Chapter 5

The role of global value chains in economic development

Emerging economies, and the People's Republic of China in particular, play a growing role in today's global economy. This is partly due to global value chains (GVCs), which have allowed countries to integrate the global economy faster than in the past. The search for cost savings and cheap labour as well as market size/growth have led companies to relocate large parts of their value chains to emerging markets. The increasing global engagement of emerging economies has contributed to rapid growth in exports, employment and economic growth in these countries. Integration in GVCs is only one, albeit an important, stepping stone for economic development. Given their specialisation in labour-intensive and low-cost activities, emerging and developing countries increasingly seek to move up the value chain.

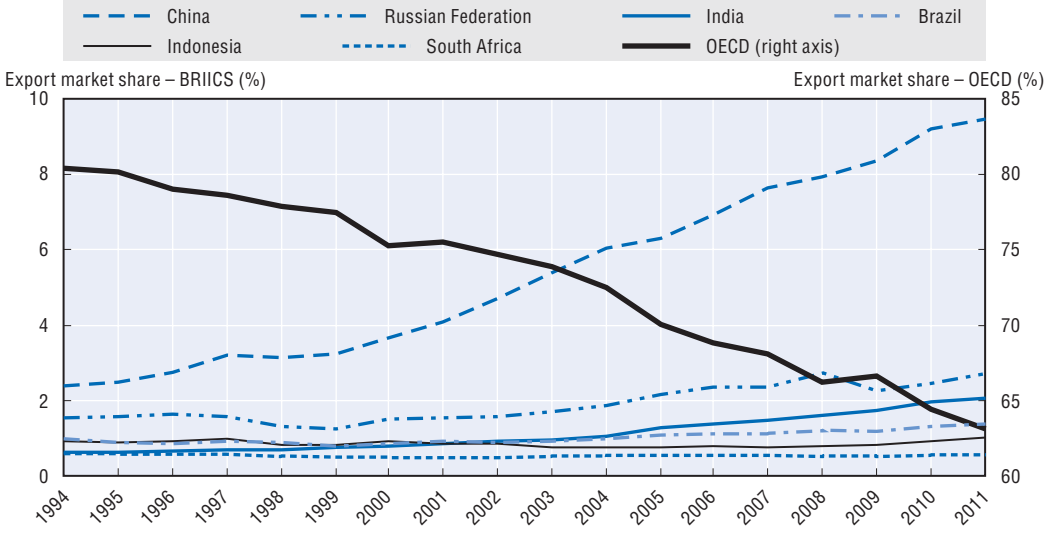
The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

The shifting geography of economic globalisation

Over the past decades, a growing number of countries have integrated the world economy, led by the so-called BRIICS (Brazil, the Russian Federation, India, Indonesia, the People's Republic of China and South Africa). Other countries are also increasingly important actors in the global economy: OECD countries such as Chile, Korea, Mexico, Poland and Turkey, and non-OECD countries such as Argentina, Malaysia, the Philippines and Thailand (O'Neill, 2011; Hanson, 2012). Behind these larger emerging economies, many (often smaller) countries have already built a strong position in specific industries, often through their connection to global value chains (Costa Rica and Viet Nam, but also the Czech Republic, Hungary and the Slovak Republic in central Europe). Yet many developing countries participate little, if at all, in the global economy.

From peripheral players, emerging economies have become major centres of global trade (IMF, 2012). OECD countries have gradually lost market share in international markets, while the BRIICS have increasingly built a strong export base (Figure 5.1). In fact, China rapidly became the world's largest exporter. China is also an important market for the exports of other BRIICS countries; exports from Brazil and the Russian Federation are partly driven by growing demand for natural resources as China and India have rapidly industrialised and urbanised.

Figure 5.1. Export market shares (goods and services)



Source: IMF, Balance of Payments Database.

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Emerging countries, and the Asian region in particular, have also attracted growing amounts of international investment. Foreign direct investment (FDI) flows to China and the rest of Southeast Asia leapt from an average of about USD 50 billion a year in 1995-99 to about USD 150 billion a year in 2005-09 (Figure 5.2), and China is now the second recipient of FDI after the United States. The BRIICS countries have also become important investors abroad: average outward flows from China increased nine-fold between the early and late 2000s, and outward flows from India increased more than seven-fold.

There are various reasons for the growing economic integration of emerging economies. First, as they largely shifted their industrial strategies from import-substitution to export-led development, they went through several rounds of trade liberalisation. Tariff barriers were significantly reduced through unilateral trade reforms as well as trade agreements with other countries (bilateral, regional and multilateral).[1] Hanson (2012) reports that between 1994 and 2008 the average tariff applied across all goods (weighted by imports) declined from 12% to 4% in 15 middle-income countries[2] and from 29% to 8% in China. In more developed economies, tariff barriers were on average already lower so that further reductions were quite small.[3]

Figure 5.2. Outward FDI flows from EU, Japan and the United States to BRICS countries, annual average, 2003-09

USD billion at current exchange rates

Note: BRICS: Brazil, the Russian Federation, India, China and South Africa.

Source: OECD (2011a); *Map source:* © ARTICQUE – all rights reserved.

International investment has increasingly been liberalised as well, making it easier for multinational enterprises (MNEs) to establish affiliates in emerging economies. While several multilateral agreements have relaxed restrictions on FDI (e.g. the Agreement on Trade-Related Investment Measures [TRIMs] and the General Agreement on Trade in Services [GATS]), liberalisation of investment has often taken place at the bilateral and regional level. According to UNCTAD (2012a), the number of bilateral investment treaties grew from 385 in 1990 to 3 164 in 2011; more recently, regional initiatives have increased, such as the Trans-Pacific Partnership (TPP) Agreement and the Association of South-East Asian Nations (ASEAN) Agreement, which include several emerging countries. In transition countries, liberalisation of trade and investment was also an explicit part of the move from a centrally planned to a more market-oriented economic system. Changes in so-called border policies were typically accompanied by macro-economic stabilisation policies, restructuring and privatisation programmes and legal and institutional reforms.

The second important factor is the rise of global value chains (GVCs), which have drastically changed the patterns of international trade and investment. The development of GVCs has contributed to strong shifts in the global economy and a more prominent role for emerging countries (see Chapter 1).

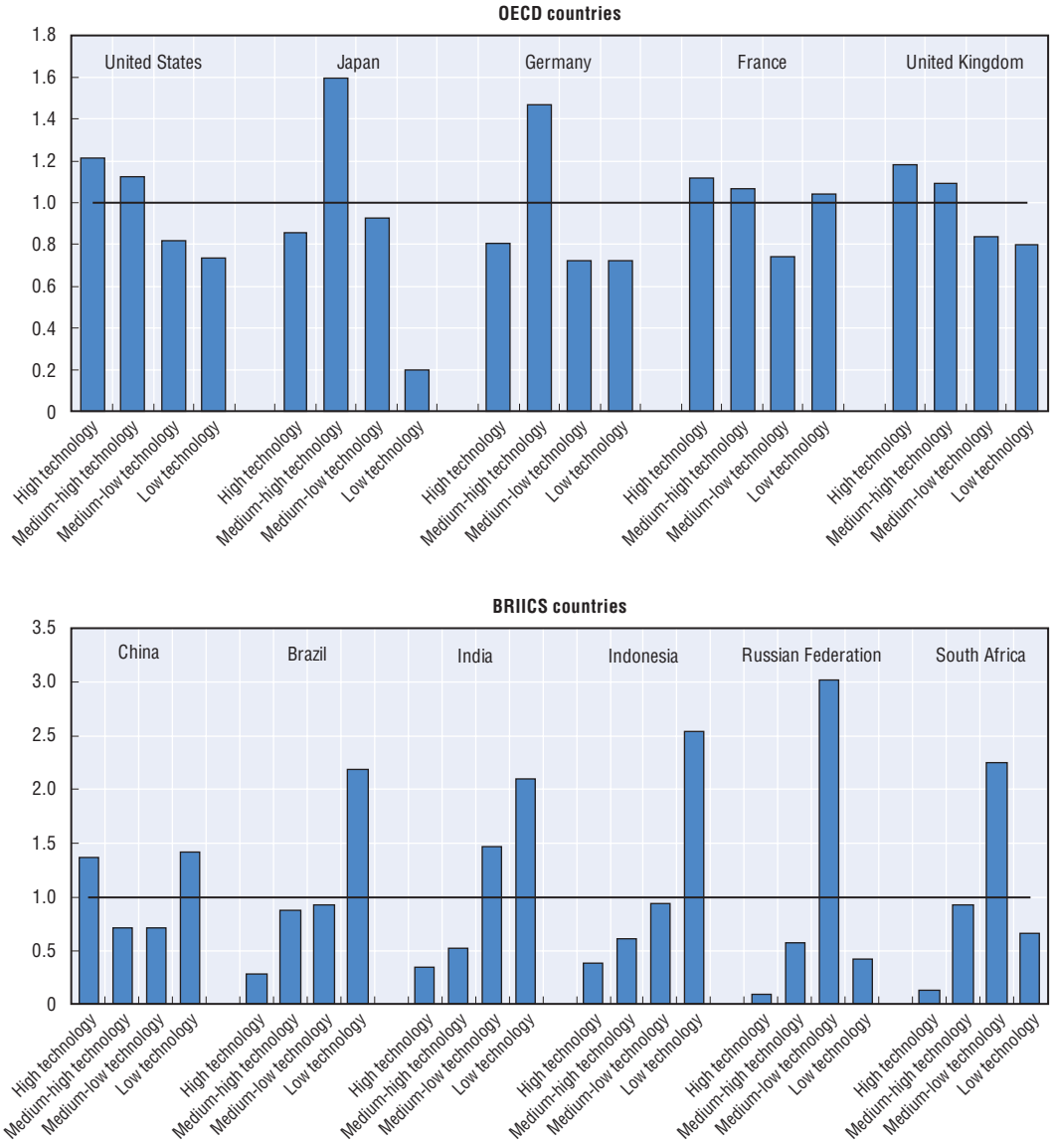
The relocation of productive activities and the growing trade between emerging/developing and developed economies (North-South trade) has rekindled interest in comparative advantage (Hanson, 2012). The dominance of trade by developed countries in the 1980s and 1990s was generally explained by the existence of scale economies and product differentiation; this so-called North-North trade took place between industrial countries with similar incomes and endowments. However, comparative advantage as a source of trade means that countries specialise in the activities they do relatively better (Eaton and Kortum, 2012); differences in factor endowments (Hecksher-Ohlin trade models) and/or technology (Ricardo trade models) explain much of the increasing export performance of emerging economies.

The more production can be split up globally on the basis of comparative advantage, the more emerging and developing countries can participate in GVCs (Dean et al., 2011). For example, BRIICS countries specialise in low-technology activities because of their large supply of labour, while developed economies specialise in high-technology industries (Figure 5.3). China seems to be an exception, as it has strong specialisation in high- as well as low-technology industries. In GVCs, however, comparative advantage increasingly has to be assessed at the level of activities/stages/tasks rather than of industries. China therefore specialises both in labour-intensive activities and in tasks in higher-technology industries (see below).

The growing integration of emerging economies has also resulted in a rise in South-South trade (i.e. among emerging/developing economies). UNCTAD (2012b) estimated that South-South exports represented 23% of total world exports in 2010 (12% in 1995) and 54% of total exports of emerging/developing countries (43% in 1995).[4] The majority of South-South trade takes place within Asia: 80% of all South-South exports are from Asia, of which 74% is intra-Asia exports. The strong economic integration of Southeast Asia is the result of Asia's growing vertical specialisation within GVCs, as the international fragmentation of production has resulted in growing trade flows in intermediate goods among Asian partners, especially in the manufacturing sector.

Figure 5.3. Revealed comparative advantage, exports of goods, selected OECD and BRIICS countries, 2010

RCA index



Note: 1) Revealed comparative advantage is calculated as RCA(X)) of total exports; calculated as $(X_{i,c}/X_{i,world})/(X_{economy,c}/X_{economy,world})$

where $X_{i,c}$ and $X_{i,world}$ are respectively exports in industry i by country c and the world, while $X_{economy,c}$ and $X_{economy,world}$ are economy-wide exports by country and the world.

2) Annex 5.A1 presents the OECD classification of high-, medium-high-, medium-low- and low-technology-intensive industries.

Source: OECD (2010b), "STAN Bilateral Trade Database 2010", STAN: OECD Structural Analysis Statistics (database), doi: 10.1787/data-00028-en, accessed May 2013.

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Emerging economies, manufacturing and GVCs

Manufacturing is increasingly global

Manufacturing has increasingly globalised over the past decade, as emerging economies have become important partners in GVCs especially in manufacturing industries.[5] Products often conceived and designed in developed countries are manufactured and assembled in countries such as China, with intermediate inputs sourced from other countries. Asia and Latin America account for most of the manufacturing in emerging countries, with growth in Asia four to five times faster than in Latin America during the past decade (Figure 5.4). China accounted for 19% of world manufacturing value added in 2010 and has become the world's leading manufacturer. China aside, Asian countries accounted for about 12% of global manufacturing in 2010, and South/ Central America accounted for about 5.6%. Africa only accounted for 1.6% of manufacturing value added in 2010, a sign that it remains largely excluded from GVCs.

