's trade share is expected to slow down after 2030, as GDP growth is slowing. Likewise, Africa, Indonesia and other Asian economies are projected to experience sizeable increases in trade shares, especially after 2030, reflecting rapid growth leading to larger economic size combined with low production costs. These gains in trade shares of emerging and developing economies are mostly at the expense of reduced trade performance within the Euro area. From having accounted for 19% of world exports in 2012, the Euro area's market share in exports is expected to fall to approximately 12% by 2060. By contrast, some OECD economies,

including the United States and Canada, are projected to see their trade shares decrease only slightly, reflecting comparatively more favourable growth projections than the euro area.

Figure 13. The share in global exports of non-OECD countries will increase significantly



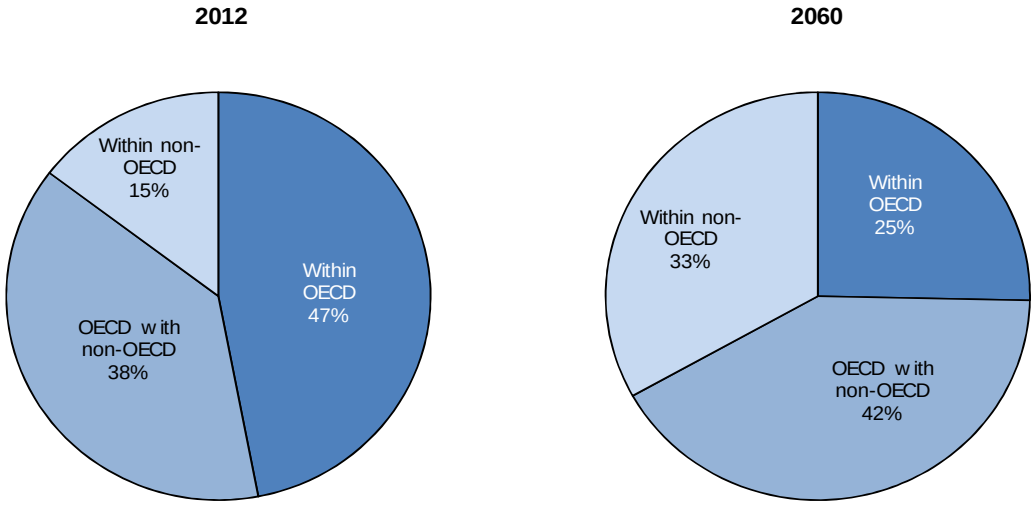
StatLink http://dx.doi.org/10.1787/888933095305

Source: Calculations based on MIRAGE.

36. The changing geographical distribution of trade is mirrored by changes in the relative importance of different constellations of trading partners (Figure 14). While in 2012 about half of total trade in bilateral terms took place within the OECD area, the importance of bilateral trade among OECD members is expected to nearly halve by 2060. Instead, by 2060 trade among non-OECD economies will more than double, to account for approximately one-third of global trade. For instance, trade among Asian economies increases from around 6% to 16% over the projection period. At the same time, OECD economies will increasingly import products from non-OECD economies, whereas the share of global imports of non-OECD from OECD countries will remain more or less unchanged. All in all, over the next 50 years the geographical centre of trade is projected to move away from OECD to non-OECD countries.

Figure 14. A growing share of trade will occur among non-OECD countries

Gross exports, %



StatLink http://dx.doi.org/10.1787/888933095324

Source: Calculations based on MIRAGE

4.3 Globalisation and income convergence will influence trade and industrial specialisation

Shift in trade shares

37. The relative importance of different countries and regions in specific markets is set to change markedly over the coming decades, driven by diverging growth performance, changes in relative productivity and production prices as well as a reorientation of consumption in emerging economies towards services (Figure 15). Notably, China, India, other Asian economies and Africa are projected to become the dominant players in manufacturing, while most OECD countries are expected to lose ground. For instance, Japan, South Korea and the United States are set to lose their comparative advantage in electronics to China and other Asian countries, who could account for as much as 70% of world exports in electronics by 2060.

