Global value chains: Transformations and economic development possibilities for the periphery since the mid-1990s

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Abstract. Since the 1970s, the global economic geography underwent major transformations of its production processes. One of the most important causes was the increasing internationalization and segmentation of production, giving rise to what are known as "global value chains" (GVCs). The aim of the paper is to explain the main changes in GVCs since the 1990s, identifying the countries and sectors that are most active in GVCs and whose participation has increased the most since the 1990s in absolute and relative terms; and to analyze whether or not there is a relationship between economic development and participation in CGVs.

Keywords: Global value chains; global economic geography; periphery; economic development.

Acronyms

ASEAN	Association of Southeast Asian Nations
ECLAC	Economic Commission for Latin America and the Caribbean
FDI	Foreign direct investment
GDP	Gross domestic product

GVC	Global value chain
ICT	Information and communication technology
IDE-JETRO	Institute of Developing Economies-Japan External Trade Organization
IPEA	Institute of Applied Economic Research (Instituto de Pesquisa Econômica Aplicada)
ISI	Import substitution industrialization
NAFTA	North American Free Trade Agreement
nec	Not earlier classified
OECD	Organization for Economic Co-operation and Development
pc	Per capita
R+D	Research and development
TiVA	Trade in value added
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization

1. Introduction

During the final quarter of the 20th century, the global economic geography underwent major transformations. One of the main causes was the increasing internationalization and segmentation of production. Firms from various – chiefly developed – countries tended to transfer some production activities, primarily the least profitable and significant, to other companies (outsourcing) and other countries (offshoring), largely on the periphery. This prompted a gradual change in how goods and services are produced, which became articulated in so-called global value chains (GVCs); these can be understood as the sequence of activities in which firms and workers engage, from the design of a product through to its end use (Gereffi & Fernandez-Stark, 2011; Mitnik, 2011). The chains are "global" since the links in the production process pass through different countries, and are of "value" in that each firm adds a certain degree of value to the end product. Thus, the country of origin of goods has become increasingly nebulous now that several countries are incorporated into the value creation process, to the point where "Made in USA" has given way to "Designed in California" and "Assembled in China."

These changes to the global economic geography mark a new stage in the international division of labor that has broken with the old model, in which developed countries specialized in manufacturing and developing countries supplied raw materials. Indeed, the new international division of labor is increasingly centered on the types of goods that countries export, and on the links in the production process in which they specialize, whether design, marketing, commercialization, research and development (R+D), assembly, and so on (Organization for Cooperation and Economic Development, OCDE, 2011, World Trade Organization & Institute of Developing Economies-Japan External Trade Organization, OMC & IDE-JETRO, 2011). The studies on this new global economic geography have shown that the way in which the value created is appropriated by firms is a direct function of the existence of specific assets – that is, skills that are not readily replicable by other firms such as capabilities related to design, branding, marketing, logistics, financialization, R+D, or specific manufacturing know-how – rather than the type of good produced (Carneiro, 2015; Dalle, Fossati & Lavopa, 2013; Dicken, 2015; Milberg & Winkler, 2013).

If the proliferation of GVCs is a consequence of changes in business strategies (offshoring and outsourcing), what caused these changes in the first place? First, there are technological factors, such as the steep reduction in transportation costs since the mid-20th century, driven in part by the rise of containerization, and the phenomenal development of information

and communication technologies (ICT) that began in the final quarter of the last century, which has greatly facilitated remote coordination of the different production stages. This has enabled, for instance, increased control over logistics, inventories, sales, and distribution (Dalle *et al.*, 2013; Dicken, 2015; Milberg & Winkler, 2013).

However, it would be too reductive to attribute the aforementioned changes in business strategies to technology alone. Indeed, there have also been important political factors behind the rise of GVCs. On the one hand, the collapse of the Soviet Union, China's turn towards state capitalism, and the liberalization of the Indian economy starting from the 1980s affected the global economy in profound ways, most notably by increasing the planet's productive capacity, international trade, foreign investment, and international outsourcing (Milberg & Winkler, 2013). Freeman (2007) has proposed that these events led to "the great doubling" of the labor force in the global capitalist system, in which at least 1.3 billion people were added to the preexisting labor stock (of a similar number) under conditions of inter-nationalized capitalism. According to the author, this expansionary shock in the labor supply radically transformed trade relations between countries and hampered wage increases the world over, including in advanced economies.

The political changes behind the rise of GVCs were not limited to the developments in the Soviet Union, China, and India. Indeed, following the debt crisis of the 1980s, many peripheral countries, such as those in Latin America, redefined their development strategies by abandoning import substitution industrialization (ISI) and embracing the idea that exportation is a key lever of development. The ensuing spate of bilateral and multilateral trade agreements can only be understood in the context of these changes of strategy; these agreements entailed steep reductions in tariff and para-tariff barriers, and created conditions for greater protection of – and tax exemptions on – foreign investment (Milberg & Winkler, 2013).

The mutations in the global economic geography also gave rise to significant qualitative changes, such as: a) an increase in the importance of intermediate inputs, especially parts and components, in inter-country exchanges;[1] b) increased trade in essential services such as logistics, design, R+D, marketing, legal services, customer service, aftermarket, etc.; c) greater interest on the part of firms in developing long-term relationships with suppliers, often including the provision of training to attain certain

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[1] In 2009, world exports of intermediate goods exceeded the sum of final and capital goods exports, accounting for 51% of the total for all categories except hydrocarbons (WTO & IDE-JETRO, 2011, p. 81).

goals; and, linked to this d) more emphasis on flows of knowledge transfer, from formalized intellectual property to tacit forms of business and production know-how (Baldwin, 2013; Carneiro, 2015). The dissemination of this production dynamic has served to reinforce the role of multinational companies, whose prominence in the global economy has increased over the past 40 years.

Since the end of the 2000s, multilateral agencies such as WTO, OECD, and the United Nations Conference on Trade and Development (UNCTAD), among others, have been adapting to the concept of GVCs (Dalle *et al.*, 2013). On the one hand, these institutions have invested considerable resources in creating statistics to better understand the new global economic geography; and on the other, they have championed the idea that peripheral countries can enhance their development prospects by embracing GVCs through greater trade liberalization, deregulation of foreign direct investment (FDI), and labor flexibilization. This has moved various authors (for example, Dalle *et al.*, 2013; Fernández, 2014; Szapiro, Vargas, Brito & Cassiolato, 2015) to denounce what they see as neoliberalism "in a different guise," used only to justify the so-called "trickle-down theory."

The aim of this study is to examine the changes to GVCs over the last two decades, determining the countries and sectors that are most active and whose participation has increased the most since the mid-1990s, as well as analyzing whether or not there is a relationship between economic development and participation in GVCs. To this end, we use a database that has been somewhat overlooked to date, not least in Latin America: the OECD Trade in Value Added (TiVA). This database contains statistics for different years in the period 1995-2011, and here we will focus mainly on the start and the end years in order to explain the changes that occurred over the last two decades. We take into account 49 countries, which together make up approximately 85% of the world gross domestic product.

This study is structured as follows: in the next section we present the methodology we use to measure the participation of countries in GVCs, and in the third we analyze the sectoral heterogeneities related to GVC integration. In sections four and five we analyze the relative and absolute participation of countries in GVCs. Then, in section six we review the relationships between economic development and participation in GVCs. Finally, in the seventh section we set out our main conclusions.

2. Methodological questions

The purpose of this section is to explain the specific way in which GVCs – and their changes over time – are measured, which will allow us not only

to explain the advantages of our database, but also its main limitations. We will begin by exploring how the importance of GVCs to the world economy can be measured in operational terms, as well as how GVCs can be estimated across different countries and sectors. A good way of tackling the first question is to analyze the particular importance of GVCs in international trade. But this inevitably leads us to an increasing problem in world trade statistics: the double counting of exports.

According to UNCTAD data (UNCTADStat), in 2014, world trade in goods and services totaled US $23.7 billion, of which $18.7 billion corresponded to goods (79%); and $5 billion to services (21%). However, the rise of GVCs – which, as we have mentioned, entails the international fragmentation of production into different links – has contributed to an increase in double counting in world trade. For example, let us assume that Country A extracts raw materials at a value of $10, which it later exports to Country B, where the materials are processed for sale to Country C for $25; from there, the semi-finished product is transformed into a finished one, and consumed by Country D at $50 (see Table 1). In this case, international trade statistics record a total gross export value of $85. However, the sum of the value added in countries A, B and C is $50. Ultimately, the difference between gross exports (in this case, $85) and the value added content of exports (in this case, $50) is analogous to that recorded in national accounts between "gross production value" and "value added."

Table 1
Problems of double counting in international trade (in USD; example)

	Raw material extraction (Country A)	Processing (Country B)	Transformation into final goods (Country C)	Final demand (Country D)	Total
Value added	10	15	25	0	50
Export value	10	25	50	0	85
Double counting	0	10	25	0	35

Double counting in international trade not only poses statistical challenges, but can also lead to serious errors in the formulation of a country's trade or even diplomatic policy. Let us assume that Country A exports raw material to Country B for $100. Then, Country B processes the raw material and exports the resultant intermediate input to Country C for $110 (thereby adding $10 of value). Finally, Country C uses the intermediate input to produce a final good, which it exports to Country A for $115 (thereby adding $5 of value). Traditional trade statistics would state that

Country A had a surplus of $100 with Country B and a deficit of $115 with Country C, while B had a surplus of $110 with C. However, if we analyze trade flows in terms of value added, we find that A had a deficit of $10 with B and $5 with C, and that B and C had a neutral trade balance.

In recent years, multilateral agencies such as the WTO, OECD, and UNCTAD, as well as other institutions (Purdue University and the IDE among them) have made considerable efforts to detect double counting in international trade in order to create tools to measure the true importance of GVCs to the world economy and to those of specific countries. In each case, an attempt has been made to create a kind of **world input-output macro-matrix** based on information from the national input-output matrices. The databases vary according to different factors, such as the number of countries and period covered, and the level of sector disaggregation. Moreover, on a regional level, the Economic Commission for Latin American and the Caribbean and the Institute of Applied Economic Research (CEPAL & IPEA, 2016) created the first input-output matrix for South America to analyze regional production chains with a greater level of detail and depth than had been possible using the bases developed by multilateral agencies, such as those mentioned above.

