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Trade and production integration in South America:

A Role For Brazil?

EXECUTIVE SUMMARY

This paper addresses two related questions. The first is whether or not there is a process of regional production-sharing and creation of regional value chains (RVCs) taking place in South America that is similar to those in other regions. There is evidence that the answer would be negative: production-sharing in South America seems less prevalent than elsewhere and the region lacks a clear 'hub country' – such as Germany in the EU or the US in the North American Free Trade Agreement (NAFTA) – capable of leading this process. The second question is whether or not Brazil could become that hub country and lead the region towards productive integration. A number of obstacles are identified that may hinder Brazil's ability to perform this role. They range from the historically closed nature and vertical integration bias of its economy to the absence of adequate infrastructure, both physical (especially trade- and transport-related) and institutional (ranging from inefficient customs procedures and excessive bureaucracy to the lack of trade arrangements, and their shallowness).

Production-sharing in RVCs creates a demand for an integrated economic space so that cross-border production processes can function without friction. South America is still far from arriving at such a position; there are a number of obstacles that can – and do – cause frictions and interruptions. A precondition for leadership in such a process of integration would be that

Brazil effectively tackles these obstacles to its own efficient functioning. Among the necessary conditions for that task are, for example, developing more and better-quality transport and trade-related infrastructure; improving customs efficiency and reducing bureaucracy and red tape at border procedures; and deepening trade and economic integration arrangements in order to enhance regulatory coherence and harmonisation of trade- and production-related rules and standards, especially with Brazil's South American neighbours.

INTRODUCTION

Over the past few years there has been a proliferation of studies stressing the growing trend toward global and regional production-sharing and its contribution to enhancing regional competitiveness and developing productive capacities, especially in developing countries. This phenomenon, often referred to as 'international production fragmentation', increasingly is assuming a central role in the development of global production; especially of manufactures, in which the production of goods (and often services) increasingly overcomes national frontiers and is carried out through GVCs; that is, with the participation of a number of companies located in several countries, rather than one company in a single country.

An important conclusion of this literature is that the process of international production fragmentation is not spread evenly across the globe; on the contrary, there is a rather clear pattern of regional concentration in which the main production networks are centred in North America, Europe and East and South-East Asia, leaving many countries in Africa and South America, for example, in large part out of the process.[1] Similarly, Baldwin[2] points out that supply-chain trade is regionalised and geographically distributed in a hub-and-spoke pattern around the 'four manufacturing giants [Germany, US, China and Japan]', creating regional production blocs or 'regional factories'.

Because much of the world's production dynamism, especially in manufacturing industries, arises from those networks, staying out of this process may jeopardise the developmental prospects of regions that lie outside them. South America is an example: as the commodity boom of the past few years that benefited the region fades away, the challenge of developing productive capabilities becomes even more urgent.

Against this background this paper tries to identify the possibilities – and obstacles – that South American countries face in the task of developing an integration framework that could spur production-sharing and value-chain formation across the region. It focuses especially

1 Estevadeordal A, Blyde J & K Suominen. *Are global value chains really global? Policies to accelerate countries' access to international production networks.* Washington: ICTSD (International Centre for Trade and Sustainable Development) & IDB (Inter-American Development Bank), 2013.

2 Baldwin R, 'Global Governance of Supply-Chain Trade', CEPR (Centre for Economic Policy Research) Policy Insight, 64. London: CEPR, 2012.

on Brazil which, as the region's largest country endowed with a relatively developed and diversified productive structure, could be regarded as a possible regional hub.

The paper is divided into five sections. The second section discusses whether or not there is a process of production-sharing developing in South America. The third analyses the role of Brazil as a possible regional hub and the fourth presents some obstacles that might lie in the way of this process, with a special focus on inadequate infrastructure. The fifth and final section offers some concluding remarks.

PRODUCTION-SHARING IN SOUTH AMERICA

The first – and central – question underlying this study is whether or not it is possible to talk about a process of regional production-sharing in South America similar to those in, for example, East Asia, North America or Europe. Another way of putting this question is to ask whether or not there are RVCs established or in the course of formation that connect South American countries. Evidently the answer is less than straightforward, especially using aggregate or sectoral data. A number of articles try to circumvent this limitation by analysing very specific sectors using case studies;[3] the downside to this approach is that it misses the 'big picture' – that is, the degree to which these individual processes are present throughout the regional production environment.

Answering the question in a definitive way, therefore, goes beyond the scope of this short (or indeed any single) paper; instead, it is necessary to try to gather a number of pieces of information which, when analysed together, build a relatively clear picture that suggests that the answer to the question is mostly negative. Among South American countries regional production-sharing is rare, or at least less intense than in regions such as East and South-East Asia, North America or Europe.

The first indicator that can be used to proxy the existence of production-sharing is the relative intensity of production goods (ie, intermediate and capital goods). The rationale for this is straightforward: a region with intense production fragmentation should show intense trade among its partners in goods used in production such as semi-finished inputs or machinery, thus reflecting the shared nature of production processes.

Collating and analysing the data, however, are less straightforward. This is not only because identification of what constitutes intermediate or capital goods is not a simple process, given normal trade data classification protocols, but also because the information is not

3 See, for example, Hernández, R, Martinez-Piva M & N Mulder (eds), *Global Value Chains and World Trade: Prospects and Challenges for Latin America.* Santiago: ECLAC (Economic Commission for Latin America and the Caribbean), 2014.

shown in value-added terms, which tends to over-estimate the trade value of downstream goods.[4] Such information therefore should be taken with a grain of salt.

Tables 1–4 show the relative intensity of Brazil's intermediates and capital goods trade[5] with its South American partners, and compare it with examples in other regions (Chinese trade with a sample of Asian partners, US trade with NAFTA and German trade with a sample of European countries).

The patterns are not very clear, although it is noticeable that Brazilian trade in production goods with regional partners represents, on average, a significantly smaller share of total imports and exports than that observed in China's trade with its neighbours. The comparison with Europe and NAFTA is even less clear: the shares of US trade with Mexico and Canada are similar to those of Brazil with Argentina, the second largest country in the region, whereas on average the production goods shares observed in German trade with selected European countries are higher than in the Brazilian case but less strikingly so when compared with China.