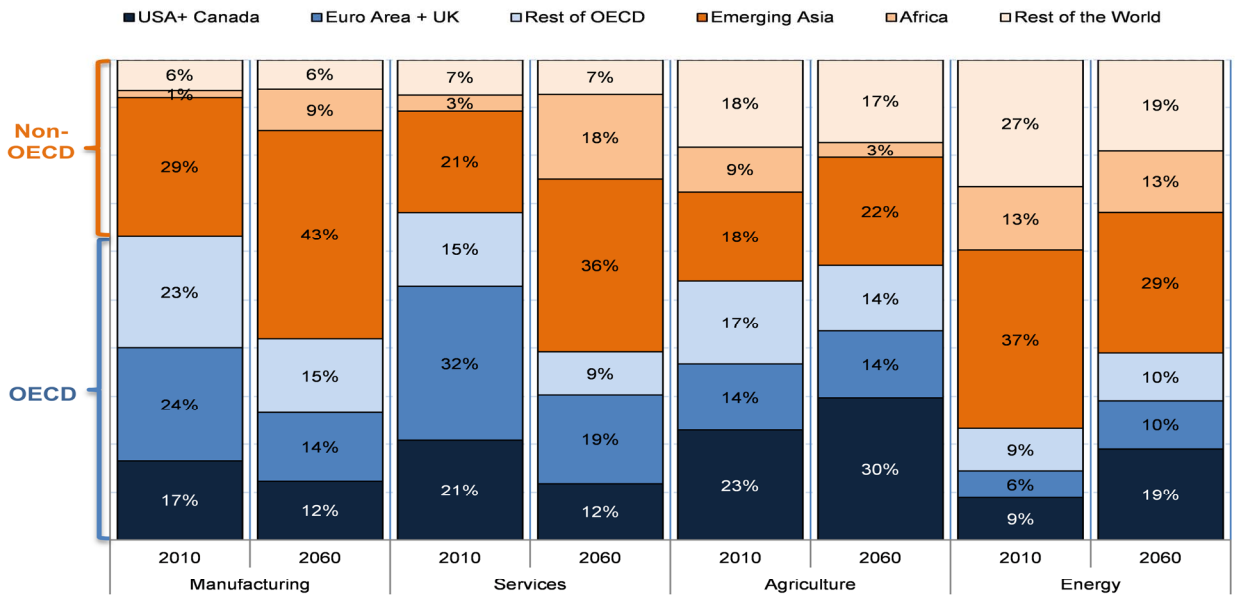
38. Emerging and developing economies' (e.g. China, India and Africa) world market shares will increase significantly even in service trade, as a result of a shift towards more advanced activities as these economies become wealthier, combined with a larger economic size. The gain in service trade shares in China and India is mostly at the expense of the Euro area, the United States, Japan and the United Kingdom. One explanation for this is that some service sectors are typically characterised by low productivity levels. Therefore, access to low-cost labour matters comparatively more for these sectors than others and, despite rising labour cost in emerging economies, the cost is still lower than in some advanced economies.

39. In the energy sector, a marked shift in the global distribution of trade is expected to occur over the next half century. The trade share of the United States in world energy exports is expected to more than triple by 2060, at the expense of the Middle East and the Russian Federation. This large gain reflects investments in technologies to extract and develop new sources of shale gas and oil as compared with the exhaustion of conventional natural reserves in other parts of the world (e.g. IEA, 2012). However, it should be noted that the energy sector is subject to large geopolitical and technological uncertainty over the next half century, making projections particularly vulnerable to unpredicted events.

40. In agriculture, the United States and other Asian countries are expected to remain competitive and their trade share in agricultural exports will increase mostly at the expense of Africa and Latin America.

Figure 15. The relative importance of different countries in specific industries are expected to change[1]

Countries' share in world exports by industry, 2010 and 2060 %



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1. Manufacturing includes chemicals rubber and plastic, electronics, food, iron and steel, metal products, other manufacturing, other metals, other minerals, paper and wood, textiles, transport equipment. Service includes business service, transport service, wholesale and retail, public administration and other services. Agriculture includes livestock, rice and crops, other agriculture and other mining. Energy includes coal, crude oil, electricity, gas and refined oil.

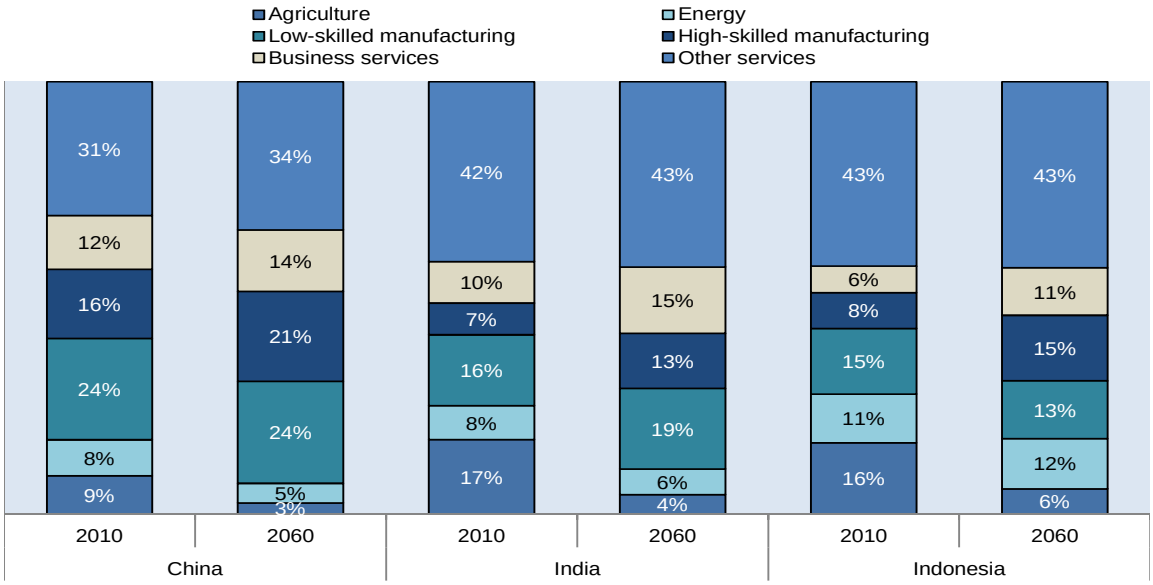
Source: Calculations based on MIRAGE.

