Chapter 6

Global value chains and competitiveness

As companies and countries become embedded in international networks of production the global value chains (GVCs) they create challenge prevailing policy thinking about competitiveness. The growing upstream and downstream interconnections in GVCs increase the interdependence of countries' competitiveness policies and limit the effectiveness of national policies. Yet there have been calls for "new" industrial policies in many countries, often to support specific industries, in particular manufacturing. Defensive policies to protect domestic industries or firms are increasingly ineffective in a world of GVCs, however, whereas outsourcing and offshoring enhance the export competitiveness of countries by providing access to cheaper, more differentiated, and better quality inputs.

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.

Competitiveness in interconnected economies

Growing interdependencies

Because an internationally competitive economy drives growth and employment, competitiveness is high on the policy agenda in most countries. Although the debate on how to define and measure the competitiveness of countries continues,[1] there is a growing consensus that productivity and attractiveness are important aspects. For example, the United States has been defined as a competitive location "to the extent that companies operating in the United States are able to compete successfully in the global economy while supporting high and rising living standards for the average American" (Porter and Rivkin, 2012). A country's competitiveness is based on its long-term productivity – the extent to which it produces valuable goods and services from its factors of production (capital, labour, natural resources, etc.) – which is also a determinant of its average living standards (Baily and Slaughter, 2008). In a global economy, companies can locate and/or expand their operations is a wide range of possible locations. This means that national economies need to be internationally attractive.

With companies and countries now embedded in international networks of production, GVCs increasingly challenge policy thinking about competitiveness. Today's economies no longer rely exclusively on domestic resources to produce and export goods and services; instead, their exports increasingly embody the technology, labour and capital of the countries from which they import intermediate goods. As a result, the competitiveness of national economies increasingly depends on the competitiveness of their partners. Policy makers need to understand these patterns and to know how concentrated or diversified this international sourcing is.

This policy intelligence must encompass more than the geographic origin of the intermediates imported by companies, as this would only take account of the last country from which intermediates are imported. These intermediates most likely also include foreign value added, i.e. they are produced using intermediates from third countries. A complete view of the sources and interdependencies of the export competitiveness of economies will require information on the geographical origin of all of the value embodied in intermediates.

Table 6.1 presents the matrix of international sourcing on the economy-wide level in terms of value added. Each cell in the matrix shows the share of foreign value added from column countries embodied in row country's exports. For example, the exports of the Czech Republic include 9% value added from Germany; other major suppliers of intermediates to the Czech Republic are China, France, Italy, Japan, Poland, the Russian Federation, the United States (foreign value added content above 2%). The cells on the diagonal represent the domestic value added of countries' exports (61% in case of the Czech Republic). All together the geographic distribution of the value added content of exports shows the interdependencies of the Czech Republic with other countries in terms of competitiveness. Annex 6.A1 presents similar results for electronics, transport equipment (including automotive) and business services.

Table 6.1. Foreign value added and domestic content of gross exports, total economy, 2009 (in %)

Area	Country	Total gross exports[1]	Austria	Belgium	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Luxembourg	Netherlands	Poland	Portugal	Slovak Republic	Slovenia	Spain	Sweden	United Kingdom	Iceland	Norway	Switzerland	Russian Federation	Israel	Turkey	Canada	Mexico	United States	Chile	Brazil	Australia	New Zealand	Japan	Korea	China	India	Indonesia	South Africa	Rest of the World
	Partner		EU																					Other Europe				Middle East		North America			South America		Oceania		Other Asia						
EU	Austria	100	68	1	1				1	9		1		2		1	1				1		1			2	1					2					1		1	1			3
	Belgium	100		65					4	4			1	1		4					1	1	2		1		1					3					1		1				4
	Czech Republic	100	1	1	61				2	8		1		2		1	2		1		1		1			1	3					2					2	1	2				4
	Denmark	100		1		68			1	4				1		1	1				1	2	2		2		1					3					1		1				5
	Estonia	100					67	2	1	3				1		1	1					2	1		1		5					2					1	1	1				7
	Finland	100		1		1		66	1	5				1		1					1	2	2		1		6					4					1		2	1			3
	France	100		1					75	4				2		1					1		1		1	1	1					3					1		1				4
	Germany	100	1	1	1				2	73			1	2		1	1				1	1	2		1	1	1					3					1		1				3
	Greece	100							1	1	77			1		1					1		1				3		1			2					1						6
	Hungary	100	2	1	1				2	8		60		2		1	1		1		1		1				3					3					2	1	2				5
	Ireland	100		1					2	2			58	1		3					1		6		1	1	1					12					1		1	1			5
	Italy	100							2	3				80		1					1		1			1	1					1							1				4
	Luxembourg	100	1	5					3	9			2	3	41	2					2		7			6	1					7							1	1			7
	Netherlands	100		2					2	5				1		64					1		3		2		3					4		1			1		1				6
	Poland	100	1	1	1				1	5				2		1	72				1		1				3					2					1	1	1				3
	Portugal	100		1					2	4				2		1		68			7		1		1		1					2		1			1		1				5
	Slovak Republic	100	1	1	3				2	7		1		2		1	1		56		1		2				7					2					2	3	2				4
	Slovenia	100	2		1				2	5				4		1	1			66	1		1			1	2					2					1		1				6
	Spain	100							2	2				1		1					79		1				1					2							1				5
	Sweden	100		1		2		1	2	4				1		1	1				1	66	2		3		3					3					1		1				3
	United Kingdom	100							1	2				1		1					1		83		2		1					3							1				2
Other Europe	Iceland	100				1			3	4				1		1						1	1	63	1		2					6		1			2		2				8
	Norway	100				1			1	2				1								2	1		85		1					2											2
	Switzerland	100	1						2	7			1	2		1					1		2			72	1					3					1		1				3
	Russian Federation	100								1																	93					1											2
Middle East	Israel	100		1					1	2			1	2		1							2			2	1	69	1			5					1	1	2	1			4
	Turkey	100							1	2				1							1		1				4		78			2					1		1				5
North America	Canada	100								1													1							80		9					1		1				3
	Mexico	100								1																				1	70	13					2	2	3				4
	United States	100								1													1							1	1	89					1		1				3
South America	Chile	100								1													1									4	82	1			1	1	1				6
	Brazil	100								1																						2		91									3
Oceania	Australia	100								1																						2			87		1		1		1		4
	New Zealand	100							1	1													1									2			3	82	1	1	1				4
Other Asia	Japan	100								1																						2			1		85	1	2		1		5
	Korea	100							1	2													1				1			1		5			2		5	59	5	1	1		14
	China	100							1	2													1				1			1		4		1	1		4	3	67	1	1		10
	India	100								1													1			1						2			1		1	1	2	78			8
	Indonesia	100								1																						2					1	1	1		86		5
	South Africa	100							1	2													1									2					1		1			84	6
	Rest of the World	100	1	1		1		1	3	6	1		1	3		2	1				2	1	4		1	1	6	1	1	1	1	18	1	3	3		12	5	12	4	3		

Note: Darker shading shows higher shares of foreign value added; shares below 1% are not represented. 1. Rest of the world: domestic value added is not available.

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

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This table suggest a number of more general observations: [2]

- At the economy-wide level, most intermediates are sourced in the domestic economy, and foreign value-added content is generally higher in smaller countries (see Chapter 1). Foreign value-added content is significantly higher in manufacturing industries such as electronics and transport equipment, where it can reach 50-60%. In contrast, domestic value-added content is much higher in business services' exports.
- International sourcing has a strong regional dimension, as intermediates are mainly sourced within the regional blocs of the European Union, North America and Asia (also see Chapter 1). The importance of distance is confirmed by the marked bilateral sourcing between neighbouring countries (including smaller ones). Regional sourcing is particularly important in the transport equipment industry: high transport costs make intercontinental shipping very costly, especially downstream (e.g. complete cars or subsystems). In addition, political pressures may also motivate lead firms to locate production close to end markets; the high cost and visibility of automotive products risk creating a political backlash if imported vehicles represent too large a share of the vehicles sold. There is also pressure for supplier co-location in regional production systems for operational reasons, such as just-in-time production, design collaboration and the support of globally produced vehicle platforms (Van Biesebroeck and Sturgeon, 2010).
- Each regional block has a number of clusters (again especially in manufacturing). They concentrate around larger countries: Germany, France, Italy and the United Kingdom in the EU; the United States in North America, and Japan and China in Asia. For example, Germany has bilateral linkages with the Czech Republic, Hungary, Poland and the Slovak Republic; it supplies intermediate inputs to these countries and also sources intermediates from them. In Asia there is strong bilateral sourcing between China, Indonesia, Japan and Korea.
- The importance of a number of these hubs clearly goes beyond the region as some countries supply intermediates worldwide. In electronics and transport equipment, China, Germany, Japan and the United States produce significant inputs for almost all countries. France, Italy, Korea, the Russian Federation and the United Kingdom are primarily regional suppliers of manufacturing intermediates; in business services there are fewer world (the United States) and regional (Germany, Japan and the United Kingdom) suppliers.
- China clearly takes the lead among emerging economies in manufacturing GVCs. It is a major supplier of intermediate inputs to all other BRIICS countries (Brazil, India, Indonesia, the Russian Federation and South Africa), but it sources relatively few inputs from them.