Table 1: Brazil: Intermediates/capital trade with South America

Imports											
	Argentina	Bolivia	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela	Mercosur	Total
Intermediates (except fuel)	37.8%	2.4%	82.1%	53.5%	39.5%	74.7%	72.0%	61.2%	44.5%	41.7%	45.1%
Capital	17.0%	0.0%	0.4%	1.9%	3.7%	0.4%	0.1%	3.5%	0.2%	14.9%	9.4%
Other	45.2%	97.6%	17.5%	44.6%	56.7%	24.9%	27.9%	35.3%	55.3%	43.3%	45.5%

4 For a detailed exposition of these (and other) caveats, see, for example, Park A, Nayyar G & P Low, *Supply Chain Perspectives and Issues:* A Literature Review. Geneva & Hong Kong: WTO (World Trade Organization) & Fung Global Institute, 2013.

5 In order to identify the intermediate and capital goods, data from UN Commodity Trade Statistics (UN/Comtrade) was classified according to the Broad Economic Categories (BEC) Classification using the World Integrated Trade Solution (WITS) system developed by UNCTAD and the World Bank. Considered 'intermediate goods' were those classified under BEC codes 111 (Food and beverages, primary, mainly for industry), 121 (Food and beverages, processed, mainly for industry), 2 (Industrial supplies not elsewhere specified), 42 (Parts and accessories of capital goods), and 53 (Parts and accessories of transport equipment), and 'capital goods' were considered to be those under codes 41 (Capital goods, except transport equipment) and 521 (Other transport equipment, industrial).

Exports											
	Argentina	Bolivia	Chile	Colombia	Ecuador	Paraguay	Peru	Uruguay	Venezuela	Mercosur	Total
Intermediates (except fuel)	52.8%	52.7%	35.6%	64.9%	62.7%	55.4%	48%	38%	52%	52%	51%
Capital	16.7%	20.2%	17.7%	16.0%	22.2%	19.1%	32%	16%	17%	17%	18%
Other	30.5%	27.1%	46.7%	19.1%	15.2%	25.5%	20%	46%	31%	31%	31%

Source: UN/Comtrade data (for methodological details, see footnote 8)

Table 2: China: Intermediates/capital trade with Asia

Imports										
	Hong Kong	Indonesia	Japan	Korea, Rep. of	Malaysia	Philippines	Singapore	Thailand	Vietnam	Total
Intermediates (except fuel)	77.6%	59.7%	66.9%	72.0%	81.8%	71.4%	61.1%	68.1%	55.8%	69.5%
Capital	6.7%	3.0%	25.2%	19.7%	9.1%	24.4%	14.2%	22.9%	17.4%	19.2%
Other	15.7%	37.4%	7.9%	8.3%	9.1%	4.2%	24.7%	8.9%	26.8%	11.3%

Exports										
	Hong Kong	Indonesia	Japan	Korea, Rep. of	Malaysia	Philippines	Singapore	Thailand	Vietnam	Total
Intermediates (except fuel)	42.6%	49.0%	37.1%	57.6%	46.6%	51.8%	40.9%	55.0%	57.6%	45.1%
Capital	38.8%	27.0%	22.2%	25.1%	22.3%	15.7%	36.7%	26.8%	17.3%	30.4%
Other	18.6%	24.0%	40.7%	17.2%	31.1%	32.5%	22.4%	18.1%	25.1%	24.5%

Source: UN/Comtrade data

Table 3: US: Intermediates/capital trade with NAFTA

Imports				Exports			
	Canada	Mexico	Total		Canada	Mexico	Total
Intermediates (except fuel)	37.4%	34.2%	35.9%	Intermediates (except fuel)	49.1%	64.7%	55.6%
Capital	6.3%	25.9%	15.3%	Capital	19.0%	10.1%	15.3%
Other	56.3%	39.9%	48.8%	Other	31.9%	25.2%	29.1%

Source: UN/Comtrade data

Table 4. Germany: Intermediates/capital trade with Europe

Imports									
	Austria	Belgium	Czech Republic	France	Italy	Netherlands	Poland	UK	Total
Intermediates (except fuel)	68.3%	59.9%	60.3%	49.8%	56.0%	47.2%	59.2%	50.5%	54.7%
Capital	12.2%	5.2%	15.2%	26.3%	12.3%	8.3%	8.1%	10.5%	12.9%
Other	9.5%	34.9%	24.4%	23.9%	31.7%	44.4%	32.7%	39.0%	32.4%

Exports									
	Austria	Belgium	Czech Republic	France	Italy	Netherlands	Poland	UK	Total
Intermediates (except fuel)	46.4%	51.1%	63.1%	47.4%	50.9%	55.3%	59.7%	43.1%	50.7%
Capital	15.3%	12.8%	17.3%	26.9%	16.3%	13.5%	16.3%	17.1%	18.0%
Other	38.3%	36.1%	19.6%	25.7%	32.9%	31.2%	24.0%	39.8%	31.4%

