

# INTERNATIONAL TRADE

## Trade integration and production sharing

A characterization of Latin American  
and Caribbean countries' participation  
in regional and global value chains

Dayna Zaclicever



UNITED NATIONS

ECLAC

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## Abstract

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In the last three decades, the rise of global value chains (GVCs) created new growth opportunities for developing countries, by allowing them to participate in international trade without the need to develop vertically integrated industries at home. Latin American and Caribbean countries have largely remained on the periphery of this process, as exporters of primary products and natural resource-based manufactures. Yet, studies on these countries' participation in cross-border production sharing have been hampered by a lack of comprehensive data.

This document combines information from input-output tables with trade data to provide new evidence on Latin American and Caribbean countries' gross forward participation in international production networks (i.e., as exporters of intermediate products that are incorporated into other countries' exports). The data show a limited insertion into extra-regional value chains (with the main exception of Mexico), as well as significantly lower levels of intra-regional production integration than countries in other regions. However, both extra and intra-regional linkages vary greatly across countries.

Although the limited forward engagement of most Latin American and Caribbean countries in international value chains could be related to structural factors such as distance to the major GVC regions, and across the continent, the data presented in this document show the potential for further integration. However, in order to maximize the positive spillovers into the domestic economy (in terms of productivity gains, creation of high-quality jobs, skills and technology transfer to local firms, and greater integration of small and medium-sized enterprises), Latin American and Caribbean countries need to upgrade in international value chains. This would require coordinated plans across a number of policy areas, including trade, foreign direct investment, innovation and human capital formation.



## Introduction

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In the last three decades, the rise of global value chains (GVCs) created new trade and growth opportunities for developing countries. The rapid progress in information and communication technologies (ICT), along with the reduction in trade costs, enabled different tasks within a production process to be performed by geographically dispersed processing units, leading to the sharing of production between developed and developing economies. This so-called globalization's second unbundling (or North-South production sharing) allowed developing countries to specialize in specific segments of the value chain, and participate in international trade without the need to develop vertically integrated industries at home.<sup>1</sup>

The available evidence suggest the existence of a regional bias in the process of international fragmentation of production, as it has largely taken place within groups of neighbouring countries and regional trade blocs (Johnson and Noguera, 2012; Estevadeordal et al., 2013; Baldwin and Lopez-Gonzalez, 2015). Moreover, GVCs are organized around three major manufacturing hubs in North America, Europe and East Asia, centred in the United States, Germany, and Japan and China, respectively. This regionalization of international production networks is mainly explained by the role of geographical distance in determining international transport costs and delivery times, as well as by the existence of regional trade agreements.<sup>2</sup>

Although limited, the existing evidence on developing economies shows great diversity in their degree of participation in GVCs. Many East Asian countries have successfully integrated into international production networks, mainly within the Asian region, by specializing in niches of the manufacturing process where they have a comparative or competitive advantage. In contrast, Latin American and Caribbean (as well as African) economies have largely remained on the periphery of GVCs, as exporters of primary products and natural resource-based manufactures (a traditional specialization pattern accentuated in the 2000s by the boom in commodity prices).

In spite of being interconnected by a number of trade agreements (including the Andean Community, the Southern Common Market (MERCOSUR), the Central American Common Market (CACM), the Caribbean Community (CARICOM), the more recent Pacific Alliance Agreement, and several bilateral preferential agreements), Latin American and Caribbean countries exhibit significantly lower levels of intra-regional trade and production integration than countries in other regions (OECD, 2015; Cadestin et al., 2016; ECLAC, 2016). Also, the trade agreements signed with extra-regional

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<sup>1</sup> While in the first unbundling (up until the mid-1980s) international competition occurred mainly at the level of sectors (or firms), in the second unbundling it occurs at the level of production stages (or tasks) (Baldwin, 2006; 2013).

<sup>2</sup> Several studies have found evidence of a larger effect of geographical distance and preferential trade agreements on trade associated with international production networks than on overall trade or trade in final products (e.g., Miroudot et al., 2009; Gamberoni et al., 2010; Lopez-Gonzalez, 2012; Orefice and Rocha, 2014).

economies (including those linking Chile, Colombia, Peru and Central American and Caribbean countries with the United States or the European Union) do not seem to have contributed much to promote Latin American and Caribbean economies' participation in GVCs. The exceptions are Mexico and, to a lesser extent, some Central American countries, which have been relatively successful in joining (mostly labour-intensive assembly segments of) international production networks, in particular those centred in the United States.

Yet, studies on Latin American and Caribbean countries' participation in international value chains have been hampered by the limited availability of data. Although conventional (i.e., gross) trade statistics on intermediate goods (or, more limited, parts and components) are used in the empirical literature as a proxy for GVC trade, they do not provide a link between the industry of origin and the industry actually using the intermediates in its production process. The use of input-output tables allows a more accurate identification of international production linkages. Particularly, inter-country input-output (ICIO) tables provide information on the domestic and foreign inputs used in the production by each industry, revealing the linkages between countries within international value chains. Unfortunately, the available ICIO tables cover only a few Latin American countries.<sup>3</sup>

A more comprehensive analysis of Latin America and the Caribbean's participation in international value chains can be approximated by combining information from input-output tables with trade data. This is the approach adopted in this document to examine countries' forward insertion into international production networks (i.e., as exporters of intermediate products that are incorporated into other countries' exports). Input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables are used to compute the value of imported inputs embodied in countries' gross manufacturing exports, by source industry. These inputs are then disaggregated by origin country to build a bilateral vertical specialization-related intermediate trade dataset, which is used to characterize countries' participation in cross-border production sharing along the period 1995-2011.<sup>4</sup>

The document is organized in four sections. Section I describes the construction of the database. Section II presents the general trends and patterns of countries' vertical specialization, to then focus on the analysis of Latin American and Caribbean countries' integration into the three major GVCs (the so-called Factory North America, Factory Europe and Factory Asia).<sup>5</sup> Section III examines intra-regional production linkages within Latin America. Finally, section IV summarizes the main findings and draws some policy implications.

---

<sup>3</sup> The Organisation for Economic Co-operation and Development (OECD)'s ICIO tables cover seven Latin American countries (Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, and Peru), while the World Input-Output Database (WIOD) only includes two of these countries (Brazil and Mexico). Other databases provide more extensive country coverage; however, the inclusion of countries with poor quality/non-official data results in a loss of statistical rigor. As for the South American Input-Output Table, developed by the Institute of Applied Economic Research (IPEA) of Brazil and ECLAC, it is not a global ICIO table (as it only includes the ten South American countries) and it is currently available only for 2005.

<sup>4</sup> This approach is conceptually similar to that of Lopez-Gonzalez and Holmes (2011), although the implementation differs.

<sup>5</sup> Factory North America comprises Canada, Mexico and the United States; Factory Europe includes the 28 current member countries of the European Union; while Factory Asia is given here by the 14 South and East Asian countries covered in the OECD's ICIO tables (i.e., Brunei Darussalam, Cambodia, China, Hong Kong, India, Indonesia, Japan, Malaysia, Philippines, the Republic of Korea, Singapore, Taiwan, Thailand, and Viet Nam).

## I. Vertical specialization-related intermediate exports

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One way of examining countries' participation in international production networks is through the concept of vertical specialization, introduced by Hummels et al. (2001). Vertical specialization measures link a country's imported inputs with its exports. Thus, they reflect the process by which, as a result of the geographical fragmentation of production, different countries become part of a single supply chain (De Backer and Yamano, 2012). Particularly, countries' forward participation in international production networks can be measured, in gross terms, by their exports of intermediate inputs that are incorporated into other countries' exports.

The measure of vertical specialization considered here includes both the direct and indirect (i.e., embodied in domestic inputs) foreign intermediates used by each country in the production of its exported manufactured goods,<sup>6</sup> given by:

$$\mathbf{VS}_{c,t} = \mathbf{A}_{c,t}^M (\mathbf{I} - \mathbf{A}_{c,t}^D)^{-1} \hat{\mathbf{E}}_{c,t} = \mathbf{A}_{c,t}^M \mathbf{L}_{c,t} \hat{\mathbf{E}}_{c,t} \quad (1)$$

where the subscripts  $c$  and  $t$  denote country and time, respectively;  $\mathbf{A}_{c,t}^M$  is the  $K \times K$  matrix of direct imported input coefficients;  $\mathbf{A}_{c,t}^D$  is the  $K \times K$  matrix of direct domestic input coefficients (or technical coefficients);  $\mathbf{I}$  is a  $K \times K$  identity matrix;  $\mathbf{L}_{c,t} = (\mathbf{I} - \mathbf{A}_{c,t}^D)^{-1}$  is the  $K \times K$  Leontief inverse;  $\hat{\mathbf{E}}_{c,t}$  is a  $K \times K$  diagonal matrix of gross exports by exporting industry; and  $K$  is the number of industries.<sup>7</sup>

Each  $VS_{c,t}(i, j)$  (i.e., each component of matrix  $\mathbf{VS}_{c,t}$ ) is the value of the imported inputs from industry  $i$  used in country  $c$  at time  $t$  in the production of industry  $j$ 's gross exports. Thus, the imported intermediates from industry  $i$  embodied in country  $c$ 's total gross manufacturing exports is calculated as:

$$VS_{c,t}(i) = \sum_j VS_{c,t}(i, j) \quad (2)$$

<sup>6</sup> In addition to the direct use of foreign intermediates, the production of exports requires the use of inputs sourced from domestic suppliers, which in turn may require the use of imported intermediates, and so on. Ignoring these indirect import requirements leads to an underestimation of the foreign content of exports.

<sup>7</sup> Each coefficient of matrix  $\mathbf{A}_{c,t}^D$ ,  $a_{c,t}^D(i, j)$ , gives the value of products from domestic industry  $i$  used by industry  $j$  as intermediate inputs to produce one monetary unit of output. Similarly, each coefficient of matrix  $\mathbf{A}_{c,t}^M$ ,  $a_{c,t}^M(i, j)$ , shows the imported inputs from foreign industry  $i$  required by domestic industry  $j$  to produce one monetary unit of output. For details on these matrices see Ahmad et al. (2017).

The data used to compute  $VS_{c,t}$  come from the 2016 edition of the OECD's ICIO tables, which provide information for 63 countries covering the years 1995-2011, with a 34-industry breakdown.<sup>8</sup>

The final step in the construction of the database is the disaggregation of  $VS_{c,t}(i)$  by origin country:

$$VS_{p,c,t}(i) = VS_{c,t}(i) * m_{p,c,t}(i) \quad (3)$$

where  $m_{p,c,t}(i)$  is the share of origin country  $p$  in country  $c$ 's total intermediate imports from source industry  $i$  at time  $t$ . This share is computed using 6-digit Harmonized System (HS) level data from the *Base pour l'Analyse du Commerce International* (BACI) developed by the *Centre d'Études Prospectives et d'Informations Internationales* (CEPII).<sup>9</sup> The correspondence between industries and HS codes considered here is based on the conversion tables used in the construction of the OECD's ICIO tables. This ensures a good match between product-level bilateral trade and the industry of origin in  $VS_{c,t}(i)$ .

The resulting vertical specialization-related intermediate trade database comprises 210 exporting/origin countries (including 33 from the Latin American and Caribbean region) and 63 importing/destination countries (7 of which are from the Latin American region), providing information at the industry level. The main advantage of this dataset is its broad country coverage, relative to the input-output data from which  $VS_{c,t}(i)$  is obtained. This allows a more comprehensive identification of the trade relationships associated with countries' vertical specialization. Although ICIO tables provide information on the geographical origin of the inputs imported by each country, they only identify those imports originated from the countries included in the tables (and a residual Rest of the world). The disaggregation by origin country proposed here allows a more complete analysis by including, in a consistent manner, all input-exporting countries. However, in terms of importing countries, the analysis can only include those for which input-output data are available (i.e., the 63 countries covered in the OECD's ICIO tables).

It should be noted that the data approach adopted in this document does not address the double-counting problem that affects international trade statistics, which do not distinguish between the domestic and foreign value added embodied in traded products.<sup>10</sup> An analysis based on measures of trade in value added would allow quantifying the actual contribution of each country to the value generated in each production chain. However, the (statistically rigorous) data required for such analysis—related with each country's production structure and the countries from which it supplies—are not available for most Latin American countries. Thus, the vertical specialization-related gross flows computed here should be considered a proxy for inter-industrial interactions between countries within international value chains. Notwithstanding this, they improve the characterization of countries' engagement in cross-border production sharing, relative to the use of conventional intermediate trade data.<sup>11</sup>

<sup>8</sup> The OECD's ICIO tables are available for downloading at <http://www.oecd.org/sti/ind/inter-country-input-output-tables.htm>. See tables A.1 and A.2 in the annex for a list of the industries and countries covered, respectively.

<sup>9</sup> BACI provides bilateral values and quantities of exports, reconciling exporting and importing countries' data from the United Nations Commodity Trade Statistics Database (COMTRADE) (see Gaulier and Zignago, 2010).

<sup>10</sup> Intermediate inputs and the goods in process in which they are subsequently embedded cross several national borders as they move along the supply chain. The fact that conventional trade statistics record the gross cumulated value embodied in traded goods, not just the value added in the exporting country, results in a double-counting problem that overstates the domestic content of exports.

<sup>11</sup> Another drawback of the data approach adopted here is the proportionality assumption implied in the disaggregation of foreign inputs by origin country (i.e., the fact that countries' import shares do not differ by using industry). However, this assumption is standard in the construction of ICIO tables.

## II. Latin American and Caribbean countries' participation in international production networks

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### A. Trends and patterns of countries' vertical specialization

The rise of GVCs can be illustrated by the increase in the imported intermediate inputs embodied in countries' gross exports over the period 1995-2011. As shown in figure 1.A, the share of foreign intermediates in the gross value of manufactures exported by the three major GVCs rose until 2008, particularly in the case of Factory Asia.<sup>12</sup> By 2011, vertical specialization levels were similar to those of 2008, after recovering from the decline caused in 2009 by the global economic crisis.<sup>13</sup>

At the aggregate level, the Latin American countries covered in the OECD's ICIO tables, excluding Mexico (i.e., Argentina, Brazil, Chile, Colombia, Costa Rica, and Peru; referred hereafter as Latin America (6 countries)), exhibit a considerably lower content of imported intermediates in their manufacturing exports than Factory North America, Factory Europe and Factory Asia. Notwithstanding this, their dependence on foreign inputs also increased significantly between 1995 and 2008.

Although regional aggregates are informative, they hide wide differences across countries (driven mainly by structural characteristics such as market size, level of development, and specialization patterns). Within Latin America (6 countries), Costa Rica has a considerably higher gross backward participation in international production networks, reflecting the larger share of non-natural resource-based manufactures in its exports (see figure 1.B). In contrast, the higher natural resource intensity of the other five countries' manufacturing exports results in lower levels of vertical specialization (as the production of these exports tends to use relatively few imported inputs).<sup>14</sup>

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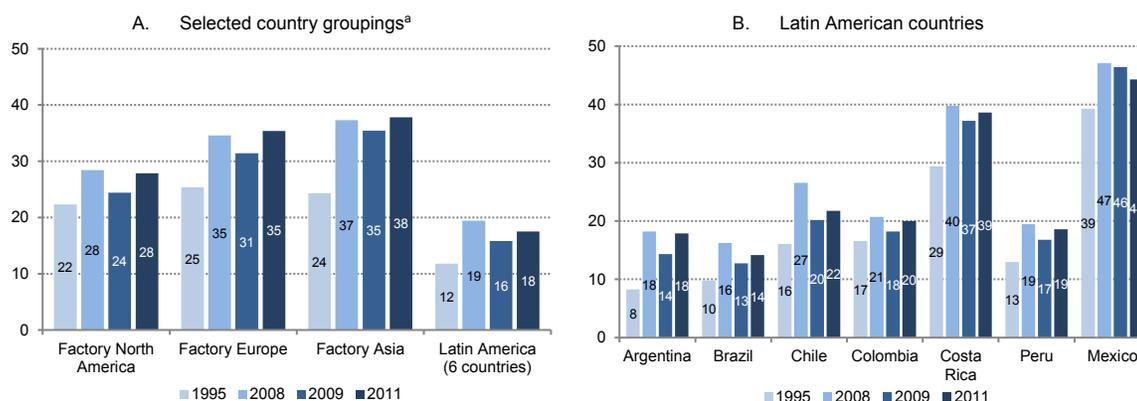
<sup>12</sup> Manufacturing exports refer hereafter to foreign sales from the manufacturing sectors listed in table A.1 in the annex, excluding Coke, refined petroleum products and nuclear fuel.

<sup>13</sup> Some recent estimates indicate that international fragmentation of goods production would have stalled, or even reverted, since 2011 (Timmer et al., 2016; OECD, 2016).

<sup>14</sup> As shown in section III, aggregate vertical specialization levels also hide large differences across exporting industries within countries.

Similarly, within each of the three major GVCs, countries exhibit significant differences in their gross backward participation levels. In Factory North America, the import content of the United States' gross manufacturing exports (21% in 2011) is considerably lower than those of Canada and Mexico (37% and 44%, respectively). For Factory Europe, in 2011 vertical specialization levels ranged between a minimum of 26% (Romania) and a maximum of 58% (Hungary), with an average of 38%. In Factory Asia the values averaged 40%, ranging between 18% (Japan) and 57% (Cambodia).

**Figure 1**  
**Imported intermediates embodied in gross manufacturing exports,**  
**1995, 2008, 2009 and 2011**  
*(Percentages of gross exports)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables.

<sup>a</sup> Latin America (6 countries) includes Argentina, Brazil, Chile, Colombia, Costa Rica and Peru. Mexico is included in Factory North America.

The composition by source industry shows that the foreign intermediate goods embodied in the manufactures exported by Factory North America, Factory Europe and Factory Asia originate mainly from medium-high or high-technology industries (including Computer, electronic and optical equipment; Chemicals and chemical products; Motor vehicles; Machinery and equipment, not elsewhere classified (n.e.c.); and Electrical machinery and apparatus, n.e.c.) (see figure 2). Some medium-low-technology industries (particularly, Basic metals and, to a lesser extent, Fabricated metal products) and the primary mining sector are also among the main suppliers of imported intermediates for the three GVCs.<sup>15</sup>

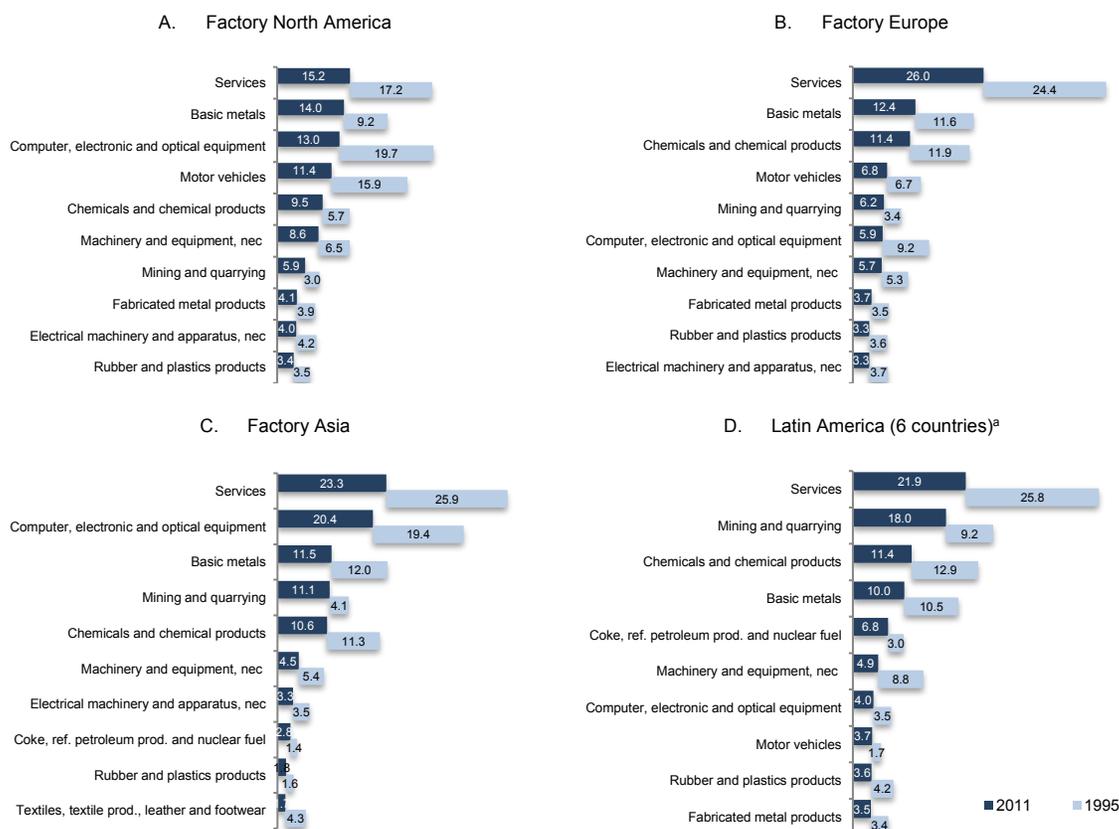
Medium-high or high-technology industries are also an important source of foreign inputs for Latin American countries' exports (particularly, Chemicals and chemical products; Machinery and equipment, n.e.c.; Computer, electronic and optical equipment; and Motor vehicles), although to a lesser extent than for Factory North America, Factory Europe and Factory Asia. On the other hand, inputs from the mining sector have a significantly larger participation for Latin American exports.<sup>16</sup>

<sup>15</sup> The technology-intensity classification of manufacturing industries considered in this document is based on that of the OECD (see *ISIC Rev. 3 Technology Intensity Definition* (OECD, online document: [www.oecd.org/dataoecd/43/41/48350231.pdf](http://www.oecd.org/dataoecd/43/41/48350231.pdf))). The group of low-technology industries comprises Food products, beverages and tobacco (ISIC 15-16); Textiles, textile products, leather and footwear (ISIC 17-19); Wood and products of wood and cork (ISIC 20); Pulp, paper, paper products, printing and publishing (ISIC 21-22); and Manufacturing n.e.c., recycling (ISIC 36-37). Medium-low-technology industries include Coke, refined petroleum products and nuclear fuel (ISIC 23); Rubber and plastics products (ISIC 25); Other non-metallic mineral products (ISIC 26); Basic metals (ISIC 27); and Fabricated metal products (ISIC 28). Finally, the group of medium-high or high-technology industries comprises Chemicals and chemical products (ISIC 24); Machinery and equipment, n.e.c. (ISIC 29); Computer, electronic and optical equipment (ISIC 30, 32, 33); Electrical machinery and apparatus, n.e.c. (ISIC 31); Motor vehicles, trailers and semi-trailers (ISIC 34); and Other transport equipment (ISIC 35).

<sup>16</sup> It should be noted that the increase in the share of Mining and quarrying as origin of foreign inputs, in the four country-groupings considered, might be largely explained by the sustained boom in prices experienced in the 2000s by crude oil, natural gas and mineral ores. Moreover, GVC indicators (such as the vertical specialization measure used in this study) are affected by relative price movements, since they are computed from current-price data.

As shown in figure 2, services play an important role in international fragmentation of production, representing a significant source of foreign intermediates for the manufactures exported by the three major GVCs, as well as for Latin American countries. Unfortunately, the limited availability of data on bilateral trade in services prevents from including them in the more detailed analysis that follows in this document. Also, hereafter crude and processed fuels are excluded for not being considered of interest for this study.

**Figure 2**  
**Selected country groupings: main imported intermediates embodied in gross manufacturing exports, 1995 and 2011**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables.

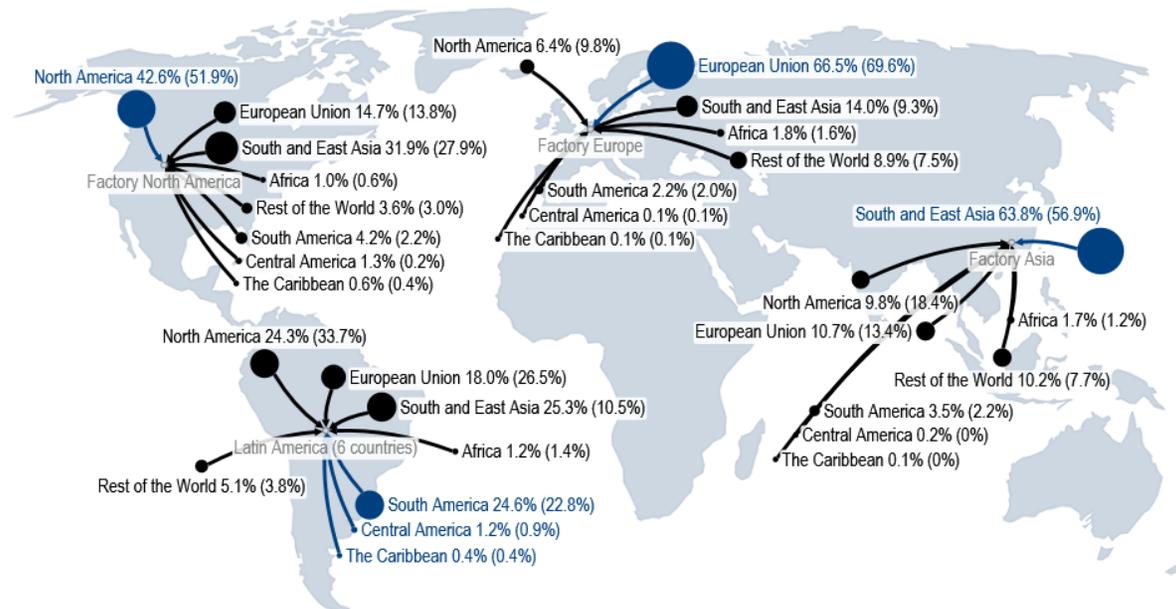
<sup>a</sup> Latin America (6 countries) includes Argentina, Brazil, Chile, Colombia, Costa Rica and Peru. Mexico is included in Factory North America.

The composition of (non-fuel) foreign intermediate goods by geographical origin shows the regional character of Factory Europe and Factory Asia (see diagram 1). In 2011, more than 60% of total imported intermediate goods embodied in these GVCs' gross manufacturing exports had an intra-regional origin. A high proportion of foreign intermediates in Factory North America's manufacturing exports was also imported from the region itself (i.e., Canada, Mexico, and the United States), but extra-regional countries accounted for the majority of those inputs (particularly, Southeast Asian countries).

The limited intra-regional production integration of Latin American countries is revealed by the relatively low participation of the region as origin of the imported intermediate goods used in the production of these countries' manufacturing exports (slightly over 25% in 2011, with the South American subregion accounting for the bulk of this share). The data presented in diagram 1 also show that Latin America and the Caribbean's participation as a source of foreign intermediate goods for Factory Europe and Factory Asia is

very low (2.4% and 3.8%, respectively, in 2011), and concentrates in South American countries. For Factory North America, the region's share is somewhat higher (6.1% in 2011).

**Diagram 1**  
**Selected country groupings: imported intermediate goods embodied in gross manufacturing exports by origin region, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

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<sup>a</sup> Latin America (6 countries) includes Argentina, Brazil, Chile, Colombia, Costa Rica and Peru. Mexico is included in Factory North America. The size of the circles reflects the share of each region as origin of foreign intermediates in 2011 (i.e., the percentages next to the name of each origin region). Percentages in brackets correspond to the shares in 1995.

The boundaries and names shown and the designations used in this map do not imply any official endorsement or acceptance on the part of the United Nations.

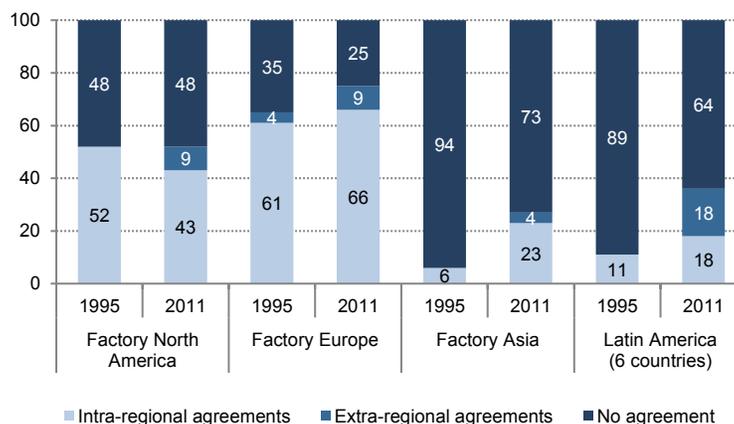
The expansion of GVCs has been associated with the proliferation of trade agreements, particularly those that go beyond traditional market access issues (by including provisions related to foreign direct investment (FDI), intellectual property rights, competition policy, product regulations, and customs procedures).<sup>17</sup> This is reflected in the large and increasing proportion of countries' backward linkages that originates in trade partners with which some kind of trade agreement exists (see figure 3). For Factory Europe and Factory North America, in 2011 75% and 52%, respectively, of the foreign intermediate inputs embodied in manufacturing exports was imported from countries with which a trade agreement was in place. In both cases, the main origin of foreign inputs was largely the regional bloc itself (i.e., the European Union and the North American Free Trade Agreement (NAFTA), respectively); however, the share of extra-regional agreements has increased.

For Factory Asia, most backward linkages are not related with any trade agreement, but the proportion of inputs imported from a country with which there is an agreement increased significantly between 1995 and 2011 (from 6% to 27%). Also in this case, intra-regional agreements have the largest

<sup>17</sup> As shown by Orefice and Rocha (2014), the relationship between international production networks and deep integration can go in both directions. On the one hand, deep trade agreements may facilitate trade amongst potential members of a supply chain, stimulating the creation of production networks. On the other hand, countries already involved in international fragmentation of production may be willing to sign deeper trade agreements with their partners in order to secure their trading relationships as suppliers of intermediate products.

participation. For Latin America (6 countries), trade agreement-related imports also account for an increasing share of the total (36% in 2011, compared to 11% in 1995), but the participation of intra and extra-regional agreements is the same (after a larger increase of the latter).

**Figure 3**  
**Selected country groupings: imported intermediate goods embodied in gross manufacturing exports**  
**by trade agreement status with origin countries, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI); and information on trade agreements from the World Trade Organization's Regional Trade Agreements Information System (RTA-IS).