4.3.1 The industrial structure in emerging economies gradually becomes similar to that of the OECD

41. In parallel with the changing trade patterns, the industrial structure (measured as value-added shares of specific sectors in total value-added) will evolve differently across countries and regions depending on changing patterns of domestic and international demand, differences in the accumulation of production factors across countries, the allocation of factors across sectors within countries and countries' international competitiveness. One general trend that stands out in the baseline projection is that most significant changes will occur in emerging economies, whereas the industrial structure will remain relatively stable in OECD countries over the next half century (Figure 16). In fast-growing emerging countries past trends are expected to continue over the projection period and the industry mix will continue shifting towards services away from manufacturing, typically low-skilled (e.g. textile, food production etc.). China and India are projected to experience marked increases in the contribution of financial and business services, wholesale and retail and transport services to value added as demand for these services increases with income combined with trade frictions (Figure 16). This largely reflects the development process in lower-income countries with income and living standards catching-up towards levels of higher-income OECD countries, which results in changing domestic demand and consumption patterns.

Figure 16. Industrial structure is set to change in emerging economies

Value-added shares of different sectors in China, India and Indonesia, 2010 and 2060



StatLink http://dx.doi.org/10.1787/888933095362

1. Agriculture includes rice and crops, other agriculture and other mining. Energy includes coal, crude oil, electricity, gas and refined oil. Low-skilled (low-technology) manufacturing includes food, textile, paper and wood, other manufacturing, metal products, other metals and other mining. High-skill (high-technology) manufacturing includes chemicals, iron and steel, transport equipment and electronics. Other services include transport service, wholesale and retail, public administration and other services.

Source: Calculations based on MIRAGE.

4.4 Income convergence will influence wage inequality among and within countries

42. Over the next 50 years income gaps among countries will narrow. Rapid GDP growth in emerging economies is matched by a tendency of GDP per capita to converge across countries. Between now and 2060, GDP per capita (measured in 2005 PPPs) in India, Philippines and some African countries will increase by more than 7 times, while the increase is around 5 times in Indonesia and China. Over the same period, living standards will roughly double in the highest-income OECD countries. This will lead to a richer and more equal distribution of world income among countries, which will push in the direction of falling absolute poverty.

43. Furthermore, across countries the relative wage of skilled to unskilled labour will change over the next half century, with implications for trade patterns. As highlighted in Braconier et al., (2014) the evolution of the relative wage earnings of different workers depends on several factors including the amount of investment in tertiary education. Indeed, the projected relative wage varies with the pace of investment in skills. For example, if educational attainment in emerging economies were to converge at a slower pace (i.e. 50% slower) than assumed in the baseline due to lower investment in education, the relative wage of skilled to unskilled labour will tend to increase in these countries as compared with the baseline (see below for the implications on trade). Since a sector's production price varies according to its skill intensity less skill-intensive sectors will face a decrease in their price, while more skill-intensive an increase. The induced change in production prices reshapes a country's comparative advantage and this influences trading partners' demand for its goods (as well as for goods originating in all other countries). However, the spillover of lower supply of skilled workers in emerging economies on wage growth in other countries is limited. This reflects a substitution of skilled labour for other production factors mitigating the impact on producer and international prices from the wage change and, in turn, on foreign demand (production and consumption).

44. The distribution of wages across differently skilled workers within countries depends on the supply and demand for skills, the extent of skill-biased technological change, the composition of consumption demand and institutional settings in labour markets and educational systems. Over the next half century educational attainment will continue to improve, increasing the supply of skilled labour, and thereby putting downward pressure on the skill premium. However, as shown in Braconier et al., (2014) continued skill-biased technological progress, with rapidly rising demand for higher skills, is likely to outpace the increase in the supply of skills, leading to increased wage inequality over the next 50 years. If skill-biased specialisation continues at the same pace over the next 50 years as during the period 1995-2009, this would more than offset the downward pressure on relative wages stemming from an increased supply of high-skilled workers. Indeed, during the period 1995-2009, the upward pressures of skill-biased specialisation on the relative wage gap between skilled and unskilled workers were on average about 1.5 times greater than the downward impact of increasing supply of high-skilled workers (Figure 8).

4.5 Trade liberalisation can increase global trade and growth

45. Despite reductions in market- and non-market barriers to trade during the last decades, particularly for industrial products, significant barriers still remain at the global level. These barriers go beyond tariffs on goods. Regulatory obstacles to trade in services, agricultural subsidies and transaction costs on goods remain large. Removing trade barriers can improve GDP and welfare, while also having side effects on income distribution; for instance, amplifying within-country wage inequality even as it reduces average income gaps across countries. While trade liberalisation can take different forms, the approach in this section is to describe two stylised alternative trade facilitation scenarios, and to gauge the impact of these on global trade, GDP, real incomes, industrial structure and wage inequality over the next 50 years, compared with the baseline long-run scenario described above.

46. Trade liberalisation can occur at global or regional level. It is well known that multilateral negotiations among a large set of countries are inherently difficult, whereas regional trade agreements among a limited group of relatively similar countries can allow for negotiating rules and commitments that go beyond what would be possible in a wider forum. However, a regional agreement can lead to trade discrimination and welfare losses in some countries. To the extent that it generates a diversion of production from efficient producers outside the regional agreement to inefficient ones within the region, it may cause efficiency losses. It can also promote regionalism, potentially hindering trade liberalisation at a global level.