Source: UN/Comtrade data

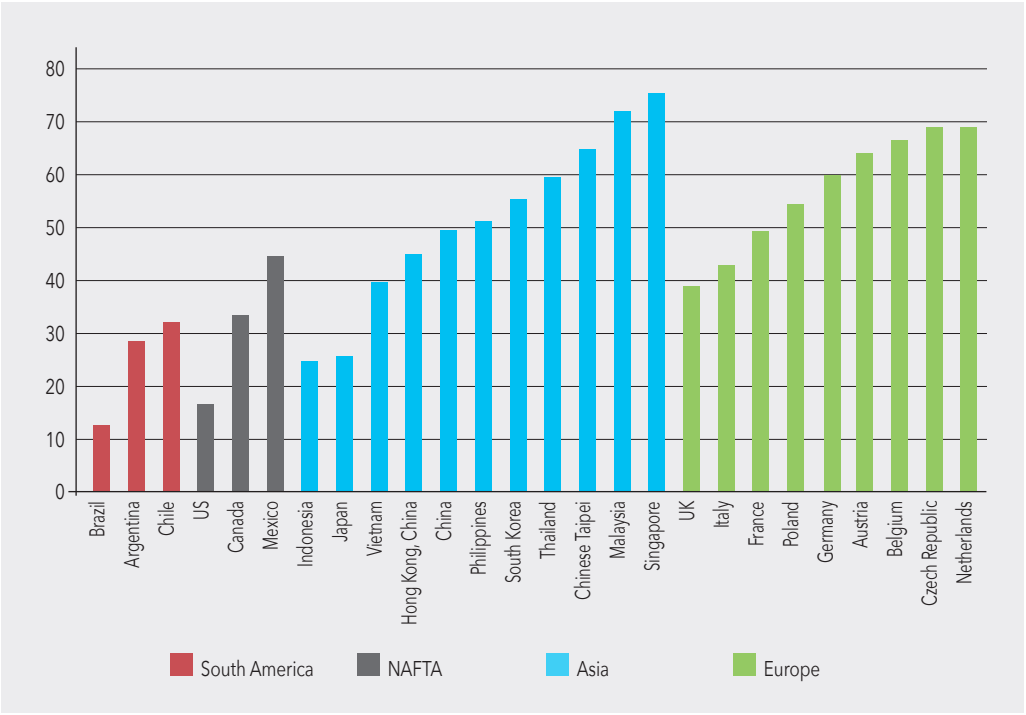
It should again be stressed that these figures are based on traditional trade statistics and therefore should be taken with caution. One way of avoiding at least some of the problems involved in the use of trade data for analysing production fragmentation is to use value-added data such as that provided by the Trade in Value Added (TiVA) project undertaken jointly by the Organisation for Economic Co-operation and Development (OECD) and the WTO.[6] This programme provides a number of indicators arrived at by considering the value

6 OECD (Organisation for Economic Co-operation & Development), 'Implications of global value chains for trade policy', in *Interconnected Economies: Benefiting from Global Value Chains,* Synthesis Report. Paris: OECD, 2013

added by each country in the production of goods and services consumed worldwide; they are therefore better suited for analysing production-sharing processes. As yet, however, the coverage of the database is limited both geographically (the only South American countries included are Brazil, Argentina and Chile) and in time (the latest available year is 2009), which limits the scope of the analysis.

The first TiVA indicator that can be used to assess the degree of participation of a given country in shared production processes is the share of re-exported intermediates in total intermediates imports. Among the sample of South American, NAFTA, Asian and European countries shown in Figure 1, Brazil has the smallest indicator, suggesting a very low degree of value chain trade. The other two South American countries exhibit higher indices than Brazil but fare much worse than most of the Asian and European countries analysed (and are also lower than NAFTA countries other than the US).

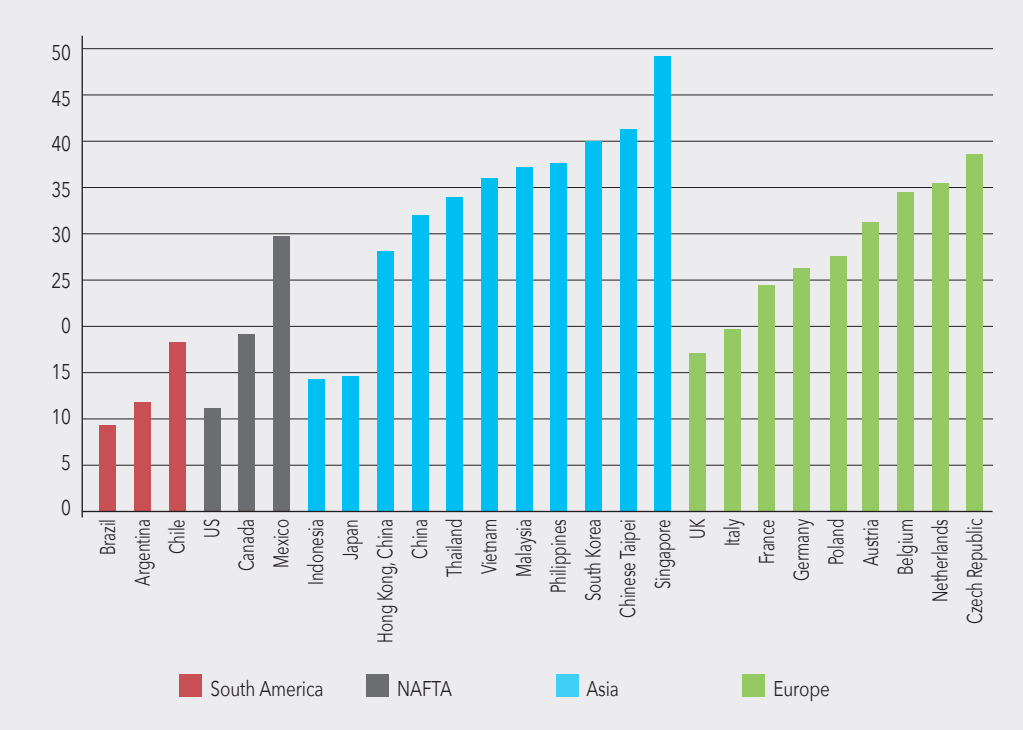
Figure 1: TiVA database: Re-exported intermediates (% of intermediate imports, 2009)



Source: OECD/WTO, TiVA database, http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C1

Another TiVA indicator that leads to similar conclusions – reaffirming the impression that production fragmentation is less intense in South America than in the other regions analysed – is the share of foreign value-added embedded in each country's gross exports. Again, Brazil shows the lowest indicator and Argentina and Chile are below most of the other countries (see Figure 2).

Figure 2: TiVA database: Foreign value-added shares of gross exports (%, 2009)



Source: OECD/WTO, TiVA database, http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C1

For the purpose of this study, however, these two indicators have one important downside: they are not bilateral in nature and provide information for a standalone country. Fortunately the TiVA database contains an essential indicator that does provide bilateral information, allowing better assessment of the regional aspect of production- sharing: that is, the foreign value-added shares of each country's exports, broken down by origin. This information permits a clearer evaluation of the intensity of regional production-sharing but also enables us to identify those countries that function as hubs, taking the central role in RVCs.[7]

As Table 5[8] shows, North America, Europe and East and South-East Asia each have at least one country that provides a substantial amount of the value-added in the exports of the regional partners. The US is clearly a hub for the other NAFTA countries, contributing 9% and 13% of the value of Canadian and Mexican exports respectively. The same goes for Germany in Europe; its contribution to the value-added of its neighbours' exports ranges from 2% to 9%. The Asian case is peculiar, with Japan and China seemingly sharing the role of hub country.

