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# REGIONAL PRODUCTIVE COMPLEMENTARITY AND COMPETITIVENESS

Renato Baumann, Francis Ng\*

## Abstract

A positive international environment favours growth of the several economies in a given region, but does not assure that the differences in the economic potential of the several countries are reduced in this process. Alternatively, the presence of productive complementarities might foster competitiveness and contribute to increase the degree of homogeneity even in situations of adverse terms of trade. This paper reviews the experience of six sub regional groups in Asia and in Latin America in the last two decades. Latin America has recently benefitted from significant improvement in terms of trade and yet the economies in that region remain as different in their relative economic potential as they were in the beginning of the 1990s. In Asia, differently, the negative impact of terms of trade has not blocked a quite fast pace of GDP growth; furthermore, productive complementarity has led to an increasing convergence of the several economies, with sharp increase in their share of the international market. There are clear lessons from the Asian experience.

JEL classification: F10, F13, F15, F43

Keywords: Regional integration, international trade, productive complementarity, export competitiveness, trade and GDP growth in Asia and Latin America

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\* Renato Baumann is an economic/ technical staff of IPEA and professor at Universidade de Brasília; Francis Ng is an economist of Development Research Group-Trade at the World Bank. We thank Ian Gilson from the World Bank for useful comments on an earlier version. However, neither him nor the institutions mentioned are responsible for the opinions or mistakes herein. Email correspondence to: Renato Baumann at [renatobauma@gmail.com](mailto:renatobauma@gmail.com) and Francis Ng at [fng@worldbank.org](mailto:fng@worldbank.org).

## I. Introduction

The literature on regional trade stresses a few channels through which trade preferences might affect GDP growth of the participating economies. Apart from the Vinerian concept of trade creation, which can be associated to gains from scale<sup>1</sup>, it also considers dynamic gains stemming from adjustments on the terms of trade and the exchange rate<sup>2</sup>, the gains from joint negotiations with third parts<sup>3</sup> and the expansion of intra-industrial trade leading to lower adjustment costs<sup>4</sup>.

Less attention has been devoted to productive complementarities on a regional scale as a means to acquire competitiveness. This is the central issue of this paper. A positive international environment (as reflected in terms of trade gains) favours growth of the several economies in a given region, but does not assure that the differences among the economic potential of the several countries are reduced in this process.

Alternatively, the presence of productive complementarities might foster competitiveness and contribute to increase the degree of homogeneity among the economies of a region even in situations of adverse terms of trade. This is an important dimension to the extent that higher homogeneity improves the alignment of business cycles and contributes to amplify the operation of transmission mechanisms such as factor mobility and the consolidation of productive chains.

Productive processes in an increasing number of industries have in recent years been characterized by the fragmentation of production, with different stages taking place in several countries, mostly in accordance to the difference in costs. The division of production in isolated units is not a new issue. Multiple productions within a given productive unit or even the combination of processes to get a varied set of finished goods belong to the very logic of productive processes. It is, however, the intensity of the division of processes comprising different parts of the world that is a new phenomenon.

In parallel to this fragmentation since the mid-1980s the world has witnessed an unprecedented pace of negotiations of preferential trade agreements, both on bilateral terms and on a regional basis.

Productive fragmentation corresponds to the difference in costs hence allows for a more efficient allocation of resources. Trade preferences might contribute further to reducing costs in the use of goods produced in the participating countries, as they have by definition comparatively better access conditions to the regional market.

The combination of these two elements (the partition of productive processes among various countries coupled to preferential trade conditions) can provide quite dynamic conditions to compete in the international market. Furthermore, productive

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<sup>1</sup> See, for instance, J.Viner (1950), M. Corden (1972) and H. Johnson (1965).

<sup>2</sup> B. Balassa (1964).

<sup>3</sup> R. Ffrench-Davis (1979).

<sup>4</sup> R. Devlin, P. Giordano (2004).

complementarities thus defined lead to a reinforcing process whereby one growing economy provides demand stimuli to other economies in a given region, generating one kind of 'regional multiplier' whereby an exogenous increase in demand for the production in one country might provoke 'derived demand' for the goods produced elsewhere in the same region.

Alternatively, when a process of trade preferences takes place in a different scenario, with low productive complementarities, the objective becomes essentially the reduction of formal barriers to trade, but there is little margin for such multiplier effect. Instead, when most of the regional trade flows are finished goods an increase in the exports by one of the countries implies a higher share in the domestic market for these goods in other participating countries; as a consequence, this raises the pressure for the adoption of trade barriers. Instead of a virtuous cycle it is more likely to obtain sudden stops.

This reasoning is directly linked to the peculiar characteristics of producer goods. The demand for these products is a derived demand, hence it is closely linked to the overall activity of the economy and - even more important - these products play an important role in the diffusion of technical progress. Technological changes are embedded in the characteristics of the productive process, so the more intense the involvement of a given economy with the production and commercialization of these products the higher the chances that it will benefit from the opportunities of access to updated technological information.

Castaldi and Dosi (2008) have shown that the rates of growth of GDP are closely correlated with domestic innovative activities, the rates of investment in capital equipment and international technological diffusion. Relating these issues to trade Goh and Olivier (2002) suggest that a country with comparative advantage in a consumption good, but which gains access to capital goods, is able to accumulate more capital compared to autarky, because this access raises output per worker and thus learning by doing.

There is additionally a component of technological transfer involved that fosters growth even further. Goh (2005) indicates that suppliers in developing countries are not passive recipients of technology: long-term buyer-seller relationships are built as the supplier makes technological efforts to complement the knowledge received from the buyer.

There are, hence, sound reasons for focusing the attention of the analysis on the trade on producer goods. On a regional level the derived demand for these products is more likely to originate in the bigger economies in the area. Every process of regional integration has an axis departing from the bigger economies where exchanges are more intense. Hence in each region it is possible to identify 'leading' economies with a potential to spread demand stimuli into the other partners.

This paper is focused therefore on the regional trade of these products that are not destined to final consumption. The more intense these trade flows, the more significant the degree of productive complementarities. And because production

fragmentation corresponds to lower costs, the more intense these flows the higher the probability of gains in competitiveness.

The analysis here focuses on six subregional groupings of countries in Asia and Latin America. We provide empirical evidence of a close relationship, within those country groups where productive complementarity has taken place more intensely, of a higher degree of convergence of the rates of growth of GDP of the various countries that form each group.

This kind of regional approach takes for granted that the benefits from an alternative, non-discriminatory multilateral opening that could provide access to better and cheaper inputs than the ones supplied by block members can be surpassed by the dynamic gains over time stemming from trans-frontier productive complementarity.

It is beyond the purposes of the present work to compare alternative trade or growth strategies, as well as to infer their actual net impact on global welfare. Neither do we aim at isolating the actual contribution of preferential trade agreements and of productive complementarity schedules. We only set ourselves to compare groups of countries that have opted for preferential trade agreements on a regional basis and have achieved quite different results, stemming from the joint influence of both productive chains and preferential trade.

The paper has six sections. The next one presents some arguments in favour of increasing the degree of homogeneity in GDP growth on a regional basis. The third section shows the basic methodological approach adopted in this work, essentially centred on trade and GDP growth data for some sub regions in Asia and Latin America. The fourth section compares the basic characteristics of the regional and external trade of these sub regions and the fifth section brings some evidence with regard to GDP growth rates and the degree of homogeneity of the growth process in each case. The last section summarizes the basic conclusions.

## **II. The Rational for Homogeneity of Regional Growth**

The theoretical literature on differentiated trade preferences is not very helpful for the discussion of its effects on growth, given the focus on the welfare effects of such preferences. This has led several authors to try and identify the actual contribution of preferential agreements to growth via 'ad hoc' procedures.

The basic question is whether one can expect more dynamism stemming from closer regional links or whether more intense multilateral relations (opening up the economy on a multilateral basis) is what affects growth more intensely. A brief survey of a number of empirical works on the links between regionalism and output growth provides a rather mixed outcome.

Some analyses<sup>5</sup> find that convergence takes place faster within regions as compared with the world economy, so the gap between less open and more open economies tends to close faster within given regions rather than across the global economy.

