The new structure of international trade: the participation and position of countries in global value chains.

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Abstract.

The interdependence of countries due to trade has increased significantly because most countries incorporates parts and imported services in production process, on the other hand, exports of any country incorporated a higher proportion of foreign value-added, namely, the proportion of inputs originate from third countries contents in exports is increasingly, more and more products are not made entirely in one country and increasingly on sales of product types include related services. As the aim of this study to examine the role and position of various countries in Global Value Chains (CGV) due to their impact on the global economy of today, the goods and services covered by the trade contain inputs can come from many different countries and traditional trade statistics incur a mistake to attribute the full transaction value of these products to the latest economy that invests in the production process. Using the rate of participation in global value chains allow us to know the extent to which a country's exports are integrated in international production networks. Using methodologies Average Propagation Length (Dietzembacher, et. al., 2007) and value added exports (Koopman, et. al., 2011), we proceed in the first case the methodology to calculate the sectorial composition of the countries within the Global Production Chain (CGP) and in the second case to calculate the matrix exports in value added at the sector and country, using the matrix of bilateral trade WIOD and the share of value added is calculated foreign FV and domestic DV incorporated in exports, and domestic value added incorporated in third countries IV, for all countries. In addition the position of a country is calculated within the CGV whether it is upstream or downstream yielding results that specialize in various stages of production.

Key words: Global value chains, foreign value added and domestic value added.

Introduction.

During the last 20 years, the improvements in transportation, information technology and telecommunications, along with a greater economic openness and trade agreements have resulted in a higher level of technological diffusion and internationalization of production processes ; as well as increased mobility and accumulation of production factors , especially capital . The result is that countries are not as specialized in the export of specific end products; nowadays, the main trade of goods are intermediate inputs.

The interdependence between countries due to trade has increased significantly because most countries incorporate parts of imported goods in their exports which in turn are also parts and components. The comparative advantages and international differences in relative efficiencies among different products have been declining in many countries, as a result of a change in the geographical distribution of those benefits. Trade has gone rapidly global with three main centers throughout the globe: China and Japan leading Asia; a huge intra-regional trade in Europe steered by Germany; and USA leading Canada and Latin American countries.

In this document the position of the sectors and countries, within *global supply chains* and their participation in *global value chains* are identified. We highlight the countries position at the beginning or end of the production chain using the methodology Average Propagation Length (APL) as well as their participation in global value chains (GVC). In the latter case a splitting up of the domestic and foreign content of countries' exports and value-added contribution to third countries is made. The analysis is conducted for the years 1995 and 2011.

The paper is organized as follows: The first section deals with the historical context of the factors that have influenced the development of global value chains and the necessity for a better measurement of trade between countries, i.e. trade in value added, not just gross trade. In the second section we briefly present the used methodologies, highlighting the approach to distances and linkages of the Average Propagation Lengths, on one hand, and the calculation of indicators of trade and exports in value added on the other. In the third section the main results are presented for ten countries i.e. the eight major world exporters (USA, China, Germany, Japan, UK, Russia, South Korea and France) and the two major exporters in Latin America (Mexico and Brazil). Finally, we present the position and participation of 35 industries for each country. Conclusions are presented in the fourth and final section. The detailed development of the methodologies used is provided in Appendix 1.

I. Background

A major transformation of trade has been is in progress for some time and its clearest manifestation is the fast growth of the international trade during the last three decades. This international increase of trade was fostered by trade openness, due to multilateral agreements since the mid-eighties; a huge diminishing of the transport and telecommunication costs; and a wide expansion of the multinational firms with a massive and diversified international investment trade in all corners of

the world. The new institutional settings of trade, the technological possibilities of a fragmentation of the goods production and new marketing practices shaped a new economic international division. The actual result of this new trade is that the main exchange of goods and services are associated to intermediate goods, so the conventional measurement of trade among countries must be complemented with a measurement of the value added incorporated in the slice of the production process that each economy takes. The incorporation to the added value of the exports that each economy realizes, is what matters to the countries, because is there where it is generated income and well-being for his populations. In plain words, we have to measure trade in value added within the global value chains.

The global value chains play a major role in the global economy today. The goods and services covered by the trade, containing parts and components that can come from many different countries, requires a set of statistics that could capture this new phenomena. Traditional trade statistics may induce us to attribute the full transaction value of these products to the last economy that makes the final part of the production process. For this reason, trade should be measured not only in gross value, but in value added, in order to evaluate the distribution of income among several economies. Nowadays, nearly 70 % of total trade consists of exports of intermediate inputs (WTO, 2013), indicating an increase in international interdependence by effect of global production and value chains.

Trade openness can help to generate greater value and create new quality jobs, especially in companies that are adequately integrated in world markets; however, it also puts pressure on the use of non- competitive businesses. Trade facilitates the diffusion of ideas and innovations that contribute to economic growth; this diffusion involves a technological change which countries have to adopt and they have to adapt. For successful integration into global markets, individuals and companies have to constantly adapt to changes that may occur in the global competitive environment and take advantage of international trade to generate greater value added and jobs internally.

II. Theoretical framework and methodology.

The countries position within the global production chains.

Global Production Chains play an important role in the field of vertical integration, in discussions of partnership and outsourcing, and management of supply chains. The production activities can be approached as a process from the early stages of production to final demand, within which it is possible to identify and quantify linkages between sectors as intensities or a sort of wavelengths. In this section it is shown the so called Average Propagation Length (APL) method for input-output analysis, which is defined as the average number of steps it takes an economic stimuli in a sector to propagate its impact and reach other sectors. The theoretical and methodological considerations are discussed in this section are based on documents Dietzenbacher, et al (2005 and 2007) and Romero I. et.al (2009) and are described in more detail in Annex 1.

To introduce and motivate the use of APL methodology let us take the following example: the agriculture sector provides inputs to the food processing sector and in turn provides the sector of hotels and restaurants. We have two direct connections between agriculture and the food processing and food processing with hotels and restaurants, while we have an indirect connection between agriculture and hotels and restaurants. In this production chain, two aspects are important, the intensity and the number of steps between connections. In the approach of backward linkages, APL measures the average number of steps it takes, an increase in final demand in hotels and restaurants services, to spread through the production process and have an effect on the production in agriculture. In the approach of forward linkages, APL measures the average number of steps it takes an increase of cost in agriculture, to have an effect on the value of output of hotels and restaurants. It can be shown that the APL forward and backward approaches Ghosh Leontief generate the same information; i.e., are equivalent.

The backward APL shows the average distance of a sector i to a sector j, when considering an effect on the value of output of sector i due to a boost of demand sector j .The forward APL shows the average distance between a sector j and a sector i when considering the effects on the value of output of sector j due to cost- push in sector i.

For a sector a backward APL greater than the forward APL, indicates that such activity is located at the end of the production chain. This measure applies as well to a whole economy. An average forward APL higher than average backward APL indicates that a sector or country is situated at the beginning of the production chain.

The APL matrix is obtained from the relations given below:

$$APL = \frac{L(L-I)}{L-I} = \frac{H}{L-I}$$

The matrix elements of the APL are:

$$\frac{h_{ij}}{l_{ij}} \; ; i \neq j$$

$$\frac{h_{ij}}{(l_{ij}-1)} \; ; i = j$$

Where L is the inverse of Leontief matrix and I is the identity matrix. A similar expression can be obtained using the so called Gosh matrix (normalizing the inter-industry flows by rows). Both matrices contain the same information, i.e. for any a couple of sectors its backward distance is the same than its forward distance. (See Annex 1).

Country participation in global value chains.

International trade and investment are closely linked through international production chains of goods and services with companies investing worldwide, also engaged with marketing activities that build chains with varying degrees of complexity.

Global value chains can be understood as a new form of organization and operation of transnational networks representing about 80% of world trade (Ferrando, 2012). The country participation in global value chains can be identified through an indicator that reflects the portion of foreign value added embodied in the exports from that country on one hand, and also domestic value added by that country embodied into the exports of other countries.

Production lines can be described as a system of sources and destinations of value added within a globally integrated production network. Within a supply chain, each producer purchases inputs and then adds value to them, which is included in the cost of the next stage of production. At each stage of the process, intermediate goods cross the international border, the trade flow is equal to value added value added paid to factors of production, domestic and foreign, by the exporting country. The framework developed by Koopman, et al. (2010) provides a full breakdown of net exports in two components of value added. Through this framework net exports of a country is completely broken down in terms of their original sources of added value, which expresses the sources and destinations of value added either at country level or industry level.

This analysis was made possible by the emergence of Input -output tables inter - countries such as the World Input -Output Database (WIOD), whose tables provides us, for an assembly of economies, their domestic production flows, as well its foreign trade flows. This data base does have an inter-country coverage that allows us to evaluate more than 80% of the global trade.