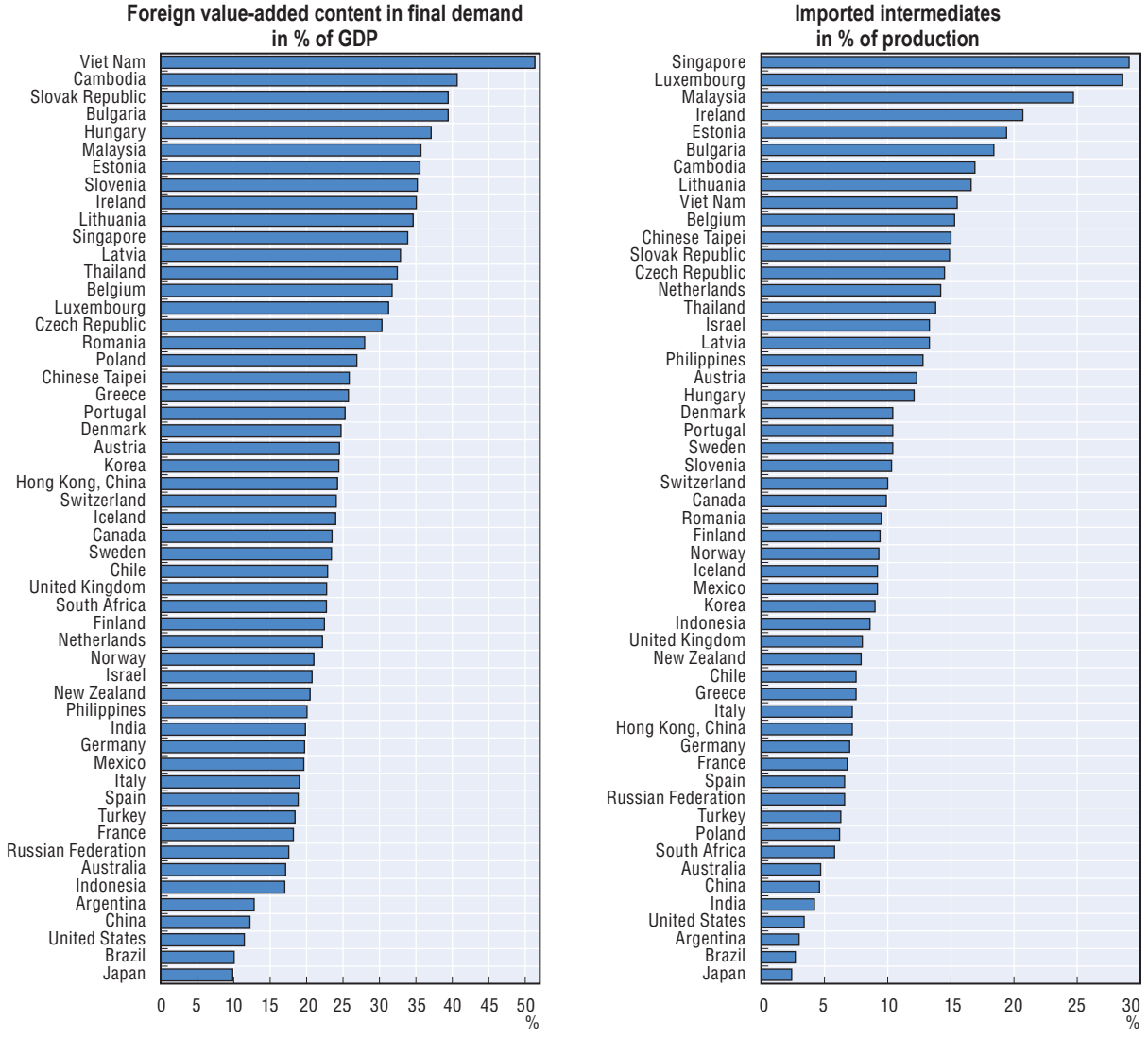
Growing limits to national policies

This growing interdependence implies that the drivers of competitiveness increasingly include factors beyond the scope of national policies. This limits the degree to which policy makers directly influence growth and job creation within their national borders. Nevertheless, there has been renewed interest in industrial policy in OECD and emerging economies in recent years. In the aftermath of the economic and financial crisis of 2008-09, policy makers in OECD economies are seeking new sources of economic growth and employment. Some countries are concerned that their economic growth trajectory is not

sufficiently balanced. In others, there are calls for industrial policies to strengthen specific sectors, technologies or areas of economic activity, such as advanced manufacturing, knowledge-intensive business services or the "green" economy in order to tap into new sources of economic growth. Emerging economies use industrial policies as part of their longer-term economic development strategies (Warwick, 2013).

It is not easy to design and implement effective industrial or competitiveness policies in a GVC landscape of fragmented and dispersed activities. For example, policies that promote domestic activities can have spillover effects in other countries via participation in GVCs. Policies that target domestic demand may be ineffective because of the large foreign value-added content in final demand (Figure 6.1). This was an important policy concern during the 2008-09 economic crisis, when policy measures were adopted to stimulate domestic consumption. Some countries introduced conditionality criteria to increase the benefits of stimulus packages in the domestic economy.

Figure 6.1. Foreign dependency of final demand and production, 2009



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

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The situation is similar for measures to promote domestic production and output because of the growing shares of imported intermediates in an economy's production; measures taken in one country will also benefit the production of intermediates abroad (Figure 6.1). The spillovers may even be greater if domestic companies cannot find enough domestic suppliers and have to revert to international sourcing to satisfy demand.

Instead, policies increasingly focus on domestic factors of production to ensure that national policy measures affect the domestic economy. However, with the rise of GVCs, some factors of production have become increasingly footloose, and firms move activities and resources across countries. Therefore, rather than promote activities and factors that are potentially highly mobile, it is increasingly important to focus on factors that "stick" to the domestic economy (Baldwin, 2012): human capital and skills, high-quality infrastructure, well-developed industry-university linkages, sound institutions, etc.

All this reflects the growing tension between the truly global character of the strategies of individual firms that participate in GVCs and "national" policies that target local jobs and value added. In an era in which some multinational enterprises (MNEs) are larger than some national economies[3], it is not easy to pinpoint the contribution of domestically owned firms to the national economy. Moreover, as companies themselves become increasingly global through their international sourcing, their connections to their "home" country have weakened. Promoting the competitiveness of the domestic economy is therefore no longer the equivalent of promoting the competitiveness of domestic companies (see Chapter 1).

The growing complexity of the global economy requires smart (industrial) policies that strike a balance between stimulating economies' international orientation on the one hand and harnessing the local benefits of GVCs on the other. Concerns about the effectiveness of national policies and potential spillover effects to other countries are rising as policy makers in countries faced with serious budgetary constraints look for more effective and lower-cost policy interventions. Moreover, industrial policies with a strong national focus may curtail local companies' international engagement and negatively affect their competitiveness. Defensive policies aimed at retaining industries at home ignore the reality of today's global economy: in a world characterised by GVCs, firms require imports from abroad and may need to offshore some of their activities to remain competitive at home. Relocating some activities abroad leads to important productivity increases that can support job creation throughout the economy. Protection of a specific activity in the domestic economy can create cost disadvantages with upstream and downstream effects throughout the economy and eventually weaken the competitiveness of the whole value chain.

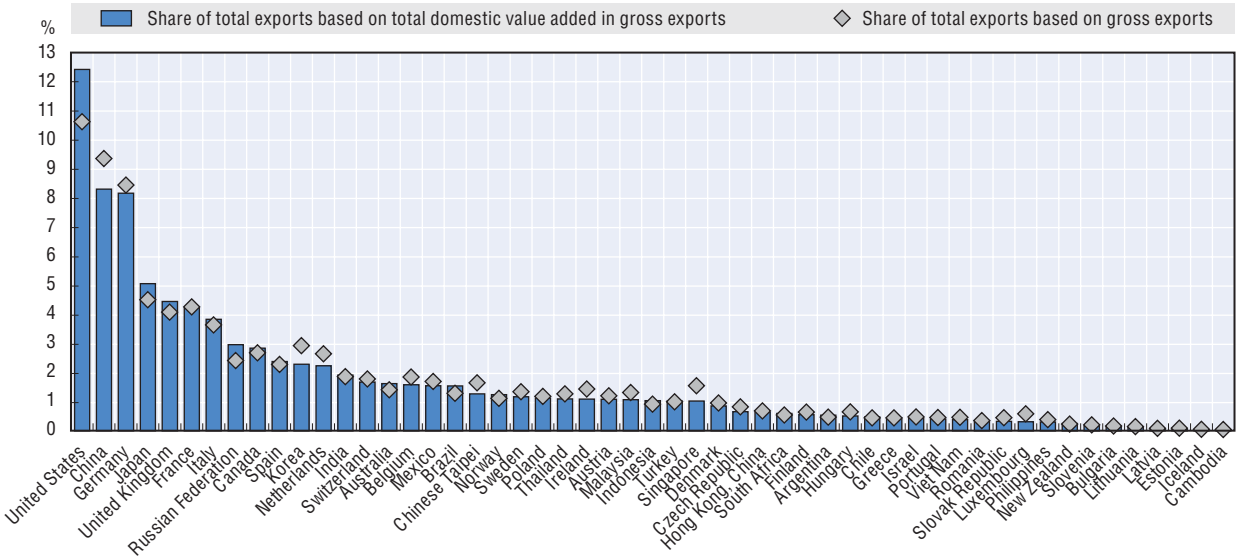
International sourcing, export specialisation and competitiveness

GVCs increasingly challenge traditional (export) competitiveness measures

International competitiveness is typically assessed on the basis of export market shares and indicators of revealed comparative advantage (RCA).[4] The emergence of GVCs raises questions about such measures of competitiveness, as countries' export specialisation increasingly reflects imports of intermediates from abroad. Instead, using export flows expressed in value-added terms allows to capture countries' capacity to add value across activities. For example, on the basis of the domestic value added embodied in exports, the United States was still the largest exporting economy in 2009, which it was not on the basis of gross exports (Figure 6.2). Economies heavily engaged in global value chains,

such as China, tend to have significantly lower shares of total exports based on domestic value added than they have in terms of gross exports. Economies such as the United States, Japan and the United Kingdom, but also the Russian Federation and Brazil, have higher shares based on domestic value added than on gross exports.

Figure 6.2. Export shares, 2009



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

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In a world of GVCs, comparative advantage increasingly reflects strengths at the level of activities, tasks and production stages. Competitiveness should no longer be assessed (solely) at the level of industries or products, but also in terms of activities ("What you do matters more than what you sell"; The Conference Board, 2012). Indicators based solely on export data (in gross terms) may misrepresent the real specialisation of countries: they may simply reflect the fact that a country is specialised in the final assembly of a good but imports all the necessary intermediate inputs and adds little or no value to the good itself. Koopman et al. (2011) have shown that RCA measures based on export flows in terms of value added give a more accurate indication of economies' competitiveness, in particular in industries and countries where GVCs are pervasive. For example, they report that the ranking of China and India, which have significant assembly activities (characterised by low value added), significantly drop in value-added rankings, while developed economies typically move up.

