

Chapter 3

Implications of global value chains for trade policy

This chapter describes the challenges that global value chains (GVCs) present for traditional trade policy and the main trade policy implications of the increased fragmentation of production. It aims to clarify concepts, offer new policy insights, and help policy makers to see new issues that require special attention in a context of global production networks.

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.

Effects of global value chains on trade and trade policy

When value chains are global, countries' trade policies become more interdependent and, perhaps more importantly, have more immediate and more pervasive effects. Of course, this interdependence is nothing new. Managing the consequences for one country of another country's policies has been a central part of trade policy and trade negotiations for a long time. What is new is the degree to which and the ways in which global value chains (GVCs) affect trade policy.

In a simpler world, where goods are entirely or largely produced in a single country, international trade can be viewed as competition between domestic and foreign finished goods with their own national character. Obviously even going back in time this is a rather simplistic view of real-world trade – raw materials imports and intermediate goods have been around for a long time – but the world of manufactures trade was closer to that end of the spectrum in the post-war decades. Countries could put in place barriers to discourage consumers from choosing the finished foreign product and the political economy of trade was essentially a question of opposing the gains from domestic producers sheltered from international competition to the losses of consumers who pay a higher price.

If this scenario ever applied, it certainly does not apply in today's world of offshoring and fragmented production processes. As competition increasingly takes place at the level of tasks rather than sectors (Baldwin, 2006a; Grossman and Rossi-Hansberg, 2008), protectionist policies are more harmful than commonly understood or are even counterproductive. The so-called "domestic" producer in fact depends for its efficiency on imports of goods and services (imports that may themselves incorporate prior inputs from the "domestic" producer). When goods (or services) are "made in the world", countries do not engage in "cradle to grave" production. They have a slice of the action and seek to capture a share of the overall GVC income.

This increased interdependence means much less scope for "national" control of competitiveness. National trade policies have, of course, long taken into account the effect of policies in other markets. High tariffs in a target market suppress the demand for exports. Taxes on imported raw materials increase costs of production, including for export. And long before GVCs emerged in their modern form, policy makers understood (although they could not always act promptly on that understanding) that a tax on imports was a tax on exports. As modern supply chains have vastly intensified the speed and scale of this interdependence, even relatively low tariff and other border costs can have significant knock-on consequences for a supply chain.

Furthermore, domestic producers can be affiliates of foreign-owned firms and domestic firms can have affiliates producing inputs in foreign countries. Foreign direct investment (FDI) therefore affects the welfare analysis of trade policy (Blanchard, 2007; Ornelas and Turner, 2008). As a large share of international trade is intra-firm trade, the income of domestic companies established in foreign countries and of foreign-owned companies located in the domestic economy changes the cost-benefit analysis of trade policy. "Domestic" companies are hit by domestic tariffs through their foreign affiliates so that higher trade barriers translate into lower repatriated earnings and a welfare loss. When countries engage in FDI, the optimal tariffs are lower.

What this greater interdependence means concretely for trade policy is not yet clear. Some take the view that GVCs may simply provide new arguments in favour of trade liberalisation, preferably multilateral and uniform across products. However, new issues or old issues may require a different treatment. For example, what are the interactions

between unilateral, regional and multilateral liberalisation when one country's producers depend on trade policies of a succession of countries, down and up the value chain? Is there a case to revisit the old debate on trade creation versus trade diversion in preferential trade agreements, taking into account the conditions under which they help or hurt the expansion of global production networks?

To address these questions, this chapter first discusses how the impact of tariffs has changed with the rising prevalence of GVCs. It then provides an overview of issues related to non-tariff barriers at all stages of the value chain. There follows an analysis of the role of trade agreements in fostering integration in global production networks, and the relative benefits of unilateral, regional and multilateral liberalisation. A final section describes some policy implications.

The impact of tariff barriers on GVCs

A value chain perspective suggests, first, that tariffs still do (and tariff liberalisation still does) matter overall. Although nominal protection rates have been considerably reduced, the effects of a given tariff on competitiveness are compounded in GVCs, hurting both exporters and importers. The way in which tariffs and other protective measures at the border affect value chains needs to be taken into account in policy making and negotiations.

GVCs magnify the effects of protectionist measures

Since the post-war period, tariffs on manufactures have been sharply reduced through successive rounds of multilateral negotiations, regional agreements and autonomous liberalisation. The average applied tariff on manufactured goods was as low as 2.6% for WTO members in 2010.¹ This liberalisation has undeniably eroded the importance of tariff protection worldwide, but it should not lead to the conclusion that tariffs on manufactures have ceased to matter.

That conclusion might be more plausible if trade consisted of nationally produced finished goods crossing a border once for consumption abroad. In GVCs, however, goods are traded across borders many times as intermediates and then as final products. What might appear as a relatively “small” tariff adds up if it is applied several times in a production process (Yi, 2010). The costs of trade barriers are magnified when goods cross borders several times (Box 3.1). Traded intermediate inputs incur tariffs and transport costs every time they are shipped to another country for further processing. The cumulative effect of tariffs can significantly raise prices by the time the finished good reaches final consumers, thereby reducing demand and affecting production and investment at all stages of the value chain.

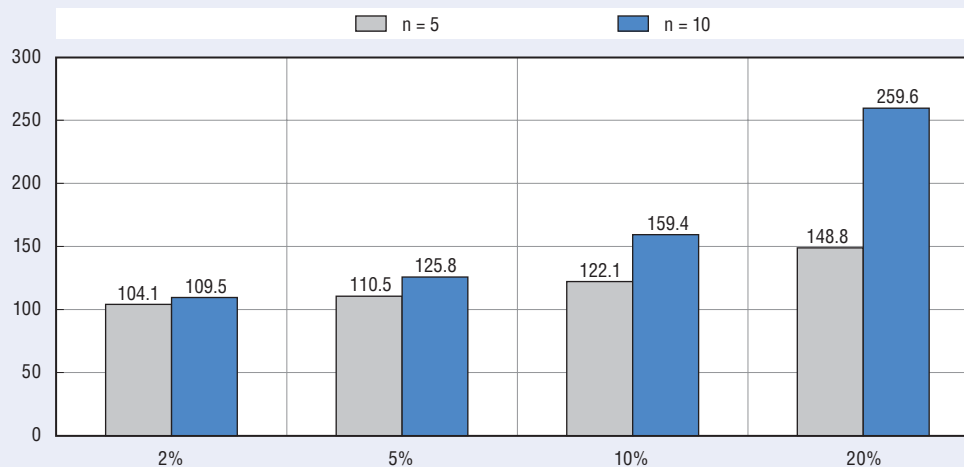
Furthermore, the magnification effect is intensified because tariffs are levied on the gross value of imported goods, rather than on value added. If foreign content accounts for a large fraction of the value of a good, even small tariffs have a sizeable impact on costs. For instance, a vertical production chain in which inputs produced in country A are assembled in country B and re-exported for consumption in A can be discouraged by what might be casually assumed to be a “low” tariff on final goods, even if B has a comparative advantage in assembly. In this example, the tariff is applied to the full value of country A's imports – including previously incurred trade costs – even though most of their value added originates in country A. Multiple border crossings therefore amplify the effect of tariffs on trade flows, so that even small nominal tariff rates can discourage foreign outsourcing (Yi, 2003) and the development of within-firm vertical production networks (Hanson et al., 2005).²

Box 3.1. Quantifying the tariff amplification effect

There are two sources of tariff amplification in GVCs: multiple border crossings and the discrepancy between import value and value added in the last country. Suppose, for example, that a good has value added 100, produced in n distinct stages, each of which takes place in a different country (the last production stage, e.g. marketing and distribution, is located in the final destination country). Also suppose each stage makes an equal contribution to value added and a uniform tariff is levied at every border.

The figure below shows how the final price of the product varies depending on the number of stages and the value of the tariff. In a highly fragmented production process ($n=10$), seemingly “small” tariffs add up to a high cost: a 5% tariff leads to a 25% increase in the price of the final good – while a 20% tariff would increase the same price by 160%. The larger the number of countries in the value chain, the more the cost of tariffs is compounded. For a 10% tariff, it increases from 22% of value added for five stages to 60% for ten stages.