The explanation presented here for an Inter Country Input-Output Model, and the methodology for calculating trade and exports in value added follow the documents of Koopman, et al. (2010). Annex I are presented in more detail.

From this inter-country matrix, the technical coefficients (including its imports) for all countries and sectors are denoted as the matrix A. Leontief inverse which we will call B and the vector of final demand for each country and sector are subsequently obtained are calculated is denoted as Y. The system can be written as follows briefly.

$$X = (I - A)^{-1}Y = BY$$

The matrix of this model is an array of matrices: the diagonal matrices are the input - output based on domestic transactions of a country, transactions which are located in the off-diagonal matrices are inputs imported by country supplied by another country.

Pre-multiplying the Leontief inverse matrix (B) by the diagonal matrix coefficients of value added (a ratio between value added and gross domestic production), which we will call $\hat{V}$, we obtain a

matrix whose entries are measured in value added ($\hat{V}B$). This matrix shows the proportion of value added by country of origin of the resources. The diagonal matrices elements measure the proportion of domestically produced value added at the sectorial level. The off-diagonal matrices measure the proportion of foreign value added required for producing an additional unit within a country.

Post-multiplying matrix $\hat{V}B$ by the vector of exports $\hat{E}$ we obtain a matrix that shows by country and at sectorial level, the exports expressed in value added by country of origin. The elements of $\hat{V}B\hat{E}$ matrix show the internal and external content of added value that the countries and their sectors embody in their exports.

The sum of elements outside the matrices of the main diagonal, throughout a column, is the measurement of the foreign value added resources incorporated in the gross exports of a country in particular. This is expressed by the following equation:

$$FV_R = \sum_{s \neq r} V_s B_{sr} E_{r*}$$

The sum of the elements outside the main diagonal matrices, along the rows, IV provides information of domestic value added of a country, embodied as an intermediate input in gross exports of third countries.

$$IV_r = \sum_{s \neq t} V_r B_{rs} E_{st}$$

Finally the terms of the matrices of the diagonal DV measure domestic value added in gross exports of a particular country. Its algebraic expression is:

$$DV_r = V_r B_{rr} E_{r*}$$

The sum of domestic and foreign value added must add gross exports, ensuring that the aggregate value of all resources is equivalent to the official gross trade data:

$$DV_r + FV_r = E_{r*}$$

Participation in global value chains is calculated as follows:

$$\frac{IV_{ir}}{E_{ir}} + \frac{FV_{ir}}{E_{ir}}$$

Where E_{ir} are the gross exports of each country, indicating the degree of participation of countries within the GVC.

III. Results

The results of the analysis of the position of countries in global production chains and their participation in global value chains shown below were calculated from the World Input-Output Database (WIOD), each table provides domestic and foreign intermediate economic flows for a group of 40 countries including a fictitious country to cope with the rest of the world economy.

III.1 Position in global production chains with APL

In Figure 1, the APL data shows that the Brazilian economy has not substantially changed its position in global production chains during the period 1995-2011, on average, sectors are diversified involving activities both at the beginning and the end of the global chains, showing little differences. The Mexican economy is positioned, mainly, at the end of the global value chains with the greatest backward APL forward in both years, their integration into global production chains is higher than Brazil, Germany , France, United Kingdom and United States . The more integrated economy into global production chains countries are China, Japan and Korea, while the least integrated are Germany, France and the UK. China is a country that has substantially increased its APL backwards and forwards and year after year, maintaining its position at the end of the global production chains, China and Mexico have remained in this position. Germany, France, UK and Russia have maintained their position at the beginning of the chain in both years; while in Brazil, Korea and the United States go from being at the beginning of the chain to t the end of it.

Figure 1
Average backward APL (B) and forward (F) by country in 1995 and 2011
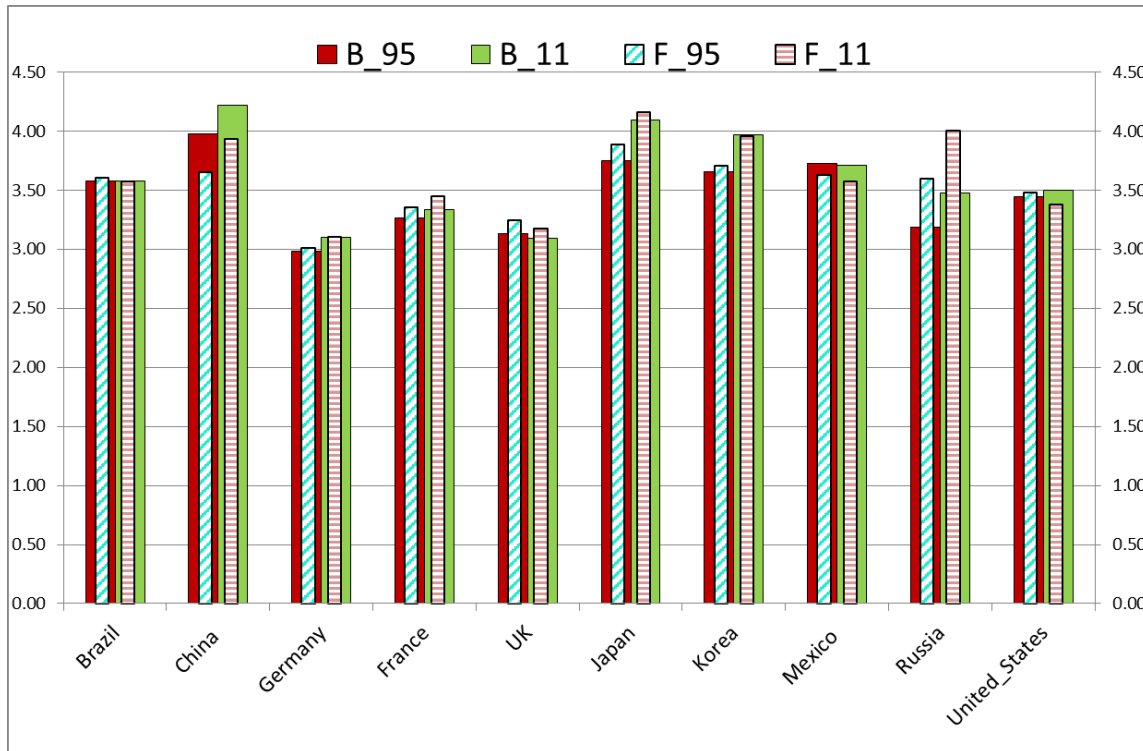
Source: Prepared with information matrices WIOD world trade.

In Table 1, it is also shown a sectorial analysis of the position in global production chains. In the case of agriculture, Brazil is the only country positioned at the end of the chain, while in mining Russia goes from the beginning to the end of the chain during the studied period. For Russia the only sectors positioned at the end of the chain are mining, oil refining, chemical and land transport, other sectors are at the beginning of the chain .

Brazil is the country with more sectors that change their position from the beginning to end of the chain during the period spanning 1995 to 2011, especially in areas such as transport services; telecommunications; machinery and equipment rental and other business activities; public administration, defense and social security; and social and personal services. The second country with major changes is United States with repositioning sectors such as food, beverages and snuff; leather products; non-metallic minerals; basic metals and metal products; electricity, gas and water; and public administration, defense and social security.

France is the country with more sectors that in 1995 were at the beginning of the production chain that changed to the end of it in 2011. Such is the case of sectors as electricity, gas and water; shipping; financial intermediation; public administration, defense and social security; social and personal services. China is the second country showing those changes, with food, beverages; pulp,

paper, printing and publishing; electricity, gas and water; public administration, defense and social security.

France is the only country positioned at the end of the chain in all manufacturing sectors in both years, while Germany and the United States shown this feature only in 2011 and China in 1995. In 1995 China was the country with fewer sectors to the beginning of the chain with sectors as agriculture, mining, financial services, real estate, education and health, however, in 2011 other sectors were added, while in the U.S. the behavior is opposite, in 2011 the country becomes with less sectors at the beginning of the global production chains including sectors such as food, beverages; electricity, gas and water, and public administration, defense and social security. These are sectors that in the case of China went to the beginning of the chain.

In 2011 Japan showed many sectors at the beginning of the production chain that moved to the end of that chain, with 21 out of 35 sectors in this case; sectors such as machinery and equipment and business activities, and social and personal services, moved dramatically their position.