Figure 6.3 presents RCA measures in gross and value-added terms for "Basic metals and fabricated metal products" and for "Electrical and optical equipment". It also presents a more detailed breakdown by industry level for Germany and the Slovak Republic. It shows significant variations in both the ranking and size of RCA measures both across and within countries. While positions in the rankings change, the rankings also show a relatively high degree of stability.[5] Not surprisingly, industries that involve a high level of international sourcing show on average larger dissimilarities between the two RCA measures. RCA measures based on value added also provide new insight into the international specialisation of countries. In general, larger countries generally show smaller dissimilarities between the two RCA measures, as they are less dependent overall on international sourcing. Annex 6.A3 presents more results on dissimilarities in RCA measures on the country and industry level.

Figure 6.3. RCA based on gross exports and value-added exports, two industries and two countries, 2009

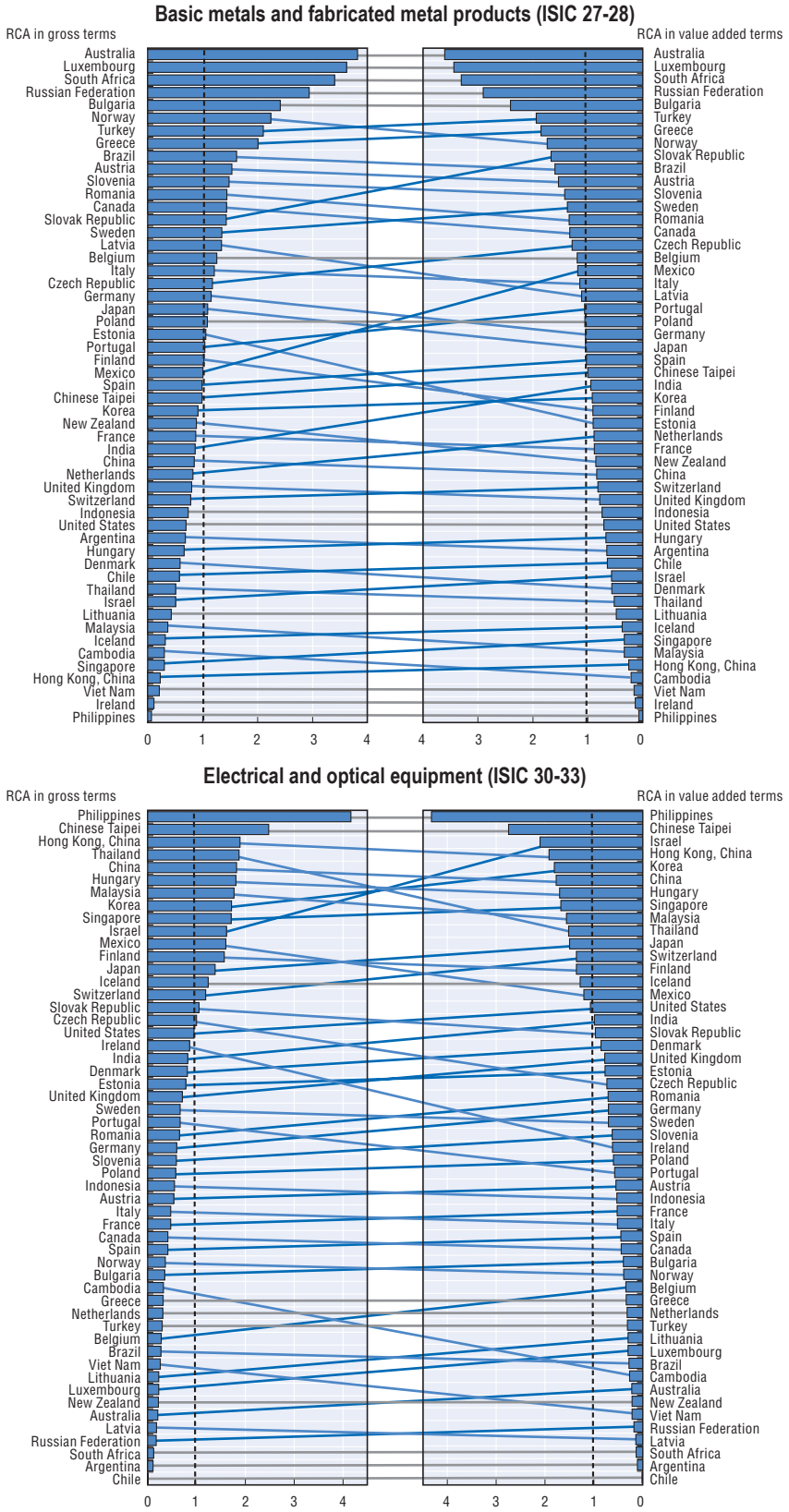
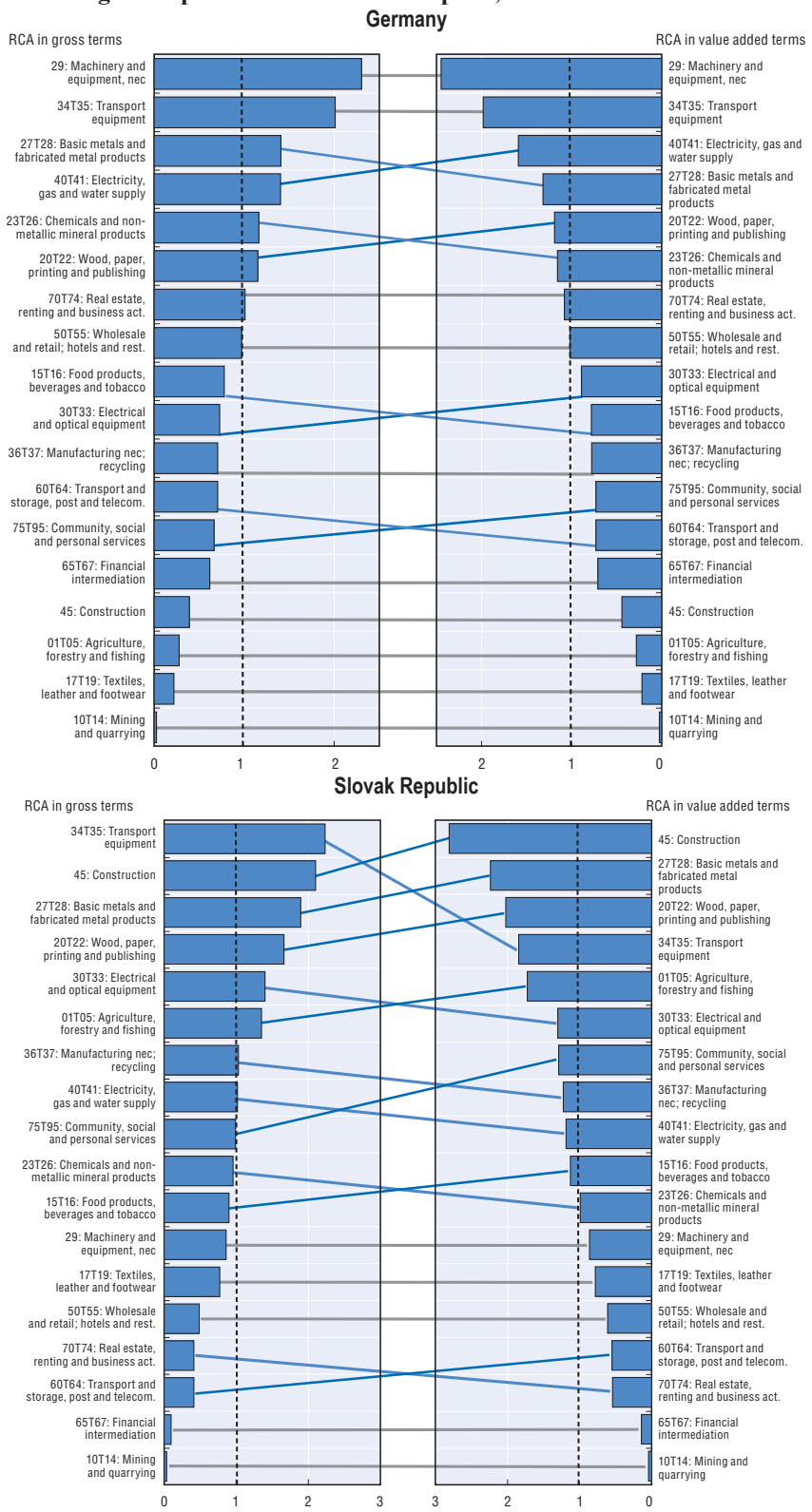


Figure 6.3. RCA based on gross exports and value-added exports, two industries and two countries, 2009 *(cont'd)*



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

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(International) sourcing enhances export specialisation and competitiveness

The international sourcing of intermediates in GVCs helps firms to lower costs, acquire higher-quality inputs, and improve productivity and (export) competitiveness. While many studies have documented the strong connection between imported inputs and firm productivity (see Chapter 1), only recently have a number of studies reported on the positive effect of international sourcing on export performance (Bas and Strauss-Kahn, 2011; Bas, 2012; Feng et al., 2012; Aristei et al., 2013). Moreover, the effects of offshoring go beyond improved export performance on the firm level; offshoring also matters for countries' export specialisation and competitiveness.

Extending the traditional analysis of countries' comparative advantage[6] shows that GVCs positively affect the international specialisation of countries by enlarging the sourcing possibilities both within the domestic economy and abroad. The empirical model in Table 6.2 adds interconnectedness through offshoring to the existing framework of determinants of export specialisation. The analysis includes external economies of scale, the country's capital endowment (dependent on capital intensity at the industry level; Romalis, 2004) and high-skilled labour endowments (dependent on high-skill intensity at the industry level) as variables to capture the more traditional explanations of international trade.

Export specialisation or competitiveness are measured in RCAs in gross as well as value-added terms, reflecting the limitations of traditional RCA measures in the presence of GVCs. Deardorff (2012) describes how RCA measures can be used, together with other data, as a guide to what causes actual patterns of trade between countries and whether these are driven by the traditional explanations of comparative advantage or by other factors.[7] Annex 6.A4 gives detailed information on the development of the model, the construction of variables (including fixed effects) and the sample (which includes OECD and non-OECD economies).