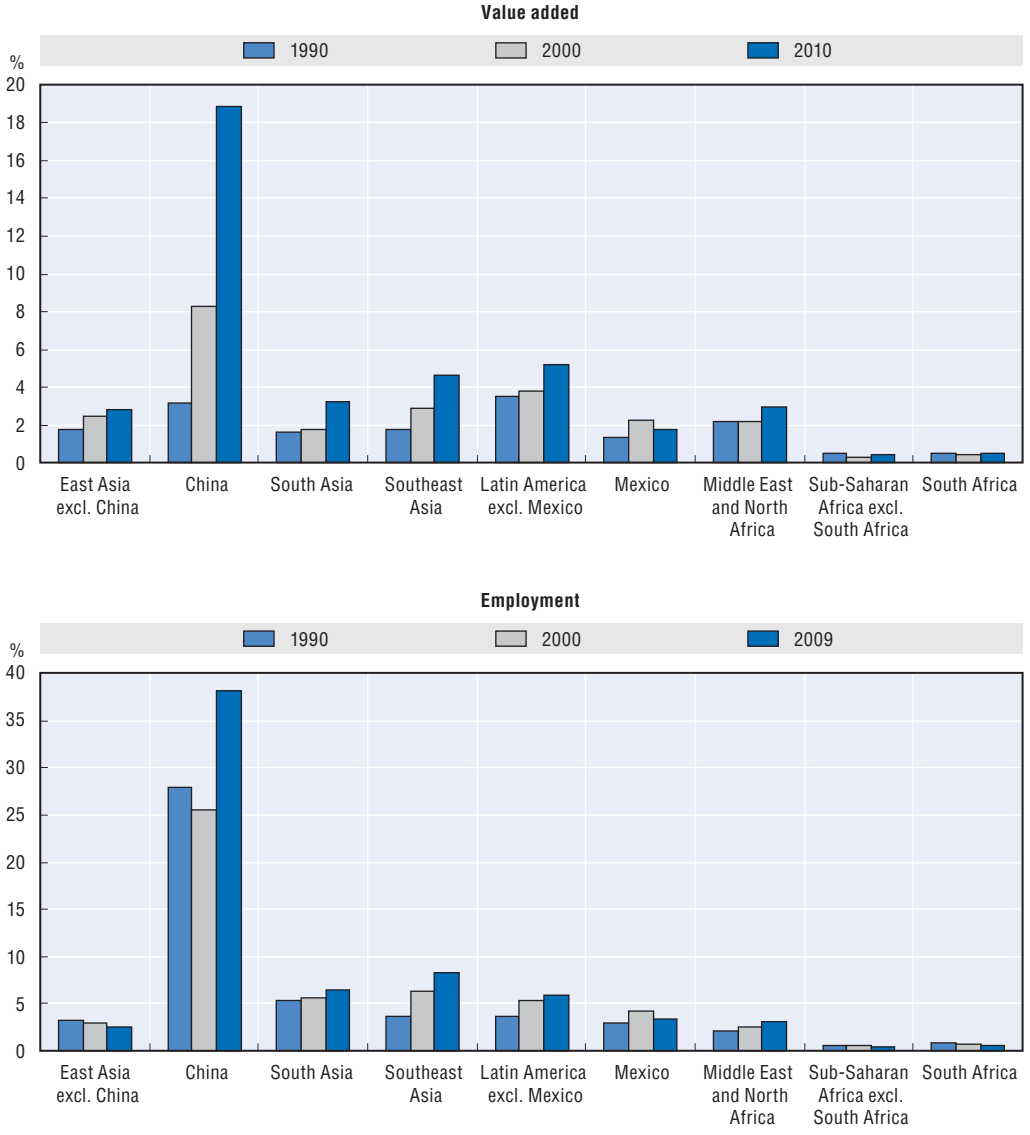
Emerging countries are attractive locations for labour-intensive activities, as their labour costs are lower than those of more developed economies (Pilat et al., 2006). Although labour costs account for only a fraction of total production costs (with considerable differences across industries), it is an important factor in firms' choices of locations.[6] Emerging regions have also increased their share in value added, especially in traditional industries such as food and beverages, textiles and apparel, leather and footwear, paper, etc. (Hepburn, 2011). As labour-intensive, low-value-added activities have been relocated, manufacturing jobs in emerging countries have expanded strongly (Figure 5.4). This growth is sometimes perceived to have come at the expense of (significant) losses of jobs in OECD manufacturing industries. It is argued that companies from OECD countries move manufacturing plants to China only to take advantage of the low labour costs, thereby hollowing out their national manufacturing industry and building up China's competitiveness. It is in fact hard to dispute that GVCs have accelerated the loss of manufacturing jobs in developed economies in lower-technology and labour-intensive industries.

However, the discussion on the future of manufacturing (and manufacturing jobs) is complex. Research has shown that the process of de-industrialisation that characterises most developed countries is mainly driven by falling demand for manufactured goods relative to services (as countries develop and consumers become richer) and by higher productivity in manufacturing relative to services (Pilat et al., 2006). Although offshoring is often viewed negatively, it may benefit the home country significantly in terms of productivity, innovation and competitiveness. Companies that offshore labour-intensive jobs to low-cost countries can help save domestic jobs when offshoring strengthens their international competitiveness; the tasks that are moved offshore increase the productivity of activities that are not relocated (see also Chapter 1).

Moreover, in spite of its decreasing importance in terms of (direct) employment and (nominal) value added, manufacturing still occupies a central position in OECD economies; in 2010 OECD countries still accounted for about 60% of world manufacturing value added. Some restructuring has also taken place among OECD countries, with Mexico and eastern European countries (the Czech Republic, Hungary, Poland and the Slovak Republic) attracting sizeable manufacturing activities.

Figure 5.4. Share of major emerging regions in world manufacturing

In percentage of world manufacturing



Note: **East Asia excl. China** includes Hong Kong Special Administrative Region (China), Macao Special Administrative Region (China), Mongolia, Korea and Chinese Taipei; **South Asia** includes India, Iran, Nepal, Pakistan and Sri Lanka; **Southeast Asia** includes Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam; **Latin America excl. Mexico** includes Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Peru, Suriname, Uruguay, Venezuela, Costa Rica, Guatemala, Honduras and Panama; **Middle East and North Africa** includes Algeria, Egypt, Morocco, Tunisia, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Syria and Turkey; **Sub-Saharan Africa excl. South Africa** includes Botswana, Cameroon, Eritrea, Ethiopia, Gabon, Kenya, Lesotho, Malawi, Mauritius, Mozambique, Niger, Senegal, Swaziland, Uganda, Tanzania and Zimbabwe.

Source: United Nations Statistics Division.

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The role of export processing zones: Importing to export

In emerging economies, manufacturing activities often take place in areas with special administrative and regulatory status, the aim of which is to promote trade and investment (WTO and IDE/JETRO, 2011). The term most widely used to designate these areas is "export processing zone" (EPZ); it is defined by the International Labour Organisation as "industrial zones with special incentives set up to attract foreign investors, in which imported materials undergo some degree of processing before being re-exported" (ILO, 2011). These areas increasingly include logistic centres, finance zones and high technology/science parks in addition to assembly and simple processing operations.

Export processing zones (EPZs) have become an integral part of the export-led development strategies of emerging and developing economies; the latest estimates point to 3 500 EPZs operating in 130 countries and providing jobs for 68 million people (Boyenge, 2007). The Asia and Pacific region account for 61 million jobs (Table 5.1); other regions with EPZ employment above 1% of the national workforce are the Americas (especially Mexico and the Caribbean region), the Middle East and North-Africa (MENA). Outliers include Mauritius, where EPZs account for 24% of the national workforce, the United Arab Emirates (25%) and Tunisia (8%).

Table 5.1. Direct employment in export processing zones (EPZs), 2007

	Direct employment (millions)	% of national employment
World	68 441	0.21
Asia & Pacific	61 089	2.30
Americas	3 084	1.15
Western Europe	0.179	0.00
Central and Eastern Europe and Central Asia	1 590	0.00
Middle East and North Africa	1 458	1.59
Sub-Saharan Africa	1 040	0.20

Source: The World Bank (2008).

Foreign investors have been attracted to EPZs because of the low costs and the ease of importing and exporting; low or zero tariff barriers and minimum administrative requirements allow companies to source intermediates from abroad efficiently for assembly into final products, which are then exported. Emerging and developing countries have used EPZs with variable success to become involved in GVCs. Farole (2010) shows that the success of EPZs depends more on the quality of infrastructure and logistics than on low labour costs. EPZs have not taken off in many African regions; under conditions of poor governance and political instability, EPZs are generally considered to offer foreign investors insufficient protection. In some countries EPZs have also been used as a "shortcut" to more comprehensive structural reforms (elimination of red tape, corruption, high tariffs and taxes, etc.) that were not deemed feasible.

According to WTO and IDE/JETRO, about one-fifth of the exports of emerging and developing economies originate from EPZs (Figure 5.5). The growing importance of Asia as a manufacturing hub in GVCs is largely linked to EPZs. China has five special economic zones and accounts for almost 70% of world exports from EPZs. EPZs have been instrumental in promoting countries' exports; almost half of Chinese exports are

estimated to originate in EPZs and the corresponding figure for Mexico is 40%. EPZs have clearly stimulated exports and created employment in emerging countries; however, their performance is less strong in terms of value added owing to the high import content of the exports (see below).

Figure 5.5. Economies with export processing zones

EPZ exports as % of total exports of countries

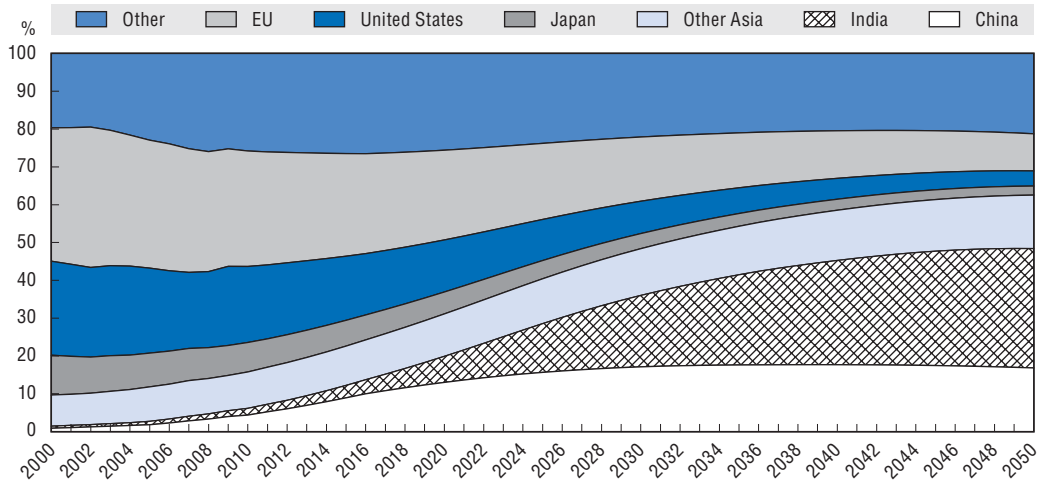
Source: WTO and IDE/JETRO (2011); map source: ARTICQUE© - all rights reserved.

Production activities go where the markets are

Cost savings and cheap labour are important drivers of the growth of production in emerging markets, but they are not the sole, or even the most important factors; market size and growth are the main reasons for international investment (OECD, 2011b). The attractiveness of Brazil, China, India and South Africa depends greatly on their large and rapidly growing home market. Brantstetter and Foley (2007) show that until 2006 US firms mainly located plants in China to gain access to the Chinese market: almost 75% of the sales of these US affiliates were directed to the Chinese market and less than 10% was exported to the United States. The room for growth in emerging markets is substantial; several Asian, Latin American and African countries boast burgeoning middle classes, whereas markets are often saturated in OECD countries.

China and India are the world's most populated countries and have high GDP growth rates. They are quickly becoming important markets for firms in many industries. While global consumer demand had previously been concentrated in (rich) OECD economies, a new middle class[7] is emerging in China and India (Figure 5.6). While the middle class worldwide could rise from 1.8 billion to 3.2 billion people by 2020 and to 4.9 billion by 2030, almost 85% of this growth is expected to come from Asia. In 2000, Asia (excluding Japan) only accounted for 10% of the global middle-class spending; this could reach 40% by 2040 and almost 60% in the long term (Kharas, 2010).

Figure 5.6. The global middle class, by country, 2000-50



Source: Kharas, 2010.

The emergence of new growth centres will significantly shift the world's centre of economic gravity eastwards (Quah, 2011). Kharas (2010) located the global economic centre of gravity in 1965 in Spain, at the mid-point of Europe, the United States and Japan. Since then, the economic centre has been moving to the southeast, close to the axis connecting Washington, DC, and Beijing. India, China, Indonesia and Viet Nam are expected to pull the centre of economic gravity further to the east.

China as the factory of the world?

"Made in China" is largely "Made in Asia"

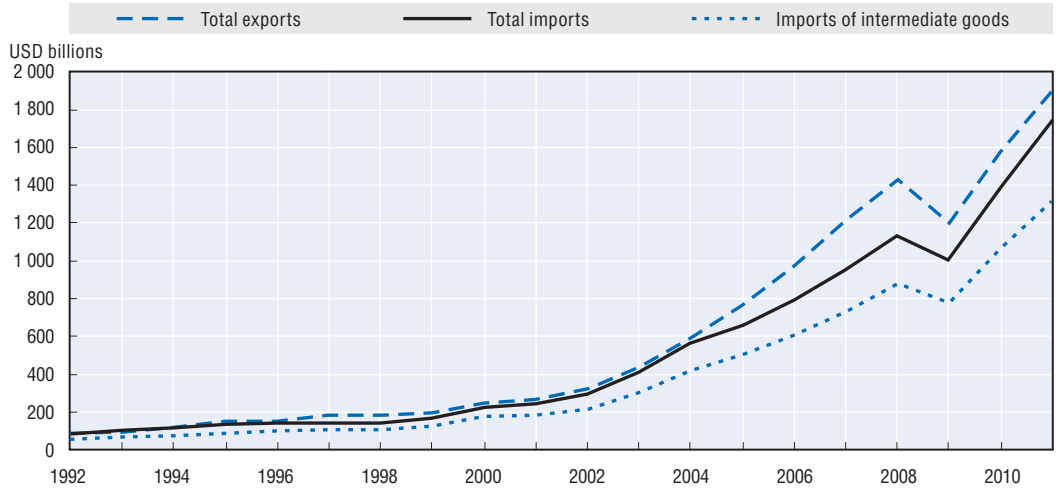
China's strong export performance has attracted much attention worldwide amid claims that China has become the factory of the world. China is not only a large exporter of low-cost, low-technology manufactures (toys, textiles, footwear) but also, increasingly, of sophisticated products (electronics, computers) (see Figure 5.3). In a world of GVCs, however, aggregate export figures hide the role of intermediates sourced from abroad in final products. Exports are no longer entirely produced by the exporting country but also include the production activities of countries from which intermediates are imported.