7 This point is stressed in Baldwin R, *op. cit.*

8 The tables are colour-coded to facilitate understanding: cells with values between 1% and 3% are marked in light blue; values between 3% and 5% are medium blue; values that exceed 5% are darker blue.

In South America, however, there is no clear hub country: the contribution of each country to the value of its neighbour's exports is meagre at most. This is true even for the relationship between Brazil (the largest country in the region) and Argentina (the second largest), which not only share similar productive structures and a common frontier but are also major partners in the region's most important trade arrangement, the Southern Common Market (Mercado Común del Sur, or Mercosur). Even if the US is included as a possible 'extra-regional hub' the figures are not much higher (1.7%, 2.1% and 3.7% for Argentina, Brazil and Chile respectively).

Table 5: Foreign value-added shares of exports (by origin)

	Value added origin		
	Canada	**Mexico**	**US**
Canada	0.0%	0.5%	9.2%
Mexico	0.9%	0.0%	13.0%
US	1.5%	0.8%	0.0%

	Value added origin								
	Austria	**Belgium**	**Czech Republic**	**France**	**Germany**	**Italy**	**Netherlands**	**Poland**	**UK**
Austria	0.0%	0.6%	0.8%	1.3%	9.0%	2.2%	0.7%	0.5%	1.1%
Belgium	0.4%	0.0%	0.3%	3.7%	4.4%	1.3%	3.8%	0.3%	2.3%
Czech Republic	1.0%	0.7%	0.0%	1.7%	8.4%	1/8%	1.1%	2.1%	1.3%
France	0.3%	1.1%	0.2%	0.0%	3.8%	1.8%	0.8%	0.3%	1.1%
Germany	1.1%	0.8%	0.7%	1.9%	0.0%	1.7%	1.3%	0.8%	1.8%
Italy	0.5%	0.5%	0.2%	1.5%	2.8%	0.0%	0.6%	0.3%	0.7%
Netherlands	0.3%	1.7%	0.2%	1.6%	4.6%	0.9%	0.0%	0.3%	3.3%
Polands	0.5%	0.5%	0.8%	1.4%	5.2%	2.0%	0.8%	0.0%	1.0%
UK	0.1%	0.4%	0.1%	1.0%	2.1%	0.7%	0.7%	0.2%	0.0%

	Value added origin										
	Japan	**South Korea**	**China**	**Chinese Taipei**	**Hong Kong, China**	**Indonesia**	**Malaysia**	**Philippines**	**Singapore**	**Thailand**	**Vietnam**
Japan	0.0%	0.6%	1.7%	0.5%	0.1%	0.6%	0.3%	0.1%	0.2%	0.3%	0.1%
South Korea	5.1%	0.0%	4.8%	1.1%	0.3%	1.1%	0.9%	0.3%	0.8%	0.4%	0.2%
China	4.4%	2.9%	0.0%	2.2%	0.5%	0.5%	1.1%	0.4%	0.6%	0.7%	0.1%
Chinese Taipei	6.7%	2.5%	5.4%	0.0%	0.4%	1.3%	1.2%	0.4%	0.9%	0.5%	0.1%
Hong Kong, China	2.1%	0.9%	5.7%	0.9%	0.0%	0.4%	0.6%	0.2%	1.1%	0.4%	0.1%
Indonesia	1.4%	0.6%	1.4%	0.3%	0.2%	0.0%	0.6%	0.1%	0.9%	0.4%	0.1%
Malaysia	4.2%	1.7%	3.3%	1.3%	0.2%	1.0%	0.0%	0.3%	1.9%	1.1%	0.3%
Philippines	4.6%	3.0%	4.4%	2.8%	1.0%	0.6%	1.7%	0.0%	2.3%	1.1%	0.4%
Singapore	3.9%	1.8%	3.0%	1.5%	0.5%	1.2%	2.2%	0.5%	0.0%	0.8%	0.3%
Thailand	5.3%	1.5%	3.5%	1.3%	0.4%	0.7%	1.9%	0.4%	1.0%	0.0%	0.3%
Vietnam	3.9%	2.9%	5.8%	2.2%	0.5%	0.9%	1.0%	0.2%	1.1%	1.4%	0.0%

	Value added origin		
	Chile	**Argentina**	**Brazil**
Chile	0.0%	2.0%	0.9%
Argentina	0.2%	0.0%	2.7%
Brazil	0.2%	0.4%	0.0%

Source: OECD/WTO, TiVA database, http://stats.oecd.org/Index.aspx?DataSetCode=TIVA2015_C1

Given these disparate pieces of information, the picture that emerges is relatively clear. Compared with countries in Asia, Europe and NAFTA, South American countries seem to have (i) a smaller share of trade in intermediates and capital goods; (ii) a smaller share of re-exports of imported intermediates; (iii) a smaller share of foreign value-added in their exports; and (iv) no clear hub for RVCs. All these conclusions suggest that production-sharing in South America is at the very least much less than in the other regions analysed.

DEVELOPING RVCs: BRAZIL AS A SOUTH AMERICAN HUB COUNTRY

As noted in the previous section, South America seems to lag in the development of RVCs. One key aspect of this poor performance is the absence of a hub country capable of organising the process of regional production-sharing on the subcontinent. As the largest country in the region, endowed with the most sizeable and most diversified manufacturing sector among its partner and neighbouring countries, it could be argued that Brazil stands as a natural candidate for the role. Such a prospect, however, faces a number of obstacles that cloud the likelihood of its realisation.

The first and most obvious challenge standing in the way of a nascent regional industry led by Brazil lies in the fact that the latter's history shows a tendency towards a closed, inward-looking economy with relatively weak ties to the global and regional economy and in which the centripetal force generated by its large internal market is in many ways reinforced by a series of institutional and bureaucratic obstacles to internationalisation. These range from clear protectionist measures, such as tariffs and non-tariff barriers, to other transaction costs that (intentionally or not) hinder external competitiveness.