Table 1

Average backward APL (B) and forward (F) for selected sectors and countries in 1995-2011

Sectores\Paises	Brasil	China	Alemania	Francia	Reino Unido	Japón	Korea	México	Rusia	USA
Agriculture, Hunting, Forestry and Fishing	END	BEG	BEG	BEG	BEG	BEG	BEG	BEG	BEG	BEG
Mining and Quarrying	BEG	BEG	BEG	BEG	BEG	BEG	BEG	BEG	BEG TO END	BEG
Food, Beverages and Tobacco	END	END TO BEG	END	END	BEG	BEG	BEG	END	BEG	BEG TO END
Textiles and Textile Products	END	END	END	END	END	END	END	END	BEG	END
Leather, Leather and Footwear	END	END	END	END	END	BEG	BEG	BEG TO END	BEG	BEG TO END
Wood and Products of Wood and Cork	END	END	BEG TO END	END	BEG	BEG	BEG	BEG	BEG	END
Pulp, Paper, Paper , Printing and Publishing	END	END TO BEG	END	END	END	BEG	BEG	BEG	END TO BEG	END
Coke, Refined Petroleum and Nuclear Fuel	END	END	END	END	END	BEG TO END	BEG TO END	END	END	END
Chemicals and Chemical Products	END	END	END	END	END	END	END	END	END	END
Rubber and Plastics	BEG	END	END	END	END	END	END	END	BEG	END
Other Non-Metallic Mineral	BEG	END	BEG TO END	END	END	BEG	BEG	BEG TO END	BEG	BEG TO END
Basic Metals and Fabricated Metal	BEG	END	END	END	END	END	BEG TO END	BEG	BEG	BEG TO END
Machinery, Nec	END	END	END	END	END	END	END	END	END TO BEG	END
Electrical and Optical Equipment	END	END	END	END	END	END	END	END	BEG	END
Transport Equipment	END	END	END	END	END	END	END	END	BEG	END
Manufacturing, Nec; Recycling	BEG	END	END	END	END	END	END	BEG	BEG	END
Electricity, Gas and Water Supply	BEG	END TO BEG	BEG	END TO BEG	BEG	BEG	BEG	BEG	BEG	BEG TO END
Construction	BEG	END	BEG	BEG	BEG	BEG	BEG	BEG	BEG	BEG
Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	BEG	0	BEG	BEG	BEG	BEG	BEG TO END	END	BEG	BEG
Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	BEG	BEG TO END	BEG	BEG	BEG	BEG	END	END	BEG	END
Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	BEG	BEG TO END	BEG	BEG	BEG	BEG	BEG	END	BEG	BEG
Hotels and Restaurants	END	END	END	BEG	BEG TO END	BEG	BEG TO END	BEG	BEG	BEG
Inland Transport	BEG TO END	END	END TO BEG	END	BEG	END	END TO BEG	END	END	END
Water Transport	BEG TO END	END	END TO BEG	END TO BEG	END TO BEG	END	END	END	BEG	END
Air Transport	BEG TO END	END	END	END	END	END	END	END	BEG	END
Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	BEG TO END	END	BEG	BEG	BEG	END	END TO BEG	END	BEG	END
Post and Telecommunications	BEG TO END	END	BEG	BEG	BEG	BEG	BEG	END	BEG	END
Financial Intermediation	BEG	BEG	BEG	END TO BEG	END	BEG	BEG	BEG	BEG	END
Real Estate Activities	BEG	BEG	BEG	BEG	BEG	BEG	END	BEG	BEG	BEG
Renting of M&Eq and Other Business Activities	BEG TO END	END	BEG	BEG	END TO BEG	END TO BEG	END	BEG	BEG	END
Public Admin and Defence; Compulsory Social Security	BEG TO END	END TO BEG	BEG	END TO BEG	BEG	BEG	END TO BEG	BEG	BEG	BEG TO END
Education	BEG	BEG	BEG	BEG	BEG	BEG	BEG	BEG	BEG	BEG
Health and Social Work	BEG	BEG	BEG	BEG	BEG	BEG	BEG	END TO BEG	BEG	BEG
Other Community, Social and Personal Services	BEG TO END	END	BEG	END TO BEG	BEG	END TO BEG	BEG	BEG	BEG	END
Private Households with Employed Persons	0	0	0	BEG	BEG		0	0	END	0	BEG

███	Sectores posicionados a principios de la CGP (F_APL > B_APL) que han modificado su B_APL y F_APL de un año a otro conservando su posición
███	Sectores posicionados a principios de la CGP (F_APL > B_APL) que han modificado su B_APL y F_APL de un año a otro cambiando su posición al final de la CGP (F_APL < B_APL)
███	Sectores posicionados a finales de la CGP (F_APL < B_APL) que han modificado su B_APL y F_APL de un año a otro conservando su posición
███	Sectores posicionados a finales de la CGP (F_APL < B_APL) que han modificado su B_APL y F_APL de un año a otro cambiando su posición a principios de la CGP (F_APL > B_APL)

Source: Prepared with information matrices WIOD world trade.

III.2 Domestic and foreign content of exports in value added

As already shown the trade in added value measurement might be decomposed into domestic and foreign added value of exports; also the value of domestic value incorporated in exportations of third countries can be obtained. These indicators constitute the natural extension of the global production chains, opening the way to the Global Value Chains. The concept of vertical specialization is a close concept that measures the amount of imports needed to export (Koopman, 2010), but turns out to be equal to foreign and domestic value embodied in the exports.

Table 2 shows the averages of the shares of the foreign value (FV) and domestic value added (DV) embodied in exports of 40 countries worldwide. Taking the average of the forty countries around the world, the share of FV incorporated in exports increased from 24% in 1995 to 30% in 2011, meanwhile the DV embodied in the world trade exports fell from 76 % to 70 % for the same years; showing a clear tendency to increase the FV in all countries.

Table 2
Holdings of foreign and domestic value added in exports.
Average global 1995 and 2011

País	DV 1995	FV 1995	DV 2011	FV 2011
Average 40 Countries	76%	24%	70%	30%

Source: Prepared with information matrices WIOD world trade.

In Figure 2, it is shown that most countries we selected for the present paper does have DV levels incorporated in their exports above the average of the total, with the exception of Korea which in the year 2011 obtained a lower average value. It seems to be a more embodiment of domestic value in the exports of developed countries. Regarding the high level FV in Korea's exports in 2011, stress its increased dependence on foreign value added to export.

The foreign share of value added as part of each country's exports has increased, and conversely the DV has been substantially reduced due to the defragmentation of production processes all over the world. This tendency can be observed in graph 2. The only exception is Russia.

Despite the reported increase, Brazil, the U.S. and the UK maintain a low participation levels in FV embodied in their exports. This is due to the fact that major economies have important internal resources depend less on foreign value added. There are exceptions to this such as China and Germany, whose exports depend in large proportion of intermediate inputs from third countries.

The countries with substantial amount of natural resources, oil and other commodities in their exports, such as Russia and Brazil, tend to have a higher domestic value added embodied in their exports so they are located at the beginning of the global production chains and require few inputs imported intermediates.

Figure 2
Foreign and domestic value added in exports

■ Doméstico ■ Foráneo

| Country	Doméstico	Foráneo
United States_95	91%	9%
United States_11	86%	14%
China_95	85%	15%
China_11	78%	22%
Germany_95	83%	17%
Germany_11	74%	26%
Japan_95	94%	6%
Japan_11	82%	18%
UK_1995	82%	18%
UK_11	80%	20%
Russia_95	93%	7%
Russia_11	94%	6%
Korea_95	76%	24%
Korea_11	58%	42%
France_95	81%	19%
France_11	72%	28%
Mexico_95	80%	20%
Mexico_11	75%	25%
Brazil_95	92%	8%
Brazil_11	88%	12%
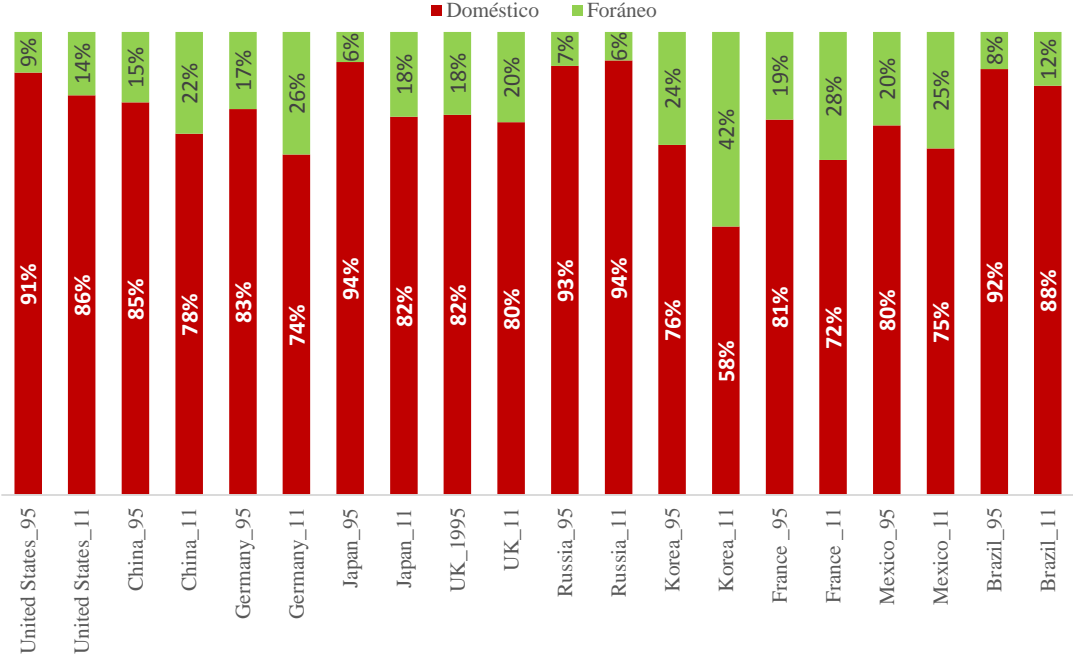
Source: Prepared with information matrices WIOD world trade.