<sup>a</sup> Latin America (6 countries) includes Argentina, Brazil, Chile, Colombia, Costa Rica and Peru. Mexico is included in Factory North America. For Factory North America, Factory Europe and Factory Asia intra-regional agreements correspond to those signed with other members of the GVC; for Latin America (6 countries), they include the trade agreements signed with any Latin American or Caribbean country. Partial scope agreements are excluded.

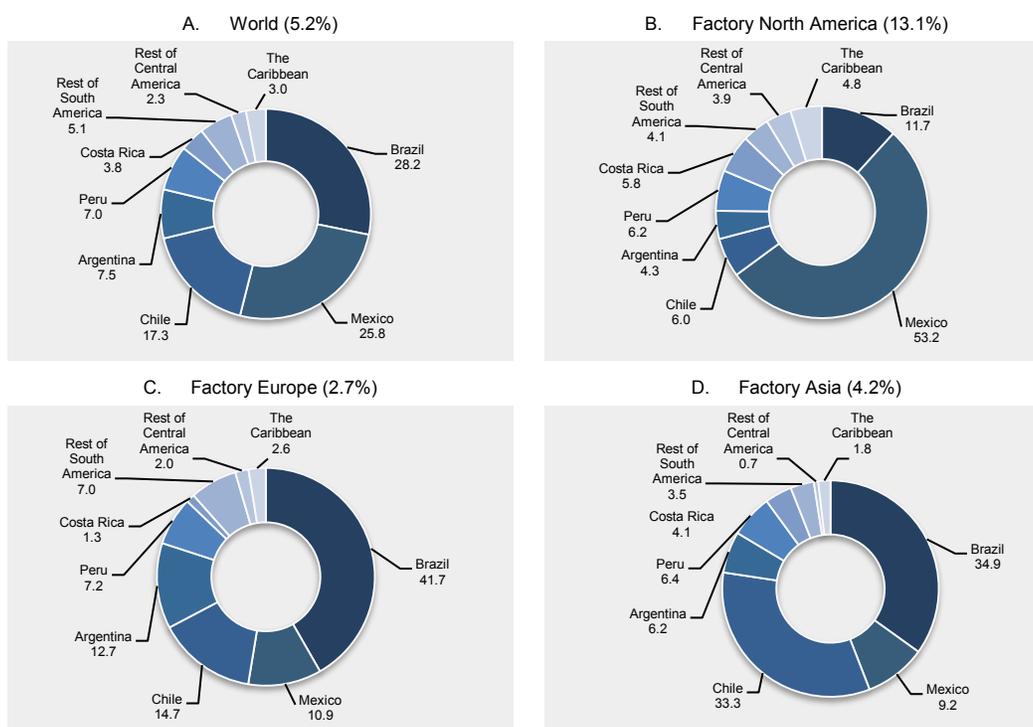
## B. Latin America and the Caribbean's forward participation in GVCs

### 1. Current linkages

In line with their position in world trade, Latin American and Caribbean countries' forward participation in international production networks is limited. Their share in the foreign intermediate goods used in the production of world manufacturing exports was only around 5% in 2011, showing a small increase since 1995 (from nearly 4%). In addition, this participation is highly concentrated in a few countries, with Brazil, Mexico and Chile accounting for more than 70% of the total (see figure 4). Moreover, the six main origin countries (Brazil, Mexico, Chile, Argentina, Peru, and Costa Rica) explained 90% of the region's gross forward linkages in 2011.<sup>18</sup> For Factory North America, most Latin American intermediate goods come from Mexico, while Brazil and Chile are, within the region, the main sources for Factory Europe and Factory Asia.

<sup>18</sup> Latin America and the Caribbean's participation in world goods exports, excluding fuels, was 6.4% in 2011. This participation was somewhat less concentrated than that of the region's forward linkages, as five countries (Mexico, Brazil, Argentina, Chile, and Colombia) accounted for around 70% of the total (with the first two countries explaining more than 50%).

**Figure 4**  
**Selected importing regions: origin-country composition of vertical specialization-related intermediate imports from Latin America and the Caribbean, 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Percentages in brackets next to the name of each importing region indicate the share of Latin America and the Caribbean in the region's total vertical specialization-related intermediate imports in 2011.

In terms of destination markets, the concentration of Latin America and the Caribbean's gross forward linkages is, at the aggregate level, relatively low (0.11 in 2010-2011, as measured by the normalized Herfindahl-Hirschman (HH) index).<sup>19</sup> However, other exporting regions show lower concentration levels (see figure 5.A). Within the region, Mexico—highly dependent on the United States market—and, to a lesser extent, Central America and the Caribbean are less diversified than the South American subregion.

Between 1995 and 2011, the concentration of gross forward linkages on the country dimension increased for all Latin American subregions. This is due to the higher participation of Factory Asia (particularly, China) as destination of Latin American and Caribbean countries' exports.<sup>20</sup> In fact, for South America, Central America and the Caribbean, gross forward linkages with Factory Asia are significantly more concentrated than those with Factory North America and Factory Europe (see figures 5.B to 5.D). The same holds for other exporting regions.

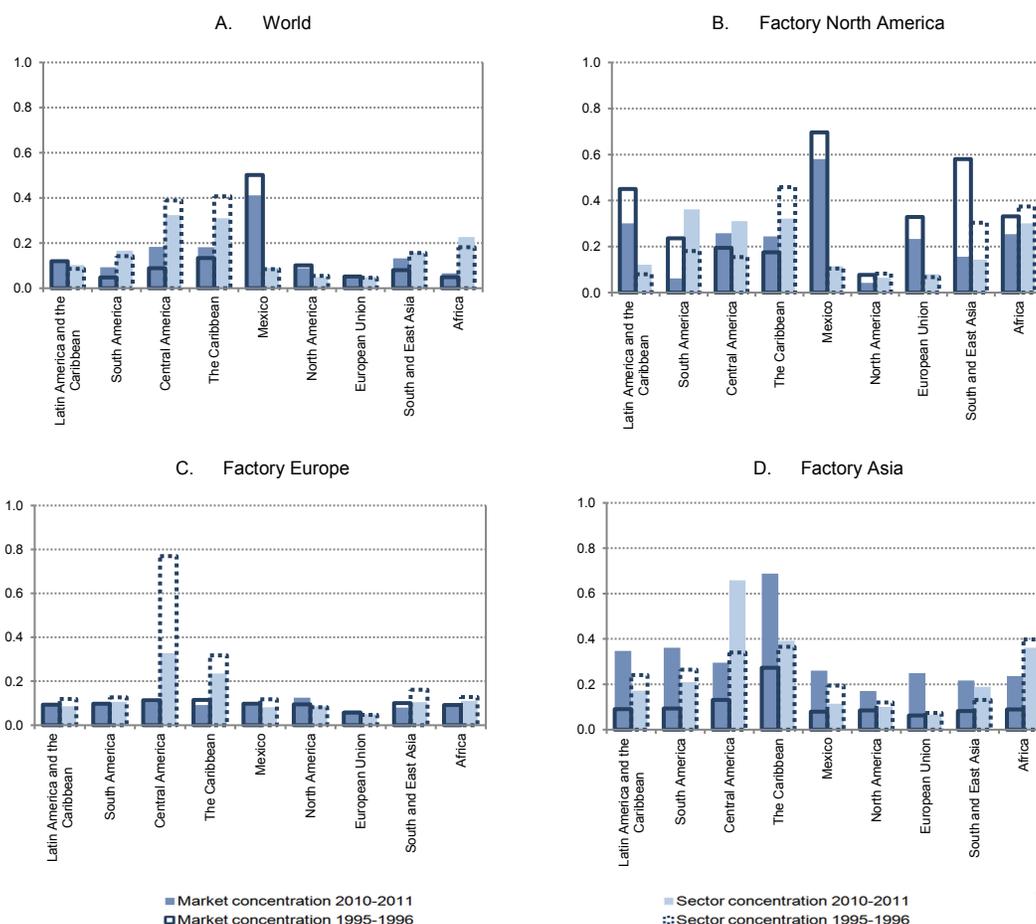
On the sector dimension, the HH index (normalized by the number of source sectors) shows considerably larger values for Central America and the Caribbean than for Mexico and South America. The concentration level is generally lower for exports to Factory Europe and Factory North America than for

<sup>19</sup> The normalized HH index ranges between 0 and 1. The higher the index, the more concentrated exports are in a few destination markets (an extreme value of 1 would indicate that one market accounts for the country/region's entire forward linkages).

<sup>20</sup> The participation of Factory Asia in the region's gross forward linkages doubled between 1995 and 2011 (going from 16% to 33%), while those of Factory Europe and, to a lesser extent, Factory North America fell in this period (from 34% to 20% and from nearly 40% to 36%, respectively).

those oriented to Factory Asia (the main exception is the South American subregion, for which exports to Factory North America are significantly less diversified at the sector level) (see figure 5).

**Figure 5**  
**Selected country groupings: Herfindahl-Hirschman indices of destination market and sector concentration of vertical specialization-related intermediate exports, 1995-1996 and 2010-2011**  
*(Normalized indices)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

Among the six main Latin American suppliers of intermediate inputs for world manufacturing exports, Chile and Costa Rica, along with Mexico, have higher levels of market concentration than Argentina, Brazil and Peru (see figure A.1 in the annex). Chile's forward linkages are highly concentrated in Factory Asia, while those of Mexico and, to a lesser extent, Costa Rica concentrate in Factory North America. On the sector dimension, Costa Rica and Chile show the highest concentration among the six countries, having experienced a large increase between 1995-1996 and 2010-2011 (see figure A.2 in the annex). In the case of Chile, this is explained by the high participation of copper products, for which prices rose substantially in the 2000s. Similarly, Argentina, Brazil and Peru's gross forward linkages — particularly those with Factory Asia— were concentrated in natural resource-based products (like soya, iron, copper and other metals). In contrast, in this period Costa Rica stood out in the region for an increasing concentration of gross forward linkages in high-technology products (particularly, electronic

parts and components).<sup>21</sup> However, the country has been affected by the closure of Intel's microprocessor assembly plant in 2014, which caused a sharp decline in Costa Rican exports of electronic components.

The analysis of the main imported inputs embodied in Factory North America, Factory Europe and Factory Asia's manufacturing exports shows that they have mostly an intra-regional origin (see figures 6 to 8), particularly in the last two cases (as already shown in diagram 1). It also reveals inter-GVC linkages, mainly in Computer, electronic and optical equipment, where the participation of China has increased considerably. However, it should be pointed out that, in this and other technology-intensive industries (like Electrical machinery and apparatus, n.e.c.), a large proportion of the value added embodied in Chinese gross exports is sourced from abroad, mostly from other Southeast Asian countries, the European Union and the United States.<sup>22</sup>

Latin American and Caribbean countries' gross forward linkages with Factory Europe and Factory Asia concentrate in the primary sectors Mining and quarrying and Agriculture (see figures 7 and 8).<sup>23</sup> None of these countries has a significant (i.e., at least 1%) participation in the inputs originated in medium-high or high-technology industries, or even in medium-low-technology industries (the exception is Basic metals, where Brazil and Chile account for a rather significant, though small, share of the total).

For Factory North America, Latin American and Caribbean countries' participation as input suppliers is more diversified in terms of origin sectors. As shown in figure 6, the region sources a significant proportion of inputs from industries like Basic metals (25% of the total), Mining and quarrying (also 25%), Motor vehicles (around 15%), and Electrical machinery and apparatus, n.e.c. (14%). Its share is also relevant in the other main imported inputs embodied in Factory North America's manufacturing exports.<sup>24</sup> Although, in most cases, Mexico accounts for the bulk of these inputs, other countries have a significant participation in some sectors (including Chile and Peru in Mining and quarrying and Basic metals, Costa Rica in Computer, electronic and optical equipment, and Brazil in several industries).

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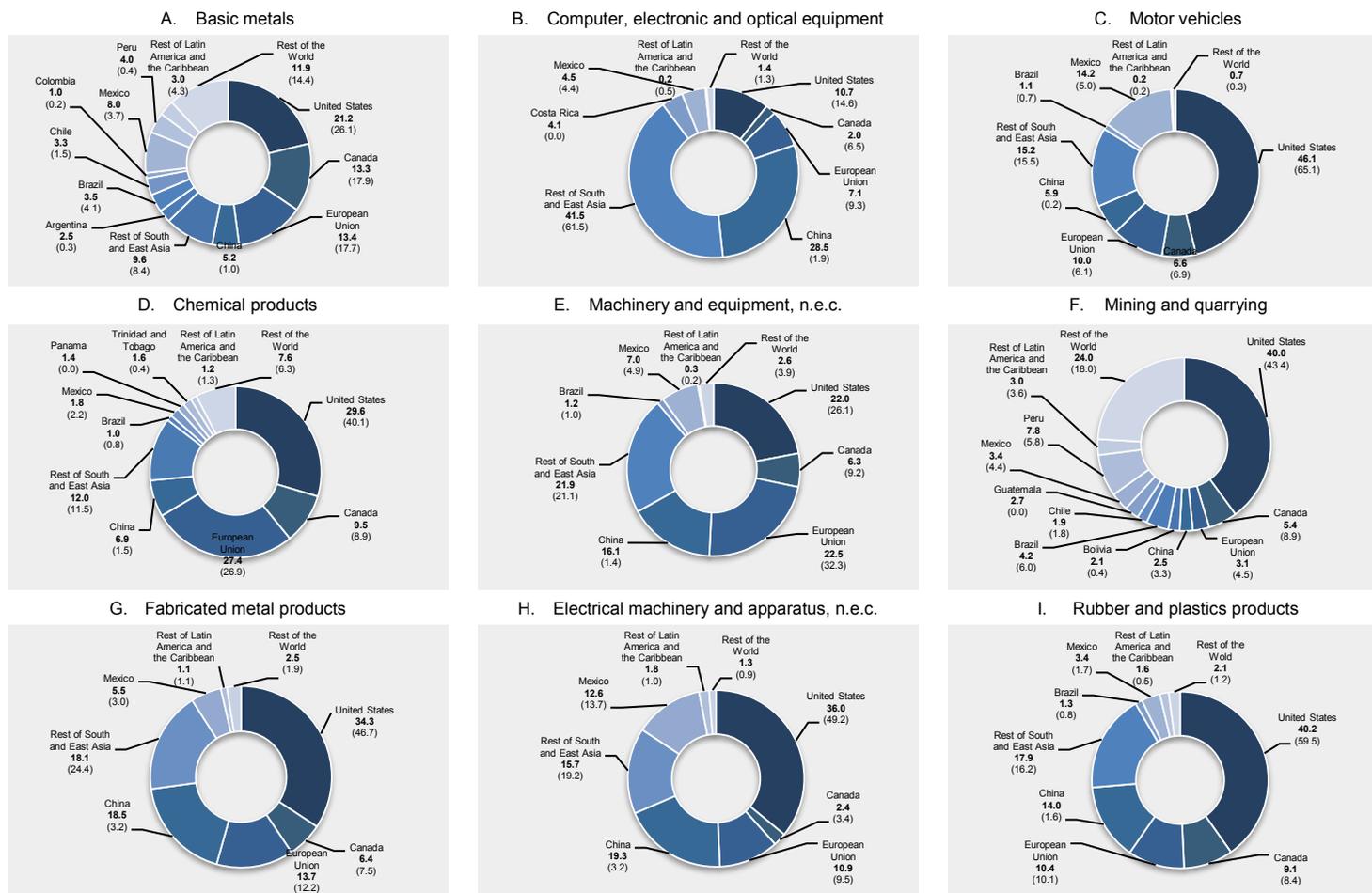
<sup>21</sup> Some Caribbean countries (like Barbados, Saint Kitts and Nevis, and Saint Lucia) also have a large participation of high-technology products in their intermediate exports; however, the share of these countries in the region's forward linkages with Factory North America, Factory Europe and Factory Asia is marginal.

<sup>22</sup> According to the OECD's Trade in Value Added (TiVA) database, in 2011 foreign value added accounted in China for around 55% and 50% of gross intermediate exports from Computer, electronic and optical equipment and Electrical machinery and apparatus n.e.c., respectively. Southeast Asian countries (particularly, Japan, Korea, and Taiwan), the European Union, and the United States were the origin of around 80% and 70% of the total, respectively.

<sup>23</sup> The region's participation as a source of agricultural inputs for Factory Europe, not shown in figure 7, was around 15% (both in 1995 and 2011), with Brazil accounting for over 50% of the total. For Factory Asia, this participation was 22% in 2011 (compared to 5% in 1995), and also concentrated in Brazil (with more than two thirds of the total). Latin American and Caribbean countries' share is also significant in the related industry Food products, beverages and tobacco, with 14% and 19% for Factory Europe and Factory Asia, respectively, in 2011. However, these two sectors represent a very low proportion of the imported inputs embodied in these GVCs' manufacturing exports.

<sup>24</sup> Also in this case, Latin America and the Caribbean is an important source of agricultural inputs (24% of the total in 2011), as well as of inputs originated in Food products, beverages and tobacco (19%). The region's participation is also significant in other low-technology industries like Wood and wood products (15%), and Textiles, leather and footwear (10%). These sectors, however, represent a very low share of the imported inputs used in the production of Factory North America's manufacturing exports.

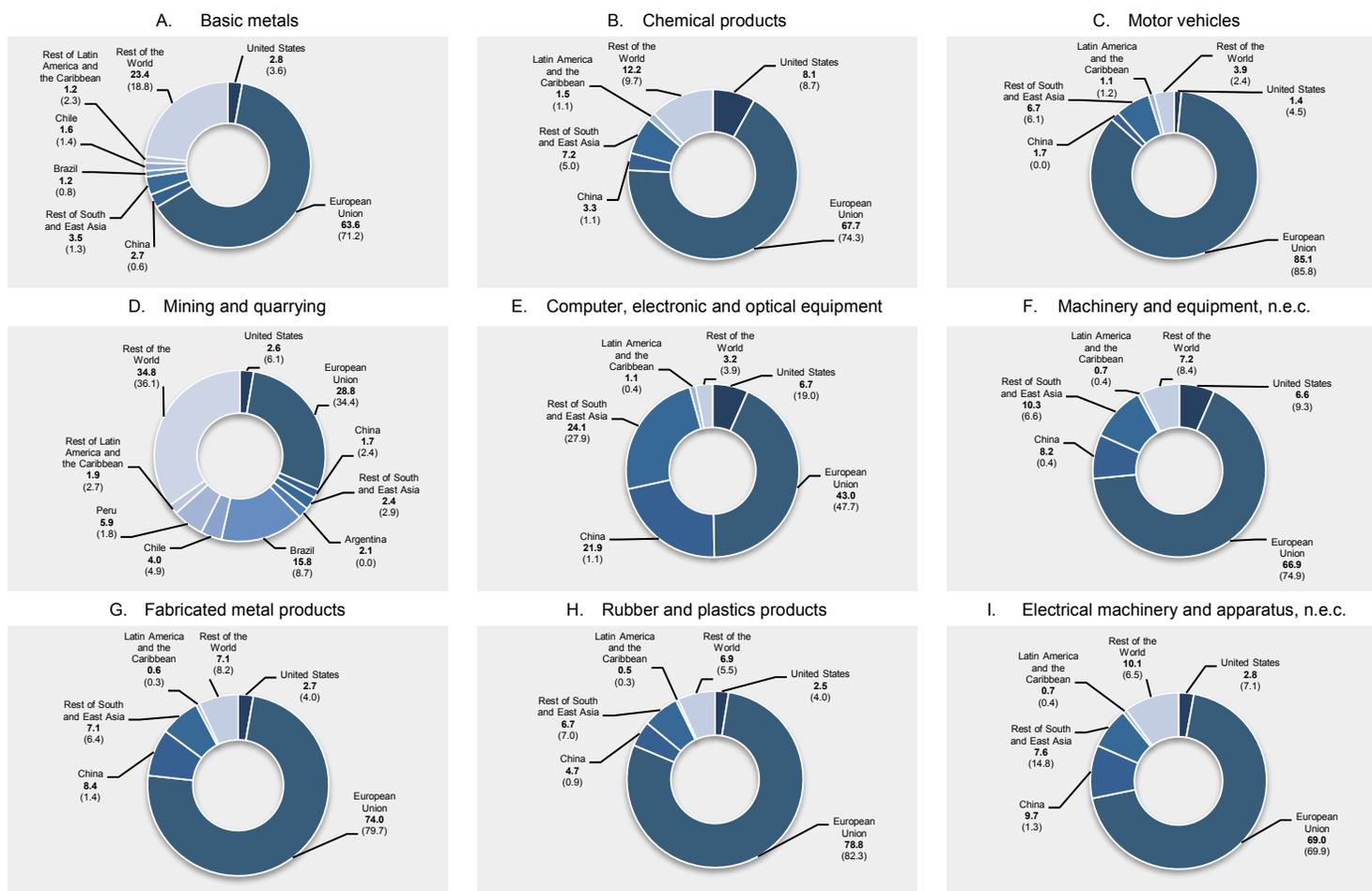
**Figure 6**  
**Factory North America: geographical origin of main imported inputs embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Origin sectors are decreasingly ordered according to their share in total imported intermediate goods in 2011 (see figure 2.A). Percentages in brackets indicate the share of each origin country/region in 1995.

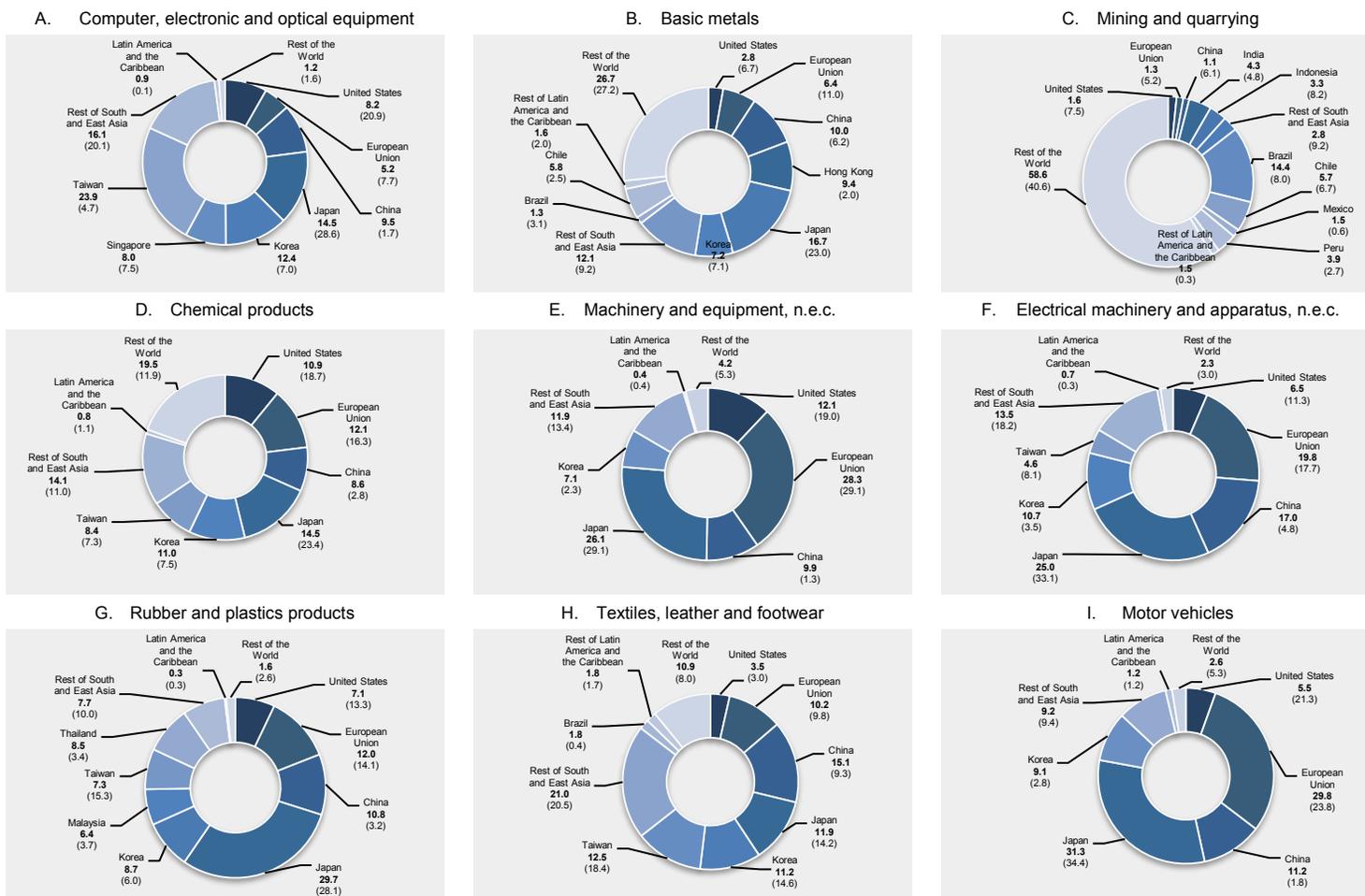
**Figure 7**  
**Factory Europe: geographical origin of main imported inputs embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Origin sectors are decreasingly ordered according to their share in total imported intermediate goods in 2011 (see figure 2.B). Percentages in brackets indicate the share of each origin country/region in 1995.

**Figure 8**  
**Factory Asia: geographical origin of main imported inputs embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Origin sectors are decreasingly ordered according to their share in total imported intermediate goods in 2011 (see figure 2.C). Percentages in brackets indicate the share of each origin country/region in 1995.

## 2. Trade agreements and GVC participation

The data presented in this document would indicate that the trade agreements signed by Latin American and Caribbean countries with members of Factory North America, Factory Europe or Factory Asia have not contributed much to promote their forward participation in extra-regional production networks (although causality is not evaluated). The region's linkages with the three major GVCs have remained limited and concentrated in a few origin countries, largely specialized in natural resource-based exports (except for Costa Rica and Mexico).

As shown in table 1, four of the six main Latin American suppliers of foreign intermediates for Factory North America, Factory Europe and Factory Asia (Chile, Costa Rica, Mexico, and Peru) gained preferential access to at least one of the three GVCs in 1995-2011. For Chile, the concentration of vertical specialization-related intermediate exports increased in this period, at least in terms of origin sectors. In contrast, Mexican exports became more diversified in the sector dimension. For Costa Rica and Peru the results were mixed (see figures A.1 and A.2 in the annex).

**Table 1**  
**Latin America and the Caribbean: preferential trade agreements with members of GVCs<sup>a</sup>**  
(In chronological order)

	South America	Mexico & Central America	The Caribbean
<b>Factory North America</b>			
Canada	Chile (1997), Peru (2009), Colombia (2011)	Mexico (1994), Costa Rica (2002), Panama (2013), Honduras (2014)	
Mexico	Ecuador (1987 <sup>b</sup> ), Peru (1987 <sup>b</sup> , 2012), Paraguay (1994 <sup>b</sup> , 2003 <sup>b</sup> ), Colombia (1995), Bolivia (1995, 2010), Chile (1992 <sup>b</sup> , 1999), Argentina (2003 <sup>b</sup> ), Brazil (2003 <sup>b</sup> ), Uruguay (2003 <sup>b</sup> , 2004)	Cuba (1985 <sup>b</sup> , 2001 <sup>b</sup> ), Panama (1986 <sup>b</sup> , 2015), Costa Rica (1995, 2013), Nicaragua (1998, 2012), El Salvador (2001, 2012), Guatemala (2001, 2013), Honduras (2001, 2013)	
United States	Chile (2004), Peru (2009), Colombia (2012)	Mexico (1994), El Salvador (2006), Guatemala (2006), Honduras (2006), Nicaragua (2006), Costa Rica (2009), Panama (2012)	Dominican Republic (2007)
<b>Factory Europe</b>			
European Union	Chile (2003), Colombia (2013), Peru (2013), Ecuador (2017)	Mexico (2000), Costa Rica (2013), El Salvador (2013), Guatemala (2013), Honduras (2013), Nicaragua (2013), Panama (2013)	CARICOM (2008), Dominican Republic (2008)
<b>Factory Asia</b>			
Brunei Darussalam	Chile (2006)		
China	Chile (2006), Peru (2010)	Costa Rica (2011)	
Hong Kong	Chile (2014)		

Table 1 (concluded)

	South America	Mexico & Central America	The Caribbean
India	Chile (2007 <sup>b</sup> ), Argentina (2009 <sup>b</sup> ), Brazil (2009 <sup>b</sup> ), Paraguay (2009 <sup>b</sup> ), Uruguay (2009 <sup>b</sup> )		
Japan	Chile (2007), Peru (2012)	Mexico (2005)	
Malaysia	Chile (2012)		
Republic of Korea	Chile (2004), Peru (2011), Colombia (2016)		
Singapore	Chile (2006), Peru (2009)	Panama (2006), Costa Rica (2013)	
Taiwan		Panama (2004), Guatemala (2006), El Salvador (2008), Honduras (2008), Nicaragua (2008)	
Thailand	Peru (2011), Chile (2015)		
Viet Nam	Chile (2014)		

Source: Author's elaboration on the basis of information from the World Trade Organization's Regional Trade Agreements Information System (RTA-IS) and the Design of Trade Agreements (DESTA) Database (Dür et al., 2014).

<sup>a</sup> Numbers within brackets refer to the year in which the agreement entered into force.

<sup>b</sup> Partial scope agreement.

For other countries with preferential access to Factory North America, Factory Europe and/or Factory Asia, the share in Latin America and the Caribbean's gross forward linkages remained very low or even decreased. The Dominican Republic, El Salvador, Guatemala, Honduras and Nicaragua accounted jointly for only 3% of the region's gross forward linkages with Factory North America in 2011 (compared with 2.5% in 1995). For these countries, GVC linkages with the United States are mainly of the backward type and concentrate in the labour-intensive assembly segment of the apparel industry. Notwithstanding this, except for Nicaragua, the other four countries diversified their gross forward linkages with Factory North America in the sector dimension (although the concentration in terms of destination markets increased). While El Salvador and Guatemala continued to export largely natural resource-based products, the Dominican Republic and Honduras diversified their exports towards medium-high or high-technology industries.

The Dominican Republic and CARICOM members, who had preferential access to Factory Europe in the studied period, show a low and decreasing participation in the region's total gross forward linkages, as well as mixed results in terms of export concentration. Also, for most Central American countries with some preferential access to Factory Asia, their share in the region's gross forward linkages remained very low (and even decreased); however, exports became more diversified (at least in the sector dimension).