One possible historical cause for the closed nature of its economy stems from Brazil's industrialisation in the 20th century, which was based on import substitution and in which the development of fully vertically integrated industrial sectors was an explicit goal.[9] Despite initiatives towards greater openness that came about in the late 1980s and especially in the 1990s, there is still a strong bias towards industry protection and vertical integration; manifested, for example, in a growing number of local content requirements in industries considered 'strategic'[10] and in anti-dumping measures and other trade remedies.[11] One striking example of this vertical integration bias is the identification among the main guidelines of the federal government's latest industrial policy initiatives such as the Productive Development Plan and the Brasil Maior Plan, of the need to enhance national production chains, reduce import penetration and increase local value addition.[12]

A further example of the consequences of the closed nature of the Brazilian economy for the possibility of regional integration is the recent performance of Mercosur which, despite the 2012 addition of Venezuela as a full member, struggles with internal conflicts and seems unable to deepen integration or even completely to fulfil its role as a customs union.[13]

9 For a brief analysis of the Brazilian industrialisation process, see for example 'Origens e consequencias da substituição de importações: 40 anos depois', in Bacha E & M Bolle, *O futuro da indústria no Brasil: desindustrialização em debate.* Rio de Janeiro: Civilização Brasileira, 2013.

10 Araujo Júnior J, 'Fragmentação da produção e competitividade internacional: o caso brasileiro'. Breves Cindes 73, 2013.

11 Szpak C& D Tussie,'Policies and instruments employed by Argentina and Brazil', in Evenett S (ed.), Not just victims: *Latin America and Crisis-Era Protection – the 13th GTA report.* London: CEPR, 2013.

12 See, for example, http://www.desenvolvimento.gov.br/pdp/index.php/sitio/conteudo/setor/145 and <http://www.brasilmaior.mdic.gov.br/conteudo/153.

13 Rios S & L Maduro, Mercosul: é hora de rever o modelo?, Breves Cindes, 86, 2014.

In fact, it increasingly functions de facto as an extended space of protection for Brazilian companies, which enjoy the benefits of the relatively high common internal tariff (although recently China has posed a serious threat to this equilibrium).

Another, arguably related, example is the relative freeze in bilateral trade negotiations as Brazil apparently focuses on the multilateral level. Although the number of trade agreements in the world has boomed in the past two decades, Mercosur has signed deals only with other countries within the region or with smaller counterparties such as Egypt or Israel. Negotiations for an agreement with the EU started in 1999 but are still incomplete. More importantly, both the Mercosur agreement and other trade deals in which Brazil participates are 'shallow'; that is, they consider only trade in goods and do not extend to areas such as services, investment or regulatory coherence that are generally considered crucial for the development of RVCs and production-sharing.[14] Brazil has absented itself from the two 'mega-regional' arrangements at present under negotiation – the Trans-Atlantic Trade and Investment Partnership (TTIP) and the Trans-Pacific Partnership (TPP) – although this is primarily for geographical reasons.

INFRASTRUCTURE: OBSTACLE TO INTEGRATION

One crucial obstacle to the possibility of developing RVCs with Brazil as a hub is the current status of its infrastructure, particularly transport and trade-related elements. The difficulties facing Brazil in this area are well documented. Investments in infrastructure have been diminishing since the severe domestic fiscal and external debt crises that the country suffered in the 1980s; even with some recovery in the 2000s, levels are still low.[15] Recent estimates indicate that Brazil's investment in infrastructure in 2013 was 2.45% of its gross domestic product (GDP), whereas for Chile and Colombia, the regional leaders in this sector, the figures are 6–7% of GDP; in countries such as China and Vietnam they may reach 10%.[16] More importantly, Brazil's estimated spend is below the minimum investment necessary to cover depreciation of the country's existing capital stock, estimated at 3% of GDP.[17]

One defining aspect of the Brazilian transport infrastructure is its reliance on land-based transportation modes (especially road transport) in both regional trade (53% of trade with Mercosur partners is by road freight) and internal freight transport, of which 52% is by road.

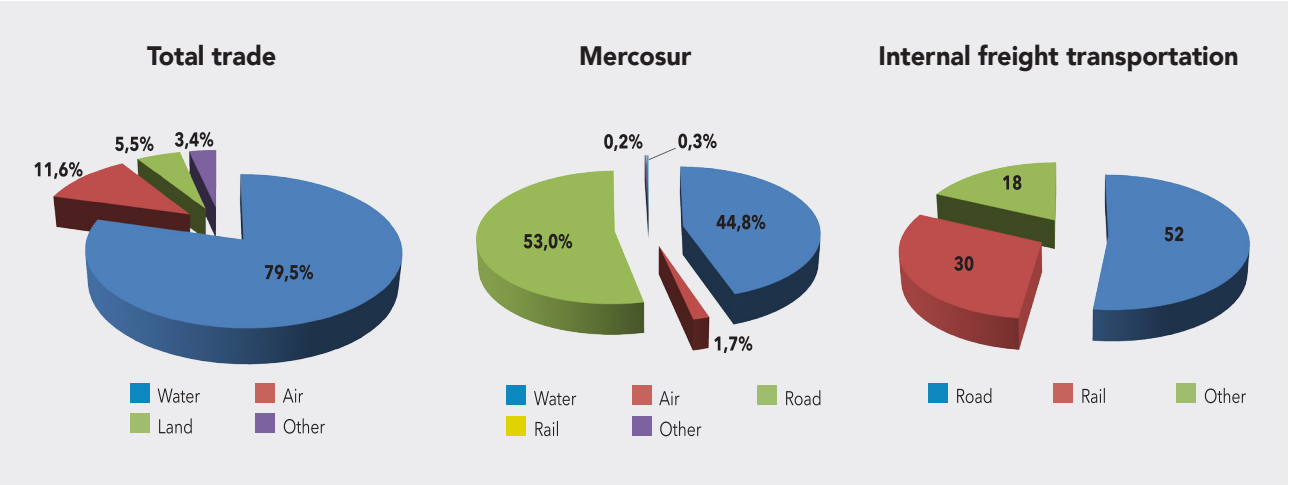
14 On the importance of these subjects for value chain trade, see, for example, OECD, *op. cit.,* or Baldwin R, *op. cit.*

15 Moreira M *et al., Too Far to Export: Domestic Transport Costs and Regional Export Disparities in Latin America and the Caribbean.* Washington, DC: Inter-American Development Bank, 2013.