Tariff amplification due to multiple border crossings: An example

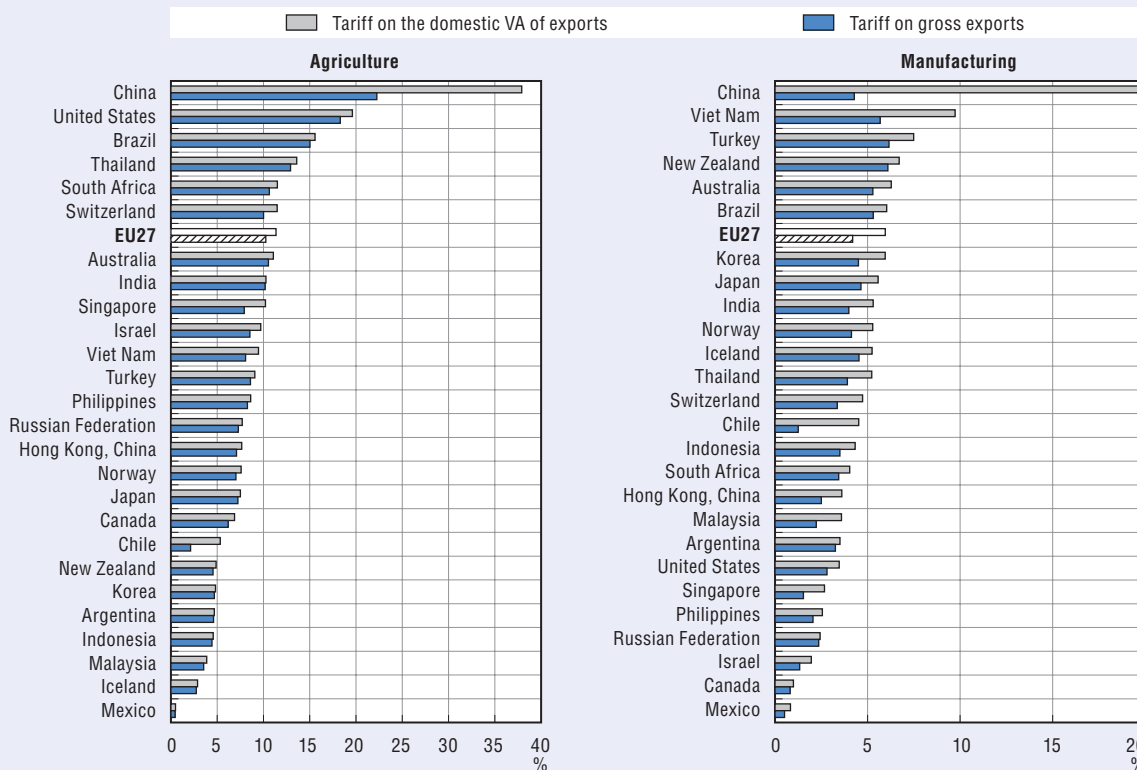


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The second source of amplification is the fact that in GVCs, exports often embody a significant share of foreign value added. For a single border crossing at a given point in the value chain, the value-added tariff rate faced by a country’s exporters can be defined as the nominal tariff divided by the exporter’s share of domestic content (e.g. if the nominal tariff is 5% but the exporter only contributed 20% of total value added, the value-added tariff is 25%). A low nominal tariff can translate into a high value-added tariff if imported inputs account for a large share of value added.

The following figure compares nominal tariffs on gross exports and tariffs on domestic value added, following the methodology of Koopman et al. (2010). It reveals that nominal tariff rates provide an incomplete picture of tariff barriers: taking the foreign content of exports into account significantly raises the extent of measured protection, especially in emerging economies. For instance, the average tariff rate on the domestic value added of manufacturing exports is 19% in the People’s Republic of China, 10% in Viet Nam and 5% in Chile, while the corresponding gross tariffs are 4%, 6% and 1%, respectively. In agriculture, the share of domestic content is often larger but effective tariffs can be high as the pace of nominal tariff liberalisation in this sector has been slower. These calculations confirm that the cumulative impact of small tariffs on the chain of inputs can lead to non-negligible costs for firms and consumers.

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Box 3.1. Quantifying the tariff amplification effect (continued)**Tariff amplification from foreign content in exports, 2009**

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Note: 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.

Source: OECD ICIO and UN TRAINS. Applied *ad valorem* equivalent tariffs, weighted by the share of each sector and destination market in the country's agricultural or manufacturing exports.

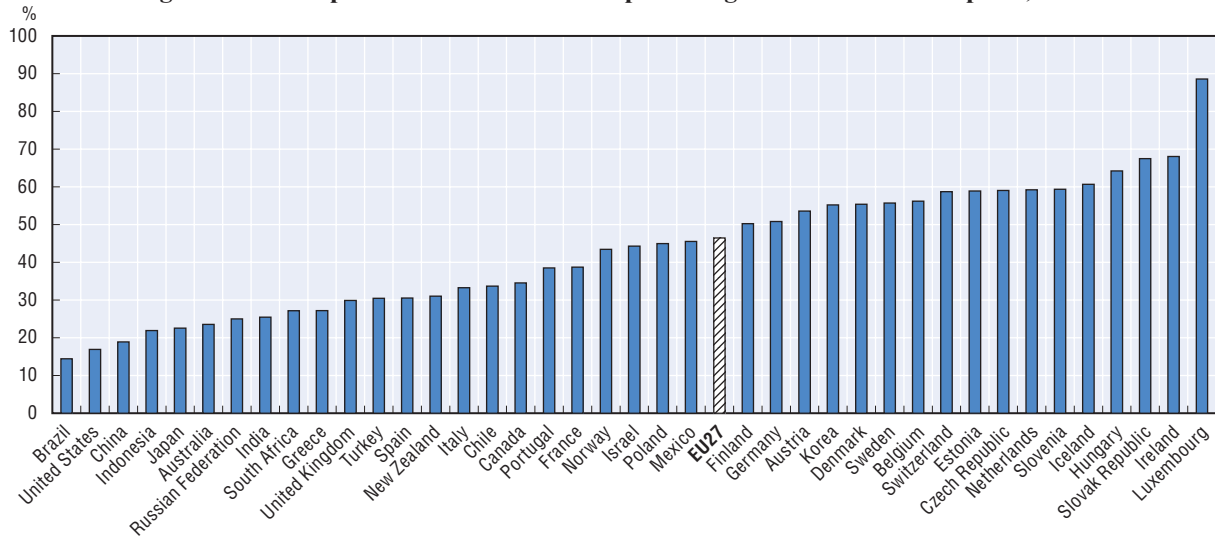
This effect not only concerns tariffs, it applies to all trade costs incurred at every border. These include the costs of non-tariff measures such as fees and delays for inspections and customs clearance. Goods traded many times along the value chain are subject to these costs at every border crossing, with potentially large cumulative effects. As nominal tariff rates decline, the relative importance of non-tariff border costs in GVCs has risen. The benefits of trade facilitation policies to curb such costs and delays are discussed below.

A country's barriers matter for competitiveness

A value chain perspective supports the view that a country's own barriers are costly not only for its consumers but also for its producers and exporters. There may be nothing inherently new in the recognition that a country's capacity to compete in international markets can be diminished as much – or more – by its own cost-raising import barriers as by the tariffs in the target market. For instance, Mostashari (2011) showed that the expansion of developing countries' exports to the United States in the late 20th century is due more to their own trade liberalisations than to cuts in US import duties. But GVCs appear to have intensified the relevance of that recognition, and it is probably also the

case that the relative importance of a country's cost-raising measures has increased. As Figure 3.1 shows, a significant share of imported intermediate inputs is re-exported after being incorporated in the production of goods and services. This share is 46% on average in OECD members and reaches much higher levels in small countries, and shows exporters' need for imports. In a globalised world, export competitiveness hinges more than ever on obtaining high-quality inputs from the most efficient source, and raising import costs through tariffs or non-tariff barriers blunts a country's competitive edge.

Figure 3.1. Re-exported intermediates as a percentage of intermediate imports, 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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This effect is more intense further downstream in the value chain. Downstream countries (processing and assembly activities) have a larger share of foreign value added embedded in their exports than upstream countries (R&D and design services, but also raw materials). Upstream countries have more indirect exports and value added returning home after transiting through third countries (Koopman et al., 2012). It follows that the further downstream the production stage, the more the exporter's own trade barriers matter for its competitiveness. However, the further upstream a country is located in the value chain, the more imposing tariffs on semi-finished or finished products risks hurting indirectly its producers that contributed value added to imported goods.

This issue has been addressed through the proliferation of export processing zones (EPZs) and the development of duty drawback schemes, which exempt exporting firms from paying import duties on their inputs (Engman et al., 2007). EPZs are a means to promote international trade and employment in countries seeking to participate in GVCs (Chapter 5). They can be a useful step towards country-wide policies of trade and investment liberalisation, regulatory transparency and infrastructure improvement. However, the benefits are larger if favourable conditions for exporters and foreign investors are not durably limited to specific geographic zones. Almost by definition, the benefits of EPZs only concern a fraction of firms with a strong export orientation. They do not extend to firms in other geographical areas or that sell primarily on their domestic market but wish to expand their activity as suppliers for foreign companies. Duty drawbacks are more readily available to all exporters but often have cumbersome documentation and audit requirements (to prove which imported inputs went into the

production of which exported goods). The process may be so complicated for firms selling both in their home market and abroad that they choose to forego this option. More generally, input tariffs raise not only the price of imported intermediates, but also those of domestically produced inputs. As a result of the tariffs imposed on their foreign competitors, domestic producers are likely to adjust their mark-ups upwards. EPZ exemptions or duty drawbacks do not make up for these higher costs for firms purchasing domestic inputs along with foreign ones.

For these reasons, some countries are taking the bolder step of removing barriers on all inputs and capital goods in order to increase their participation in GVCs. While removing tariffs on inputs and maintaining them unchanged on final goods was seen in the past as an essentially protectionist strategy of tariff escalation for “vertical” product competition, the situation is different in a world where, for most manufacturing products, tariffs are very low and where competition lies in the production of and access to specialised inputs. Removing tariffs on intermediate goods lowers the costs and enhances the profitability of domestic firms sourcing inputs from both domestic and foreign suppliers. The unilateral removal by Canada of tariffs on manufacturing inputs and equipment in 2010 is a good example, yet needing further investigation as regards the impact of the tariff elimination on productivity and employment (Box 3.2).

Tariffs are not the only trade policy instruments which, beyond their direct effect on the targeted exporters and importers, can have knock-on effects in other sectors or countries through their GVC linkages. One example is export restrictions. Some countries impose export quotas or export taxes on specific agricultural products and/or raw materials. Such restrictions do not only hurt the targeted exporters. They hurt all downstream sectors abroad when the country imposing the restriction accounts for a significant share of global supply. In particular, the production of some strategic metals and rare earths used in a range of technologically sophisticated products is concentrated in a few countries whose export restrictions have a large impact on world supply and world prices (Korinek and Kim, 2010). For these products, export taxes and quotas can disrupt production and raise costs throughout entire GVCs. The result is more costly semi-processed goods or final imports in all countries, including the ones that impose the export restriction. Export restrictions designed to protect domestic consumers and promote domestic downstream industries may hurt both if intermediate production stages are performed abroad.