Increased sourcing of intermediates is captured through outsourcing and offshoring on the industry level to reflect the choices companies face when sourcing inputs for their production processes. Outsourcing indicates a change in the boundaries of the firm that assigns the production of the intermediate input to an independent supplier; this is captured in the variable "intermediates use intensity" at the industry level (i.e. the cost of intermediate inputs as a share of total output). Offshoring relates to the location of production and involves the firm moving production of the intermediate input abroad; this is proxied by the variable "intermediates import intensity" (i.e. the share of imported intermediates in total intermediates used by that industry). Both variables are expressed relative to world averages in the same industry and therefore point to intensities that deviate from technological norms of production for either of the two activities.

Rather than test the traditional explanations of international specialisation, the results for the control variables confirm the core determinants of specialisation formalised in international trade theory: physical and human capital endowment favour export specialisation in industries that use these factors of production intensively. Large market size is also found to drive export competitiveness and points to the importance of (external) economies of scale across industries. Overall, despite significant qualitative differences between the results for gross exports and value added, the direction of the impact of the various determinants remains unchanged.

Table 6.2. The effects of outsourcing and offshoring on the export competitiveness of countries

	RCA in gross exports (symmetric)						
Variables	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Domestic demand index	0.079***	0.077***	0.081***	0.081***	0.072***	0.079***	0.074***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Physical capital endowment × Physical capital intensity	0.001***	0.001***	0.002***	0.001***	0.002***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High-skill endowment × High-skill intensity	1.828***	1.849***	2.057***	2.104***	1.724***	1.866***	1.807***
	(0.253)	(0.251)	(0.251)	(0.249)	(0.247)	(0.254)	(0.249)
Outsourcing Index (broad definition - intermediate use intensity)		0.165***		0.154***			
		(0.020)		(0.019)			
Offshoring Index (broad definition - imported intermediates intensity)			0.097***	0.097***			
			(0.006)	(0.006)			
Outsourcing Index (narrow definition - intermediate use intensity)					0.058***		0.065***
					(0.004)		(0.004)
Offshoring Index (narrow definition - imported intermediates intensity)						0.006***	0.008***
						(0.001)	(0.001)
Observations	18639	18612	18603	18603	18612	18603	18603
R-square	0.192	0.197	0.209	0.212	0.205	0.197	0.211

	RCA in value added (symmetric)						
Variables	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Domestic demand index	0.077***	0.075***	0.079***	0.078***	0.071***	0.077***	0.072***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Physical capital endowment × Physical capital intensity	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High-skill endowment × High-skill intensity	1.963***	1.961***	2.124***	2.151***	1.858***	1.992***	1.935***
	(0.255)	(0.254)	(0.254)	(0.254)	(0.250)	(0.257)	(0.252)
Outsourcing Index (broad definition - intermediate use intensity)		0.098***		0.088***			
		(0.020)		(0.019)			
Offshoring Index (broad definition - imported intermediates intensity)			0.075***	0.074***			
			(0.007)	(0.006)			
Outsourcing Index (narrow definition - intermediate use intensity)					0.057***		0.063***
					(0.004)		(0.004)
Offshoring Index (narrow definition - imported intermediates intensity)						0.006***	0.008***
						(0.001)	(0.001)
Observations	18639	18612	18603	18603	18612	18603	18603
R-square	0.191	0.193	0.2	0.202	0.203	0.195	0.208

Note: Robust standard errors are reported in parentheses. Significance levels are indicated by: *** at 1%, ** at 5%, and * at 10% level.

Source: OECD calculations.

More importantly, the empirical results lend broad support to the hypothesis that outsourcing and offshoring in the context of GVCs enhance countries' export specialisation and competitiveness. The positive relationship between offshoring and RCAs in gross terms partly reflects the fact that exports expressed in gross terms increasingly include (imported) intermediates; hence, it implies that outsourcing and offshoring benefit competitiveness. The positive effect on RCAs in value-added terms, however, clearly signals the significant impact of increased sourcing on the export specialisation and competitiveness of countries. Greater use of intermediates sourced both domestically and abroad clearly allows countries to increase their value added in export activities.

The impact of sourcing is also positive when outsourcing and offshoring are restricted to the sourcing of intermediates within the industry ("narrow definition") instead of from any source ("broad definition").[8] Better use of intermediates allows firms and countries to specialise in industries and activities according to their comparative advantage, i.e. where they are more efficient than other firms and countries. The provision of cheaper, more differentiated, and better-quality inputs boosts productivity and allows firms to compete successfully in world markets.

The fact that offshoring and outsourcing have positive effects on competitiveness not only on the level of firms but also of countries has important policy implications. While outsourcing and offshoring typically have negative connotations, because they are associated with firm closures and job losses, importing of intermediates, including offshoring, actually increases countries' ability to export. Policy interventions intended to limit such competitive effects, often aimed at protecting individual firms or industries, may have an effect opposite to the desired one and thus reduce competitiveness.

Manufacturing competitiveness

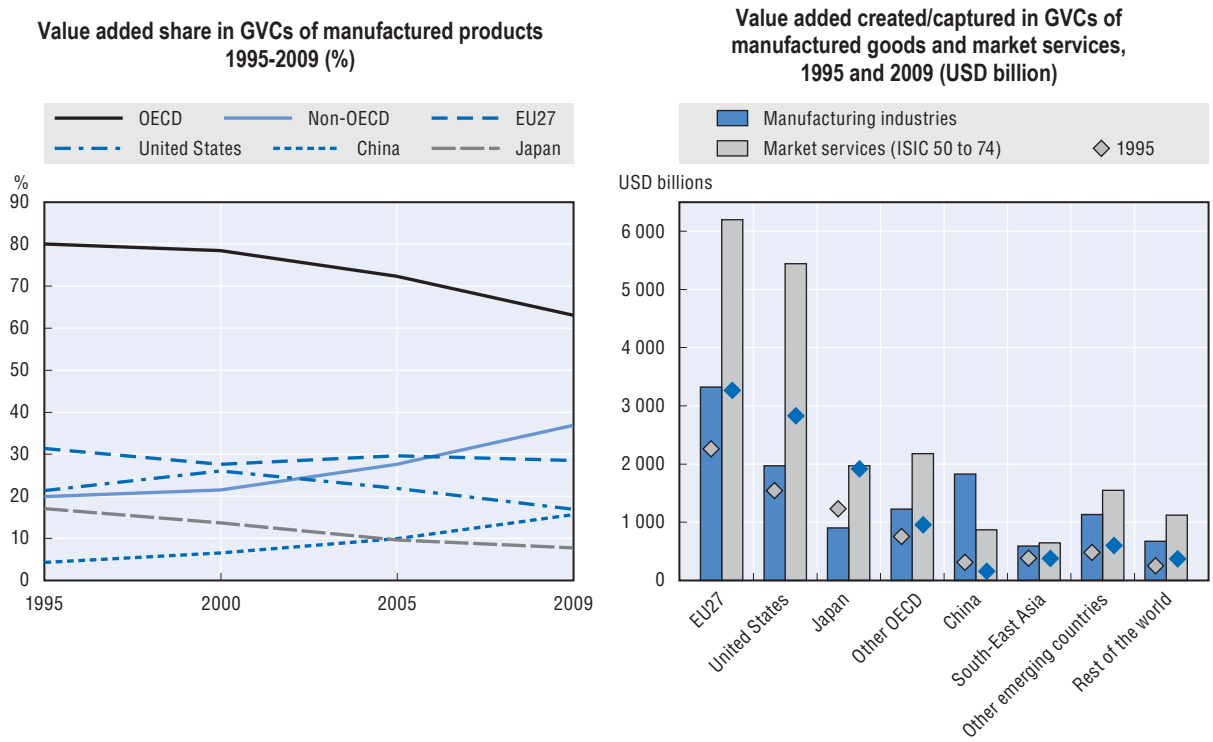
Does manufacturing still have a future in developed economies?

GVCs have dramatically reshaped patterns of manufacturing competitiveness during the past decades. As OECD countries have lost significant export market shares, doubts have arisen about the current and future competitiveness of mature OECD economies in global manufacturing (see Chapter 5). However, as discussed above, export market shares do not reveal the competitiveness of countries when GVCs are pervasive. Indeed, the loss in (export) market share seems at odds with the many case studies (such as that of the iPod) that find that European, Japanese and US companies still capture much of the value in manufacturing value chains, because they specialise in higher value-added activities such as branding, design, etc.

Looking at the distribution of value added inputs within manufacturing GVCs shows that developed economies still create and capture much value added and are still competitive in manufacturing (Figure 6.4). A new indicator based on the TiVA database shows the value added that countries earn from their participation in global manufacturing. The measure decomposes worldwide sales of manufactured products and identifies the value added inputs from different countries and industries; countries add value by producing final manufactured goods and the intermediates (goods and services) that are included in these manufactured goods (Timmer et al., 2012).[9] The value added created and captured by a country provides better insights in the competitive strength of that country when production is organised within GVCs. Like RCA measures based on trade in value added (see above), this indicator gives a more accurate picture of competitiveness when economies specialise not only in different products but also in different activities.

Furthermore, the indicator reflects economies' ability to compete in both domestic and global markets; one dollar gained abroad is equal to one dollar gained at home (Timmer et al., 2012). Annex 6.A2 presents GVC income in more detail.

Figure 6.4. Value added created/captured by selected economies and regions in GVCs of manufactured goods and market services, 1995-2009



Note: Other emerging countries include Argentina, Brazil, India, the Russian Federation and South Africa; Southeast Asia includes Brunei, Cambodia, Chinese Taipei, Hong Kong (China), Indonesia, Malaysia, Philippines, Singapore, Thailand and Viet Nam.

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/10.1787/888932835062*

The strong and rapid rise of emerging countries in manufacturing is reflected in the growing share in value added (inputs) in manufacturing GVCs of non-OECD economies; emerging countries such as Brazil, China and India have significantly increased the value added they create and capture in manufacturing GVCs through their growing participation in global manufacturing (see Chapter 5). Among OECD economies, Japan in particular has seen its share in manufacturing value added fall; the United States strengthened its contribution to manufacturing in the early 2000s mainly owing to the IT boom but has lost ground in recent years. Europe has maintained its overall position in manufacturing but this hides significant restructuring: manufacturing activities in the Czech Republic, Hungary, Poland and the Slovak Republic have expanded strongly following the eastward shift of European GVCs. Korea, Mexico and Turkey are among the OECD countries that have gained significantly in terms of value added.