16 Silva B, 'The challenges of infrastructure investment in Brazil: the issue of funding', *Revista Paradigma,* XVIII, 22, pp. 141–162.

17 Frischtak C & K Davies, 'O investimento privado em infraestrutura e seu financiamento', in Frischtak C & A Pinheiro (eds), *Gargalos e soluçõesnainfraestrutura de transportes.* São Paulo: FGV (Fundação Getúlio Vargas), 2014.

Figure 3: Brazil: Transportation modes in foreign trade and domestic freight



Source: Left and centre: SECEX/MDIC (Foreign Trade Secretariat of the Ministry of Development, Industry and Foreign Trade). Right: SPNT/MT (National Transportation Policy Secretariat of the Ministry of Transportation).

Even so, as the low investment figures would lead one to expect that the quality of existing roads is poor; a 2012 study by the National Confederation of Transport (CNT) concluded that 46% of paved roads have 'pavements in insufficient conditions' [sic].[18] The extent of the road network is also inadequate. In 2011 road density was only 20km/100km2, less than half that of the US (46km/100km^2).[19]

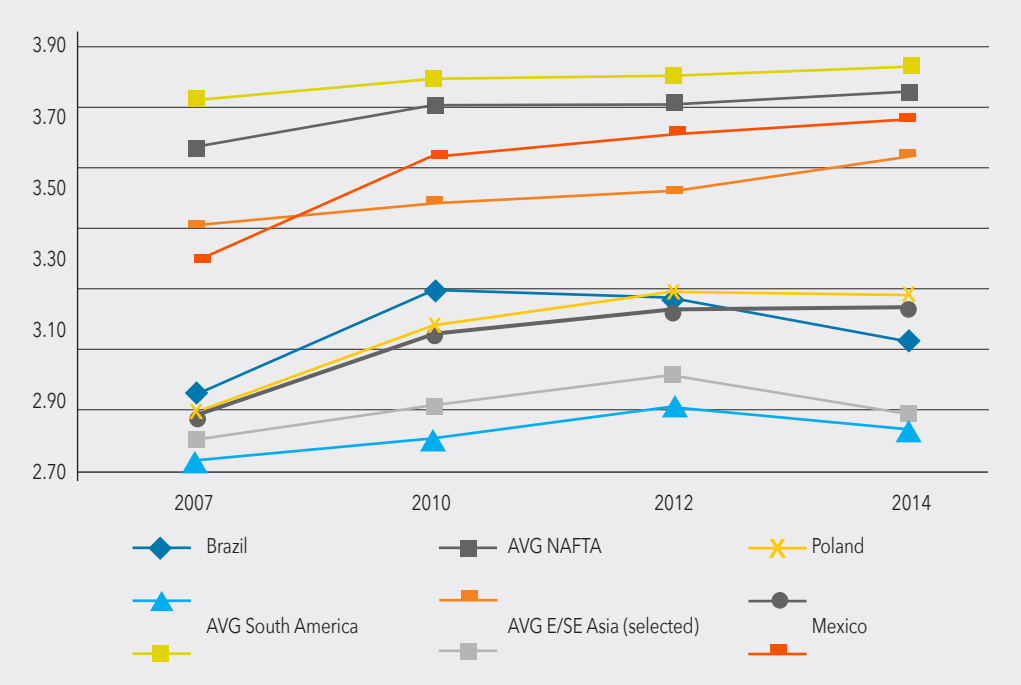
The lack of adequate transport infrastructure is not restricted to roads. Another survey conducted by the CNT among soy and corn exporters (responsible for about 43% of the country's exports) concluded that 83.3% of them consider the lack of railway coverage and the poor quality of existing railroads 'serious' or 'very serious' obstacles to their business and a remarkable 100% of the respondents have the same opinion about the low productivity of port terminals and the lack of adequate equipment for port operation.[20]

The low coverage and poor quality of existing infrastructure on the one hand and insufficient investment to improve infrastructure on the other, have obvious ramifications for the country's external competitiveness and are a serious hindrance to its ability effectively to contribute to the development of production-sharing and RVCs in South America. As Figure 4 shows, the quality of Brazilian trade- and transport-related infrastructure (a component of the World

18 CNT (Confederação Nacional do Transporte), 'Pesquisa de Rodovias', 2012, http://pesquisarodovias.cnt.org.br/Paginas/Inicio.aspx.
19 Moreira M *et al., op cit.*
20 CNT, 'Transporte & Desenvolvimento: Entraves Logísticos ao Escoamento de Soja e Milho', 2015, http://www.cnt.org.br/Imagens%20CNT/PDFs%20CNT/Pesquisa%202015/entravesaatualisado.pdf.

Bank's Logistics Performance Index) is not only far below the standards in other regions used as benchmarks but has been in decline since 2010. Moreover, this poor situation is not limited to Brazil: average indices for Mercosur and South America are even worse and also fell in 2014, the latest year for which figures are available.