47. Two illustrative scenarios are considered, one with strengthened regional integration among a set of present OECD economies (e.g. the United States, Canada, Mexico, the European Union, Switzerland, Iceland, Australia, New Zealand, Japan and Korea), and another with trade liberalisation on a global basis (see Box 3 for details):

- The so-called “regional liberalisation” scenario assumes significant reductions in tariffs and non-tariff barriers in services among the members of the free-trade zone, in combination with reductions in transaction costs for goods; at a later stage, in 2030, the free-trade zone is assumed to sign bilateral trade agreements with key partner countries (such as China and India).

- The so-called “partial multilateral agreement” scenario is global but assumes less extensive reductions of trade barriers than in the regional liberalisation.

Box 3. Assumptions in the alternative trade policy scenarios

The two trade scenarios include the following assumptions:

Regional liberalisation:

- A free-trade agreement (FTA) is established in 2012 between United States, Canada, Mexico (NAFTA), the European Union, Switzerland, Iceland and Liechtenstein (EFTA), Australia, New Zealand, Japan and Korea. Trade barriers (tariffs, transaction costs such as handling at customs and regulatory barriers to trade in services measured by ad valorem tariff equivalents) are progressively phased out in this region.
- In the FTA, tariffs on goods are abolished by 2060 and transaction costs for goods are reduced by 25% more than in the baseline by 2060.
- Regulatory barriers in services as measured by *ad valorem* tariff equivalents converge to half the average intra-European Union level for non-EU countries within the FTA, while barriers between EU members are reduced by a further 10%.
- In 2030, bilateral trade agreements are negotiated with key partners of the FTA including South Africa, The Russian Federation, Brazil, China, India, Indonesia, other ASEAN countries and Chile. With these countries, the FTA bilaterally reduces tariffs by 50% progressively, until 2060.

Partial multilateral liberalisation:

- From 2013 tariffs on goods are reduced on a multilateral global basis by 50% by 2060 and transaction costs are reduced by 25% more than in the baseline by 2060.
- Regulatory barriers in services converge to half the average intra-European Union level for non-EU countries within the FTA, while barriers between European Union members are reduced by a further 10%.
- From 2013 agricultural support is reduced by 50% by 2060 in the European Union, the Unites States, Japan, Korea, Canada and in EFTA countries

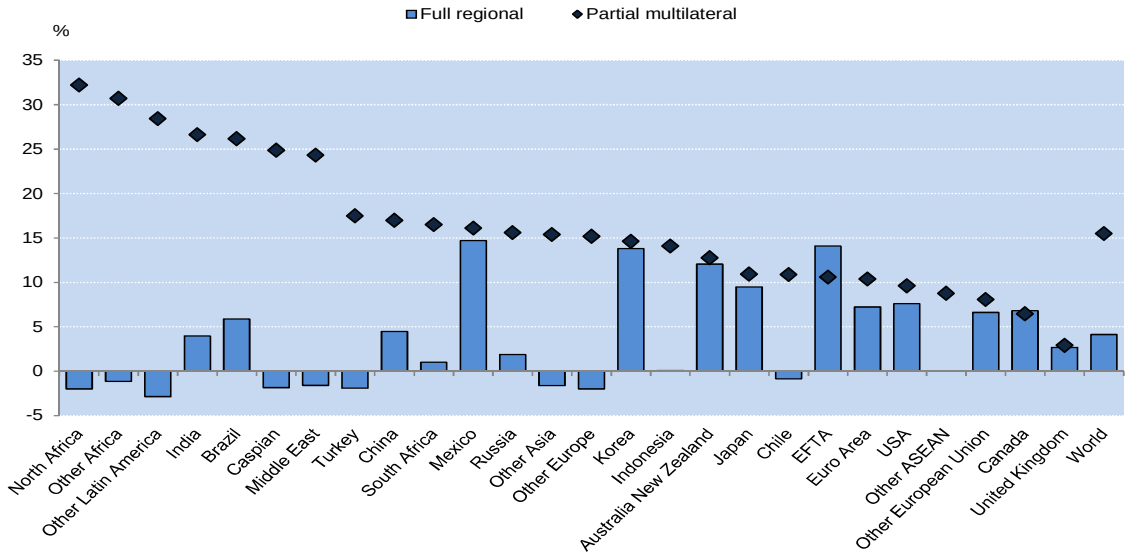
4.5.1 Unevenly distributed increases in trade

48. Projecting the alternative scenarios reveals mostly positive trade impacts across the globe but illustrates the different outcomes of regional versus multilateral approaches to trade liberalisation. World trade (exports) in the regional and partial multilateral liberalisation is 4% and 15% higher in 2060, respectively, although the gains are distributed unevenly across countries or regions in the two scenarios (Figure 17). While the effect of trade liberalisation in FTA members (mostly OECD economies) is to raise trade by around 7-8% in both scenarios, non-FTA members (mostly non-OECD countries) only enjoy sizeable increases in trade in the multilateral scenario. For these economies the increase in trade is only about 1% in the regional liberalisation scenario, while multilateral liberalisation could raise their trade on average by 20%. Nonetheless, as in the baseline, in both scenarios the bulk of all trade still occurs among non-OECD (non-FTA) countries or regions at the end of the projection period.