Although their overall share is decreasing, OECD economies still add a great deal of value to manufacturing products; in fact, more than 60% of the world sales of manufactured products in 2009 represented value added inputs created in the OECD area. The value added derived from manufacturing GVCs by Europe and the United States is still larger than that

of China. A first reason for this is that OECD economies are specialised in higher-value, more technology-intensive products ("what you export matters") as well as in higher value-added activities ("what you do matters") in manufacturing. Second, the high value added of mature economies in manufacturing is also due to the growing use of services as (differentiated) inputs in manufactured goods (see below).

The specialisation in higher value-added activities and products has allowed mature economies to increase their value added from manufacturing GVCs between 1995 and 2009, although manufacturing value added in GVCs decreased significantly in Japan. Hausmann and Hildago (2011) discuss how advanced knowledge and capabilities contribute to the manufacturing competitiveness of mature economies as they allow to pursue fragmented specialisation into complex products. Emerging economies are generally specialised in more labour-intensive and low-cost assembly activities that create less value added. In general, however, both mature and emerging economies benefit from participation in manufacturing GVCs. Globalisation is not a zero-sum game in which one country only advances if others lose.

In addition to their large and rising value added in manufactured products, OECD countries also derive growing value added from their participation in services GVCs (Figure 6.4). This reflects to a large extent their shift to more services-oriented economies. Emerging economies create substantially lower value added inputs in market services GVCs; their activities in GVCs in market services are also much less extensive than in manufacturing. In parallel, gains in value added within GVCs between 1995 and 2009 in China, Southeast Asia and other emerging economies are larger in manufacturing than in services.

These far-reaching changes in competitiveness patterns have launched discussions on "making things instead of making ideas"[10] given that manufacturing competitiveness is no longer accompanied by large-scale domestic employment. Timmer et al. (2012) show that low-skilled and medium-skilled labour have captured ever smaller shares of GVC income in mature economies over the past decade, as OECD countries have increasingly moved towards producing ideas, concepts and services rather than physical goods. This has led in some countries to policy proposals that would discourage (manufacturing) companies from relocating activities abroad. However, the creation of new manufacturing jobs in developed economies is likely to remain modest, owing in part to the continuing technological progress that enables further productivity growth. Policies to protect existing jobs only take part of the GVC reality into account. This risks being short-sighted and may harm the domestic economy's competitiveness.

Another rationale for advocating a "new industrial policy" to support manufacturing is the fear that when emerging economies upgrade in GVCs (sometimes with the support of important policy interventions) the long-term manufacturing competitiveness of developed economies will be threatened. This argument suggests that the loss of core manufacturing activities may set off a reaction that will erode upstream and downstream activities in the value chain, including activities related to innovation and design, all of which could eventually weaken the competitiveness of OECD countries (Pisano and Shih, 2009, 2012). An implication is that high-income countries may struggle to retain innovative, R&D-based and higher value-added activities: ceding capacity in manufacturing might result in the loss of R&D and design capabilities in the longer term.

In a number of countries this has resulted in policy measures that foresee implicit support for the manufacturing sector. Yet old-style industrial policies characterised by industry-specific support policies or national champions have no role to play in a world of

GVCs. They distort international competition and the efficient operation of value chains and run the risk of an international subsidy war, with tax payers the main losers. More fundamentally, targeted support or subsidies are not the way to encourage long-term investment and the building of capabilities.

This is not to say that governments cannot play a useful role in maintaining manufacturing capabilities. Strategies and policies that support the building of new capabilities including skills, infrastructure and research, provide a way forward for ensuring the future of manufacturing in developed economies. Recent technological advances, such as the emergence of 3-D printing, may enable manufacturing firms to engage in tailored production – with the efficiency of mass production – close to their markets. Labour costs will be less important in these new products and production processes and will curb the need to offshore manufacturing activities to regions with low labour costs. It is not clear whether this would result in extra jobs given the limited role of labour (costs) in these production processes. Furthermore, given the high level of technological intensity,[11] most new jobs would likely be concentrated at the high skill end.

The growing importance of services for manufacturing

The character of manufacturing is profoundly changing and the distinction between manufacturing and services is increasingly blurred; recent empirical evidence shows the growing "servitisation" of the manufacturing industry.[12] Manufacturing firms increasingly use and produce services as inputs in their products (Nordas, 2010), and services have taken on greater importance for manufacturing competitiveness. Manufacturing today is much broader than the pure production of goods and includes service-related activities both upstream and downstream. The value of manufactured products increasingly reflects service inputs, as services as sold together or embodied with the goods. Services represent, for example, a growing share of the sales of Swedish manufacturing companies (Kommerskollegium, 2012).

Likewise, manufacturing exports include significant value added in service industries, a further indication of the importance of services for export competitiveness in manufacturing (Figure 6.5). OECD as well as non-OECD countries show significant shares of service inputs in their manufacturing exports; smaller countries source relatively more service inputs from abroad.

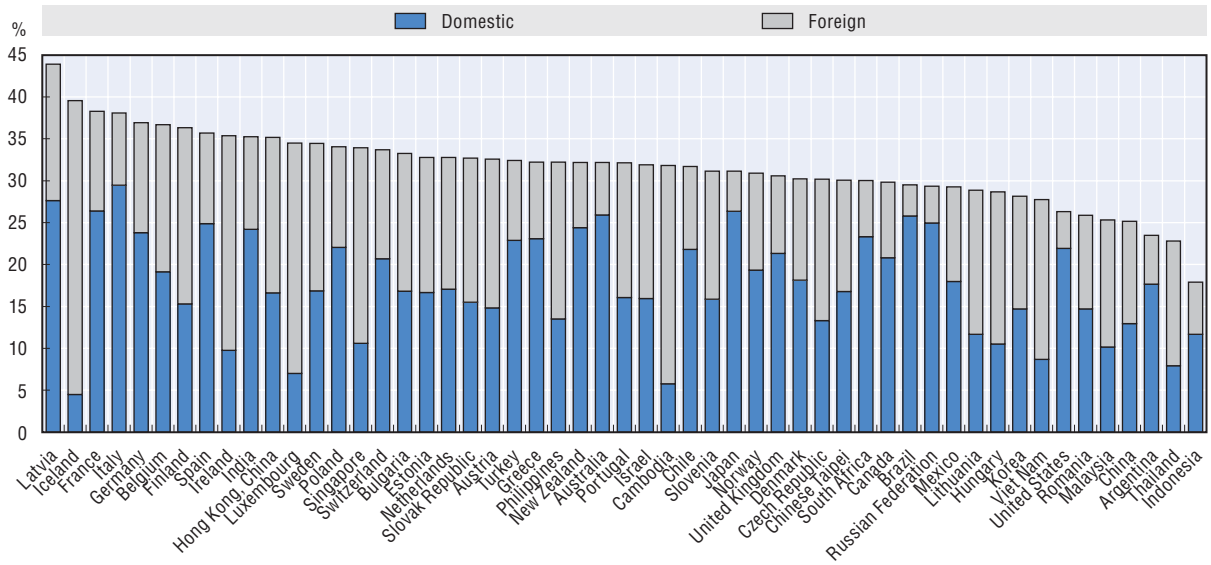
Services have become more important for manufacturing for a number of reasons. First, logistics, communication services, business services, etc., facilitate the efficient functioning of GVCs as they help to transfer goods, data, technology and (managerial) know-how across borders and to co-ordinate dispersed activities quickly and smoothly. Transport and communications networks are the backbone of GVCs and services provided to these networks, often by specialised suppliers (domestically or internationally), directly benefit manufacturing activities (see Chapter 3).[13] Several of these (supporting) services show a sticky character to the location where they are produced.

Second, manufacturing firms increasingly use services to gain a competitive advantage. Services help not only to raise productivity but also to differentiate, customise and upgrade products and develop closer, more longstanding relationships with customers (Kommerskollegium, 2012). Service activities (developed in house or bought in) promote the export activities of manufacturing companies in Sweden (Lodefalk, 2012). As GVCs increasingly allow for the unbundling of business functions and as pure production activities are increasingly located in emerging economies, manufacturers in OECD countries rely more on complementary non-production functions to create value.

Manufacturing companies no longer sell goods alone, but instead sell bundles that include design, development, marketing, warranties and after-sales care. A company like Rolls Royce does not simply sell cars but offers "solutions, outcomes or experiences" to meet customers' needs and differentiate itself from competitors. Xerox has restructured into a "document solution" company that offers advanced printer systems but also services such as document management and consulting; in fact, services represent around 40% of Xerox's turnover and are soon expected to represent 50% (Benedettini et al., 2010). In classifying the activities of manufacturing companies as "manufacturing" and/or "services", Neely et al. (2012) report the growing importance of combined manufacturing-services activities across countries. A large part of the future growth in manufacturing is expected to come from so-called "manu-services" which combine advanced manufacturing with a range of services (Sissons, 2011).

Policies that focus exclusively on manufacturing may ignore the growing importance of services for value creation in GVCs, including for the production of manufactured goods. An integrated view of manufacturing and services is needed and should explicitly take into account their complementary character. Furthermore, as services are still – at least for now – less susceptible to relocation abroad, turning innovation and knowledge into jobs may be more likely to occur in services than in manufacturing, although a strong manufacturing sector is needed to underpin job creation in services.