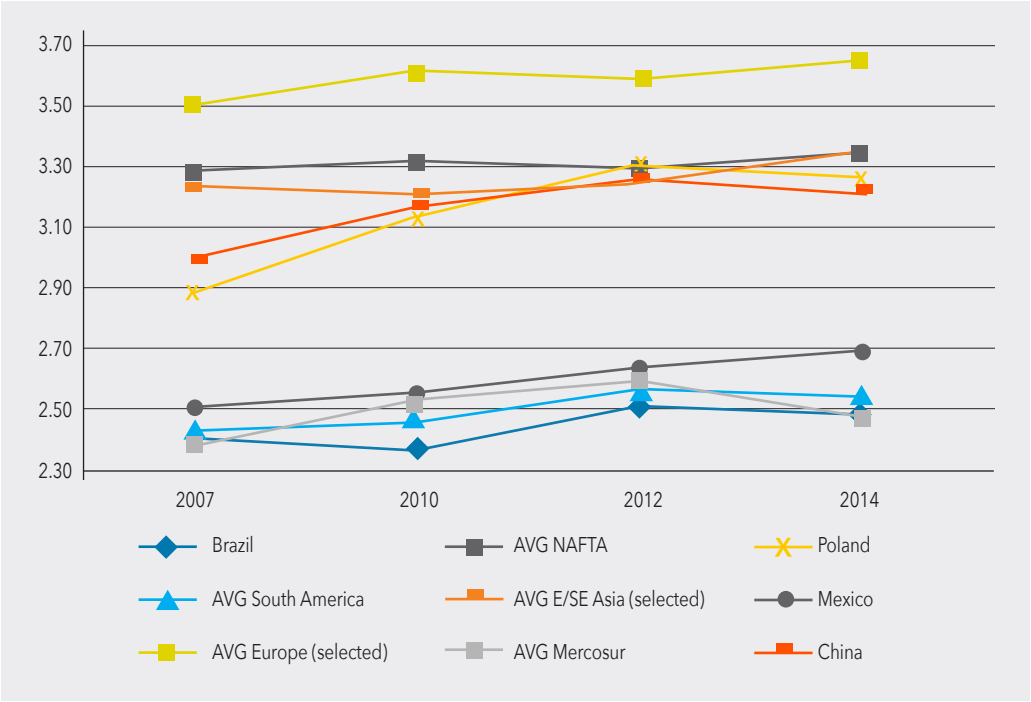
Figure 4: Logistics Performance Index: Quality of trade & transport-related infrastructure (1 = low to 5 = high)



Source: World Bank, Logistics Performance Index, http://lpi.worldbank.org/

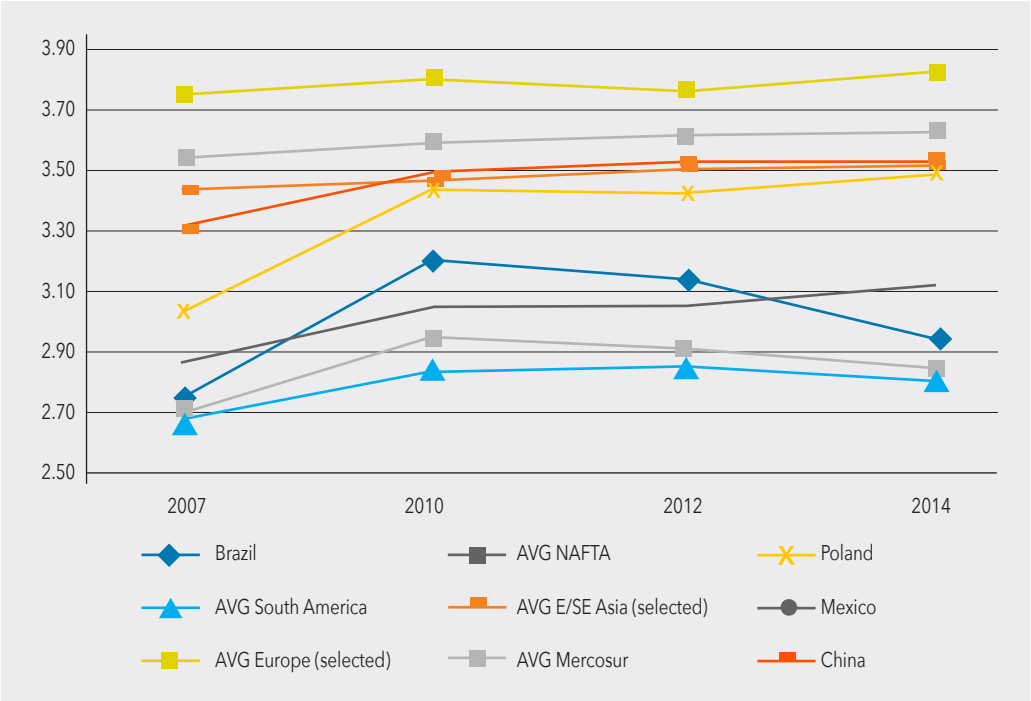
As other components of the Logistics Performance Index show, the obstacles to international trade in these countries go beyond physical infrastructure per se. One example is customs efficiency: Figure 5 indicates that Brazil, Mercosur – and South America as a whole – fare poorly in this respect. As Figure 6 shows, the overall result clearly is much the same, a situation that has serious consequences for regional integration. The example of Mexico is noteworthy: with index levels similar to those of the South American countries at the beginning of the series, that country's performance has been steadily improving and constitutes a mode for its southern neighbours, albeit one that is unheeded.

Figure 5: Logistics Performance Index: Customs efficiency



Source: World Bank, Logistics Performance Index, http://lpi.worldbank.org/

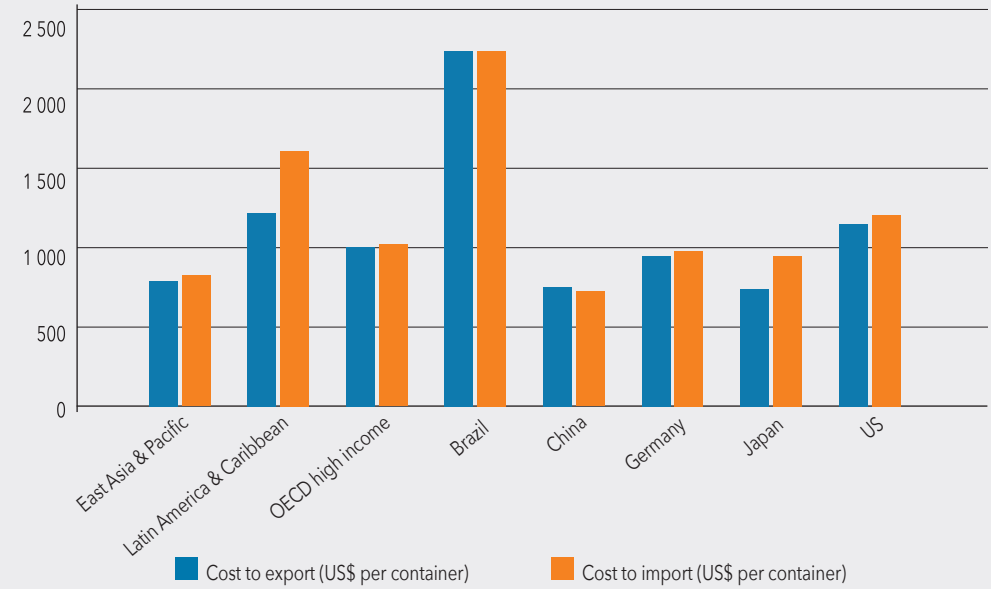
Figure 6: Logistics Performance Index: Overall