In GVCs, countries increasingly specialise in specific production stages, activities and tasks. The export success of China largely reflects its assembly activities: it imports large volumes of raw materials and intermediates from other countries and exports almost 40% of its output, far more than other large economies (Koopman et al., 2008). In the 2000s, China has become not only a large exporter but also a large importer; its imports closely track its exports, with some divergence in recent years (Figure 5.7).

A large part of the assembly activities in China takes place through processing trade,[8] often in EPZs. Companies can import intermediates without paying custom duties provided that these inputs are used solely for the production of final goods destined for third markets. The share of processing trade in China's exports increased rapidly in the late 1980s to mid-1990s and remained near 50% as its volume grew by an average annual rate of 17% between 1991 and 2010 (Figure 5.8). Processing trade has given rise to a triangular pattern of trade, with parts and components produced by more developed Asian

countries (e.g. Korea and Japan) and other advanced countries, and then exported to China where the different intermediates are assembled into finished products. Almost 80% of China's processing imports, including high-technology intermediates, originate from other East Asian economies (Chang et al., 2008). The assembled final products are either exported back to Asian countries or exported to developed countries/regions such as the United States and Europe where they may undergo additional processing (packaging, marketing, etc.).[9]

Figure 5.7. Exports and imports of goods, China, 1992-2011



Source: OECD (2010b), "STAN Bilateral Trade Database 2010", STAN: OECD Structural Analysis Statistics (database), doi: 10.1787/data-00028-en, accessed May 2013.

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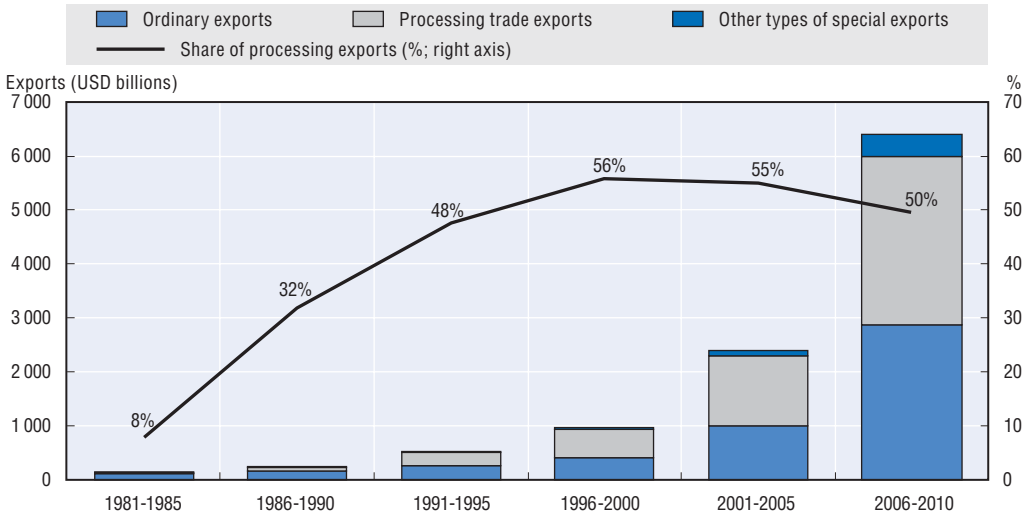
Clearly, the economic development of China is closely linked to processing trade and to the development of GVCs in the Asian region. GVCs have facilitated the vertical division of labour in Asia as Japan and industrialised economies such as Korea, Hong Kong (China), Singapore and Chinese Taipei have gradually moved their low-cost activities to overseas export platforms in low-wage countries in Asia. This has helped economies that industrialised early to upgrade their industrial capacities and exports, and, at the same time, has allowed economies that are industrialising later, such as China, to develop a comparative advantage in manufacturing.

Foreign-owned companies have played a leading role in China's strong export performance. Originally attracted by low labour costs and favourable treatment in EPZs, foreign firms moved their labour-intensive manufacturing plants to China to reduce production costs. The share of foreign-invested enterprises in processing trade rose rapidly during the expansion of processing trade as a share of China's exports: from 39% in 1992 to nearly 70% at the end of 1990s and to 85% in 2008 (Figure 5.9). Brantstetter and Foley (2007) reported that most of the 200 largest exporting firms are from other Asian economies, primarily Chinese Taipei, Hong Kong (China) and Korea.[10]

Foreign companies' involvement in GVCs is not limited to processing trade. The share of foreign affiliates in non-processing exports has also risen, from only 5% in 1992 to 29% in 2008 (Figure 5.9). This suggests that the activities of foreign-owned companies in China, as well as China's involvement in GVCs, no longer simply involve the assembly of imported inputs but increasingly include local procurement and other interactions with Chinese industries beyond the processing trade regime.

Figure 5.8. China's processing and non-processing exports, 1981-2010



Source: Pilat et al. (2012).

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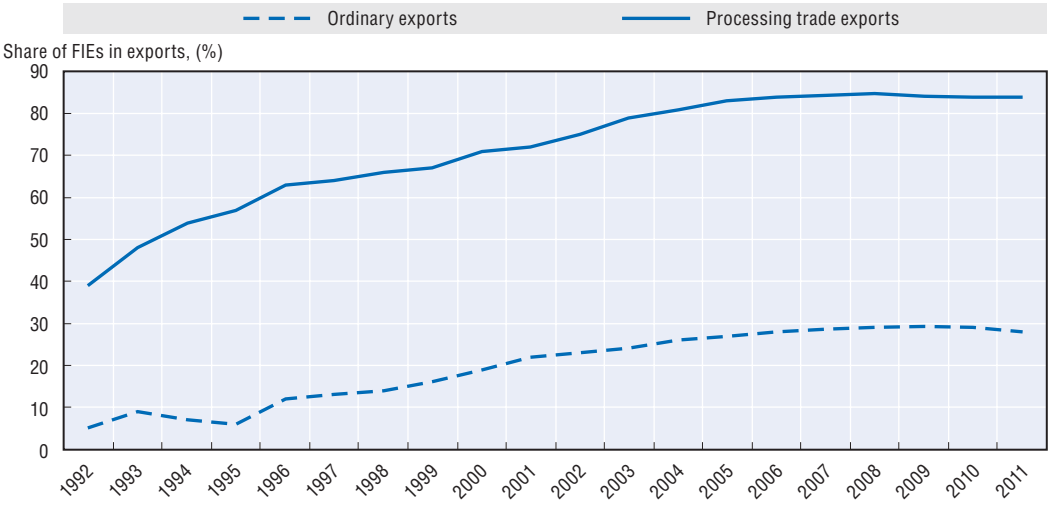
Figure 5.9. Foreign-owned enterprises (FIE) and China's exports, 1992-2011



Source: Pilat et al. (2012).

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Domestic value added in Chinese exports is relatively small but growing

Processing trade largely determines how much value is created in China; assembly activities typically represent only a small part of the value of final goods and services. The strong position of (emerging) countries in GVCs, as reflected in export figures, does not necessarily mean that a country such as China creates and captures a large share of the value generated by GVCs. This was first illustrated in the often-cited study of the Apple iPod (Linden et al., 2009). Although the final product was exported from China, the value added in China represented only a fraction (USD 4) of the factory cost (USD 144, exported from China to the United States) and of the final retail price in the United States (USD 300).[11]

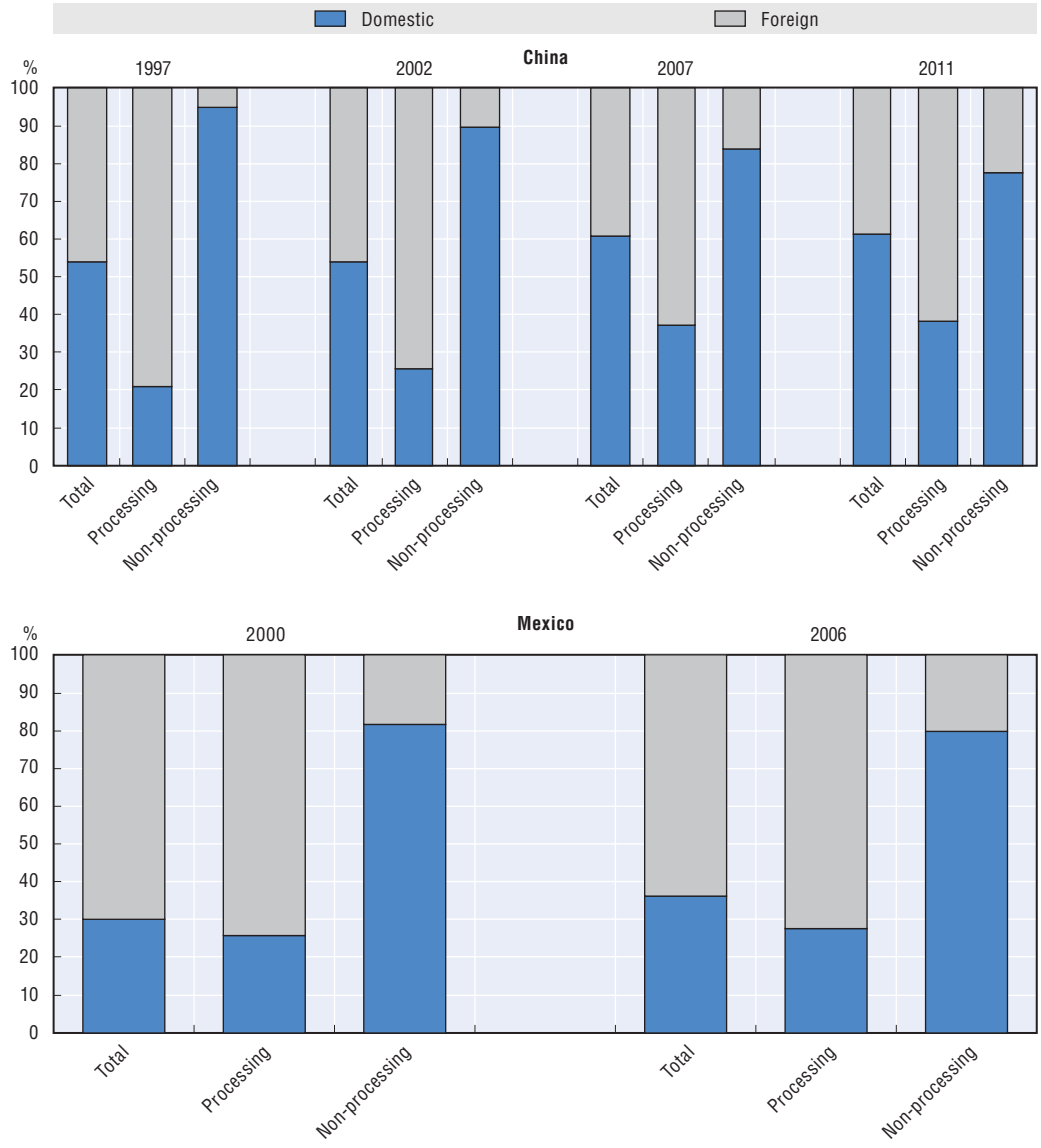
Aggregate results for China showed that the share of foreign value added in total Chinese manufactured exports was about 40% in 2007 (Koopman et al., 2008). In comparison, the share of foreign value added for the whole world is estimated at 25% (Johnson and Noguera, 2012). Certainly, the iPod is not representative of the average product exported by China, but it does show the importance of foreign value added embodied in Chinese exports. This share rises to 62.7% for China's processing exports, which suggests that the rest of the exported value is related to (assembly) activities in China (Figure 5.10).[12] Important differences in foreign content exist across industries; foreign value added is highest in electronics and low to moderate in textiles (Dean et al., 2011; Koopman et al., 2008). Non-processing exports of China have significantly higher domestic value added: in 2007, 84% of the export value was created in China.

Similar results have been reported for Mexico, another country with large and growing volumes of processing trade originating in EPZs (e.g. the maquiladora and PITEX[13] programmes) (De La Cruz et al., 2011). Around 72% of the value of processing exports from Mexico comes from intermediates sourced abroad, especially from the United States (Figure 5.10). The share of foreign value added in non-processing exports is much lower but still constitutes 20.2% of the exported value. Given the importance of processing exports in total Mexican exports (larger than for China), almost two-thirds of Mexico's total exports represent foreign value added through inputs imported from abroad. Only one-third of the export value derives from value-adding activities in Mexico.

The domestic content of Chinese exports has increased over time; estimates show that domestic value added reached 66.2% of total exported value in 2011.[14] In contrast, the share of domestic value-added for the world as a whole is decreasing as a result of growing international fragmentation (Johnson and Noguera, 2012). A first explanation for the rise in Chinese domestic value added is the decreasing importance of processing trade (see Figure 5.8) with its high levels of foreign content. Second, the domestic value added of processing exports has increased significantly, suggesting that domestic activities in processing zones are now creating more value added. Chinese firms in EPZs have increasingly moved from simple contract assembly to "full-package" manufacturing, with Chinese firms controlling all stages from material procurement to product design (Pilat et al., 2012). In contrast, foreign value added is increasing in non-processing exports, a sign of increased sourcing of intermediates from abroad.