III.3 Transfer of Value Added to support exports between countries.

The following maps show those countries which embody added value to support exports of other countries. In map number 1, the main dominant countries in trade were Germany, United Kingdom, United States and Japan. Countries with more color intensity and higher volume are the center of the cluster and are located "upstream" within the GVC because they are involved producing inputs for other countries either by providing raw materials or providing intermediate manufactured, or both. Countries that are located around the main countries are located "downstream" in the GVC and use large amounts of products from other countries (intermediate goods) to produce final goods for their exports.

Map 1
Transfer of value added by exports between countries in 1995
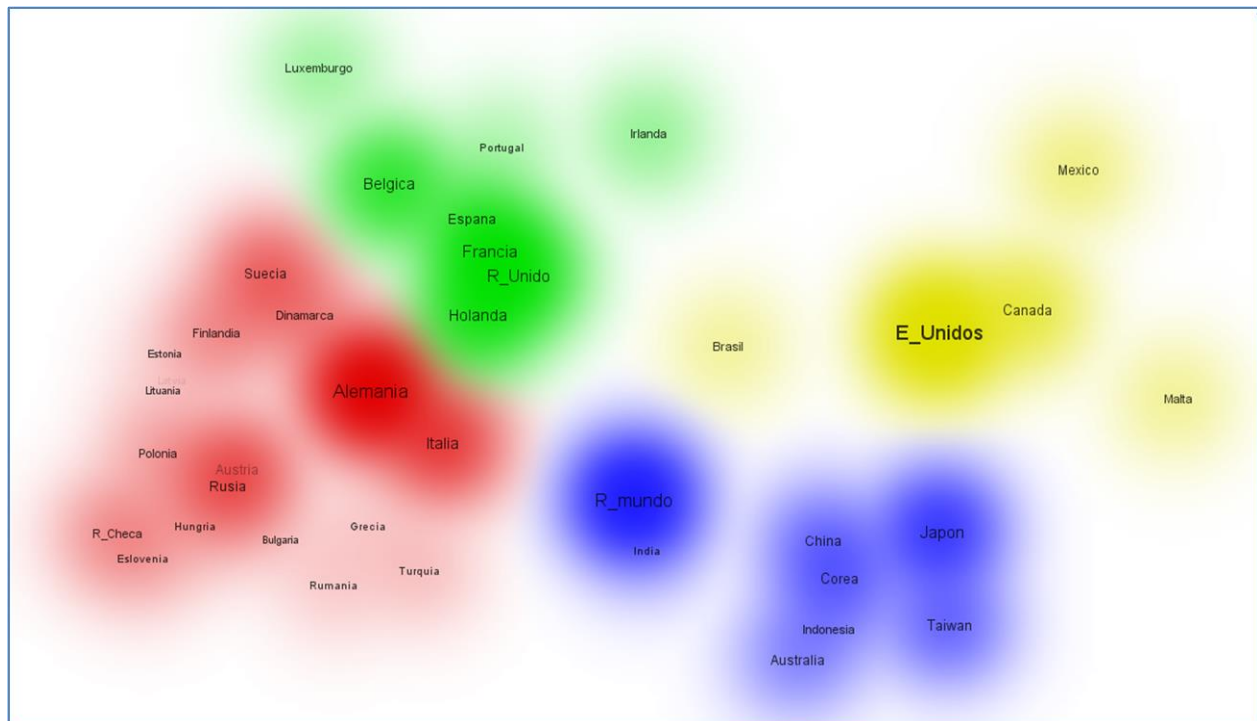
Source: Prepared with information matrices WIOD world trade and the VOSViewer software.

In the map number 2 we find five clusters, which are dominated by U.S., China, Germany and the UK; there is an additional cluster formed by Spain, Portugal and Brazil that do not show a dominant country. China replaces to Japan, which appeared in 1995 as the dominant country, and in 2011 a leads a cluster and positioned "upstream" within the GVC.
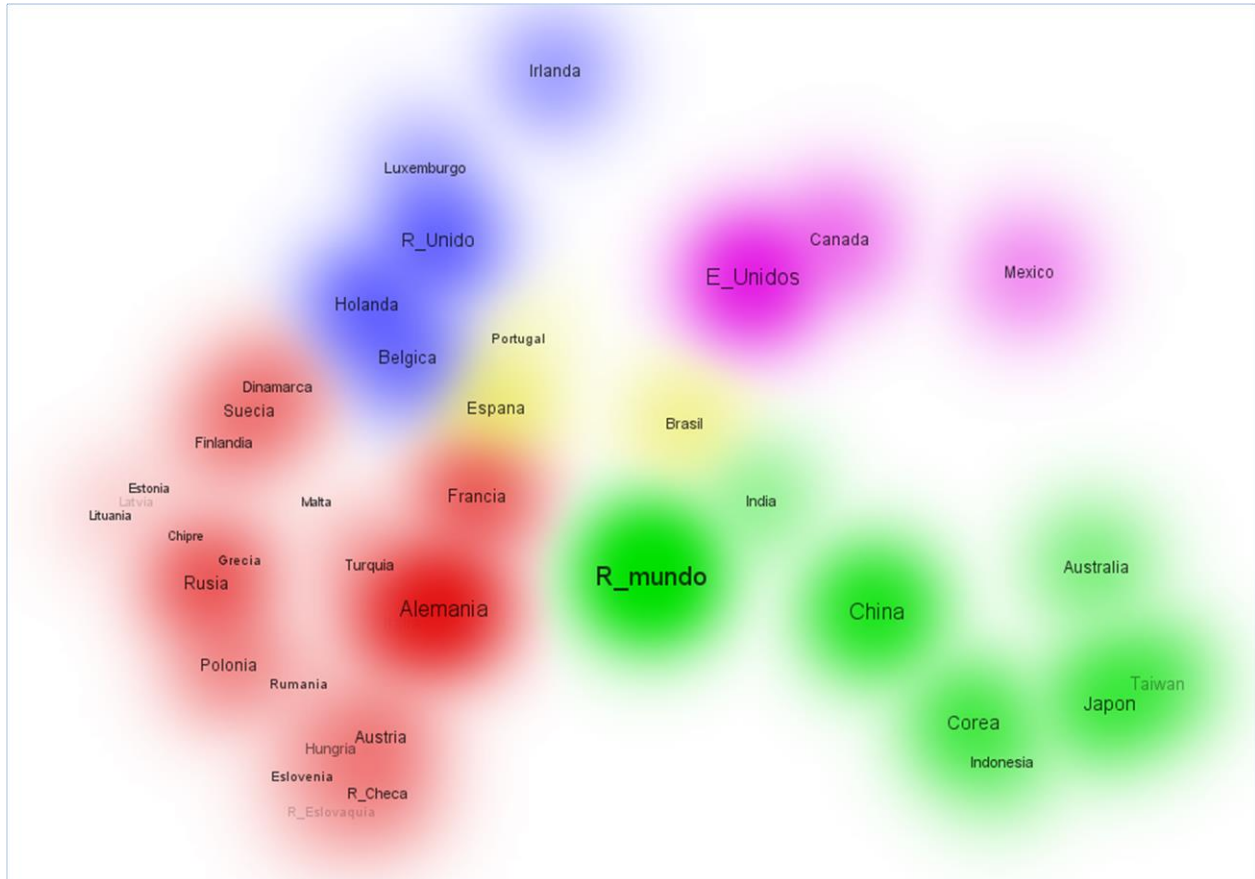
Map 2
Transfer of value added by exports between countries in 2011

Source: Prepared with information matrices WIOD world trade and the VOSViewer software.

III.4 Positions and participation in global value chains

To locate the position of countries and sectors at the beginning, middle or end of the global value chain (GVC) , an index that compares the value added by each country incorporates exports from third countries divided on their exports is obtained Raw , against the use of foreign value-added embodied in such crude exports.