### 3. Potential further integration into GVCs

As pointed out by Estevadeordal et al. (2013), for countries away from the major GVC regions, the high transport costs implied by long distances are most likely compensated with savings in production costs arising from strong comparative advantages. Thus, Latin America and the Caribbean countries' access to Factory North America, Factory Europe and Factory Asia would take place, at least initially, in sectors where comparative advantages are the strongest.

In order to assess the region's potential as a source of imported intermediates for the three GVCs, a revealed comparative advantage (RCA) index is considered.<sup>25</sup> Using data from BACI for 1995-1996 and 2010-2011, an industry-level RCA index is computed for each input-exporting country, considering both total exports and exports to each GVC. This allows distinguishing the industries in which the exporting country is competitive in both the world market and the GVC, from those in which it enjoys a comparative advantage in the GVC despite not being globally competitive.

As shown in table 2, Latin American and Caribbean countries' competitiveness as exporters of intermediate inputs for Factory North America, Factory Europe and Factory Asia is mostly related with natural resource-based industries (many of which are also competitive in the world market).<sup>26</sup> Yet, countries like Brazil, Costa Rica, the Dominican Republic, Honduras, Nicaragua and Mexico also show competitiveness in some of the most technology-intensive industries (Computer, electronic and optical equipment; Electrical machinery and apparatus, n.e.c.; or Motor vehicles, depending on the country).<sup>27</sup> However, as shown previously in this document, this competitiveness has not translated into a significant participation of these industries in the region's forward linkages with the GVCs.

The overall low forward engagement of Latin American and Caribbean countries in extra-regional value chains could indicate that countries from other regions are more efficient suppliers of the foreign inputs used in the production of the GVCs' manufacturing exports. Although this could be related to structural factors such as countries' distance to the main manufacturing hubs in Factory North America, Factory Europe and Factory Asia, the industries in which many Latin American and Caribbean countries are competitive do not have a significant participation in the imported inputs embodied in those GVCs' exports (see figure 2).

It should be pointed out that, rather than reflect countries' actual comparative advantages, revealed competitiveness might be affected by trade policy, which also plays an active role in promoting countries' engagement in GVCs (Kowalski et al., 2015). Also, some Latin American and Caribbean countries are mainly assemblers or are involved in activities with little domestic transformation. The difference between these countries' gross exports and their value added exports can be large, particularly for technology-intensive products. Thus, the identification of RCAs based on value-added export data would yield very different results.

<sup>25</sup> The RCA index, proposed by Balassa (1965), reflects countries' competitiveness in foreign markets by measuring the intensity with which a country exports a product (or group of products), in comparison to the product's share in world exports. A country is considered to have a comparative advantage (disadvantage) in a certain product if the share that the product represents in the country's export basket is higher (lower) than the product's share in world trade. The normalized RCA index is used here. It is computed as:  $NRCA_{p,t}(i) = \frac{RCA_{p,t}(i)-1}{RCA_{p,t}(i)+1}$ , with  $RCA_{p,t}(i) = \frac{E_{p,t}(i)/E_{p,t}}{\sum_p E_{p,t}(i)/\sum_p E_{p,t}}$  (where the subscript  $t$  denotes time,  $E_{p,t}(i)$  are country  $p$ 's exports of intermediate inputs from industry  $i$ , and  $E_{p,t}$  are country  $p$ 's total intermediate exports). This index is bounded between -1 and 1, with a positive value indicating that the country has a RCA in industry  $i$ .

<sup>26</sup> Table 2 presents the industries for which each Latin American and Caribbean country had a RCA in 2010-2011 (industries in which the exporting country was only competitive in the GVC, and not in the world market, are indicated in italics). It also shows each industry's participation in countries' vertical specialization-related intermediate exports to the GVC.

<sup>27</sup> According to the RCA index, also Antigua and Barbuda, Barbados, Dominica, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines would be competitive in some medium-high or high-technology industries. It should be noted, however, that Balassa's index is sensitive to the number of exported products. Thus, it takes high values for countries with few exported goods (like these small islands), as the share of each product in total exports is higher than for countries with more diversified export baskets.

**Table 2**  
**Latin America and the Caribbean: RCAs in intermediate exports to GVCs, 2010-2011<sup>a</sup>**

Exporting country	Factory North America	Factory Europe	Factory Asia
South America			
Argentina	<i>Basic metals</i> (75.9%) Textiles (4.6%) Agriculture (2.1%) Food products, beverages and tobacco (1.6%) <i>Mining and quarrying</i> (1.0%) <i>Wood and wood products</i> (0.4%) <sup>b</sup>	Food products, beverages and tobacco (51.3%) <i>Chemical products</i> (20.7%) <sup>b</sup> Textiles (7.0%) Agriculture (5.2%)	Agriculture (49.5%) Food products, beverages and tobacco (27.9%) Textiles (8.0%)
Bolivia (Plurinational State of)	Basic metals (62.2%) Mining and quarrying (14.6%) Agriculture (6.6%) <sup>b</sup> Wood and wood products (2.0%)	Mining and quarrying (41.7%) Basic metals (22.4%) Food products, beverages and tobacco (12.1%) <sup>b</sup> <i>Textiles</i> (10.9%) <sup>b</sup> Agriculture (7.1%) Wood and wood products (3.3%)	Mining and quarrying (74.8%) Wood and wood products (2.0%)
Brazil	Basic metals (38.8%) Motor vehicles (10.9%) <i>Chemical products</i> (8.5%) <sup>b</sup> Agriculture (6.5%) <i>Rubber and plastics products</i> (4.1%) Pulp, paper and paper products (3.7%) Food products, beverages and tobacco (3.7%) <i>Textiles</i> (3.7%) <i>Other non-metallic mineral products</i> (1.8%) Mining and quarrying (1.5%) <sup>b</sup> Wood and wood products (1.4%)	Agriculture (17.9%) Basic metals (17.0%) Food products, beverages and tobacco (15.9%) Mining and quarrying (12.9%) Pulp, paper and paper products (6.6%) <i>Textiles</i> (4.3%) Wood and wood products (1.3%)	Mining and quarrying (32.6%) Agriculture (20.3%) Pulp, paper and paper products (10.4%) Food products, beverages and tobacco (8.8%)
Chile	Basic metals (74.2%) Wood and wood products (5.4%) <i>Agriculture</i> (1.9%) Pulp, paper and paper products (1.8%) <sup>b</sup> <i>Food products, beverages and tobacco</i> (0.7%)	Basic metals (74.7%) Mining and quarrying (9.3%) Pulp, paper and paper products (6.2%) Wood and wood products (0.9%) <sup>b</sup>	Basic metals (74.7%) Mining and quarrying (14.4%) Pulp, paper and paper products (7.1%) Wood and wood products (0.7%)
Colombia	Basic metals (57.2%) <sup>b</sup> Agriculture (22.4%) Mining and quarrying (0.4%)	Agriculture (34.8%) Mining and quarrying (0.1%)	Basic metals (69.2%) <sup>b</sup> Agriculture (8.0%) Mining and quarrying (0.1%) <sup>b</sup> Other non-metallic mineral products (0.0%) <sup>b</sup>
Ecuador	Agriculture (37.5%) Wood and wood products (9.8%) Mining and quarrying (0.2%)	Agriculture (46.4%) Food products, beverages and tobacco (21.4%) Wood and wood products (5.9%) <sup>b</sup>	Wood and wood products (35.9%) Food products, beverages and tobacco (26.6%) Agriculture (6.1%) <sup>b</sup> Mining and quarrying (0.0%)

Table 2 (continue)

Exporting country	Factory North America	Factory Europe	Factory Asia
Paraguay	Agriculture (37.1%) Food products, beverages and tobacco (25.6%) Wood and wood products (13.6%) Textiles (7.4%)	Agriculture (81.8%) Food products, beverages and tobacco (8.0%) Textiles (5.8%)	Agriculture (41.5%) Textiles (40.4%) Food products, beverages and tobacco (9.9%) <sup>b</sup> Wood and wood products (5.2%)
Peru	Basic metals (89.1%) Agriculture (2.7%) Food products, beverages and tobacco (0.8%) <i>Wood and wood products (0.6%)</i>	Basic metals (44.8%) Mining and quarrying (29.4%) Agriculture (11.7%) Food products, beverages and tobacco (7.3%)	Mining and quarrying (49.0%) Basic metals (31.7%) Food products, beverages and tobacco (14.8%) <i>Wood and wood products (1.2%)<sup>b</sup></i>
Uruguay	<i>Chemical products (35.8%)<sup>b</sup></i> Textiles (35.0%) Wood and wood products (10.7%) <sup>b</sup> Food products, beverages and tobacco (1.8%)	Pulp, paper and paper products (29.8%) <sup>b</sup> Textiles (29.8%) Wood and wood products (14.1%) <sup>b</sup> Food products, beverages and tobacco (8.3%) Agriculture (6.1%)	Pulp, paper and paper products (50.2%) <sup>b</sup> Textiles (24.7%) Agriculture (13.1%) <sup>b</sup> Food products, beverages and tobacco (3.6%) Wood and wood products (1.7%) <sup>b</sup>
Venezuela (Bolivarian Republic of)	Mining and quarrying (2.8%)	<i>Basic metals (75.7%)</i> Mining and quarrying (7.1%)	Mining and quarrying (29.2%) <sup>b</sup>
Mexico and Central America			
Mexico	Motor vehicles (30.2%) Electrical machinery and apparatus, n.e.c. (9.8%) <i>Other non-metallic mineral products (0.9%)</i>	<i>Computer, electronic and optical equipment (24.6%)</i> Electrical machinery and apparatus, n.e.c. (8.4%) <sup>b</sup> <i>Other transport equipment (4.6%)<sup>b</sup></i> Mining and quarrying (1.5%)	<i>Basic metals (24.4%)</i> Mining and quarrying (12.4%) Electrical machinery and apparatus, n.e.c. (5.8%) <sup>b</sup> Motor vehicles (5.0%) <sup>b</sup>
Costa Rica	Computer, electronic and optical equipment (90.2%) <sup>b</sup> Rubber and plastics products (2.0%) Agriculture (1.7%) Food products, beverages and tobacco (0.8%)	Computer, electronic and optical equipment (76.0%) <sup>b</sup> Agriculture (12.8%)	Computer, electronic and optical equipment (93.1%) <sup>b</sup> Electrical machinery and apparatus, n.e.c. (4.0%) <sup>b</sup> Agriculture (0.6%)
El Salvador	Agriculture (33.7%) Food products, beverages and tobacco (17.5%) Textiles (10.8%)	Agriculture (79.2%) Food products, beverages and tobacco (10.9%) <sup>b</sup> Rubber and plastics products (3.6%) <sup>b</sup>	Food products, beverages and tobacco (37.8%) Agriculture (16.3%)
Guatemala	Agriculture (36.3%) <i>Basic metals (24.0%)<sup>b</sup></i> Food products, beverages and tobacco (12.2%) <i>Mining and quarrying (10.5%)<sup>b</sup></i> Textiles (6.6%)	Agriculture (69.2%) Food products, beverages and tobacco (26.5%)	Food products, beverages and tobacco (56.5%) Agriculture (20.8%) <i>Wood and wood products (1.5%)<sup>b</sup></i>
Honduras	Electrical machinery and apparatus, n.e.c. (31.5%) <sup>b</sup> Agriculture (15.3%) Food products, beverages and tobacco (5.2%)	Agriculture (87.0%) Food products, beverages and tobacco (8.1%) <sup>b</sup>	<i>Mining and quarrying (37.5%)<sup>b</sup></i> Agriculture (13.6%)

Table 2 (continue)

Exporting country	Factory North America	Factory Europe	Factory Asia
Nicaragua	Basic metals (58.2%) <sup>b</sup> Electrical machinery and apparatus, n.e.c. (18.1%) <sup>b</sup> Agriculture (15.5%) Food products, beverages and tobacco (3.6%)	Agriculture (80.1%) <i>Textiles (9.7%)<sup>b</sup></i> Food products, beverages and tobacco (8.3%) <sup>b</sup>	Food products, beverages and tobacco (51.9%) Agriculture (12.3%) <i>Wood and wood products (10.2%)<sup>b</sup></i>
Panama	Chemical products (82.8%) <sup>b</sup> <i>Food products, beverages and tobacco (0.6%)</i>		Chemical products (60.6%) <sup>b</sup>
The Caribbean			
Antigua and Barbuda	<i>Electrical machinery and apparatus, n.e.c. (13.1%)<sup>b</sup></i> <i>Textiles (9.2%)<sup>b</sup></i> Fabricated metal products (7.8%) <sup>b</sup>	<i>Agriculture (32.7%)</i>	Machinery and equipment, n.e.c. (35.3%) <sup>b</sup> <i>Basic metals (29.5%)<sup>b</sup></i> <i>Food products, beverages and tobacco (16.8%)</i> Fabricated metal products (8.9%) <sup>b</sup>
Bahamas	Chemical products (69.8%)		
Barbados	<i>Computer, electronic and optical equipment (55.7%)</i> Food products, beverages and tobacco (9.9%) Fabricated metal products (8.0%) <sup>b</sup> <i>Other transport equipment (6.1%)<sup>b</sup></i>	Food products, beverages and tobacco (49.5%) <i>Computer, electronic and optical equipment (24.3%)<sup>b</sup></i>	Fabricated metal products (26.1%) <sup>b</sup>
Belize	Food products, beverages and tobacco (23.7%) <i>Wood and wood products (10.7%)</i> Mining and quarrying (0.0%) <sup>b</sup>	Food products, beverages and tobacco (89.3%)	Agriculture (13.9%) <sup>b</sup> <i>Wood and wood products (11.5%)<sup>b</sup></i> Food products, beverages and tobacco (10.8%) <sup>b</sup> <i>Textiles (4.1%)<sup>b</sup></i>
Cuba	Basic metals (36.4%) <i>Chemical products (12.1%)<sup>b</sup></i> Food products, beverages and tobacco (2.4%)	Basic metals (44.6%) Food products, beverages and tobacco (24.9%)	Basic metals (77.4%) <sup>b</sup> Food products, beverages and tobacco (19.9%)
Dominica	<i>Chemical products (39.3%)</i> <i>Electrical machinery and apparatus, n.e.c. (17.4%)<sup>b</sup></i> <i>Fabricated metal products (7.3%)<sup>b</sup></i> Pulp, paper and paper products (2.4%) <sup>b</sup>	<i>Mining and quarrying (19.7%)<sup>b</sup></i> Food products, beverages and tobacco (13.3%) <sup>b</sup> <i>Agriculture (8.9%)<sup>b</sup></i>	<i>Basic metals (25.5%)</i> <i>Machinery and equipment, n.e.c. (17.4%)<sup>b</sup></i> <i>Electrical machinery and apparatus, n.e.c. (15.9%)<sup>b</sup></i>
Dominican Republic	Electrical machinery and apparatus, n.e.c. (25.6%) Textiles (7.9%) <sup>b</sup> Food products, beverages and tobacco (6.2%) Agriculture (5.5%)	Agriculture (38.3%) Electrical machinery and apparatus, n.e.c. (14.1%) <sup>b</sup>	<i>Basic metals (53.1%)</i>
Grenada	Agriculture (14.1%)	Agriculture (54.1%)	<i>Chemical products (12.3%)</i> <i>Textiles (4.3%)</i> <i>Motor vehicles (0.4%)<sup>b</sup></i>

Table 2 (concluded)

Exporting country	Factory North America	Factory Europe	Factory Asia
Guyana	Basic metals (97.1%) Food products, beverages and tobacco (0.9%) Wood and wood products (0.3%)	Food products, beverages and tobacco (77.4%) Mining and quarrying (15.8%) Wood and wood products (1.9%)	Agriculture (35.5%) Wood and wood products (17.9%) Food products, beverages and tobacco (0.9%) <sup>b</sup>
Haiti		Chemical products (61.9%) <sup>b</sup> Agriculture (28.3%) Food products, beverages and tobacco (4.2%)	Textiles (1.8%) <sup>b</sup>
Jamaica	Basic metals (85.7%) Food products, beverages and tobacco (4.4%) Mining and quarrying (4.0%)	Basic metals (73.7%) Food products, beverages and tobacco (19.9%)	Food products, beverages and tobacco (13.0%) <sup>b</sup> Agriculture (6.9%)
Saint Kitts and Nevis	Computer, electronic and optical equipment (74.8%) <sup>b</sup> Electrical machinery and apparatus, n.e.c. (15.0%) Pulp, paper and paper products (3.3%) <sup>b</sup>	Electrical machinery and apparatus, n.e.c. (71.4%) <sup>b</sup> Machinery and equipment, n.e.c. (16.9%) <sup>b</sup>	Computer, electronic and optical equipment (81.5%) <sup>b</sup> Fabricated metal products (1.8%) <sup>b</sup> Agriculture (0.5%)
Saint Lucia	Computer, electronic and optical equipment (87.8%) Electrical machinery and apparatus, n.e.c. (4.7%) <sup>b</sup>		Computer, electronic and optical equipment (36.5%) <sup>b</sup> Machinery and equipment, n.e.c.(3.1%) <sup>b</sup> Food products, beverages and tobacco (1.8%) Electrical machinery and apparatus, n.e.c.(1.3%) <sup>b</sup>
Saint Vincent and the Grenadines	<i>Basic metals (34.3%)<sup>b</sup></i> <i>Other transport equipment (11.7%)</i> Food products, beverages and tobacco (3.4%)		<i>Fabricated metal products (29.8%)<sup>b</sup></i> <i>Electrical machinery and apparatus, n.e.c.(16.6%)<sup>b</sup></i>
Suriname	Basic metals (98.2%)	Basic metals (91.0%) <i>Food products, beverages and tobacco (3.0%)</i> <i>Wood and wood products (0.5%)</i>	<i>Agriculture (28.3%)</i> <i>Wood and wood products (17.8%)<sup>b</sup></i> <i>Food products, beverages and tobacco (1.5%)<sup>b</sup></i>
Trinidad and Tobago	Chemical products (70.7%) Basic metals (27.0%) Mining and quarrying (0.9%) <i>Food products, beverages and tobacco (0.8%)</i>	Basic metals (50.0%) <sup>b</sup> Chemical products (46.5%) Mining and quarrying (0.0%) <sup>b</sup>	Mining and quarrying (7.1%) <sup>b</sup>

Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Industries are ranked, from highest to lowest, on the basis of their share in countries' vertical specialization-related intermediate exports to the GVC (indicated in brackets). In italics, industries with RCA in the GVC but not in the world market.

<sup>b</sup> Industries that were not competitive in 1995-1996.

### III. Intra-regional production networks in Latin America

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In contrast to the strong role of regional value chains in North America, Europe and Southeast Asia, countries in Latin America and the Caribbean have weak intra-regional production linkages (OECD, 2015). Most foreign intermediate inputs embodied in Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico and Peru's manufacturing exports are imported from outside the region (particularly, those with a higher technology content). The participation of China increased significantly since the early 2000s, in detriment of other extra-regional origins (the United States and the European Union).

Notwithstanding the above general pattern, the seven Latin American countries for which data are available exhibit significant differences in the composition of their backward linkages. The analysis carried out in this section characterizes each country's backward participation in international value chains and explores the potential for deeper intra-regional production integration.

#### A. Current linkages

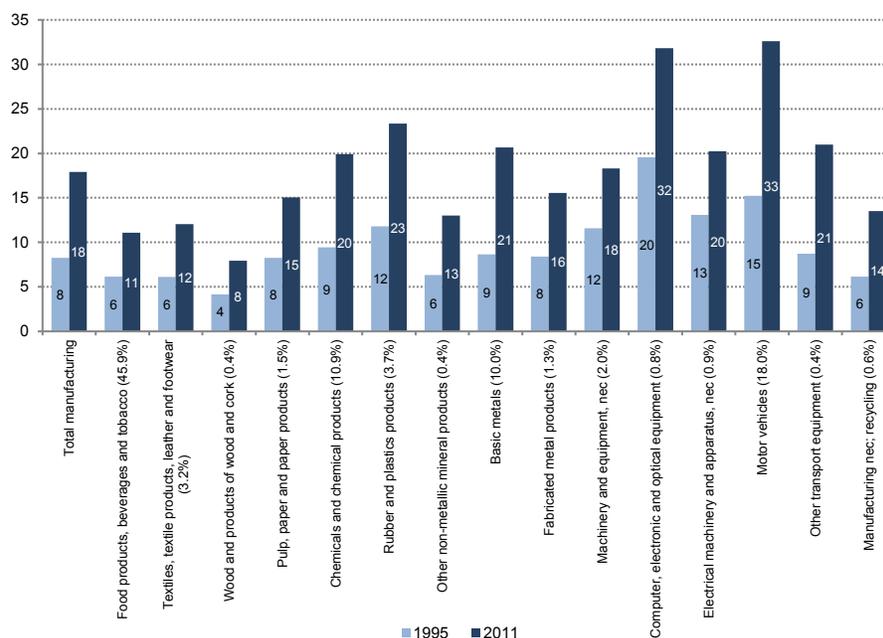
##### 1. Argentina

The high natural resource intensity of Argentina's manufacturing exports reflects in a relatively low level of vertical specialization (18% of gross exports in 2011). However, as shown in figure 9, there are large differences across industries. Among the main exporting sectors, the share of foreign intermediates in gross exports ranged in 2011 between 11% for Food products, beverages and tobacco (which accounted for almost half of manufacturing exports) and 33% for the more technology intensive industry Motor vehicles (18% of total exports). Despite these differences, the use of foreign inputs increased significantly for all manufacturing sectors with respect to 1995.

Argentina stands out in the region for the high level of backward integration with its MERCOSUR partner Brazil, the main origin of imported intermediate goods in Argentine manufacturing exports (almost 40% of the total in 2011, compared to nearly 30% in 1995) (see figure 10.A). Gross backward linkages with other Latin American and Caribbean countries represented only 6.5% of the total in 2011 (compared to 9.3% in 1995), and were concentrated in Chile (2.6%), Mexico (1.8%) and Uruguay (1.0%) (another MERCOSUR partner). The European Union, the United States, China and other Southeast Asian countries

(particularly, Japan, Korea, Thailand, and India) were, along with Brazil, the main suppliers of foreign intermediates for Argentina's manufacturing exports.<sup>28</sup>

**Figure 9**  
**Argentina: imported intermediates embodied in gross manufacturing exports by exporting industry, 1995 and 2011<sup>a</sup>**  
*(Percentages of gross exports)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables.

<sup>a</sup> Percentages in brackets indicate the share of each industry in total manufacturing exports in 2011.

The composition by source industry shows that the main imported intermediate goods in Argentine gross exports corresponded in 2011 to Chemical products and Motor vehicles, followed by Basic metals, Fabricated metal products, Machinery and equipment, n.e.c., and Rubber and plastics products (see figure 10.B). Brazil is the main or one of the main suppliers of most of these inputs, with a generally increasing participation (see figure A.3 in the annex). The share of Brazil is particularly high in the case of Motor vehicles, Basic metals, and Rubber and plastics products, as well as in other intermediates with a lower participation in Argentina's input basket (like Pulp, paper and paper products, and Electrical machinery and apparatus, n.e.c.). Brazil is also the main source of mining inputs (particularly, iron ores and concentrates).<sup>29</sup>

The competition of China has affected the United States and the European Union, who lost participation in Argentina's gross backward linkages since the 2000s. Despite representing a relatively low (and decreasing) share of total inputs, it is worth mentioning the most technology-intensive sectors Computer, electronic and optical equipment and Electrical machinery and apparatus, n.e.c., where the participation of China reached the highest levels (affecting also other Southeast Asian countries). However, as pointed out in section II, in these sectors a large proportion of the value added embodied in

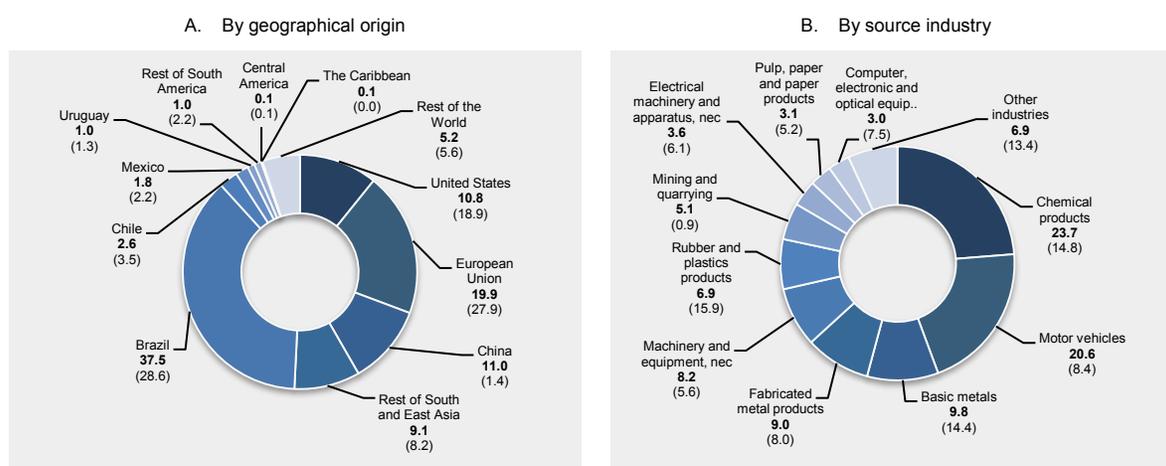
<sup>28</sup> In addition to Brazil and the rest of MERCOSUR's founding members, several Latin American countries benefited from some degree of preferential access to the Argentine market in the studied period (including Chile, Mexico, and the Andean Community's members) (see table A.3 in the annex).

<sup>29</sup> Brazil also has a large participation in Agriculture and all low-technology industries (see table A.4 in the annex).

Chinese gross exports is sourced from abroad, mostly from other Southeast Asian countries, the European Union and the United States.

At the aggregate level, Latin American and Caribbean countries (excluding Brazil) had a larger participation in low and medium-low-technology industries (particularly, Wood and wood products, Pulp, paper and paper products, Food products, beverages and tobacco, Other non-metallic mineral products, Rubber and plastics products, and Basic metals), which account in general for a small share of Argentina's gross backward linkages. However, along with Brazil, a few countries had rather significant participations in more technology-intensive industries, like Mexico in Computer, electronic and optical equipment, Motor vehicles, and Electrical machinery and apparatus, n.e.c. (see table A.4 in the annex for details on each industry's main intra-regional origin countries).

**Figure 10**  
**Argentina: composition of imported intermediate goods embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
(Percentages of the total)



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Percentages in brackets indicate the share of each origin country/region (figure 10.A) or industry (figure 10.B) in 1995.

## 2. Brazil

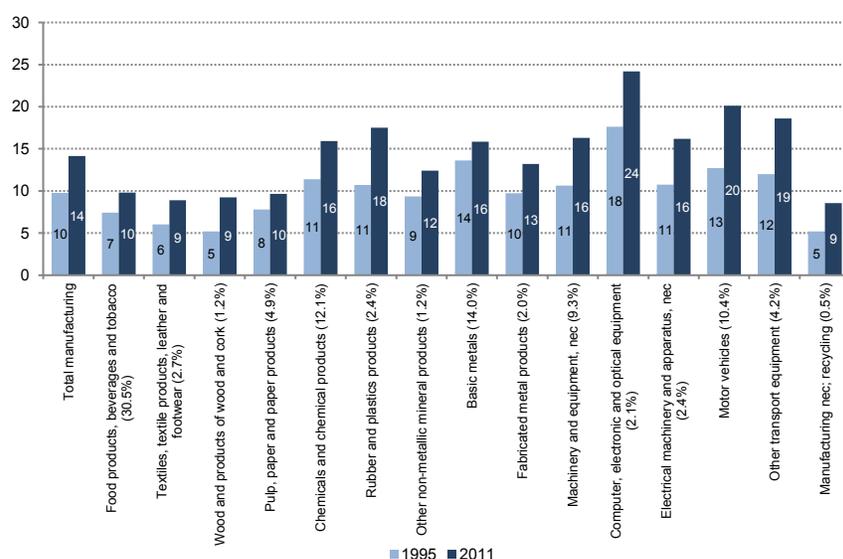
Brazil's level of vertical specialization is lower than those of the other Latin American countries considered (14% of gross exports in 2011).<sup>30</sup> This would mainly be related with the country's larger market size, rather than with its export specialization, since all manufacturing sectors show lower backward linkages than in the other six countries (with a few exceptions). However, for many industries the level of vertical specialization is lower in Brazil than in other large countries like France, Germany, the United Kingdom or the United States, which would be explained by these countries' higher level of development.<sup>31</sup>

Among Brazil's main exporting industries, the share of foreign intermediates in gross exports ranged in 2011 between 10% for Food products, beverages and tobacco (the largest exporter, with around 30% of the total) and 20% for Motor vehicles (10% of total exports) (see figure 11). To a lesser extent than in the case of Argentina, the use of imported inputs also increased in Brazil for all manufacturing sectors between 1995 and 2011.

<sup>30</sup> Brazil shows the lowest level of vertical specialization among the 63 countries included in the OECD's ICIO tables.

<sup>31</sup> A larger domestic market is associated with a lower backward participation in GVCs, due to countries' larger capabilities for sourcing intermediates domestically. However, developed countries tend to source more from abroad (Kowalski et al., 2015).

**Figure 11**  
**Brazil: imported intermediates embodied in gross manufacturing exports by exporting industry,**  
**1995 and 2011<sup>a</sup>**  
*(Percentages of gross exports)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables.

<sup>a</sup> Percentages in brackets indicate the share of each industry in total manufacturing exports in 2011.

Brazil is also characterized by a lower level of intra-regional production integration than the other Latin American countries (the only exception is Mexico, when considered as part of the Latin American region<sup>32</sup>). In 2011, less than 20% of the imported intermediate goods embodied in Brazilian manufacturing exports were sourced from the region (the same proportion as in 1995) (see figure 12.A). Argentina (6.2%)—Brazil's largest MERCOSUR partner—, Chile (5.4%), Mexico (1.9%) and Peru (1.5%) accounted for the bulk of these intra-regional inputs. The other two founding members of MERCOSUR, Paraguay and Uruguay, represented less than 10% of the intra-regional total (with a joint participation of only 1.6% in total foreign intermediates). Most imported inputs in Brazil's manufacturing exports came from the European Union, the United States, China and other Southeast Asian countries (particularly, Japan and Korea).<sup>33</sup>

The main origin industries of the imported intermediate goods embodied in 2011 in Brazil's gross manufacturing exports were Chemical products, Basic metals, and Machinery and equipment, n.e.c. (see figure 12.B). Other industries with a significant participation include Other transport equipment, Computer, electronic and optical equipment, Rubber and plastics products, and Fabricated metal products. The European Union, the United States, China and the rest of South and East Asia accounted for the majority of all these inputs, with particularly high shares in the most technology-intensive ones (see figure A.4 in the annex). Also in this case, the gross participation of China increased significantly in the studied period (reaching higher levels in Computer, electronic and optical equipment, and Electrical machinery and apparatus, n.e.c.), in detriment of the United States and the European Union.