Theory (and common sense) indicates that the chances for trade creation are bigger the larger the joint market of participating economies. Hence the chances for regional trade to foster output growth will be more significant for larger markets than for a joint set of small economies<sup>6</sup>. In this sense the findings by Alcalá and Ciccone (2003)<sup>7</sup> for European countries, that trade and domestic market size are robust determinants of growth reinforces the hypothesis of 'growth-led exports', instead of an 'export-led growth'. As a corollary, the larger the regional market the higher the probability that it will positively influence the rate of output growth.

Other studies, relying on the Grange-causality type of approach<sup>8</sup> find that intra-regional trade has a lesser impact on growth of output per capita than extra-regional growth. This is reinforced by an alternative type of approach that estimates growth performance for different sets of countries, classifying some as 'open economies', as different from others, who have signed trade preference agreements. For instance, Vamvakidis (1999)<sup>9</sup> finds that economies grew faster after broad liberalization and slower after participation in an RTA. One problem with this approach is that it departs from the simplistic view that assumes that a) every regional agreement is equal to any other and b) simply adhering to an agreement should be a sufficient condition to foster growth.

Little guidance from theory increases the difficulty in designing empirical experiments as well as in interpreting their results. Not only do regional agreements differ but the set of countries that participate in each agreement also helps to determine the outcome in terms of output performance.

Regional agreements should in principle stimulate growth and investment, facilitate technology transfer, shift comparative advantage towards high value-added activities, provide credibility to reform programs and induce political stability, although at the risk of at the same time divert trade in inefficient direction and negatively affect the multilateral trade system. Depending on the set of countries involved it might turn out that all these effects take place at the same time. Furthermore, a higher degree of homogeneity improves the alignment of business cycles and contributes to amplify the operation of transmission mechanisms such as factor mobility and the consolidation of productive chains.

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<sup>5</sup> G.Chortareas, T.Pelagidis (2004). Also, S.Kim and E.Shin (2002), and R.Wooster, S.Dube, T.Banda (2007), find that regionalization and globalization are not contradictory processes, and that trade regionalization is trade-creating rather than trade-diverting.

<sup>6</sup> As illustrated, for instance, by the high number of preferential agreements among African countries, with rather limited regional trade.

<sup>7</sup> F. Alcalá, A Ciccone (2003)

<sup>8</sup> Wooster/Dube/Banda (2007), op.cit.

<sup>9</sup> A Vamvakidis (1999)

Trying to deal with these questions Gupta and Schiff (1997)<sup>10</sup> discuss the actual impact of an agreement over those countries that do not participate. They find that even an agreement with little economic expression may have market power in certain products, thus leading to the worsening of the terms of trade of the rest of the world.

The question of regional agreements contributing to economic growth has been addressed also in terms of the degree of convergence of per capita levels amongst member states and in terms of the relation to the business cycle. The results will depend on a number of variables, such as macro policies adopted by each participating country, infrastructure, geographical concentration of supply, product differentiation, the existence of trade barriers (among partner countries as well as imposed by third countries) and others.

Venables (2003)<sup>11</sup> contributes with a peculiar perspective, concentrating on the comparative advantages of the participating countries in each trade block. He proposes that countries can be classified in accordance to a spectrum of comparative advantages. If comparative advantage is related to income per capita, a union containing high income countries is likely to lead to convergence of per capita incomes, whereas unions essentially comprising developing countries are associated with divergence of per capita incomes.

This result is supported by Berthelon (2004)<sup>12</sup> for whom the agreements between countries in the North have unambiguous growth effects, whereas the effects of initiatives among developing economies depends on the size of its partners. For North-South agreements the evidence is mixed.

Venables proposition is also indirectly supported by Agora and Vamkakis (2004)<sup>13</sup> who explore the extent to which a country's economic growth is influenced by its trading partner. They find that the level of foreign income relative to domestic income matters (the ratio of the average per capita GDP of trading partners relative to a country's own per capita GDP is positively correlated with growth).

From a different perspective, the relation between regional factors and the business cycle was studied by Kose/Otrok/Whiteman (2003)<sup>14</sup>, for a 60-countries sample. They find that region-specific factors play only a minor role in explaining fluctuations in economic activity.

So far for empirical exercises aiming at identifying generic rules in terms of the actual contribution of regional trade to output growth. The outcome is mixed, but the bets look more significant on the side of positive impact, since – as recalled by Freund and Ornelas (2009) – trade creation and not trade diversion is the norm. In any case, the central question is whether the regional market can be a source of demand for locally-produced manufactured exports and even more so for those goods (high-technology products) for which it is expected that production will take

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<sup>10</sup> A Gupta, M.Schiff (1997)

<sup>11</sup> A Venables (2003), op.cit.

<sup>12</sup> M.Berthelon (2004).

<sup>13</sup> V.Arora, A Vamkakis (2004).

<sup>14</sup> M.Kose, C.Otrok, C.Whiteman (2003).

place with decreasing costs, stimulating investment in a more intense way, thus contributing most to GDP growth. Presumably, this is what is taking place in Asia.

In Asia a number of smaller economies in the region have been 'plugged' to the production processes by means of productive fragmentation and outsourcing<sup>15</sup>, but also as a result of 'conscious effort to upgrade the composition of their final exports'<sup>16</sup>.

The fragmentation of productive stages, with different stages taking place in different countries, mostly in accordance to the difference in costs is not a new issue. Multiple stages within a given productive unit or even the combination of processes to get a varied set of finished goods belong to the very logic of productive processes. It is, however, the intensity of the division of processes in different parts of the world that is a new phenomenon.

The concept of a 'regional productive integration' is not something precisely defined neither in the academic literature nor in the business literature. Intuitively it is a process of production physically divided in many units that are linked by a systematic logistic arrangement (Hamaguchi (2010))<sup>17</sup>.

The average cost of fragmentation will be lower if the total output increases as an outcome of scale economies. In this case, a region with a large consumption market or with a great capacity to export is a natural candidate for regional productive integration.

Productive fragmentation corresponds to the difference in costs, hence allows for an efficient allocation of resources. Trade preferences contribute further to reducing costs in the use of goods produced in the participating countries, as they have by definition comparatively better access conditions to the regional market. The combination of these two elements (the partition of productive processes among various countries, coupled to preferential trade conditions) can provide quite dynamic conditions to compete in the international market.

The available evidence relative to East Asia seems to reinforce this perception. One characteristic of the intra-Asian trade (East Asia in particular) is that the increase over time in the intraregional trade ratio is mainly due to rapid increases in intra-regional imports, whereas intra-regional exports have been systematically slower<sup>18</sup>. This asymmetry reflects by and large the significant dependency of Asian economies on the exports to third markets, the peculiar composition of the regional export bill<sup>19</sup>, at the same time that it is a consequence of the type of economic relationship of China and Japan – the two most important power machines in the region – with the other economies in the region.

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<sup>15</sup> A process known under various names, such as 'slicing the value chain', 'vertical specialization', 'international production sharing', 'outsourcing', 'productive complementarities', among others. This type of operation can of course comprise both arm's length and intra-firm transactions.

<sup>16</sup> F.Ng, A.Yeats (2003).

<sup>17</sup> N.Hamaguchi (2010).

<sup>18</sup> P.Athukorala, A.Kohpaiboon (2009).

<sup>19</sup> Asian countries typically import from the rest of the world natural-resources intensive products and export manufacturing products, consumer goods in particular.



This very perception of a dynamic (surplus) trade relations with the rest of the world has led to a number of exercises trying to identify whether the high growth these economies have achieved are an outcome of their regional links or follow from their overall trade.

Ng and Yeats (2003)<sup>20</sup> provide a rather exhaustive analysis of regional trade in East Asia, with an increasing importance of regional transactions. A good deal of the export dynamism by the smaller economies is provided by demand from Japan and China. Regional countries' export and import profiles have become increasingly complementary over time.

Alternatively, Athukorala (2005)<sup>21</sup> departs from the perspective that international product fragmentation has made East Asian growth dynamism increasingly reliant on extra-regional trade, and finds that extra-regional trade is much more important than intra-regional trade for continued growth dynamism: the process of fragmentation seems to have strengthened the case for a global, rather than a regional approach to trade and investment, as it corresponds to sector production chains.