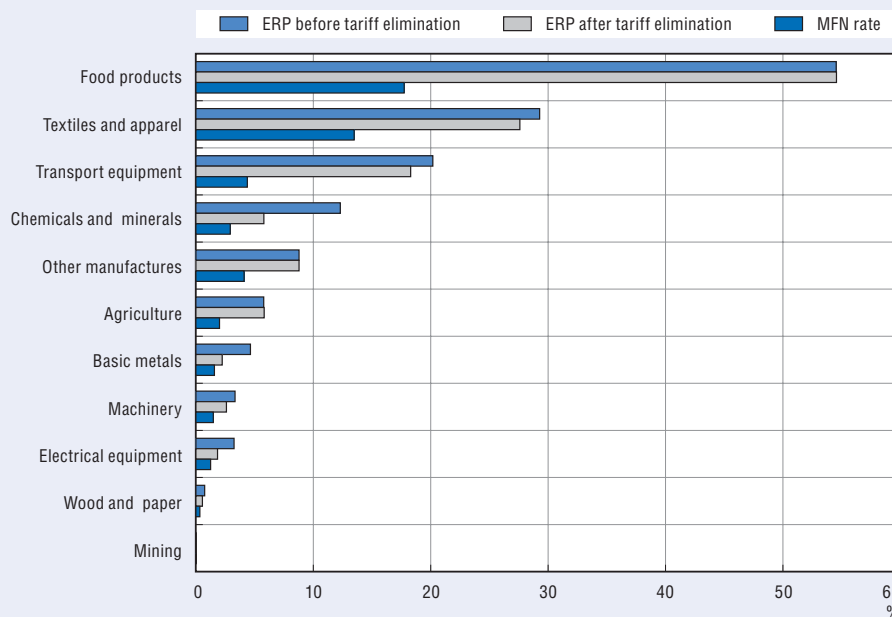
Another example of potentially unintended effects of trade policy on domestic producers can be found in an unbalanced use of antidumping and countervailing measures (National Board of Trade, 2012). As such, the GVC approach does not question the legitimacy of trade defence instruments when domestic firms are hurt by unfair competition, in order to revert to a level playing-field. Yet, most antidumping cases are about intermediate inputs (Vandenbussche and Viegelahn, 2011). For example, in India, which had the highest number of antidumping initiations between 2005 and 2011, more than 90% of cases dealt with intermediate goods. Using firm-level data, Vandenbussche and Viegelahn (2012) show that input-using firms in India are directly affected and tend to change their mix of inputs to avoid the goods affected by antidumping measures. As a result, domestic producers of inputs do not really benefit from these measures and the competitiveness of input-using firms is diminished. Moreover, a value-added perspective on trade flows suggests that a certain percentage of domestic value added may be incorporated in “foreign” products targeted by antidumping or countervailing measures. Thus, a comprehensive assessment of the desirability of such measures, on a case-by-case basis, would take into account both the need to restore fair conditions for competition and the expected impact of the measure on all domestic producers involved in a given value chain.³

Box 3.2. Removing input tariffs to improve export competitiveness in Canada


In March 2010, Canada unilaterally decided to eliminate tariffs on a broad range of manufacturing inputs, machinery and equipment. The decision was part of an action plan in favour of jobs and growth. The elimination covers 1 541 tariffs, most of them removed immediately and 381 gradually until 2015. At the end of this period, Canada will be the first G20 economy in which manufacturers operate without tariffs on inputs.

While it is too recent to analyse the impact on the sourcing strategies of firms and Canada's imports of intermediate inputs, the OECD ICIO model can be used to calculate the change in "effective rates of protection" across multiple borders, as a result of changes in tariffs (following the approach proposed by Diakantoni and Escaith, 2012).¹ The effective rate of protection (ERP) calculates the comprehensive effects of a country's trade policy on each sector. It takes into account both tariffs on output, which protect the sector, and tariffs on inputs which are paid by the sector, as well as how much imported inputs are used. Tariffs on an input used by a given downstream industry raise its production costs and can therefore be considered as negative protection for that industry. In the context of GVCs, ERPs provide a useful tool for analysing the cumulative impact of tariffs on different stages of production. In particular they reveal the extent to which an industry is affected by tariffs on its imported intermediate inputs.

ERPs in Canada before and after the elimination of input tariffs (%)



Source: OECD Inter-Country Input-Output (ICIO) and UN TRAINS Database.

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Prior to the elimination of tariffs in Canada, there were wide variations in the extent of protection awarded to different manufacturing industries: from small negative ERP rates in mining to 54% in food products (see figure above). Interestingly, these differences are not only explained by nominal rates. Industries that contribute a small share of the value of their output – such as transport equipment or chemicals and minerals – have relatively high ERPs despite low nominal tariffs.

As Canada switches to duty-free imports of manufacturing inputs, most sectors will have lower effective protection, but there are important sectoral differences. In manufacturing sectors, the largest declines in ERPs take place in chemicals and minerals. The output of this industry largely consists of intermediate products used in further stages of production; the new policy therefore exposes it more intensely to the competition of imported inputs.² Effective protection on textiles, vehicles and basic metals drops less. However, agriculture and food products are expected to have very slightly higher ERPs. These sectors are closer to final demand and do not compete directly with imported intermediates, but benefit from lower tariffs on their inputs.

Beyond the impact of the reform on the openness of various sectors, its success will hinge on the extent to which it improves the competitiveness of downstream sectors and creates jobs. Estimates of the impact of the elimination of tariffs on productivity and employment are not yet available, but the initiative sets an interesting precedent and will warrant evaluation of its effects in the future. Broadly speaking, there are several sources of potential gains for Canada and its partners:

Box 3.2. Removing input tariffs to improve export competitiveness in Canada (continued)

- The immediate effect of the tariff removal is to allow Canadian firms to import cheaper and better-quality intermediate inputs.³ Prices will fall both on imported and domestically sourced intermediates, as domestic producers of inputs are expected to adjust their prices in a more competitive environment and pass on their cost savings on their own inputs. Access to better-quality inputs also facilitates quality upgrading, reduces the number of defects and improves the efficiency of the production process.
- In the long run, productivity gains will be larger as firms adjust their production structure to the new tariff environment. As long as there is some substitutability between inputs, Canadian firms should rely more on the cheaper imported intermediates in the duty-free categories. Such reallocations will raise the share of tariff-free inputs in the production structure and amplify the gains induced by the policy for firms outsourcing inputs.
- The expected gains can be further boosted by a rise in foreign investment in Canada. The absence of tariffs on imported inputs is likely to encourage firms to locate downstream production sites in Canada to enjoy the cost savings of importing intermediates from non-NAFTA countries. It could become more profitable to open production facilities in Canada to serve not only the domestic market but also the rest of North America.
- Canada will not be the only one to benefit from the policy change. Its partner countries will also gain. On the one hand, foreign input producers supplying Canadian firms directly or indirectly will see their market access increase. On the other hand, the cost savings of the tariff removal will be transmitted down the value chain to foreign firms purchasing intermediate goods from Canadian suppliers (for instance US car manufacturers purchasing basic metal products from Canada) and raise their productivity.

MFN = most favoured nation.

1. OECD data on global input-output (I-O) linkages prior to the reform in 2005 are used, assuming that the production structure stays the same after the policy change (at least in the short run) in order to isolate changes in ERPs due to tariff policy. Canadian tariffs applied to each partner country pre-2010 are drawn from the WTO integrated database and aggregated at the ISIC Rev.3 2-digit level. Owing to lack of data on which imports transit through the Winnipeg free trade zone (Canada's only EPZ), this analysis does not reflect duty deferrals and exemptions in this specific regime.

2. However, as the level of aggregation of the I/O data does not allow for distinguishing varieties at the product level, the calculation is likely to overstate the extent of direct competition between domestic and foreign products.

3. On the contribution of foreign intermediates to productivity and growth see, for example, Amiti and Konings (2007), Miroudot et al. (2009), Shepherd and Stone (2011) and Feng *et al.* (2012).

Tariff policies are more than ever interdependent

Because GVCs lead to greater interdependence of countries and sectors, trade barriers in a given industry affect not only the industry itself but also other sectors and partners to which it is tied through backward and forward linkages. Imposing tariffs on a foreign final product affects the whole chain of suppliers, abroad and at home. In particular, services embodied in goods indirectly pay duties and bear the cost of protectionist policies. Goods and services are intertwined in global production networks and an important policy implication is that barriers in one industry affect others.

Greater interdependence also means more competition between countries to attract foreign buyers and investors, and tariffs are one source of competitive edge. When firms decide on the location of production stages, the relative as well as the absolute level of tariffs matter. When production is fragmented, the choice of where to source inputs is very sensitive to variations in prices and trade costs. The question is not only how high tariffs are but also how they compare with those of other countries. This issue has become increasingly relevant as “trade in tasks” has gained over trade in final goods. Since becoming a successful exporter no longer requires building or replicating an entire value chain, GVCs offer developing countries new opportunities to enter global markets as

components suppliers but also imply fiercer competition to supply foreign firms. The openness of trade policies is a critical component of this competition. The sensitivity of location choices to small differences in trade and transactions costs is also affected by agglomeration effects, such as knowledge spillovers or local supply linkages (FAITC, 2011, Chapter 4).