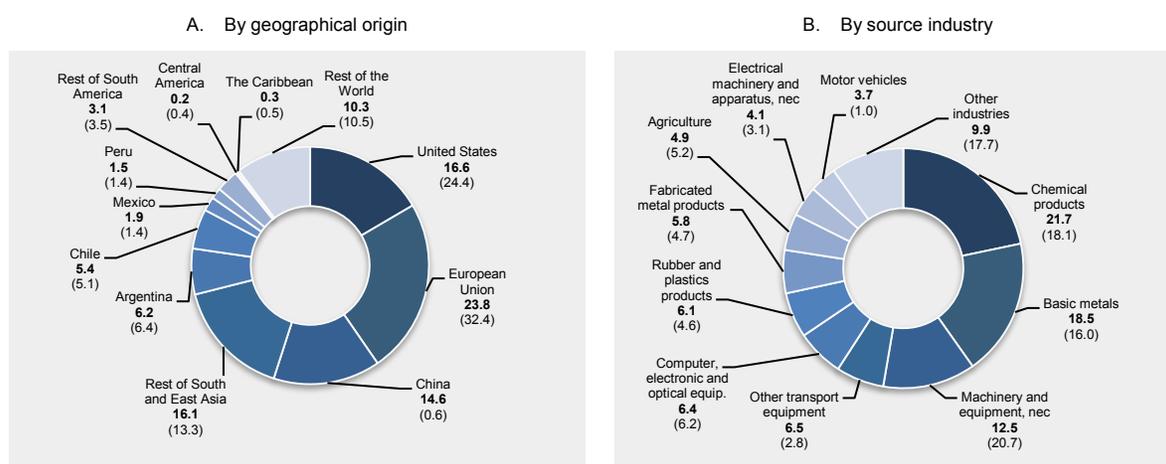
Intra-regional inputs had a larger participation in the medium-low-technology industries Basic metals (almost 40% of the total) and Rubber and plastics products (22%) (see figure A.4 in the annex). Their share was also significant in Motor vehicles (16%); however, Argentina—the main input supplier in this sector within the region—lost almost 20 percentage points between 1995 and 2011, due to the competition of South and East Asia. As for other intermediates with a lower participation in Brazil's gross backward linkages,

<sup>32</sup> Although Mexico is a Latin American country, it is much more economically integrated with North America (particularly, with the United States).

<sup>33</sup> The founding members of MERCOSUR, Chile, Mexico, the Andean Community's members, and some Caribbean countries enjoyed, in different degrees, preferential access to the Brazilian market during the studied period (see table A.3 in the annex).

Latin American and Caribbean countries accounted for a large proportion of those originated in the primary sectors Mining and quarrying and Agriculture (over 50% of the total), and in the low-technology industries Wood and wood products (48%) and Food products, beverages and tobacco (36%) (for details, see table A.4 in the annex).

**Figure 12**  
**Brazil: composition of imported intermediate goods embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Percentages in brackets indicate the share of each origin country/region (figure 12.A) or industry (figure 12.B) in 1995.

### 3. Chile

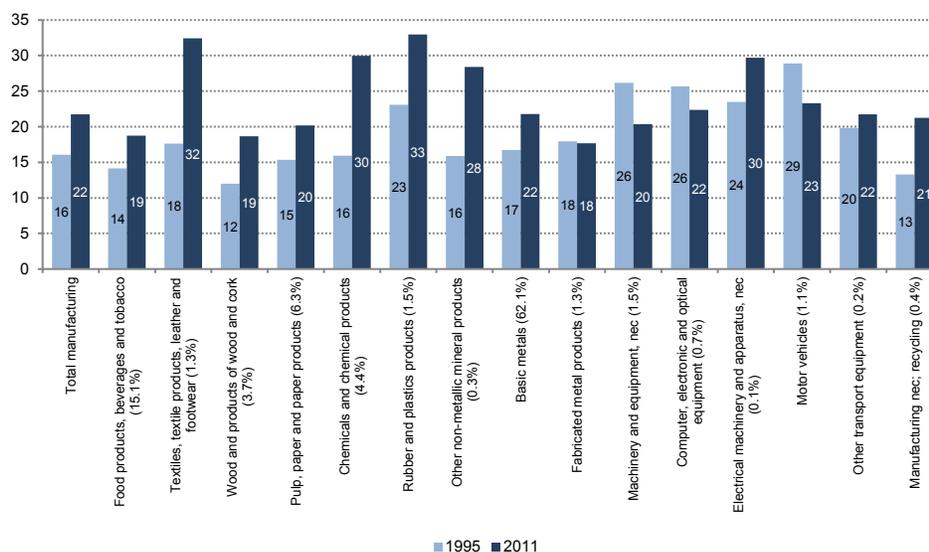
The level of Chile's gross backward linkages (22% of gross exports in 2011) is comparable to those of Colombia (20%) and Peru (19%), two countries with a similar export specialization pattern.<sup>34</sup> As shown in figure 13, the three main Chilean exporting sectors in manufacturing, the natural resource-based Basic metals, Food products, beverages and tobacco and Pulp, paper and paper products, have similar vertical specialization levels (around 20%). For most manufacturing sectors, the use of foreign inputs increased between 1995 and 2011 (the exceptions are the technology-intensive industries Machinery and equipment, n.e.c., Computer, electronic and optical equipment and Motor vehicles, which account for a low share of total exports).

Latin American countries are an important source of foreign inputs for Chile's manufacturing exports, with a joint participation of nearly 40% in 2011 (compared to around 35% in 1995) (see figure 14.A). These intra-regional linkages concentrate in Chile's Pacific Alliance partners Peru (11.7%) and Mexico (3.7%), and the two largest MERCOSUR members (Brazil and Argentina, with 8.3% and 7.9%, respectively). The United States, the European Union, China and the rest of South and East Asia (particularly, Korea, Japan, Taiwan, and India) account for the bulk of extra-regional inputs.<sup>35</sup>

<sup>34</sup> Chile's gross vertical specialization level is also similar to those of Australia (25%) and New Zealand (21%), two extra-regional natural resource-intensive economies.

<sup>35</sup> As shown in table A.3 in the annex, Mexico, Peru, the United States, the European Union, China and several other Southeast Asian countries enjoyed preferential access to the Chilean market during the studied period. Also, Chile had FTAs or partial scope agreements in place with other extra-regional countries, as well as with members of the Andean Community, CARICOM and MERCOSUR.

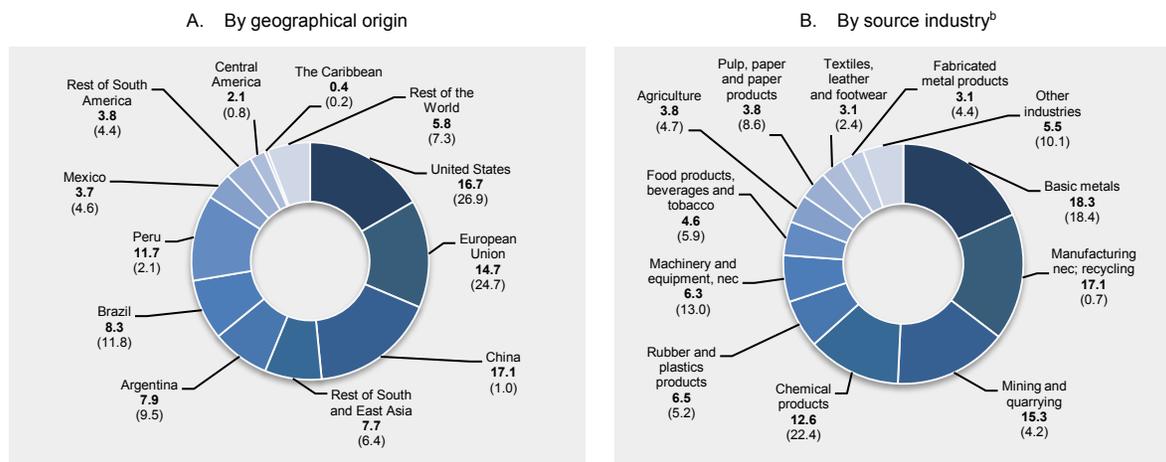
**Figure 13**  
**Chile: imported intermediates embodied in gross manufacturing exports by exporting industry, 1995 and 2011<sup>a</sup>**  
*(Percentages of gross exports)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables.

<sup>a</sup> Percentages in brackets indicate the share of each industry in total manufacturing exports in 2011.

**Figure 14**  
**Chile: composition of imported intermediate goods embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Percentages in brackets indicate the share of each origin country/region (figure 14.A) or industry (figure 14.B) in 1995.

<sup>b</sup> Manufacturing n.e.c.; recycling corresponds mostly to metal waste and scrap.

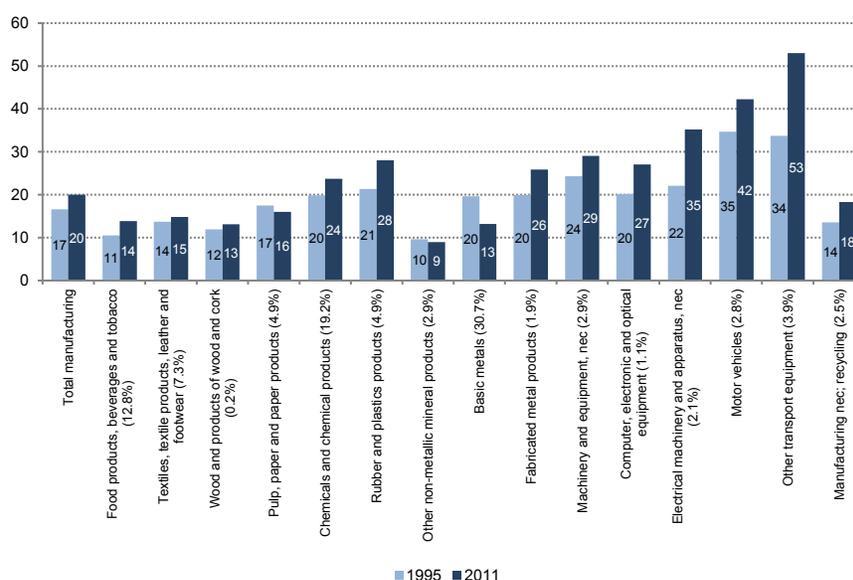
Most imported intermediate goods used in the production of Chilean manufacturing exports originate in mining-related sectors (see figure 14.B). Latin American and Caribbean countries (particularly, Peru) are the main suppliers of inputs from Mining and quarrying, while inputs from Basic metals (as well as metal waste) are sourced mostly from outside the region (mainly, from South and East

Asia and the European Union) (see table A.4 and figure A.5 in the annex). Extra-regional countries are also the main origin of most of the other imported intermediate goods embodied in Chile's manufacturing exports (including, Chemical products, Rubber and plastics products, and Machinery and equipment, n.e.c.), with an increasing participation of China. The exceptions are Food products, beverages and tobacco and Agriculture, where Latin American and Caribbean countries have a larger participation (for details, see table A.4 in the annex).

#### 4. Colombia

The aggregate level of Colombia's gross vertical specialization (20% of gross exports in 2011) is driven mainly by Basic metals, Chemical products and Food products, beverages and tobacco, the country's three largest exporting sectors in manufacturing (see figure 15). While in Basic metals the use of foreign inputs fell by one third between 1995 and 2011, Chemical products, Food products, beverages and tobacco and most of the other manufacturing sectors experienced an increase in this period. Also, unlike the case of Chile, in Colombia vertical specialization is significantly higher in the most technology intensive industries (particularly, Electrical machinery and apparatus, n.e.c., Motor vehicles, and Other transport equipment), which jointly account for a rather important share of total manufacturing exports.

**Figure 15**  
**Colombia: imported intermediates embodied in gross manufacturing exports by exporting industry,**  
**1995 and 2011<sup>a</sup>**  
*(Percentages of gross exports)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables.

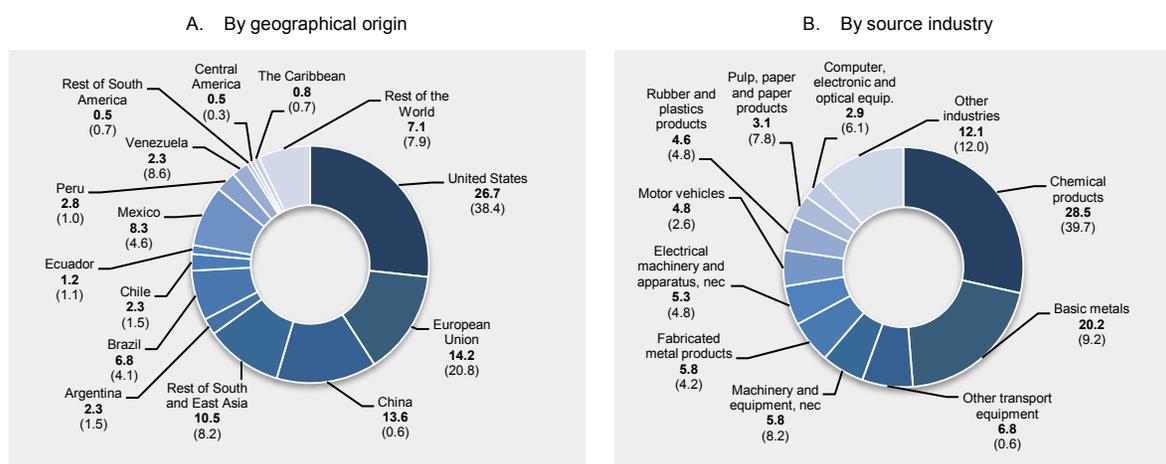
<sup>a</sup> Percentages in brackets indicate the share of each industry in total manufacturing exports in 2011.

In 2011, nearly 30% of the foreign intermediates used in the production of Colombia's manufacturing exports was imported from the Latin American region (somewhat more than in 1995), with Mexico (8.3%), Brazil (6.8%), Peru (2.8%), Argentina, Chile and Venezuela (2.3% each), and Ecuador (1.2%) as the main origin countries (see figure 16.A). Also in this case, the United States, the European

Union, China and the rest of South and East Asia (particularly, Japan, Korea, India, and Taiwan) accounted for the bulk of extra-regional inputs.<sup>36</sup>

The composition by source industry shows that the main imported intermediates in Colombia's gross exports corresponded in 2011 to Chemical products and Basic metals (see figure 16.B). The medium-high or high-technology industries Other transport equipment, Machinery and equipment, n.e.c., Electrical machinery and apparatus, n.e.c., Motor vehicles and Computer, electronic and optical equipment, sourced mainly from extra-regional countries, also had a significant participation.

**Figure 16**  
**Colombia: composition of imported intermediate goods embodied**  
**in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
(Percentages of the total)



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Percentages in brackets indicate the share of each origin country/region (figure 16.A) or industry (figure 16.B) in 1995.

Latin American and Caribbean countries accounted for a larger proportion of the inputs originated in Basic metals, Pulp, paper and paper products and Rubber and plastics products, although their share in Electrical machinery and apparatus, n.e.c., Chemical products and Motor vehicles was also important (see figure A.6 in the annex). Notwithstanding this, the region sourced a larger proportion of other intermediates with a lower participation in Colombia's input basket (particularly, those originated in Agriculture and the low-technology industries Food products, beverages and tobacco and Wood and wood products) (for details, see table A.4 in the annex).

## 5. Costa Rica

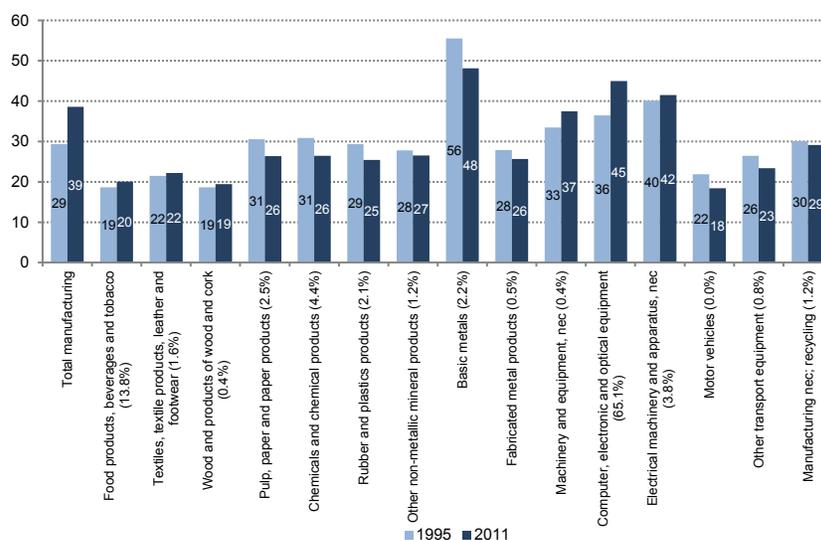
Costa Rica has, after Mexico, the second highest gross vertical specialization level in Latin America (7 countries) (39% in 2011). Both countries specialize in assembling and processing foreign intermediates, which are subsequently exported. Unlike other countries in the region, Costa Rican manufacturing exports concentrate in the high-technology sector Computer, electronic and optical equipment (65% of the total in 2011), where the share of foreign inputs in gross exports reached 45% (see figure 17).<sup>37</sup> In contrast, the

<sup>36</sup> Several Latin American and Caribbean countries had some degree of preferential access to the Colombian market in the studied period, including the members of the Andean Community, CACM, MERCOSUR and CARICOM, Chile, and Mexico. Colombia has also signed several extra-regional FTAs, including those with the United States and the European Union (entered into force after 2011) (see table A.3 in the annex).

<sup>37</sup> As noted before, Costa Rica's exports of high-technology products were significantly affected by the closure of Intel's microprocessor assembly plant in 2014.

natural resource-based industry Food products, beverages and tobacco (around 14% of gross manufacturing exports) had a vertical specialization level of 20%. In these two sectors, the use of foreign inputs increased between 1995 and 2011 (particularly, in Computer, electronic and optical equipment), but most of the other industries experienced a decline in this period.

**Figure 17**  
**Costa Rica: imported intermediates embodied in gross manufacturing exports by exporting industry, 1995 and 2011<sup>a</sup>**  
*(Percentages of gross exports)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables.

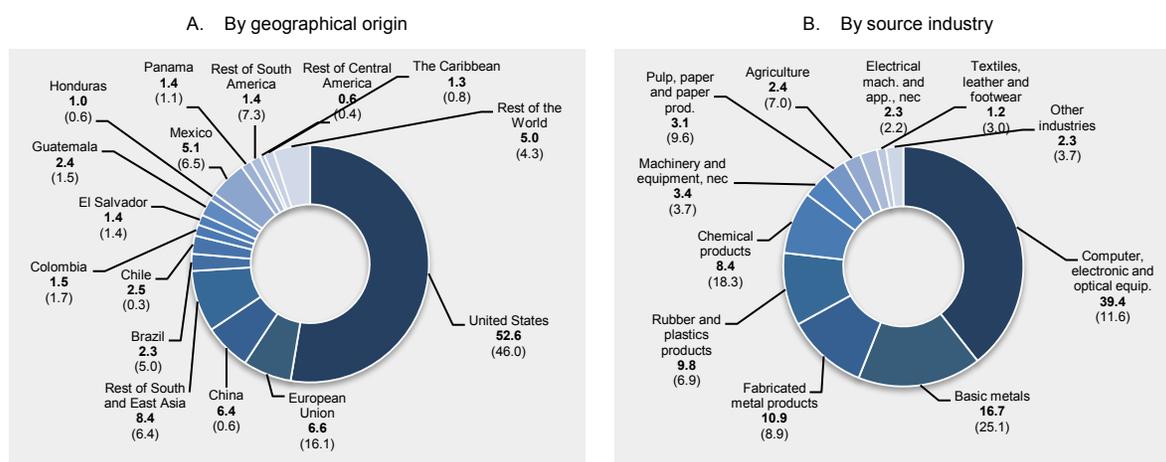
<sup>a</sup> Percentages in brackets indicate the share of each industry in total manufacturing exports in 2011.

The United States concentrate more than half of Costa Rica's gross backward linkages (see figure 18.A). However, Latin American countries have an important, though decreasing, participation (21% of the total in 2011, compared to 27% in 1995). Mexico (5.1%), Chile (2.5%), Brazil (2.3%), Colombia (1.5%) and Panama (1.4%), along with Costa Rica's CACM partners Guatemala (2.4%), El Salvador (1.4%) and Honduras (1.0%), account for the bulk of these intra-regional linkages. The share of China and, to a lesser extent, other Southeast Asian countries (particularly, Japan) in total foreign inputs has increased, although it is relatively low compared to Asia's participation in other Latin American countries' backward linkages. The European Union's share, in contrast, fell significantly in the studied period.<sup>38</sup>

A large proportion of the foreign inputs embodied in Costa Rica's manufacturing exports originates in the high-technology industry Computer, electronic and optical equipment (see figure 18.B). Other sectors with a significant participation include Chemical products and the medium-low-technology industries Basic metals, Fabricated metal products and Rubber and plastics products. The main origin of these inputs (particularly, those from Computer, electronic and optical equipment), as well as other intermediates with a lower participation in Costa Rica's input basket, are extra-regional countries (see figure A.7 and table A.4 in the annex). The Latin American region accounts for a larger proportion of inputs from Mining and quarrying, and low and medium-low-technology industries (among the main source sectors, Basic metals and Rubber and plastics products). A few Latin American countries also have a significant participation in medium-high or high-technology industries (particularly, Brazil and Mexico).

<sup>38</sup> In addition to the CACM's partners (El Salvador, Guatemala, Honduras and Nicaragua), CARICOM countries, Chile, Colombia, the Dominican Republic, Mexico and Panama benefited from some preferential access to the Costa Rican market during the studied period. Also, before 2011 Costa Rica put in place FTAs with Canada and the United States (see table A.3 in the annex).

**Figure 18**  
**Costa Rica: composition of imported intermediate goods embodied**  
**in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Percentages in brackets indicate the share of each origin country/region (figure 18.A) or industry (figure 18.B) in 1995.

## 6. Mexico

Integrated into Factory North America through NAFTA, Mexico has a relatively high level of vertical specialization (44% of gross exports in 2011). Among Mexico's main exporting industries, gross backward linkages ranged in 2011 between 17% for Basic metals and 64% for Computer, electronic and optical equipment (see figure 19).<sup>39</sup> Except for Basic metals, the use of foreign inputs increased for all Mexican manufacturing sectors between 1995 and 2011.

The United States remain as the main origin of the imported intermediates used in the production of Mexico's manufacturing exports, but China and other Southeast Asian countries (particularly, Japan, Korea, Taiwan, and Malaysia) have accounted for an increasing share of the total (see figure 20.A). Thus, between 1995 and 2011 the United States' participation fell from nearly 80% to around 50%, while that of Asian countries increased from 10% to 35%.<sup>40</sup> Mexico's backward linkages with Latin American and Caribbean countries are very low (around 4% of the total in 2011).<sup>41</sup>

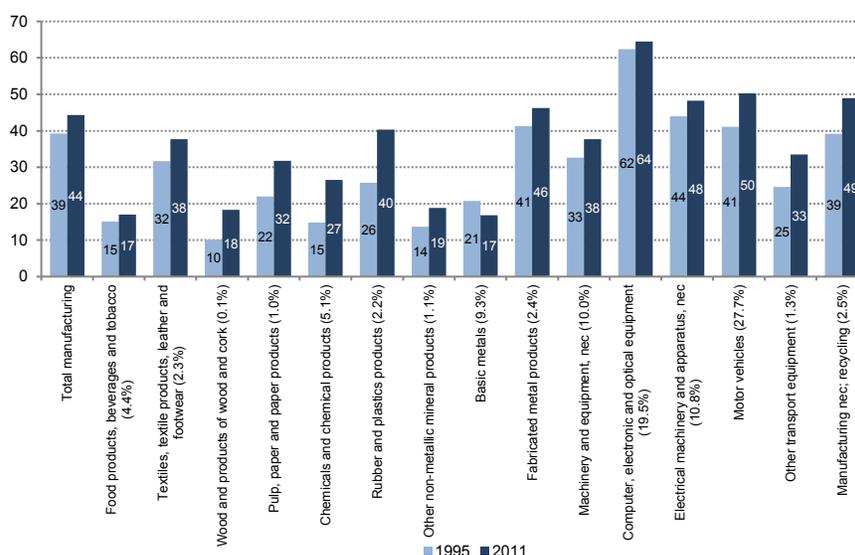
Most of the imported intermediate goods embodied in Mexico's manufacturing exports originate in medium-high or high-technology industries (particularly, Computer, electronic and optical equipment, Machinery and equipment, n.e.c., Electrical machinery and apparatus, n.e.c., and Motor vehicles) (see figure 20.B). Some medium-low-technology industries (Basic metals, Fabricated metal products, and Rubber and plastics products) also have a significant participation. Except for Computer, electronic and optical equipment, where China and the rest of South and East Asia account for three quarters of the total, the United States is still the main supplier of all these inputs (although the competition of Asian countries has particularly affected American exports) (see figure A.8 in the annex).

<sup>39</sup> The OECD's ICIO tables include a breakdown for Mexico between global manufacturers and other enterprises. For global manufacturers, the aggregate level of vertical specialization was nearly 60% in 2011 (reaching 76% for Computer, electronic and optical equipment). In contrast, backward linkages for non-global manufacturers represented only 20% of gross exports.

<sup>40</sup> China's participation went in this period from less than 1% to 16%. However, as noted previously in this document, in value-added terms this participation would be considerably lower (particularly, in some of the most technology-intensive sectors).

<sup>41</sup> During the studied period, several Latin American countries enjoyed some degree of preferential access to the Mexican market, including the members of the Andean Community, CACM and MERCOSUR, and Chile. Also, Mexico put in place several extra-regional FTAs, including those with the European Union and Japan (see table A.3 in the annex).

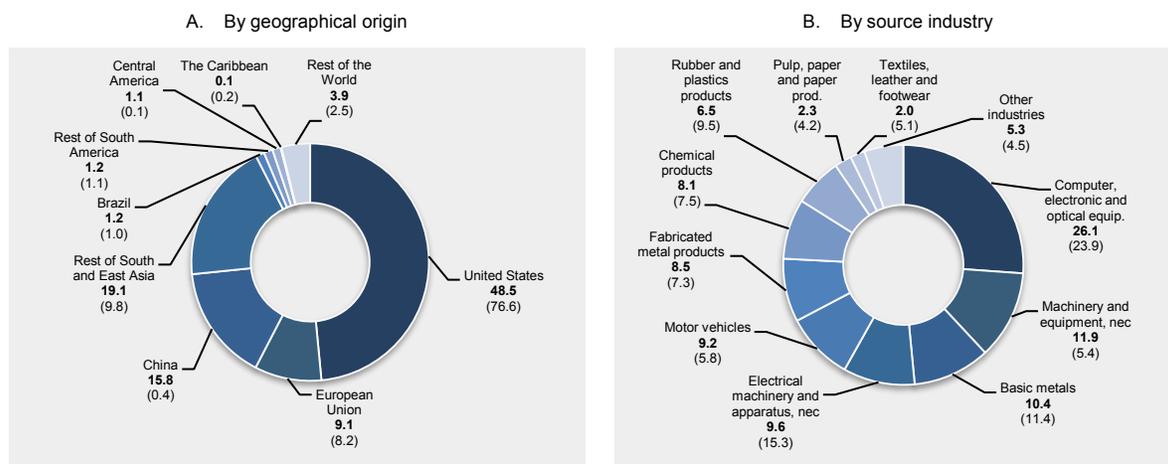
**Figure 19**  
**Mexico: imported intermediates embodied in gross manufacturing exports by exporting industry, 1995 and 2011<sup>a</sup>**  
*(Percentages of gross exports)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables.

<sup>a</sup> Percentages in brackets indicate the share of each industry in total manufacturing exports in 2011.

**Figure 20**  
**Mexico: composition of imported intermediate goods embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

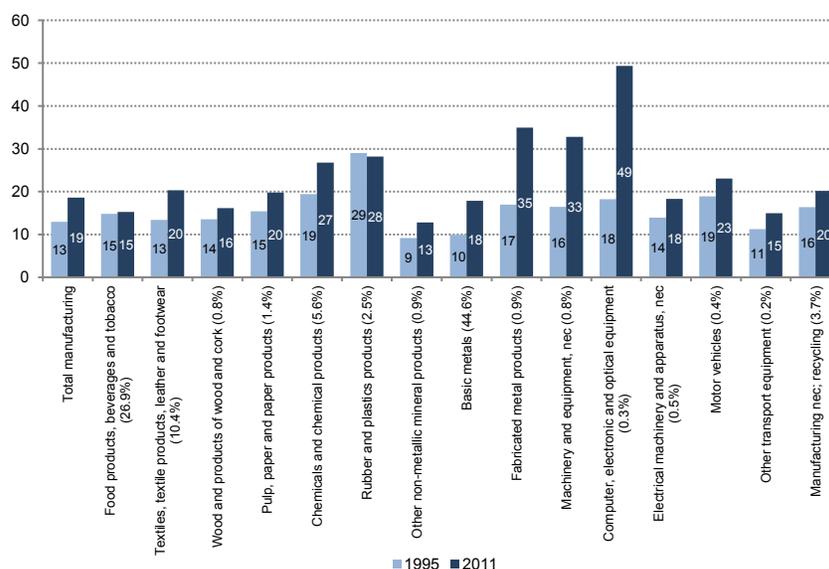
<sup>a</sup> Percentages in brackets indicate the share of each origin country/region (figure 20.A) or industry (figure 20.B) in 1995.