49. This asymmetry in the impact of liberalisation across OECD and non-OECD countries in the two scenarios can be explained by a reorientation of trade and by large trade diversion effects. In the regional liberalisation scenario, a share of potential trade will shift towards members of the FTA (OECD countries) away from non-members (non-OECD countries) (Figure 18). Part of this expansion of trade is replacing former trade of non-members with trade from regional members, as a result of the shift in relative market access conditions. As a result of this trade diversion some non-FTA countries will experience trade losses, particularly those in regions that do not sign a bilateral agreement with the FTA in 2030 (e.g. Africa, Latin America, the Middle East etc.). By contrast, in the partial multilateral scenario trade is instead reoriented away from OECD countries towards the non-OECD area, reflecting comparatively larger reductions in tariffs than in OECD countries (i.e. given that initial tariff levels in the baseline are higher in non-OECD than in OECD), as well as stronger underlying growth performance in this area.

Figure 17. Unevenly distributed increases in trade in liberalisation scenarios, 2060

% increase in gross exports as compared with the baseline by 2060



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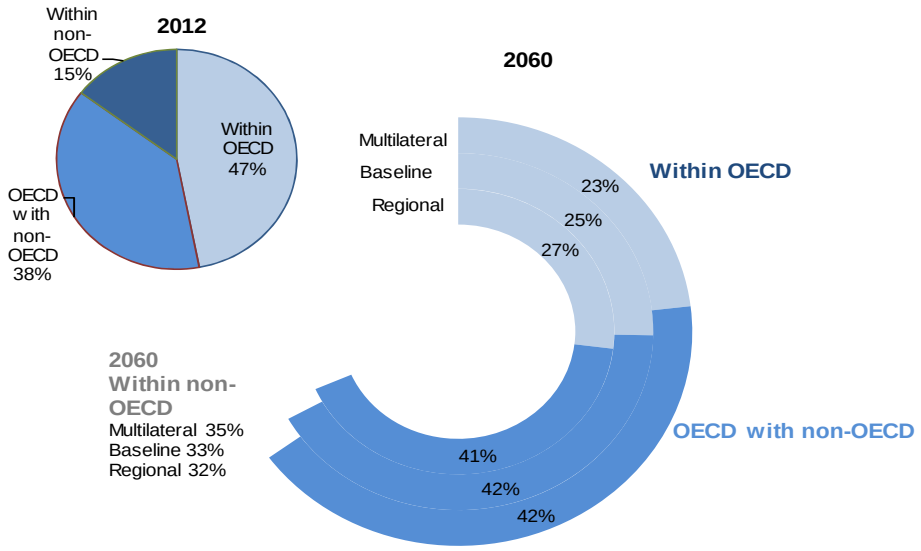
Source: Calculations based on MIRAGE.

Figure 18. Reorientation of trade towards FTA partners

Export shares in world trade, %



StatLink http://dx.doi.org/10.1787/888933095400

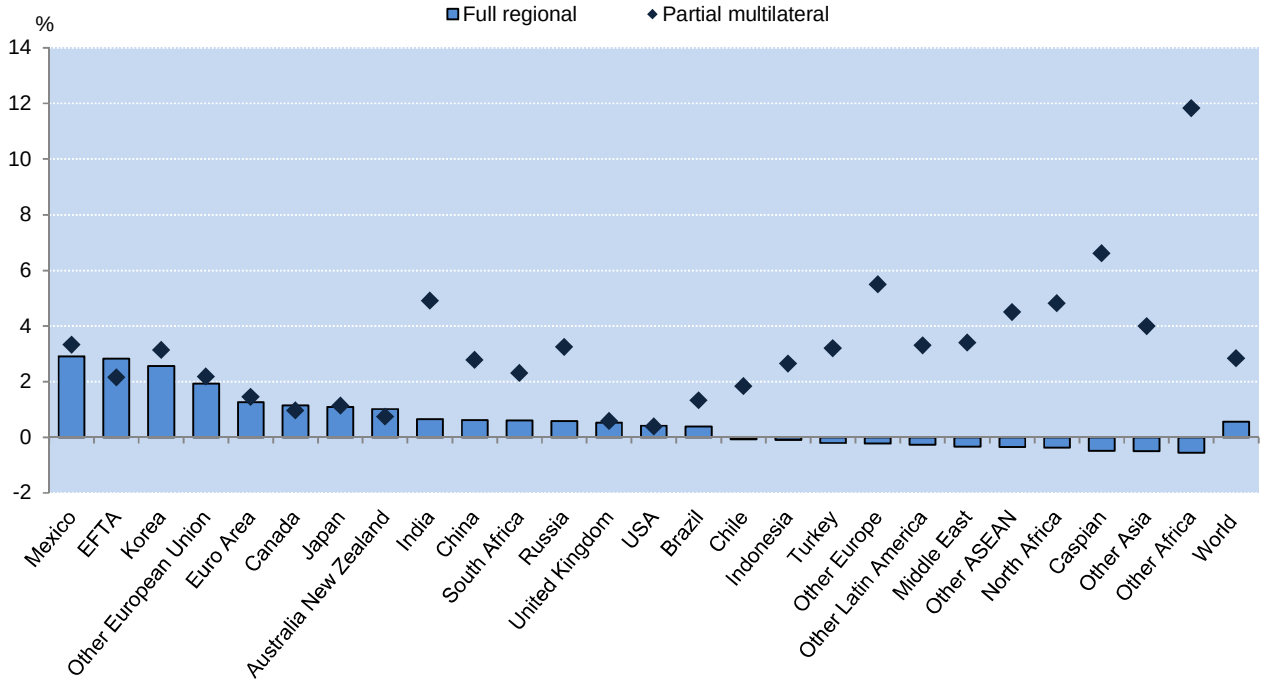
Source: Calculations based on MIRAGE.