For Shin and Wang (2003)<sup>22</sup> intra-industry trade is the major channel through which business cycles have become increasingly synchronized among Asian economies. This is not to say that trade by itself increases business cycle coherence: the increased synchronization is an attribute of Asian trade presenting an increasing intra-industry characteristic.

Park and Shin, (2009)<sup>23</sup> analyzes the effects of intra-regional and extra-regional integration on changes in the pattern of East Asia's business cycle since 1990. In spite of the proliferation of preferential agreements in recent years, the high degree of trade integration in the region has been driven mainly without governments' deliberate promotion. They find strong evidence that deeper trade integration reinforces output co-movement.

So far for empirical research and theoretical contributions. The advocacy of a higher degree of homogeneity of output on a regional basis has at least one strong historical support. In the real world perhaps the best example of the importance granted to fostering the degree of homogeneity among countries in an integration exercise is provided by the European Union. Since its early stages a number of instruments were created so as to reduce the disparities among member-countries, as a basic condition for the very existence and sustainability of the integration exercise.

We understand, therefore, that there are a number of reasons why preferential partners should care about promoting a higher degree of homogeneity in output growth within a region. This dimension is present throughout the following analysis.

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<sup>20</sup> Ng, Yeats (2003), Op.cit.

<sup>21</sup> P.Athukorala (2005).

<sup>22</sup> K.Shin, Y.Wang (2003).

<sup>23</sup> Y.Park, K.Shin (2009),

### III. The Object of Analysis

The existence of trade links between the bigger and the other economies within a given region is indicative of a relationship of the 'hub' and 'spoke' type. For the present purposes a 'hub' country is an economy large enough and with significant links with others so that its business cycle might (actually or potentially) affect the activity in other, neighbouring economies.

Previous exercise<sup>24</sup> has analysed the existence of this type of relationship in Asia and Latin America, when taken as homogeneous sets of countries. It has shown indications that the existence of a 'regional multiplier' as defined above is more likely to be found in the former than in the latter region. The present exercise departs from these results and tries to identify the existence of such relations at a sub regional level.

The groups of countries considered here are the following, with an asterisk identifying the so-called 'hub' economies in each case: A) East Asia – China (\*), Hong-Kong, Japan (\*), Mongolia, South Korea, Taiwan, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam; B) South Asia – Bangladesh, India (\*), Pakistan and Sri Lanka; C) Central America – Costa Rica, El Salvador, Guatemala, Honduras, Mexico (\*), Nicaragua and Panama; D) South America (with two 'hubs', namely Brazil and Argentina), divided into E) Andean Countries<sup>25</sup> - Bolivia, Chile, Colombia (\*), Ecuador, Peru and Venezuela (\*)<sup>26</sup> and F) Mercosur – Argentina, Brazil (\*), Paraguay and Uruguay.

The period of analysis is 1992-2008<sup>27</sup>. For the present purposes a specific databank on trade (from the United Nations COMTRADE Database) was built up, comprising three sets of products traded by each country: a) total goods, meaning the aggregate trade flows; b) 'producer goods (an 'ad hoc' selection of 1919 specific items in SITC Rev. 3, at the 5-digit classification level<sup>28</sup>) and c) 'other products', comprising the difference between total products and 'producer goods'. These items were identified in the trade flows between each pair of countries within each sub region, between the so-called 'spoke' countries and each of the 'hub' countries in each sub region, as well as in the trade between each sub region and the Rest of the World (ROW).

In the period considered – 1992 to 2008 – there have been significant variations of international prices, mostly for commodities, and this has contributed to the

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<sup>24</sup> R.Baumann (2010).

<sup>25</sup> Notice that this grouping of countries does not correspond to the Andean Community. It comprises, instead, an 'ad hoc' list of countries along the Andean Mountains

<sup>26</sup> The Bolivarian Republic of Venezuela was included in this group because for most of the period of analysis its economic links were closer to these other economies than to the Mercosur partners, a group to which she has applied for full-membership

<sup>27</sup> The period of analysis is determined to a large extent by the very availability of information in the UN COMTRADE Database at the five-digit level: most countries miss data for 1990-91, according to SITC Rev.3.

<sup>28</sup> List is available from the authors upon request.

performance particularly for some Latin American economies, whose terms of trade have been sharply affected. There is no commitment to isolate the actual effects of these variations in terms of price and volume actually traded, which would require another, rather ambitious type of approach. The analysis here is made essentially in value terms. The parallel consideration of the gains and losses with terms of trade and GDP growth is instrumental for the analysis of the relative importance of productive complementarities on a regional level.

The analysis that follows starts with an overall characterization of the trade composition in each of the sub regions by identifying the actual weight of producer goods in each case in these two decades. Two usual descriptive tools are used, namely the Herfindahl-Hirschman Index of concentration of the export bill and the Grubel-Lloyd Index for the intensity of intra-industry trade.

This is followed by an appraisal of the actual trade flows between 'hubs' and 'spoke' countries in each case, again isolating the role of trade in producer goods.

The above reasoning that attributes a central role to the trade in producer goods can be complemented by the idea of a 'regional multiplier'. The basic idea is that where the regional trade in producer goods is complemented by regional exchange in 'other' goods in a more intense scale than in the trade with third countries this provides a self-reinforcing mechanism that benefits all the countries involved.

The 'regional multiplier' can be illustrated as follows:

Country A experiences an exogenous increase in demand. Given a certain degree of productive complementarities, this new excess demand is met by an increase in production that involves the purchase of producer goods from another country B in the same region. This improves country B's revenue of foreign exchange and hence its capacity to import. To the extent that country B imports final consumption goods produced in country A, this generates a virtuous cycle where aggregate demand in A is reinforced and hence A's demand for B's producer goods, etc. Both A and B gain in this process.

After the overall description of the basic characteristics of the regional trade between the hubs and the spoke countries in each sub region, the next step is, therefore, to analyse the relation between regional trade in producer goods and the origin of the imports of 'other goods', whether they are supplied within the region or originated in third countries.

This analysis is followed by an appraisal of the degree of convergence/divergence of GDP growth rates in each sub region, using the estimation of 'entropy indexes'. It is expected that the more intense the incidence of this so-called 'regional multiplier' the higher the degree of convergence of GDP growth among the countries in each case, given the above reasoning.

#### **IV. The Basic Characteristics of Regional Trade**

Table 1 shows the actual composition of trade flows for the Asian countries. For the sake of analysis, we have taken as references the average values for the 1992-99 and the 2000-08 periods and start by presenting each region separately.

There are clear differences between East and South Asia, in terms of the relative weight of regional transactions. In the former not only the participation of regional trade is significantly high, coming close to half of total trade in exports and surpassing the 50% mark in imports, but this share has further increased in the last decade. This is true for both producer and other goods, but it is worth emphasizing that regional suppliers provide almost 2/3 of the imports of producer goods. For South Asia, differently, regional trade accounts for less than 7% and that share has remained rather constant since 1992.

	<b>Total goods</b>		<b>Producer goods</b>		<b>Other goods</b>	
	%regional/total trade		%regional/total trade		%regional/total trade	
	<b>1992-99</b>	<b>2000-08</b>	<b>1992-99</b>	<b>2000-08</b>	<b>1992-99</b>	<b>2000-08</b>
<b>Exports:</b>						
<b>East Asia</b>	46%	49%	50%	53%	40%	43%
<b>South Asia</b>	4%	4%	6%	6%	3%	3%
<b>Imports:</b>						
<b>East Asia</b>	51%	55%	56%	65%	44%	43%
<b>South Asia</b>	3%	3%	4%	3%	3%	2%

Source: Based on UN COMTRADE Statistics.

The indication of intense trade at the sub regional level reinforces the reasoning about the existence of 'leading' ('hubs') economies and their links with the other ('spokes') economies in each group of countries. Table 2 illustrates this point, for East and South Asia. In each line the direction of trade is identified by the origin followed by the destination of each flow.