Figure 6.5. Services value-added content of gross manufacturing exports, 2009



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

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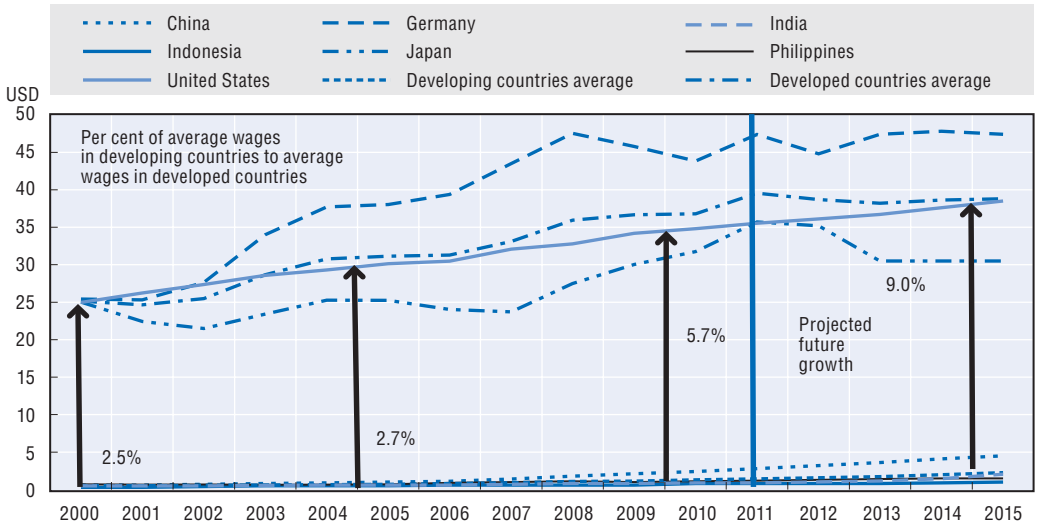
Is there a trend towards back-shoring on the horizon?

GVCs are very dynamic and will continue to evolve as costs increase, technologies continue to change, and firms reconsider their operations. Will the offshoring of manufacturing to emerging countries slow down and will GVCs turn back to developed economies? A number of companies (especially in the United States) have been reported to consider bringing activities they offshored to China back to the United States. Analysis by the Boston Consulting Group (2011) suggests that this trend towards "back-shoring" (also called "on-shoring" or "re-shoring") could lead to a manufacturing "renaissance" in the United States.[14]

Back-shoring is becoming more attractive since the cost structure of production is changing in emerging countries and is narrowing the cost gap between emerging and developed economies. In China, for example, average hourly wage increases of 15-20% a year have eroded the country's cost advantage in labour-intensive activities. India, Indonesia, the Philippines, and others have also experienced strong wage increases as the middle classes have grown (see Chapter 5). The average hourly wage in emerging economies was estimated at around 2% of the US average in 2000 and is expected to reach 9% in 2015 (Figure 6.6). As productivity differences narrow and the share of labour in total production costs shrink, savings from offshoring become much smaller. Companies respond to these rising labour costs by increasingly automating factories in emerging countries, relocating production to other emerging countries where labour costs are still low, and/or eventually back-shoring specific activities.

Figure 6.6. Average hourly wages in emerging and developing countries



Source: Deloitte analysis, Economist Intelligence Unit data; published in World Economic Forum (2012).

Another explanation for the trend towards back-shoring is that certain hidden costs were not fully taken into account in the offshoring decision (Porter and Rivkin, 2012). There is often too much focus on labour costs and too little on other costs when establishing production processes overseas. A 2011 study by Ernst & Young showed that for more than one-third of US manufacturers, entering high-growth markets such as Brazil, China and India resulted in higher than expected total costs. Indirect costs may be unexpectedly high because of the need for additional monitoring and training, travel and personnel costs, transport costs, higher obsolescence and inventory costs, or unanticipated loss of intellectual property. Products manufactured in emerging countries but destined to the home market might then be produced at higher "total landed costs".

Back-shoring is also related to firms' strategies to balance cost savings and risk dispersion in GVCs. Natural disasters such as the recent Japanese earthquake/tsunami and the floods in Thailand led to global disruptions of GVCs and halted the worldwide supply of products and intermediates in several industries (see Chapter 8). Just-in-time models, lean structures and the absence of redundancy in a chain imply that a breakdown in one part of the chain may quickly have detrimental effects throughout the value/supply chain. In order to diversify the risks inherent in their complex supply chains, companies

increasingly consider alternative GVCs for the same product. In addition to GVCs in low-cost countries, companies set up (often shorter) GVCs in higher-cost countries close to their major markets.

A final reason to bring manufacturing activities back home is the greater operational flexibility it offers companies. The organisation of long and complex GVCs that cross several countries limits companies' ability to adjust the production process to market signals. Negative shocks to final demand are not always easily incorporated in GVCs' scheduled production runs; the global financial crisis of 2007-08 demonstrated how a slowdown in downstream activities amplifies the reduction in the demand for inputs upstream. Closer to home, specific customer needs ("manufacturing on demand") can be met more rapidly as developers, engineers, manufacturing and operating staff are closer together. Physical distance often results in less efficient co-operation and co-ordination of the different production stages.

Technological advances are expected to support this trend: digital manufacturing that relies on clever software combined with novel materials and new production techniques (e.g. nanotechnology) is expected to reshape production processes in manufacturing. While mass-produced products will continue to be manufactured according to more traditional – albeit more automated and flexible – methods, new ways of manufacturing will increasingly result in smarter products and smarter production processes (World Economic Forum, 2012). Digital technology will lower the cost of producing smaller batches of a wider variety; as scale economies decrease, "manufacturing on demand" is expected to become (more) economically feasible. Additive manufacturing such as 3-D printing, for example, builds products from successive layers of material and allows for tailoring products to individual customers' needs.

In spite of back-shoring's growing appeal, there is no consensus on how big this has or will become. It is expected that offshoring to emerging countries will remain an important strategy even though costs are on the rise in these countries. Emerging countries offer large and rapidly growing markets for manufactured products given their growing middle classes. Back-shoring to developed economies might become more prevalent in technological and quality products characterised by fast product cycles and for which market feedback is important. The mass production of labour-intensive, commoditised products will most likely remain concentrated in emerging economies where production costs, including labour, are lower.

Notes

1. Krugman (1996) famously noted that while we can refer to the competitiveness of firms, we cannot speak about the competitiveness of countries. If a corporation is not performing and its business positition is unsustainable, i.e. if it is uncompetitive, it will eventually go out of business. It is much harder to say when a country is uncompetitive.

2. Individual countries not presented in the table are grouped in the category "rest of the world"; this explains the large size of the percentages in the corresponding column. Future work on the OECD-WTO TiVA Database will extend the geographical coverage of the estimates.

3. Such comparisons should be interpreted with care as MNE sales/production (which is a gross concept) is often compared with countries' GDP which is a value-added concept.

4. Empirical measures of comparative advantage go back to the seminal work of Balassa (1965). The shares of a given sector in a country's exports are compared to that sector's share in world exports. A value larger than 1 is said to show that a country possesses a comparative advantage and is specialised in that industry, while a value smaller than 1 points to a comparative disadvantage. Measures of comparative advantage suffer from a number of shortcomings, however (for an overview, see Sanidas and Shin, 2010).

5. This is to some extent explained by the relatively high level of industry aggregation in the OECD-WTO TiVA Database; more disaggregated industries will typically show greater dissimilarities between RCA measures in gross and value added terms.

6. The question of where comparative advantage originates is as old as the study of international trade. There have been many attempts to identify the economic conditions that determine comparative advantage. Ricardo (1772-1823) attributed specialisation to technological differences between countries, Ohlin (1933) focused on country endowments of factors used relatively intensively in the production of certain goods, and more recently Krugman's New Trade Theory (1979) adds imperfect competition and economies of scale to the determinants of international specialisation. In all these theories, comparative advantage in a broad sense reflects a lower opportunity cost of production and motivates international trade.

7. Most studies have used export flows to study determinants of international competitiveness; only a few have used RCAs in econometric models (Dalum et al., 1998; Sleuwaegen and DeBacker, 2001).

8. Endogeneity issues may arise between offshoring broadly defined and export specialisation as offshoring intensity is structurally associated with the RCA index; these issues are not very important when the narrow definition of offshoring is used.

9. Worldwide, global expenditures on manufacturing goods represent global value added in manufacturing activities. As Timmer et al. (2012) note, this does not necessarily hold on the country level as current account imbalances will result in value added produced higher/lower than final consumption in a country.

10. Discussions on "made in the United States/Japan, etc." contain similar arguments.

11. This high-technology manufacturing would not be limited to more technology-intensive industries. It could also concern more traditional industries (e.g. embedded software on advanced computer chips in clothing).

12. Other terms used are servicification, servicisation (Kommerskollegium, 2012).

13. The increasing use of services in manufacturing is also some extent a statistical artefact. Many services activities were previously provided in house but are now increasingly outsourced and offshored by manufacturing companies (Pilat et al., 2006; Rowthorn and Ramaswamy, 1998; *The Economist*, 2011).

14. The Boston Consulting Group estimates that in areas such as transport, computers, fabricated metals and machinery, 10-30% of the goods that the United States now imports from China could be made at home by 2020, boosting American output by USD 20-55 billion a year.

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Annex 6.A1. Foreign value added and domestic content of gross exports, 2009 (%)

Foreign value added and domestic content of gross exports, electrical, and optical equipment (ISIC 30 to 33), 2009 (in %)