4.5.2 Reducing trade barriers has a positive impact on real GDP, more so if liberalisation is multilateral

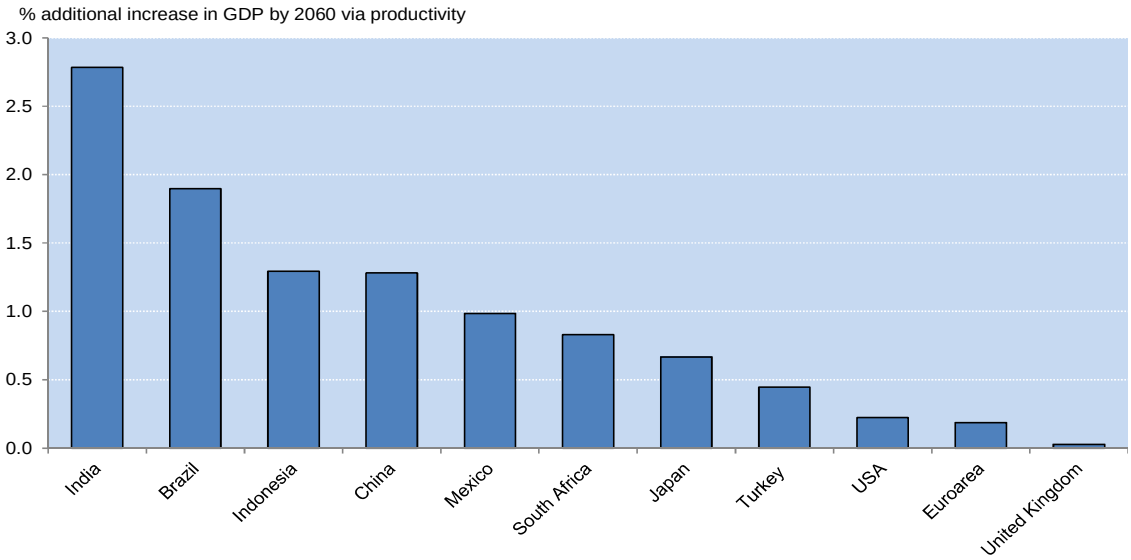
50. In parallel with the increased trade integration and associated reallocation of resources across sectors to comparatively more efficient ones, long-term real GDP will increase relative to baseline. World GDP in the regional and partial multilateral liberalisation scenarios is 0.6% and 2.8% higher in 2060, respectively. But again, the gains in long-term GDP are unevenly distributed across the globe in the two scenarios. While the change in real GDP in most OECD countries is similar in the two scenarios, the gains are always greater for non-FTA members (mostly non-OECD countries) in the multilateral scenario. Multilateral liberalisation could raise long-term real GDP in India and other Asian regions by more than 4% by 2060 (relative to baseline) (Figure 19A). The gains in terms of GDP illustrated here may appear modest compared with large changes observed as a result of growth fundamentals (e.g. demography, education, technical progress etc.). However, it should be kept in mind that, while the projections capture only allocative gains, a better trade environment and level playing field are pre-conditions to reap the growth benefits of the mentioned fundamentals. For instance, if feedback effects of increased trade openness on growth in terms of acceleration of productivity catch-up (due to knowledge spillovers and diffusion of technologies) were taken into account in the multilateral liberalisation scenario, GDP would be on average an additional 1.2% higher in 2060. Thus, world GDP could be as much as 4% higher in 2060 in the multilateral scenario as compared with baseline. In countries with large scope for productivity catch-up, such as emerging economies, the effect of trade openness on productivity could add up to more than 2.5% to GDP (Figure 19B). For instance, accounting for the effect of rising openness on productivity catch-up, GDP could be 7.6% and 4.1% higher by 2060 in India and China, respectively. Even larger effects on GDP could be expected if the full range of dynamic effects were accounted for.