If a country's participation in value added exports in third countries exports is larger than its value-added requirements of third countries for its exports, means that such country is located at the beginning of the global chains. Conversely, the country is positioned at the end of the chain when requires a lot of added value in other countries that produce final goods that are exported again. Some countries with very small gaps in these measures involved embodying similar proportions of domestic and foreign value added to their exports are positioned in the middle of the chain.

Figure 3
Position in the global value chain 1995 and 2011
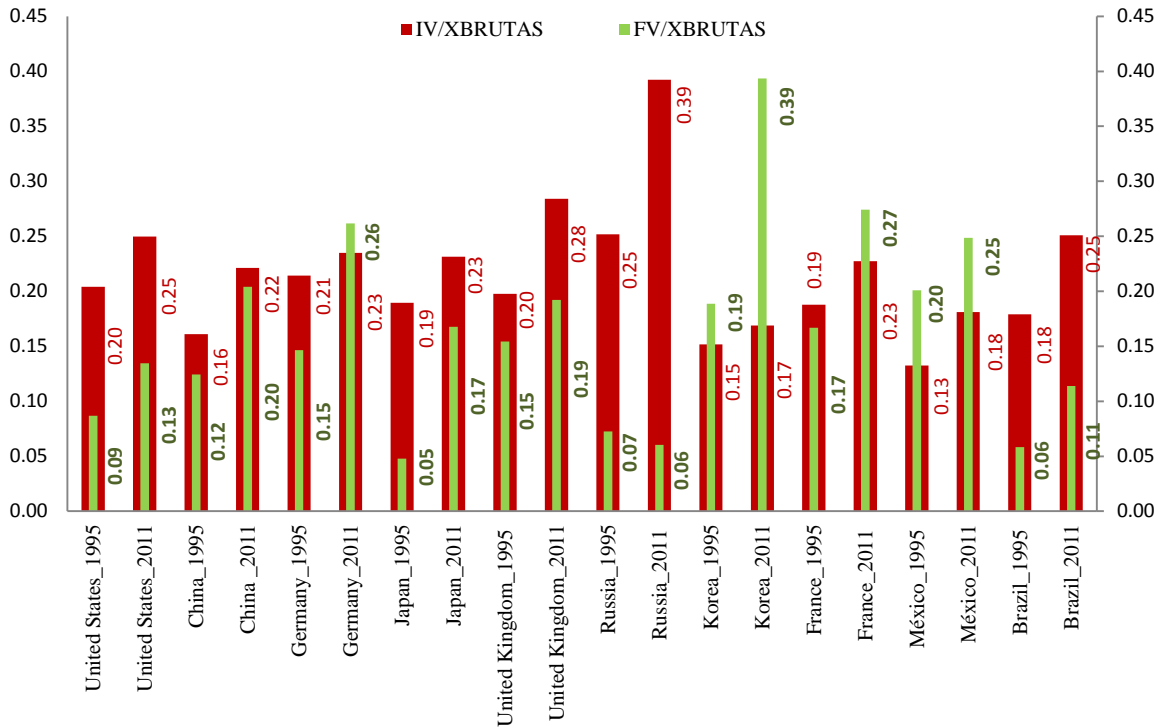
Source: Prepared with information matrices WIOD world trade

In Figure 3, it is observed that the countries which in both years incorporated a greater proportion foreign value added exports were Mexico and Korea, resulting in a high dependency on external inputs; in the year 2011 Germany and France join this group.

The most drastic changes are observed for the year 2011in Germany, Korea, France and Mexico, due to the fact that these countries embody added value from other countries to their own exports. Japan also rapidly increased the foreign content in its exports; however it is still a country that adds greater domestic value and intermediate inputs to its exports. In the same year the countries applying similar proportions of foreign and domestic added value to their exports are China and Germany, which brings them closer to an intermediate position within the global value chain.

Finally the countries that more add value to the exports of third parties countries in 2011 are: United States, Japan, the United Kingdom, Russia and Brazil. In the case of Russia they reduced the incorporation of added value of third parties countries in its exports, because these are made up of products of petroleum, natural gas, metals, wood and products of wood, chemical agents and military manufactures.

By the year of 1995, most of the countries studied in this work incorporated higher proportions of intermediate inputs and value added exports to third countries, except for Korea and Mexico showing since that year a large dependence on foreign value-added imports.

If a country is positioned at the beginning or in the middle of the global value chains, is an involved producing input for other countries, either by providing raw materials or intermediate supplies, or both.

In this case countries like the U.S., China, Japan, UK, Russia and Brazil are countries that are upstream in the global value chain incorporating intermediate input and value added in third countries.

It must be highlighted that the gap that exists between the participation of the incorporated foreign added value in the exports of each country and those that this same country incorporates in third parties countries is smaller in China and Germany. By contrast the other countries have a wider gap, which implies that they add an important proportion of intermediate inputs as added value in the exports of third parties, turning them into the key countries of the commerce and therefore positioned at the beginning or in the middle of the GVC and providing raw materials or intermediate manufactures to third parties countries; or that they require a greater proportion of inputs of third parties countries to export.

Figure 4
Participation in the global value chain 1995 and 2011
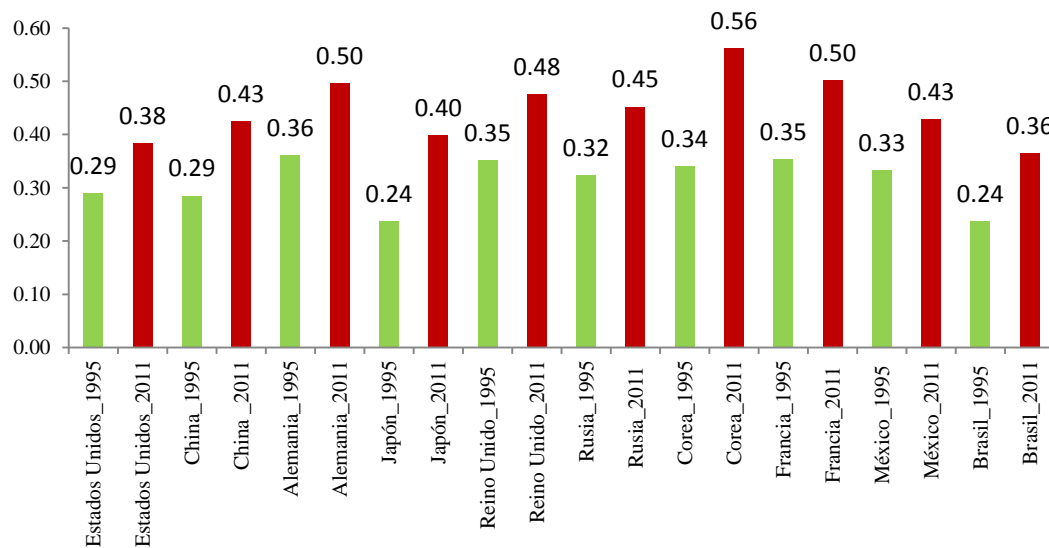
Source: Prepared with information matrices WIOD world trade

In Figure 4, it is observed that countries with greater participation in global value chains in 1995 were Germany, UK, France and the United States. In 2011, Korea, Germany, France and United Kingdom are the countries with the highest participation in the GVC. These are countries that

incorporate and receive large amounts of value added from third countries. Germany, France and Korea incorporated foreign added value to their exports, and the United Kingdom and the United States to incorporate higher value added exports to third countries.

III.5 Domestic and foreign value -added embodied in exports at the sectorial level.

For the countries selected, foreign and domestic value added to their exports at the sectorial level differs. We will evaluate some of these differences with the aim of identify sectors with a high generation of domestic added value within each country. Likewise we try to identify sectors incorporating large proportion foreign value added to their exports in order to observe sectors vulnerable to the international cycles.

The following thermal maps stained green sectors that absorb greater amounts of foreign value or domestic value for each of the countries (Table 3, Table 4, Table 5 and Table 6).

In 1995, in the United States incorporating sectors were the largest domestic value to its exports were agriculture forestry and fishing and hunting sector (1), pulp paper , printing and publishing (7), basic Metals and fabricated metal (12) machinery nec (13) optical and electrical equipment (14), transport equipment (15) , wholesale trade and commission trade , except of motor vehicles and motorcycles (20) , financial intermediation (28) and machinery and equipment rental and other business activities (30). In the case of China, incorporating higher domestic added value to its exports we can find sectors such as textiles and textile products (4), basic metals and metal manufacturing (12) and electrical and optical equipment (14).