As far as the composition of regional trade flows is concerned the first aspect that stands out from Table 2 is the high share of producer goods in the indicators for East Asia: over 60% of the trade between the hubs and the spoke countries (as well as among the spokes) is comprised by these goods. But even more significant is the very fact that this share was somewhat reduced between the 1990s and the following decade in the exports by the hubs to the spoke countries, whereas it has increased significantly in the exports by the spoke countries to the hubs. This consolidates a productive networking at the regional level that is perhaps matched only in Western Europe, among countries of quite similar levels of development.

It is worth noticing, furthermore, that in their trade with the Rest of the World the East Asian hub countries import relatively higher shares of other goods than do the spoke countries. These rely heavily on the supply by the regional 'hubs'.

These indications are suggestive of a 'regional multiplier effect', where spoke countries provide producer goods to the hub countries and import other goods mostly from them.

A different scenario is found in South Asia. It is worth noticing that there has been over time an increase in the relative importance of exports of producer goods by spoke countries to the hub countries (as well as to other spokes). This has reduced the relative participation of these products in the regional imports from the Rest of the World. But the figures are much lower in comparison to East Asia and the intensity of these movements has been far more limited.

**Table 2: East and South Asia - Composition of Regional and External Trade, 1992-2008**

	producer goods		other goods	
	average 1992-99	average 2000-2008	average 1992-99	average 2000-2008
<b>East Asia</b>				
exphubs-spokesEastAsia	69%	67%	31%	33%
exspokes-spokesEastAsia	64%	66%	36%	34%
exspokes-hubsEastAsia	58%	66%	42%	34%
exspokesEastAsia-ROW	52%	55%	48%	45%
imspokesEastAsia-ROW	59%	49%	41%	51%
exphubsEastAsia-ROW	62%	58%	38%	42%
imphubsEastAsia-ROW	43%	38%	57%	62%
<b>South Asia</b>				
exphubs-spokesSouthAsia	57%	45%	43%	55%
exspokes-spokesSouthAsia	36%	51%	64%	49%
exspokes-hubsSouthAsia	22%	46%	78%	54%
exspokesSouthAsia-ROW	31%	23%	69%	77%
imspokesSouthAsia-ROW	57%	51%	43%	49%
exphubsSouthAsia-ROW	31%	35%	69%	65%
imphubsSouthtAsia-ROW	41%	38%	59%	62%

Source: Based on UN COMTRADE Statistics.

Tables 3 and 4 show the same indicators for Latin America. Once again, in each line the direction of trade is identified by the origin followed by the destination of each flow.

Starting with total trade, on Table 3 the indications of the relative weight of regional trade are much lower than in East Asia but far higher than in South Asia. Also, there are marked differences between continents. The typical figure for South America is in the neighbourhood of 20%, whereas in Central America it does not surpass 5% of total trade.

The second and third columns of Table 3 in comparison to Table 1 show that the relative importance of overall regional trade in Central and South America is much lower than in Asia and has actually decreased between these two periods. This corresponds to the significant market diversification that has taken place for the exports of these economies.

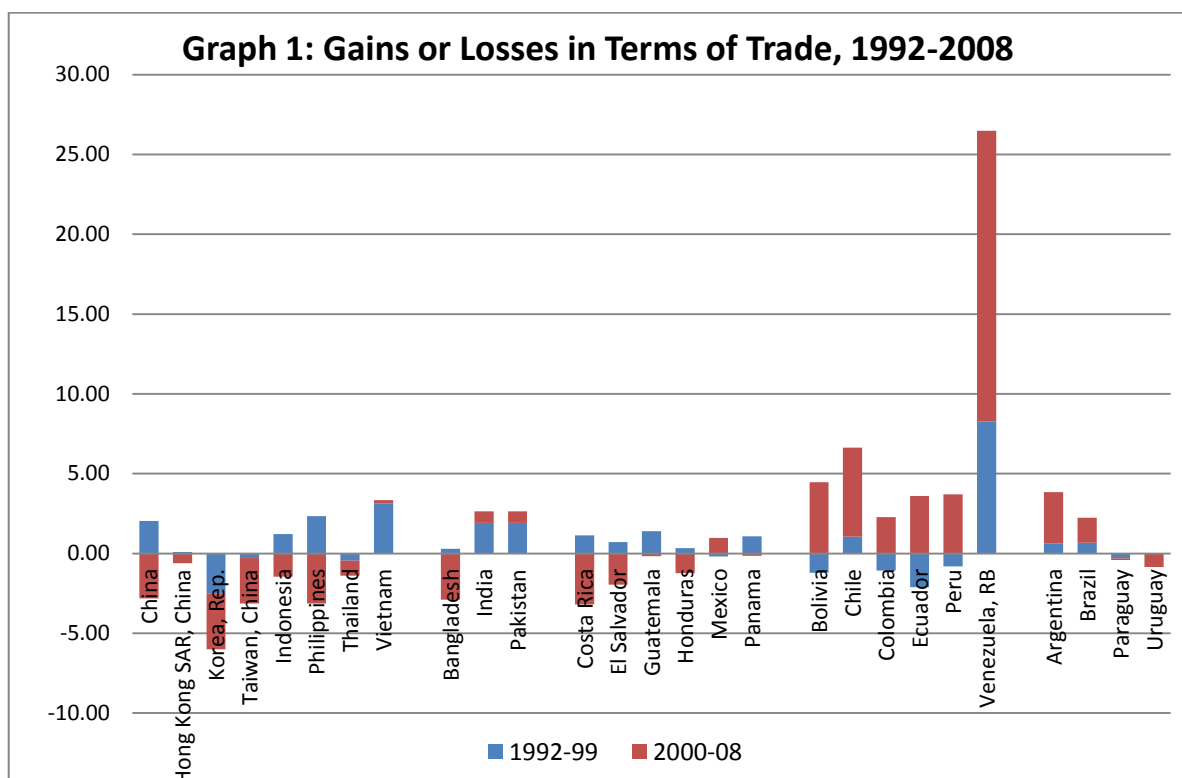
	<b>Total goods</b>		<b>Producer goods</b>		<b>Other goods</b>	
	% regional/total trade		% regional/total trade		% regional/total trade	
	1992-99	2000-08	1992-99	2000-08	1992-99	2000-08
<b>Exports</b>						
Central America	3%	3%	3%	3%	4%	4%
South America	24%	20%	34%	29%	19%	16%
Andean Countries	11%	10%	20%	16%	8%	8%
Mercosur	21%	14%	26%	21%	18%	12%
<b>Imports</b>						
Central America	3%	3%	2%	2%	5%	5%
South America	23%	26%	16%	19%	35%	36%
Andean Countries	11%	14%	7%	9%	17%	19%
Mercosur	20%	19%	14%	15%	29%	26%

Source: Based on UN COMTRADE Statistics.

This result is, of course, highly influenced by the terms of trade effects<sup>29</sup>, which have affected positively most economies in South America in recent years. According to the Graph 1<sup>30</sup> it was clearly the Andean countries and the Mercosur members who have benefitted from the favourable international prices in the last decade. The value of exports of 'commodities' having increased significantly has reduced the relative weight of 'producer goods' in total exports. This has also contributed to increase the share of third markets as destination for South American products.

<sup>29</sup> In 2000-08 as a whole the Asian losses ranged from 1% in Hong-Kong and Thailand to 3% in China, Thailand, Korea and the Philippines. In Latin America the gains ranged from 1.5% in Brazil to not less than 18% in Venezuela.

<sup>30</sup> Data from World Bank, World Development Indicators, 2010



It is therefore particularly noticeable, on Table 3 that the share of producer goods in regional exports has actually reduced over time in all sub regional groupings considered here, in an inverse process in comparison to Asia. This is particularly remarkable in South America, for both sub regional groupings, whereas the Central American figures are marginal.

It is also interesting to notice, on Table 3, that in parallel to the market and product diversification that have affected the relative importance of regional trade on the export side in South America – both for the Andean countries and Mercosur – there has been a small gain in the relative importance of regional trade on total imports, for both producer and ‘other’ goods.