The composition of Mexico's backward linkages with Latin American and Caribbean countries by source industry reveals a poor intra-regional production integration. These countries have a larger participation in Mining and quarrying and the low-technology industries Wood and wood products and Food products, beverages and tobacco, which account for a very low share of the foreign intermediates embodied in Mexican manufacturing exports. Only Brazil and Costa Rica have a somewhat significant participation in medium-high or high-technology industries (see table A.4 in the annex).

## 7. Peru

With a similar export specialization pattern than Chile and Colombia, Peru's aggregate level of gross backward linkages (19% of gross exports in 2011) is given mainly by the natural resource-based industries Basic metals and Food products, beverages and tobacco (which accounted jointly for more than 70% of manufacturing exports) (see figure 21). For these and most other Peruvian manufacturing sectors, the use of foreign inputs increased between 1995 and 2011.

**Figure 21**  
Peru: imported intermediates embodied in gross manufacturing exports by exporting industry, 1995 and 2011<sup>a</sup>  
(Percentages of gross exports)



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables.

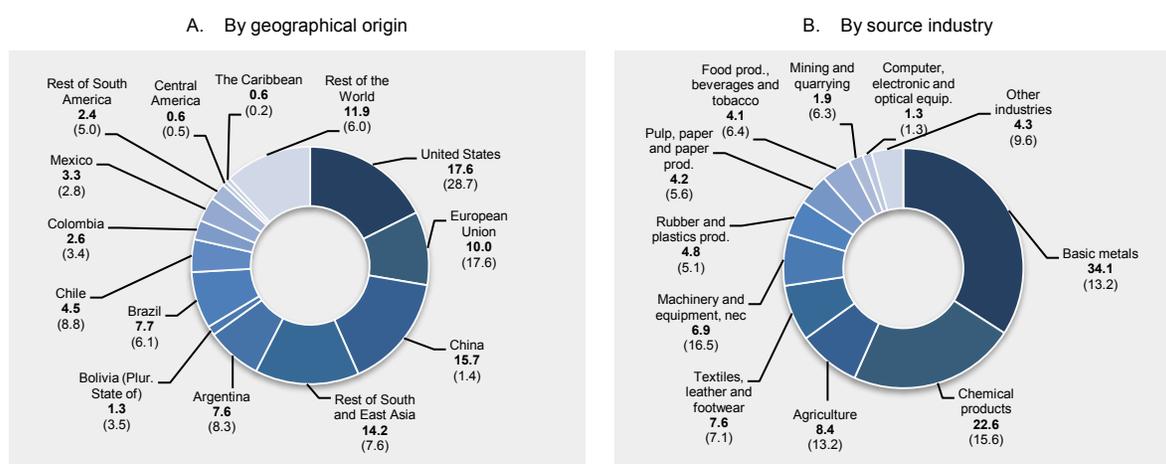
<sup>a</sup> Percentages in brackets indicate the share of each industry in total manufacturing exports in 2011.

The United States, the European Union and, increasingly, China and the rest of South and East Asia (particularly, Korea, India, Japan, and Taiwan) account for the majority of the imported inputs used in the production of Peru's manufacturing exports (see figure 22.A). However, Latin American countries are an important, though decreasing, source of foreign intermediates, with a joint participation of around 30% in 2011 (compared to nearly 40% in 1995). Like in the case of Chile, Peru's intra-regional linkages concentrate in the two largest MERCOSUR members (Brazil and Argentina, with 7.7% and 7.6% of the total, respectively), and the Pacific Alliance partners Chile, Mexico and Colombia (4.5%, 3.3% and 2.6% of the total, respectively).<sup>42</sup>

<sup>42</sup> Along with the Andean Community members, Chile, Mexico and MERCOSUR countries benefited from some preferential access to the Peruvian market during the studied period. In addition, by the end of the period Peru implemented FTAs with Canada, the United States, China and other Asian countries (see table A.3 in the annex).

In terms of source sectors, Peru's backward linkages concentrate in Basic metals and Chemical products (see figure 22.B). The other main origins are mostly primary sectors and low-technology industries (Textiles, leather and footwear, Pulp, paper and paper products, and Food products, beverages and tobacco). Most of non-primary inputs are sourced mainly from outside the region (see figure A.9 in the annex). Latin American and Caribbean countries account for a larger proportion of the inputs originated in the primary sectors (Mining and quarrying, and Agriculture), Food products, beverages and tobacco, and other low and medium-low-technology industries with a lower participation in Peru's backward linkages. However, countries like Argentina, Brazil, Chile, Colombia, Costa Rica and Mexico also have a significant participation in medium-high or high-technology industries (for details, see table A.4 in the annex).

**Figure 22**  
**Peru: composition of imported intermediate goods embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Percentages in brackets indicate the share of each origin country/region (figure 22.A) or industry (figure 22.B) in 1995.

## B. Intra-regional export potential

According to the RCA index, Latin American and Caribbean countries' intra-regional competitiveness in intermediate goods concentrates in primary sectors and low and medium-low-technology industries (see table 3). However, countries like Argentina, Brazil, Costa Rica, the Dominican Republic, Honduras, Mexico, Nicaragua, Panama and Uruguay also show competitiveness in more technology-intensive sectors (Machinery and equipment, n.e.c., Electrical machinery and apparatus, n.e.c., Computer, electronic and optical equipment, Motor vehicles, or Other transport equipment, depending on the country).<sup>43</sup> Yet, as in the case of Factory North America, Factory Europe and Factory Asia, the share of these sectors in the region's gross forward linkages with Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico and Peru is relatively low. Moreover, regardless of their technology intensity, Latin American and Caribbean industries with revealed intra-regional competitiveness do not necessarily account for a significant portion of the imported inputs embodied in the region's manufacturing exports (as shown previously in this section).

For many countries, comparative advantages in some industries —particularly, those with higher technology content— are limited to the regional level. For instance, Uruguay, a country with preferential access and geographical proximity to Argentina, enjoys in that market comparative advantages in two medium-high or high-technology industries (Motor vehicles and Electrical machinery and apparatus, n.e.c.) that are not competitive in any of the major GVCs or the world market. Similarly, preferential access would contribute to explain Argentina's comparative advantage in the Brazilian and Mexican markets in Motor vehicles (geographical proximity to Brazil would play a role as well).<sup>44</sup> Also, Chile and Uruguay —who enjoy different degrees of preferential access to the Colombian market— show competitiveness in Colombia in some technology-intensive industries that are not competitively exported to any of the major GVCs or the world market. The same would hold for other countries (including Brazil and Mexico), and for sectors with lower technology content. This reveals the importance of regional integration for Latin American and Caribbean countries, particularly the smallest ones, to build additional export capacities.

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<sup>43</sup> As pointed out in section II, results on revealed competitiveness of the small Caribbean countries should be interpreted with caution, bearing in mind the limitations of the Balassa index. However, the data presented in table 3 shows that, for many Caribbean countries, intra-regional gross forward linkages concentrate in technology-intensive industries (although these countries' participation as intermediate input suppliers for Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico and Peru is marginal).

<sup>44</sup> In the case of Mexico, Argentina did not have revealed competitiveness in Motor vehicles in 1995-1996, when the automotive agreement had not yet been implemented (see table 3).

**Table 3**  
**Latin America and the Caribbean: RCAs in intra-regional intermediate exports, 2010-2011<sup>a</sup>**

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
South America							
Argentina		Agriculture (30.0%) <i>Rubber and plastics products (9.0%)<sup>b</sup></i> Food products, beverages and tobacco (8.6%) <i>Motor vehicles (7.7%)</i> <i>Pulp, paper and paper products (3.1%)<sup>b</sup></i> <i>Wood and wood products (0.9%)</i>	Agriculture (18.3%) Food products, beverages and tobacco (13.7%) <i>Chemical products (12.9%)<sup>b</sup></i> <i>Mining and quarrying (11.2%)</i> <i>Pulp, paper and paper products (6.5%)<sup>b</sup></i> <i>Other non-metallic mineral products (1.4%)</i>	Agriculture (40.2%) Food products, beverages and tobacco (32.8%)	Textiles (29.7%) <sup>b</sup> <i>Wood and wood products (0.3%)</i>	<i>Basic metals (35.7%)</i> <i>Motor vehicles (16.7%)<sup>b</sup></i> Textiles (11.6%) <i>Mining and quarrying (6.6%)<sup>b</sup></i> Food products, beverages and tobacco (1.8%)	Agriculture (34.2%) Food products, beverages and tobacco (19.1%) <i>Chemical products (16.2%)<sup>b</sup></i> <i>Pulp, paper and paper products (3.5%)<sup>b</sup></i> <i>Wood and wood products (0.3%)<sup>b</sup></i>
Bolivia (Plurinational State of)	Mining and quarrying (55.0%) Agriculture (19.4%) <sup>b</sup> Wood and wood products (7.6%)	Mining and quarrying (47.7%) Wood and wood products (2.7%)	Food products, beverages and tobacco (26.8%) Basic metals (6.9%) Mining and quarrying (3.2%) <sup>b</sup> Wood and wood products (2.8%) <i>Textiles (2.1%)<sup>b</sup></i> Agriculture (2.0%) <i>Other non-metallic mineral products (0.3%)<sup>b</sup></i>	Food products, beverages and tobacco (87.4%) Mining and quarrying (5.0%) <sup>b</sup>	Food products, beverages and tobacco (55.5%) <sup>b</sup> Mining and quarrying (10.2%) <sup>b</sup> <i>Machinery and equipment, n.e.c. (6.2%)<sup>b</sup></i> <i>Other non-metallic mineral products (3.4%)<sup>b</sup></i>	Basic metals (63.8%) <sup>b</sup> Mining and quarrying (16.1%) Wood and wood products (7.2%) <i>Textiles (2.8%)<sup>b</sup></i> Food products, beverages and tobacco (0.6%) <sup>b</sup>	Mining and quarrying (48.3%) Food products, beverages and tobacco (38.0%) Agriculture (8.4%)

Table 3 (continued)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Brazil	<p>Motor vehicles (30.6%)</p> <p>Mining and quarrying (13.5%)</p> <p>Basic metals (13.0%)</p> <p><i>Rubber and plastics products</i> (6.7%)</p> <p>Pulp, paper and paper products (3.6%)</p> <p>Food products, beverages and tobacco (1.6%)</p> <p><i>Other non-metallic mineral products</i> (0.7%)</p>		<p>Basic metals (30.2%)</p> <p><i>Rubber and plastics products</i> (8.1%)</p> <p>Pulp, paper and paper products (6.3%)</p> <p>Motor vehicles (3.0%)</p> <p>Mining and quarrying (0.6%)<sup>b</sup></p>	<p>Basic metals (28.3%)</p> <p><i>Chemical products</i> (23.8%)<sup>b</sup></p> <p>Motor vehicles (11.0%)</p> <p><i>Rubber and plastics products</i> (5.8%)</p> <p><i>Electrical machinery and apparatus, n.e.c.</i> (5.1%)</p> <p>Mining and quarrying (4.6%)<sup>b</sup></p> <p>Pulp, paper and paper products (4.5%)<sup>b</sup></p> <p>Agriculture (3.7%)<sup>b</sup></p> <p><i>Other non-metallic mineral products</i> (0.7%)</p>	<p>Basic metals (50.1%)</p> <p><i>Fabricated metal products</i> (12.5%)</p> <p><i>Rubber and plastics products</i> (9.6%)<sup>b</sup></p> <p><i>Chemical products</i> (9.6%)<sup>b</sup></p> <p><i>Textiles</i> (5.1%)<sup>b</sup></p> <p><i>Machinery and equipment, n.e.c.</i> (3.4%)</p> <p>Motor vehicles (2.6%)</p> <p>Food products, beverages and tobacco (0.7%)<sup>b</sup></p> <p><i>Other non-metallic mineral products</i> (0.4%)</p>	<p>Motor vehicles (23.3%)</p> <p>Basic metals (21.5%)</p> <p><i>Machinery and equipment, n.e.c.</i> (14.9%)</p> <p><i>Rubber and plastics products</i> (8.4%)<sup>b</sup></p> <p><i>Textiles</i> (4.1%)</p> <p>Mining and quarrying (3.3%)</p> <p><i>Other non-metallic mineral products</i> (1.9%)</p> <p><i>Other transport equipment</i> (0.7%)</p> <p>Wood and wood products (0.4%)</p>	<p>Basic metals (59.4%)</p> <p>Pulp, paper and paper products (5.8%)</p> <p><i>Rubber and plastics products</i> (4.0%)</p> <p>Motor vehicles (1.7%)</p> <p><i>Other non-metallic mineral products</i> (0.2%)</p>
Chile	<p><i>Fabricated metal products</i> (20.1%)</p> <p>Basic metals (19.9%)</p> <p>Pulp, paper and paper products (16.7%)</p> <p><i>Rubber and plastics products</i> (12.3%)<sup>b</sup></p> <p><i>Food products, beverages and tobacco</i> (1.7%)</p> <p>Agriculture (1.7%)</p> <p><i>Other non-metallic mineral products</i> (1.5%)<sup>b</sup></p> <p><i>Textiles</i> (1.1%)<sup>b</sup></p> <p>Wood and wood products (0.9%)</p>	<p>Basic metals (61.5%)</p> <p>Mining and quarrying (25.9%)</p> <p><i>Fabricated metal products</i> (2.6%)<sup>b</sup></p> <p>Pulp, paper and paper products (1.0%)</p>		<p>Basic metals (28.3%)</p> <p>Pulp, paper and paper products (23.0%)</p> <p><i>Electrical machinery and apparatus, n.e.c.</i> (7.0%)<sup>b</sup></p> <p><i>Rubber and plastics products</i> (6.8%)<sup>b</sup></p> <p>Wood and wood products (5.3%)</p> <p><i>Fabricated metal products</i> (4.9%)<sup>b</sup></p> <p>Motor vehicles (4.6%)<sup>b</sup></p> <p><i>Food products, beverages and tobacco</i> (2.7%)</p>	<p>Basic metals (78.1%)</p> <p><i>Rubber and plastics products</i> (12.3%)<sup>b</sup></p> <p>Pulp, paper and paper products (3.5%)<sup>b</sup></p> <p>Wood and wood products (0.5%)</p> <p><i>Food products, beverages and tobacco</i> (0.5%)<sup>b</sup></p>	<p>Basic metals (51.0%)</p> <p>Wood and wood products (10.6%)</p> <p>Pulp, paper and paper products (5.3%)<sup>b</sup></p> <p><i>Food products, beverages and tobacco</i> (0.5%)</p>	<p>Pulp, paper and paper products (18.1%)</p> <p><i>Rubber and plastics products</i> (6.6%)</p> <p>Wood and wood products (4.2%)</p> <p><i>Food products, beverages and tobacco</i> (4.2%)</p> <p><i>Fabricated metal products</i> (1.2%)</p>

Table 3 (continued)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Colombia	<p><i>Chemical products (44.3%)<sup>b</sup></i>  <i>Rubber and plastics products (33.7%)</i>  Agriculture (4.3%)  Other non-metallic mineral products (1.4%)<sup>b</sup>  Mining and quarrying (0.0%)</p>	<p><i>Chemical products (44.8%)</i>  <i>Rubber and plastics products (24.5%)</i>  Other non-metallic mineral products (3.9%)<sup>b</sup>  <i>Food products, beverages and tobacco (3.7%)</i>  Mining and quarrying (0.0%)<sup>b</sup></p>	<p>Mining and quarrying (0.3%)<sup>b</sup></p>		<p><i>Chemical products (25.4%)<sup>b</sup></i>  <i>Rubber and plastics products (21.4%)</i>  Other non-metallic mineral products (0.7%)<sup>b</sup>  Mining and quarrying (0.4%)  <i>Wood and wood products (0.1%)<sup>b</sup></i></p>	<p><i>Rubber and plastics products (26.9%)<sup>b</sup></i>  <i>Chemical products (20.0%)<sup>b</sup></i>  <i>Textiles (18.4%)</i>  Other non-metallic mineral products (3.6%)<sup>b</sup>  <i>Food products, beverages and tobacco (3.1%)</i>  Mining and quarrying (2.9%)<sup>b</sup></p>	<p><i>Chemical products (38.6%)</i>  <i>Textiles (19.0%)<sup>b</sup></i>  <i>Pulp, paper and paper products (13.1%)<sup>b</sup></i>  <i>Rubber and plastics products (10.4%)<sup>b</sup></i>  <i>Electrical machinery and apparatus, n.e.c. (2.3%)<sup>b</sup></i>  Other non-metallic mineral products (0.3%)<sup>b</sup>  Mining and quarrying (0.3%)</p>
Ecuador	<p>Food products, beverages and tobacco (69.4%)</p>	<p><i>Rubber and plastics products (23.4%)</i>  Wood and wood products (19.4%)<sup>b</sup>  Food products, beverages and tobacco (10.4%)<sup>b</sup>  <i>Textiles (8.1%)</i>  Agriculture (6.8%)<sup>b</sup></p>	<p>Food products, beverages and tobacco (18.9%)<sup>b</sup>  Mining and quarrying (0.0%)</p>	<p>Food products, beverages and tobacco (21.3%)  <i>Rubber and plastics products (11.2%)</i>  Agriculture (9.4%)  <i>Textiles (8.7%)</i>  <i>Pulp, paper and paper products (5.8%)<sup>b</sup></i>  Wood and wood products (5.3%)  <i>Other non-metallic mineral products (0.7%)</i></p>	<p><i>Fabricated metal products (34.6%)<sup>b</sup></i>  <i>Chemical products (32.1%)<sup>b</sup></i>  Food products, beverages and tobacco (3.7%)<sup>b</sup>  <i>Other non-metallic mineral products (1.5%)</i></p>	<p>Agriculture (41.5%)<sup>b</sup>  Wood and wood products (12.8%)  Food products, beverages and tobacco (9.2%)</p>	<p>Wood and wood products (8.0%)  Mining and quarrying (3.2%)</p>

Table 3 (continued)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Paraguay	Agriculture (24.8%) <i>Rubber and plastics products</i> (12.8%) <sup>b</sup> Food products, beverages and tobacco (11.1%) <i>Pulp, paper and paper products</i> (9.1%) <sup>b</sup> Textiles (8.4%) Wood and wood products (4.1%) <i>Other non-metallic mineral products</i> (2.7%)	Agriculture (59.2%) <i>Rubber and plastics products</i> (13.1%) <sup>b</sup> Food products, beverages and tobacco (11.5%) Textiles (2.1%) Wood and wood products (0.9%)	Food products, beverages and tobacco (50.0%) Agriculture (41.2%) Wood and wood products (2.5%)	Agriculture (94.1%) Food products, beverages and tobacco (4.0%)	Wood and wood products (1.3%) <sup>b</sup>	Agriculture (82.8%) Textiles (10.1%) Wood and wood products (4.5%) Food products, beverages and tobacco (1.4%)	Food products, beverages and tobacco (64.5%) Agriculture (35.3%) <sup>b</sup>
Peru	Mining and quarrying (33.9%) Basic metals (23.1%) <i>Rubber and plastics products</i> (6.8%) <sup>b</sup> Agriculture (4.7%) Textiles (4.6%) Food products, beverages and tobacco (1.8%) <i>Other non-metallic mineral products</i> (0.9%) <sup>b</sup>	Basic metals (72.2%) Mining and quarrying (20.6%) Textiles (0.7%)	Mining and quarrying (82.2%) Food products, beverages and tobacco (3.8%) Textiles (1.2%) <i>Other non-metallic mineral products</i> (0.3%)	Basic metals (54.0%) <i>Rubber and plastics products</i> (12.0%) <sup>b</sup> Mining and quarrying (6.4%) Textiles (3.8%) Food products, beverages and tobacco (3.4%) <i>Pulp, paper and paper products</i> (3.4%) <sup>b</sup> Agriculture (3.4%) <sup>b</sup> <i>Other non-metallic mineral products</i> (1.0%)	<i>Rubber and plastics products</i> (43.0%) <sup>b</sup> <i>Electrical machinery and apparatus, n.e.c.</i> (6.2%) <sup>b</sup> Agriculture (5.1%) <sup>b</sup> Food products, beverages and tobacco (3.6%) <i>Other non-metallic mineral products</i> (0.7%)	Basic metals (29.7%) Mining and quarrying (24.3%) <i>Wood and wood products</i> (15.1%) Textiles (3.9%) <sup>b</sup> <i>Other non-metallic mineral products</i> (1.3%) <sup>b</sup>	

Table 3 (continued)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Uruguay	<i>Motor vehicles</i> (22.5%) Rubber and plastics products (13.4%) Pulp, paper and paper products (9.5%) <i>Electrical machinery and apparatus, n.e.c.</i> (6.2%) <sup>b</sup> Food products, beverages and tobacco (4.9%) Textiles (2.8%) Wood and wood products (0.9%) <sup>b</sup> <i>Other non-metallic mineral products</i> (0.8%)	Rubber and plastics products (35.4%) Food products, beverages and tobacco (25.5%) Agriculture (19.4%) Pulp, paper and paper products (1.6%) <sup>b</sup> Wood and wood products (0.2%) <sup>b</sup>	Rubber and plastics products (25.4%) <i>Chemical products</i> (23.7%) <sup>b</sup> Wood and wood products (17.5%) <sup>b</sup> Pulp, paper and paper products (9.7%) <sup>b</sup> Textiles (7.8%)	<i>Chemical products</i> (42.3%) <sup>b</sup> Food products, beverages and tobacco (9.0%) Textiles (7.9%) Agriculture (7.6%) Wood and wood products (7.2%) <sup>b</sup> <i>Machinery and equipment, n.e.c.</i> (5.0%) <sup>b</sup>	<i>Fabricated metal products</i> (45.4%) <sup>b</sup> <i>Chemical products</i> (26.6%) <i>Other transport equipment</i> (1.6%) <sup>b</sup>	<i>Chemical products</i> (49.2%) <sup>b</sup> Textiles (20.5%) Wood and wood products (12.3%) <sup>b</sup> Food products, beverages and tobacco (1.0%)	Textiles (24.3%) Wood and wood products (5.9%) <sup>b</sup>
Venezuela (Bolivarian Republic of)	<i>Fabricated metal products</i> (47.2%) <i>Chemical products</i> (31.3%) <i>Basic metals</i> (8.1%) <sup>b</sup> <i>Agriculture</i> (1.2%) <sup>b</sup>	<i>Basic metals</i> (78.1%) <sup>b</sup> <i>Other non-metallic mineral products</i> (1.4%)	<i>Chemical products</i> (55.1%) <i>Basic metals</i> (38.4%) <sup>b</sup> <i>Fabricated metal products</i> (4.6%)	<i>Basic metals</i> (50.9%) <i>Chemical products</i> (33.8%) <sup>b</sup> <i>Fabricated metal products</i> (5.2%) <i>Wood and wood products</i> (0.8%) <sup>b</sup> <i>Other non-metallic mineral products</i> (0.4%)	<i>Basic metals</i> (72.9%) <i>Chemical products</i> (21.7%) <sup>b</sup> <i>Other non-metallic mineral products</i> (0.3%) <sup>b</sup>	<i>Basic metals</i> (71.4%) <i>Chemical products</i> (19.2%) Mining and quarrying (3.2%)	<i>Basic metals</i> (73.7%) <i>Chemical products</i> (19.9%) <i>Fabricated metal products</i> (2.2%) Mining and quarrying (0.0%)

Table 3 (continued)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
<b>Mexico and Central America</b>							
Mexico	<i>Computer, electronic and optical equipment (9.0%)<sup>b</sup></i>	<i>Basic metals (35.0%) Chemical products (26.4%) Motor vehicles (4.9%) Other non-metallic mineral products (2.7%)</i>	<i>Basic metals (20.0%) Chemical products (13.8%) Computer, electronic and optical equipment (1.8%)<sup>b</sup> Other non-metallic mineral products (1.2%) Electrical machinery and apparatus, n.e.c. (1.2%)<sup>b</sup></i>	<i>Basic metals (41.2%)<sup>b</sup> Electrical machinery and apparatus, n.e.c. (7.8%) Other non-metallic mineral products (0.8%)</i>	<i>Basic metals (32.8%) Chemical products (17.0%) Fabricated metal products (15.6%) Rubber and plastics products (14.4%) Electrical machinery and apparatus, n.e.c. (5.6%) Textiles (2.0%)<sup>b</sup> Food products, beverages and tobacco (1.4%) Other non-metallic mineral products (1.1%)</i>		<i>Basic metals (47.8%) Computer, electronic and optical equipment (2.2%)<sup>b</sup> Electrical machinery and apparatus, n.e.c. (1.5%)<sup>b</sup> Motor vehicles (0.9%)<sup>b</sup> Other non-metallic mineral products (0.4%)</i>
Costa Rica	<i>Computer, electronic and optical equipment (59.2%)<sup>b</sup> Rubber and plastics products (14.6%)<sup>b</sup> Textiles (4.3%)<sup>b</sup></i>	<i>Computer, electronic and optical equipment (84.0%)<sup>b</sup> Rubber and plastics products (6.5%)<sup>b</sup> Agriculture (4.7%)<sup>b</sup> Wood and wood products (0.4%)<sup>b</sup></i>	<i>Basic metals (8.2%) Rubber and plastics products (6.0%)<sup>b</sup> Computer, electronic and optical equipment (2.0%)<sup>b</sup> Agriculture (1.8%) Other non-metallic mineral products (0.8%)<sup>b</sup> Textiles (0.8%)<sup>b</sup> Electrical machinery and apparatus, n.e.c. (0.3%)<sup>b</sup></i>	<i>Electrical machinery and apparatus, n.e.c. (15.5%)<sup>b</sup> Rubber and plastics products (13.2%) Food products, beverages and tobacco (9.4%)<sup>b</sup> Computer, electronic and optical equipment (8.3%)<sup>b</sup> Mining and quarrying (4.5%) Textiles (2.5%)</i>		<i>Computer, electronic and optical equipment (92.1%)<sup>b</sup> Food products, beverages and tobacco (1.3%)</i>	<i>Computer, electronic and optical equipment (41.2%)<sup>b</sup> Rubber and plastics products (22.1%)<sup>b</sup> Electrical machinery and apparatus, n.e.c. (5.3%) Fabricated metal products (2.5%)<sup>b</sup> Other non-metallic mineral products (0.6%)<sup>b</sup></i>

Table 3 (continued)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
El Salvador	Rubber and plastics products (65.6%) <sup>b</sup> Pulp, paper and paper products (27.5%) Textiles (4.0%) <sup>b</sup> Agriculture (2.0%) <sup>b</sup>	Textiles (6.9%) <sup>b</sup> Rubber and plastics products (15.9%) <sup>b</sup>		<i>Basic metals</i> (58.9%) Textiles (8.2%)	<i>Basic metals</i> (36.6%) <sup>b</sup> Rubber and plastics products (21.4%) <sup>b</sup> Pulp, paper and paper products (13.4%) <sup>b</sup> <i>Chemical products</i> (10.5%) <sup>b</sup> Textiles (4.1%)	Textiles (39.9%) Pulp, paper and paper products (21.4%) Rubber and plastics products (14.8%)	<i>Basic metals</i> (64.5%) <sup>b</sup> Pulp, paper and paper products (9.0%) <sup>b</sup> <i>Fabricated metal products</i> (2.3%) <sup>b</sup> <i>Computer, electronic and optical equipment</i> (0.8%) <i>Other non-metallic mineral products</i> (0.5%) <sup>b</sup>
Guatemala	Agriculture (68.7%) Food products, beverages and tobacco (29.5%) <sup>b</sup>	<i>Basic metals</i> (42.4%) Agriculture (36.0%)	Food products, beverages and tobacco (32.9%) Agriculture (13.5%) <sup>b</sup>	Agriculture (54.1%) Food products, beverages and tobacco (21.7%) <sup>b</sup>	<i>Basic metals</i> (32.5%) <sup>b</sup> <i>Rubber and plastics products</i> (27.6%) <i>Fabricated metal products</i> (13.1%) <sup>b</sup> Agriculture (6.7%) <sup>b</sup> Pulp, paper and paper products (5.1%) <sup>b</sup> Textiles (2.1%) Other non-metallic mineral products (1.0%) Food products, beverages and tobacco (0.9%) <i>Wood and wood products</i> (0.1%)	Textiles (33.8%) Food products, beverages and tobacco (23.8%) Agriculture (15.7%) <i>Wood and wood products</i> (2.6%)	Agriculture (54.7%) <sup>b</sup> Food products, beverages and tobacco (35.8%)

Table 3 (continued)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Honduras	Food products, beverages and tobacco (21.7%) <sup>b</sup>	<i>Fabricated metal products</i> (11.6%) <sup>b</sup> Electrical machinery and apparatus, n.e.c. (8.9%) <sup>b</sup> Agriculture (6.5%) <sup>b</sup> <i>Pulp, paper and paper products</i> (2.7%) <sup>b</sup> <i>Wood and wood products</i> (0.7%) <sup>b</sup>	<i>Fabricated metal products</i> (0.4%) <sup>b</sup> <i>Chemical products</i> (0.4%) Food products, beverages and tobacco (0.4%) <sup>b</sup> Textiles (0.3%) <i>Wood and wood products</i> (0.1%) <sup>b</sup>	Food products, beverages and tobacco (65.9%) <sup>b</sup>	<i>Pulp, paper and paper products</i> (27.6%) <sup>b</sup> <i>Rubber and plastics products</i> (26.3%) <sup>b</sup> <i>Fabricated metal products</i> (21.0%) Textiles (5.4%) Agriculture (4.7%) Food products, beverages and tobacco (1.7%) <sup>b</sup> <i>Wood and wood products</i> (0.2%)	Electrical machinery and apparatus, n.e.c. (44.4%) <sup>b</sup> <i>Mining and quarrying</i> (21.1%) Food products, beverages and tobacco (14.7%)	Food products, beverages and tobacco (44.0%) Textiles (18.1%) <sup>b</sup> <i>Other non-metallic mineral products</i> (1.7%) <sup>b</sup> <i>Other transport equipment</i> (1.1%) <sup>b</sup>
Nicaragua		Agriculture (43.9%) <sup>b</sup> Food products, beverages and tobacco (39.8%) <sup>b</sup>	<i>Other non-metallic mineral products</i> (0.5%) <sup>b</sup>	Agriculture (89.2%) <sup>b</sup>	<i>Rubber and plastics products</i> (33.8%) Food products, beverages and tobacco (19.6%) Agriculture (9.5%) <i>Wood and wood products</i> (0.1%)	Electrical machinery and apparatus, n.e.c. (79.8%) <sup>b</sup> Agriculture (12.7%) Food products, beverages and tobacco (2.8%)	<i>Computer, electronic and optical equipment</i> (29.5%) <sup>b</sup> <i>Other non-metallic mineral products</i> (1.8%)
Panama	Chemical products (62.1%)	Chemical products (47.7%) Textiles (7.1%)	<i>Motor vehicles</i> (2.5%) <sup>b</sup> Textiles (1.6%) <i>Computer, electronic and optical equipment</i> (1.0%) <sup>b</sup>	Textiles (26.8%) <i>Computer, electronic and optical equipment</i> (11.8%)	<i>Rubber and plastics products</i> (28.1%) <sup>b</sup> Textiles (4.4%) <sup>b</sup> <i>Food products, beverages and tobacco</i> (1.7%) <i>Wood and wood products</i> (0.2%) <sup>b</sup>	Chemical products (49.4%) Textiles (14.2%) <i>Other non-metallic mineral products</i> (6.9%) <sup>b</sup>	<i>Computer, electronic and optical equipment</i> (9.2%) <sup>b</sup>
The Caribbean							
Antigua and Barbuda		<i>Fabricated metal products</i> (80.7%) <sup>b</sup> <i>Other non-metallic mineral products</i> (19.3%) <sup>b</sup>		Machinery and equipment, n.e.c. (24.9%) <sup>b</sup>	<i>Chemical products</i> (56.5%) <i>Fabricated metal products</i> (40.8%) <sup>b</sup>	<i>Computer, electronic and optical equipment</i> (72.6%) <sup>b</sup> Machinery and equipment, n.e.c. (12.3%) <sup>b</sup> <i>Electrical machinery and apparatus, n.e.c.</i> (8.3%) <sup>b</sup>	