On a related topic, the establishment of vertical production networks involves long-term contractual relationships with suppliers or fixed costs for setting up plants abroad. The benefits of vertical specialisation therefore hinge on countries' ability to offer foreign firms long-term stability. The importance of a predictable trade regime has risen as trade in GVCs involves more foreign direct investment (FDI) and more relationship-specific investments than trade in final goods. Switching to a different trade partner when the policy environment changes will be more costly, making downstream foreign firms more cautious about where they invest in the first place. Countries able to guarantee not only that tariffs and non-tariff barriers are low, but also that they will remain so in the foreseeable future, are more reliable partners in GVCs and more attractive locations for domestic and foreign investment. Besides the relative level of tariffs, the predictability of the trade policy environment – in absolute terms and relative to neighbouring or similar countries – is therefore crucial for a successful insertion into GVCs.

Non-tariff trade costs along the value chain

This section reviews the types of non-tariff trade costs that affect producers along the value chain and the specific concerns they raise for GVCs. Non-tariff measures (NTMs) encompass a variety of trade impediments and regulations, such as administrative customs procedures, technical regulations and health or safety standards, quantitative restrictions such as quotas and voluntary export restraints, and subsidies. In a broader sense, domestic regulations and limitations on foreign investment that affect the provision of services are also considered non-tariff barriers to trade. These are particularly relevant in global production networks, as the efficient provision of services facilitates cross-border trade in components and final goods. Inefficiencies or lack of competition in key services sectors can act as bottlenecks and effectively prevent successful participation in GVCs. More broadly, trade barriers are found not only in the letter of non-tariff restrictions but also in their implementation. A lack of transparency in the application of trade rules and other procedural obstacles can severely impede trade and compound the impact of NTMs.

Border bottlenecks: Transport and administrative procedures

Fast and efficient administrative procedures at the border are essential to the smooth operation of value chains and demonstrate the importance of trade facilitation measures in boosting competitiveness. Different types of costs in terms of customs and port procedures or clearing processes raise prices for exporters, especially when inputs are traded many times. Like tariffs, administrative costs and delays incurred when intermediate goods cross borders are cumulative in GVCs and act as constraints on domestic exporters that rely on world-class intermediate inputs. Leaving aside inspection and certification requirements related to technical and safety standards, which are discussed below, logistical and administrative procedures, both at the point of departure and in the destination country, slow down the workings of global supply chains (Table 3.1).

Logistical operations rely on the efficiency of port infrastructure but also on the regulatory framework in the destination country. Direct consignment requirements (which prevent goods from being shipped through third countries), requirements to pass through a specified port of customs, and restrictive air, sea or land transport regulations add to exporters' shipping costs. Behind the border, the quality of road infrastructure and the competitiveness of trucking services come into play. Like administrative procedures, technical measures related to customs formalities, including the determination of applicable duties and import clearance, can be unnecessarily cumbersome. Costs incurred for transport and customs procedures are, like tariffs, magnified in GVCs, as goods cross borders many times. The cumulative effect of such barriers raises costs not only in monetary terms but also in terms of delays in delivery. The time required to clear customs and comply with various procedures at the border also forces firms to maintain larger inventories and incur opportunity costs in terms of delayed sales. Exporters are also subject to depreciation costs on immobilised goods stemming from rapid technological obsolescence (e.g. consumer electronics) or physical loss (e.g. fresh agricultural produce). These costs have been estimated as equivalent to a tariff of 0.6% to 2.1% of the value of imported products per day of delay. Trade in components is the most time-sensitive: the cost of an extra day is 60% higher for importers of intermediate goods than for importers of final goods (Hummels and Schaur, 2012).

Table 3.1. Typology of customs and port procedures

	Logistical procedures	Administrative procedures
Departure country	Warehousing	Pre-shipment inspections
	Yard procedures	Licensing or permit requirements to export
	Loading ships	Export tax payment
Destination country	Unloading containers	Inspections for security
	Dispatching the cargo	Inspections for drug enforcement
	Storage of containers	Documentation requirements
Customs	Clearance and release of imports	Determination of applicable duties
		Physical inspections for customs
		Payment of fees and charges

Source: Adapted from Ferrantino (2012).

Uncertainty adds an additional cost to lengthy customs procedures or inefficient border infrastructures. Exporting firms' uncertainty regarding demand is compounded in GVCs. Firms located upstream in the production chain and remote from final demand may not be able to respond to increases in final demand in a timely way if their goods wait days (or weeks) at customs at each subsequent manufacturing stage. For their part, downstream firms may not be able to reduce their orders when final demand contracts if delays force them to place orders early with foreign suppliers. More generally, when shipments are delayed at every border crossing, exporters have to choose the quantity to produce and the precise characteristics of their products before they know whether they are adapted to the destination market. When components travel through several countries in such situations, just-in-time production or fast reactivity to demand shifts are not feasible. Furthermore, upstream firms in GVCs may not know how much time is needed for goods to comply with required procedures and may have difficulties timing their deliveries to downstream firms, with the risk of a slowdown or forced idleness in later production stages. Such risks can only be averted by carrying higher inventories at each production stage, which is costly and inefficient and ties up working capital.

Streamlining import and export procedures and investing in more efficient port and storage equipment takes time and resources in countries seeking to improve access to GVCs. Yet there are ways to start without jeopardising security and customs collection objectives. OECD analysis reveals that the most significant reductions in trade costs for high-income countries are achieved by simplifying procedures through single windows and pre-arrival processing; providing advance rulings on goods classification and applicable duties; and allowing exporters to find information on regulations and complete all procedures on line (Moisé et al., 2011). Together, such measures can result in a reduction of over 10% of trade costs in OECD countries (Table 3.2). In developing countries, the most effective trade facilitation measures relate to improving transparency and information availability, and harmonising and simplifying documents; while more expensive measures such as single windows could be implemented at a later stage.

Trade facilitation measures are important for making GVCs accessible to small and medium-sized enterprises (SMEs). Obtaining information about various countries' customs formalities, inspection requirements and administrative procedures is a particular hurdle for small firms entering new markets. Complying with the documentation requirements and testing and certification procedures entails high fixed costs; these disproportionately burden SMEs that import and export small amounts. The fixed costs of participating in GVCs can be reduced by making information readily available on line and introducing single windows and simplified clearance procedures for small shipments. To promote the participation of SMEs in GVCs, improving the efficiency of border crossings should be a priority.

Table 3.2. Trade facilitating measures and trade costs in manufacturing

Potential contribution to the reduction of trade costs	
Simplification of customs procedures	5.4%
Advance rulings: share, delays and transparency	3.7%
Automation of customs formalities	2.7%
Fees: level and transparency	1.7%
Border agency external cooperation	1.2%
Number of documents and acceptance of copies	0.2%
Total	14.9%

Source: Moisé et al. (2011); OECD countries.

Trade facilitation measures can be undertaken unilaterally, with potentially large benefits in terms of exports and job growth for the country investing in more efficient border procedures. Through such measures, domestic firms and local foreign affiliates gain better, more reliable access to high-quality foreign inputs, can raise their productivity by more efficient timing of production, and can export with fewer hurdles. Measures aimed at alleviating administrative burdens and encouraging processing trade can help SMEs take full advantage of GVCs. Inward and outward processing trade regimes and duty drawbacks, in particular, allow exporting firms to save not only on tariffs but also on the costs and delays involved in complying with customs procedures. However, such schemes are usually limited in scale and are only partial substitutes for full-fledged trade facilitation measures, as qualification may entail heavy documentation requirements and such schemes do not benefit firms that import intermediate inputs but sell to their domestic market.

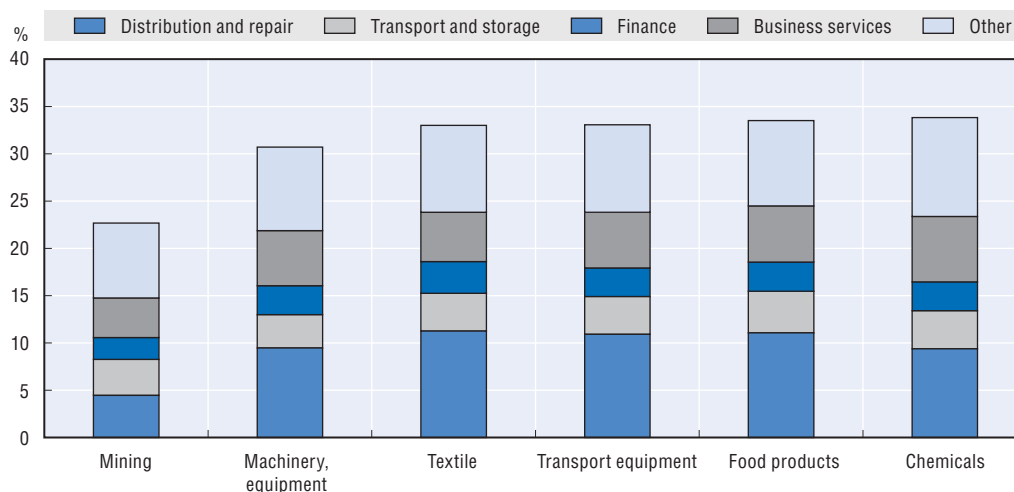
While the benefits for consumers and local firms provide a rationale for unilateral trade facilitation reforms, further progress can be made through concerted efforts at the regional or multilateral level. Firms involved in GVCs are affected not only by costs and delays at their own borders but also by those between third countries upstream and downstream that may disrupt the value chain or significantly raise their costs of operation. If a large number of countries addressed such procedural obstacles together, value chains would be globally more efficient. It would also mean, for countries undertaking costly investments to improve their customs and port infrastructure, that their current or potential trade partners would do the same, giving firms in every country opportunities to participate more in GVCs.