The OECD (TiVA-OECD) estimates that in 2011, 24% of global trade in goods and services was double counted (or to put it differently, 24% of the total export value was not added domestically). On this basis, given that the total value of goods and services exports was around $19 trillion, double counting will have accounted for roughly $4.6 trillion of that total. By way of comparison, in 1995, double counting in international trade comprised 18% of the total ($1 trillion).

However, as we will see in this study, the magnitude of double counting is subject to profound regional and sectoral heterogeneities. Moreover, this magnitude varied unevenly across countries and industries between 1995 and 2011. On a national level, double counting is reflected in the share of imported value added in the value of exports. In turn, industries that are now highly segmented internationally, such as the electronics and automotive industries, are also subject to high levels of double counting.

The imported value-added content of exports is highly influenced by the way in which a country is integrated into the GVC links involving processing and/or assembly of manufactured goods. Nonetheless, countries also participate in GVCs as suppliers of raw materials and inputs that are later processed by a second country, to be exported as a final good. Returning to the example from Table 1, countries A, B, and C all participate in GVCs: Country A as a supplier; B as a processor and supplier; and C as

a processor. Thus, institutions such as UNCTAD (2013) have devised an index of participation in GVCs, broken down into two parts: **downstream** participation and **upstream** participation.

Here, we refer to the percentage of one country's exports in the final value of another country's exports as **relative downstream participation**. For example, if Saudi Arabia exports crude oil to South Korea, where it is processed into refined fuel and then exported to Vietnam, this export will be recorded as downstream GVC participation. But if the South Korean fuel is not exported, then Saudi Arabia will not be credited with this participation. By definition, all downstream participation corresponds to exports of intermediate goods, but the same cannot be said in reverse. In turn, we call the percentage of imported content in the exports (of both final and intermediate goods) of a given country its **relative upstream participation**. Countries whose relative upstream participation is higher than their downstream participation will be specialized in the final links in the chain involving processing and/or assembly. Conversely, those with relative downstream participation that is higher than their upstream participation will be centered on the initial stages, as suppliers of intermediate materials (such as, for instance, raw materials or industrial intermediate goods). Meanwhile, a country's overall GVC participation represents the total value of the transactions associated with GVCs (whether upstream or downstream), out of the world total of such transactions.

3. The impact of GVS on a sectoral level: the main changes since the 1990s

In this section we seek to account for the changes in the physiognomy of international trade since the 1990s, by identifying the industries whose weight has increased the most and inquiring into the impact of double counting on international trade by industry and by country. Table 2 provides information to aid in the analysis of these phenomena. The rows show different industries by sector, whether primary, secondary, or tertiary; while the columns present three variables: a) the imported content of the global exports for each industry; b) the share of each industry in gross exports (that is, without accounting for the effects of double counting); and c) the export share of each industry in terms of value added (that is, accounting for the effects of double counting). Drawing on the TiVA-OECD database, the table shows the data for 1995 and 2011 and the difference between these years.

As can be seen in the last row, in 1995, 17.9% of global exports were double counted – that is, they contained imported value added. In 2011, this figure reached 24.2%, attesting to a worldwide increase in the seg-

mentation of production. However, analysis of the sectors that drove this increase shows, first, that the increase in the import content of exports is almost entirely due to the secondary sector, which went from 23.5% to 33.4% between 1995 and 2011 (see the second-last row in Table 2). This suggests that the bulk of global restructuring of production occurred in this sector, the technical and productive characteristics of which make it much more input-intensive than other sectors.

Table 2
Import content of exports and share of exports (gross and discounting imported value added), by sector and industry, 1995 and 2011 (in percentages)[2]

Industry	Import content of exports			Share of exports (gross)			Share of exports (domestic value added)		
	1995	2011	Difference	1995	2011	Difference	1995	2011	Difference
Agriculture, hunting, forestry and fishing	10.2	13.9	3.7	2.5	2.1	- 0.4	2.7	2.4	- 0.3
Mining and quarrying	6.5	6.0	- 0.6	4.2	9.7	5.5	4.7	12.0	7.2
Food products, beverages and tobacco	17.8	21.7	3.8	4.7	3.8	- 0.9	4.7	3.9	- 0.7
Textiles, textile products, leather and footwear	24.6	27.1	2.5	4.4	3.0	- 1.4	4.0	2.9	- 1.2
Wood and products of wood and cork	17.9	25.1	7.2	0.9	0.5	- 0.5	0.9	0.5	- 0.5
Pulp, paper, paper products, printing and publishing	17.0	22.1	5.0	2.5	1.5	- 1.0	2.6	1.6	- 1.0
Coke, refined petroleum products and nuclear fuel	26.0	42.7	16.7	1.8	4.2	2.4	1.6	3.2	1.5
Chemicals and chemical products	20.7	31.2	10.5	6.7	7.2	0.5	6.5	6.6	0.0
Rubber and plastics products	23.0	32.6	9.6	2.0	1.8	- 0.2	1.8	1.6	- 0.3

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2   In tables 2 to 7, the color scale denotes intensity: the highest values are shown in dark green, intermediate values are those in shades of yellow to orange, and the lowest values are expressed in dark red.

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Industry	Import content of exports			Share of exports (gross)			Share of exports (domestic value added)		
	1995	2011	Difference	1995	2011	Difference	1995	2011	Difference
Other non-metallic mineral products	17.5	26.1	8.6	1.0	0.8	- 0.2	1.0	0.7	- 0.3
Basic metals	24.7	33.9	9.2	4.4	5.2	0.8	4.0	4.6	0.5
Fabricated metal products (except machinery and equipment)	22.8	32.3	9.5	2.1	1.9	- 0.2	1.9	1.7	- 0.3
Machinery and Equipment, nec	20.7	29.8	9.1	6.8	5.8	- 1.0	6.6	5.3	- 1.2
Computer, electronic and optical equipment	28.6	42.1	13.5	9.7	8.2	- 1.4	8.4	6.3	- 2.1
Electrical machinery and apparatus, nec	25.5	37.6	12.0	2.6	2.5	- 0.1	2.4	2.1	- 0.3
Motor vehicles	27.9	37.4	9.5	6.8	5.5	- 1.3	6.0	4.6	- 1.4
Other transport equipment	23.0	32.5	9.5	2.5	2.7	0.1	2.4	2.4	0.0
Manufacturing, nec; recycling	22.4	27.5	5.1	1.9	2.0	0.0	1.8	1.9	0.1
Electricity, gas and water supply	11.6	24.1	12.5	0.3	0.5	0.2	0.3	0.5	0.2
Construction	19.0	22.9	3.9	0.6	0.5	- 0.1	0.6	0.5	- 0.1
Wholesale and retail trade; repairs	7.3	9.8	2.5	11.9	10.9	- 0.9	13.4	13.0	- 0.4
Hotels and restaurants	10.7	13.6	3.0	2.3	1.7	- 0.6	2.5	1.9	- 0.6
Transport and storage	12.5	20.3	7.7	9.1	7.2	- 1.9	9.6	7.6	- 2.1
Post and telecommunications	7.4	14.3	6.9	0.6	0.7	0.1	0.6	0.8	0.2
Financial intermediation	8.3	15.4	7.0	2.0	2.9	0.9	2.2	3.2	1.0
Real estate activities	3.1	4.9	1.8	0.4	0.3	- 0.1	0.5	0.4	- 0.1
Renting of machinery and equipment	6.7	12.6	5.9	0.5	0.7	0.2	0.5	0.8	0.3
Computer and related activities	11.2	18.9	7.7	0.4	1.1	0.6	0.4	1.1	0.7

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Industry	Import content of exports			Share of exports (gross)			Share of exports (domestic value added)		
	1995	2011	Difference	1995	2011	Difference	1995	2011	Difference
R+D and other business activities	8.5	12.1	3.5	3.0	3.7	0.8	3.3	4.3	1.0
Education	3.5	5.1	1.6	0.2	0.1	0.0	0.2	0.2	0.0
Health and social work	8.7	11.1	2.4	0.1	0.1	0.0	0.1	0.1	0.0
Other community, social and personal services	9.6	12.6	3.0	1.2	1.3	0.1	1.3	1.5	0.1
Sector									
Primary	7.9	7.3	- 0.6	6.7	11.8	5.1	7.5	14.4	6.9
Secondary	23.5	33.4	9.9	61.7	57.6	- 4.1	57.5	50.6	- 6.9
Tertiary	9.3	13.8	4.5	31.7	30.8	- 0.9	35.0	35.0	0.0
Total	17.9	24.2	6.3	100.0	100.0	0.0	100.0	100.0	0.0

Source: Compiled by authors based on TiVA-OCDE.

By contrast to the secondary sector, the imported value added in primary-sector exports all but remained constant (in fact, it fell slightly from 7.9% to 7.3%); while in the tertiary, or service, sector, it increased slightly from 9.3% to 13.8%. Within the secondary sector, the "coke, refined petroleum products and nuclear fuel" industry was that in which the import content of exports increased the most, by 16.7%, due to the sharp rise in hydrocarbon prices in the 2000s. Such was the increase that by 2011, this was the industry with the highest import content of all: 42.7%. In the case of the "computer, electronic and optical equipment" and the "electrical machinery and apparatus, nec" industries, this variable rose considerably, with increases in foreign value added of 13.5% and 12%, respectively. These three industries were already among those with the highest import content in 1995, and the trend became all the more pronounced between that year and 2011. The "motor vehicles, trailers, and semi-trailers" industry also increased its import coefficient over the period 1995-2011, but to a lesser extent than

the above-mentioned industries (9.5%). Even so, in 2011 it remained one of the activities with the highest levels of global fragmentation.[3]

It is interesting to note that the "textiles, textile products, leather and footwear" industry, one of the most studied in the GVC literature, underwent a very small increase in its import content – just 2.5% between 1995 and 2011. As a result, it ceased to be one of the secondary industries in which imported inputs were used most extensively, which had been the case in 1995. One possible explanation for this phenomenon – and for the academic attention given to the industry – is that it was the first to embrace offshoring. Indeed, in the 1950s, U.S. and European clothing companies began offshoring to Japan, before moving on to South Korea, Taiwan, Hong Kong, and Singapore in the 1960s (Sztulwark & Juncal, 2014). Thus, the segmentation of production in the industry had already hit a ceiling. In addition, many of the imported inputs used in this chain (vegetable fibers such as cotton and wool, for instance) escaped the price increases that affected key raw materials in the chemical and metalworking chains during the 2000s (hydrocarbons and minerals, respectively).