Table 3
Sector participation in the domestic value added embodied in exports in 1995

No	Sector	USA	CHINA	ALEMANIA	JAPÓN	REINO UNIDO	RUSIA	COREA	FRANCIA	MEXICO	BRASIL
1	Agriculture, Hunting, Forestry and Fishing	4.32%	5.87%	1.14%	0.09%	1.20%	1.82%	0.86%	5.03%	4.48%	8.42%
2	Mining and Quarrying	1.90%	5.22%	0.74%	0.30%	9.00%	27.30%	0.10%	0.49%	16.54%	6.08%
3	Food, Beverages and Tobacco	1.28%	1.22%	1.79%	0.15%	1.11%	0.16%	0.24%	2.73%	0.62%	13.55%
4	Textiles and Textile Products	1.03%	14.29%	2.59%	1.98%	1.80%	0.28%	11.37%	2.68%	1.08%	1.60%
5	Leather, Leather and Footwear	0.02%	2.92%	0.21%	0.05%	0.27%	0.05%	1.08%	0.28%	0.44%	2.04%
6	Wood and Products of Wood and Cork	0.90%	1.72%	0.81%	0.19%	0.21%	0.81%	0.11%	0.99%	0.46%	2.66%
7	Pulp, Paper, Paper , Printing and Publishing	4.27%	1.37%	5.00%	0.79%	3.58%	2.30%	1.36%	3.86%	1.29%	6.54%
8	Coke, Refined Petroleum and Nuclear Fuel	1.03%	0.91%	0.78%	0.61%	1.87%	2.11%	1.31%	1.10%	0.98%	1.35%
9	Chemicals and Chemical Products	8.35%	2.62%	16.94%	8.84%	12.93%	5.84%	9.44%	14.41%	5.71%	7.18%
10	Rubber and Plastics	1.73%	4.99%	4.55%	2.46%	2.81%	0.17%	2.72%	3.93%	2.13%	1.87%
11	Other Non-Metallic Mineral	0.97%	2.76%	2.44%	1.65%	1.46%	0.31%	0.67%	2.64%	1.98%	1.58%
12	Basic Metals and Fabricated Metal	4.82%	11.89%	14.03%	14.86%	9.10%	16.50%	9.39%	10.98%	9.04%	17.86%
13	Machinery, Nec	4.37%	2.19%	8.62%	6.24%	4.95%	1.46%	1.92%	4.14%	1.18%	2.37%
14	Electrical and Optical Equipment	13.62%	17.67%	12.34%	23.10%	12.54%	0.64%	28.83%	10.68%	7.15%	2.87%
15	Transport Equipment	8.67%	1.80%	11.89%	15.95%	7.40%	0.69%	4.04%	8.16%	9.21%	7.97%
16	Manufacturing, Nec; Recycling	0.71%	0.91%	0.95%	0.58%	0.73%	0.02%	0.51%	1.50%	5.32%	0.45%
17	Electricity, Gas and Water Supply	0.06%	0.44%	0.34%	0.04%	0.08%	0.36%	0.03%	1.71%	0.09%	0.00%
18	Construction	0.01%	0.62%	0.39%	0.00%	0.09%	0.05%	0.06%	0.02%	0.00%	0.78%
19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	0.01%	0.00%	0.04%	0.01%	0.01%	0.69%	0.00%	0.00%	0.49%	0.13%
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	14.18%	0.00%	1.73%	5.94%	0.57%	14.43%	6.40%	1.88%	11.42%	0.26%
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	0.01%	0.00%	0.19%	0.24%	0.03%	0.17%	0.08%	0.00%	10.11%	0.46%
22	Hotels and Restaurants	0.05%	3.14%	0.67%	0.23%	0.01%	0.06%	0.04%	0.00%	0.04%	2.65%
23	Inland Transport	2.58%	2.46%	1.34%	1.63%	0.50%	19.98%	1.60%	1.15%	5.29%	1.56%
24	Water Transport	1.60%	1.49%	1.50%	5.50%	2.23%	0.29%	7.30%	1.71%	0.14%	0.13%
25	Air Transport	2.60%	2.16%	0.96%	0.90%	2.45%	0.35%	1.98%	3.86%	0.80%	0.20%
26	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	1.44%	5.12%	1.49%	1.64%	0.99%	2.31%	0.84%	1.12%	0.66%	0.70%
27	Post and Telecommunications	1.94%	0.93%	0.65%	0.15%	0.88%	0.36%	0.60%	0.25%	0.96%	0.53%
28	Financial Intermediation	7.87%	0.36%	0.61%	1.45%	6.93%	0.02%	0.48%	3.34%	1.59%	0.83%
29	Real Estate Activities	0.09%	0.00%	0.14%	0.01%	0.02%	0.01%	0.07%	0.00%	0.01%	0.80%
30	Renting of M&Eq and Other Business Activities	7.48%	1.27%	4.47%	1.53%	11.42%	0.37%	5.58%	9.01%	0.73%	3.85%
31	Public Admin and Defence; Compulsory Social Security	0.66%	0.14%	0.09%	0.04%	0.34%	0.03%	0.39%	1.74%	0.00%	0.23%
32	Education	0.03%	0.13%	0.00%	0.00%	0.47%	0.05%	0.01%	0.00%	0.00%	0.03%
33	Health and Social Work	0.01%	0.06%	0.01%	0.00%	0.00%	0.00%	0.00%	0.10%	0.01%	0.02%
34	Other Community, Social and Personal Services	1.42%	3.32%	0.54%	2.86%	2.05%	0.01%	0.60%	0.52%	0.06%	2.44%
35	Private Households with Employed Persons	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Source: Prepared with information matrices WIOD world trade

Table 4
Sector participation in the value added foreign incorporated in exports in 1995

No	Sector	USA	CHINA	ALEMANIA	JAPÓN	REINO UNIDO	RUSIA	COREA	FRANCIA	MEXICO	BRASIL
1	Agriculture, Hunting, Forestry and Fishing	3.32%	2.02%	0.70%	0.07%	0.75%	1.87%	0.28%	2.89%	1.64%	4.37%
2	Mining and Quarrying	1.23%	2.99%	0.41%	0.83%	4.20%	21.29%	0.03%	0.34%	3.08%	6.08%
3	Food, Beverages and Tobacco	1.34%	0.62%	1.51%	0.12%	0.91%	0.26%	0.19%	1.80%	0.41%	10.02%
4	Textiles and Textile Products	1.23%	17.04%	3.98%	1.84%	2.45%	1.15%	12.07%	3.20%	1.13%	1.52%
5	Leather, Leather and Footwear	0.04%	3.77%	0.31%	0.04%	0.19%	0.15%	1.07%	0.23%	0.34%	2.41%
6	Wood and Products of Wood and Cork	1.06%	1.84%	0.69%	0.32%	0.28%	0.92%	0.16%	0.68%	0.26%	1.37%
7	Pulp, Paper, Paper , Printing and Publishing	4.37%	1.28%	4.10%	0.58%	3.35%	3.07%	0.94%	3.93%	1.17%	6.70%
8	Coke, Refined Petroleum and Nuclear Fuel	4.03%	1.32%	1.79%	2.44%	2.49%	1.98%	7.01%	3.01%	0.26%	3.53%
9	Chemicals and Chemical Products	10.85%	2.65%	17.31%	9.37%	16.38%	10.43%	10.79%	18.70%	3.35%	9.10%
10	Rubber and Plastics	2.37%	6.10%	5.00%	2.23%	3.34%	0.43%	2.78%	4.61%	2.77%	2.78%
11	Other Non-Metallic Mineral	0.84%	1.87%	1.50%	2.23%	1.32%	0.35%	0.46%	1.81%	0.91%	1.48%
12	Basic Metals and Fabricated Metal	6.89%	12.16%	18.21%	21.52%	12.07%	27.82%	12.84%	13.57%	10.85%	23.07%
13	Machinery, Nec	6.23%	2.12%	8.38%	5.92%	6.17%	3.07%	1.87%	4.27%	2.06%	2.80%
14	Electrical and Optical Equipment	24.16%	28.08%	13.76%	23.94%	20.42%	1.26%	34.51%	14.26%	33.54%	5.01%
15	Transport Equipment	17.27%	1.96%	15.80%	13.77%	13.26%	1.71%	3.54%	12.95%	19.38%	11.87%
16	Manufacturing, Nec; Recycling	0.81%	0.92%	0.86%	0.58%	0.94%	0.03%	0.44%	1.44%	8.55%	0.37%
17	Electricity, Gas and Water Supply	0.04%	0.25%	0.15%	0.04%	0.05%	0.31%	0.02%	0.93%	0.05%	0.00%
18	Construction	0.01%	0.49%	0.24%	0.00%	0.06%	0.05%	0.03%	0.01%	0.00%	0.52%
19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	0.00%	0.00%	0.01%	0.00%	0.00%	0.34%	0.00%	0.00%	0.34%	0.04%
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	3.34%	0.00%	0.46%	1.59%	0.20%	6.38%	1.39%	0.68%	3.56%	0.07%
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	0.00%	0.00%	0.05%	0.06%	0.01%	0.08%	0.02%	0.00%	2.93%	0.12%
22	Hotels and Restaurants	0.02%	1.29%	0.32%	0.12%	0.00%	0.04%	0.02%	0.00%	0.01%	1.45%
23	Inland Transport	1.63%	1.31%	0.55%	0.64%	0.23%	14.04%	0.99%	0.39%	1.64%	0.85%
24	Water Transport	1.47%	1.23%	0.92%	8.21%	1.41%	0.21%	4.67%	2.70%	0.09%	0.07%
25	Air Transport	1.65%	1.71%	0.77%	1.02%	1.45%	0.24%	1.47%	2.95%	0.57%	0.11%
26	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	0.41%	2.64%	0.87%	0.68%	0.38%	2.00%	0.29%	0.48%	0.20%	0.38%
27	Post and Telecommunications	0.63%	0.54%	0.14%	0.03%	0.56%	0.19%	0.16%	0.07%	0.30%	0.38%
28	Financial Intermediation	1.88%	0.13%	0.19%	0.30%	2.80%	0.02%	0.07%	0.92%	0.29%	0.22%
29	Real Estate Activities	0.01%	0.00%	0.02%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.04%
30	Renting of M&Eq and Other Business Activities	2.14%	1.33%	0.82%	0.42%	2.88%	0.25%	1.60%	2.53%	0.30%	1.95%
31	Public Admin and Defence; Compulsory Social Security	0.28%	0.08%	0.02%	0.01%	0.22%	0.03%	0.13%	0.45%	0.00%	0.08%
32	Education	0.01%	0.06%	0.00%	0.00%	0.11%	0.03%	0.00%	0.00%	0.00%	0.01%
33	Health and Social Work	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.02%
34	Other Community, Social and Personal Services	0.42%	2.12%	0.14%	1.05%	1.08%	0.01%	0.17%	0.17%	0.02%	1.20%
35	Private Households with Employed Persons	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Source: Prepared with information matrices WIOD world trade