Inefficiencies in services markets

Costs along the value chain are influenced by the quality of the services involved in the logistics chain. Services that complement production span a wide spectrum: most prominent are transport and warehousing, but banking and insurance, business services, professional services, and communication services are supplied at every stage of production. Services involved at both ends of the value chain include R&D and design in the conception stage, distribution networks, advertising and marketing services, or repair and maintenance facilities at the end of the chain.

All together, the value created directly and indirectly by services as intermediate inputs represents over 30% of the total value added in manufactured goods (Figure 3.2). These numbers constitute a lower bound for the contribution of services to manufacturing output, as they only count traded services; services such as R&D are often performed in house. In GVCs, services play a crucial role as “enablers” of trade in goods and act to coordinate production stages and move components efficiently across borders. Although services account for a minor share of world trade in recorded gross flows, their share in value-added flows is significantly higher: around 50% of the value of exports in OECD countries is services value added, and it is to a large extent embodied in gross manufacturing exports (see Figure 2.5 in Chapter 2).

Figure 3.2. Services share of value added in manufacturing exports, world, 2009



Note: The share of distribution does not include distribution services for final goods.

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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While some of the costs associated with services inputs (in particular transport costs) depend on the quality of infrastructure, facilitating trade in the value chain also requires efficient services markets. Pro-competitive domestic regulations and the liberalisation of services ensure the efficient functioning of the logistics chain. The literature distinguishes between restrictive regulations that discriminate against foreign providers or that apply equally to domestic and foreign firms, and between regulations affecting entry or operations⁴ (Francois and Hoekman, 2010). On the latter, what matters for regulatory reform is to identify which limitations are motivated by efficiency or equity concerns (such as correcting a negative externality) and which are purely rent-creating.⁵ Barriers to entry and discriminatory measures are rarely justified as a response to efficiency concerns and only restrict competition. Such measures can create inefficiencies in key complementary services and disrupt GVCs that rely on them.

An implication is that gains from trade in GVCs are magnified if the development of global production networks goes hand-in-hand with a liberalisation of services trade. With increased openness, more efficient infrastructure services improve the reliability of import and export flows and thus promote participation in GVCs. A revealing example comes from the transport sector; Deardoff (2001a) identifies several sources of efficiency gains from the cross-border provision of services. Beyond the standard welfare-enhancing forces of comparative advantage, economies of scale and reduced fixed costs, there are gains to be realised from a reduction of border frictions and regulatory costs. These gains are achieved by harmonising regulations applying to domestic and foreign providers, adopting similar procedures and equipment in different countries, and removing inefficient delays (e.g. unloading and reloading trucks at the border). The smooth provision of transport services then lowers the cost of internationally sourced inputs for a wide range of industries.

Similar benefits for export competitiveness arise from the increased openness of business services to trade and FDI. The gains in this area primarily accrue to technology-intensive industries such as machinery, motor vehicles, chemicals and electric equipment (Francois and Woerz, 2008). More open and more competitive telecommunications sectors would also increase the productivity and competitiveness of manufacturing firms, by improving Internet penetration rates and encouraging investments in better information technology (IT) infrastructure. At the same time, they would favour the development of services value chains in sectors such as computer services, finance or tourism.

Distribution services provide another key link in GVCs. The literature identifies “buyer-driven” GVCs for which global retailers organise the supply chain (Gereffi, 1994). Such GVCs are particularly relevant for small-scale agricultural producers, for whom finding international partners, obtaining information about foreign markets and complying with standards and procedures to import and export are among the main obstacles to participation in GVCs. Global retailers are often the most accessible means of entering global markets for these producers as they typically provide assistance to their suppliers on most or all of these concerns. However, the efficiency and competitiveness of the retail and wholesale sector can be hampered by regulatory barriers to entry and foreign investment (Reisman and Vu, 2012). These behind-the-border barriers reduce the gains from trade and fragmentation for agricultural and manufacturing suppliers further up the value chain.

Diversity of standards⁶

In the past decades, technical barriers have largely become the new face of trade policy. With quotas eliminated and tariffs reduced, one of companies' main challenges for entering new markets is meeting mandatory standards for products or processes, especially for exports to high-income countries. In many respects, compliance is more challenging and costly in GVCs as it requires co-ordination of all stages of the value chain. Efforts to address the complexity, and above all the diversity, of standards would significantly enhance the ability of SMEs to participate in GVCs.

Technical barriers to trade (TBT) affect around 30% of all international trade, and sanitary and phytosanitary measures (SPS) over 60% of agricultural trade (Nicita and Gourdon, 2012). As long as they differ from those of the country of origin and in the absence of mutual recognition agreements, technical norms and sanitary standards require exporters to adapt their production processes, provide additional documentation and obtain accreditation. The costs of product certification, product testing and inspection, as well as specific packaging and labelling requirements, can substantially alter the benefits of entering foreign markets for small-scale exporters.

It is worth noting that the expansion of GVCs may well strengthen the case for stringent standards. Although government-imposed standards may conceal protectionist policies, they are often responses to legitimate concerns about consumer health and safety, the environment, or other quality issues. International production networks can increase the information asymmetries that justify adopting safety and quality standards in the first place, for instance by making it harder to track the origin of a defective product and issue a recall. Setting technical requirements and performance measures then implies a trade-off between better consumer protection and restrictions on trade (Fischer and Serra, 2000).

Not all quality standards necessarily involve such a choice. More stringent regulations can also expand trade by boosting consumer confidence in foreign-made products. The net effect of standards on imports is therefore ambiguous, and empirical studies on the effects of TBT/SPS on trade have yielded mixed results depending on the sector and measures involved (Li and Beghin, 2012). Trade in agricultural and food products seems to be negatively affected by standards, while the effect on manufacturing trade is small or even positive. Therefore, if harmonised and efficiently implemented, quality and safety standards may facilitate the entry into global networks of some developing country suppliers, especially large-scale producers able to invest to meet international standards, often with assistance from downstream buyers and retailers, and improve their productivity and reliability.

The main obstacle is that public standards are far from harmonised across countries and involve procedures that limit the ability of upstream suppliers to take full advantage of GVCs. Lengthy and opaque certification processes are unambiguously detrimental to trade, as are substantial differences in the standards imposed by the countries involved in the production of a good. For conformity assessment procedures associated with technical regulations, Chen et al. (2006) estimate that a requirement for testing procedures reduces export shares by 9% (mainly for non-manufacturing firms) and difficulties for obtaining information on standards by about 18%, in a sample of developing countries. Such procedures also reduce the number of destinations to which firms export owing to the duplication of fixed costs and diseconomies of scale involved in producing to meet several sets of technical specifications. The lack of consistent requirements on labelling

and packaging across jurisdictions has similar effects. Without harmonisation, standards and certification costs are a major hindrance to trade for producers supplying downstream firms in several countries or serving consumers in several markets (Box 3.3).

Compliance with a diversity of technical standards is particularly burdensome for firms that participate in GVCs. International production networks raise the costs of TBT or SPS measures for exporters because of the nature of fragmented production processes. If upstream suppliers of inputs do not know what the final export market is, downstream firms may incur adaptation costs in later stages. Alternatively, upstream firms may need to tailor production to each country's requirements and thus lose the benefit of economies of scale.

In food supply chains, compliance with SPS measures typically requires a high degree of co-ordination, monitoring and traceability along the value chain. This is a challenge for fragmented production processes. In this respect, it is useful to distinguish between product standards (e.g. maximum chemical residue), which are tested at the level of the final product, and process standards (e.g. hazard analysis and critical control points – HACCP). For firms in GVCs, compliance with the latter is more difficult and costly, as it requires information on production processes and quality management systems at all stages of the supply chain. The costs involved can effectively preclude small firms' participation in global production networks (Kaplinsky, 2010). The trade-restrictive effects of technical barriers in GVCs can also explain why the import coverage ratios of TBT/SPS measures are lower in intermediate-intensive sectors (WTO, 2012).

Box 3.3. Dealing with diverse standards in order to export: The case of Moroccan farms

In their study of the Moroccan citrus and vegetable sectors, Aloui and Kenny (2005) illustrate the difficulties of complying with a variety of standards in GVCs. The value chain is composed of seeds, fertiliser and pesticide suppliers, mechanical equipment suppliers, farmers, packing houses, export intermediaries, import intermediaries and foreign retailers in the European Union and the United States. Exporters must comply with several sets of food safety and quality control standards at the farm and packing-house stage, both public standards in the destination country (HACCP, ISO 9001, national standards in EU countries) and private standards imposed by consortia of large retailers (EurepGAP [now GlobalGAP], BRC). While not legally mandatory the latter are effectively preconditions for serving a market.

While health and food safety standards are essential for consumer protection and should not be considered barriers to trade as such, the study shows the costs of complying with diverse, and sometimes conflicting, standards in an international agri-food value chain. Compliance with each standard requires significant upfront investments and recurring costs estimated to be at least 8% of the total farm-gate cost. Moreover, participation in the GVC that links Moroccan farmers to pesticide suppliers and retailers in the United States and the European Union typically requires compliance with several standards simultaneously, at the grower's level and at the packing-house level. The main concerns of surveyed farmers are the incompatibility of national standards (e.g. different maximum residue limits for the same pesticide in different importing countries and in different years) and the absence of equivalence agreements between certifying bodies (e.g. certified organic farmers cannot be exempted from EurepGAP certification although the former meet more stringent standards).

The variability of foreign quality control standards regarding pesticide residue raises the most issues. Supplying several countries through co-operatives and export intermediaries usually do not know where the final product will be sold prior to harvest yet some pesticides are allowed in the European Union but not in the United States and vice versa. Discrepancies between SPS requirements raise compliance and certification costs and limit economies of scale for small co-operatives and packing houses. Convergence in standards and certification procedures would clearly facilitate the participation of small-scale agricultural producers in GVCs.