It can also be appreciated that the rise in the import content of exports in the "food products, beverages and tobacco," "wood and products of wood and cork," "paper, pulp, paper products, printing and publishing," and "manufacturing, nec; recycling" industries was lower than the average across the entire secondary sector. In this case, there are two factors at play: a) a less pronounced trend of geographic segmentation, given the characteristics of the production process (for instance, it is more common for countries to import electronic inputs for processing and subsequent exportation as finished products than for them to do the same with food raw materials); and b) a lower price rise vis-à-vis oil and minerals in the key raw materials used in these chains.

In the tertiary sector, the "transport and storage" industry posted the highest increase in foreign value added, of 7.7%; followed by "post and telecommunications," at 6.9%; "computer and related activities," 7.7%; and "financial intermediation," 7.0%, albeit these industries started from a far lower base than in the secondary sector. It is no coincidence that these services are those most closely linked to the organization of production in GVCs.

Table 2 also shows which sectors increased as a proportion of world exports, both in gross (that is, without discounting the effects of double

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3   The "electricity, gas and water supply" industry was another of those in which the import content of exports increased to a large degree, by 12.5%, since one of its basic inputs is hydrocarbons. However, its share in world exports in both 1995 and 2011 was marginal, below 0.5%.

counting) and in domestic value added terms. In 1995, 61.7% of gross world exports pertained to the secondary sector, 31.7% to the tertiary, and 6.7% to the primary sector. By 2011, the figures were 57.6%, 30.8%, and 11.8% respectively. After discounting the double counting of imported inputs, the changes recorded between 1995 and 2011 are all the more pronounced; the primary sector is seen to have increased by 7% as a proportion of world exports, at the expense of the secondary. Logically, this can be explained by the stark change in relative prices that occurred in the 2000s. Also noteworthy is the increase in importance of services – such as "financial intermediation," "R+D and other business activities," and "computer and related activities" – in world exports, which is indicative of the deepening of GVCs.

Table 3 shows the sectors that contributed most of the imported value added in global exports in 1995 and 2011. The secondary sector accounted for around 80% (81.1% in 1995 and 79.5% in 2011), far ahead of the tertiary (16.4% in 1995 and 17.5% in 2011) and primary sectors (2.9% in 1995 and 3.5% in 2011). Of the secondary industries, in both 1995 and 2011, "computer, electronic and optical equipment" had the highest level of segmentation of global production (15.5% and 14.3% of the total, respectively). In 1995, the "motor vehicles, trailers and semi-trailers" industry accounted for an additional 10.6% of inputs imported for use in the production of export goods, occupying second place for this variable; by 2011, this figure had dropped to 8.5%.

Table 3
Share by sector and by industry of total imported value added in global exports,
1995 and 2011 (in percentages)

Industry	1995	2011	Difference
Agriculture, hunting, forestry and fishing	1.4	1.2	- 0.2
Mining and quarrying	1.5	2.4	0.9
Food products, beverages and tobacco	4.6	3.4	- 1.2
Textiles, textile products, leather and footwear	6.0	3.3	- 2.7
Wood and products of wood and cork	0.9	0.5	- 0.4
Pulp, paper, paper products, printing and publishing	2.4	1.4	- 1.0
Coke, refined petroleum products and nuclear fuel	2.6	7.4	4.7
Chemicals and chemical products	7.8	9.3	1.5
Rubber and plastics products	2.5	2.4	- 0.1
Other non-metallic mineral products	1.0	0.8	- 0.2

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Industry	1995	2011	Difference
Basic metals	6.1	7.3	1.2
Fabricated metal products (except machinery and equipment)	2.6	2.5	- 0.1
Machinery and equipment, nec	7.8	7.1	- 0.8
Computer, electronic and optical equipment	15.5	14.3	- 1.1
Electrical machinery and apparatus, nec	3.7	3.9	0.2
Motor vehicles, trailers, and semi-trailers	10.6	8.5	- 2.1
Other transport equipment	3.2	3.6	0.3
Manufacturing nec; recycling	2.4	2.2	- 0.2
Electricity, gas and water supply	0.2	0.5	0.3
Construction	0.6	0.4	- 0.2
Wholesale and retail trade; repairs	4.8	4.4	- 0.4
Hotels and restaurants	1.3	0.9	- 0.4
Transport and storage	6.3	6.0	- 0.3
Post and telecommunications	0.2	0.4	0.2
Financial intermediation	0.9	1.8	0.9
Real estate activities	0.1	0.1	0.0
Renting of machinery and equipment	0.2	0.4	0.2
Computer and related activities	0.3	0.8	0.6
R+D and other business activities	1.4	1.9	0.5
Public administration and defense; compulsory social security	0.1	0.1	0.0
Education	0.0	0.0	0.0
Health and social work	0.1	0.0	0.0
Other community, social and personal services	0.7	0.7	0.0
Sector			
Primary	2.9	3.5	0.6
Secondary	81.1	79.5	- 1.6
Tertiary	16.4	17.5	1.1
Total	100.0	100.0	0.0

Source: Compiled by authors based on TiVA-OCDE.

The decline in importance of the textile industry in the global segmentation of production is noteworthy – it went from 6% to 3.3% of the total. As we saw earlier, this could be due to a saturation point in the offshoring

of this industry, along with the fact that the cost of textile raw materials did not increase by as much as those of mining or hydrocarbons. In contrast, the "coke, petroleum products and nuclear fuel" industry soared as a share of the global segmentation of production (from 2.6% to 7.4%), which is largely attributable to the hydrocarbon price rise. The same is true of the "chemicals and chemical products" industry (which rose from 7.8% to 9.3%) and of "basic metals" (from 6.1% to 7.3%), in the latter case due to the increase in mineral prices.

The estimations of the imported content of a sector's exports are proxies of a certain dynamic in the GVCs, but do not explain them fully. Indeed, the main drawback of this indicator is that it does not show how many stages are in a production process – that is, how long a chain is. A high import content in exports may be due to the use of expensive imported raw materials in a simple chain. For example, let us suppose that Country A exports oil to Country B at a value of $10. B transforms this oil into a petrochemical product and exports it to C for $20. In this case, the imported content of the petrochemical product would be 50%, with two links in the production process. Now, let us suppose that Country E exports iron ore to Country F for $5. F transforms it into steel and exports it to Country G for $10. G transforms the steel into auto parts and exports them to Country H for $15. H assembles the auto parts into an automobile and exports them to Country J for $30. Here, the imported content of J's exports would be 50%, even though the chain is much longer, since there are four links in the production process.

Figure 1, estimated from OECD (2012) data, complements the information set out above by showing the "length" of different GVCs in 2008. The index will be 1 if this industry's production process only uses one link – which, logically, is from this same industry. The value of the index increases the more links are used, whether in the same industry (for example, auto parts supplied for automotive terminals, both of which pertain to the automobile industry) or in others. The index also takes into account the degree of segmentation of production necessary for the manufacture of these intermediate inputs, such that the chains whose intermediate inputs also use their respective intermediate inputs will score more highly than those that do not. Figure 1 not only shows the length of the chain, but which part of it is domestic and which part is international.[4]

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4   The index of the number of stages in the production process is that proposed by Fally (2011), calculated for the U.S. economy using the input-output matrix. The OECD has used the same methodology, but on the basis of the world input-output macro-matrix. Thus, the index of GVC

Figure 1
GVC length by sector, 2008
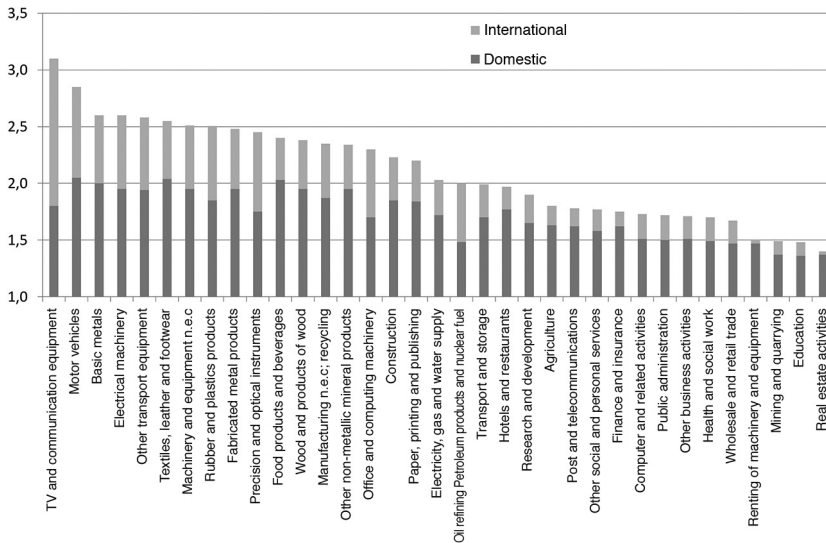
Source: Compiled by authors based on OECD (2012).

Moreover, it can be seen that the longest chains – indeed, the most vertically segmented, with both domestic (dark gray) and global links (light gray) – are those pertaining to "TV and communication equipment," "motor vehicles," "basic metals," "electrical machinery," "other transport equipment," and "textiles, leather and footwear." It is notable that chains such as "oil refining," whose exports have a high imported content,[5] are now located **mid-table**, far behind other secondary industries. This is because this chain is relatively short (in sum, the crude oil is transformed into refined oil), but the main and most expensive input (crude oil) is usually imported.

4. Changes in relative GVC participation at country level

In this section, we analyze how the indices of relative GVC participation have changed for the 49 countries in our sample, which, as we have stated, make

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length is calculated as follows: Nik = u.(I - A)-1, where Nik is the index for industry k in country i; u is a unit vector; I is and identity matrix; and A is the Leontief inverse. This index is similar to that used for the calculation of backward linkages used in the literature on input-output (OECD, 2012).

5   In tables 2 and 3, this industry is listed as "coke, refined petroleum products and nuclear fuel."

up 85% of global GDP. To this end, we will make use of the data presented in Table 4, in descending order by level of increase in GVC participation.