The higher levels of domestic content in Chinese exports suggest that China is upgrading its activities and role within GVCs. Recent research shows that labour-intensive activities are being shifted from the Chinese mainland to countries such as Cambodia, the Philippines and Viet Nam. China has also become a larger exporter of intermediate goods (particularly parts and components) and capital goods and is thus engaging in higher value activities, alongside its specialisation in assembly (OECD, 2011a). This is also pushing the vertical division of labour in East Asia further as other countries take over lower-value activities. The metaphor of the flying geese (Akamatsu, 1961; Ozawa, 2008) has often been used to describe industrial upgrading in East Asia. One economy (e.g. Japan), like the first goose in a V-shaped formation, leads other economies (e.g. Korea) toward industrialisation, passing older technologies down to followers as it moves into newer ones. This process still seems to be happening, with countries such as Bangladesh, Cambodia and Viet Nam picking up textile and garment business from China.

Figure 5.10. Total domestic value added, processing and non-processing exports, China and Mexico



Note: Estimates for Mexico are upper-bound estimates with maquiladora and PITEX both counted as processing trade.

Source: Koopman et al. (2008); De La Cruz et al. (2011); Chinese Academy of Sciences (2012).

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GVCs and industrial development

Joining a value chain instead of building one

Until the 1980s, industrial development in many emerging and developing countries focused on import substitution: replacing foreign imports with domestic production and reducing foreign dependency. Government intervention played a crucial role in creating an internal market and developing manufacturing capabilities through protectionist policies such as high tariff barriers, subsidies to key industries, nationalisation, etc. Because they did not succeed, these strategies were gradually abandoned in the 1980s and 1990s and development strategies became increasingly export-led. Countries in Southeast Asia followed a dual path by combining import substitution to create new industries (the infant industry argument) with the development of export platforms (Baldwin, 2011).

To gain export competitiveness in international markets, emerging/developing countries had to develop a strong industrial base and build up their value chains. Foreign direct investment was promoted to the extent that MNEs brought in external knowledge; local content requirements were set to ensure that domestic companies would learn from foreign expertise. This was relatively straightforward for light manufactures such as clothing and footwear, but much more difficult for capital-intensive and knowledge-intensive manufacturing, because of economies of scale, knowledge spillovers and agglomeration economies. Industrial policy played an important role in overcoming problems of lumpiness and complexity in these industries; interventionist policies were used to reach a critical mass domestically in order to become competitive in international markets (Rodriguez-Clare, 1996; Rodrik, 1995).

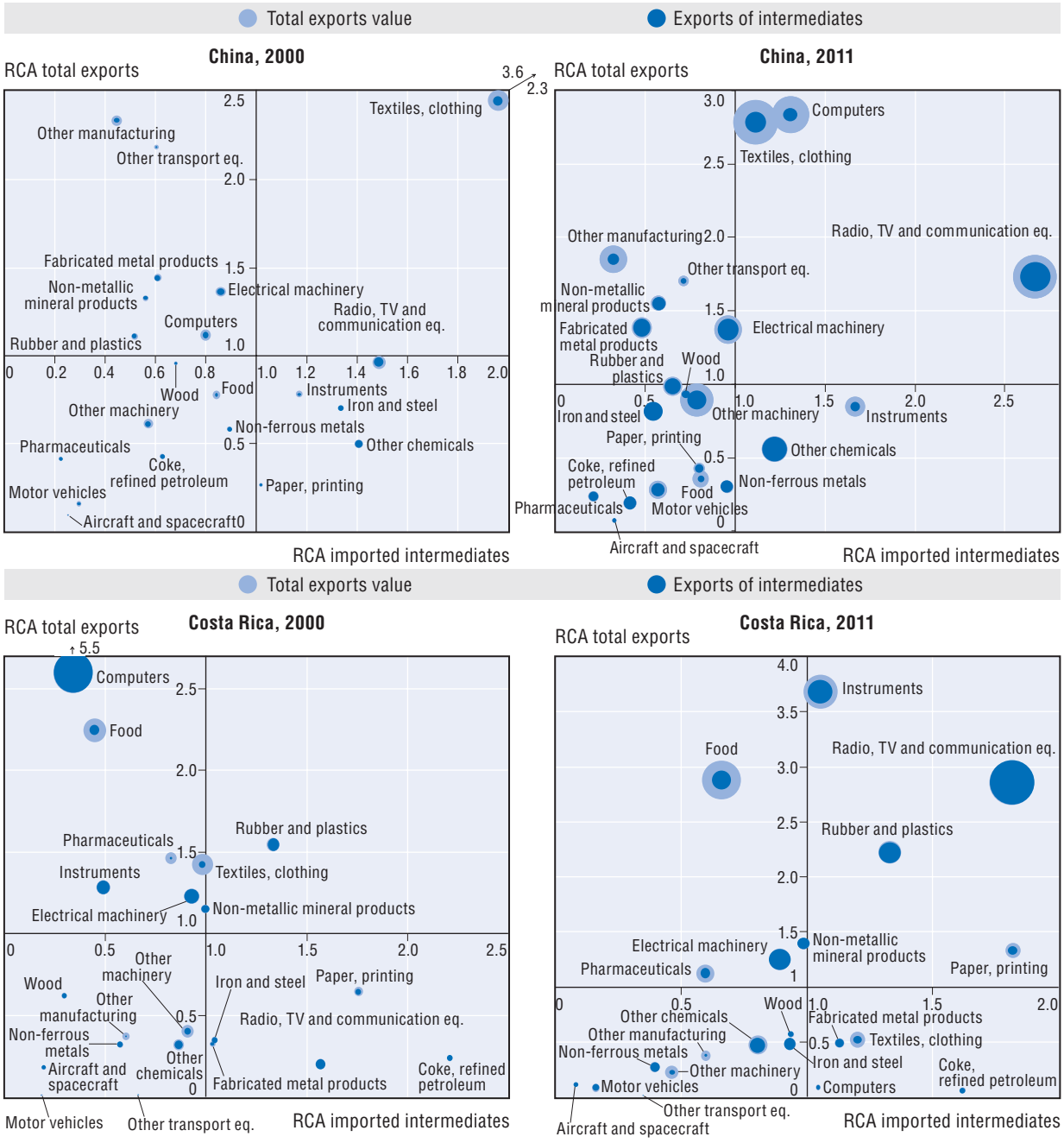
In a world of GVCs, countries can now seek to join a global value chain and start to export more quickly and at lower cost.[15] Instead of industrialising by developing vertically integrated industries (and producing both intermediates and final products), industrialising countries can become export-competitive by specialising in specific activities. As discussed, China has specialised in the assembly of final products in the electronics industry and has become the largest exporter of information and communication technology (ICT) products (OECD, 2010a). Other countries have specialised in the assembly of intermediates (e.g. sub-systems for motor vehicles in Mexico) or the production of simple parts and components.

Countries export different types of goods at different stages of development, with low-income countries typically producing a narrow range of goods. As countries grow, they diversify their export portfolio until they re-concentrate at higher income levels (Imbs and Wacziarg, 2003). Export growth is achieved largely along the intensive margin (through the growth of existing trade flows) while growth along the extensive margin (through trade flows of new products and/or to new destinations) contributes to the diversification of countries' exports (Cadot et al., 2011a). Recent OECD work shows that the international fragmentation of production has accommodated the emergence of new competitors in intermediate products (Beltramello et al., 2012). Emerging economies have displayed relatively stronger growth along the extensive margin by diversifying their export portfolio of intermediate goods.[16] One explanation may be the large sunk investments required to begin exporting final products (e.g. R&D, branding, other forms of knowledge capital). Another explanation is that trade in intermediates depends less on the size of the market or the "home bias" than trade in final goods (Miroudot et al., 2009).

Figure 5.11 (China and Costa Rica) and Annex 5.A2 (the Czech Republic, Mexico and Thailand) present the export performance of five emerging economies that have successfully integrated in GVCs in a number of industries. The evolution of their exports clearly shows that GVCs have contributed to their sometimes remarkable export success. Export competitiveness is measured by the widely used indicator of revealed comparative advantage (RCA) (Balassa, 1965), while integration into GVCs has been proxied by imports of intermediate inputs. Ng and Yeats (1999) argued that a Balassa indicator calculated on the basis of imports instead of exports, specifically for intermediate inputs, shows whether a country has a comparative advantage in *assembly* in a given industry. The reasoning is that intermediate inputs have no general use in themselves but are traded for further assembly. Above-average import shares of intermediates can indicate a comparative advantage in assembly operations. An analysis of the export portfolios of these emerging countries between 2000 and 2011 shows that:

- In a relatively short time, large countries (China, Mexico) but also smaller countries (Costa Rica, the Czech Republic, Thailand) have increased their export volumes exponentially (as reflected in the expansion of the bubbles in the figure between 2000 and 2010); this has resulted in strong export competitiveness in a number of industries (RCA(X) > 1).
- The production and assembly of intermediates account for a large share of export performance (as reflected in the size of the dark bubbles); intermediates exports have become increasingly important in the export industries of these five countries.
- Export competitiveness of countries, in final as well as intermediate products, has become closely linked to imports of intermediates; the correlation is especially clear in industries that have become internationally fragmented, such as modularised industries (e.g. electronics).
- Integration in GVCs has drastically changed these countries' specialisation. They have moved from more traditional industries (e.g. food, textiles) towards higher-technology-intensive industries (e.g. computers, TV, radio and telecommunications equipment). This pattern is at odds with the view of comparative advantage that sees emerging countries specialising in more traditional industries while developed countries specialise in more technologically advanced industries and products.
- Traditional measures of export competitiveness (such as revealed comparative advantage based on gross exports) may misrepresent the actual export competitiveness of countries. Export success is increasingly linked to imports of intermediates produced in earlier production stages and may especially demonstrate the competitiveness of foreign activities embodied in imported products. It does not indicate what value has been created in the domestic economy: estimates for China and Mexico are given above. The domestic content of exports for the Czech Republic is 61% and for Thailand 59% (see Chapter 1) while the domestic content of Costa Rican exports is about 36% (Costa Rica, 2011).

Figure 5.11. Export competitiveness and GVCs, China and Costa Rica, 2000 and 2011



1) The vertical axis represents the index of revealed comparative advantage (RCA(X)) of total exports; calculated as $RCA(X)_{i,c} = (X_{i,c}/X_{i,world})/(X_{economy,c}/X_{economy,world})$ where $X_{i,c}$ and $X_{i,world}$ are respectively exports in industry i by country c and the world, while $X_{economy,c}$ and $X_{economy,world}$ are economy-wide exports by country and the world; horizontal axis represents the index of revealed comparative advantage (RCA) of imports of intermediates and is calculated as $RCA(M)_{int\text{-}i,c} = (M_{int\text{-}i,c}/M_{int\text{-}i,\ world})/(M_{int\text{-}economy,c}/M_{int\text{-}economy,world})$ where $M_{int\text{-}i,c}$ and $M_{int\text{-}i,world}$ are respectively the imported intermediates of industry i by country c and the world, while $M_{int\text{-}economy,\ c.}$ and $M_{int\text{-}economy,world}$ refer to total intermediates imported by country c and the world.

2) The size of the bubbles is proportional to countries' total exports and should only compared within and not across countries.

3) See Annex 5.A2 for Mexico, Thailand and the Czech Republic.

Source: Calculations based on OECD (2010b), "STAN Bilateral Trade Database 2010", STAN: OECD Structural Analysis Statistics (database), doi: 10.1787/data-00028-en, accessed May 2013.

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Are emerging economies competing head-to-head with developed economies?

While countries traditionally move up the quality ladder (in production and exports) as their incomes rise over time, the rapid increase in the export competitiveness of emerging countries, and particularly that of China in high-technology industries, has attracted much attention. In a widely cited article on "what you export, matters", Hausmann et al. (2005) demonstrated the high level of sophistication of China's exports for a country at its level of development[17] (see also Rodrik, 2007). Schott (2008) showed a growing overlap between Chinese and OECD exports to the United States; while China previously competed with other Asian economies, its export portfolio is rapidly converging with that of countries like Germany, Japan or the United States. In general, export structures of emerging countries are increasingly similar to those of developed economies (IMF, 2012).

At face value, this suggests that China increasingly competes with OECD economies and that Chinese exports have become close substitutes of exports of developed economies, even for advanced products such as ICT equipment. Not surprisingly, this has raised concerns in developed economies about the impact of this "new" competition on OECD labour markets.[18] However, the apparent sophistication of Chinese exports is to some extent a statistical artefact, as exports of emerging countries include significant imports of intermediates, often from developed economies, particularly in more technology-intensive industries. Processing trade in China, for example, accounts for only 30% of low-technology exports but up to 90% of high-technology exports.

The upgrading of China's export mix largely disappears when processing trade is omitted (Van Assche and Gangnes, 2007). Foreign affiliates (from OECD countries, but not from Chinese Taipei and Hong Kong [China]) have been responsible for much of China's growing export sophistication through their processing trade activities (Xu and Lu, 2010). In fact, China's exports may reflect growing vertical specialisation rather than increasing sophistication (Dean et al., 2011); China's and OECD exports differ significantly across export destinations but the similarity increases as the foreign content of China's exports increases. This shows that the skills content of China's exports largely reflects the skills content of the imported intermediates (Amiti and Freund, 2010). It suggests that China can export sophisticated ICT products because it imports the necessary high-value-added parts and components from other countries (Brantstetter and Lardy, 2006).

While competitive pressures have increased in high-technology industries as a result of growing exports by emerging economies, the increasing similarity between emerging and developed countries' exports also reflects their greater complementarity (IMF, 2012). Because of the heightened offshoring of labour-intensive production to lower-cost countries, emerging economies have moved towards the low-skill activities (e.g. assembly) of higher-technology industries. In GVCs, comparative advantage increasingly applies at the level of individual production stages rather than at the level of whole industries and products, i.e. emerging economies specialise in unsophisticated stages of production for products or industries classified as sophisticated or technology-intensive.