Area	Country	Total gross exports[1]	Austria	Belgium	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Luxembourg	Netherlands	Poland	Portugal	Slovak Republic	Slovenia	Spain	Sweden	United Kingdom	Iceland	Norway	Switzerland	Russian Federation	Israel	Turkey	Canada	Mexico	United States	Chile	Brazil	Australia	New Zealand	Japan	Korea	China	India	Indonesia	South Africa	Rest of the World
	Partner		EU																					Other Europe				Middle East		North America			South America		Oceania		Other Asia						
EU	Austria	100	56	1	1				2	13		1		3		1	1				1	1	1			2	1					3					2		2	1			4
	Belgium	100		67					3	5			1	1		3					1	1	2			1	1					3					1		1				3
	Czech Republic	100	1	1	37				2	11		1		2		3	2		1		1		2			1	2					4					7	2	8	1			9
	Denmark	100		1		71			1	6				1		1	1				1	2	2		1		1					2					1		1				3
	Estonia	100		1			56	2	2	5				1		1	1				1	4	2		1	1	2					4					3	1	3				7
	Finland	100	1	1		1	1	46	1	9				1		1	1				2	3	4		1		2					9					2	1	5	2			4
	France	100		1					70	5				3		1					2		1			1	1					3					1		2				4
	Germany	100	1	1	1				2	75				1		1	1				1		1			1	1					3					2	1	2				3
	Greece	100		1					2	3	68			3		1					1		1			1	3		1			2					1		1				6
	Hungary	100	2	1	1				3	11		46		2		2	1		1		1		2			1	1					4					3	3	5				8
	Ireland	100		1					2	3			38	1		4	1				1	1	7		1	1	1			1	1	15					2	1	4				10
	Italy	100		1					2	4				77		1					1		1			1	1					2					1		1				3
	Luxembourg	100	1	5	1				5	14			1	2	41	3					1	1	3		1	1	2					4					4	1	2	1			4
	Netherlands	100	1	3				1	2	8			1	1		49					2		5		1	1	1					8					2	1	3	1			5
	Poland	100	1	1	1				2	5				2		1	66				1	1	1				2					2					2	2	3				4
	Portugal	100		1					4	11				3		3		46			13		2		1	1	1					2		1			1	1	2				4
	Slovak Republic	100	1	1	3				2	8		1		2		1	2		43		1		5				2					3					3	7	4				8
	Slovenia	100	2	1	1				2	6				5		1	1		1	59	1	1	1			1	1					3					2	1	2				7
	Spain	100		1		1			2	4				2		1		1			72		2			1	1					2					1		1				4
	Sweden	100		1		1		1	2	6			1	1		2	1				1	57	3		2	1	1					5					1	1	2	1			4
	United Kingdom	100		1					1	4			1	1		1					1		75		1		1					4					1	1	2				3
Other Europe	Iceland	100		1		3			3	5			1	1		2	1				1	2	2	49	3		1					5					3	1	4				10
	Norway	100		1		2			1	3				1		1	1				1	2	2		68		1			1		3					2	1	2				4
	Switzerland	100	1						2	8				3		1					1		2			68	1					3					1		1			1	3
	Russian Federation	100							1	2																	88					1					1	1	1				2
Middle East	Israel	100		1					1	2				1		1							2			1	1	73				6					1	1	2				4
	Turkey	100							2	3				2							1	1	1			1	2		70			2					2	1	3				5
North America	Canada	100							1	1				1									1							69	1	14					2	1	2				4
	Mexico	100							1	2				1									1							1	43	20					6	4	8				8
	United States	100								1																				1	1	87					2	1	2				3
South America	Chile	100																														1	95										1
	Brazil	100								1																						3		85			1	1	2				3
Oceania	Australia	100								1													1									3			81		2	1	2				5
	New Zealand	100							1	2				1									1									4			3	73	3	1	3				4
Other Asia	Japan	100								1																						3			1		82	1	3		1		5
	Korea	100							1	2				1									1				1					6			1		7	53	9	1	1		14
	China	100							1	2													1				1					5	1		1		6	5	57	1			15
	India	100								1													1			2	1					2			2		1	1	1	78			8
	Indonesia	100							1	1																						3			1		4	1	3	1	72		8
	South Africa	100							1	3				1									1				1					3			1		2	1	3			73	7
	Rest of the World	100	1	1					3	6			1	2		1					1	1	3		1	1	2	1		1	1	19	1	1	2		17	10	18	2	2		

Note:darker shading shows higher shares percentages of foreign value added; shares below 1% are not represented. 1. Rest of the World: domestic value added is not available.

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

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Foreign value added and domestic content of gross exports, transport equipment (ISIC 34 to 35), 2009 (in %)

Area	Country	Total gross exports[1]	Austria	Belgium	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Luxembourg	Netherlands	Poland	Portugal	Slovak Republic	Slovenia	Spain	Sweden	United Kingdom	Iceland	Norway	Switzerland	Russian Federation	Israel	Turkey	Canada	Mexico	United States	Chile	Brazil	Australia	New Zealand	Japan	Korea	China	India	Indonesia	South Africa	Rest of the World
	Partner		EU																					Other Europe				Middle East		North America			South America		Oceania		Other Asia						
EU	Austria	100	48	1	1				2	19		1		4		1	1		1		1	1	2			2	1					4					1		1	1			3
	Belgium	100	1	52	1				4	9			1	2		3	1				2	2	4		1	1	1					4					2	1	1				4
	Czech Republic	100	1	1	51				3	13		1		3		1	4		2		1		1			1	2					2					2	1	2				4
	Denmark	100	1	1		65		1	2	7				2		1	1				1	3	2		1		1					4					1		2				3
	Estonia	100					67	2	2	4				1		1	1					2	1		1		4					3					2	1	1				6
	Finland	100	1	1		1	1	57	2	9				2		1	1				1	3	2		1	1	4					4					1		2	1			3
	France	100		1					60	8				3		1	1				2	1	2			1	1					8					1		2				4
	Germany	100	2	1	1				3	66		1		3		1	1				1	1	3			1	1		1			4					1		1				3
	Greece	100		1					1	3	81			2		1					1		1				1		1			2					1		1				3
	Hungary	100	2	1	1				3	14		51		3		1	2		1		1		2			1	1					3					2	1	2	1			5
	Ireland	100	1	1					4	6	1		20	3		6	1				1	1	5		1	2	1				1	23					2	1	3				14
	Italy	100	1						2	4				77		1	1				1		1			1	1					2					1		1				3
	Luxembourg	100	1	6				2	8	11			1	2	42	5					1	1	3		1	1	1					3					1		1	1	1		5
	Netherlands	100	1	2	1				2	10				2		55	1				1	1	3		1	1	1			1		5					2	1	2				4
	Poland	100	1	1	1				2	9		1		4		1	61		1		1	1	1			1	2		1			3					2	1	2				3
	Portugal	100	1	1	1				5	12		1		4		1	1	41			13	1	2		1	1	1		1			2		1			2		1				4
	Slovak Republic	100	1	1	5				6	15		1		3		1	2		42		1		2			1	2					2					2	5	2				4
	Slovenia	100	2	1	1				6	7				5		1	1		1	52	2		1			1	1					2					1	1	1				8
	Spain	100		1	1				4	6				2		1	1	1			69		2			1	1					2					1		1				3
	Sweden	100	1	2	1	2		1	3	9				2		2	2				1	52	3		2	1	1					4					1	1	2	1			3
	United Kingdom	100		1					2	5				2		1	1				1	1	69		1		1			1		6					1		1				3
Other Europe	Iceland	100				1			2	3				1		2						1	1	62	2		1					9					2	1	3				5
	Norway	100				1		1	2	5				2		1	1				1	3	2		62	1	1			1		8					1		1				3
	Switzerland	100	1	1	1				3	11				4		1					1		2			60	1					6					1		1			1	2
	Russian Federation	100			1				1	3				1					1								79					1					2	2	1				4
Middle East	Israel	100							1	2				1		1							1			1		74				9					2	1	1				3
	Turkey	100							3	3				2			1				1		1			1	3		70			3					1	1	2				5
North America	Canada	100							1	1				1									2							64	1	20					2	1	2				3
	Mexico	100								2																				1	67	16					2	1	3				3
	United States	100							1	1				1									1							1	1	83					2	1	2				3
South America	Chile	100							1	2				1							1		1							1		8	71	2			2	1	2				4
	Brazil	100							1	1				1																		3		86			1		1				3
Oceania	Australia	100							1	1				1									1									1			80		2	1	2				5
	New Zealand	100							1	3				1									1									5			4	65	3	2	4				5
Other Asia	Japan	100								1																						3			1		86	1	2		1		4
	Korea	100							1	2				1									1				1					5	1		1		7	64	4		1		8
	China	100							1	3				1									1				1					4		1	1		7	3	67	1			6
	India	100							1	1													1			2	1					3			2		1	1	1	76			8
	Indonesia	100								1																						2					3	1	2		83		5
	South Africa	100							2	6				2		1					1	1	2				1					5		1	1		2	1	3	1		62	7
	Rest of the World	100	1	1					4	7		1		3		1	1				1	1	3		1	1	3		1	1	1	22	1	6	2		19	3	8	2	2		

Note: darker shading shows higher shares percentages of foreign value added; shares below 1% are not represented. 1. Rest of the World: domestic value added is not available.

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

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Foreign value added and domestic content of gross exports, business services (ISIC 70 to 74), 2009 (in %)

Area	Country	Total gross exports[1]	Austria	Belgium	Czech Republic	Denmark	Estonia	Finland	France	Germany	Greece	Hungary	Ireland	Italy	Luxembourg	Netherlands	Poland	Portugal	Slovak Republic	Slovenia	Spain	Sweden	United Kingdom	Iceland	Norway	Switzerland	Russian Federation	Israel	Turkey	Canada	Mexico	United States	Chile	Brazil	Australia	New Zealand	Japan	Korea	China	India	Indonesia	South Africa	Rest of the World
	Partner		EU																					Other Europe				Middle East		North America			South America		Oceania		Other Asia						
EU	Austria	100	84	1					1	5				1							1		1									2							1	1			1
	Belgium	100		82					2	2			1	1		1					1		2									2											2
	Czech Republic	100	1		83				1	3				1			1		1				1				1					2					1		1				2
	Denmark	100				87				2												1	1									2							1				2
	Estonia	100					83	1	1	2												1					2					2					1		1				3
	Finland	100						84		2												1	1				1					2							1				1
	France	100							92	1				1							1		1									1											1
	Germany	100							1	91				1							1		1									1											1
	Greece	100								1	89			1									1				1					2											2
	Hungary	100	1						1	3		82		1		1							1				1					3							1				2
	Ireland	100	1	1					3	3			44	2		4					1	1	4			1	1				1	18					1	1	2				10
	Italy	100							1	1				92																		1											1
	Luxembourg	100		5					2	8				2	55	1					3		7			1						6							3	2			2
	Netherlands	100		1					1	2						89							1									2											1
	Poland	100							1	2				1			88						1				1					1							1				1
	Portugal	100							1	1								88			3		1									1											1
	Slovak Republic	100	1		1				1	2				1			1		85				1				1					1						1					2
	Slovenia	100	1						1	2				2						85							1					1					1		1				3
	Spain	100							1	1				1							90		1									1											1
	Sweden	100		1		1		1	1	3				1		1					1	80	2		1		1					3							1				2
	United Kingdom	100								1											1		94									2											1
Other Europe	Iceland	100							2	3						1						1	1	73	1		1					6					1		1				5
	Norway	100				1				1											1	2	1		86							2							1				1
	Switzerland	100							1	3				1									1			88						1											1
	Russian Federation	100								1																	96																1
Middle East	Israel	100								1													1					90				3											1
	Turkey	100								1																	1		91			1											1
North America	Canada	100																												93		4											1
	Mexico	100																													93	4											1
	United States	100																														96											1
South America	Chile	100								1																						3	90						1				3
	Brazil	100																														1		96									1
Oceania	Australia	100																														1			93		1						2
	New Zealand	100							1	1													1									2			1	89	1		1				2
Other Asia	Japan	100																														1					96						1
	Korea	100								1																						2					1	89	1				3
	China	100								1																						1			1		2	1	89				3
	India	100								1													1									3							1	86			3
	Indonesia	100								1																						2					1		1		87		3
	South Africa	100								1													1									1							1			90	2
	Rest of the World	100	1	2				1	4	6	1		2	3		2					2	3	7		1	1	2	2		1		22		1	2		8	3	14	5	1		

Note:darker shading shows higher shares percentages of foreign value added; shares below 1% are not represented. 1. Rest of the World: domestic value added is not available.