In the last two tables for 1995, we show some common sectors among countries, incorporating large portions of domestic and foreign value added such as chemicals and chemical products, optical and electrical equipment and base metals and fabricated metal.

Table 5
Sector participation in the domestic added value incorporated in exports in 2011

No	Sector	USA	CHINA	ALEMANIA	JAPÓN	REINO UNIDO	RUSIA	COREA	FRANCIA	MEXICO	BRASIL
1	Agriculture, Hunting, Forestry and Fishing	3.56%	0.88%	1.16%	0.09%	0.79%	0.86%	0.14%	4.39%	2.83%	14.74%
2	Mining and Quarrying	2.51%	0.89%	0.78%	0.29%	8.61%	38.49%	0.00%	0.72%	32.52%	18.26%
3	Food, Beverages and Tobacco	1.36%	0.69%	1.45%	0.14%	0.79%	0.05%	0.09%	2.47%	0.51%	11.57%
4	Textiles and Textile Products	0.58%	7.60%	0.87%	1.00%	0.53%	0.03%	2.06%	1.02%	0.63%	0.93%
5	Leather, Leather and Footwear	0.01%	0.69%	0.09%	0.02%	0.07%	0.03%	0.20%	0.12%	0.22%	1.16%
6	Wood and Products of Wood and Cork	0.44%	0.79%	0.94%	0.19%	0.12%	0.72%	0.01%	0.67%	0.10%	1.33%
7	Pulp, Paper, Paper , Printing and Publishing	2.88%	0.64%	4.43%	0.57%	2.11%	0.99%	0.82%	2.69%	0.68%	3.85%
8	Coke, Refined Petroleum and Nuclear Fuel	3.47%	0.70%	1.83%	1.59%	3.27%	7.17%	3.25%	2.28%	2.16%	3.27%
9	Chemicals and Chemical Products	8.23%	8.10%	12.79%	8.84%	7.45%	4.71%	11.22%	13.59%	3.98%	4.95%
10	Rubber and Plastics	1.74%	4.23%	4.64%	4.87%	1.83%	0.11%	2.61%	3.58%	2.03%	1.57%
11	Other Non-Metallic Mineral	0.77%	2.00%	1.97%	1.75%	0.77%	0.10%	0.45%	1.72%	1.42%	1.19%
12	Basic Metals and Fabricated Metal	5.93%	9.09%	14.17%	16.70%	6.21%	8.65%	11.51%	10.63%	12.42%	10.94%
13	Machinery, Nec	4.53%	4.74%	9.46%	7.88%	3.31%	0.79%	5.07%	5.38%	1.59%	1.97%
14	Electrical and Optical Equipment	10.77%	28.76%	11.99%	19.32%	4.95%	0.40%	29.98%	10.05%	9.09%	2.57%
15	Transport Equipment	5.97%	4.68%	11.61%	13.54%	6.03%	0.31%	13.13%	11.50%	11.72%	3.55%
16	Manufacturing, Nec; Recycling	1.48%	2.32%	0.86%	0.55%	0.89%	0.01%	0.29%	1.51%	1.37%	0.18%
17	Electricity, Gas and Water Supply	0.04%	0.13%	1.57%	0.09%	0.12%	0.42%	0.02%	0.76%	0.04%	0.64%
18	Construction	0.00%	0.42%	0.37%	0.00%	0.34%	0.01%	0.05%	0.01%	0.00%	0.37%
19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	0.01%	0.00%	0.04%	0.01%	0.05%	0.74%	0.06%	0.00%	0.26%	0.11%
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	10.77%	6.63%	1.34%	6.85%	0.49%	17.44%	5.41%	1.18%	5.90%	0.35%
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	0.01%	0.49%	0.08%	0.39%	0.18%	0.02%	0.02%	0.00%	5.22%	0.53%
22	Hotels and Restaurants	0.06%	0.85%	0.57%	0.53%	1.64%	0.06%	0.02%	0.00%	0.01%	2.66%
23	Inland Transport	2.59%	1.27%	0.89%	2.01%	0.65%	14.66%	0.22%	1.48%	2.66%	2.11%
24	Water Transport	0.46%	3.10%	2.96%	5.36%	2.30%	0.24%	4.46%	2.77%	0.07%	0.12%
25	Air Transport	2.00%	1.63%	0.82%	1.43%	1.25%	0.43%	1.89%	2.89%	0.39%	0.19%
26	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	1.59%	0.50%	1.79%	1.45%	0.92%	1.51%	0.34%	2.07%	0.34%	1.00%
27	Post and Telecommunications	1.37%	0.95%	0.56%	0.09%	1.55%	0.44%	0.37%	1.31%	0.58%	1.69%
28	Financial Intermediation	11.65%	0.17%	1.96%	1.30%	20.36%	0.03%	1.34%	2.24%	0.81%	0.20%
29	Real Estate Activities	0.06%	0.00%	0.15%	0.00%	0.16%	0.01%	0.24%	0.00%	0.00%	0.87%
30	Renting of M&Eq and Other Business Activities	11.58%	5.99%	7.57%	2.77%	19.19%	0.46%	3.77%	11.88%	0.42%	4.29%
31	Public Admin and Defence; Compulsory Social Security	1.80%	0.05%	0.10%	0.05%	0.22%	0.05%	0.49%	0.12%	0.00%	0.31%
32	Education	0.07%	0.04%	0.01%	0.01%	0.56%	0.06%	0.02%	0.02%	0.01%	0.03%
33	Health and Social Work	0.02%	0.04%	0.01%	0.02%	0.05%	0.00%	0.01%	0.21%	0.01%	0.03%
34	Other Community, Social and Personal Services	1.69%	0.95%	0.18%	0.31%	2.23%	0.01%	0.43%	0.75%	0.03%	2.45%
35	Private Households with Employed Persons	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Source: Prepared with information matrices WIOD world trade

Table 6
Sector participation in the value added foreign incorporated in exports in 2011