This calls for a closer look at the trade flows between the ‘hubs’ and the ‘spoke’ countries in the Americas. Table 4 shows the basic indicators.

The first aspect to notice on Table 4 is that in Central America not only the weight of regional trade is – as already shown – quite limited; there has actually been an intense reduction in the participation of producer goods in regional trade between 1992-99 and 2000-08. The counterpart of this movement is that the degree of dependency of imports from both hub and spoke countries of imports of these products from the Rest of the World has remained stable at quite high levels over time.

**Table 4: Latin America - Composition of Regional and External Trade in 1992-2008**

<b>Central America</b>	<b>Producer goods</b>		<b>Other goods</b>	
	1992-99	2000-08	1992-99	2000-08
exphubs-spokesCAm	53%	46%	47%	54%
exspokes-spokesCAm	42%	37%	58%	63%
exspokes-hubsCAm	42%	29%	58%	71%
exspokesCAm-ROW	19%	24%	81%	76%
imspokesCAm-ROW	66%	66%	34%	34%
exphubsCAm-ROW	54%	55%	46%	45%
imphubsCAm-ROW	68%	68%	32%	32%
<b>South America</b>				
exphubs-spokesSAm	50%	49%	50%	51%
exspokes-spokesSAm	37%	34%	63%	66%
exspokes-hubsSAm	31%	35%	69%	65%
exspokesSAm-ROW	20%	20%	80%	80%
imspokesSAm-ROW	66%	59%	34%	41%
exphubsSAm-ROW	35%	33%	65%	67%
imphubsSAm-ROW	70%	68%	30%	32%
<b>Andean countries</b>				
exphubs-spokesAC	45%	40%	55%	60%
exspokes-spokesAC	42%	37%	58%	63%
exspokes-hubsAC	42%	29%	58%	71%
exspokesAC-ROW	19%	24%	81%	76%
imspokesAC-ROW	57%	48%	43%	52%
exphubsAC-ROW	11%	10%	89%	90%
imphubsAC-ROW	67%	61%	33%	39%
<b>Mercosur</b>				
exphubs-spokesM	64%	62%	36%	38%
exspokes-spokesM	47%	49%	53%	51%
exspokes-hubsM	31%	36%	69%	64%
exspokesM-ROW	21%	20%	79%	80%
imspokesM-ROW	69%	68%	31%	32%
exphubsM-ROW	42%	36%	58%	59%
imphubsM-ROW	67%	65%	33%	35%

Source: Based on UN COMTRADE Statistics.



The South American story is a bit different. There was an increase in the share of producer goods in the exports by spoke countries to the hubs – indicating a movement in the right direction – and the exports of these products by the hubs to the spoke countries has remained rather constant. As an outcome there has been a reduction in the imports of producer goods by both hubs and spoke countries from the Rest of the World between the two periods.

Disaggregating these figures by groups of countries one finds that in the Andean countries the share of producer goods in the trade between hubs and spoke countries was reduced both for the exports by hubs to spokes as well as from spokes to hubs. In the latter case quite significantly, from 42% to only 29% of regional trade flows. Nevertheless – and as different from the Asian experience – there has been also a simultaneous fall in the share of producer goods in the trade of these countries with the Rest of the World: there were significant reductions in the shares of producer goods both in the imports by hubs and by spoke countries. This is particularly odd, when one considers that the value (in constant US dollars) of the Fixed Gross Capital Formation in the Andean countries has doubled between 1992-2008, and its share of GDP remained rather constant (21% in the first period and 20% in the second). The explanation seems to lie in the remarkable performance of trade in ‘other goods’ with third countries.

In Mercosur, differently, the trajectory has been more similar to the Asian experience. The share of producer goods in the exports by the hub country to the spokes has varied marginally, but at the same time there has been a significant increase in the share of these products in the exports by the spokes to the hub. As a consequence – again as similar to Asia – there has been a small reduction in the share of producer goods in the imports from the Rest of the World by both hub and spoke countries.

Table 5 illustrates the composition of each trade flow, for the five sub regions, by indicating those 2-digit products that account for approximately half the value of each trade flow.

The first thing to notice on Table 5 is the actual difference in the composition of trade relations in East Asia and in the other country groups. In the former one finds quite similar products being traded both regionally and with the Rest of the World, as well as similar exports by both hub and spoke countries. Furthermore, these are predominantly manufactured products.

In the other four groups a common characteristic is that the exports by hub countries present a higher degree of diversification in terms of number of items as well as are different from the exports by spoke countries<sup>31</sup>, in that these tend to be not only less diversified but also present a higher content of natural resources.

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<sup>31</sup> The figures for Central America are, of course, strongly influenced by the Mexican exports of maquiladora plants and others. But this is an inevitable consequence of the way we have defined this group of countries.

Most of the differences between East Asia and the other groups on Table 5 are found in the export pattern of the spoke countries: the more similar and the more complementary to the trade pattern of the big economies in a given region the higher the potential for sharing dynamism.

	East Asia	South Asia	Central America	Andean countries	Mercosur
<b>Regional exports to ROW</b>	Road vehicles, telecom equip., office machines, electr. Equip., apparel/clothing, miscel. Manufact., industrial equip.	Petroleum, Apparel/clothing, non-metal mineral manufact., textile yarn	Petroleum, Telecomm equip., Road vehicles, Electrical equip.	Petroleum	Metal ores, Petroleum, Meat&preparations, Oil seeds, Iron&Steel, Animal feed, Road vehicles
<b>Regional imports from ROW</b>	Petroleum, Metal ore, electrical equip., natural gas, non-ferrous metal	Petroleum, gold non-monetary, railway equip., non-metal mineral manufact., fertilizers, Iron & Steel, coal	Electrical equip., Petroleum, Road vehicles, Telecomm equip., Industrial equip., Miscellaneous manufact., office machines	Petroleum, Road vehicles, Industrial equip. nes, Telecomm equip., Industry special machines, Iron&Steel, electrical equip., Cereals	Petroleum, Electrical eq., Road vehicles, Industrial equip. nes, Manufactured fertilizers, Telecomm equip., Organic chemicals
<b>Hubs exports to Spokes</b>	Electrical equip., Telecomm equip., office machines, Iron&steel, industry special machines	Petroleum, textile yarn, textile fibres, cereals, organic chemicals, sugar, road vehicles, Iron&Steel, vegetables& fruit	Petroleum, Telecomm. equip., Iron&Steel, Electrical equip., Metal manufact., Pharmaceutical products, Perfumes	Iron&Steel, Plastics, Road vehicles, Perfume, Paper, Chemical material	Road vehicles, Iron&Steel, Telecomm equip., Industry special machines, Electrical equip.
<b>Spokes exports to Hubs</b>	Electrical equip., office machines, Telecomm equip., Petroleum	Petroleum, non-metal mineral manufact., textile yarn	Vegetable oils, Electrical equip., Metal ores	Non-ferrous metals, Apparel/clothing, Vegetables&fruit, Road vehicles, Fish, Textile yarn	Road vehicles, Cereals, Petroleum
<b>Hubs exports to ROW</b>	Road vehicles, office machines, Telecomm equip., Electrical equip., Apparel/clothing, Industrial equip. nes	Petroleum, non-metal mineral manufact., Apparel/clothing, Iron&Steel, Textile yarn, Miscellaneous manufact.	Petroleum, Telecomm. equip., Road vehicles	Petroleum	Metal ore, Petroleum, Meat&preparations, Iron&Steel, Oil Seeds, Road vehicles
<b>Spokes exports to ROW</b>	Electrical equip., Telecomm equip., office machines, Road vehicles, Petroleum, Apparel/clothing, Miscellaneous manufactures	Apparel/clothing, textile yarn	Apparel/clothing, Vegetables&fruit, Coffe/tea/cocoa, Electrical equip.	Non-ferrous metals, Metal ores	Animal feed, Vegetable oils, Cereals&preparations, Oil seeds, Meat & meat preparations

Source: Based on UN COMTRADE Statistics.