Figure 19. Trade liberalisation increases GDP, 2060

A. % increase in real GDP of trade liberalisation as compared with the baseline by 2060



B. % additional increase in real GDP of multilateral trade liberalisation via productivity catch-up, 2060



StatLink http://dx.doi.org/10.1787/888933095419

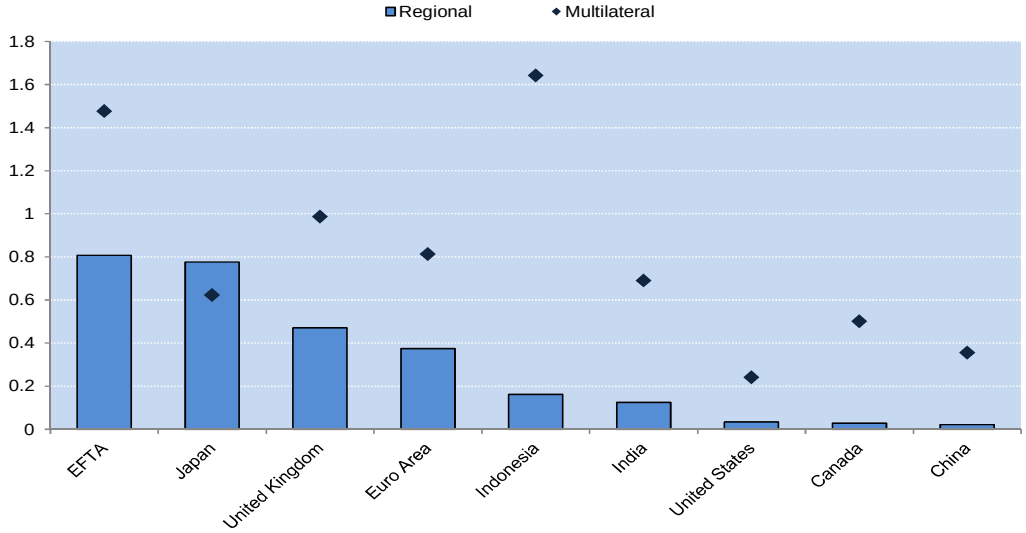
Source: Calculations based on MIRAGE and the Long-Term Growth model.

4.5.3 Pressures on skill premia tend to increase as trade barriers are removed

51. Relative wages will be affected by trade liberalisation since the demand for different types of skills changes as the volume and composition of bilateral trade is altered. Overall, there is a tendency for the wage gap between skilled and unskilled workers to widen in both advanced and emerging economies in the trade liberalisation scenarios relative to baseline. In most cases, upwards pressures on skill premia are stronger in the multilateral liberalisation scenario than in the regional one, reflecting greater reallocation of resources across industries and countries towards higher-skilled activities.[4] Generally, however, the pressures are moderate (Figure 20). Stronger pressures on wage premia are observed in the Euro area and Japan, as demand shifts from low-skilled sectors such as crops towards higher-skilled auto industry, oil refinery and other manufacturing, as well in some other advanced economies (e.g. the United Kingdom and EFTA countries). Pressures on wages of skilled workers are also significant in Indonesia due to the strong reorientation of production towards the relatively high-skilled electronic sector, in combination with comparatively lower up-skilling than in some other emerging economies (e.g. China).

Figure 20. Liberalisation puts pressure on skill premia

Percentage point change in the relative wage of skilled to unskilled as compared with baseline, 2060



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Source: Calculations based on MIRAGE.

4.6 The speed of up-skilling in emerging economies influences trade and specialisation

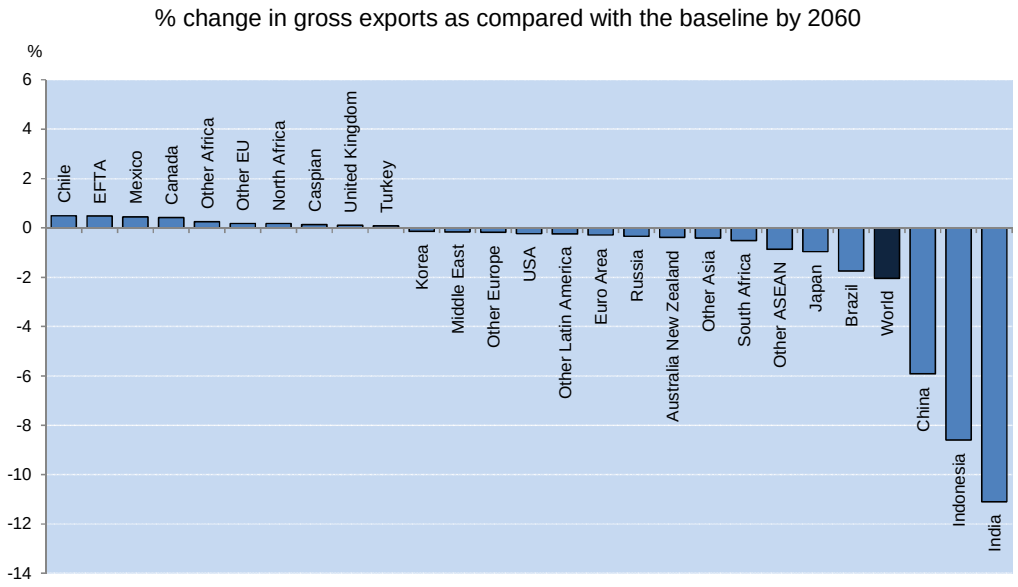
52. The speed of up-skilling has important implications for trade and specialisation across countries. To highlight this, this section compares the baseline trade projection with one in which China, India and Indonesia are assumed to approach the global frontier level of education much more slowly than in the baseline scenario (i.e. by 2060 average years of schooling are around 1.2 years lower than in the baseline).[5] Changes in the stock of human capital influence aggregate growth and it relative factor prices, especially in these emerging economies, thereby affecting trade and specialisation across countries via scale, gravity

4. It should be kept in mind that the model does not account for any feedback from skill premia to the supply, which could have implications for wage gaps. Also, any existence of shared rents in protected sectors prior to the trade liberalisation is not taken into account.