Another perspective on the growing exports of emerging economies in higher-technology industries shows that while countries may export the same products, they may export different varieties of it. Recent empirical evidence indicates that even in the same product category, trade specialisation and competition increasingly take place on varieties and market segments. Emerging economies may export mainly to lower market segments at a lower quality and lower price, while developed economies target the top segments of

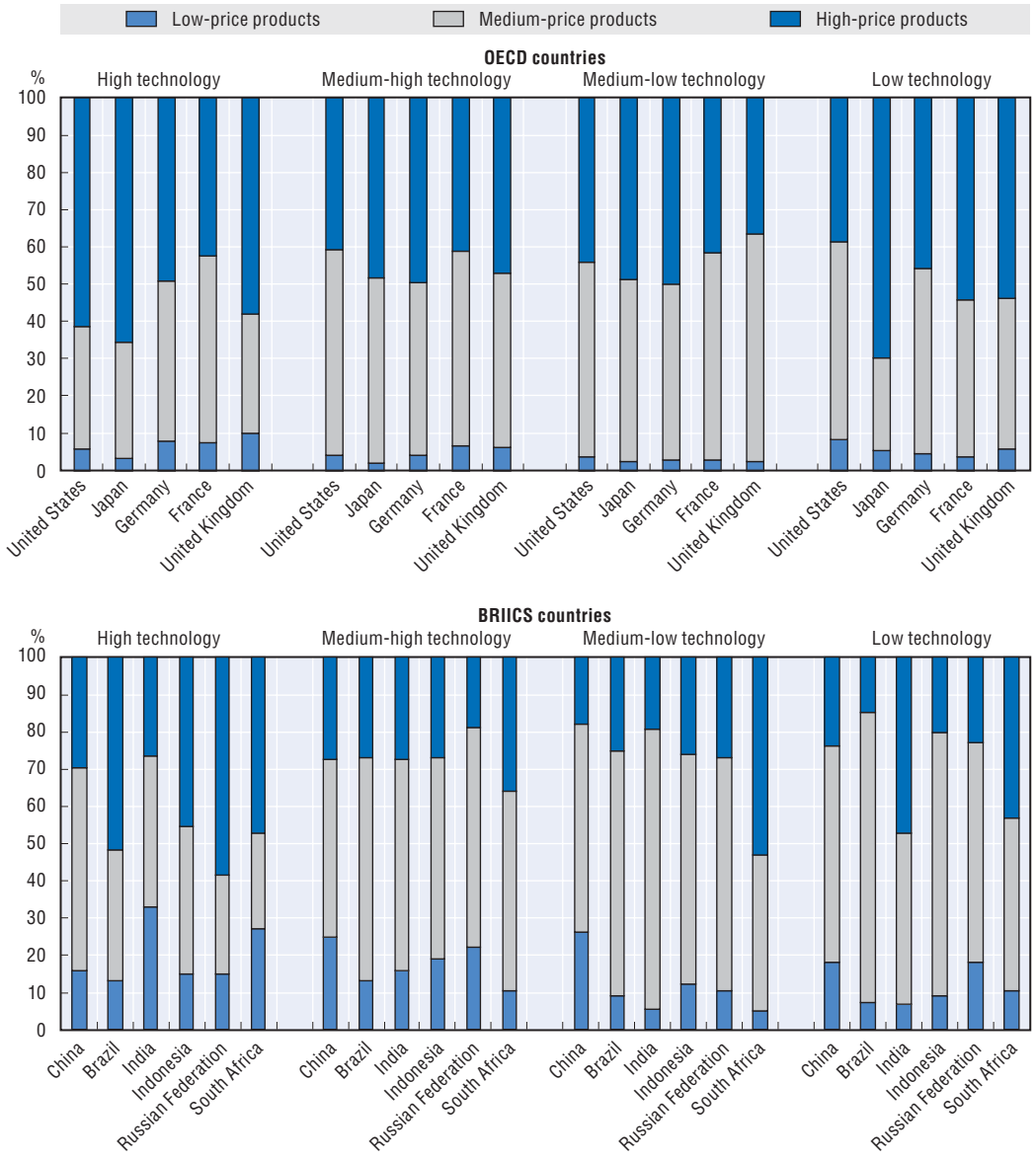
the market. Analysing the price or unit value of exports (calculated as trade in value divided by trade in volume) can offer further insights.[19] The idea here is that countries exporting at higher unit values offer higher "quality" products and can sell identical products at a higher price (marketing, advertising, quality) or specialise in higher-priced segments (Aiginger, 1997).

Aggregate results indicate the existence of a quality ladder in the exports of emerging and developed economies; the unit value of exports of BRIICS countries is significantly lower than that of exports of developed OECD economies for every technology category (Figure 5.12). For its high-technology exports,[20] China mainly exports goods at a low or medium price, while developed OECD economies export around half of their products at a high price. While China's export bundle thus overlaps those of more developed countries (China exports the same products), the unit values of Chinese exports are significantly lower (China specialises in lower price/quality products).

The fact that Chinese products overall are sold at a discount suggests that developed countries compete on terms other than price and that China's competition with developed countries on exports might be less intense than is sometimes asserted (Rodrik, 2007; Branstetter and Lardy, 2006; Schott, 2004 and 2008). This does not mean of course that individual US and Chinese companies may not compete head-to-head on specific products, but these results generally suggest a different level/kind of competition (price versus quality).

As mentioned in the discussion of the domestic content of exports, China's position in GVCs is evolving rapidly. It is clearly climbing up the quality ladder. The share of high quality/price products in China's exports increased significantly between 2000 and 2010, particularly in high-technology industries (Figure 5.13). GVCs seem to play a role in these export dynamics; China's ranking in terms of export quality is highest in industries in which processing trade is pervasive (Pula and Santabarbara, 2011). Figure 5.13 also shows that China is increasingly importing from abroad high-quality intermediates for high-technology industries. GVCs and foreign activities (through imported intermediates and foreign MNES) have thus helped drive China's export performance (in terms of size, composition and quality) (Box 5.1). The process of upgrading in China also increasingly involves domestic sources (Pilat et al., 2012).

Figure 5.12. Exports by technology and price level, selected OECD and BRIICS countries, 2010



Note: Bilateral trade flows of countries have been classified into three broad quality ranges defined on the world level. The highest quality products are assumed to be the most expensive (i.e. to have the largest unit value). Following Fontagné et al. (2008), the world unit value $UV_{i,\ world}$ is calculated for each HS-6 product as the median of the unit values of all bilateral transactions UV_{ijk} (i being product i, j the exporting country and k the country of destination) for that product. The three quality ranges are defined as follows:

- High quality: UV_{ijk} in the last nine deciles of $[1.25xUV_{i,\ world};\ max(UV_{ijk})]$;
- Medium quality: UV_{ijk} in the interval $[0.75xUV_{i,\ world};1.25xUV_{i,\ world}]$ and in the first decile of $[1.25xUV_{i,\ world};\ max(UV_{ijk})]$ and in the last decile of $[min(UV_{ijk});\ 0.75xUV_{i,world}]$;
- Low quality: UV_{ijk} in the first nine deciles of $[min(UV_{ijk});\ 0.75xUV_{i,world}]$.

The use of the median and intervals takes account of the sometimes high variability of unit values; the medium range is defined more broadly in order to capture a significant share of trade.

Source: OECD calculations based on CEPII BACI database.

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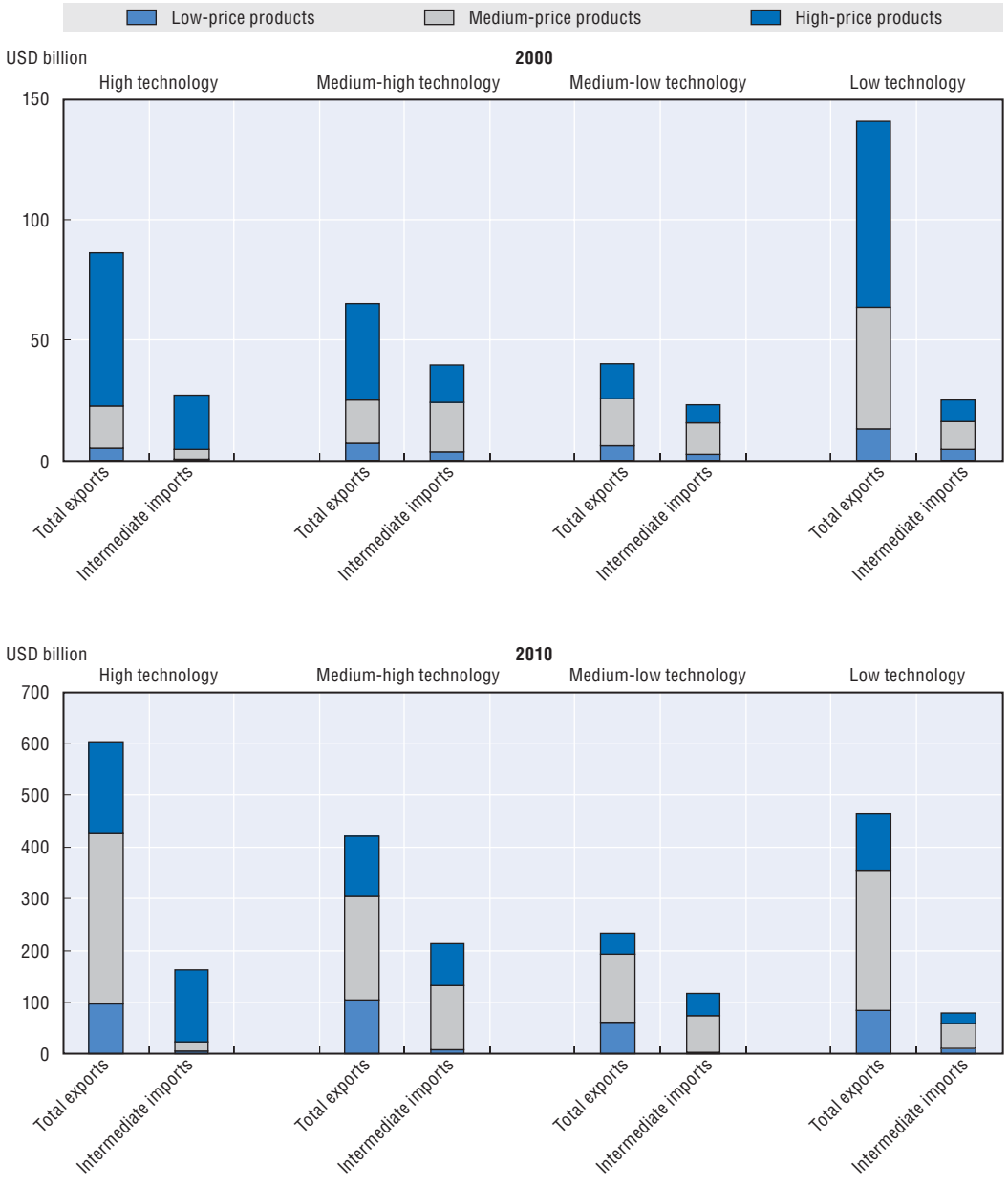
Figure 5.13. Total exports and intermediates imports by technology and price level, China, 2000 and 2010



Note: See Figure 5.12 for an explanation of the methodology.

Source: OECD calculations based on CEPII BACI database, September 2012.

StatLink http://dx.doi.org/10.1787/888932834948

Box 5.1. What explains China's climb up the quality ladder?

By analysing information on the type of trade (processing versus ordinary [i.e. non-processing]) and on exporter/importer (foreign affiliates, private domestic firms, state-owned enterprises) on the product level, it is possible to gain further insight into what drove the rising unit values (as a proxy for quality) of imports and exports in China between 2001 and 2009. The first results indicate that:

- The largest increases in exports' unit value are recorded in processing trade. Foreign affiliates in particular, but also state-owned enterprises, have significantly increased the unit value of their exports. In the electronics industry, for example, foreign MNEs have pushed up the quality of Chinese exports.
- The unit value of imports into China has increased most strongly in processing trade. The increased quality of Chinese exports is thus explained to some extent by the higher quality of imported intermediates.
- Activities of foreign affiliates (and state-owned enterprises) seem to add more value to processing exports, since the increase in the unit value of imports is significantly smaller than the rise in unit value of Chinese exports.
- In the category of ordinary trade, state-owned enterprises have raised the quality of their exports; the unit value of the exports of private domestic firms and foreign MNEs have also increased but to a lesser extent.
- The rise in the unit value of exports is larger than that of imports (in ordinary trade), again suggesting that activities in China increasingly add value.

Source: On-going analysis by De Backer, Van Assche and Ma.