The overall picturing for the sub regions is based on those trade flows that are central for the present argument. These comprise the exports of 'producer goods' from the 'spoke' countries to the 'hub' countries (XSpG<sub>H</sub>), the exports by 'hub' countries of 'other goods' to the 'spoke' countries (XHog<sub>S</sub>)<sup>32</sup> and regional exports of both producer goods and other goods to the Rest of the World (Xpg-ROW and Xog-ROW).

<sup>32</sup> Which equals, by definition, the imports by spoke countries of 'other goods' produced in the 'hub' countries, as indicated in the above description of the 'regional multiplier'.

Table 6 shows the Herfindahl-Hirshman indexes of concentration<sup>33</sup> of each of these trade flows.

The first aspect worth noticing is that the degree of concentration is the lowest in the regional trade within East Asia, both for producer goods and 'other goods', as well as in the exports of 'producer goods' by East Asia to third countries. This reflects competitiveness in a diversified range of products, not matched by the other groups of countries considered here.

<b>Table 6: IHH for Regional and External Trade</b>		
	<b>1992-99</b>	<b>2000-08</b>
<b>EAST ASIA</b>		
XSpGH East Asia	0,09	0,14
XHogS East Asia	0,11	0,13
XpgEastAsia-ROW	0,12	0,12
XogEastAsia-ROW	0,21	0,22
<b>SOUTH ASIA</b>		
XSpGH South Asia	0,45	0,29
XHogS South Asia	0,32	0,24
XpgSouthAsia-ROW	0,16	0,10
XogSouthAsia-ROW	0,20	0,19
<b>CENTRAL AMERICA</b>		
XSpGH Central America	0,27	0,23
XHogS Central America	0,22	0,22
XpgCentral America-ROW	0,12	0,13
XogCentral America-ROW	0,29	0,33
<b>ANDEAN COUNTRIES</b>		
XSpGH Andean	0,21	0,21
XHogS Andean	0,18	0,25
XpgAndean-ROW	0,44	0,47
XogAndean-ROW	0,39	0,46
<b>MERCOSUR</b>		
XSpGH Mercosur	0,22	0,18
XHogS Mercosur	0,22	0,29
XpgMercosur-ROW	0,12	0,12
XogMercosur-ROW	0,18	0,20

Source: Computations based on UN COMTRADE Statistics.

<sup>33</sup> Defined as  $H_j = \text{SQRT}(\sum_{ij} (x_i / X)^2)$ , where  $x_i$  is the value of the export of product  $i$  at SITC 4- or 5-digit level in Rev. 3 and  $X$  is the total category exports in country  $j$ . The index is normalized to make values ranking from 0 to 1, which indicates maximum concentration.

A second observation is that a process of increasing diversification between the two periods took place in South Asia. In its trade with the Rest of the World it has reached levels of diversification comparable to those in East Asia.

Third, the degree of concentration of the export bills – both regionally and externally – is much higher in general in Latin America than in Asia, with the sole exception of external exports by Mercosur.

Fourth, and as different from all other groupings, the Andean countries present a much higher degree of export concentration in their trade with the Rest of the World than on a regional basis.

As already mentioned, one of the channels linking regional trade to GDP growth according to the literature is via the effects following the existence of significant intra-industry trade<sup>34</sup>. Table 7 shows some indication for each of the sub regions.

Figures on Table 7 are suggestive that the intensity of intra-industry transactions have increased between the two decades in almost all trade flows shown, the only (surprising) exception being the exports of ‘other goods’ from East Asia. It is clearly in regional and external trade in producer goods that the indicators in this area are more expressive.

By and large, the most significant indications of intra-industry transactions are related to regional trade in East Asia, where close to half of each trade flow considered is of this kind. These are followed by regional trade in ‘other goods’ in Central America and by regional trade in both producer goods and ‘other goods’ in Mercosur. The comparative figures for the other trade flows are typically in the range of 10-20% of intra-industry trade.

If taken in comparison with the ‘typical’ standard found in intra-European Union trade, where these indexes surpass the 60% level it turns out that for these groupings of countries one source of GDP growth emphasized by the theory is only found in significant proportions in East Asia.

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<sup>34</sup> The Grubel-Lloyd index is defined as:  $GL_j = 1 - [\sum |X_{ij} - M_{ij}| / (X_{ij} + M_{ij})]$ , where  $X_i$  and  $M_i$  are the values of total exported and imported products  $i$  respectively at SITC 4- or 5-digit level (Rev. 3) in country  $j$ . The value of index is ranked from 0 to 1.

<b>Table 7: Grubel-Lloyd Indexes for Regional and External Trade</b>		
	<b>1992-99</b>	<b>2000-08</b>
<b>EAST ASIA</b>		
EApRegional	0,45	0,54
EApROW	0,45	0,44
EAogRegional	0,26	0,30
EAogROW	0,23	0,19
<b>SOUTH ASIA</b>		
SAppRegional	0,15	0,22
SAppROW	0,25	0,36
SAogRegional	0,08	0,13
SAogROW	0,09	0,11
<b>CENTRAL AMERICA</b>		
CAppRegional	0,20	0,27
CAppROW	0,47	0,52
CAogRegional	0,21	0,28
CAogROW	0,32	0,34
<b>ANDEAN COUNTRIES</b>		
AndeanpgRegional	0,22	0,22
AndeanpgROW	0,11	0,12
AndeanogRegional	0,16	0,16
AndeanogROW	0,13	0,14
<b>MERCOSUR</b>		
MercopgRegional	0,34	0,35
MercopgROW	0,28	0,33
MercoogRegional	0,21	0,26
MercoogROW	0,17	0,24

Source: Computations based on UN COMTRADE Statistics.

These indications raise the obvious question about what could be the basic explanations for these different outcomes in the trade relation between 'hubs' and 'spokes' in each region. There are at least two natural candidates: preferential trade agreements (PTAs) might be inducing trade diversion and/or there are differences in the actual comparative advantages of the countries in each region.

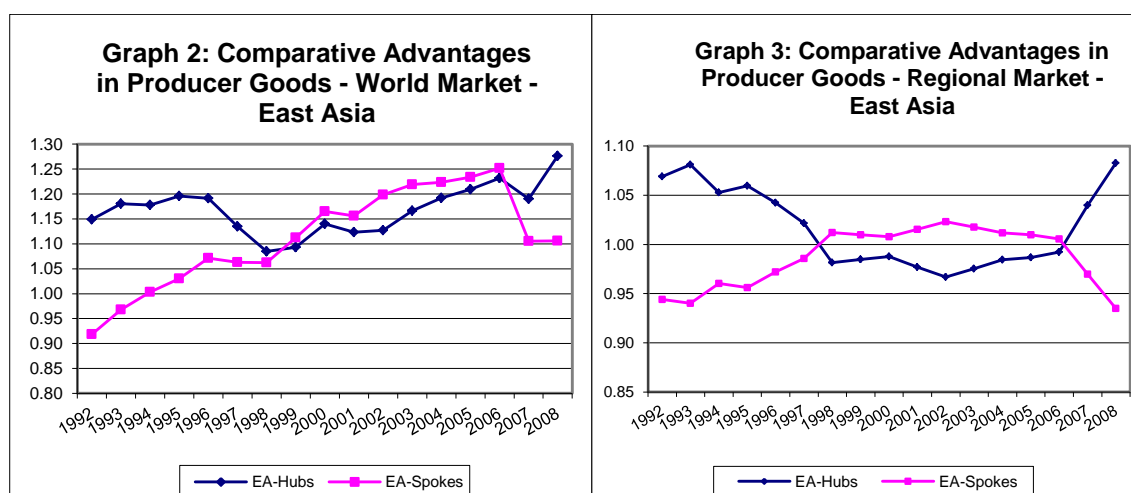
As far as PTAs are concerned it is well known that this has been an important issue for regional relations in Latin America since the early 1950s. Notwithstanding the number of existing PTAs, the overall understanding is that a number of actual tariffs and non-tariff barriers still remain, affecting bilateral trade.

Asian countries have traditionally avoided regional PTAs. This has changed mainly since the 1990s and today this region has been quite active in promoting such agreements.

The actual effect of the intensity and the characteristics of these PTAs on the trade flows is a matter for additional, specific research, which goes beyond the purposes of this paper.