It follows that the increase in trade flows in GVCs amplifies the benefits of regulatory convergence. Policies that promote the convergence of standards and certification requirements, through the adoption of international standards (e.g. ISO, Codex Alimentarius), and mutual recognition agreements alleviate the burden of compliance. They help reduce unnecessary duplication of testing and certification procedures. As such, these policies facilitate integration into GVCs. In particular, insofar as they lower the costs of imported inputs without endangering consumer safety, they improve the competitiveness of exporters who source inputs internationally.

The role of trade liberalisation in the expansion of GVCs

The analysis of trade changes when companies fragment their production across countries. Cheaper inputs become a new source of gain from trade, with an impact on comparative advantage (Deardorff, 2001b, 2005). The role of trade agreements does not fundamentally change: they are still useful for reducing barriers to trade and facilitating companies' participation in GVCs. However, the way trade should be liberalised might be different for three reasons.

First, trade policy is not the only policy affecting the expansion of GVCs. The literature on GVCs highlights the role of the trade-investment-competition nexus in trade costs: trade policy should be part of a coherent strategy for dealing with market access in a broad sense. Second, the debate on the relative emphasis on multilateral, regional and unilateral trade liberalisation might take account of the increased interdependence of trade policies. Third, specific issues related to vertical specialisation and trade may need to be taken into account in the next generation of trade agreements.

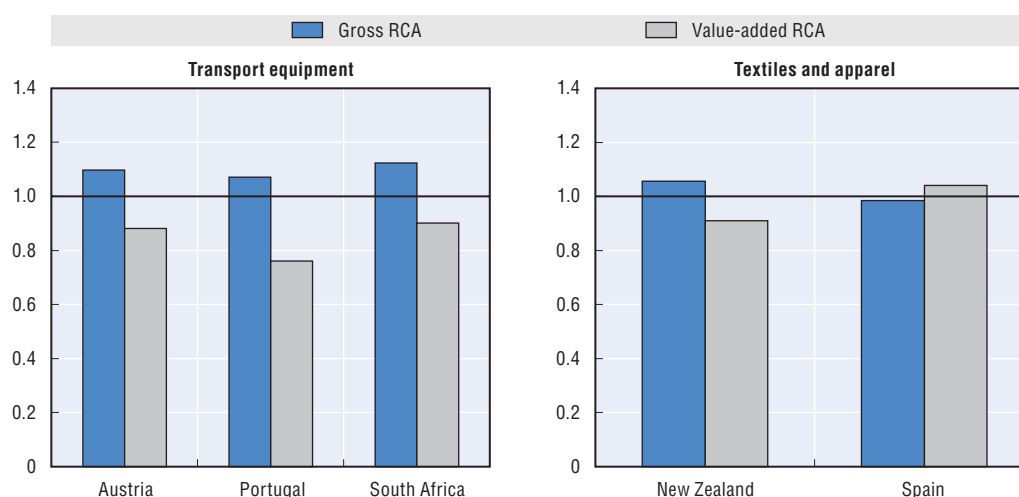
This section first describes what is different for comparative advantage when trade is “vertical” and inputs are traded and then addresses the three main implications for trade agreements in terms of complementary policies, the appropriate level of trade liberalisation and new issues to be considered.

Comparative advantage, trade costs and GVCs

Simply defined, a country has a comparative advantage when it produces a good or a service at a *relative* lower cost. What matters is not the cost of production between, say, country A and country B, but within country A the relative cost of producing good 1 as opposed to good 2 or service 3 (and how it compares with relative costs in country B). When introducing the possibility of trading intermediate inputs, the same logic applies. However, what defines the cost of production is much more complicated than in a world where no trade in intermediates takes place (Deardorff, 2005). The cost of production in A does not depend only on factors of production located in A (e.g. labour costs). It is also a function of the cost of intermediate inputs, a cost that is affected by trade policy: prices of domestic inputs can be raised if imports are made more expensive by trade barriers. Trade patterns therefore become very sensitive to trade costs and comparative advantage is no longer based only on a country's endowment in labour and capital. Prices of intermediate inputs in foreign countries now affect the comparative advantage of the domestic economy.

The revealed comparative advantage (RCA) is an index measuring a country's specialisation in a given industry by comparing the share it represents in the country's exports to the world share of the industry in world exports. By looking at RCA in gross and value-added terms it is possible to see the importance of trade in intermediate inputs for comparative advantage. There is a comparative advantage when the RCA is superior to 1. In gross terms, the calculation uses currently available trade statistics, while new statistics identifying domestic value-added in exports are used for the RCA in value-added terms. In the case of transport equipment, Figure 3.3 shows that some countries have a revealed comparative advantage in gross terms – an RCA above 1 – but not in value-added terms (the transport sector in Austria, Portugal and South Africa). In textiles and apparel, this is also the case of New Zealand, while the opposite is the case for Spain. In gross terms, Spain does not seem to have a comparative advantage but the RCA in value-added terms reveals that in fact it does. To identify countries' comparative advantage, it is therefore important to account for intermediates trade (see Chapter 6 for a more detailed discussion).

Figure 3.3. Revealed comparative advantage (RCA) in gross and value-added terms, 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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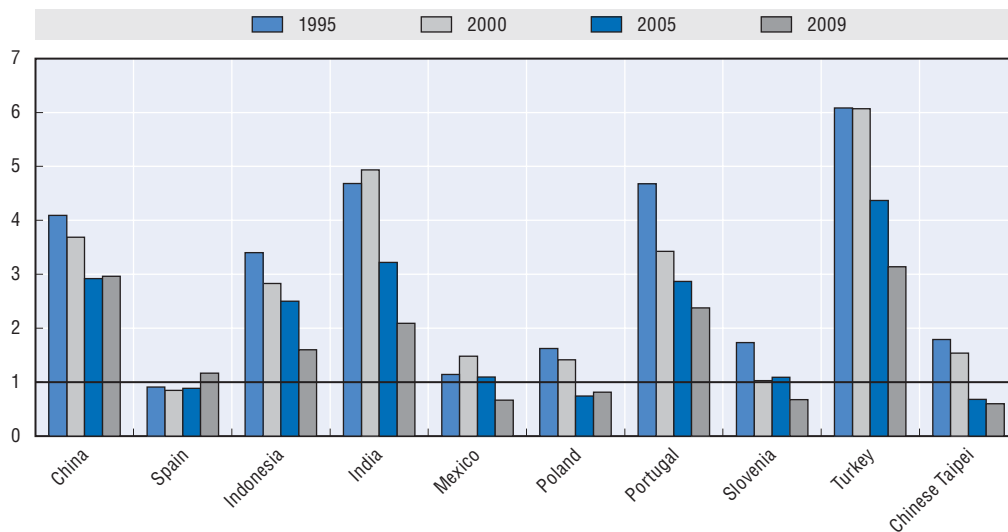
The RCA index can also illustrate the volatility of comparative advantage when trade costs are subject to variations. As Figure 3.4 shows, there are significant changes in the textile and apparel industry even over a short time (between 1995 and 2009). With the WTO Agreement on Textiles and Clothing, further liberalisation in regional trade agreements (RTAs) and unilateral reforms in emerging countries, this is an industry in which trade costs have varied significantly in the last decade. Figure 3.4 shows that countries' specialisation has varied as well. For example, Spain had an RCA below 1 in 2005 but a comparative advantage three years later.

A concrete implication is that, more than before, trade policy can drive comparative advantage and the competitiveness of domestic firms. When barriers to trade are removed, there is the traditional gain from trade in terms of increased real income because consumers pay less for final products; but there is, in addition, a new gain. By providing access to cheaper inputs, the cost of production is lower and further specialisation can occur in the value chain, increasing the overall gain. For example, country A may have had has a

comparative advantage in car manufacturing. In the absence of trade in intermediate inputs, however, country A had to produce all the parts and components before assembling the cars. What was a comparative advantage in terms of “car industry” becomes a stronger comparative advantage when the country specialises in a specific segment of car manufacturing. There is at least one segment where the cost of production will be *relatively* lower and this is an opportunity for further gains from specialisation.⁷

Moreover, this new comparative advantage will be directly affected by trade policy since the relative cost depends on the price of inputs (including foreign inputs). Trade policy makers therefore have a new responsibility when production is vertically fragmented. Any cost advantage that was previously defined on the basis of the labour and capital available in the economy becomes less “sticky” and is directly affected by trade policy and other policies that affect trade costs.⁸

Figure 3.4. Revealed comparative advantage (RCA) over time in textiles and apparel in value-added terms, selected economies



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/10.1787/888932834663>

Trade in intermediate inputs is of course not a new phenomenon. But a few decades ago, it was possible to ignore it and to assume that most products were manufactured in one place, with only raw materials traded as intermediate inputs. The increased fragmentation of production since the mid-1980s now makes it impossible to disregard trade in inputs and the implications for comparative advantage. The rest of this section therefore examines the concrete implications for the negotiation of trade agreements.

How can trade agreements help companies increase their global productivity and boost job creation?

Trade agreements can play a positive role in reducing trade costs and enabling firms to engage in vertical specialisation to increase their overall productivity. An often-cited example is the role played by the WTO Information Technology Agreement (ITA) (Baldwin, 2006b; Kimura and Obashi, 2011). It is no coincidence that GVCs are particularly strong in the industries covered by the agreement (Box 3.4). Removing tariffs for most products in the same value chain can have a significant impact and the fact that

the agreement is based on the most favoured nation (MFN) principle and covers 97% of world trade in IT products ensures that there is no magnification effect (see Box 3.1) across countries.