GVC policies for emerging/developing economies

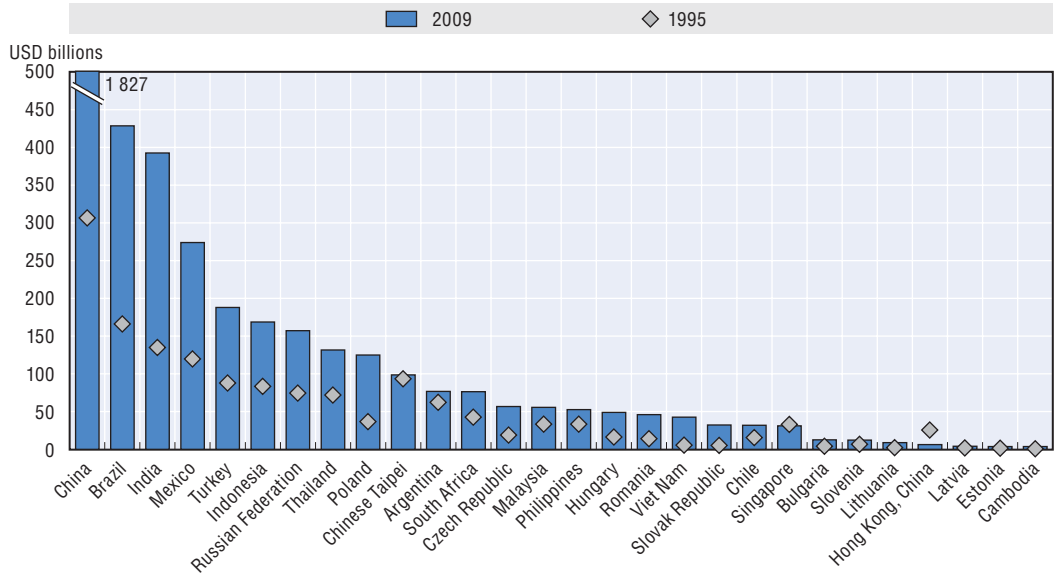
Engagement in GVCs supports economic development

Countries' prosperity largely depends on their participation in the global economy, which is now largely dependent on their role in GVCs (Gereffi and Lee, 2011). Global engagement opens up new markets, provides access to better information and creates opportunities for rapid technological learning and acquisition of skills (Sturgeon, 2013). Participation in GVCs can offer a fast track to development and industrialisation. The offshoring of activities previously carried out in developed countries has driven investment in new productive capacity, stimulated export performance and created jobs in emerging and developing countries. The rise of GVCs has therefore helped to drive economic growth in these economies even when their exports have relatively low domestic content, as rapid growth in exports results in strong growth of domestic value added and thus of GDP.

A new metric calculated from the TiVA Database estimates the value added that economies earn from their GVC activities by producing manufactured goods (final, capital and intermediate goods) that are sold worldwide (Timmer et al., 2012; see Chapter 6). As Figure 5.14 shows, GVC value added in emerging and developing economies is rising because of their increased engagement in manufacturing GVCs. China's GVC income increased by a factor of five between 1995 and 2009. In Brazil, India, the Russia Federation, Mexico, Turkey and Indonesia GVC income grew less rapidly but nevertheless significantly.

Smaller economies such as the Czech Republic, the Slovak Republic, Hungary and Viet Nam have also benefitted from their participation in manufacturing GVCs, largely to meet final demand abroad, owing to the small size of their domestic markets. China's manufacturing industry is also strongly oriented towards foreign final demand, as almost two-thirds of China's domestic value added goes to markets abroad. In contrast, the GVC income of other large emerging economies in manufacturing is more dependent on the domestic market: India generates almost half its manufacturing GVC income for the domestic market, Brazil even 65%.

Figure 5.14. Value added created/captured in manufacturing GVCs, selected emerging and developing economies, 1995 and 2009



Source: OECD/WTO (2013), OECD-WTO: Statistics on Trade in Value Added, (database), doi: 10.1787/data-00648-en, (accessed April 2013).

StatLink *http://dx.doi.org/10.1787/888932834967*

Openness and integration in GVCs

Motivated by the successful participation of these emerging economies in GVCs, other economies seek to become part of international production networks. But even with advantages in terms of (labour) costs, such economies may be disadvantaged in other respects. A new global dataset of bilateral trade costs developed by the World Bank and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) shows that developing economies face higher trade costs and larger constraints in terms of connectivity which increase the costs of offshoring to these countries. Trade costs include tariff- and non-tariff barriers, logistics, transport costs, etc., but also geographical and cultural distance, and are negatively related to per capita income (Arvis et al., 2013). Participation in GVCs also depends greatly on the ease and costs of international flows of goods, services, capital, knowledge and people, etc. Table 5.2 represents various connectivity constraints for middle- and low-income economies.

While firms are the main actors in GVCs, governments play an important role in creating appropriate framework conditions and a conducive business environment. Raising firms' participation in GVCs requires effective policies at the border and in the domestic economy. As structural reforms to eliminate barriers typically require time, emerging and developing economies have sometimes taken more pragmatic approaches, such as EPZs or technology parks, to overcome obstacles (Box 5.2). This section draws attention to policy areas likely to require further efforts.

First, favourable border policies for participation in GVCs include lower trade barriers (see Chapter 3). Trade barriers depend on the level of tariffs and the existence of non-tariff barriers; the efficiency of border processes and customs practices are also an important determinant of the costs and time required to export and import (Table 5.2). Trade costs play a large role in GVCs because goods cross borders several times before reaching the final consumer (Yi, 2003; Ma and Van Assche, 2010). Domestic regulations and trade-related bureaucracy are also important cost factors, because of the importance of operating in a timely manner (WTO and IDE/JETRO, 2010).

Table 5.2. Some determinants of offshoring costs in high-, middle- and low-income countries

	High-income countries	Middle-income countries	Low-income countries
Quality of transport infrastructures			
Quality of Airport, Index 0-7 (2005)	5.9	4.2	3.3
Quality of Port Infrastructure Index 0-7 (2005)	5.5	3.5	2.9
Paved Airports per 1 000 sq km (2006)	2.6	1.2	0.1
Quality of communication infrastructures			
Telephone mainlines, per 1 000 people (2005)	499.6	210.1	36.7
Mobile phone per 1 000 people (2005)	837.8	376.7	76.5
Internet users per 1 000 people (2005)	523.4	114.3	44
Faults, per 100 fixed line (2005)	8.4	16.8	40.5
Quality of institution for doing business			
Rule of Law, index between -2.5 and 2.5 (2006)	1.2	-0.2	-0.9
Time to enforce a contract, days (2006)	548.2	629.1	625
Procedure to enforce a contract, number (2006)	34.2	38.2	40.8
Cost to enforce a contract, % of claim (2006)	20	28.7	53.6
Time-related barriers			
Time to start a business, days (2006)	22.2	51.3	58.3
Time to deal with license, days (2006)	162.6	217.7	265
Export documentations, number (2006)	4.8	7.2	8.6
Time for Export, days (2006)	11.3	25	41
Time for Import, days (2006)	12.9	29.3	49.6

Source: WTO (2008).

Box 5.2. Technology parks in high-technology industries: Saigon High-Tech Park, Viet Nam

Developing economies have increasingly established technology parks to connect to high-technology GVCs, especially if such industries are not yet part of the national economy. Technology parks may help to address – on a limited scale – the infrastructure challenges that these countries face. By providing the parks with state-of-the-art physical, communication and social infrastructure, policy makers hope to attract FDI in high-technology sectors (Infodev/Worldbank, 2008).

The Saigon Hi-Tech Park (SHTP) illustrates the opportunities and challenges afforded by this approach. Established in 2002 with the strong support of the Ho Chi Minh (HCM) City government and the Vietnamese government, SHTP boasts a number of foreign companies, including Intel, Nidec (Japanese producer of computer motor fans) and Sonion (Danish producer of micro-acoustic parts for cellular phones). As of 2012, SHTP hosted 61 local and foreign companies, employed more than 17 000 people and had registered investment of USD 2 billion.

SHTP has been quite successful in integrating Viet Nam in knowledge-intensive GVCs. The transport infrastructure features harbours and airports within a half-hour drive, which lowers the cost of accessing export markets. In addition, it has an adequate skill endowment; the park is located near downtown Ho Chi Minh City and its universities. SHTP has targeted skill enhancement through the creation of an on-site training and research centre, where newly recruited employees of tenant companies receive job-preparation courses. SHTP has also established research laboratories with funding from the Ho Chi Minh City government to invest in technical infrastructure and equipment. The research laboratories are managed as business units that receive contracts from the government and tenant companies. Finally, institutional improvements have been instrumental in facilitating SHTP's integration into value chains: the government grants SHTP companies a "one-stop-shop" to ease business transactions and channel tax incentives.

The SHTP has been effective in attracting foreign companies, stimulating economic activity, including employment, and integrating Viet Nam in GVCs. There is some debate, however, about the extent to which SHTP has helped shift Viet Nam's industrial structure towards higher-value-added and skill-intensive sectors. This is one of the government's goals and an important reason why the SHTP was originally set up. Many tenant companies continue to concentrate on lower value activities (even in higher-technology industries). Technology parks that are isolated from the developmental challenges affecting the rest of the economy may be too limited a tool. For example, the SHTP's advanced training centre and research laboratories contrast sharply with the level of human resources and technological capabilities found elsewhere in the country.

Second, lower barriers to investment facilitate the integration of economies in international production networks because they facilitate investments by lead (MNE) firms (see Chapter 4). Beyond specific rules or restrictions on investment, a broad range of policy areas determine how attractive economies are for international investment: investment policy, trade policy, competition policy, tax policy, human resources, infrastructure, corporate governance, responsible business conduct, public governance, promotion and facilitation (Box 5.3).

Box 5.3. FDI-led strategies for integrating GVCs in Costa Rica

Costa Rica offers a clear example of how policies can help facilitate the insertion of an economy in GVCs. From the 1980s, the country shifted from an import-substitution model of economic development towards a model based on integration in international trade and diversification of exports towards knowledge-intensive industries. FDI has played a fundamental role in this strategy with foreign affiliates linking the Costa Rican economy to GVCs in high-technology industries.

Costa Rica has been very successful in attracting international investment. First, it is politically stable and has enjoyed democratic rule since the mid-20th century. Second, its high levels of secondary and tertiary education rates have formed a labour force with an attractive skill-cost mix. In addition, Costa Rica developed an efficient and supportive FDI policy framework in 1982 when it established a dedicated Investment Promotion Agency (CINDE) to provide services to investors. It also established a free trade zone (FTZ) with fiscal incentives for companies investing in the country, including fiscal credits for non-traditional exports. In 1986, the Ministry of Foreign Commerce (COMEX) was charged with co-ordinating investment promotion and trade policies, and another agency (PROCOMER) was established to promote Costa Rica's exports. Finally, Costa Rica has preferential trade agreements with 54 nations, as well as numerous bilateral investment treaties. Monge-Arino (2011) describes how 11 trade agreements negotiated by Costa Rica with 42 countries have strongly supported Costa Rica's participation in GVCs, in industries such as electronics, medical devices, automotive and aeronautics/aerospace.

FDI flows responded well and have come to play a critical role in the economy. Costa Rica's FDI stock is currently 37% of GDP, second only to Chile in Latin America. A turning point was Intel's decision in 1990 to manufacture microprocessors in Costa Rica; since then HP, P&G, Baxter, IBM and over 200 others have invested in Costa Rica (Costa Rica, 2011). The country's insertion in advanced manufacturing value chains has led to a dramatic shift in its trade profile; from being a primary exporter of bananas and coffee, it has become an important exporter in high-technology industries such as electronics, medical devices and business services. Most of the growth of these non-traditional exports takes place through Costa Rica's FTZ regime, which accounts for 50% of total exports.

While Costa Rica has been very successful in upgrading by attracting FDI, the challenge today is to upgrade the (domestic) value chain and to translate its integration in GVCs into domestic value added. However, the country suffers from a low level of market "thickness" which hampers the formation of linkages between local firms and foreign GVC leaders in knowledge-intensive sectors. There is a shortage of appropriate domestic suppliers, but also of professionals with the required technical qualifications, particularly at the PhD level. This small internal market combined with relatively low investments in R&D (around 0.4% of GDP) limit the development of domestic technological capabilities.

Third, the quality of infrastructure is increasingly a determinant of success in international production networks. A high-quality transport infrastructure with major international gateways and corridor infrastructures such as airports, harbours, railways and highways facilitates economies' participation in GVCs. Gateway ports, hubs and inland transport connections are crucial for the international transfer of goods, services and people. Maritime transport has greatly benefited from containerisation: standardisation, automation and inter-modality of freight have resulted in faster movement of intermediate and final goods through GVCs. Air transport is especially important for the (international) transfer of high-value and low-volume products, and for goods that are time-sensitive goods for just-in-time production and other lean production processes.

Speed and flexibility are crucial not only for exchanging physical goods/services but also for information flows. Adherence to international standards has become increasingly important for the exchange of information across borders. GVCs crucially depend on seamless and uninterrupted information flows across companies and economies; ICT networks channel business information and the data needed for the efficient co-ordination of activities across locations. A well-developed ICT infrastructure (communication, broadband, etc.) is necessary to connect economies' value chain activities across countries. Overall, reductions in transport and communication costs can be seen as equivalent to trade liberalisation for reducing the costs of trade and enhancing trade between countries (Globerman, 2011).

Fourth, beyond investments in "hard" transport and communication infrastructure, a "soft" infrastructure (facilitating policies, procedures and institutions) is at least as important for integration in GVCs. The quality of the institutional framework can be a source of comparative advantage (Grossman and Helpman, 2005). Since GVCs involve many activities involving different companies (MNEs, independent suppliers), contract enforceability is crucial for their smooth functioning. Countries with good legal systems export more in more complex industries (Costinot, 2009; Levchenko, 2007). Moreover, tasks that require more complex contracts (e.g. R&D, design, branding, etc.) are conducted more cheaply in economies with well-functioning contractual institutions (Acemoglu, 2007). Economies characterised by bad governance and political instability, e.g. some economies in Sub-Saharan Africa, have failed to attract foreign investors to export processing zones in spite of promises to shelter them from local rules (Farole, 2007; Cadot et al., 2011b).

Fifth, competitiveness in GVCs is critically dependent on efficient services inputs, including in manufacturing (see Chapter 3). Embedded services are the "glue" between economies' infrastructure and companies' activities in the GVC trade-investment-services nexus. Investments in logistics services (which move goods from one country to another) can enhance trade through efficient organisation and management of international shipment operations and effective tracking and tracing of shipments. High-quality logistics affect trade relatively more than less policy-dependent factors such as distance and transport costs; recent OECD results indicate that every extra day needed to ready goods for export and import reduces trade by around 4% (Korinek and Sourdin, 2011). Likewise, the development of communication and information services as "enablers" of GVCs leverages economies' integration in GVCs; these services may also transform emerging/developing economies into centres for offshore services (e.g. India and Mauritius).