Table 4

Overall relative GVC participation, upstream and downstream, by country, 1995 and 2011 (in percentages)

Country	1995			2011			Variation 2011/1995		
	Up-stream	Down-stream	Total	Up-stream	Down-stream	Total	Up-stream	Down-stream	Total
South Korea	22.3	17.1	39.4	41.6	20.5	62.1	19.3	3.4	22.8
Hungary	29.8	13.4	43.2	48.5	16.6	65.1	18.7	3.1	21.9
Taiwan	30.6	15.8	46.5	43.5	24.1	67.6	12.9	8.2	21.1
India	9.3	13.6	22.9	24.0	19.1	43.1	14.7	5.5	20.1
Poland	16.1	19.9	36.0	32.3	23.3	55.5	16.2	3.3	19.5
Turkey	8.9	13.3	22.2	25.7	15.3	41.0	16.8	1.9	18.7
Chile	13.8	19.9	33.8	20.2	31.7	51.9	6.4	11.7	18.1
Thailand	24.2	12.1	36.3	39.0	15.4	54.3	14.7	3.3	18.1
Vietnam	21.1	13.1	34.3	36.3	16.0	52.3	15.2	2.9	18.0
Japan	5.6	23.8	29.4	14.6	32.8	47.4	9.0	9.0	18.0
Cambodia	12.8	18.0	30.8	36.8	11.9	48.7	24.0	- 6.1	17.9
Denmark	23.2	16.7	39.9	32.8	24.1	56.9	9.6	7.4	17.0
Czech Republic	30.5	17.5	48.0	45.1	19.6	64.7	14.6	2.1	16.7
Slovakia	31.8	18.9	50.7	46.7	20.6	67.3	14.9	1.7	16.6
Greece	16.3	11.9	28.3	24.9	18.3	43.3	8.6	6.4	15.0
Italy	17.2	15.4	32.6	26.4	21.1	47.5	9.2	5.7	15.0
Indonesia	12.5	16.3	28.8	12.0	31.5	43.5	- 0.5	15.2	14.6
Malaysia	30.4	15.6	46.0	40.6	19.8	60.4	10.2	4.2	14.4
Saudi Arabia	4.2	27.0	31.2	3.3	42.0	45.3	- 0.9	15.1	14.2
Germany	14.8	20.7	35.5	25.5	24.1	49.6	10.6	3.4	14.1
Colombia	8.5	15.4	23.9	7.6	30.2	37.9	- 0.8	14.8	14.0
Austria	21.4	17.3	38.6	27.6	24.7	52.3	6.3	7.4	13.7
Russia	13.2	25.1	38.4	13.7	38.1	51.8	0.5	13.0	13.5
Australia	12.1	18.4	30.5	14.1	29.5	43.6	2.0	11.1	13.1
Spain	19.1	14.3	33.4	26.8	19.7	46.5	7.7	5.4	13.1
Rest of the world	20.3	21.2	41.5	17.7	36.6	54.3	- 2.5	15.4	12.9
World total	17.9	17.9	35.7	24.2	24.2	48.4	6.3	6.3	12.6

(Continues)

(Continued)

Country	1995			2011			Variation 2011/1995		
	Up-stream	Down-stream	Total	Up-stream	Down-stream	Total	Up-stream	Down-stream	Total
Finland	24.1	20.6	44.7	34.6	22.7	57.3	10.5	2.1	12.6
Argentina	5.7	12.2	17.9	14.1	16.4	30.5	8.3	4.2	12.6
Norway	19.9	25.5	45.4	17.2	40.5	57.7	- 2.7	15.0	12.3
South Africa	13.1	20.5	33.6	19.5	26.5	45.9	6.3	6.0	12.3
Brazil	7.8	15.1	22.9	10.7	24.5	35.2	2.9	9.3	12.3
France	17.3	17.9	35.2	25.0	21.9	47.0	7.8	4.0	11.8
Switzerland	17.5	18.2	35.7	21.7	25.6	47.3	4.2	7.5	11.6
Costa Rica	22.1	11.1	33.1	27.8	16.8	44.6	5.7	5.8	11.5
Romania	21.2	17.1	38.3	24.4	24.6	49.0	3.2	7.5	10.7
Portugal	27.3	12.5	39.8	32.6	17.7	50.3	5.3	5.2	10.5
United Kingdom	18.2	19.0	37.2	22.9	24.7	47.6	4.7	5.7	10.4
Israel	21.6	12.4	34.0	25.0	19.3	44.3	3.4	6.9	10.3
Belgium	30.9	17.6	48.6	34.4	23.5	57.9	3.5	5.8	9.3
United States	11.4	19.4	30.8	15.0	24.9	39.8	3.5	5.5	9.1
Sweden	26.2	18.7	45.0	29.0	24.6	53.7	2.8	5.9	8.7
Mexico	27.3	11.1	38.4	31.7	15.1	46.8	4.4	4.0	8.4
Philippines	29.8	12.8	42.6	23.5	27.4	50.9	- 6.3	14.6	8.3
Ireland	38.4	12.7	51.1	43.5	15.7	59.2	5.1	3.0	8.1
Canada	24.3	11.1	35.3	23.4	19.0	42.4	- 0.9	7.9	7.1
Singapore	42.3	12.3	54.6	41.7	19.9	61.6	- 0.6	7.5	7.0
Netherlands	23.2	17.9	41.1	20.0	27.5	47.4	- 3.2	9.6	6.3
Hong Kong	21.6	15.8	37.4	20.4	23.2	43.6	- 1.1	7.4	6.2
New Zealand	16.8	10.9	27.8	16.6	16.6	33.3	- 0.2	5.7	5.5
China	33.3	9.5	42.9	32.1	15.6	47.7	- 1.2	6.1	4.9

Note: the countries are ordered based on the totals set out in the final column. Relative upstream participation is the percentage of imported value added in a country's gross exports; relative downstream participation is the percentage of a country's exports used as intermediate inputs in other country's exports. Overall relative GVC participation is the sum of upstream and downstream participation. Source: compiled by authors based on TiVA-OCDE.

Several interesting observations can be made from the data presented in Table 4. The first is that all countries in the sample posted increases in their overall relative GVC share, which speaks to the widespread integration of global production during the period. A second notable point is that China

is the country whose relative participation in GVCs increased the least, by "just" 4.9%.

This is due to a fall in its relative upstream participation (that is, in the percentage of imported content in its exports) and a moderate increase in downstream participation (that is, in the percentage of exports that are not used as intermediate inputs in the exports of other countries). How is this to be understood? While China was predominantly an assembler of industrial products in the 1990s (indeed, its level of relative downstream participation was the lowest in the sample, at 9.5%), between then and 2011 it developed a base of local suppliers that allowed it to reduce the imported content of its exports, which became increasingly high-tech (Koopman, Wang & Wei, 2008).

Another point of interest in Table 4 is that the other East Asian manufacturing powers (South Korea, Taiwan, and Japan) strongly increased their relative GVC participation. Taiwan and, above all, South Korea reaffirmed their specialization in the final links of the chain (that is, their upstream participation is much higher than their downstream participation), while Japan's level of specialization remained intact (largely as a supplier of industrial inputs). Moreover, ASEAN countries[6] such as Thailand, Vietnam, Cambodia, and Malaysia also recorded sharp increases in their relative GVC participation, consolidating their positions as never before in the final links of the chain; likewise, it should be noted that their relative downstream participation increased very little. However, the experience of Indonesia was different; although the growth in its relative GVC participation was in excess of the global average, this increase was entirely downstream. Thus, although in 1995 its position in the GVCs was located on average in the central links (that is, its upstream and downstream participation were similar), by 2011 it had clearly come to specialize in the early links, as a supplier of raw materials such as hydrocarbons, rubber, and coal. Other members of ASEAN, such as the Philippines and Singapore, also exhibited singular characteristics: both countries increased their relative GVC participation below the global average due to a drop in their relative upstream participation. Rather than a Chinese-style development of local suppliers, this would appear to indicate a gradual change in the role of the GVCs, from the final links back through to the earlier ones.

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6   The Association of Southeast Asian Nations is a regional organization of Southeast Asian states founded in 1967. Its ten members are Malaysia, Thailand, Indonesia, Vietnam, Philippines, Cambodia, Laos, Singapore, Burma, and Brunei.

Other countries that posted heavy increases in their relative GVC participation are those of Eastern Europe, particularly Hungary, Poland, the Czech Republic, and Slovakia. It is worth mentioning that these are former Soviet Bloc nations with qualified, low-cost labor, a history of relative industrialization, and close geographical proximity to Western Europe, particularly Germany. Over the last two decades, these countries have received large waves of FDI, especially from German firms – followed by those from France, Italy, and the United States – in fields such as automobiles, consumer electronics, and other metalworking industries. In general, they assemble these products using inputs imported from other European Union countries, particularly Germany.[7] This explains their high and growing rate of participation in GVCs, and their far greater inclination towards the final chains than the earlier ones, as shown by the figures for relative upstream and downstream participation.

For their part, countries such as Chile, Saudi Arabia, Russia, or Australia increased their relative participation in GVCs beyond the global average on the strength of their downstream activity. In 1995, these countries were already specialized in the initial links through commodity exports, and the intervening years only reinforced this situation.

In general, the countries of Western Europe increased their relative participation in the GVCs in a manner not unlike the global average, except for the Netherlands, Ireland, and Sweden, which were somewhat below the average. At present, most Western European countries (Germany, France, Italy, the United Kingdom, Spain, the Netherlands, Sweden, Switzerland, Austria, and Portugal) are located in the central links on average, given that there are no significant differences between their upstream and downstream participation. Meanwhile, the North American nations (the United States, Canada, and Mexico) increased their relative participation in the GVCs, but at levels that were below the world average; this shows that the fragmentation of production chains as a consequence of the implementation of the North American Free Trade Agreement (NAFTA) in 1994 occurred to a far greater extent in the 1990s than in the 2000s, unlike the case of East and Southeast Asia where, as we have seen, the chains fragmented at a faster rate. It is worth noting that the United States occupies a similar role to Japan, in that both in 1995 and 2011, it specialized more in the first links in the chain – but instead of exporting commodities, like Chile, Saudi Arabia, Colombia, or Australia, it exports manufactured intermediate goods.

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7   In 2011, Germany accounted for 21% of the imported value added of Czech exports, 14% in the case of Slovak exports, 20% for Hungarian exports, and 17% for Polish exports.

In contrast, Mexico and Canada are more slanted towards the final links; it is worth noting that while Mexico retained this position between 1995 and 2011, Canada's downstream participation grew at a faster rate than did its upstream, approaching, on average, the central links in the chains.