An alternative (complementary) explanation for these results has to do with the actual comparative advantages: to the extent that, say, 'spoke' countries in a given region are competitive in the production of producer goods, this could be a sound reason why the 'hub' countries in that region would prefer to import those products from them.

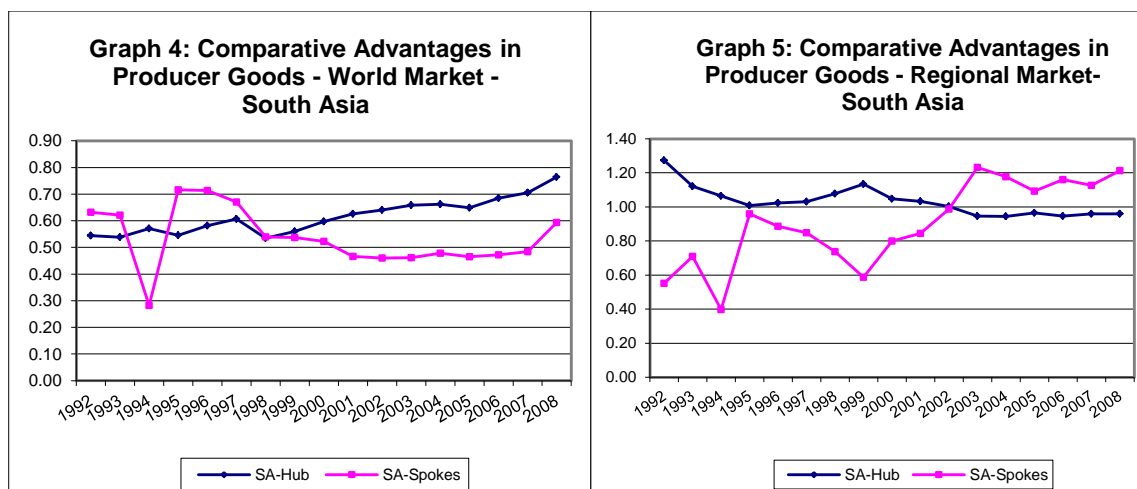
In order to deal with this hypothesis we have estimated the Balassa index of revealed comparative advantages<sup>35</sup> in producer goods for the 'hubs' and the 'spokes' in each region. The following graphs illustrate the results.



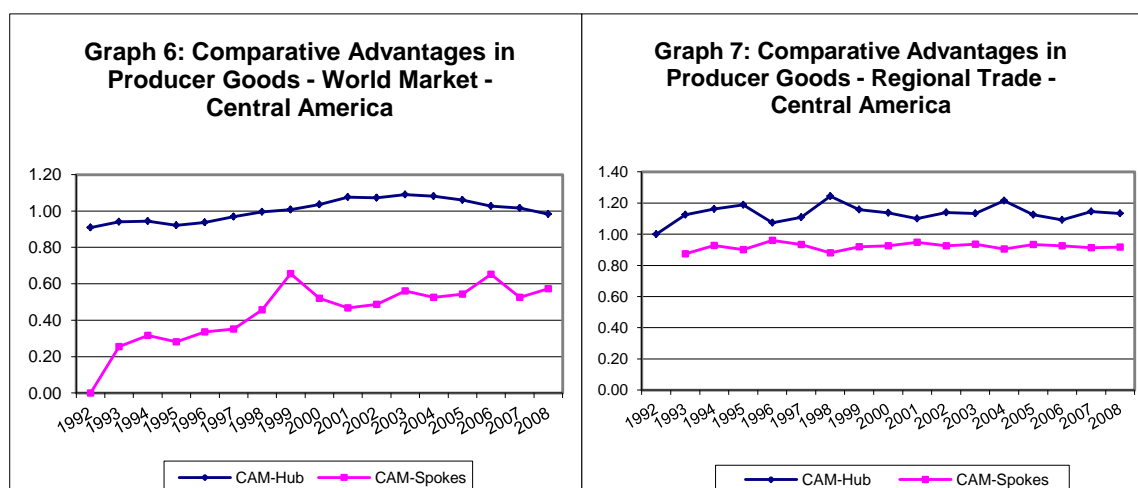
The results for East Asia are rather peculiar and different from all other regions considered here. At least three aspects are worth noting. First, in their trade with the Rest of the World (Graph 1) the RCA indexes for both 'hubs' and 'spokes' present systematic upward trend, (except in the last two years), indicating gains in comparative advantages. Second, both indexes are quite close, an indication of comparable comparative advantages for both large and smaller countries. Third, and not less important, in the regional market (Graph 2) the 'spoke' countries seem to be even more competitive.

<sup>35</sup> The RCA index is computed as:  $RCA = (x_{ij} / X_j) / (x_{iw} / X_w)$ , where  $x_{ij}$  = exports of product  $i$  by country (or group)  $j$ ;  $X_j$  = total exports of country (or group)  $j$ ;  $x_{iw}$  = exports of product  $i$  by the world (or region);  $X_w$  = total exports by the world (or region). If the value of index is above 1, it is said that the country (or group) has revealed comparative advantage in that product.

Independently of the trade diversion effects provoked by preferential agreements, therefore, there is a departing point of productive efficiency in most countries in that region.



The RCA indexes for South Asia indicate low competitiveness in the overall trade (Graph 4), as they remain – for both types of countries – less than one, even though with a light upward trend. In the regional market (Graph 5) it is worth noticing that the ‘spoke’ countries have shown a far better performance, overtaking the ‘hub’ since the beginning of the 2000s.

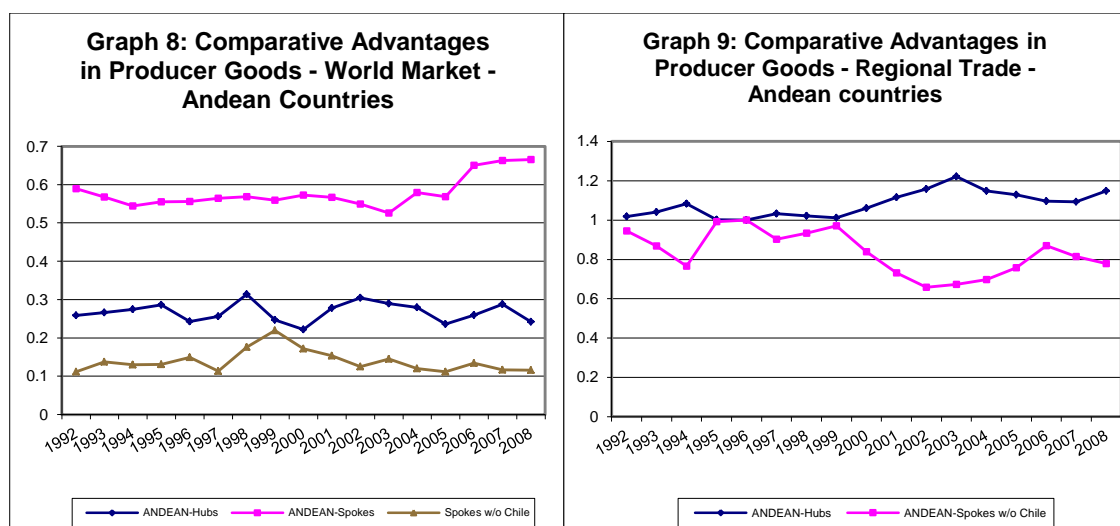


The RCA indexes in Central America show a large (even though reducing) distance between the ‘hub’ and the ‘spoke’ countries in their overall trade (Graph 6). On the regional market (Graph 7) the differences are smaller, but there is no convergence between the two series of indexes.