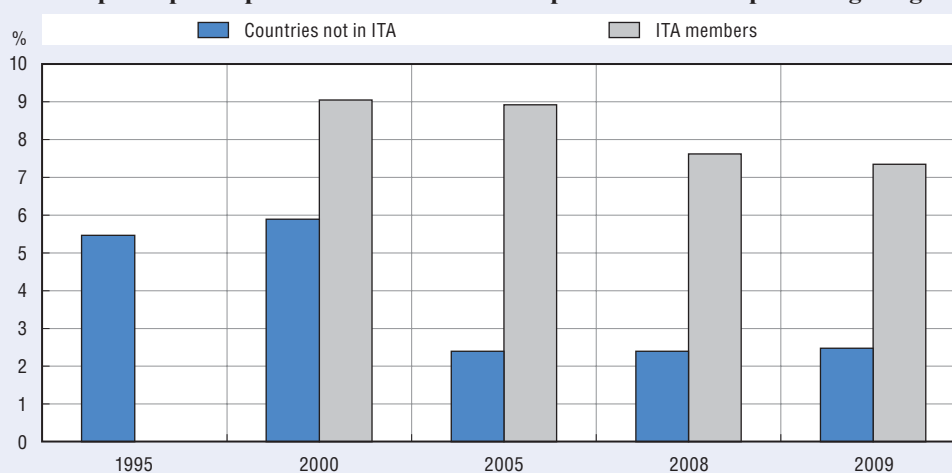
However, the ITA only covers goods and tariffs and as such does not address all barriers in the value chain or all segments. Services are also important for IT products and are not covered by the agreement. Beyond trade policy, investment barriers or competition issues can hinder trade in IT products. Taking complementarities with other policy areas into account can be an important policy implication arising from the increased fragmentation of production.

Box 3.4. The Information Technology Agreement (ITA) and the IT value chain

The ITA is a multilateral agreement that removed tariffs on key technology and telecommunications products, initially for 29 signatories and now for 75 countries (covering 97% of world trade in IT products). The benefits of the agreement apply to all WTO members because it is based on the MFN principle. GVCs are particularly strong in the industries covered by the agreement. Electrical and optical equipment, the industry covering most IT products, is, with transport equipment, the industry in which the length of value chains increased the most between 1995 and 2008.

The expansion of IT GVCs coincided with the entry into force of the ITA in 1997 (Anderson and Mohs, 2011). The figure below does not provide evidence of a causal link but ITA members are more involved in GVCs than non-signatories. The participation rate is calculated as a percentage of gross exports and accounts both for the import content of exports and for exports of domestically produced intermediates used in third countries' exports. Before the agreement, the average participation rate for all countries was about 5%. The first members of the ITA had a higher participation rate in 2000 (above 8%) and, despite a slight decrease as new members join, the participation rate remains much higher than for non-members.

ITA membership and participation in IT GVCs: Participation index as a percentage of gross exports



Source: OECD (2012).

StatLink  <http://dx.doi.org/10.1787/888932834682>

More complementarities between trade, investment and competition policies

The relative cost of producing goods and services is also influenced by labour, capital and knowledge flows in GVCs. What gives a comparative advantage to a firm in country A can change if another firm invests in country B, if some high-skilled workers move to this new location and if technology is imported. Comparative advantage can shift from country A to country B through foreign investment decisions or partnerships between firms. In addition to trade policy, investment and competition policies shape relative production costs and hence comparative advantage.

The greater volatility of comparative advantage is therefore also due to the flows of labour, capital and knowledge in GVCs. In the past, stocks and endowments determined productivity in a given location and evolved slowly over time. As firms are able to shift resources within GVCs, flows now shape comparative advantage (Henderson et al., 2002). Investment affects the availability of capital directly and affects productivity indirectly through knowledge spillovers. Competition policy helps ensure that firms have the right incentives (including with respect to intellectual property) and that foreign companies are not creating rents but lowering prices and giving domestic firms incentives to increase their productivity.

The most recent theories of capital flows emphasise complementarities between trade and investment. According to the classical view, capital goes to where it is scarce and consequently better remunerated. However, most capital is going to developed countries rather than emerging economies. A driving force of capital flows appears to be export specialisation in capital-intensive sectors (Jin, 2012) and this is more in line with actual capital flows. There are strong links between trade and the movement of capital. A compartmentalised approach to policy making is not sustainable when firms define their strategies on the basis of production costs that are affected by several types of regulations and their interactions across countries.

Facilitating investment and job creation

Ideally, trade agreements would cover all dimensions of market access and would deal with complementarities among policies that affect trade costs. While abolishing tariffs on inputs offers companies new trade opportunities, the value chain requires efficient services as well as the possibility to move people, capital and technologies across countries. Trade agreements covering trade in services, investment, intellectual property and the temporary movement of workers and dealing with domestic regulations or specific competition issues are more likely to lead to an environment that deals with all the obstacles encountered by firms when building their supply chains.

Companies doing business abroad and building long-term relationships with suppliers and customers do not only need access to the market. They also need rules that facilitate their establishment, enable them to share their knowledge and technologies without infringement of their property rights, allow them to repatriate profit and to move key personnel, and ensure fair treatment and protection against anti-competitive practices. Countries with a good regulatory environment and efficient infrastructure services increase the opportunities for their firms to join global production networks. Ensuring the same conditions for domestic companies abroad is beyond the scope of domestic regulation. International disciplines and consistent rules across countries can facilitate the organisation of international supply chains. This goes well beyond a concept of reciprocal trade liberalisation as the negotiation of mutual “concessions”. When trade agreements are instruments to increase the competitiveness of domestic firms within value chains, their main objective is mutually supportive outcomes that facilitate investment and job creation (Baldwin, 2012). This approach is already apparent to some extent in the “deep” RTAs negotiated since the middle of the 1990s, starting with NAFTA. Deep integration is an important characteristic of the recent wave of RTAs for several reasons (WTO, 2012). One is the fact that countries are looking for governance on a range of regulatory issues that are essential to GVCs. Moreover, given firms’ concerns about attracting new jobs or encouraging job creation in more competitive sectors, deep integration can help deal with some of the complementary policies that are needed for labour adjustments to take place smoothly.

Finally, to reduce distortions and let firms choose the best strategy to access foreign inputs and foreign markets, trade agreements ideally need to pursue some kind of neutrality across modes of access. In fact, the literature emphasises the diversity of firms' decisions (Bernard et al., 2007). For example, some companies prefer to establish foreign affiliates while others serve markets through arm's-length trade (Antràs and Helpman, 2004). In the case of services, the same neutrality could be sought with respect to modes of supply (cross-border trade versus commercial presence for example). Efficiency considerations should drive firm strategies, and productivity gains are higher when firms choose the least costly strategies.

Unilateral, multilateral or regional trade liberalisation?

The past two decades have seen an acceleration of the fragmentation of production and slow progress in multilateral trade negotiations. Most negotiated trade liberalisation has taken place through RTAs but the benefit for GVCs is debatable. First, most of these agreements are bilateral (WTO, 2011) and do not reach all of the countries potentially involved in GVCs. While there is a reasonably high degree of liberalisation for trade in goods (Crawford, 2012), the evidence also suggests that preferential margins are modest and that companies do not always use preferential tariff rates (Francois and Manchin, 2011). Moreover, RTAs often correct for negative relative preference margins: they offer partner countries treatment equivalent to the more favourable treatment already accorded to third countries (WTO, 2011). In the area of services and investment, WTO-plus commitments do not always mean more market access. There is “water” in commitments (Borchert et al., 2010) – meaning that actual regulations are more liberal than commitments and most trade liberalisation has taken place unilaterally and on an MFN basis (Francois and Hoekman, 2010).

This new landscape of trade agreements is consistent with the idea that removing barriers to trade offers benefits on the import side; it can increase the competitiveness of domestic firms and encourage further specialisation in the value chain. There is no need to wait for other countries to do the same; in fact, there are distinct advantages for “first movers”. The first to access foreign inputs at a cheaper cost can increase their market share, position themselves on international markets with economies of scale and scope and make it more difficult for subsequent entrants to compete. GVCs seem to have weakened the case for “reciprocal trade liberalisation”.

Does this mean that trade agreements are no longer useful? The practice in terms of bilateral and regional deals suggests the opposite. Trade agreements can still be useful for long-term commitment and for dealing with issues such as the harmonisation of standards or the recognition of qualifications that require co-operation among countries. Such topics may be easier to treat at the regional level, with a limited number of partners, than in a multilateral setting. This would explain the success of RTAs, and they may be useful steps to a first-best solution for multilateral trade liberalisation.

When RTAs cover economies that are part of a regional bloc and introduce deep integration provisions in the area of services, investment and competition, they may play a positive role in the development of GVCs. For example, Altomonte and Rungi (2008) point to the role of EU enlargement in the increased fragmentation of production across Europe. NAFTA is also described as being at the origin of some North American GVCs. In Asia, instead, the literature suggests that global production networks developed before the negotiation of RTAs and that these were not among the main drivers of the recent expansion of Asian value chains (UNESCAP, 2011). Box 3.5 provides some evidence on

the relation between regional production networks and RTAs. Asia and Oceania appear as the two regions in which the consistency is greatest (in 2008). It may be because RTAs were negotiated after the expansion of GVCs in Asia that they follow more closely the structure of vertical production networks.

The increased activity in terms of negotiation of regional trade agreements in parallel with the development of global production networks remains a paradox. The fact that trade policies are much more interdependent in GVCs should, in principle, encourage multilateral trade agreements (such as the ITA). The more international the value chain is, the broader should be the group of partner countries in agreements. This of course pleads for multilateral rather than bilateral negotiations.