Table 3 (continued)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Bahamas	Chemical products (99.3%)		<i>Fabricated metal products (31.8%)<sup>b</sup></i>		<i>Rubber and plastics products (53.7%)<sup>b</sup></i>		
Barbados	Machinery and equipment, n.e.c. (68.9%) Motor vehicles (31.1%) <sup>b</sup>	<i>Mining and quarrying (47.9%)<sup>b</sup></i>		<i>Chemical products (81.7%)<sup>b</sup></i> <i>Mining and quarrying (12.0%)<sup>b</sup></i>	Pulp, paper and paper products (70.5%) Other non-metallic mineral products (22.5%) <sup>b</sup>	<i>Electrical machinery and apparatus, n.e.c. (52.1%)</i> <i>Computer, electronic and optical equipment (37.8%)<sup>b</sup></i>	<i>Chemical products (58.7%)<sup>b</sup></i> <i>Basic metals (39.2%)<sup>b</sup></i> <i>Wood and wood products (0.6%)<sup>b</sup></i>
Belize		<i>Machinery and equipment, n.e.c. (89.7%)<sup>b</sup></i> <i>Electrical machinery and apparatus, n.e.c. (4.2%)<sup>b</sup></i> <i>Other non-metallic mineral products (0.7%)<sup>b</sup></i>		<i>Rubber and plastics products (100%)<sup>b</sup></i>	Mining and quarrying (0.1%) <sup>b</sup>	<i>Wood and wood products (4.0%)</i>	<i>Fabricated metal products (100%)<sup>b</sup></i>
Cuba	<i>Chemical products (99.2%)</i>	<i>Chemical products (88.9%)</i> <i>Other non-metallic mineral products (10.6%)</i>		Basic metals (49.4%) <i>Chemical products (38.8%)</i> Food products, beverages and tobacco (8.6%) <sup>b</sup> <i>Electrical machinery and apparatus, n.e.c. (2.8%)</i>	<i>Fabricated metal products (68.9%)<sup>b</sup></i> <i>Machinery and equipment, n.e.c. (9.8%)<sup>b</sup></i> Food products, beverages and tobacco (8.7%) <sup>b</sup> <i>Agriculture (6.6%)<sup>b</sup></i>	Basic metals (47.6%) <i>Chemical products (14.9%)</i> Food products, beverages and tobacco (3.0%)	<i>Chemical products (97.8%)</i>
Dominica	<i>Chemical products (100%)<sup>b</sup></i>	<i>Fabricated metal products (73.2%)<sup>b</sup></i> <i>Machinery and equipment, n.e.c. (18.0%)<sup>b</sup></i> <i>Chemical products (8.8%)<sup>b</sup></i>	<i>Electrical machinery and apparatus, n.e.c. (100%)<sup>b</sup></i>	<i>Mining and quarrying (96.1%)<sup>b</sup></i> <i>Electrical machinery and apparatus, n.e.c. (1.7%)<sup>b</sup></i> <i>Machinery and equipment, n.e.c. (1.0%)<sup>b</sup></i> Pulp, paper and paper products (0.9%) <sup>b</sup>	Rubber and plastics products (62.0%) <sup>b</sup> Pulp, paper and paper products (9.3%) <sup>b</sup> Machinery and equipment, n.e.c. (7.7%) <sup>b</sup>	Electrical machinery and apparatus, n.e.c. (37.0%) <sup>b</sup> Computer, electronic and optical equipment (26.7%) <sup>b</sup> Fabricated metal products (20.6%) <sup>b</sup> Rubber and plastics products (7.9%) <sup>b</sup> Textiles (4.6%) <sup>b</sup>	

Table 3 (continued)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Dominican Republic	Electrical machinery and apparatus, n.e.c. (24.8%)	Electrical machinery and apparatus, n.e.c. (27.9%) <sup>b</sup> <i>Other transport equipment</i> (26.3%) <sup>b</sup> Rubber and plastics products (7.2%)	Electrical machinery and apparatus, n.e.c. (0.6%) <sup>b</sup>	<i>Mining and quarrying</i> (15.4%) <sup>b</sup> Other non-metallic mineral products (1.9%) <i>Wood and wood products</i> (1.1%) <sup>b</sup>	Basic metals (57.2%) <sup>b</sup> Fabricated metal products (18.6%) <sup>b</sup> Rubber and plastics products (10.4%) Electrical machinery and apparatus, n.e.c. (3.0%) <sup>b</sup> Food products, beverages and tobacco (1.5%) <sup>b</sup> Other non-metallic mineral products (0.2%) <sup>b</sup>	Electrical machinery and apparatus, n.e.c. (47.1%) <sup>b</sup> Textiles (18.3%) <sup>b</sup> Rubber and plastics products (16.7%) <sup>b</sup> Wood and wood products (0.9%) <sup>b</sup>	Other non-metallic mineral products (48.5%) <sup>b</sup> Electrical machinery and apparatus, n.e.c. (23.3%) <sup>b</sup>
Grenada		<i>Electrical machinery and apparatus, n.e.c.</i> (79.9%) <sup>b</sup> <i>Motor vehicles</i> (20.1%) <sup>b</sup>			Computer, electronic and optical equipment (91.4%) <sup>b</sup> Agriculture (6.3%) <sup>b</sup> Electrical machinery and apparatus, n.e.c. (2.3%) <sup>b</sup>	Electrical machinery and apparatus, n.e.c. (47.1%) <sup>b</sup> Basic metals (27.6%) <sup>b</sup> Fabricated metal products (20.3%) <sup>b</sup>	Fabricated metal products (100%) <sup>b</sup>
Guyana		Food products, beverages and tobacco (81.8%) <i>Machinery and equipment, n.e.c.</i> (8.8%) <sup>b</sup>	<i>Mining and quarrying</i> (100%)	<i>Mining and quarrying</i> (99.9%) Wood and wood products (0.1%)	Mining and quarrying (87.6%) <sup>b</sup> Wood and wood products (12.4%)	Mining and quarrying (88.0%) <sup>b</sup> Agriculture (1.7%) <sup>b</sup>	Mining and quarrying (100%)
Haiti	<i>Chemical products</i> (98.8%) <i>Other non-metallic mineral products</i> (1.2%) <sup>b</sup>	<i>Chemical products</i> (65.4%) <sup>b</sup>		<i>Chemical products</i> (83.2%) <sup>b</sup> <i>Computer, electronic and optical equipment</i> (16.8%) <sup>b</sup>	Fabricated metal products (94.3%) <sup>b</sup> Textiles (2.8%) <sup>b</sup> Agriculture (2.7%) <sup>b</sup>		Pulp, paper and paper products (100%)

Table 3 (continued)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Jamaica	<i>Chemical products (72.5%)<sup>b</sup></i> <i>Agriculture (27.5%)<sup>b</sup></i>	Food products, beverages and tobacco (94.0%) <sup>b</sup>	<i>Wood and wood products (55.5%)<sup>b</sup></i>	<i>Mining and quarrying (78.9%)</i> <i>Chemical products (14.3%)<sup>b</sup></i> Other non-metallic mineral products (1.1%) <sup>b</sup>	Other non-metallic mineral products (40.9%) <sup>b</sup>	Fabricated metal products (65.9%) <sup>b</sup>	
Saint Kitts and Nevis	Electrical machinery and apparatus, n.e.c. (100%) <sup>b</sup>	Electrical machinery and apparatus, n.e.c. (99.8%) <sup>b</sup>				Computer, electronic and optical equipment (92.3%) <sup>b</sup> Electrical machinery and apparatus, n.e.c. (7.7%)	Electrical machinery and apparatus, n.e.c. (100%) <sup>b</sup>
Saint Lucia	Computer, electronic and optical equipment (100%) <sup>b</sup>	Computer, electronic and optical equipment (91.3%) <sup>b</sup>			<i>Other non-metallic mineral products (75.2%)<sup>b</sup></i> <i>Textiles (24.8%)<sup>b</sup></i>	Computer, electronic and optical equipment (62.4%) <sup>b</sup> <i>Electrical machinery and apparatus, n.e.c. (37.3%)<sup>b</sup></i>	Computer, electronic and optical equipment (100%) <sup>b</sup>
Saint Vincent and the Grenadines	<i>Computer, electronic and optical equipment (100%)<sup>b</sup></i>						
Suriname		<i>Machinery and equipment, n.e.c. (43.7%)<sup>b</sup></i> <i>Electrical machinery and apparatus, n.e.c. (23.5%)<sup>b</sup></i>		<i>Fabricated metal products (74.2%)<sup>b</sup></i> <i>Computer, electronic and optical equipment (25.6%)<sup>b</sup></i>	<i>Other non-metallic mineral products (19.6%)<sup>b</sup></i> <i>Pulp, paper and paper products (15.6%)<sup>b</sup></i>	<i>Fabricated metal products (27.4%)<sup>b</sup></i>	<i>Mining and quarrying (85.6%)<sup>b</sup></i>

Table 3 (concluded)

Exporting country	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Trinidad and Tobago	Mining and quarrying (66.1%) <sup>b</sup>	Chemical products (49.9%) Basic metals (46.7%) <sup>b</sup> Mining and quarrying (2.2%) <sup>b</sup>	Chemical products (97.3%) Mining and quarrying (0.0%) <sup>b</sup>	Chemical products (71.4%) Mining and quarrying (8.8%) <sup>b</sup>	Basic metals (97.0%) Mining and quarrying (0.0%) <sup>b</sup>	Chemical products (66.4%) <sup>b</sup> Basic metals (26.2%) Mining and quarrying (6.6%) <sup>b</sup>	Basic metals (97.8%)

Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Industries are ranked, from highest to lowest, on the basis of their share in countries' vertical specialization-related intermediate exports to the destination market (indicated in brackets). In italics, industries in which the exporting country has a RCA in the destination market but not in the world market.

<sup>b</sup> Industries that were not competitive in 1995-1996.

## IV. Concluding remarks

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Latin American and Caribbean countries have been poorly integrated into international production networks. Particularly, the analysis carried out in this document shows that in 1995-2011 the region's participation as a source of foreign intermediate goods for the three major GVCs (Factory North America, Factory Europe, and Factory Asia) was limited and concentrated in a few origin countries (in decreasing order of importance, Brazil, Mexico, Chile, Argentina, Peru, and Costa Rica). In addition, the level of intra-regional production integration is considerably lower than that of other regions. However, both current and potential engagement in intra and extra-regional production networks vary greatly across countries.

The main findings on Latin America and the Caribbean's gross forward integration into extra-regional value chains are:

- The concentration of gross forward linkages increased since 1995 in terms of destination markets, due to the higher participation of Factory Asia (particularly, China) as destination of Latin American and Caribbean countries' exports. Within the region, Mexico —highly dependent on the United States market— and, to a lesser extent, Central America and the Caribbean are less diversified than the South American subregion. Along with Mexico, Chile and Costa Rica have higher levels of market concentration than the other three main origin countries (Argentina, Brazil, and Peru).
- On the sector dimension, the concentration of gross forward linkages is considerably higher for Central America and the Caribbean than for Mexico and South America. Also, exports to Factory Asia are generally more concentrated than those oriented to Factory North America and Factory Europe (the main exception is the South American subregion). Among the six main origin countries, Costa Rica and Chile show higher and increasing concentration levels, although in different sectors (natural resource-based products for Chile and high-technology products for Costa Rica).
- Gross forward linkages with Factory Europe and Factory Asia concentrate in primary sectors (Mining and quarrying and Agriculture). Links with Factory North America are more diversified in terms of origin sectors (with Basic metals, Mining and quarrying, Motor vehicles and Electrical machinery and apparatus, n.e.c. as the main source industries).
- The trade agreements signed with GVC members would not have contributed much to promote Latin American and Caribbean countries' insertion into GVCs (although causality is not evaluated). Four of the six main origin countries (Chile, Costa Rica, Mexico, and Peru) gained preferential access to at least one of the three GVCs in 1995-2011, with mixed results in terms

of export diversification. For other countries with preferential access to those markets, the share in the region's gross forward linkages remained very low (or even decreased).

- In terms of export potential, Latin American and Caribbean countries' revealed competitiveness as a source of foreign inputs for extra-regional value chains concentrate in primary sectors and low and medium-low-technology industries (most of which do not have a significant participation in the imported inputs embodied in the GVCs' exports). Although some countries (like Brazil, Costa Rica, the Dominican Republic, Honduras, Nicaragua, and Mexico) show competitiveness in some of the most technology-intensive industries (Computer, electronic and optical equipment; Electrical machinery and apparatus, n.e.c.; or Motor vehicles), these industries account for a very low share of the region's forward linkages with the GVCs.

The analysis of the import content of Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico and Peru's manufacturing exports shows that:

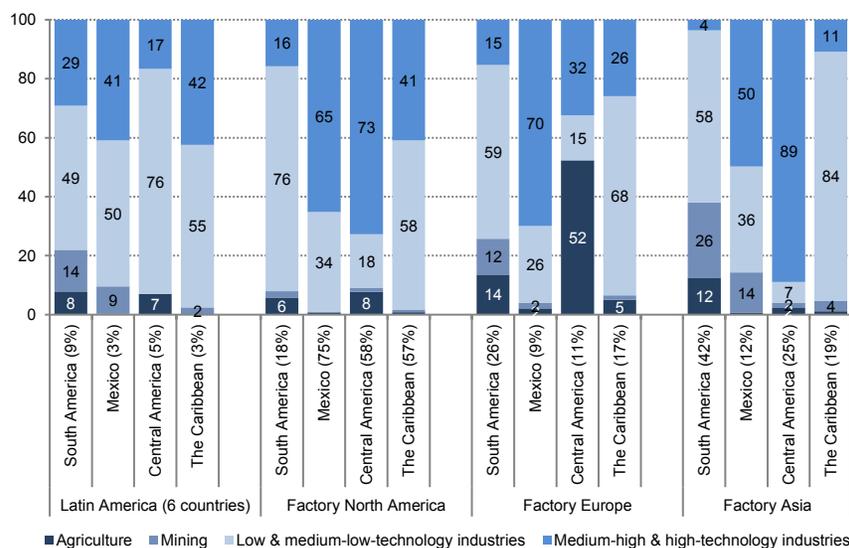
- Brazil is characterized by a relatively low level of gross vertical specialization, in comparison with other Latin American and extra-regional countries. The other four natural resource-intensive economies (Argentina, Chile, Colombia, and Peru) have similar (intermediate) levels of gross backward linkages. Costa Rica and Mexico, who specialize in assembling and processing foreign inputs, show the highest levels. In all seven countries, aggregate vertical specialization levels hide large differences across exporting industries.
- Brazil and Costa Rica have lower levels of intra-regional backward linkages than the other countries (except for Mexico, which is integrated into the North America region). Although most imported inputs in Argentina, Chile, Colombia and Peru's manufacturing exports come from outside the region (particularly, the United States, the European Union, China and the Rest of South and East Asia), Latin American and Caribbean countries have a significant participation. Argentina stands out for its high level of backward integration with Brazil. Other important intra-regional linkages include those between Argentina and Brazil—the largest MERCOSUR members—and the Pacific Alliance countries (particularly, Chile, Mexico and Peru). Also, significant intra-Pacific Alliance linkages are observed.
- Due to the competition of China, the United States and the European Union lost participation in Latin America's gross backward linkages. This is particularly the case of the technology-intensive sectors Computer, electronic and optical equipment and Electrical machinery and apparatus, n.e.c., where the participation of China reached high levels. However, in these industries a large proportion of the value added embodied in Chinese gross exports is sourced from abroad (mostly from other Southeast Asian countries, the European Union and the United States).
- Latin American and Caribbean countries have a larger participation as intra-regional providers of low and medium-low-technology inputs (including Food products, beverages and tobacco, Pulp, paper and paper products, Rubber and plastics products, and Basic metals). Their share is also important in the primary sectors (Agriculture and Mining and quarrying). However, a few countries have significant participations in the most technology-intensive industries (like Brazil in Motor vehicles, Electrical machinery and apparatus, n.e.c. and Computer, electronic and optical equipment for Argentina; Argentina in Motor vehicles for Brazil; and Brazil and Mexico in Electrical machinery and apparatus, n.e.c. and Motor vehicles for Costa Rica).
- Intra-regional competitiveness in intermediate goods concentrates in primary sectors and low and medium-low-technology industries. Countries like Argentina, Brazil, Costa Rica, the Dominican Republic, Honduras, Mexico, Nicaragua, Panama and Uruguay also show competitiveness, in some regional markets, in medium-high or high-technology industries (Machinery and equipment, n.e.c., Electrical machinery and apparatus, n.e.c., Computer, electronic and optical equipment, Motor vehicles or Other transport equipment, depending on the country). However, the share of these industries in the region's gross forward linkages with Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico and Peru is low.

- For many countries, comparative advantages in some industries —particularly, those with higher technology content— are limited to the regional level. This would be related to countries' preferential access and geographical proximity to regional markets, which shows the importance of regional integration.

The comparison of intra and extra-regional gross forward linkages reveals that:

- For South American countries, intra-regional linkages are somewhat less concentrated in primary and low and medium-low-technology inputs than their linkages with Factory North America, Factory Europe and, particularly, Factory Asia (see figure 23).<sup>45</sup> Also, they are overall more diversified in the sector dimension (see figure 24). However, the share of Latin America (6 countries) and Mexico as destination of South American vertical specialization-related intermediate exports is, at the aggregate level, quite low (9% and 3% respectively, in 2011). Also, both intra and extra-regional linkages are concentrated in a few origin countries (Brazil, Chile, Argentina and Peru, with around 90% of the total).

**Figure 23**  
**Latin America and the Caribbean (selected subregions and countries): vertical specialization-related intermediate exports by technology content, 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Latin America (6 countries) includes Argentina, Brazil, Chile, Colombia, Costa Rica and Peru. Mexico is included in Factory North America. Percentages in brackets next to the name of each exporting subregion/country indicate the share of the corresponding destination (i.e., Latin America (6 countries), Factory North America, Factory Europe, or Factory Asia) in the subregion/country's total vertical specialization-related intermediate exports in 2011.

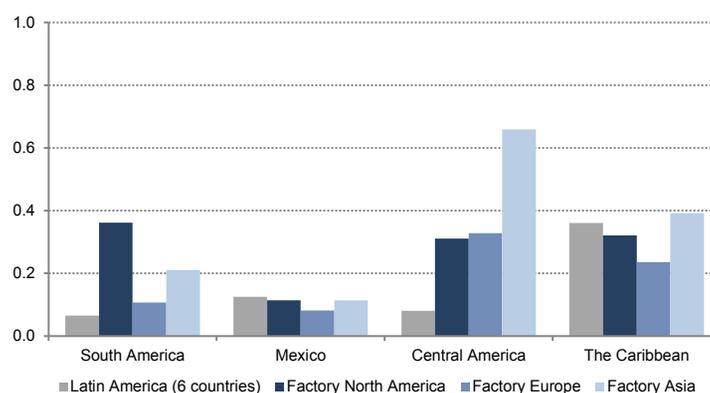
- Unlike South America, low and medium-low-technology industries account for a larger proportion of Mexico's forward linkages with Latin America (6 countries) than of its extra-regional linkages. In addition, intra-regional linkages (only 3% of the total in 2011) show a somewhat higher overall level of sector concentration. Similarly, for Central American countries, the most technology-intensive industries have a significantly larger participation in extra-regional linkages (which is mostly explained by Costa Rica's forward integration into

<sup>45</sup> The share of medium-high or high-technology industries is higher in South American countries' gross forward linkages with Argentina, Colombia and Mexico than in those with Brazil, Chile, Costa Rica and Peru.

Factory North America and Factory Asia).<sup>46</sup> Central America's linkages with Latin America (6 countries) are, however, considerably more diversified than its extra-regional linkages in terms of both origin sectors and countries.

- The Caribbean countries' forward linkages with Latin America (6 countries) (3% of the total in 2011) are similar in composition to those with Factory North America, and are less concentrated in low and medium-low-technology industries than their linkages with Factory Europe and, particularly, Factory Asia. However, these intra-regional linkages show a higher overall level of sector concentration than extra-regional linkages (except for Factory Asia), and they are highly concentrated in terms of origin countries (with Trinidad and Tobago and the Dominican Republic accounting for over 80% of the total).

**Figure 24**  
**Latin America and the Caribbean (selected subregions and countries): Herfindahl-Hirschman index of sector concentration of vertical specialization-related intermediate exports, 2010-2011<sup>a</sup>**



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Latin America (6 countries) includes Argentina, Brazil, Chile, Colombia, Costa Rica and Peru. Mexico is included in Factory North America.

Although the limited forward engagement of most Latin American and Caribbean countries in extra-regional value chains could be related to structural factors such as countries' distance to the main manufacturing hubs in Factory North America, Factory Europe and Factory Asia, the data presented in this document show the potential for further integration. Also, the relatively low level of intra-regional links suggests the scope for further development of regional production networks, exploiting production complementarities within the region.

Integration into international value chains—and the division of production and task specialization involved—brings benefits beyond those traditionally associated with trade in final goods (Cheng et al., 2015). It offers opportunities for deeper specialization and greater export and production diversification, enabling countries to exploit finer comparative advantage niches and benefit from economies of scale and scope. Through economic upgrading and the engagement of more local actors (firms and workers), participation in international value chains can be a path for faster industrialization and development (Taglioni and Winkler, 2016). However, an integration strategy that maximizes the positive spillovers into the domestic economy—in terms of productivity gains, creation of high-quality jobs, skills and technology transfer to local firms, and greater integration of small and medium-sized enterprises—requires coordinated plans across a number of policy areas (like trade, FDI, innovation and human capital formation).

<sup>46</sup> It should be noted that medium-high or high-technology industries have a considerably larger participation in Mexico and Central America's forward linkages with Argentina and Brazil than in their linkages with the rest of Latin America (6 countries).

As shown by Cadestin et al. (2016), trade barriers on intermediate imports affect countries' engagement in cross-border production sharing. The multiple intra and extra-regional trade agreements implemented by Latin American and Caribbean countries have significantly lowered tariffs.<sup>47</sup> However, the overlapping and competing rules of origin governing trade under those agreements —by establishing when a product is eligible for preferential access— impose limits on the range of countries that can participate in the international fragmentation of production (affecting both intra and extra-agreement input suppliers). The harmonization of existing rules of origin and amendments to certification, *de minimis* and cumulation rules would contribute to stimulate both intra and extra-agreement value chains. Also, the trade-distorting effect of some standards, technical regulations, conformity-assessment procedures and similar non-tariff measures (NTMs) need to be addressed —through mutual recognition or harmonization—, to improve Latin American and Caribbean countries' integration into intra and extra-regional value chains.

A structural factor like geography imposes, however, a challenge for Latin American and Caribbean countries to join value chains in other regions, or even to develop value chains within their own region (Blyde, 2014). The low quality of logistics infrastructure (transport, storage and distribution) and other services required to move intermediate goods or coordinate production across countries (like finance and ICT services) affects Latin American and Caribbean countries' participation in international value chains. Addressing long-standing shortcomings in the region's logistics infrastructure, to improve international connectivity and lower coordination and transport costs, is therefore crucial for being able to better exploit the opportunities offered by a globalized world economy.<sup>48</sup>

Other factors affecting countries' integration into international production networks are the legal and institutional framework for FDI, intellectual property rights and contract enforcement, and the efficiency of customs procedures (Blyde, 2014). International fragmentation of production involves cross-border investments (particularly, vertical FDI that links affiliates providing inputs to parent companies in other countries), which might be inhibited by inadequate investment rules in the host country. Likewise, the delegation of links of the value chain to foreign suppliers through contract manufacturing —and the related knowledge and technology transfer— can be undermined by uncertain and ambiguous practices in contract enforcement, as well as by weak intellectual property rights. In addition, the administrative trade barriers imposed by cumbersome customs procedures may inhibit the rapid delivery of components, hampering countries' engagement in cross-border production sharing.

Along with increasing their participation in international value chains, Latin American and Caribbean countries need to upgrade within them in order to maximize the positive spillovers for local actors. This implies gaining competitiveness in more technology-intensive and higher value-added products (product upgrading), tasks (functional upgrading) and/or sectors (inter-sector upgrading), which could be achieved by improving the skills and know-how of the workforce (skills upgrading), improving firms' absorptive capacity and technology (capital upgrading), or increasing productivity in existing tasks (process upgrading) (Tagliani and Winkler, 2016). For many countries, upgrading should also address the issue of environmental sustainability, by shifting the composition of their forward linkages towards cleaner industries and tasks.

Industrial policy plays a key role in improving countries' ability to enhance their upgrading opportunities within international value chains. As pointed out by Gereffi and Sturgeon (2013), the central goal of a GVC-oriented industrial policy is not creating fully vertically integrated national industries but moving into higher-value niches in GVCs. Such policy involves actions in areas like technological progress and innovation, human capital formation, competitiveness, and competition.

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<sup>47</sup> Since tariff costs are incurred repeatedly as goods in process cross multiple borders, they have a proportionally larger effect on trade involving goods produced sequentially in multiple countries than on trade in goods produced entirely in one country (Hummels et al., 2001). Thus, even small further reductions in tariff barriers would promote Latin American and Caribbean countries' vertical specialization-related trade.

<sup>48</sup> Latin America and the Caribbean has, on average, less adequate logistics infrastructure than other regions. Moreover, logistics deficiencies make freight costs for intra-regional exports almost as expensive as they are for extra-regional exports, or even more. This affects the region's ability to attract fragmented production, particularly in industries that are more dependent on logistics services (CAF/ECLAC/OECD, 2013; Blyde, 2014).

As seen above, a comprehensive policy aimed at promoting countries' participation in intra and extra-regional value chains would involve measures that can only be fully implemented over long periods (like the improvement of transport infrastructure or the development of higher levels of human capital); however, other measures can be undertaken in a shorter time horizon (like trade facilitation measures). Likewise, some measures can be implemented unilaterally while others require negotiation and cooperation between countries (for instance, through deeper integration). Overall, policy measures have an important role to play in order to compensate Latin American and Caribbean countries' relative disadvantage in structural factors such as distance to the major GVC regions and across the continent.