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

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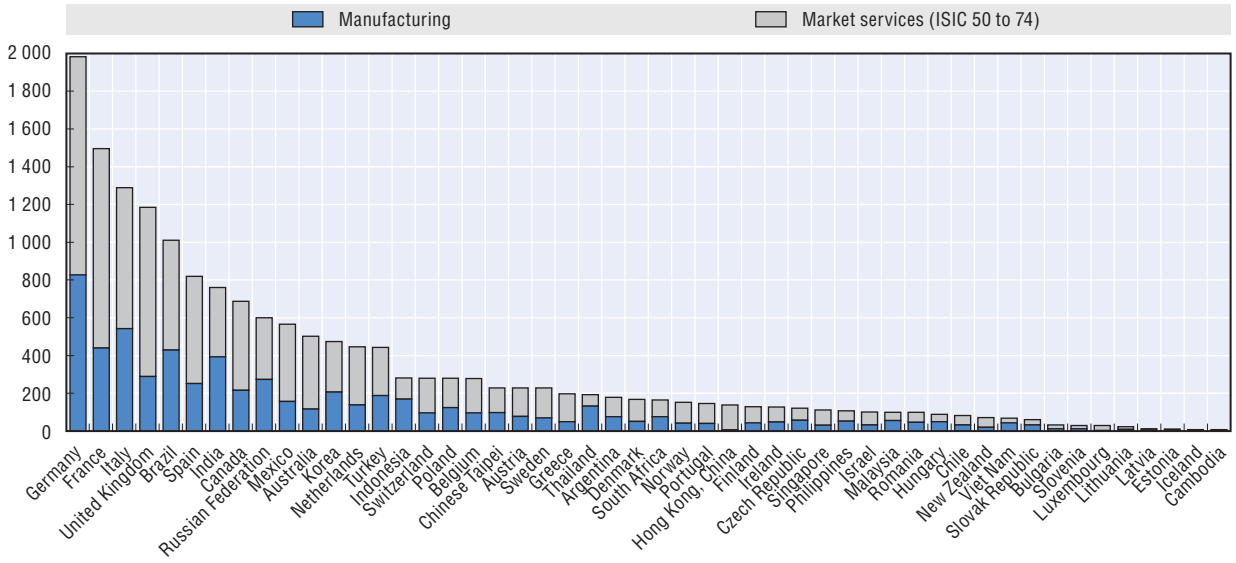
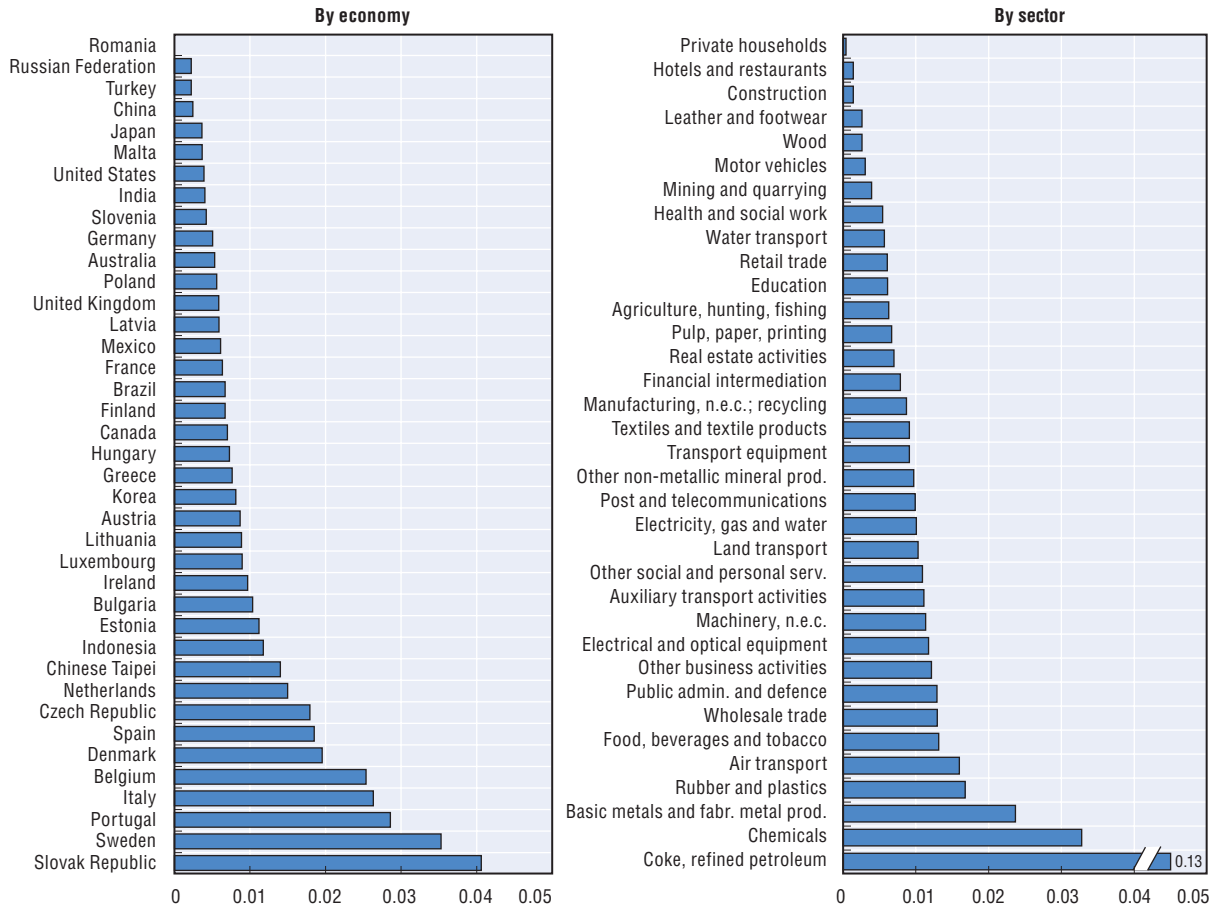
Annex 6.A2
GVC income, manufacturing and market services, 2009, USD billions



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/10.1787/888932835100*

Annex 6.A3
Dissimilarity of RCA measures in gross and value-added terms by country and industry (2009)



Note: Indicator is (1 minus Spearman Coefficient) between Gross Exports and Value Added.

Source: Calculations based on World Input-Output Database.

StatLink http://dx.doi.org/10.1787/888932835119

Annex 6.A4
Description of data and sample – econometric model

Economies: Austria, Germany, Netherlands, Canada, China, Belgium, Greece, Poland, United States, India, Bulgaria, Hungary, Portugal, Japan, Ireland, Romania, Korea, Czech Republic, Italy, Slovak Republic, Latin America, Australia, Denmark, Latvia, Slovenia, Brazil, Chinese Taipei, Estonia, Lithuania, Spain, Mexico, Turkey, Finland, Luxembourg, Sweden, Indonesia, France, Malta, United Kingdom, Russian Federation.

Years: 1995-2009.

Industries: ISIC Rev.3 sectors AtB, C, 15t16, 17t18, 19, 20, 21t22, 23, 24, 25, 26, 27t28, 29, 30t33, 34t35, 36t37, E, F, 50, 51, 52, H, 60, 61, 62, 63, 64, J, 70, 71t74, L, M, N, O, P.

Regressors

Domestic demand index: The index is introduced as a control for external economies of scale (capturing factors such as a developed infrastructure, the availability of cheaper inputs, or a history of growth). Domestic demand is calculated as the sum of final demand by households, NGOs and the government (*Source:* WIOD) in a given country-sector-year. The specification is similar to RCAs: Share of the sector in total domestic consumption, relative to the share in total world consumption.

Capital endowment × industry intensity: The impact of capital endowment at the country level is captured conditionally in an interaction term with the industry's capital intensity. Capital endowment is recorded relative to the size of the labour force (capital stock divided by the number of hours worked in the country to take into account part-time employment). Capital intensity is calculated at the industry level as expenditure shares in value added averaged over 15 years. Reference country: United States.

Skilled labour endowment × industry intensity: The impact is captured by an interaction between high-skill intensity at the industry level and abundance of high skills at the country-level. Endowment is measured at the country-level as hours worked by high-skilled workers relative to total hours worked in the economy. High-skill intensity at the industry level is calculated as expenditure shares in total labour compensation averaged over 15 years; Reference country: United States.

Outsourcing index: Intermediate use intensity (intermediates expenditure excluding expenditure for energy as a share of gross output) relative to sectoral average of the same ratio across all countries in the same year.

Offshoring index: Import intensity in intermediate use (share of imported intermediates in total intermediates) relative to sectoral average of the same ratio across all countries in the same year.

*Country × year fixed effects and sector fixed effect*s: Included to capture systematic deviations of RCAs across sectors in a certain country, as well as across countries in certain sectors. A sector might systematically score low RCAs across countries because a single country dominates world production and exports; that asymmetry will be absorbed by the sectoral fixed effect. Similarly, a country's exports might be very little diversified and dominated by few sectors; the average RCAs across sectors will therefore be low, an outcome that will be absorbed by the country fixed effect interacted with year to ensure that variation across time of this structure is suppressed.

Notice that as both the independent and dependent variables are index numbers, normalised for various types of asymmetries, the level of the coefficients in the results is not directly interpretable. Coefficients for the same regressor can nevertheless be compared in an ordinal way between two sets of regressions, adding some insights to the discussion.

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