In turn, Argentina and Brazil are countries whose overall relative participation in the GVCs are slightly below average, though their expansion in participation between 1995 and 2011 was very close to the global average. Now, while in Argentina this increase was largely upstream, the opposite was true of Brazil. The reason for this is, first and foremost, the boom in the demand for commodities recorded in the 2000s: Brazil consolidated its role as supplier of inputs for Asian metalworking, with a strong slant towards exportation, through its iron ore exports. In contrast, Argentine exports, primarily agro-industrial, are largely final goods (or intermediate, but for consumption in the destination market), so the country's downstream participation is limited. Moreover, the takeoff of Argentine automotive exports in the 2000s, with heavy imported content, especially from Brazil, also helps explain why its upstream participation was more dynamic than its downstream.

Finally, Table 4 includes a category called "rest of the world," which includes the following countries: from Asia, Qatar, Iran, Iraq, United Arab Emirates, Jordan, Kuwait, Oman, Yemen, Syria, Afghanistan, Pakistan, Bangladesh, Nepal, Kazakhstan, Armenia, Georgia, Uzbekistan, Turkmenistan, Kyrgyzstan, Azerbaijan, Burma, Laos, Mongolia, North Korea, Bhutan, and Brunei; from Africa, all countries except South Africa; from Central America, Panama, Nicaragua, El Salvador, Guatemala, Honduras, and Belize; from the Caribbean, all countries; from Oceania, all countries except Australia and New Zealand; from South America, Uruguay, Paraguay, Bolivia, Peru, Venezuela, Ecuador, Suriname, Guyana, and French Guyana; from Europe, Luxembourg, Estonia, Lithuania, Latvia, Serbia, Montenegro, Bosnia and Herzegovina, Croatia, Macedonia, Moldavia, Slovenia, Iceland, Ukraine, and Belarus. It is striking that this group of countries had similar levels of upstream and downstream participation in 1995 – in contrast to 2011, where the specialization in the initial links (high downstream participation and low upstream participation) can be clearly noted. This is due in large part to the steep increase in the price of hydrocarbons, which pushed up the relative weight of oil-producing countries in the Middle East such as Qatar, Kuwait, the United Arab Emirates, Iraq, and Iran,[8] whose exports

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8   Saudi Arabia also meets this condition, but TiVA-OECD treats it differently.

are sent mainly to industrialized (or industrializing) Asian states such as China, Japan, South Korea, Taiwan, Singapore, and India, where they are transformed into exportable petrochemical inputs.

Figure 2 provides a comparison of the relative upstream and downstream GVC participation in 1995 (blue circles) and in 2011 (red triangles) for several of the countries discussed thus far; in the interests of legibility, we have omitted others. The y-axis shows upstream participation, while the x-axis shows downstream participation, in percentages in both cases. The "geographical center" shown on the figure corresponds to the world average in 2011; logically, this average should be located between upstream and downstream participation, which for this year was 24.2% in both cases.

Figure 2
GVC participation, selected countries, 1995 and 2011 (in percentages)
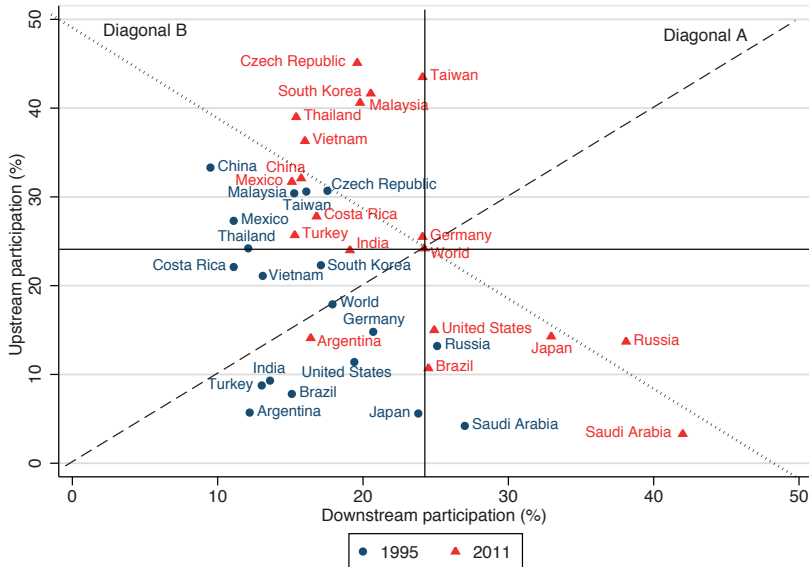
Note: the intersection between the horizontal lines shows the world average in 2011. Source: Compiled by authors based on TiVA-OECD and UnctadStat.

The countries in the upper half of Figure 2 had an upstream GVC participation above the world average in 2011, and vice versa for those in the lower half. Meanwhile, those in the right half had a downstream participation above the world average for 2011, and vice versa for those in the left. Figure 2 also contains two diagonals. The line running from "southeast to "northeast (diagonal A) represents all points at which upstream and downstream participation are identical. The countries located closest to this diagonal

will be less specialized – that is, on average, their aggregate participation is in the central links of the chain – while those positioned above them will have a specialization centered on the final links, and those below them on the initial links. The diagonal line from "northeast" to "southeast" represents all points at which total GVC participation is equal to the world average for 2011. Thus, the countries located far above this diagonal will have an overall participation that exceeds the world average in 2011, and vice versa for those positioned far below it.

5. Changes in absolute participation in world exports and GVCs at country level

As we have seen, another of the most significant changes that occurred between 1995 and 2011 was the exponential rise in China's participation in the global economy and, in particular, in international trade. In 1995, the Asian giant accounted for 2.5% of the world's gross exports (and 2% of exports in domestic value added); whereas by 2011, this figure had soared to 10.3% (9.2% in domestic value added)(see Table 5). Russia, Saudi Arabia, India, Brazil, Mexico, Indonesia, Malaysia, Thailand, Poland, Turkey, Ireland, Czech Republic, Argentina, Chile, Vietnam, and Colombia, among others, also increased their participation, at the expense of central countries such as the Unites States, Japan, and Western European countries. Taking the conventional interpretation of exports – that is, in gross terms – China was the world's biggest exporter in 2011, a little ahead of the USA. However, the fact that the USA has less imported inputs in its exports means that, in terms of value added, it has continued to occupy first place (11.2% of the world total versus 9.2% for China).

Table 5
Gross exports and domestic value added in exports by country, 1995 and 2011 (in millions of USD and percentages)

Country	1995				2011			
	Gross exports	Global %	Domestic value added in exports	Global %	Gross exports	Global %	Domestic value added in exports	Global %
United States	767,358	13.4	679,393	14.5	1,896,017	10.0	1,612,224	11.2
China	143,197	2.5	95,394	2.0	1,961,409	10.3	1,331,599	9.2
Germany	540,550	9.5	460,139	9.8	1,423,719	7.5	1,061,123	7.4
Japan	480,287	8.4	453,336	9.7	888,424	4.7	758,302	5.3
United Kingdom	313,014	5.5	255,884	5.5	731,817	3.8	563,953	3.9
France	336,411	5.9	278,167	5.9	704,711	3.7	528,206	3.7
Russia	90,805	1.6	78,768	1.7	571,975	3.0	493,489	3.4
Italy	286,931	5.0	237,474	5.1	624,433	3.3	459,547	3.2
Canada	202,928	3.6	153,460	3.3	520,844	2.7	398,949	2.8
South Korea	150,177	2.6	116,640	2.5	620,073	3.3	361,929	2.5
Saudi Arabia	53,252	0.9	51,022	1.1	363,890	1.9	351,839	2.4
India	39,116	0.7	35,455	0.8	451,252	2.4	342,975	2.4
Spain	132,258	2.3	106,916	2.3	442,283	2.3	323,792	2.2
Australia	72,885	1.3	64,087	1.4	321,697	1.7	276,398	1.9
Brazil	55,288	1.0	50,961	1.1	292,334	1.5	260,924	1.8
Switzerland	112,639	2.0	92,788	2.0	319,977	1.7	250,563	1.7
Mexico	86,494	1.5	62,849	1.3	345,834	1.8	236,229	1.6
Netherlands	163,229	2.9	125,304	2.7	278,292	1.5	222,742	1.5
Indonesia	57,429	1.0	50,208	1.1	222,123	1.2	195,518	1.4
Taiwan	122,851	2.2	85,111	1.8	334,617	1.8	189,007	1.3
Norway	54,034	0.9	43,279	0.9	197,932	1.0	163,865	1.1
Sweden	98,122	1.7	72,325	1.5	229,636	1.2	162,945	1.1
Singapore	85,949	1.5	49,526	1.1	271,128	1.4	157,998	1.1
Malaysia	66,312	1.2	46,085	1.0	263,485	1.4	156,574	1.1
Belgium	130,201	2.3	89,817	1.9	238,181	1.3	156,303	1.1
Thailand	67,104	1.2	50,805	1.1	249,451	1.3	152,280	1.1
Poland	30,745	0.5	25,793	0.5	211,474	1.1	143,194	1.0

(Continues)

(Continued)

Country	1995				2011			
	Gross exports	Global %	Domestic value added in exports	Global %	Gross exports	Global %	Domestic value added in exports	Global %
Austria	77,496	1.4	60,881	1.3	179,104	0.9	129,644	0.9
Turkey	38,366	0.7	34,935	0.7	173,292	0.9	128,788	0.9
Ireland	47,163	0.8	29,011	0.6	220,174	1.2	124,341	0.9
Hong Kong	50,922	0.9	39,877	0.9	122,247	0.6	97,298	0.7
South Africa	33,822	0.6	29,366	0.6	118,810	0.6	95,701	0.7
Denmark	59,637	1.0	45,819	1.0	136,285	0.7	91,540	0.6
Czech Republic	27,264	0.5	18,931	0.4	152,403	0.8	83,683	0.6
Argentina	24,679	0.4	23,263	0.5	96,261	0.5	82,723	0.6
Chile	20,073	0.4	17,287	0.4	91,497	0.5	72,999	0.5
Finland	45,963	0.8	34,856	0.7	103,567	0.5	67,732	0.5
Israel	26,320	0.5	20,557	0.4	87,928	0.5	65,923	0.5
Vietnam	6,627	0.1	5,215	0.1	94,909	0.5	60,488	0.4
Colombia	11,764	0.2	10,769	0.2	62,285	0.3	57,522	0.4
Hungary	19,863	0.3	13,930	0.3	105,815	0.6	54,512	0.4
Portugal	30,850	0.5	22,405	0.5	80,664	0.4	54,387	0.4
Philippines	25,035	0.4	17,510	0.4	70,458	0.4	53,877	0.4
Greece	22,583	0.4	18,891	0.4	65,187	0.3	48,929	0.3
Romania	9,039	0.2	7,125	0.2	58,400	0.3	44,151	0.3
New Zealand	17,904	0.3	14,888	0.3	47,313	0.2	39,454	0.3
Slovakia	9,936	0.2	6,764	0.1	69,941	0.4	37,260	0.3
Costa Rica	4,363	0.1	3,400	0.1	15,167	0.1	10,956	0.1
Cambodia	1,026	0.0	894	0.0	6,889	0.0	4,353	0.0
Rest of the world	363,495	6.4	302,633	6.5	1,898,398	10.0	1,613,228	11.2
World total	5,713,755	100.0	4,690,197	100.0	19,034,000	100.0	14,431,955	100.0

Note: based on the totals set out in the final column
Source: compiled by authors based on TiVA-OCDE.