Finally, the supply capacity of domestic firms (often SMEs) affects economies' integration in GVCs. In their search for independent suppliers in foreign markets companies are attracted to "thick" markets, as a large market makes it easier to find the right supplier and to find alternatives if necessary (WTO, 2008). Some economies have initiatives to increase opportunities for links between local firms and international partners; they involve the provision of information and building awareness, training facilities and courses, capacity-building programmes, upgrading activities, etc. (UNCTAD, 2006; OECD, 2008).

Creating and capturing value in GVCs: Upgrading and moving up the value chain

Participation in GVCs facilitates the engagement of emerging and developing economies in the global economy, but it is only a first step towards economic development. Engaging in GVCs has benefited many economies at the lower end of the development ladder but economies approaching middle-income levels increasingly need to upgrade their activities and move up the value chain.[21] The use of imported technologies in labour-intensive and low-cost/low-value activities of GVCs typically results in rapid economic growth in the first stage (see Figure 5.15). However, the gains and productivity growth from sectoral reallocation (from agriculture to manufacturing) and technological catch-up eventually diminish and rising wages make labour-intensive activities less competitive. Consequently, many economies have experienced a slowdown in growth and have fallen into what has sometimes been called the "middle-income trap" (Agénor et al., 2012; Eichengreen et al., 2013). It then becomes necessary to switch to higher value-added activities for further economic development (see Box 5.4).

Box 5.4. Malaysia's new economic model: Leveraging GVCs for structural transformation

Malaysia's new economic model (NEM) largely relies on GVC upgrading to achieve structural change. The plan, unveiled in 2010, aims to bring the country into the high-income group by 2020, while ensuring that growth is inclusive and sustainable. Many middle-income economies face similar development challenges: after a relatively rapid rise to middle-income status, Malaysia's growth has slowed since the Asian crisis. GDP growth averaged 4.2% between 1998 and 2010, a rate that falls short of rates in many emerging markets, notably in Asia.

A key element of the NEM is to improve Malaysia's specialisation in higher value-added activities in GVCs. An important factor in its poor growth performance in recent years has been a consistent slowing of labour productivity. However, the viability of its specialisation in low value-added segments of manufacturing has come under pressure as lower-income economies, particularly China, increasingly undertake the same activities. Malaysia can no longer compete with these economies on the basis of a high-volume, low-cost strategy.

The NEM is implemented through the Economic Transformation Programme (ETP) which identified 12 economic areas which are expected to deliver almost three-quarters of the growth in Malaysia's GDP over the next decade. Based on a broad consultation involving representatives from government, research institutions and the business sector, 11 sectors and one geographical area (Greater Kuala Lumpur/Klang Valley) were selected. An "economic lab" was created for each of the economic areas to develop an action plan, set specific targets (job creation and contribution to GDP) and determine the required resources (skills, funding, etc.).

For the areas closely involved in GVCs, the labs identified the most important challenges raised by Malaysia's specialisation in low-value-added activities. For the electronics industry the lab identified: i) excessive concentration in low-value assembly operations; ii) increasing competition from China; iii) a decreasing contribution to exports; and iv) a focus on too broad a broad range of subsectors. Four subsectors (semiconductors, LED, solar, and industrial electronics and home appliances) were then selected as most attractive in terms of growth and size; specific actions were formulated for each subsector to move Malaysia up the value chain.

Complementing these targeted actions at the subsector level, there are a number of horizontal policies:

- Promotion of private investment and fiscal support to attract domestic and foreign investment.
- Enlarging human capital through investment in vocational education, stimulating the return of Malaysians currently working abroad, and better immigration rules to facilitate the arrival of foreign talent in desired areas.
- Improvements in the business environment to encourage private investment and entrepreneurial activity: liberalisation of certain industries, easing the setup of business operations, reduction of administrative costs for SMEs and a more effective institutional setting for interaction between government and private agents.
- Investment in infrastructure, particularly in broadband and logistics.

In addition, policy makers often want to see the global connectedness of their country result in broader benefits at the national level. An important policy objective is to derive (larger) economic benefits from GVCs to enable more inclusive growth and development (OECD, 2012). The links between economic and social upgrading are important but do not happen automatically; a key challenge in emerging and developing economies is to improve the position both of domestic firms and of workers in GVCs.

The fact that participation in GVCs often takes place through affiliates of foreign MNEs makes it somewhat risky for host economies, as MNEs are increasingly footloose and can readily shift production to other economies. Thus, while GVCs help to plug into the global economy, host economies increasingly acknowledge that there is also a significant risk of being "plugged out". Furthermore, foreign investors are often located in EPZs, which can remain isolated pockets of production pockets with limited spillovers to the domestic economy. The policy challenge is to ensure that the export activities of GVCs create value and (higher-skilled) jobs that tend to "stick" to host economies. Policies to encourage co-operation and strengthen links with foreign firms can stimulate the development of spillovers from GVCs. Costa Rica, Malaysia and Morocco, among others, have programmes to foster interaction between MNEs and domestic producers (OECD, 2013a).

Because MNEs can bring advanced technologies to a country, they can be catalysts for structural change. Attracting FDI therefore remains an important focus of "industrial" policy, although domestic entrepreneurship and the creation of start-ups are increasingly promoted to help economies upgrade and diversify. There has also been renewed interest in old and new forms of industrial policy in emerging and developing economies since the early 2000s (OECD, 2013a) as governments increasingly adopt targeted approaches to foster economic development. Emerging and developing economies follow different approaches to industrial policy, reflecting their institutional capabilities, endowments and strategic choices.

Upgrading and transformation are difficult, however, and possibly more so than before. GVCs tend to "compress" the development path of developing economies, as the traditional stages (from natural resources to manufacturing/assembly, to R&D/innovation, to services) increasingly overlap, so that a linear process of catch-up is very difficult (Sturgeon, 2013). Late developers traditionally have a second-mover advantage as they learn from early developers by absorbing knowledge created elsewhere; they can leapfrog early developers by emulating good practices while avoiding policies and approaches that did not work elsewhere. However, emerging economies wanting to catch up and move to higher-value-added activities (e.g. R&D and innovation) typically chase a moving target as (newly) developed economies invest heavily in the same areas (Whitttaker et al., 2008). Gradualist rather than maximalist approaches may be more effective for upgrading and economic development. Moreover, upgrading is not without risks as the necessarily large, often sunk investments are undertaken in a context of intense competition, shortening product life cycles and rising R&D investments.

In the past, economic development often meant moving up from light industries (e.g. apparel, textiles, etc.) to more capital- and knowledge-intensive industries (automotive, ICT, etc.). Today, the challenge is to move from low-value-added to high-value-added activities within or across industries. Domestic firms and economies can create and capture more value in GVCs and "move up the value chain" in several ways. Upgrading processes through more efficient GVC activities and upgrading products (i.e. switching to higher-value-added products in the same activity) are generally

considered the easiest (UNIDO, 2004; see also Chapter 7). Other types of upgrading include functional upgrading, i.e. taking on functions in the GVC that create higher value added, and chain upgrading, i.e. moving from one value chain to another. These are much harder to achieve, especially for smaller firms, since they often require significant investments.

Some economies have successfully undertaken sequential value chain upgrading (in processes, products, functions and chains); a growing number of companies from emerging economies have introduced global brands and expanded their operations abroad: Lenovo, TLC and Huawei Technologies are examples from China. Successful examples in other industries include Tata (India, automobiles) and Embraer (aircraft, Brazil). Other companies have been less successful: companies from Chinese Taipei were able to upgrade from key suppliers to original equipment manufacturers (OEM), but have not (yet) succeeded in becoming original brand manufacturers since they would have competed directly with their customers (the lead firms in computer GVCs).

In addition, there is a risk that specialisation in production and assembly activities will lock economies into low-value activities if firms do not feel the need to develop capabilities in product design, development, logistics, etc. Until recently the Chinese electronics industry had been caught in a so-called "modularity trap"; despite significant increases in labour productivity, Chinese companies were operating in low-value niches and activities without any possibility to upgrade their capabilities (Song, 2007).

The possibilities and patterns of upgrading are largely determined by the governance structure of GVCs and the strategies of lead firms, which are often based in developed economies: large retailers and merchandisers in buyer-driven GVCs and large manufacturers in producer-driven GVCs (see Chapter 1). Lead firms typically control the core technologies, design, branding, etc., which allows them to accrue the largest rents; they therefore also control many of the mechanisms for learning, innovation, knowledge transfer and industrial upgrading. It is not completely clear when, and under what conditions, lead firms allow or encourage lower-tier suppliers to move up the value chain. In some GVCs lead firms tap the resources of developing economies but do not transfer any knowledge or offer real upgrading prospects (Cattaneo and Miroudot, 2013).

In general, when lead firms establish affiliates abroad to govern local suppliers in developing and emerging economies, these economies' upgrading opportunities are rather limited. When lead firms opt for FDI, they often want to protect their proprietary knowledge as much as possible and undertake higher-value-added activities themselves. The scope for upgrading may also be limited when lead firms use arm's-length transactions to buy inputs from local suppliers; these are typically low-technology, low-value intermediates (Gereffi et al., 2005).

Other governance structures allow in principle for more co-operation and knowledge transfer and thus tend to be more conducive to supplier upgrading if the supplier firms have a sufficient level of absorptive capacity. Technology transfer from the lead firm to so-called captive suppliers is often confined to a narrow range of tasks and activities; functional upgrading will be difficult if not impossible in this case. In relational and modular GVCs (Gereffi et al., 2010), however, local suppliers have more responsibility and can benefit from exchange of knowledge and mutual learning (Gereffi et al., 2010). Process and product upgrading is easier under this governance structure and there may be more scope for functional upgrading. In the automotive and electronics industry, for example, suppliers in developing economies have been able to move up the value chain (see above).

Lead firms often adopt standards to ensure quality throughout the chain. Stringent and costly requirements in terms of product specifications, delivery times, etc., may make compliance difficult and limit the scope for further upgrading. However, standards may also stimulate participation in higher value-added chains (often in niche markets), thus offering possibilities for upgrading (Gereffi and Lee, 2012; Humphrey, 2008).

The growing importance of South-South trade and the rise of lead firms from developing economies are expected to increase upgrading possibilities for local suppliers in these economies. Demand for less sophisticated products, in terms of quality and variety, may also decrease entry barriers to specific GVCs. This would benefit suppliers in developing economies. Building on their knowledge of the local market, they could engage in higher-value-added activities, including development, design and branding (Kaplinsky et al., 2011). However, if they focus on low-income markets, local suppliers run the risk of becoming locked into lower-quality and lower-margin activities where competition is often intense (Brandt and Thun, 2011).

The industry composition of emerging and developing economies also plays a role as possibilities for upgrading differ significantly across industries. In natural resources for example, the scope for upgrading (in particular functional and chain upgrading) is often limited because of specific requirements in terms of capabilities and investments along the value chain. Copper, for example, requires very different competencies for extraction and for manipulation. It is therefore difficult to move from extraction to derivative products; upgrading mainly involves process or product improvements.[22] In agricultural value chains as well, the possibilities for upgrading are often smaller than in manufacturing and services.

Upgrading therefore depends on many factors, only some of which can be affected by government policies. Where the value is being created will differ across industries and value chains, suggesting there is no one-size-fits-all approach to upgrading. A favourable business climate will help; most of the border and behind-the-border policies that have been effective for integrating GVCs will also help in upgrading economies. Investment in advanced infrastructure, in particular high-speed communication networks, can help economies escape the middle-income trap. But framework policies need to be complemented with capability-enhancing policies to strengthen the domestic business sector. Skilled workers and trained personnel are an important, if not the most important, factor in attracting and developing higher-value-added activities, hence the need to invest in education and human capital. Labour market reforms may also be needed if there is a misallocation of talent (Agénor et al., 2012). Better protection and enforcement of (intellectual) property rights can also strengthen incentives to engage in higher-value-added activities such as innovation and design. Innovation and knowledge diffusion not only lead to new initiatives but also help improve the absorptive capacity of domestic companies.

The risk of exclusion from GVCs

Since GVCs offer new opportunities to engage in production processes with relatively low levels of initial investment, barriers to entering the global economy have been lowered. In economies as diverse as Samoa and Cambodia, specialisation in tasks such as assembling automobile parts has made it possible to engage in GVCs in ways that would not have been possible just a decade ago. Rwanda is looking to develop agro-foods and has undertaken an assessment of value chains in five staple crops to improve the value and/or the volume of staple foods produced and marketed in Rwanda and in the region.

But while various emerging and developing economies have been able to participate in GVCs, many low-income economies remain excluded. The reasons include a geographical location removed from existing trade networks, lack of natural resources to facilitate basic insertion in GVCs, lack of the necessary infrastructure or skills, or a business environment that does not provide some of the necessary conditions for investment. Non-market factors related to the rule of law (contract enforcement, intellectual property rights and investor protection), corruption, and political instability are particularly important in poor economies.

The recent consolidation of GVCs following the economic crisis may also leave economies behind. Only the developing economies able to offer an appropriate "bundle of tasks" will remain suppliers in consolidated GVCs (Cattaneo and Miroudot, 2013). In the textile sector, for example, global brands and retailers request a full package from their providers, which includes services such as design, marketing or shipping. Economies with capacities limited to manufacturing that could once participate in GVCs risk no longer being able to capture the benefits of trade.

The challenge for developing economies is to adopt a broad strategy that tackles the key barriers to integration and upgrading in GVCs. Capacity building can help developing economies address some constraints but may be difficult for the poorest among them. Development co-operation, when supported by appropriate policies, can help developing economies take advantage of value chains. Support from the donor community through "aid for trade" initiatives can help reduce the thickness of borders and develop adequate infrastructure. In addition, these programmes can help producers meet public and private standards and promote the development of the private sector (Box 5.5). Nevertheless, complementary public policies are needed to create competitive sectors and overcome internal constraints, especially in small-scale economies.