No	Sector	USA	CHINA	ALEMANIA	JAPÓN	REINO UNIDO	RUSIA	COREA	FRANCIA	MEXICO	BRASIL
1	Agriculture, Hunting, Forestry and Fishing	3.21%	0.25%	0.76%	0.05%	0.53%	1.48%	0.05%	2.63%	1.41%	10.45%
2	Mining and Quarrying	2.22%	0.54%	0.48%	1.32%	5.28%	25.91%	0.00%	0.47%	5.80%	18.76%
3	Food, Beverages and Tobacco	1.35%	0.30%	1.39%	0.08%	0.64%	0.08%	0.05%	1.51%	0.34%	8.79%
4	Textiles and Textile Products	0.85%	4.49%	1.05%	0.61%	0.65%	0.10%	1.28%	0.84%	0.65%	0.84%
5	Leather, Leather and Footwear	0.01%	0.41%	0.11%	0.01%	0.06%	0.06%	0.11%	0.08%	0.17%	0.95%
6	Wood and Products of Wood and Cork	0.43%	0.56%	0.92%	0.16%	0.14%	1.03%	0.01%	0.50%	0.05%	0.81%
7	Pulp, Paper, Paper , Printing and Publishing	2.37%	0.51%	3.38%	0.26%	1.67%	1.47%	0.43%	1.93%	0.54%	3.45%
8	Coke, Refined Petroleum and Nuclear Fuel	17.36%	1.89%	1.81%	8.01%	15.98%	5.45%	21.21%	9.80%	0.55%	6.64%
9	Chemicals and Chemical Products	12.48%	9.00%	13.37%	10.33%	10.26%	9.18%	14.20%	17.43%	2.26%	7.43%
10	Rubber and Plastics	2.49%	4.43%	5.23%	4.43%	2.19%	0.33%	2.17%	4.55%	2.85%	2.48%
11	Other Non-Metallic Mineral	0.71%	1.41%	1.39%	2.18%	0.76%	0.13%	0.28%	1.13%	0.60%	1.14%
12	Basic Metals and Fabricated Metal	8.84%	11.79%	21.20%	25.28%	11.62%	11.63%	13.46%	12.20%	13.68%	14.27%
13	Machinery, Nec	5.81%	4.95%	9.68%	6.67%	5.43%	2.13%	3.79%	4.87%	2.45%	2.67%
14	Electrical and Optical Equipment	8.77%	41.47%	13.69%	16.48%	8.54%	0.90%	24.14%	12.08%	42.24%	5.53%
15	Transport Equipment	13.94%	4.73%	16.93%	11.21%	14.74%	2.36%	8.84%	19.90%	19.93%	6.58%
16	Manufacturing, Nec; Recycling	1.45%	1.38%	0.80%	0.44%	1.18%	0.03%	0.18%	1.36%	2.01%	0.16%
17	Electricity, Gas and Water Supply	0.04%	0.09%	0.72%	0.13%	0.21%	0.49%	0.02%	0.54%	0.04%	0.41%
18	Construction	0.00%	0.32%	0.25%	0.00%	0.22%	0.01%	0.03%	0.01%	0.00%	0.27%
19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	0.00%	0.00%	0.01%	0.01%	0.03%	0.46%	0.02%	0.00%	0.15%	0.04%
20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	3.27%	1.84%	0.38%	1.15%	0.19%	14.38%	1.13%	0.37%	1.40%	0.12%
21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	0.00%	0.14%	0.02%	0.07%	0.08%	0.01%	0.00%	0.00%	1.14%	0.18%
22	Hotels and Restaurants	0.03%	0.29%	0.20%	0.18%	0.87%	0.07%	0.01%	0.00%	0.00%	1.24%
23	Inland Transport	2.22%	0.59%	0.39%	0.69%	0.34%	18.39%	0.15%	0.58%	0.94%	1.26%
24	Water Transport	0.60%	2.12%	1.94%	7.79%	1.62%	0.36%	5.71%	0.49%	0.03%	0.07%
25	Air Transport	2.25%	1.70%	0.90%	1.20%	0.90%	0.92%	1.41%	2.31%	0.28%	0.11%
26	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	0.82%	0.27%	0.84%	0.36%	0.35%	1.91%	0.12%	0.78%	0.08%	0.60%
27	Post and Telecommunications	0.58%	0.37%	0.24%	0.01%	1.14%	0.31%	0.11%	0.36%	0.16%	1.19%
28	Financial Intermediation	3.18%	0.03%	0.64%	0.19%	7.90%	0.02%	0.16%	0.31%	0.13%	0.06%
29	Real Estate Activities	0.01%	0.00%	0.01%	0.00%	0.04%	0.00%	0.02%	0.00%	0.00%	0.07%
30	Renting of M&Eq and Other Business Activities	3.20%	3.63%	1.18%	0.62%	5.05%	0.28%	0.69%	2.75%	0.11%	2.12%
31	Public Admin and Defence; Compulsory Social Security	0.91%	0.02%	0.03%	0.01%	0.16%	0.06%	0.10%	0.02%	0.00%	0.12%
32	Education	0.02%	0.01%	0.00%	0.00%	0.14%	0.03%	0.00%	0.00%	0.00%	0.01%
33	Health and Social Work	0.01%	0.03%	0.00%	0.01%	0.04%	0.00%	0.00%	0.03%	0.00%	0.02%
34	Other Community, Social and Personal Services	0.56%	0.44%	0.04%	0.07%	1.06%	0.01%	0.12%	0.18%	0.01%	1.17%
35	Private Households with Employed Persons	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Source: Prepared with information matrices WIOD world trade

Tables 5 and 6 highlight areas with green incorporating much domestic value added and value added foreign exports of each sector in 2011. We find sectors that are repeated in different countries, which are very important sectors within the global value chain for each country, as in the case of China, Korea and Mexico to the field of optical and electrical equipment.

We can identify the mining and quarrying sector (2), which incorporates a greater proportion domestic value in Russia and Mexico. The transport equipment sector in the United States, Germany, Japan , UK, Korea, France and Mexico has increased its demands from foreign added value; this sector is closely linked to the international supplies so it is a sector requires many intermediate inputs from different countries ; the same behavior is observed in the areas of basic metals and metal manufacturing (12) and chemistry and chemicals, which are the most important in terms of the incorporation of foreign and domestic added value in major exporting countries.

IV. Some preliminary conclusions.

The change in the economics of global trade starting during the last decade of the 20 century, reconfigured the trade between countries, drastically reducing the proportions of domestic value added in their exports. The emergence of genuine global production and value chains is nowadays a structural feature of our world.

Global production chains have facilitated greater participation to all countries in the international trade, due to the fragmentation of production in specialized tasks, which are performed competitively in multiple locations as well as the increase of technological innovation. The consequences have been that most countries have diversified their export sectors and a growing number of destinations, although much of this trade is intra -company and most exports are business of a small number of firms.

Global chains can provide opportunities for industrial upgrading, technological development and dissemination of such technology, as in the case of South Korea and China (main exporter of goods). However, it may also involve some risks, especially for developing countries, since the dissemination of technological development is neither immediate nor automatic, so developing countries can be trapped in low- value added or activities that require much foreign value added.

For Brazil, Mexico and Russia, economies richer in natural resources, is it possible that diversification had reduced dependence on commodity exports and limited the risk of resource depletion, however they suffer pressures on the environment and resource substitution. To increase their participation in international trade they must reduce transport costs and delivery times.

Other face of the fragmentation of production has boosted the role of services in international trade, such as manufacturing services, simultaneous sales of goods and services, or transportation, showing that services have become an important engine of growth in many economies.

The new structure of trade has granted benefits to many countries, including those studied in this paper, due to lower transportation costs and favored geographical proximity of suppliers. However, participation in GVCs is not a guarantee of improving economic growth as it begins to redeploy those countries that supply raw materials or products of low added value, and those in which industrial development generates products high technology, knowledge and value added.

Bibliography

Dietzenbacher, E. and Romero, I. (2007): *"Production Chains in an Interregional Framework: Identification by Means of Average Propagations Lengths"*, International Regional Science Review, 30, 362-383.

Dietzenbacher, E.; Romero I. and Bosma, N.S. (2005): *"Using Average Propagation Lengths to Identify Production Chains in the Andalusian Economy",* Estudios de EconomíaAplicada, 23, 405-422.

Koopman, Robert, William Powers, Zhi Wang, Shang-Jin Wei (2010):*"Give Credit Where Credit Is Due: Tracing Value Added in Global Production Chains",* NBER Working Paper No. 16426. September.

Koopman, Robert and Zhi Wang (2012):*"The Value-added Structure of Gross Exports and Global Production Network"*, United States International Trade Commission, Paper for Presentation at the Final WIOD Conference "Causes and Consequences of Globalization", April 24-26, 2012, Groningen, the Netherlands

Koopman, Robert, Zhi Wang and Shang-jin Wei. (2012):*"Estimating domestic content in exports when processing trade is pervasive."*Forthcoming, Journal of Development Economics.

OECD, WTO, UNCTAD (2013): *"Implications of global value chains for trade, investmente, development and jobs"*, prepared for the G-20 Leaders Summit Saint Petersburg (Russian Federation), September 2013.

OECD (2013):*"Interconnected economies. Benefiting from global value chians"*, Report 2013.

Romero I., Dietzenbacher, E.; and G.J.D. Hewings (2009): *"Fragmentation and complexity: Analyzing structural change in the Chicago regional economy"*, Revista de Economía Mundial, 23 (2009), 263-282.

WTO (2013), *"Informe sobre el comercio mundial. Factores que determinan el futuro del comercio"*, Informe 2013.