Also of note is the high increase in participation of the "rest of the world." This is largely attributable to the Middle Eastern countries and, to a lesser extent, the South American countries included in this category, due to the sharp increase in the price of raw materials. The strong growth

in international trade is likewise notable, having gone from \$5.7 trillion to \$19 trillion (+ 233%). The rise proved slightly lower after the effects of double counting were excluded, but still very high (+ 207%).

Similar trends can be observed in the changes in GVC participation. In 1995, China accounted for 3% of global participation; this had grown to 10.1% by 2011, the highest in the world (see Table 6). And if only upstream participation is taken into account, the figure rises to 13.6%. By contrast, most developed countries lost ground. Emerging economies such as Russia, India, Saudi Arabia, Thailand, Turkey, and Brazil, among others, also increased their share in overall trade flows linked to GVCs. Argentina was another country whose absolute GVC participation went up (from 0.2% to 0.3%), though its role remained relatively marginal.

Table 6
Absolute participation in CGVs by country, 1995 and 2011
(in millions of dollars and percentages)

Country	1995						2011					
	Upstream	%	Downstream	%	Total	%	Upstream	%	Downstream	%	Total	%
China	47,833	4.7	13,637	1.3	61,469	3.0	632,316	13.6	307,263	6.6	939,579	10.1
United States	88,070	8.6	149,254	14.5	237,324	11.6	285,654	6.2	474,833	10.2	760,487	8.2
Germany	80,611	7.8	112,375	10.9	192,986	9.4	364,670	7.9	345,615	7.5	710,285	7.7
Japan	27,043	2.6	115,016	11.2	142,059	6.9	130,842	2.8	292,799	6.3	423,641	4.6
South Korea	33,616	3.3	25,718	2.5	59,334	2.9	259,057	5.6	127,610	2.8	386,666	4.2
United Kingdom	57,314	5.6	59,966	5.8	117,280	5.7	169,426	3.7	182,389	3.9	351,815	3.8
France	58,411	5.7	60,643	5.9	119,055	5.8	177,713	3.8	155,624	3.4	333,337	3.6
Italy	49,653	4.8	44,475	4.3	94,128	4.6	165,783	3.6	132,727	2.9	298,510	3.2
Russia	12,098	1.2	23,001	2.2	35,100	1.7	79,014	1.7	219,400	4.7	298,414	3.2
Taiwan	37,764	3.7	19,527	1.9	57,291	2.8	146,146	3.2	80,847	1.7	226,992	2.4
Canada	49,586	4.8	22,583	2.2	72,170	3.5	122,483	2.6	99,464	2.1	221,947	2.4
Spain	25,384	2.5	18,993	1.8	44,377	2.2	119,347	2.6	87,820	1.9	207,167	2.2
India	3,682	0.4	5,360	0.5	9,041	0.4	109,635	2.4	87,084	1.9	196,718	2.1
Singapore	36,550	3.6	10,650	1.0	47,200	2.3	115,005	2.5	54,747	1.2	169,752	1.8
Saudi Arabia	2,243	0.2	14,397	1.4	16,639	0.8	12,056	0.3	153,001	3.3	165,057	1.8
Mexico	23,656	2.3	9,636	0.9	33,293	1.6	109,801	2.4	52,233	1.1	162,034	1.7
Malaysia	20,280	2.0	10,411	1.0	30,691	1.5	107,372	2.3	52,407	1.1	159,779	1.7
Switzerland	19,919	1.9	20,656	2.0	40,575	2.0	70,326	1.5	83,142	1.8	153,468	1.7
Australia	8,829	0.9	13,501	1.3	22,330	1.1	45,492	1.0	95,439	2.1	140,931	1.5
Belgium	40,508	3.9	23,128	2.3	63,637	3.1	82,926	1.8	56,668	1.2	139,593	1.5

(Continues)

(Continued)

Country	1995						2011					
	Upstream	%	Downstream	%	Total	%	Downstream	%	Downstream	%	Total	%
Thailand	16,318	1.6	8,128	0.8	24,447	1.2	97,580	2.1	38,567	0.8	136,147	1.5
Netherlands	38,173	3.7	29,500	2.9	67,673	3.3	56,448	1.2	77,664	1.7	134,112	1.4
Ireland	18,233	1.8	6,021	0.6	24,255	1.2	97,735	2.1	35,174	0.8	132,909	1.4
Sweden	25,866	2.5	18,459	1.8	44,324	2.2	67,572	1.5	57,292	1.2	124,864	1.3
Poland	4,969	0.5	6,171	0.6	11,140	0.5	68,959	1.5	49,657	1.1	118,615	1.3
Norway	10,901	1.1	13,930	1.4	24,831	1.2	34,370	0.7	80,906	1.7	115,276	1.2
Brazil	4,347	0.4	8,428	0.8	12,775	0.6	31,556	0.7	71,824	1.5	103,380	1.1
Czech Republic	8,371	0.8	4,809	0.5	13,179	0.6	69,258	1.5	30,101	0.6	99,359	1.1
Indonesia	7,244	0.7	9,430	0.9	16,674	0.8	26,667	0.6	70,099	1.5	96,767	1.0
Austria	16,686	1.6	13,492	1.3	30,178	1.5	50,107	1.1	44,774	1.0	94,882	1.0
Denmark	14,023	1.4	10,079	1.0	24,101	1.2	45,760	1.0	33,593	0.7	79,352	0.9
Turkey	3,466	0.3	5,208	0.5	8,674	0.4	44,634	1.0	26,557	0.6	71,191	0.8
Hungary	5,974	0.6	2,698	0.3	8,671	0.4	51,838	1.1	17,737	0.4	69,575	0.8
Finland	11,129	1.1	9,508	0.9	20,637	1.0	36,109	0.8	23,690	0.5	59,799	0.6
Hong Kong	11,180	1.1	8,198	0.8	19,378	0.9	25,698	0.6	29,192	0.6	54,890	0.6
South Africa	4,478	0.4	7,003	0.7	11,481	0.6	23,173	0.5	31,539	0.7	54,711	0.6
Vietnam	1,425	0.1	887	0.1	2,312	0.1	34,434	0.7	15,201	0.3	49,634	0.5
Chile	2,796	0.3	4,030	0.4	6,826	0.3	18,738	0.4	29,372	0.6	48,111	0.5
Slovakia	3,192	0.3	1,892	0.2	5,084	0.2	32,817	0.7	14,457	0.3	47,274	0.5
Portugal	8,459	0.8	3,891	0.4	12,351	0.6	26,674	0.6	14,497	0.3	41,172	0.4
Israel	5,815	0.6	3,336	0.3	9,151	0.4	22,307	0.5	17,211	0.4	39,518	0.4
Philippines	7,638	0.7	3,276	0.3	10,914	0.5	16,855	0.4	19,625	0.4	36,480	0.4
Argentina	1,423	0.1	3,029	0.3	4,451	0.2	13,605	0.3	15,885	0.3	29,490	0.3
Romania	1,917	0.2	1,550	0.2	3,467	0.2	14,285	0.3	14,410	0.3	28,695	0.3
Greece	3,692	0.4	2,692	0.3	6,383	0.3	16,418	0.4	12,077	0.3	28,495	0.3
Colombia	995	0.1	1,816	0.2	2,811	0.1	4,763	0.1	18,828	0.4	23,590	0.3
New Zealand	3,026	0.3	1,967	0.2	4,993	0.2	7,909	0.2	7,924	0.2	15,834	0.2
Costa Rica	963	0.1	482	0.0	1,445	0.1	4,224	0.1	2,563	0.1	6,786	0.1
Cambodia	131	0.0	185	0.0	316	0.0	2,542	0.1	824	0.0	3,365	0.0
Rest of the world	61,114	6.0	63,972	6.2	125,086	6.1	286,358	6.2	592,108	12.8	878,466	9.5
World	1,026,993	100.0	1,026,993	100.0	2,053,987	100.0	4,634,457	100.0	4,634,457	100.0	9,268,914	100.0

Note: the countries are ordered based on the final column.
Source: Compiled by authors based on TiVA-OECD.

Maps 1 and 2, taken from OECD (2012), present the main flows of inputs imported for processing and subsequent exportation in 1995 and 2009, respectively, and thus help to clarify many of the abovementioned points. The thickness of the arrows reflects the value traded, while the size of the bubbles reflects the total imported value added in the exports of the country or region. In 1995, the main flow came from the United States as a supplier of Western European countries (EU-15, for the first 15 countries to enter the European Union). Other significant flows of inputs for export products were those from Western Europe to Eastern Europe (Other Europe) and to ASEAN, which at that time accounted for 8.7% of the total world upstream GVC participation;[9] those from the United States to Canada, ASEAN, and Mexico; and those from Japan to ASEAN. It is interesting to note the reduced prominence of China in the dynamics of the time.