5. In this lower up-skilling scenario, the educational attainment of the young cohort in China, India and Indonesia will converge to the frontier level of education at a speed that is 50% slower than assumed in the baseline macro projections.

and competition effects (Figure 21). Indeed, world trade is some 2% lower by 2060 in the slower up-skilling scenario as compared with the baseline, mainly driven by decreases in Indian, Indonesian and Chinese exports (ranging between 6-11%).

Figure 21. Effects on trade of lower up-skilling in emerging economies, 2060



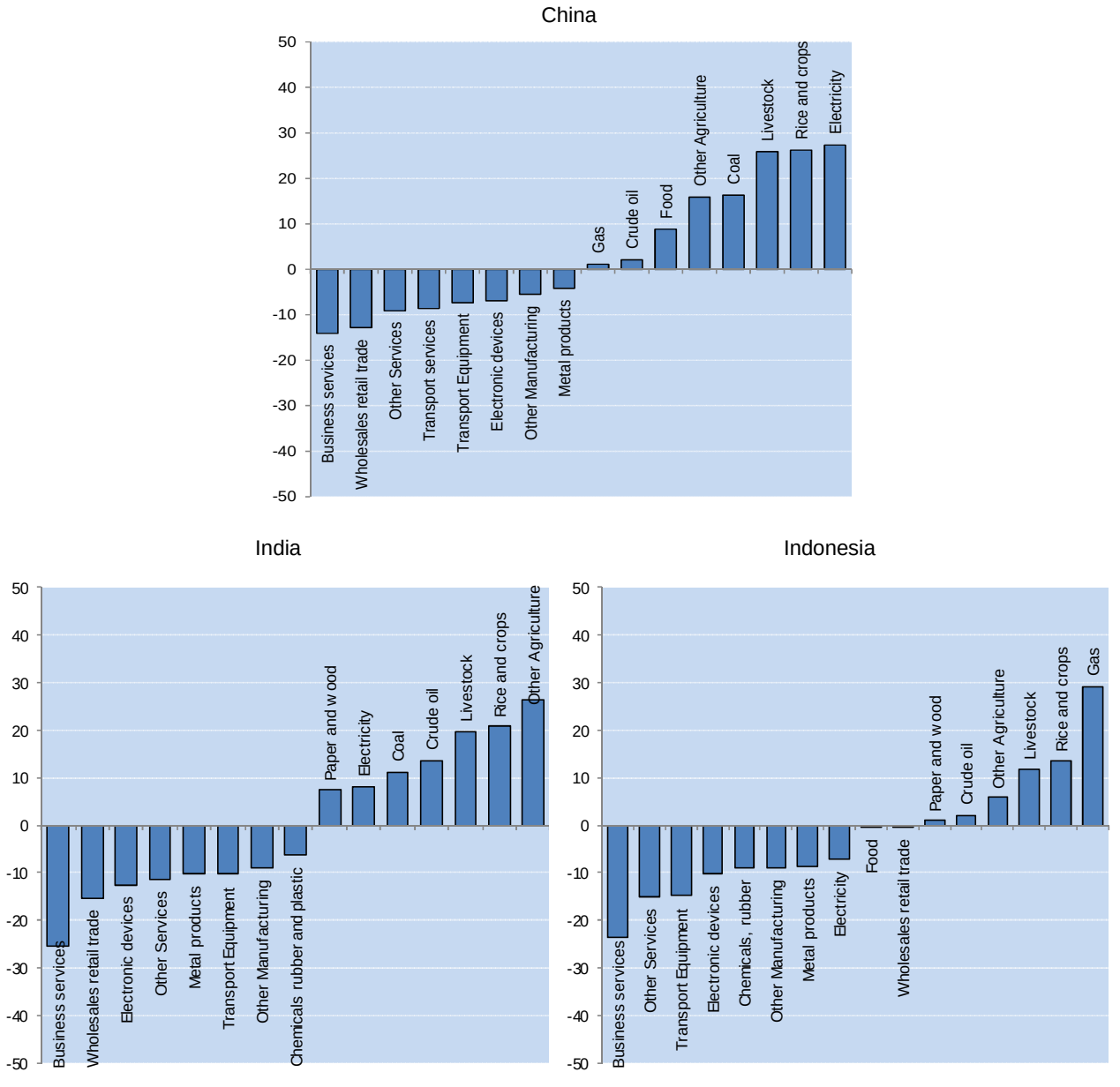
StatLink http://dx.doi.org/10.1787/888933095457

Source: Calculations based on MIRAGE.

53. Slower up-skilling in emerging economies implies that the reorientation of trade and production towards higher-value-added manufacturing and services away from lower-skill activities occurs at a slower pace than in the baseline. For instance, in India and Indonesia by 2060 exports of business services and electronics would be 25% and 10% lower, respectively, whereas exports of agricultural goods would be 5% and 15% higher, respectively, compared with the baseline (Figure 22). By contrast, slower up-skilling in emerging economies implies that advanced economies (e.g. the United States, Japan and the Euro area) maintain their relative competitiveness in products that are intensive in human capital, such as electronics, business services and other manufacturing.

Figure 22. Slower up-skilling in emerging economies slows down their restructuring towards higher skilled activities, 2060

% change in volume of industrial exports as compared with the baseline in 2060



StatLink http://dx.doi.org/10.1787/888933095476

Source: Calculations based on MIRAGE.

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