Box 3.5. Global production networks and regional trade agreements

To assess the extent to which the “spaghetti bowl” of regional trade agreements matches global production networks, two simple indexes are calculated. The first is a network trade index (Ferrarini, 2011). For a given pair of countries, it is calculated as the share of the partner in the reporter’s imports of intermediate inputs, weighted by the share of the industry in total final exports of the reporter. Both goods and services industries are included in the calculation. This index has a value of zero when there is no connection between countries in the value chain and a value of one when the connection is the strongest (i.e. when all inputs used in the reporter’s exports are sourced from this partner). The second index is based on information collected on regional trade agreements by Miroudot et al. (2010). The index has a value of zero when no regional trade agreement has entered into force between two countries, a value of 0.5 when a RTA exists and covers only goods and a value of 1 when it covers goods and services.

The table below provides correlation coefficients between the network trade index and the RTA index for broad regions (an average calculated on the basis of all bilateral relationships between countries in the region and all their trade partners in the world). The higher the value, the closer the network of trade agreements to the production networks. Concretely, it means that countries have signed RTAs with their main vertical trade partners, those from which they source their inputs.

The match between global production networks and the network of regional trade agreements, 2008

	Asia	Europe	North America	Oceania	South America
Correlation between the trade network index and RTA index	0.33	0.16	0.19	0.43	0.16

The table shows that Asia and Oceania are the two regions in which the network of trade agreements is most aligned with existing production networks. In Europe, North America or South America, there is on average a weaker correlation; this indicates that partner countries in RTAs matter less for the connection to GVCs.

In the value chain, it is not only the barriers put in place by direct trade partners, but also barriers further down, that matter. Similarly, access to cost-efficient resources can be blocked by barriers upstream between raw material suppliers and intermediate input producers. Because trade costs are cumulative and magnified in the value chain, multilateral and uniform trade liberalisation (i.e. on all types of inputs and final products) would more than ever be the first-best solution. Multilateral trade negotiations may eventually have to catch up with the new business reality of GVCs.

With the deadlock in the Doha round negotiations at the WTO, there is a risk that countries will slow the process of trade liberalisation. Unilateral reforms have been successful in the past decade when trade negotiations did not provide companies other opportunities to enter GVCs. There is no reason to abandon such strategies, as they can complement efforts to reach mutually supportive outcomes. Moreover, further multilateral trade liberalisation may also take the path of sectoral agreements. What consideration of GVCs suggests is the need to cover as many countries and industries as possible and

precisely those involved in a specific value chain. The ITA, for instance, has a broad sectoral coverage that is consistent with the IT products value chain and is signed by countries that cover 97% of world trade for these products. While it lacks a link with services and investment, it has another advantage: its non-discriminatory MFN nature eliminates concerns related to rules of origin. In addition, with tariffs at zero, potential distortive impacts on trade are reduced.

New issues and old issues that require a new look

While the rise of GVCs does not introduce radically new concerns for trade policy makers it puts a new emphasis on issues pertaining to trade in intermediate inputs and the magnified impact of trade barriers. An area that is new and specific to vertical specialisation, however, is the relationship between buyers and suppliers. At this stage, it is difficult to say that this should be a new area for disciplines in trade agreements, but offshoring certainly encourages policy makers to look closely at the difficulties of setting contracts between companies across countries (Antràs and Helpman, 2008; Antràs and Staiger, 2012).

New competition issues also arise from the possibility for firms to set vertical contracts that restrain a supplier's provision of inputs to other companies (OECD, 1999). There is also a risk of under-investment and missed trade opportunities when inputs are tailored to the buyer's needs and lack an alternative use. The buyer is then in a position to extract most of the profit from the supplier, but this can discourage the supplier from entering into the contract in the first place. The international contracting environment can be a determinant of trade in the context of vertical specialisation.

With respect to vertical restraints, i.e. restrictions that one level in a vertical chain imposes on another, the effects on competition are complex (Slade, 2008). Firms use vertical restraints for a variety of reasons. Some of them may increase efficiency when the objective is to reduce the externalities generated by decisions of upstream and downstream firms or to allocate risk along the value chain. However, vertical restraints can also be used to raise barriers to entry for competitors. International vertical co-ordination could in theory give firms strategic trade advantages similar to those generated by export subsidies (Hamilton and Stiegert, 2000), but there is very little empirical literature on this topic.

The costs associated with rules of origin for goods are an old trade policy issue, which has become more topical for regional trade agreements (see above). In the case of services, liberal rules of origin soften the impact of preferential regimes on global production networks (Miroudot et al., 2010). For goods, however, strict preferential rules of origin might prevent companies from otherwise benefitting from a preferential access to the cheapest inputs because they do not meet the requirements for originating materials. In addition, administrative costs are incurred given the necessity to document the contribution of each country to value added and obtain the certificate of origin. The costs of compliance may even outweigh the trade-creating benefits of an RTA (Brenton and Manchin, 2003; Brenton and Imagawa, 2005).

Rules of origin are inherent to an approach where countries grant preferences to specific partners through RTAs, and GVCs have no reason to question their existence. But the fragmentation of production makes it difficult to design effective rules of origin because it is difficult to identify clearly the origin of products that incorporate inputs from many different countries within and outside the RTA. In new RTAs, and when bilateral agreements are consolidated at a broader regional level, rules of origin that do not

discourage efficient sourcing by producers within the free trade area are more GVC-friendly, for example by allowing for cumulation or relaxing the percentages of non-originating materials (National Board of Trade, 2012).

Key policy implications

GVCs are the consequence of and depend upon open markets. This chapter has argued that the fragmentation of production in GVCs requires at least a change in emphasis in trade policy, taking into account the growing interdependence of the policy stances of exporters and importers. It has emphasised the amplification of trade costs for all suppliers along the value chain. Lastly, it has shown that ambitious trade agreements covering all dimensions of market access (including access to key inputs) can help countries maximise the gains from production sharing. The main policy implications are as follows:

- Despite low nominal rates, tariffs can add up to significant trade costs when goods cross borders many times. In addition, non-tariff measures accentuate the magnification effect of tariffs along the value chain. This effect strengthens the case for open markets and calls for pursuing the elimination of tariffs at the multilateral level.
- There is considerable potential for efficiency gains from streamlining administrative and customs procedures at the border. Procedural reforms that improve information about administrative requirements and reduce the time required to inspect and process shipments yield large gains for importers of intermediate goods. They enable upstream suppliers to save on the cost of delayed sales, and allow for better inventory management and the smoother operation of supply chains.
- Meeting technical standards has become one of the main barriers to entry into foreign markets. Efforts towards harmonisation or mutual recognition agreements should therefore be pursued with respect to technical specifications and certification procedures. More uniform product standards can enhance the ability of small-scale exporters to participate in GVCs as components suppliers.
- Global production networks rely on the logistics chain, which requires efficient network infrastructures and competitive complementary services. Reaping the full benefits of participation in GVCs requires liberalisation of domestic services markets to alleviate the burden of domestic regulations on the provision of inputs such as transport, finance and business services when they are more restrictive than necessary for meeting legitimate regulatory policy objectives.
- Trade agreements can reduce trade costs and maximise productivity gains from production sharing when they facilitate not only the movement of goods but also services, people and capital, through chapters on trade in services, investment, competition and the temporary movement of business persons. Trade policy should remain neutral with respect to firms' strategies for accessing foreign inputs and markets, i.e. it should not favour one mode of access over others.

- More than before, the case for multilateral trade liberalisation remains the best way, analytically, to maximise the gains from trade, as barriers between third countries upward or downward in the value chain matter as much as the barriers put in place by direct trade partners. Regional trade agreements can help if they cover a sufficient number of economies, are consistent with regional production networks, do not introduce distortions with third countries and are progressively multilateralised. Unilateral liberalisation nonetheless remains a potent option. It would be better if co-ordinated with others. If this is politically impossible, unilateral liberalisation remains a means of advancing.
- New issues such as vertical relationships between buyers and suppliers could be covered in trade agreements through provisions on enforcement of international contracts and mechanisms to deal with vertical competition issues. Other disciplines already found in trade agreements could be re-assessed in the context of GVCs. In particular, rules of origin could be updated to take into account the increasing fragmentation of production across countries and become more “GVC-friendly”.

Notes

1. *Ad valorem* equivalent tariffs were 1.9% for high-income countries, 4.3% for low- and middle-income countries and 10.3% for least developed countries, down from 4.6%, 26.1% and 88.4%, respectively, in 1989 (UN TRAINS database).
2. Note, however, that the empirical relationship between the share of foreign content in production and the effect of tariffs on trade flows has not yet been directly tested. An estimation of the magnitude of this trade-reducing effect would warrant further analysis.
3. This approach is already adopted in some jurisdictions, as in the European Union as part of the Community interest test.
4. Examples of measures affecting entry are a limit on the total number of mobile phone licences (non-discriminatory), or a maximum share of foreign equity allowed (discriminatory). Examples of measures affecting operations are price controls (non-discriminatory) or specific taxes on foreign firms (discriminatory).
5. New indicators measuring the openness of services trade policies will be available in the near future through the OECD Services Trade Restrictiveness Index.
6. Only government-imposed mandatory standards are considered here. Company codes of conduct and private standards (on quality, safety, labour, environment, etc.) imposed by global brands or industry groups on their suppliers as part of “buyer-driven” value chains are not analysed as they are outside the scope of public policy.
7. There is no further comparative advantage when the relative cost is the same across all remaining segments; this sets a limit on fragmentation and specialisation.
8. Moving up the value chain and policies affecting countries’ specialisation are discussed in Chapters 5 and 6.

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