Map 1
Imported content in exports, 1995 (selected trade flows)
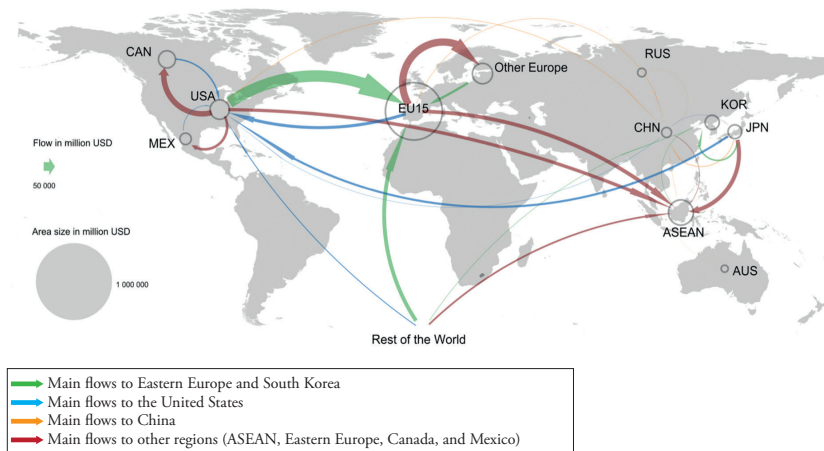
Source: OECD (2012).

Map 2 shows how the global economic geography had changed by 2009: flows had become more poly-directional and abundant (as can be seen from the direction and thickness of the arrows) and the import content of exports for all regions and countries had expanded significantly (as can be seen by the increase in size of the bubbles). It is also very clear that China had turned into a recipient country of imported value added in absolute

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9   It should be noted that Map 1 does not show flows within the following regions: EU-15, other European countries (Other Europe), ASEAN, and the rest of the world.

terms, despite the fall in its relative upstream participation because of the proportionately greater increase in the domestic value added in its exports; by 2009, its main suppliers included the United States, Western Europe, Japan, and ASEAN. The ASEAN grouping also consolidated its role as processor and assembler, primarily receiving inputs from Western Europe, the United States, the rest of the world, China, and Japan. Western Europe was another region that strengthened its specialization in the final links, with Eastern Europe providing most of its inputs. In turn, this latter region emerged as a key part of the economic GVC geography, in that it had also become a net supplier to the United States and the rest of the world. This dual role as both supplier and purchaser explains why, as we have seen, Eastern Europe's upstream and downstream participation is equal – that is, it specializes in the central links.

Map 2
Import content of exports, 2009 (selected trade flows)
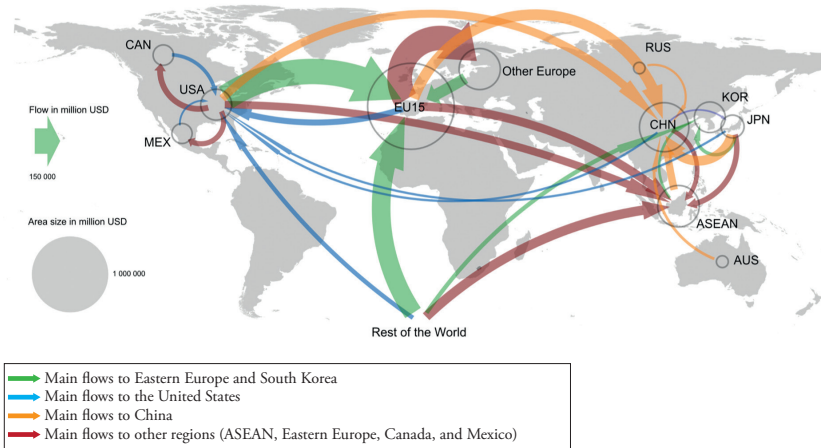
Source: OECD (2012).

As can be seen in Table 7, in which the countries are ordered by accumulated growth in overall GVC participation over the period, the total exchanges associated with GVCs climbed from $2.05 trillion in 1995 to $9.27 trillion in 2011, a rise of 351.3%. The countries whose GVC participation climbed the most included India and Vietnam, both of which posted 20-fold increases in trade linked to GVCs; China, with a 15-fold increase; Cambodia and Poland, each with increases of almost eleven-fold; Saudi Arabia, with tenfold; Slovakia, ninefold; Russia, 8.5-fold; and Colombia, Turkey, Romania, and Brazil, each of which recorded increases of a little more than eightfold. Meanwhile, Argentina multiplied its participation 6.6-fold (+

562.5%), which placed it above the world average; on this basis, its absolute participation in GVC flows climbed from 0.2% to 0.3%. Conversely, those countries whose GVC-related trade increased at below world-average levels are all developed, with the sole exception of the Philippines.

Table 7
Accumulated growth in overall participation in GVCs by country, 1995 and 2011
(in millions of dollars)

Country	1995	2011	Growth (%)
India	9,041	196,718	2075.7
Vietnam	2,312	49,634	2047.0
China	61,469	939,579	1428.5
Cambodia	316	3,365	964.8
Poland	11,140	118,615	964.8
Saudi Arabia	16,639	165,057	892.0
Slovakia	5,084	47,274	829.9
Russia	35,100	298,414	750.2
Colombia	2,811	23,590	739.3
Romania	3,467	28,695	727.8
Turkey	8,674	71,191	720.7
Brazil	12,775	103,380	709.3
Hungary	8,671	69,575	702.3
Czech Republic	13,179	99,359	653.9
Chile	6,826	48,111	604.8
Rest of the world	125,086	878,466	602.3
Argentina	4,451	29,490	562.5
South Korea	59,334	386,666	551.7
Australia	22,330	140,931	531.1
Indonesia	16,674	96,767	480.3
Thailand	24,447	136,147	456.9
Ireland	24,255	132,909	448.0
Malaysia	30,691	159,779	420.6
Mexico	33,293	162,034	386.7
South Africa	11,481	54,711	376.5
Costa Rica	1,445	6,786	369.6
Spain	44,377	207,167	366.8
Norway	24,831	115,276	364.2

(Continues)

(Continued)

Country	1995	2011	Growth (%)
Greece	6,383	28,495	346.4
Israel	9,151	39,518	331.8
Taiwan	57,291	226,992	296.2
Switzerland	40,575	153,468	278.2
Germany	192,986	710,285	268.0
Singapore	47,200	169,752	259.6
Philippines	10,914	36,480	234.3
Portugal	12,351	41,172	233.4
Denmark	24,101	79,352	229.2
United States	237,324	760,487	220.4
Italy	94,128	298,510	217.1
New Zealand	4,993	15,834	217.1
Austria	30,178	94,882	214.4
Canada	72,170	221,947	207.5
United Kingdom	117,280	351,815	200.0
Japan	142,059	423,641	198.2
Finland	20,637	59,799	189.8
Hong Kong	19,378	54,890	183.3
Sweden	44,324	124,864	181.7
France	119,055	333,337	180.0
Belgium	63,637	139,593	119.4
Netherlands	67,673	134,112	98.2
World	2,053,987	9,268,914	351.3

Source: Compiled by authors based on TiVA-OCDE.

6. Participation in GVCs and development possibilities for the periphery

So far, we have analyzed the main trends in the world economic geography over the last two decades. But is there any connection between participation in GVCs and prospects for development? In this section, we explore that question.

Development is known to be linked inextricably to a general improvement in a country's quality of life. A necessary – but insufficient in itself – condition for development is high GDP per capita; thus, the swift transit to development presupposes high rates of economic growth. Does

participating in GVCs increase growth? To what extent? According to the multilateral agencies – see, for example, UNCTAD (2013) – GVCs are a key instrument in the development of low- and middle-income countries, in that participation in them allows these economies to increase their exports and technological capacities through interaction with leading firms that employ global best practices.

In the same 2013 report, UNCTAD stresses that there is a strong relationship between economic growth and the increase in participation in GVCs recorded between 1990 and 2010; its estimations cover 125 developing countries and draw upon the UNCTAD-EORA GVC database.

Here we present our own estimation, based on TVA-OECD data for the period 1995-2011. To this end, we take three variables from Figure 3. The y-axis measures the increase in GVC participation of countries, in terms of compound annual growth; those countries in the "north" half of the figure are those whose participation in GVCs increased by more than the global average. In turn, the x-axis displays a ratio between the growth of domestic value added in exports and the growth of gross exports; this variable is a proxy of the change in vertical integration on a national level between 1995 and 2011, such that a result higher than 1 denotes greater national integration – that is, less import content in a country's exports. Here, the "east" half of Figure 3 includes those countries in which the ratio was above the world average. Finally, the third variable we take into account is per capita GDP growth, the level of which is denoted by the icon and color we assign to each country: those countries represented by blue triangles underwent "low" relative growth; those with red circles had "medium-low" growth; those with green squares were "medium high;" and those with yellow crosses, "high."[10]

This estimation yielded results that are consistent with those of UNCTAD (2014), in that they point to an association – albeit not necessarily causality – between greater GVC participation and higher per capita GDP growth; it can be seen that a sizable majority of countries located in the "north" of Figure 3 have green or yellow icons, with some exceptions, such as Saudi Arabia, Colombia, Brazil, Mexico, and Australia. In contrast, the "south" half of Figure 3 includes most countries with lower relative growth, denoted by blue and red icons; these are generally developed countries, such

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10 The criteria for this stratification involved dividing the sample into quartiles: the countries classi-
     fied as having had "low" growth were those with an compound annual growth rate of below 1.5%;
     those with a growth rate of between 1.5% and 2% were categorized as "medium-low"; those
     between 2.2% and 2.9%, the global average, were "medium high"; and those that posted levels in
     excess of 2.9% underwent "high" growth.

as Finland and Sweden, while the remainder, except for the Philippines, are consolidated emerging countries such as Singapore and Hong Kong. In line with UNCTAD's analysis, the growth rate of the countries is ranked, from highest to lowest, as follows: first, those from the "northeast" quadrant, followed by "northwest," "southeast," and "southwest."

Figure 3

Increase in GVC participation; ratio of growth in domestic value added in exports to growth in gross exports; and increase in per capita GDP, 1995-2011 (in percentages)
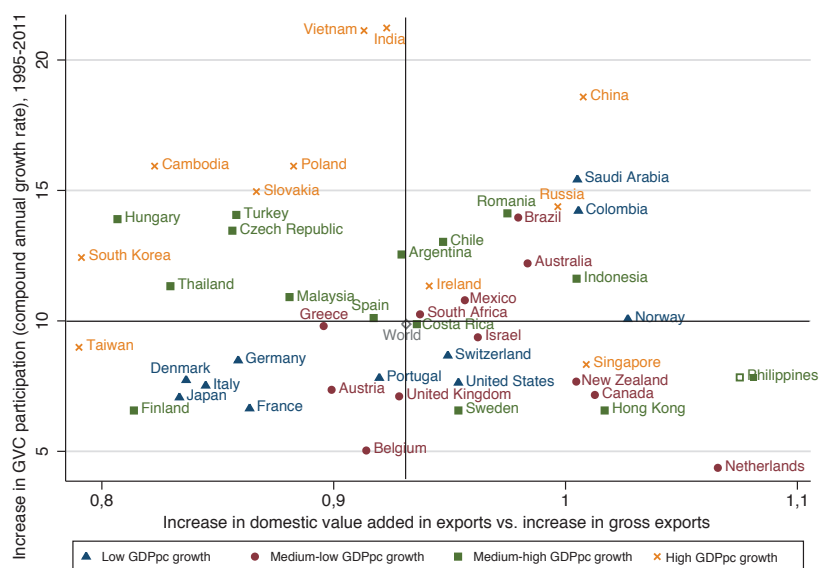
Note: the data on the y-axis are expressed in percentages, while those on the x-axis are a ratio between two rates.
Source: Compiled by authors based on TiVA-OECD and World Bank.