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## **Annex**

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## Additional tables and figures

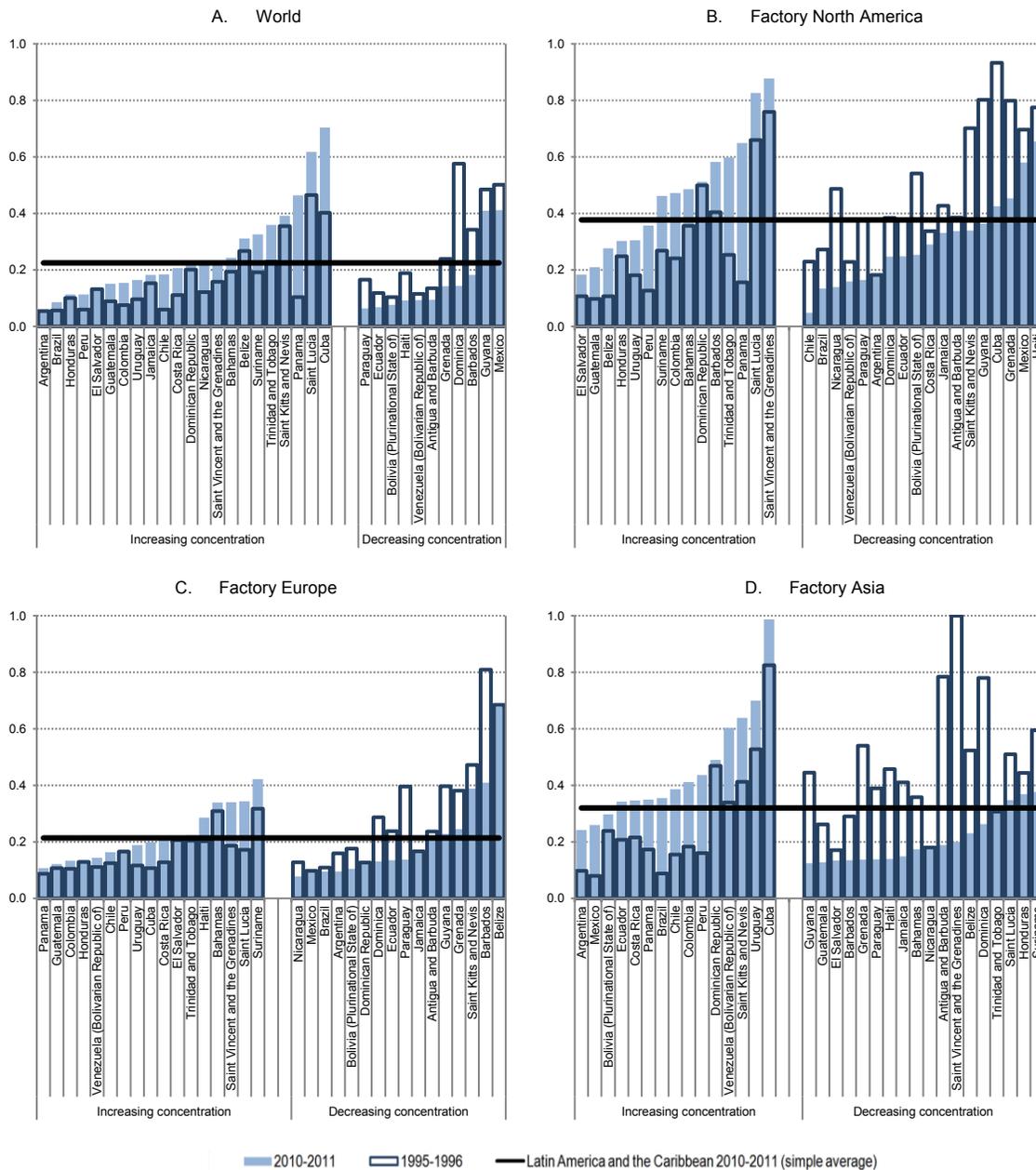
**Table A.1**  
**Industry breakdown of OECD's ICIO tables**

Group	Code	Description
Primary	C01T05	Agriculture, hunting, forestry and fishing
	C10T14	Mining and quarrying
Manufacturing	C15T16	Food products, beverages and tobacco
	C17T19	Textiles, textile products, leather and footwear
	C20	Wood and products of wood and cork
	C21T22	Pulp, paper, paper products, printing and publishing
	C23	Coke, refined petroleum products and nuclear fuel
	C24	Chemicals and chemical products
	C25	Rubber and plastics products
	C26	Other non-metallic mineral products
	C27	Basic metals
	C28	Fabricated metal products
	C29	Machinery and equipment, n.e.c.
	C30.32.33	Computer, Electronic and optical equipment
	C31	Electrical machinery and apparatus, n.e.c.
	C34	Motor vehicles, trailers and semi-trailers
	C35	Other transport equipment
	C36T37	Manufacturing n.e.c.; recycling
Services	C40T41	Electricity, gas and water supply
	C45	Construction
	C50T52	Wholesale and retail trade; repairs
	C55	Hotels and restaurants
	C60T63	Transport and storage
	C64	Post and telecommunications
	C65T67	Financial intermediation
	C70	Real estate activities
	C71	Renting of machinery and equipment
	C72	Computer and related activities
	C73T74	R&D and other business activities
	C75	Public admin. and defence; compulsory social security
	C80	Education
	C85	Health and social work
	C90T93	Other community, social and personal services
C95	Private households with employed persons	

**Table A.2**  
**List of countries covered by the OECD's ICIO tables**

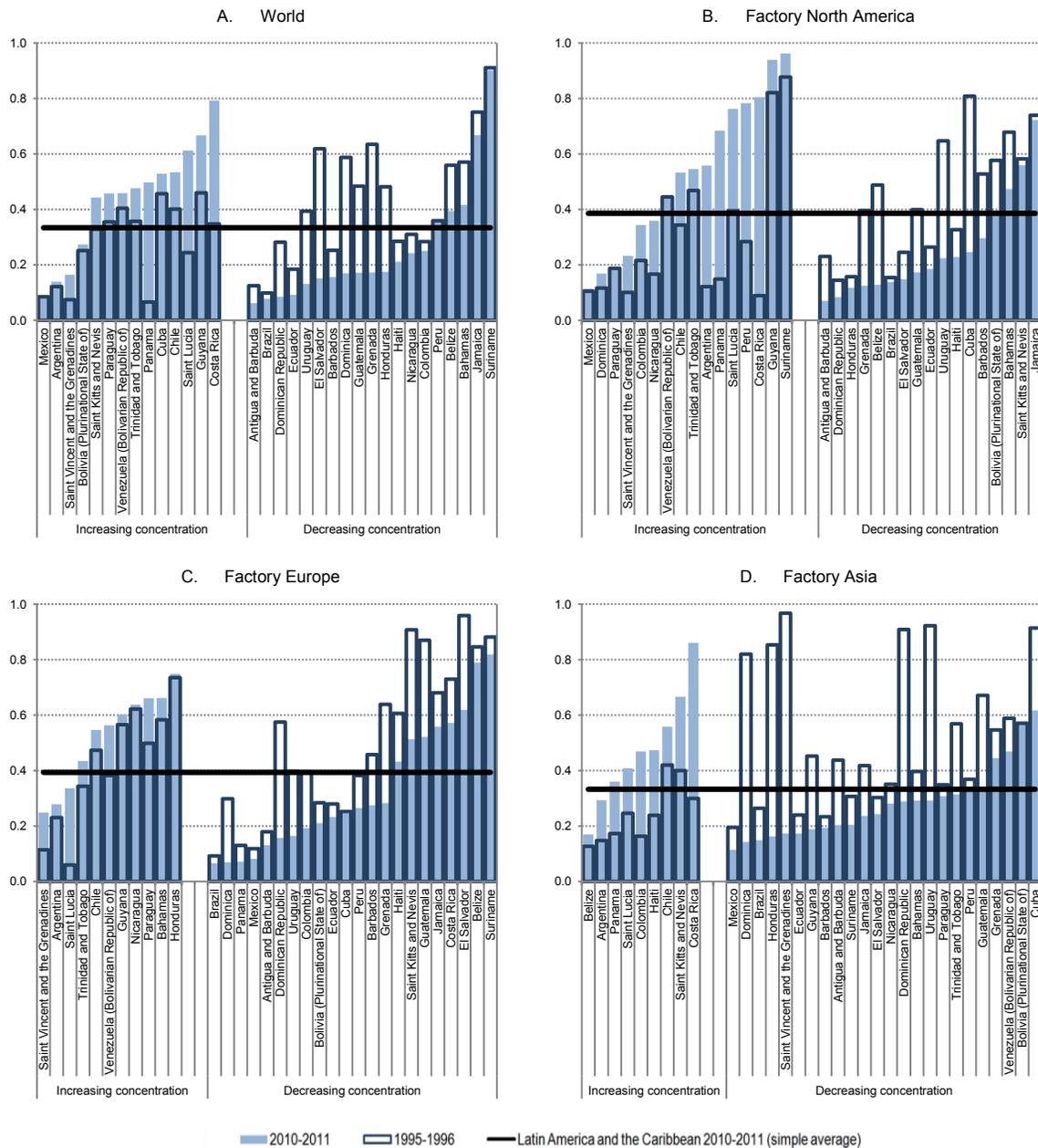
Region	Countries
North America	Canada, United States
Latin America	Argentina, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru
European Union	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom
Rest of Europe	Iceland, Norway, Russian Federation, Switzerland
South East Asia	Brunei Darussalam, Cambodia, China, Hong Kong (Special Administrative Region of China), India, Indonesia, Japan, Malaysia, Philippines, Republic of Korea, Singapore, Thailand, Taiwan (Province of China), Viet Nam
Rest of Asia	Israel, Saudi Arabia, Turkey
Oceania	Australia, New Zealand
Africa	Morocco, South Africa, Tunisia

**Figure A.1**  
**Latin America and the Caribbean: Herfindahl-Hirschman index of destination market concentration of vertical specialization-related intermediate exports, 1995-1996 and 2010-2011**



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

**Figure A.2**  
**Latin America and the Caribbean: Herfindahl-Hirschman index of sector concentration of vertical specialization-related intermediate exports, 1995-1996 and 2010-2011**



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

**Table A.3**  
**Selected Latin American countries: intra and extra-regional preferential trade agreements**  
*(In chronological order)<sup>a</sup>*

Country	Latin America and the Caribbean	Rest of the World
Argentina	Uruguay (1974 <sup>b</sup> , 1991) Ecuador (1984 <sup>b</sup> , 2001 <sup>b</sup> , 2005 <sup>b</sup> ) Mexico (1987 <sup>b</sup> ) Brazil (1987 <sup>b</sup> , 1991) Colombia (1988 <sup>b</sup> , 2001 <sup>b</sup> , 2005 <sup>b</sup> ) Peru (1988 <sup>b</sup> , 2001 <sup>b</sup> , 2006 <sup>b</sup> ) Venezuela (Bolivarian Republic of) (1988 <sup>b</sup> , 2001 <sup>b</sup> , 2005 <sup>b</sup> , 2012) Paraguay (1989 <sup>b</sup> , 1991) Chile (1991 <sup>b</sup> , 1996 <sup>b</sup> ) Bolivia (Plurinational State of) (1997 <sup>b</sup> ) Cuba (2000 <sup>b</sup> , 2007 <sup>b</sup> )	India (2009 <sup>b</sup> ) Israel (2009 <sup>b</sup> )
Brazil	Uruguay (1976 <sup>b</sup> , 1991) Argentina (1987 <sup>b</sup> , 1991) Paraguay (1991) Chile (1996 <sup>b</sup> ) Bolivia (Plurinational State of) (1997 <sup>b</sup> ) Colombia (1999 <sup>b</sup> , 2005 <sup>b</sup> ) Ecuador (1999 <sup>b</sup> , 2005 <sup>b</sup> ) Peru (1999 <sup>b</sup> , 2006 <sup>b</sup> ) Cuba (2000 <sup>b</sup> , 2007 <sup>b</sup> ) Mexico (2003 <sup>b</sup> ) Venezuela (Bolivarian Republic of) (1994 <sup>b</sup> , 1999 <sup>b</sup> , 2005 <sup>b</sup> , 2012) Guyana (2004 <sup>b</sup> ) Suriname (2006 <sup>b</sup> )	India (2009 <sup>b</sup> ) Israel (2009 <sup>b</sup> )
Chile	Uruguay (1985 <sup>b</sup> , 1996 <sup>b</sup> ) Argentina (1991 <sup>b</sup> , 1996 <sup>b</sup> ) Bolivia (Plurinational State of) (1993 <sup>b</sup> ) Colombia (1993 <sup>b</sup> , 2009, 2012) Venezuela (Bolivarian Republic of) (1993 <sup>b</sup> ) Ecuador (1994 <sup>b</sup> , 2010 <sup>b</sup> ) Brazil (1996 <sup>b</sup> ) Peru (1998 <sup>b</sup> , 2009, 2012) Mexico (1999, 2012) Costa Rica (2002) El Salvador (2002) Guatemala (2002) Honduras (2002) Cuba (2008 <sup>b</sup> ) Panama (2008) Nicaragua (2012)	Canada (1997) European Union (2003) United States (2004) Iceland (2004) Liechtenstein (2004) Norway (2004) Switzerland (2004) Republic of Korea (2004) New Zealand (2006) China (2006) Brunei Darussalam (2006) Singapore (2006) Japan (2007) India (2007 <sup>b</sup> ) Australia (2009) Turkey (2011) Malaysia (2012) Hong Kong (2014) Viet Nam (2014)
Colombia	Costa Rica (1985 <sup>b</sup> , 2016) El Salvador (1985 <sup>b</sup> , 2009) Honduras (1985 <sup>b</sup> , 2009) Guatemala (1985 <sup>b</sup> , 2009) Nicaragua (1985 <sup>b</sup> ) Argentina (1988 <sup>b</sup> , 2001 <sup>b</sup> , 2005 <sup>b</sup> ) Bolivia (Plurinational State of) (1988) Ecuador (1988) Peru (1988, 2012) Venezuela (Bolivarian Republic of) (1988) Chile (1993 <sup>b</sup> , 2009, 2012) Caribbean Community (CARICOM) (1995 <sup>b</sup> ) Mexico (1995, 2012) Panama (1995 <sup>b</sup> ) Brazil (1999 <sup>b</sup> , 2005 <sup>b</sup> ) Cuba (2001 <sup>b</sup> ) Paraguay (2005 <sup>b</sup> ) Uruguay (2005 <sup>b</sup> )	Canada (2011) United States (2012) European Union (2013) Iceland (2014) Liechtenstein (2014) Norway (2014) Switzerland (2014) Republic of Korea (2016)
Costa Rica	El Salvador (1959) Guatemala (1959) Honduras (1959) Nicaragua (1959) Panama (1962 <sup>b</sup> , 1992 <sup>b</sup> , 2003 <sup>b</sup> ) Mexico (1984 <sup>b</sup> , 1995) Colombia (1985 <sup>b</sup> , 2016) Dominican Republic (2001) Chile (2002) Caribbean Community (CARICOM) (2005) Peru (2013)	Canada (2002) United States (2004) China (2011) European Union (2013) Singapore (2013)

Table A.3 (concluded)

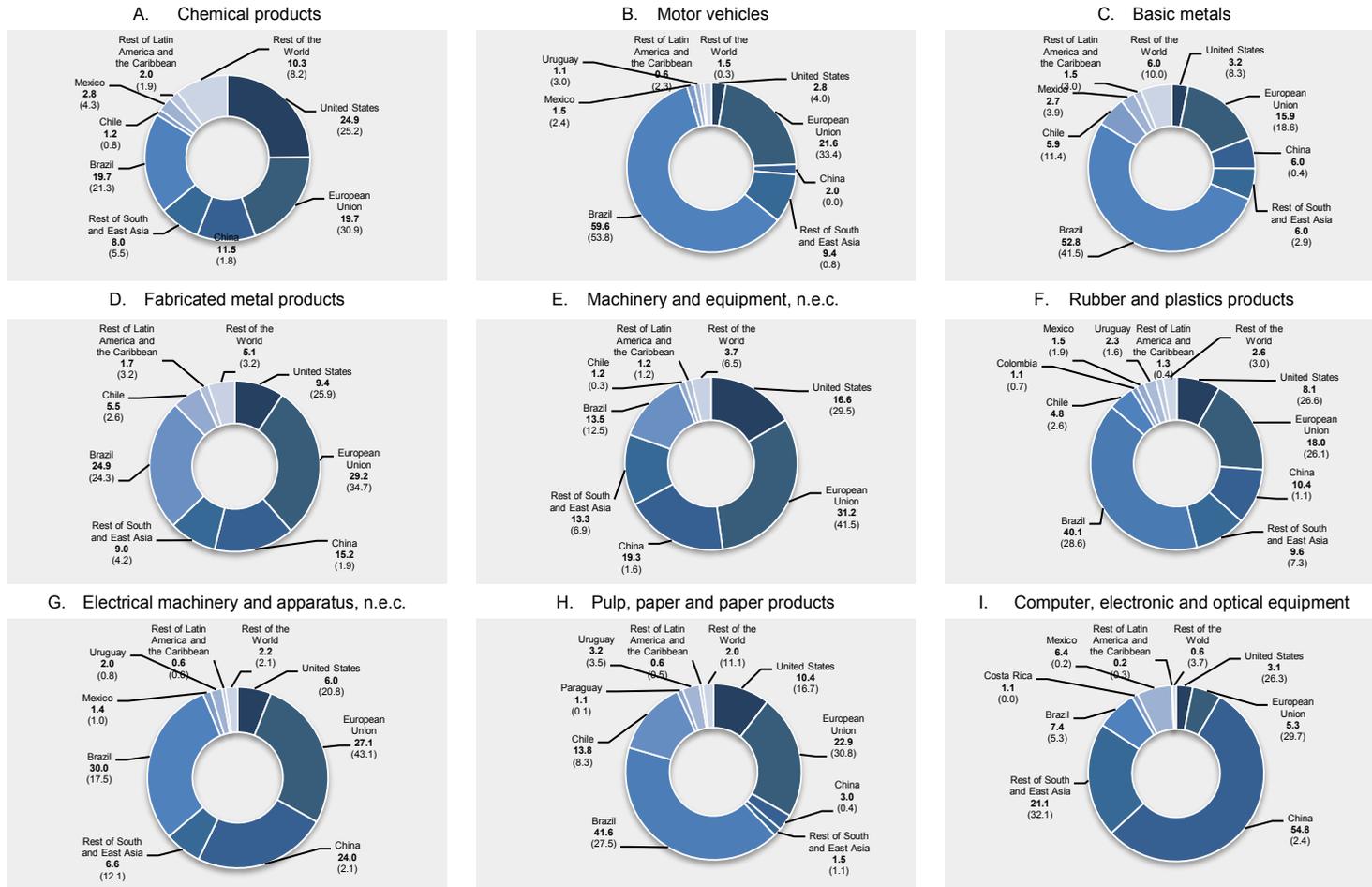
Country	Latin America and the Caribbean	Rest of the World
Mexico	Costa Rica (1984 <sup>b</sup> , 1995, 2012) Panama (1986 <sup>b</sup> ) Uruguay (1986 <sup>b</sup> , 2003 <sup>b</sup> , 2004) Argentina (1987 <sup>b</sup> , 2003 <sup>b</sup> ) Peru (1987 <sup>b</sup> , 2012) Bolivia (Plurinational State of) (1995 <sup>b</sup> ) Colombia (1995, 2012) Venezuela (Bolivarian Republic of) (1995 <sup>b</sup> ) Nicaragua (1998, 2012) Chile (1999, 2012) Cuba (2001 <sup>b</sup> ) El Salvador (2001, 2012) Guatemala (2001, 2012) Honduras (2001, 2012) Brazil (2003 <sup>b</sup> ) Paraguay (2003 <sup>b</sup> )	Canada (1994) United States (1994) European Union (2000) Israel (2000) Iceland (2001) Liechtenstein (2001) Norway (2001) Switzerland (2001) Japan (2005)
Peru	Mexico (1987 <sup>b</sup> , 2012) Argentina (1988 <sup>b</sup> , 2001 <sup>b</sup> , 2006 <sup>b</sup> ) Bolivia (Plurinational State of) (1988) Colombia (1988, 2012) Ecuador (1988) Venezuela (Bolivarian Republic of) (1988) Chile (1998 <sup>b</sup> , 2009, 2012) Brazil (1999 <sup>b</sup> , 2006 <sup>b</sup> ) Cuba (2006 <sup>b</sup> ) Paraguay (2006 <sup>b</sup> ) Uruguay (2006 <sup>b</sup> ) Panama (2012) Costa Rica (2013)	Canada (2009) United States (2009) Singapore (2009) China (2010) Republic of Korea (2011) Iceland (2011) Liechtenstein (2011) Norway (2011) Switzerland (2011) Japan (2012) European Union (2013)

Source: Author's elaboration on the basis of information from the World Trade Organization's Regional Trade Agreements Information System (RTA-IS) and the Design of Trade Agreements (DESTA) Database (Dür et al., 2014).

<sup>a</sup> Numbers within brackets refer to the year in which the agreement entered into force.

<sup>b</sup> Partial scope agreement.

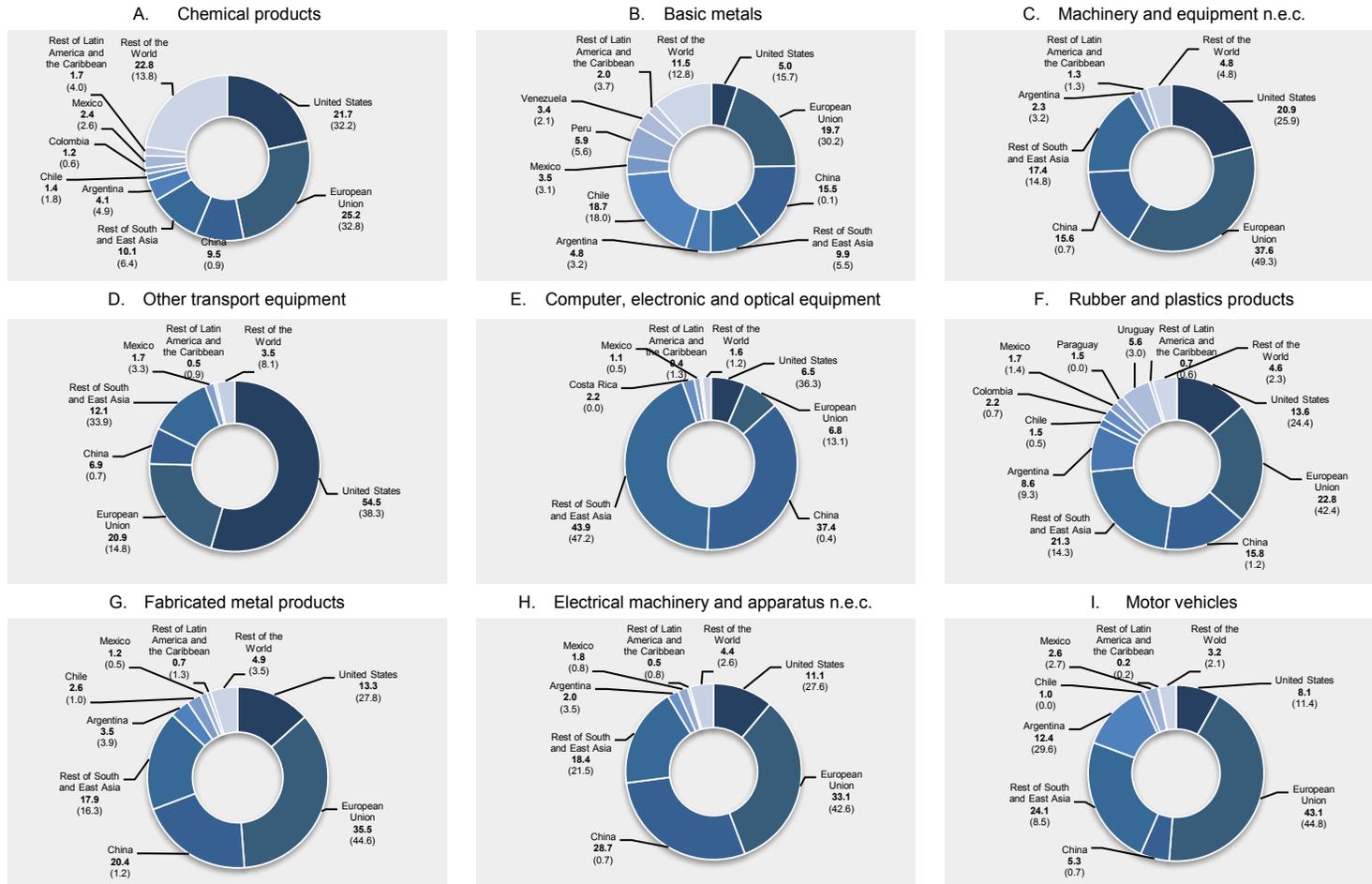
**Figure A.3**  
**Argentina: geographical origin of main imported non-primary inputs embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Origin sectors are decreasingly ordered according to their share in total imported intermediate goods in 2011 (see figure 10.B). Percentages in brackets indicate the share of each origin country/region in 1995.

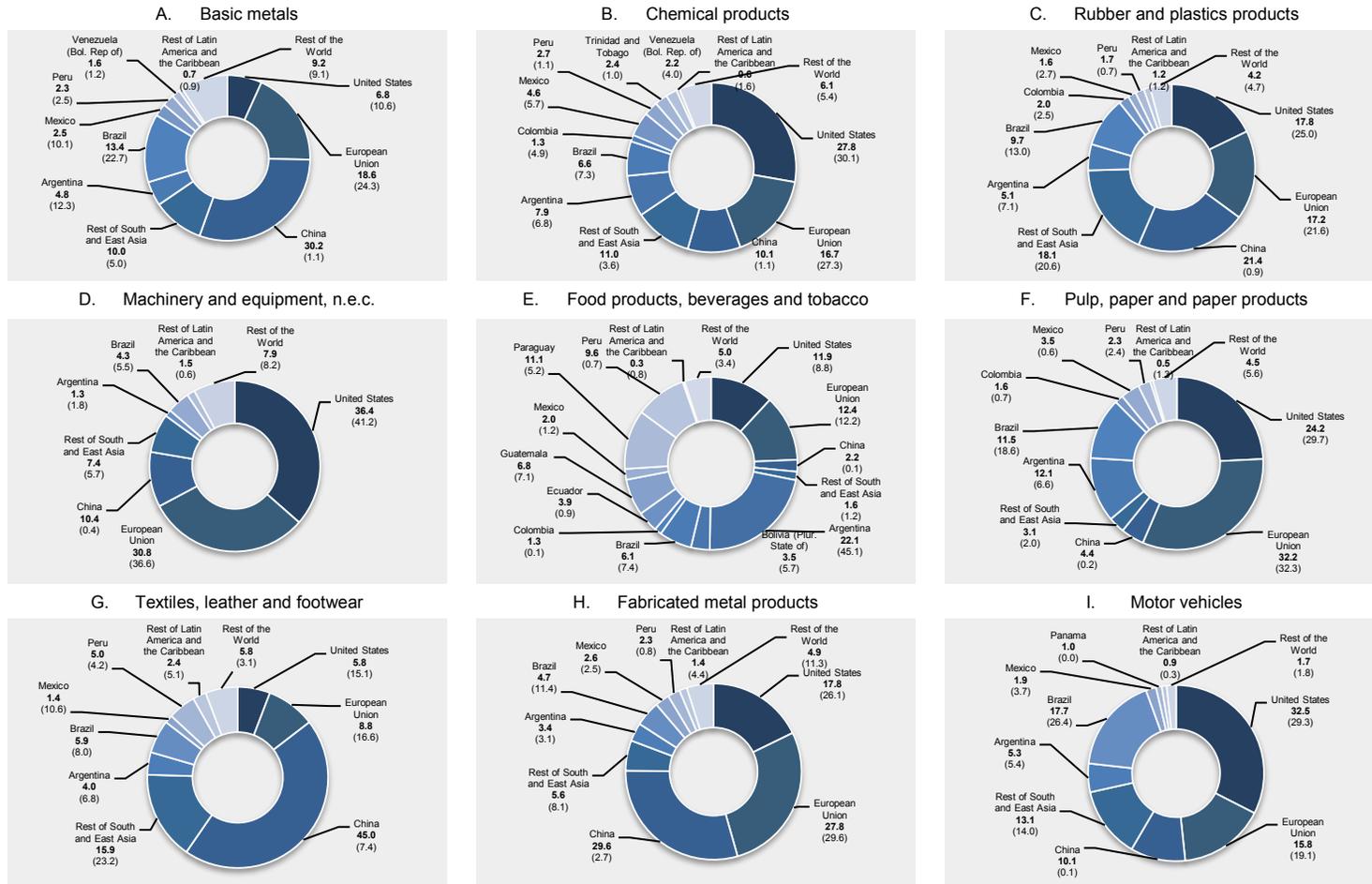
**Figure A.4**  
**Brazil: geographical origin of main imported non-primary inputs embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Origin sectors are decreasingly ordered according to their share in total imported intermediate goods in 2011 (see figure 12.B). Percentages in brackets indicate the share of each origin country/region in 1995.

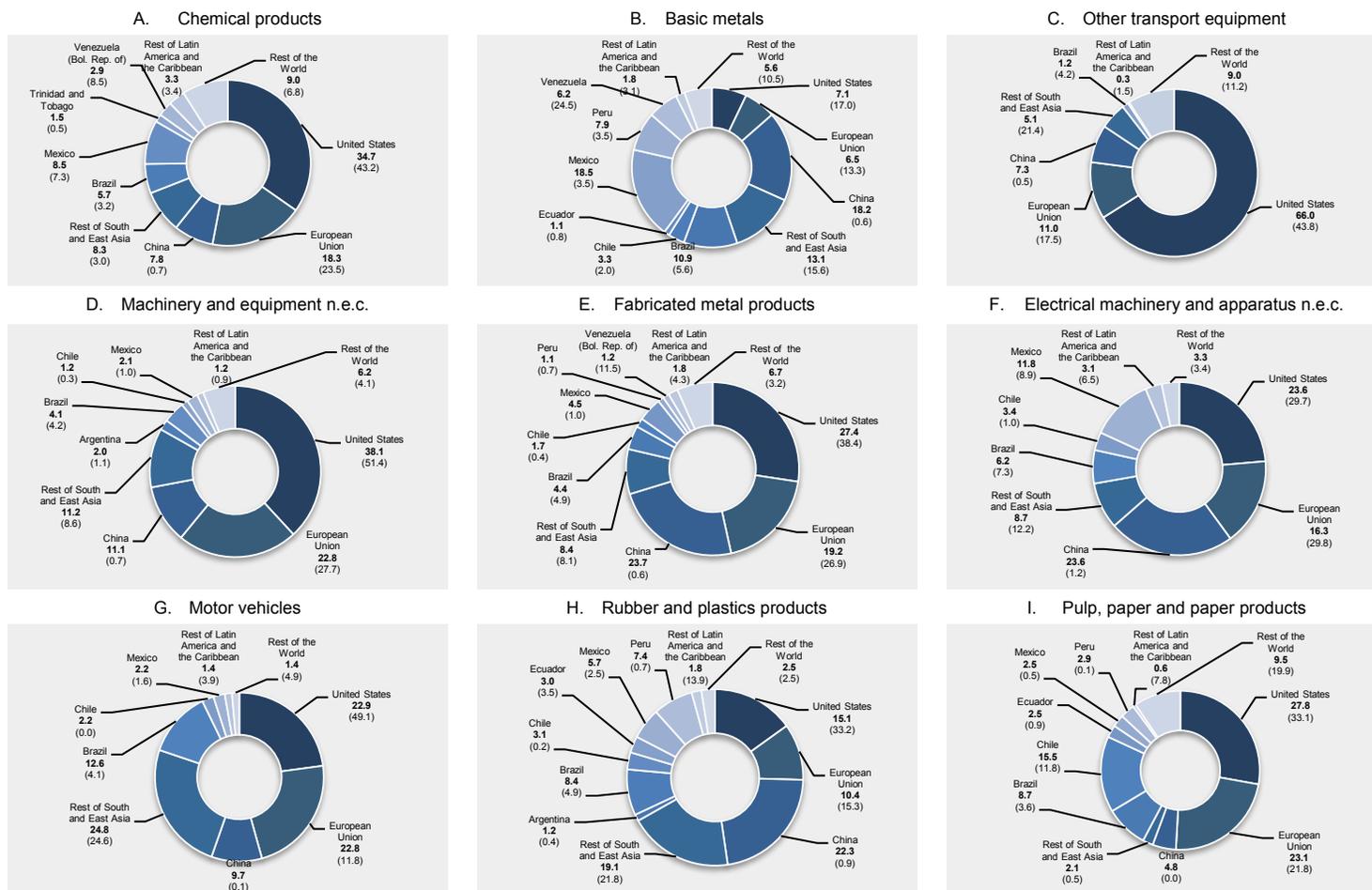
**Figure A.5**  
**Chile: geographical origin of main imported non-primary inputs embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Origin sectors are decreasingly ordered according to their share in total imported intermediate goods in 2011 (see figure 14.B). Percentages in brackets indicate the share of each origin country/region in 1995.