Source: World Bank, Logistics Performance Index, http://lpi.worldbank.org/

One striking example of the consequences of this situation for the region's trade and integration capabilities can be seen in trade costs. Figure 7 shows the estimated costs to import and export, as calculated by the World Bank's Ease of Doing Business Report. Brazilian costs are much higher than those of the other countries and regions used as benchmark. Data for South America as a single region is not available but the results for Latin America and Caribbean (of which South America is a large subset) suggest that the situation is not good.

Figure 7: Doing business, cost to import & export



Source: World Bank, Ease of Doing Business Report, http://www.doingbusiness.org/

Given this framework and its consequences, the prospects for improvement are not encouraging, at least in the short term and in Brazil, which has somehow to manage to hive off infrastructure investment amid a complicated economic environment in which the government is struggling to implement a series of fiscal adjustment measures. At the same time major infrastructure companies are involved in corruption scandals that may threaten their operations in the foreseeable future.[21] The situation is even worse in neighbouring states such as Argentina and Venezuela, both of which are undergoing serious fiscal and political hardship.

21 See, for example, BBC News, 'Petrobas scandal: Top construction bosses arrested in Brazil', 19 June 2015, http://www.bbc.com/news/world-latin-america-33203790.

In this context the Initiative for the Integration of the Regional Infrastructure of South America demands attention. Launched in 2000 with the objective of helping bridge the infrastructure gap in the region, which was regarded as a serious threat to internal and external trade, it was absorbed 11 years later into the South American Council for Infrastructure and Planning, itself subordinate to the Quito-based Union of South American Nations (Unión de Naciones Suramericanas, or Unasur). Some analysts suggest that the essentially political nature of Unasur may hinder (or has been hindering) its potential as an effective technical support body through a loss of focus on infrastructure development.[22]

CONCLUSION

This article has looked at two related questions. The first is whether or not there is a process of regional production-sharing taking place in South America similar to those in East Asia, North America or Europe, along with the establishment of RVCs connecting South American countries and the construction of a system of regional fragmented production. Although no unqualified answer to this question can be arrived at there is evidence that any response would be negative: the data analysed here suggest that production-sharing in South America, although it may exist in particular sectors (as some case studies show), is not as widespread as in the other regions considered, where the growth of RVCs connecting many companies in several countries is much more dynamic. Furthermore, South America differs from those other regions in that there seems to be no clear hub country capable of leading this process, such as there is in Europe or the NAFTA region.

The second, related question that underlies this study is whether or not Brazil, the largest economy and the most powerful nation in South America, can become the hub country that leads the region towards productive integration. The answer to this may be even more challenging. A number of obstacles can be identified that may hamper Brazil's ability to perform this role, ranging from the historically closed nature and vertical integration bias of its economy to the inadequacy of its physical and institutional infrastructure.

The improvement of this infrastructure is a necessary, though not sufficient, condition for the development of competitive RVCs in South America. In a framework of internationally fragmented production, trade becomes an essential and intrinsic part of the production process; moreover, the nature of trade itself is changing: as Baldwin[23] stresses, the global trading system is becoming more than merely 'selling things', as 'business has come to

22 Costa C & M Gonzales, 'Infraestruturafísica e integração regional na América do Sul: uma avaliação da iniciativa para a integração da infraestrutura regional da América do Sul', Institute of Applied Economic Research Discussion Paper, 2060, 2015.

23 Baldwin R, 'Global manufacturing value chains and trade rules' in *The Shifting Geography of Global Value Chains: Implications for Developing Countries and Trade Policy.* Geneva: World Economic Forum, 2012.

rely on the trading system when making things'. This '[21st] century trade', which involves continuous flows not only of goods but also of services, capital, information, knowledge and even people, has become fundamental for global production in an internationally fragmented framework. Hindering trade flows therefore means harming production itself – and consequently reducing competitiveness and the prospects for successful integration.

Against this background, as Baldwin points out, the scope of policies and barriers that may limit these flows is so broad as to include a range of subjects that are not traditionally considered 'trade issues' because usually they are not obstacles to 'selling things' internationally. More than merely reducing tariffs and raising non-tariff barriers, fragmented production demands harmonisation and congruence in a broad set of compatible rules, standards and policies on areas as diverse as capital restrictions, short-term visas, anti-competitive practices and environmental requirements; not to mention the crucial subject of assuring and protecting proprietary rights over information flows between all the agents and firms involved in the process. In sum, production-sharing in RVCs tends to create demand for an integrated economic space so that cross-border production processes can function unhindered, without friction or interruption. At present South America is still far from such a situation with a number of obstacles in place that could (and do) cause those frictions and interruptions. The examples dealt with in this paper – such as physical and institutional infrastructure – are only some among many.

If it is to prove capable of leading a process of integration, therefore, one essential condition would be for Brazil effectively to tackle these obstacles. Developing more and better-quality transport and trade-related infrastructure; improving customs efficiency and reducing bureaucracy and red tape at border procedures; and deepening trade and economic integration arrangements, especially with its South American neighbours; these together form some of the non-traditional issues involved in moving towards regulatory coherence and harmonisation of trade- and production-related rules and standards. They are necessary conditions for developing successful cross-border value chains in South America.

Clearly, political will and effective participation (and interest) from the private sector are also essential. A communications initiative stressing the potential benefits of the process would be a way to start turning heads in the right direction, although increasing productivity and innovation capacities would be essential for actually reaping the benefits of value-chain integration.

[The opinions expressed in this paper are the authors' own and do not necessarily express the views of their organisations]