This implies two corollaries: a) given similar GVC participation, lowering the import content of exports will favor per capita GDP growth; and b) in any case, it would seem to make more sense to increase GVC participation regardless of a high import content of exports, than to have more local content but less participation. Thus, UNCTAD suggests a pattern of GVC integration that involves, in the first instance, inclusion by increasing the imported content in exports, until such time as sufficient capacities have been built to expand the network of local suppliers of intermediate inputs and thereby reduce imported content. Expressed in terms of Figure 3, countries ought to first head to the "north," or even to the "northeast," and then change direction towards the "east," not unlike what China did. It is evident that an increase in GVC participation along with an increase in

imported content in exports can only occur in two ways: either via FDI flows in export processing zones, or maquiladoras,[11] or through the relationship between outsourced companies and major multinationals.

These "recommendations" should be carefully considered. In and of itself, an increase in GVC participation does not guarantee greater economic growth; this will occur when the earnings accruing from the growth in exports exceeds the possible losses caused by the displacement of local intermediate input suppliers by foreign equivalents (Dalle *et al.*, 2013). Thus, a country that "ascends" to the GVCs from a relatively simple productive structure – whereby the net effect will likely be positive – cannot be expected to experience the same effect as that of a country which develops significant local capacities for manufacturing intermediate inputs or parts and components, as in the cases of Argentina and Brazil. It is plausible that in these cases, precisely because of a displacement effect, an orthodox integration into GVCs will have a negative impact on growth and income distribution.

In turn, the successful course of China – first towards the "north" and then towards the "east" – had less to do with plain economic liberalization than with the introduction of new types of regulations in which the state maintains a crucial role in managing economic and especially industrial policy. China's industrial policy in recent decades has much in common with that of South Korea in the 1960s and 1980s: both (but especially China) are products of a political system with centralized planning, with solid institutional capacities and strong industrial leanings, and an emphasis on investment and promoting private investment in the strategic areas of education and the production structure (Deyo, 2016). It is also worth adding that the Chinese state has heavily regulated FDI: in strategic sectors (those linked to national security and the promotion of scientific and technological development) the state maintains an iron grip on foreign capital; in less strategic sectors, it relaxes these controls and grants greater decision-making power to local authorities and the private sector, whether domestic or foreign. This DFI strategy aims at technology transfer by multinationals, leading to an increase in the domestic technology base and in the production and technological capabilities of local firms. Moreover, the enormous size of the Chinese economy has assured the state of unbeatable

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11 Export processing zones are free trade zones created by states with the aim of incentivizing exports and inclusion in GVCs. They tend to be found in developing countries, and encompass tariff exemptions, low tax burdens, and reduced regulations in general; moreover, they tend to use labor under extremely flexible conditions, with very low pay levels by international standards. They are also known as "maquiladoras" or "maquilas."

trading conditions versus the major multinationals in this respect (Hsueh, 2011; Arceo, 2011; Lee, 2016; Lo & Wu, 2014; Heilmann & Shih, 2013).

In addition, it should be noted that the probability of success in "ascending" to the GVCs also depends on the extent of export demand; this is a function of several factors, of which two stand out: a) the type of goods in which the country that has "newly ascended" to the GVCs specializes; and b) the dynamism of its main trading partners. Evidently, whether participation in the GVCs is based on expansionary or stagnant demand, or whether the nodal markets are located in high- or low-growth countries, ultimately makes a difference.

Likewise, it should not be forgotten that internal demand (whether in the form of private consumption, public spending, or private investment) can also play an important role in this growth. Indeed, countries such as Argentina, Brazil, and even Japan and the United States have relatively low export to GDP ratios. This means that the contribution to economic growth of this latter component of aggregate demand is relatively small. Logically, exports, as a genuine source of foreign currency, are key for evaluating the prospects of sustaining growth in terms of external balance of payment bottlenecks, above all in peripheral countries (Amico, 2014).

The problem with the predominant doctrines espoused by international agencies such as UNCTAD, and with liberally-minded doctrines in general, is that they tend to assume that export-led models are the only path to development for the periphery, downplaying the role of domestic demand in building external competitiveness and thus stymieing the prospects of these countries increasing their export focus. It is acknowledged, even by UNCTAD itself, that the success of export-led models under peripheral capitalist conditions hinges on wage disciplining – unlike wage-led models, in which personal income becomes a key driver of growth (and even of export prospects, under certain industrial policies). Moreover, the experiences of South Korea, Taiwan, China, Vietnam, Thailand, or Malaysia, which are often held up as paradigmatic examples, have unfolded in an institutional context of low union density and, in several cases, of repressive authoritarian regimes – a context that does not frequently apply to many Latin American countries, especially not in Argentina, Uruguay, or Brazil.

To be sure, the external sustainability of all growth processes, whether driven by external or internal demand, is a question of consolidation. As ECLAC (2012) has argued, growth is more sustainable in the long term when it is accompanied by a current-account surplus. Experiences of growth featuring chronic current-account deficits financed by the capital account have been recorded in Latin America, and often led to solvency crises, such

as the external debt crisis of the early 1980s or the Argentine convertibility crisis. Although there are cases that do not entail long-term crisis, such as those of Australia (chronic current-account deficit since the post-WWII period) and South Korea (deficit between 1962 and 1985), these were due in large part to geopolitical factors: the United States considered both countries as key allies during the Cold War and had no major problem with the long-term financing of their deficits.

However, the peripheral economies usually face various difficulties in sustaining economic growth and, at the same time, a current-account surplus. In these economies, given the weakness of the production structures, growth is accompanied by heightened income elasticity of imports, particularly in a context of rising wages and consumption. In export-led strategies, the increase in exports and the under-consumption of the working class ease the transition; by contrast, in strategies centered on internal demand, there is no way of overcoming the bottleneck other than through a dynamic import-substitution and export-expansion process.

Moreover, peripheral economies are characterized by technological dependency and pronounced offshoring of their productive assets, thus placing an additional burden on their external accounts, chiefly via profit remittance, which serves to finance the developed economies. These economies, in turn, receive additional revenues for intellectual property rights; as an example, net U.S. exports in this area totaled almost $90 billion in 2014, more than all Argentine exports combined.[12] Moreover, their technological, financial, and – in the case of the United States – military strength affords these countries monetary reserves with which to conduct international transactions; thus, although they still incur current-account deficits, they have greater capacity to finance them.

One of the keys to sustaining long-term development lies in establishing and sustaining the conditions for accelerated growth with external solvency. Besides mere participation in GVCs (which, as we have seen, is far from being the sole, homogeneous route to integration), establishing these conditions in peripheral economies requires the following: a) improvement in the ratio between export and import output elasticity, by changing the composition of the export basket and occasional import substitution in strategic sectors; and b) increasing production, technology, and innovation capacities in the domestic production apparatus. In any case, the choice is not between "more or less integration into the GVCs," and the challenge

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12   UNCTADStat data for 2014.

continues to lie in avoiding those forms of international integration that drive exclusionary and impoverishing forms of growth.

7. Conclusions

In this study we have sought to analyze some aspects of the world economic geography starting from the mid-1990s, including its transformations, as well as certain implications for the development of the periphery. Through a historical approach in which we compared conditions in 1995 with those in 2011, we examined the main changes in the international integration of countries and production sectors. In so doing, we found that the secondary industries – especially the electronics, automotive, basic metal, and oil refining industries – are those that currently have the highest imported content on average, because their technical and production characteristics require more inputs from the primary and tertiary sectors. However, the fact that the primary and tertiary sectors have low imported content does not represent a failure to embrace the GVC model, since as we have seen, many countries specializing in such activities (especially in the primary sector) are highly active in the chains, albeit through downstream participation in the early links. In addition, we have found that the length of a chain is not synonymous with high imported content in exports. For instance, the aforementioned electronics, automotive, basic metal, and oil refining industries feature high import coefficients, yet the first three are "long" chains, while the latter industry is "short."

Moreover, the data shows that all of the countries analyzed increased their relative GVC participation. But despite this, the increases have been uneven in terms of magnitude, and in terms of whether the phenomenon is driven mostly by upstream or downstream participation. In the East Asian (except China) and Eastern European countries, exports have increasing levels of imported content and/or are increasingly used as inputs for the exports of other countries. The case of China is paradigmatic. Despite being the country whose relative GVC participation increased the least, by "just" 4.9%, in the mid-1990s it was predominantly an assembler of industrial products and, through the application of an aggressive export policy, it proportionally increased the domestic value added by more than it did the imported content in its exports (14-fold versus 13.2-fold, compared with the world average of 3.1-fold and 4.5-fold, respectively). In this regard, it is important to analyze the transformations that occurred in absolute GVC participation between 1995 and 2011, where there is evidence of the increasing prominence of peripheral countries.

Finally, we analyzed the relationship between greater GVC participation, growth, and development. Our standpoint departs from that of international agencies such as UNCTAD (2013), for whom "boarding the GVC train" – which implies deregulation of FDI, commercial liberalization, and labor flexibilization – increases the prospects of economic development among the peripheral countries. However, we have stressed that there is no single way of integrating into the GVCs, and nor is there a single path to development; both export-led and wage-led approaches can be equally valid given certain external and internal conditions. Moreover, export-led and wage-led need not be mutually exclusive if the internal demand succeeds in promoting external competitiveness. Now, beyond the central driver of demand (whether internal or external), there is one point that would appear undeniable: for growth in peripheral countries to lead to external solvency, there is a need to transform the production structure, which will not occur if the state opts to be a passive agent. Such structural change invariably requires the design and implementation of an aggressive industrial policy.

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