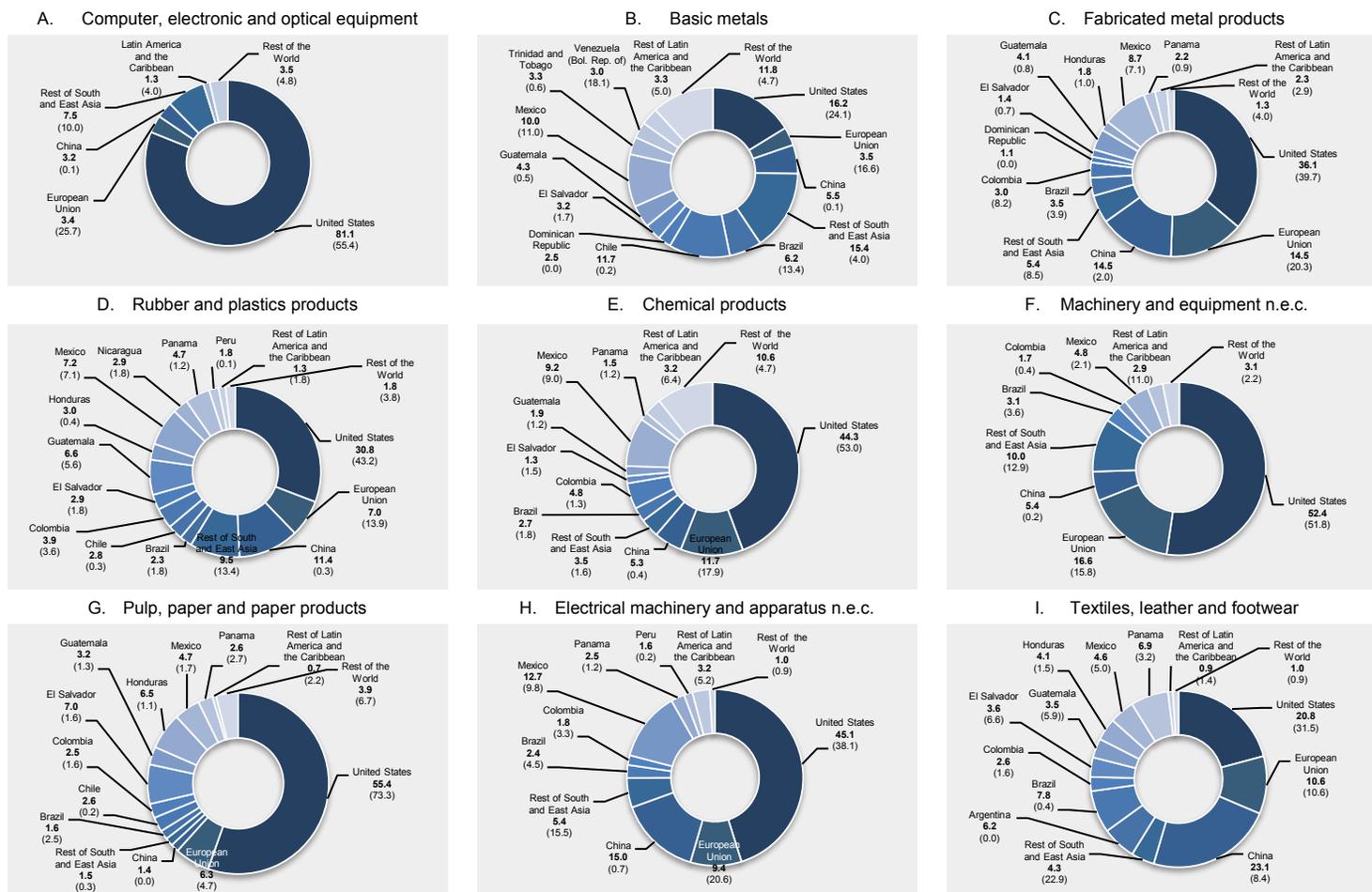
**Figure A.6**  
**Colombia: geographical origin of main imported non-primary inputs embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Origin sectors are decreasingly ordered according to their share in total imported intermediate goods in 2011 (see figure 16.B). Percentages in brackets indicate the share of each origin country/region in 1995.

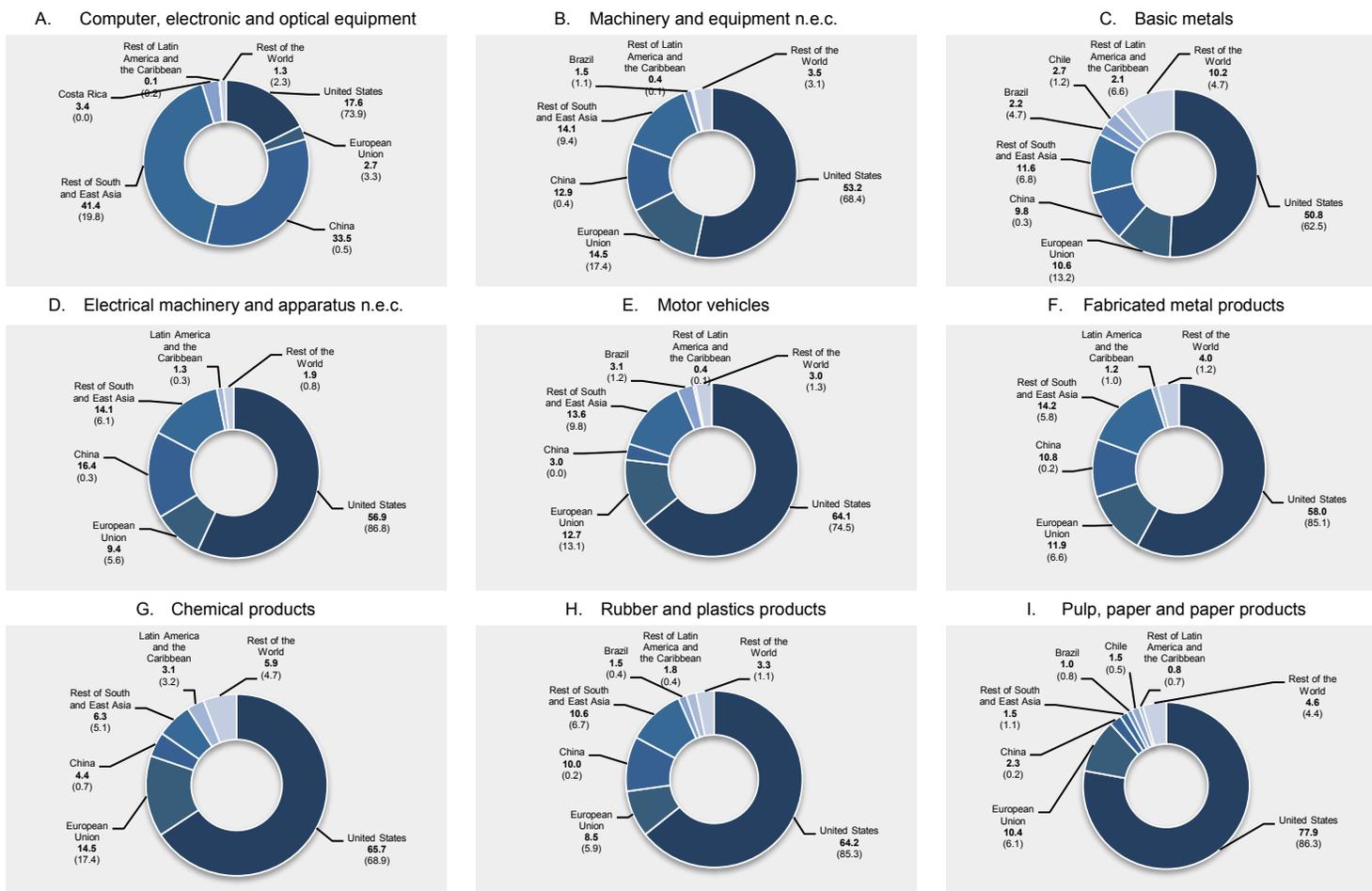
**Figure A.7**  
**Costa Rica: geographical origin of main imported non-primary inputs embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Origin sectors are decreasingly ordered according to their share in total imported intermediate goods in 2011 (see figure 18.B). Percentages in brackets indicate the share of each origin country/region in 1995.

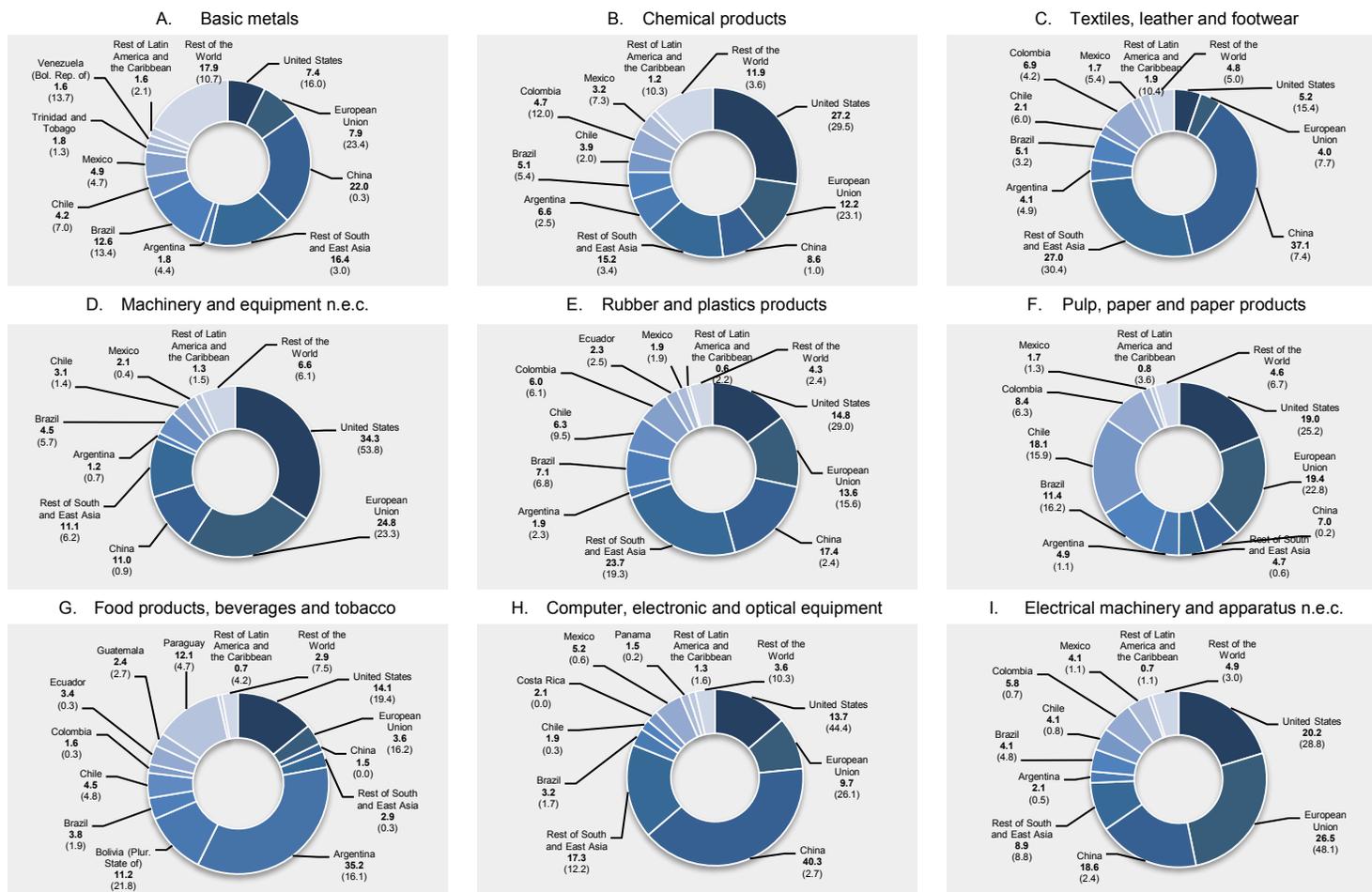
**Figure A.8**  
**Mexico: geographical origin of main imported non-primary inputs embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Origin sectors are decreasingly ordered according to their share in total imported intermediate goods in 2011 (see figure 20.B). Percentages in brackets indicate the share of each origin country/region in 1995.

**Figure A.9**  
**Peru: geographical origin of main imported non-primary inputs embodied in gross manufacturing exports, 1995 and 2011<sup>a</sup>**  
*(Percentages of the total)*



Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Origin sectors are decreasingly ordered according to their share in total imported intermediate goods in 2011 (see figure 22.B). Percentages in brackets indicate the share of each origin country/region in 1995.

**Table A.4**  
**Latin America and the Caribbean: share in imported intermediate goods embodied in Latin American countries' gross manufacturing exports**  
**by source industry, 2011<sup>a</sup>**  
*(Percentages of the total)*

Source industry	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Agriculture	Latin America and the Caribbean: <b>37.2</b> Brazil (28.9) Paraguay (2.9) Chile (2.0)	Latin America and the Caribbean: <b>54.6</b> Argentina (42.5) Paraguay (7.8) Uruguay (2.8)	Latin America and the Caribbean: <b>64.1</b> Argentina (44.5) Paraguay (9.7) Brazil (4.1) Guatemala (3.4) Peru (1.6)	Latin America and the Caribbean: <b>59.8</b> Argentina (39.2) Brazil (6.2) Ecuador (4.5) Peru (4.0) Paraguay (2.9) Guatemala (1.8)	Latin America and the Caribbean: <b>15.9</b> Guatemala (6.6) Nicaragua (2.7) Honduras (1.9) Mexico (1.8) Peru (1.2)	Latin America and the Caribbean: <b>4.7</b> Guatemala (1.2)	Latin America and the Caribbean: <b>46.6</b> Argentina (34.0) Paraguay (3.8) Brazil (3.6) Guatemala (2.3) Bolivia(Plurinational State of) (1.2)
Mining and quarrying	Latin America and the Caribbean: <b>88.5</b> Brazil (85.3) Bolivia (Plurinational State of) (1.0)	Latin America and the Caribbean: <b>60.7</b> Chile (45.0) Peru (10.4) Bolivia (Plurinational State of) (2.2) Argentina (1.8)	Latin America and the Caribbean: <b>82.1</b> Peru (63.7) Mexico (10.1) Argentina (7.9)	Latin America and the Caribbean: <b>30.0</b> Brazil (9.9) Mexico (6.2) Peru (5.8) Chile (1.7) Trinidad and Tobago (1.5) Guyana (1.3) Bolivia (Plurinational State of) (1.2)	Latin America and the Caribbean: <b>57.0</b> Guatemala (17.4) Mexico (16.4) Colombia (9.7) Nicaragua (3.3) Chile (2.7) Brazil (2.6) Guyana (1.9) Bolivia (Plurinational State of) (1.2) Peru (1.0)	Latin America and the Caribbean: <b>19.9</b> Brazil (7.6) Peru (4.0) Honduras (2.3) Chile (1.7) Bolivia (Plurinational State of) (1.2)	Latin America and the Caribbean: <b>82.9</b> Bolivia (Plurinational State of) (34.4) Argentina (22.3) Mexico (16.2) Chile (7.2) Ecuador (1.6)
Food products, beverages and tobacco	Latin America and the Caribbean: <b>61.6</b> Brazil (46.7) Paraguay (3.3) Chile (3.3) Uruguay (3.3) Ecuador (2.1)	Latin America and the Caribbean: <b>36.3</b> Argentina (19.6) Uruguay (10.3) Paraguay (3.2) Colombia (1.4) Chile (1.0)	Latin America and the Caribbean: <b>66.9</b> Argentina (22.1) Paraguay (11.1) Peru (9.6) Guatemala (6.8) Brazil (6.1) Ecuador (3.9) Bolivia (Plurinational State of) (3.5) Mexico (2.0) Colombia (1.3)	Latin America and the Caribbean: <b>66.8</b> Argentina (30.5) Bolivia (Plurinational State of) (14.4) Ecuador (9.0) Brazil (5.0) Chile (2.3) Peru (2.0) Mexico (1.3) Honduras (1.1)	Latin America and the Caribbean: <b>43.1</b> Nicaragua (15.4) Mexico (8.8) Panama (3.5) Guatemala (3.0) Brazil (2.4) Chile (1.6) Colombia (1.6) Honduras (1.5) El Salvador (1.1) Dominican Republic (1.1) Peru (1.0)	Latin America and the Caribbean: <b>12.2</b> Guatemala (3.6) Costa Rica (3.0) Honduras (1.9) Argentina (1.3)	Latin America and the Caribbean: <b>75.0</b> Argentina (35.2) Paraguay (12.1) Bolivia (Plurinational State of) (11.2) Chile (4.5) Brazil (3.8) Ecuador (3.4) Guatemala (2.4) Colombia (1.6)
Textiles, leather and footwear	Latin America and the Caribbean: <b>38.6</b> Brazil (30.3) Chile (2.3) Paraguay (1.9) Uruguay (1.7) Peru (1.1)	Latin America and the Caribbean: <b>7.4</b> Argentina (3.1) Paraguay (1.1)	Latin America and the Caribbean: <b>18.8</b> Brazil (5.9) Peru (5.0) Argentina (4.0) Mexico (1.4)	Latin America and the Caribbean: <b>23.6</b> Mexico (7.8) Ecuador (4.4) Brazil (4.3) Peru (4.1)	Latin America and the Caribbean: <b>40.2</b> Brazil (7.8) Panama (6.9) Argentina (6.2) Mexico (4.6) Honduras (4.1) El Salvador (3.6) Guatemala (3.5) Colombia (2.6)	Latin America and the Caribbean: <b>8.1</b> Brazil (2.7) Argentina (1.3) Guatemala (1.1)	Latin America and the Caribbean: <b>21.8</b> Colombia (6.9) Brazil (5.1) Argentina (4.1) Chile (2.1) Mexico (1.7)

Table A.4 (continued)

Source industry	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Wood and wood products	Latin America and the Caribbean: 44.8 Brazil (22.4) Chile (9.5) Paraguay (5.0) Bolivia (Plurinational State of) (3.8) Uruguay (3.7)	Latin America and the Caribbean: 48.1 Argentina (35.0) Ecuador (4.8) Paraguay (3.9) Bolivia (Plurinational State of) (1.8) Uruguay (1.4)	Latin America and the Caribbean: 17.4 Argentina (6.0) Brazil (5.1) Uruguay (2.2) Paraguay (1.6) Bolivia (Plurinational State of) (1.1)	Latin America and the Caribbean: 61.1 Chile (32.5) Ecuador (18.3) Brazil (2.4) Venezuela (Bolivarian Republic of) (2.1) Peru (1.8) Argentina (1.8) Uruguay (1.2)	Latin America and the Caribbean: 40.9 Chile (25.3) Panama (4.8) Guatemala (2.9) Honduras (1.8) Colombia (1.7) Argentina (1.5)	Latin America and the Caribbean: 28.8 Chile (21.2) Peru (3.6) Brazil (1.4) Uruguay (1.2)	Latin America and the Caribbean: 70.2 Chile (44.3) Ecuador (16.6) Argentina (4.8) Brazil (2.1) Uruguay (1.3)
Pulp, paper and paper products	Latin America and the Caribbean: 60.3 Brazil (41.6) Chile (13.8) Uruguay (3.2) Paraguay (1.1)	Latin America and the Caribbean: 13.3 Argentina (8.9) Chile (2.8)	Latin America and the Caribbean: 31.6 Argentina (12.1) Brazil (11.5) Mexico (3.5) Peru (2.3) Colombia (1.6)	Latin America and the Caribbean: 32.7 Chile (15.5) Brazil (8.7) Peru (2.9) Ecuador (2.5) Mexico (2.5)	Latin America and the Caribbean: 31.5 El Salvador (7.0) Honduras (6.5) Mexico (4.7) Guatemala (3.2) Panama (2.6) Chile (2.6) Colombia (2.5) Brazil (1.6)	Latin America and the Caribbean: 3.3 Chile (1.5) Brazil (1.0)	Latin America and the Caribbean: 45.3 Chile (18.1) Brazil (11.4) Colombia (8.4) Argentina (4.9) Mexico (1.7)
Chemical products	Latin America and the Caribbean: 25.6 Brazil (19.7) Mexico (2.8) Chile (1.2)	Latin America and the Caribbean: 10.7 Argentina (4.1) Mexico (2.4) Chile (1.4) Colombia (1.2)	Latin America and the Caribbean: 28.3 Argentina (7.9) Brazil (6.6) Mexico (4.6) Peru (2.7) Trinidad and Tobago (2.4) Venezuela (Bolivarian Republic of) (2.2) Colombia (1.3)	Latin America and the Caribbean: 21.9 Mexico (8.5) Brazil (5.7) Venezuela (Bolivarian Republic of) (2.9) Trinidad and Tobago (1.5)	Latin America and the Caribbean: 24.6 Mexico (9.2) Colombia (4.8) Brazil (2.7) Guatemala (1.9) Panama (1.5) El Salvador (1.3)	Latin America and the Caribbean: 3.1	Latin America and the Caribbean: 24.8 Argentina (6.6) Brazil (5.1) Colombia (4.7) Chile (3.9) Mexico (3.2)
Rubber and plastics products	Latin America and the Caribbean: 51.2 Brazil (40.1) Chile (4.8) Uruguay (2.3) Mexico (1.5) Colombia (1.1)	Latin America and the Caribbean: 22.0 Argentina (8.6) Uruguay (5.6) Colombia (2.2) Mexico (1.7) Chile (1.5) Paraguay (1.5)	Latin America and the Caribbean: 21.3 Brazil (9.7) Argentina (5.1) Colombia (2.0) Peru (1.7) Mexico (1.6)	Latin America and the Caribbean: 30.7 Brazil (8.4) Peru (7.4) Mexico (5.7) Chile (3.1) Ecuador (3.0) Argentina (1.2)	Latin America and the Caribbean: 39.5 Mexico (7.2) Guatemala (6.6) Panama (4.7) Colombia (3.9) Honduras (3.0) Nicaragua (2.9) El Salvador (2.9) Chile (2.8) Brazil (2.3) Peru (1.8)	Latin America and the Caribbean: 3.3 Brazil (1.5)	Latin America and the Caribbean: 26.2 Brazil (7.1) Chile (6.3) Colombia (6.0) Ecuador (2.3) Argentina (1.9) Mexico (1.9)

Table A.4 (continued)

Source industry	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Other non-metallic mineral products	Latin America and the Caribbean: <b>43.4</b> Brazil (32.0) Chile (5.3) Mexico (3.1) Paraguay (1.2) Uruguay (1.0)	Latin America and the Caribbean: <b>13.9</b> Mexico (6.3) Colombia (2.9) Argentina (2.2)	Latin America and the Caribbean: <b>37.5</b> Argentina (15.0) Brazil (8.2) Mexico (6.6) Peru (5.0) Colombia (1.5)	Latin America and the Caribbean: <b>40.1</b> Mexico (15.0) Brazil (11.8) Peru (6.6) Ecuador (2.0) Venezuela (Bolivarian Republic of) (1.9) Chile (1.0)	Latin America and the Caribbean: <b>40.2</b> Mexico (18.3) Guatemala (6.6) Colombia (4.2) Brazil (3.4) Panama (1.8) Jamaica (1.1)	Latin America and the Caribbean: <b>5.1</b> Brazil (3.4)	Latin America and the Caribbean: <b>29.2</b> Brazil (8.2) Mexico (7.2) Chile (4.6) Colombia (4.5) Ecuador (1.5) Argentina (1.4)
Basic metals	Latin America and the Caribbean: <b>62.9</b> Brazil (52.8) Chile (5.9) Mexico (2.7)	Latin America and the Caribbean: <b>38.4</b> Chile (18.7) Peru (5.9) Argentina (4.8) Mexico (3.5) Venezuela (Bolivarian Republic of) (3.4)	Latin America and the Caribbean: <b>25.3</b> Brazil (13.4) Argentina (4.8) Mexico (2.5) Peru (2.3) Venezuela (Bolivarian Republic of) (1.6)	Latin America and the Caribbean: <b>49.6</b> Mexico (18.5) Brazil (10.9) Peru (7.9) Venezuela (Bolivarian Republic of) (6.2) Chile (3.3) Ecuador (1.1)	Latin America and the Caribbean: <b>47.6</b> Chile (11.7) Mexico (10.0) Brazil (6.2) Guatemala (4.3) Trinidad and Tobago (3.3) El Salvador (3.2) Venezuela (Bolivarian Republic of) (3.0) Dominican Republic (2.5)	Latin America and the Caribbean: <b>7.1</b> Chile (2.7) Brazil (2.2)	Latin America and the Caribbean: <b>28.4</b> Brazil (12.6) Mexico (4.9) Chile (4.2) Argentina (1.8) Trinidad and Tobago (1.8) Venezuela (Bolivarian Republic of) (1.6)
Fabricated metal products	Latin America and the Caribbean: <b>32.1</b> Brazil (24.9) Chile (5.5)	Latin America and the Caribbean: <b>7.9</b> Argentina (3.5) Chile (2.6) Mexico (1.2)	Latin America and the Caribbean: <b>14.3</b> Brazil (4.7) Argentina (3.4) Mexico (2.6) Peru (2.3)	Latin America and the Caribbean: <b>14.7</b> Mexico (4.5) Brazil (4.4) Chile (1.7) Venezuela (Bolivarian Republic of) (1.2) Peru (1.1)	Latin America and the Caribbean: <b>28.1</b> Mexico (8.7) Guatemala (4.1) Brazil (3.5) Colombia (3.0) Panama (2.2) Honduras (1.8) El Salvador (1.4) Dominican Republic (1.1)	Latin America and the Caribbean: <b>1.2</b>	Latin America and the Caribbean: <b>16.5</b> Chile (4.9) Brazil (4.6) Mexico (2.2) Colombia (2.0)
Machinery and equipment, n.e.c.	Latin America and the Caribbean: <b>15.9</b> Brazil (13.5) Chile (1.2)	Latin America and the Caribbean: <b>3.6</b> Argentina (2.3)	Latin America and the Caribbean: <b>7.1</b> Brazil (4.3) Argentina (1.3)	Latin America and the Caribbean: <b>10.6</b> Brazil (4.1) Mexico (2.1) Argentina (2.0) Chile (1.2)	Latin America and the Caribbean: <b>12.5</b> Mexico (4.8) Brazil (3.1) Colombia (1.7)	Latin America and the Caribbean: <b>1.8</b> Brazil (1.5)	Latin America and the Caribbean: <b>12.2</b> Brazil (4.5) Chile (3.1) Mexico (2.1) Argentina (1.2)
Computer, electronic and optical equipment	Latin America and the Caribbean: <b>15.2</b> Brazil (7.4) Mexico (6.4) Costa Rica (1.1)	Latin America and the Caribbean: <b>3.8</b> Costa Rica (2.2) Mexico (1.1)	Latin America and the Caribbean: <b>12.2</b> Mexico (5.9) Brazil (4.9)	Latin America and the Caribbean: <b>14.6</b> Mexico (7.5) Brazil (2.8) Ecuador (2.2) Panama (1.1)	Latin America and the Caribbean: <b>1.3</b>	Latin America and the Caribbean: <b>3.5</b> Costa Rica (3.4)	Latin America and the Caribbean: <b>15.3</b> Mexico (5.2) Brazil (3.2) Costa Rica (2.1) Chile (1.9) Panama (1.5)

Table A.4 (concluded)

Source industry	Argentina	Brazil	Chile	Colombia	Costa Rica	Mexico	Peru
Electrical machinery and apparatus, n.e.c.	Latin America and the Caribbean: <b>34.1</b> Brazil (30.0) Uruguay (2.0) Mexico (1.4)	Latin America and the Caribbean: <b>4.3</b> Argentina (2.0) Mexico (1.8)	Latin America and the Caribbean: <b>17.3</b> Brazil (5.5) Mexico (4.9) Argentina (3.5) Colombia (2.0)	Latin America and the Caribbean: <b>24.5</b> Mexico (11.8) Brazil (6.2) Chile (3.4)	Latin America and the Caribbean: <b>24.1</b> Mexico (12.7) Panama (2.5) Brazil (2.4) Colombia (1.8) Peru (1.6)	Latin America and the Caribbean: <b>1.3</b>	Latin America and the Caribbean: <b>20.8</b> Colombia (5.8) Brazil (4.1) Chile (4.1) Mexico (4.1) Argentina (2.1)
Motor vehicles	Latin America and the Caribbean: <b>62.8</b> Brazil (59.6) Mexico (1.5) Uruguay (1.1)	Latin America and the Caribbean: <b>16.2</b> Argentina (12.4) Mexico (2.6) Chile (1.0)	Latin America and the Caribbean: <b>26.8</b> Brazil (17.7) Argentina (5.3) Mexico (1.9) Panama (1.0)	Latin America and the Caribbean: <b>18.4</b> Brazil (12.6) Chile (2.2) Mexico (2.2)	Latin America and the Caribbean: <b>17.4</b> Brazil (11.5) Mexico (2.5) Panama (1.2)	Latin America and the Caribbean: <b>3.5</b> Brazil (3.1)	Latin America and the Caribbean: <b>30.6</b> Brazil (23.6) Mexico (4.1) Chile (1.5)
Other transport equipment	Latin America and the Caribbean: <b>7.3</b> Brazil (6.9)	Latin America and the Caribbean: <b>2.2</b> Mexico (1.7)	Latin America and the Caribbean: <b>9.9</b> Brazil (7.5) Argentina (1.9)	Latin America and the Caribbean: <b>1.5</b> Brazil (1.2)	Latin America and the Caribbean: <b>5.0</b> Colombia (2.0) Panama (1.3) Brazil (1.0)	Latin America and the Caribbean: <b>1.9</b> Brazil (1.9)	Latin America and the Caribbean: <b>1.5</b>

Source: Author's calculations on the basis of current-price input-output data from the 2016 edition of the Organisation for Economic Co-operation and Development (OECD)'s ICIO tables; and trade data from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), Base pour l'Analyse du Commerce International (BACI).

<sup>a</sup> Only countries with a share larger or equal than 1% are listed in the table.



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