One of the main objectives of aid for trade is to link developing countries to major value chains and production networks. Many of the projects are intended to upgrade the quality of traditional exports or to reduce specific trade costs that hinder connection to value chains (OECD/WTO, 2011). This includes projects in Cameroon to improve bananas and plantain, in West Africa to improve cotton and rice, in Rwanda to improve the quality of tea, in Ethiopia and in Tanzania coffee, in Bangladesh to upgrade quality in the garment sector, in Guatemala to improve organic crops, in Honduras to improve oriental vegetables, in Grenada to improve fisheries, in Peru to improve milk quality, in Mozambique to revive processed cashew exports, in Tonga to control fruit flies, and in Indonesia to improve dairy livestock. Several projects financed by donors aim to help producers meet quality standards in their home and export markets. Examples include EU assistance for fish production in Fiji, for fisheries in Honduras and Mozambique, and for palm oil in Ghana.

In addition, donors seek to strengthen developing countries' private sector through support to the agriculture sector but also to industry, banking and tourism and provided over USD 16 billion a year between 2008 and 2011. Donors aim to help developing countries create a business-friendly environment in terms of macroeconomic strategies, governance issues, and policy, legal and regulatory frameworks.[23] Aid for the private sector also covers activities to address market failures, overcome information asymmetries and provide business development services. Some donor activities target individual enterprises with technical assistance, information and advisory services and finance. Until now, only a few evaluations of the long-term impact of donor activities have been undertaken.

Box 5.5. Aid for trade and GVCs

The 2013 Aid for Trade Donor Questionnaires launched by the WTO and OECD indicate that value chains are increasingly influencing donor programming (OECD, 2013b).[1] While Ireland reported to have "no applicable experience", other donors increasingly prioritise value chains in the support they provide. For Denmark value chain development has been a strategic priority since 2010. New Zealand's Aid for Trade focus aims to help the Pacific Islands enter the value chain and to encourage greater access to the New Zealand market. Germany's priority is to improve the integration of the local private sector in developing economies in regional and international value chains and strengthen compliance with social and environmental standards (BMZ, 2011, p. 6). Germany also helps SMEs and small-scale farms to improve their export and marketing capabilities and to use value chains at the micro level to achieve higher levels of value added.

The OECD Development Assistance Creditor Reporting System (CRS) provides details on projects of donor programmes based on commitments and disbursement of official development assistance. The CRS shows that donors such as the United States and the United Kingdom have various programmes that are directly linked to the issue of value chains. For instance**, t**he United States, through its Agriculture Development Value Chain Enhancement Program (ADVANCE), has set up a USD 32 million programme for 2009-13 to improve the competitiveness of key agricultural commodity value chains in Ghana's domestic and regional markets, with a focus on the three northern regions. The Africa Free Trade Initiative (AFTi) is supported by the UK Department for International Development (DfID); it aims to help 3 million more people to benefit directly from value chains by 2015 through the Africa Enterprise Challenge Fund (AECF), which has various projects to help people benefit from agribusiness value chains in Africa.[2] The World Bank (2011) describes, with examples of multinational corporations such as Walmart and United Parcel Service (UPS), the role the private sector can play in building capacity, incorporating producers into GVCs, improving quality and safety standards, and facilitating trade. Evaluations show that these programmes are achieving results.[3] DfID's interim monitoring results from value chain activities and aid for trade projects show improved incomes, working conditions and employment for developing country workers. The Netherlands recently evaluated its value chain programmes for tea, cotton and cocoa. The main positive attributable impacts included an increase in household income and sustainability.

1. The 2013 WTO/OECD report, *Aid for Trade at a Glance*, will focus specifically on GVCs.

2. www.aecfafrica.org.

3. The DAC Evaluation Resource Centre (DEReC) has a database with evaluation reports from donor agencies to facilitate learning and provide evaluators with evidence of what works and what does not in different sectors and countries.

Notes

1. Recent years have seen a proliferation of regional trade agreements.
2. In order of market size: Brazil, Korea, Mexico, the Russian Federation, Argentina, Turkey, Indonesia, Poland, South Africa, Thailand, Egypt, Colombia, Malaysia, the Philippines and Chile (Hanson, 2012).
3. Hummels (2007) reported that the average import tariff for all countries worldwide dropped from 8.6% to 3.2% between 1960 and 1995.
4. South-South trade includes trade of countries that are members of the Group of 77 and China plus other countries that claimed a developing country status in the framework of the World Trade Organization (WTO) and other developing territories that are reported to UN Comtrade.
5. However, India has become an important exporter of services, as companies have outsourced a range of knowledge processes, business processes and information technology operations to India (Fernandez-Stark et al., 2011).
6. Labour costs should be considered relative to a country's level of productivity. Countries accept high labour costs if they coincide with high levels of labour productivity; countries with low labour costs typically have low levels of labour productivity.
7. The global middle class is defined as all those living in households with daily per capita incomes of between USD 10 and USD 100 in PPP terms (Kharas, 2010).
8. Processing trade is defined as "business activities in which the operating enterprise imports all or part of the raw and ancillary materials, spare parts, components and packaging materials, and re-exports finished products after processing or assembling these materials/parts".
9. For example, 45% of the final products assembled in processing zones in China are exported to Europe and the United States.
10. MNEs from the United States, Japan and the EU accounted only for 11% of the 200 largest exporters. This seems to suggest that it is especially the Chinese market that is important for these MNEs.
11. Other studies have applied similar methodologies for other products. The iPod can also stand for other electronic industries characterised by high modularity (Chapter 1); other industries show higher domestic value added (Chapter 2).
12. The firms active in processing zones are foreign-owned, which raises the question of whether the remaining value added remains in the Chinese economy (through labour compensation) or is repatriated to MNE headquarters.
13. Programa de Importacion Temporal Para Producir Articulos de Exportacio.
14. Mexico has recently also increased the domestic value added of its exports from 30% to 36.2%.

15. Baldwin (2011) suggests that the rise of GVCs might have played a role in the decline of import-substitution strategies as the second unbundling took off at the time when import substitution disappeared as a viable strategy.

16. Exports of emerging countries typically grow faster along the extensive margin as they have more room to diversify their export portfolio. However, China's export growth took largely place along the intensive margin (see also Amiti and Freund, 2010).

17. The PRODY index measures the implied technological sophistication of goods. It is calculated as the weighted average of the income of countries that export a good; the traditional measures of comparative advantage (Balassa, 1965) are used as weights. This index is then used to calculate the income/sophistication level associated with a country's export specialisation pattern; the idea is that a good mainly exported by developed countries will have a higher technology and quality content.

18. As discussed in Chapter 1, the effects of globalisation on national economies are diverse and complex. In the public debate, China's growing exports of high-technology products are believed to affect significantly national labour markets, and increasingly high-skilled workers. Some argue that the effects should be limited since Chinese exports are not close substitutes of products developed in developed economies (because of vertical specialisation, differences in quality, etc.) (Edwards and Lawrence, 2008; Schott, 2008). Krugman (2007) argues that the impact on low-skilled labour may be greater than in the past as Chinese exports have a high labour content even in higher-technology industries.

19. Some caution is needed in interpreting unit values as indicators of quality since differences in unit values may not only reflect vertical attributes (Fontagné et al., 2008; Silver, 2007; Schott, 2008). Hallak and Schott (2011) note that exchange rate misalignments or differences in production costs may lead to differences in unit values. Alternative approaches take into account not only prices or unit values but also quantities and market shares (Hallak and Schott, 2010; Khandelwal, 2010; Berry et al., 1995; Pula and Santabarbara, 2011).

20. The large share of high-quality products in high-technology industries in Brazil, Indonesia and the Russian Federation is due to some specific products, as they have a very small share of high-technology exports.

21. The term "moving up the value chain" is somewhat ambiguous, as this can be realised by moving downstream in the value chain. There is evidence, e.g. for the electronics industry, that a large part of the value in GVCs is created both upstream and downstream; "moving up the value chain" therefore implies higher-value activities either upstream or downstream.

22. The experience of firms participating in the copper value chain led by BHP Billiton in Chile is an example. For a detailed analysis, see OECD (2013a).

23. It has been argued that private-sector development policies are mostly shaped by the nature and interests of the private sector in the donor countries themselves and incorporate a high proportion of tied aid (De Velte et al., 2008). Recent studies seem to suggest, however, that business support services through donor programmes have improved in recent years.

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Annex 5.A1
Technology classification of industries

Manufacturing industries are classified according to technology intensity using the ISIC Rev. 3 breakdown of activity. The classification is based on a ranking which uses data on R&D expenditure divided by value added, and R&D expenditure divided by production for 12 OECD countries during the period 1991-99.

High-technology:

- Pharmaceuticals (ISIC 2423)
- Office, accounting and computing machinery (ISIC 30)
- Radio, television and communication equipment (ISIC 32)
- Medical, precision and optical instruments, watches and clocks (ISIC 33)
- Aircraft and spacecraft (ISIC 353)

Medium-high-technology:

- Chemicals excluding pharmaceuticals (ISIC 24 less 2423)
- Machinery and equipment not elsewhere classified (ISIC 29)
- Electrical machinery and apparatus not elsewhere classified (ISIC 31)
- Motor vehicles, trailers and semi-trailers (ISIC 34)
- Railroad equipment and transport equipment not elsewhere classified (ISIC 352 plus 359).

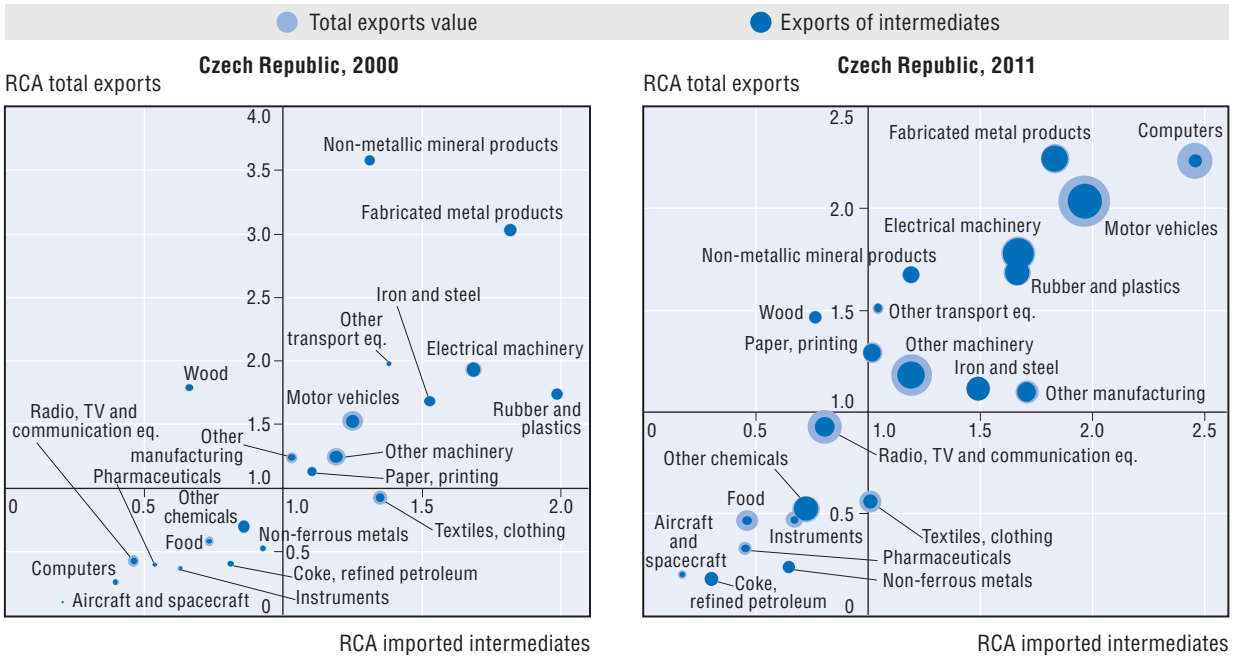
Medium-low-technology:

- Coke, refined petroleum products and nuclear fuel (ISIC 23)
- Rubber and plastics products (ISIC 25)
- Other non-metallic products (ISIC 26)
- Basic metals and fabricated metal products (ISIC 27-28)
- Building and repairing of ships and boats (ISIC 351)

Low-technology:

- Food products, beverages and tobacco (ISIC 15-16)
- Textiles, textile products, leather and footwear (ISIC 17-19)
- Wood and products of wood and cork (ISIC 20)
- Pulp, paper, paper products, printing and publishing (ISIC 21-22)
- Manufacturing not elsewhere classified and recycling

Annex 5.A2
Export competitiveness and GVCs: Mexico, Thailand and the Czech Republic, 2000 and 2011



1) The vertical axis represents the index of revealed comparative advantage (RCA(X)) of total exports; calculated as $RCA(X)_{i,c} = (X_{i,c}/X_{i,world})/(X_{economy,c}/X_{economy,world})$ where $X_{i,c}$ and $X_{i,world}$ are respectively exports in industry i by country c and the world, while $X_{economy,c}$ and $X_{economy,world}$ are economy-wide exports by country and the world; horizontal axis represents the index of revealed comparative advantage (RCA) of imports of intermediates and is calculated as $RCA(M)_{int\text{-}i,c} = (M_{int\text{-}i,c}/M_{int\text{-}i,\,world})/(M_{int\text{-}economy,c}/M_{int\text{-}economy,world})$ where $M_{int\text{-}i,c}$ and $M_{int\text{-}i,world}$ are respectively the imported intermediates of industry i by country c and the world, while $M_{int\text{-}economy,\,c.}$ and $M_{int\text{-}economy,world}$ refer to total intermediates imported by country c and the world.

2) The size of the bubbles is proportional to countries' total exports and should only compared within and not across countries.

Source: Calculations based on OECD (2010b), "STAN Bilateral Trade Database 2010", STAN: OECD Structural Analysis Statistics (database), doi: 10.1787/data-00028-en, accessed May 2013.

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