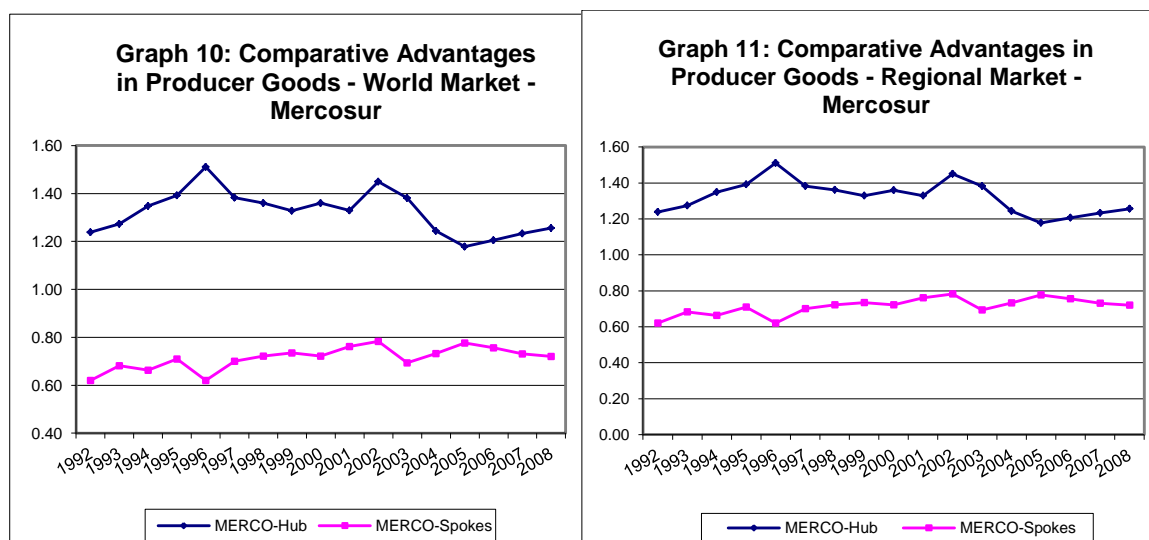
In the Andean countries we have a very peculiar situation. The set of ‘spoke’ countries presents over time a much higher index of comparative advantages than

the 'hub' countries, in their overall trade. As Graph 8 shows, this is largely due to the way this group has been conceived here: once Chile is dropped from the set of 'spokes' the index drops quite significantly. In any case, the indexes are far too low (well below one) to indicate any competitiveness in producer goods.

The indexes relative to regional trade (Graph 9) indicate a limited (if slowly rising) competitiveness by the hubs, but it is remarkable that the indexes for the 'spoke' countries are low and decreasing over time.



The case of Mercosur is certainly the one where the distance in competitiveness between the 'hub' and the 'spoke' countries is the largest. The 'spokes' within this area are not competitive in producer goods neither in the international (Graph 10) nor in the regional market (Graph 11). Even more impressive, the difference between the two set of countries has remained rather constant in both markets throughout the two decades.





These indexes help to understand why the regional transactions in producer goods are so intense in East Asia and so rare among the members of, say, Mercosur.

The next question is, therefore, what can be said in terms of the actual dynamism of these economies and – even more – in terms of the homogeneity of regional growth.

The importance of a homogeneous growth pattern stems from the fact that it is in economies of similar per capita income that one finds the most significant opportunities to explore market segments due to similarity of demand and production patterns. Also, the more unequal a region in terms of economic potential, the lower the possibilities for trade creation. To think in terms of a sustainable regional trade structure necessarily leads to consider the possibilities of increasing the similarities of economic opportunities among the participating countries.

## V. Inferences for Regional Growth

The focus of analysis here is the mechanism that allows for higher degree of homogeneity in GDP growth among the countries in each sub region. The underlying idea is that a ‘regional multiplier effect’ as described above might be an efficient tool for promoting homogeneity of GDP growth on a regional basis.

In order to identify the incidence of such mechanism we have focused on three indicators: XSpGH - the exports of producer goods by ‘spoke’ countries to ‘hub’ countries, MSogH – the imports by the ‘spoke’ countries of ‘other goods’ produced in the ‘hub’ economies and MSogRW – the imports by the ‘spoke’ countries of ‘other goods’ produced in the Rest of the World. These are the key variables for the identification of a ‘regional multiplier’ as described in Section 2.

Table 8 shows the basic results for each of the sub regions.

According to Table 8 the most remarkable case is East Asia. The value of its XSpGH is not only the highest of all sub regions considered but has almost tripled between the 1990s and the 2000s. It is also the only group where we obtain  $XSpGH > MSogH$ , meaning an even more intense regional trade in producer goods than in other goods. Given the remarkable growth of the XSpGH in this region there has been a reduction of both ratios  $MSogh/XSpGH$  and  $MSogRW/XSpGH$ .

In South Asia, differently, the XSpGH is extremely low, higher only than in Central America. Even so, there has been a reduction of both ratios  $MSogh/XSpGH$  and  $MSogRW/XSpGH$ . But the MSogRW is far more significant than the other indicators.

Central America presents, in the 2000s, the lowest value for XSpGH. Furthermore, this indicator had only a minor variation between the two decades, indicating a very poor participation of producer goods in intra-regional trade. At the same time not only there is a huge share of MSogRW, but the ratio  $MSogRW/XSpGH$  has

increased between the two periods: the region has a very strong and increasing interaction with third countries as far as trade in 'other goods' is concerned.

The Andean countries present also a very low value for XSpGH, but this indicator has increased significantly between the two decades. The indicator MSogH has varied in a smaller proportion; hence there has been a reduction of the ratio MSogH/XSpGH. As in Central America, the ratio MSogRW/XSpGH is by and large predominant.

The way we conceived the group of Andean countries does not correspond – as indicated previously – to the Andean Community in its format during most of this period. To deal with that Table 8 presents also the estimates of these indicators for the group of Andean countries not considering Chile, a more global trader. The picturing does not change significantly. The indicator MSogH has varied in a lower proportion than XSpGH, and the economies in this group are strongly dependent upon imports of other goods from the Rest of the World.

**Table 8: Evolution of Regional and Extra-Regional Trade, 1992 – 2008**

	Average 1992-00 (I) (US\$ mill.)	(B) / (A)	(C) / (A)	Average 2001-08 (II) (US\$ mill.)	(B) / (A)	(C) / (A)
<b>East Asia</b>						
XSpGH (A)	84.044			241254		
MSogH (B)	74949	89%		135323	56%	
MSogRW (C)	122449		146%	249723		104%
<b>South Asia</b>						
XSpGH (A)	30			312		
MSogH (B)	472	1576%		1936	619%	
MSogRW (C)	7996		26729%	18661		5972%
<b>Central America</b>						
XSpGH (A)	113			158		
MSogH (B)	445	394%		1294	817%	
MSogRW (C)	7129		6303%	15948		10072%
<b>Andean countries</b>						
XSpGH (A)	353			1001		
MSogH (B)	999	283%		2300	230%	
MSogRW (C)	8743		2479%	21789		2176%

<b>Andean countries (without Chile)</b>					
XSpGH (A)	261			639	
MSogH (B)	805	308%		4071	283%
MSogRW (C)	3611		1384%	7253	1371%
<b>Mercosur</b>					
XSpGH (A)	1909			3038	
MSogH (B)	2255	118%		4071	134%
MSogRW (C)	6406		336%	7253	239%

Source: Based on UN COMTRADE Statistics.

Finally, Mercosur differs from the other Latin American groups considered here in that it presents the second highest value for XSpGH, after East Asia. This indicator has increased between the two periods but in the 2000s it was still less than twice its value in the 1990s. The overall picturing with regard to a 'regional multiplier' goes, however, in the expected direction, with a simultaneous increase of the ratio MSogH/XSpGH and a decrease of the ratio MSogRW/XSpGH.

These indicators help to understand the indications of convergence among the economic potential of the several countries in each grouping. A traditional indicator of convergence/divergence of a set of observations, the relative entropy indexes<sup>36</sup> shown in Table 9 indicate a set of varied situations in these groups of countries. The higher the index the more intense has been the movement towards an increasing degree of homogeneity of the sample, as the weight of each observation would have increased relatively.

<b>Table 9: Relative Entropy Indexes of GDP, 1992-2008</b>		
	<b>1992-99</b>	<b>2000-08</b>
East Asia	0,139	0,161
South Asia	0,218	0,197
Central America	0,103	0,110
Andean Countries	0,399	0,412
without Chile	0,356	0,372
Mercosur	0,158	0,151

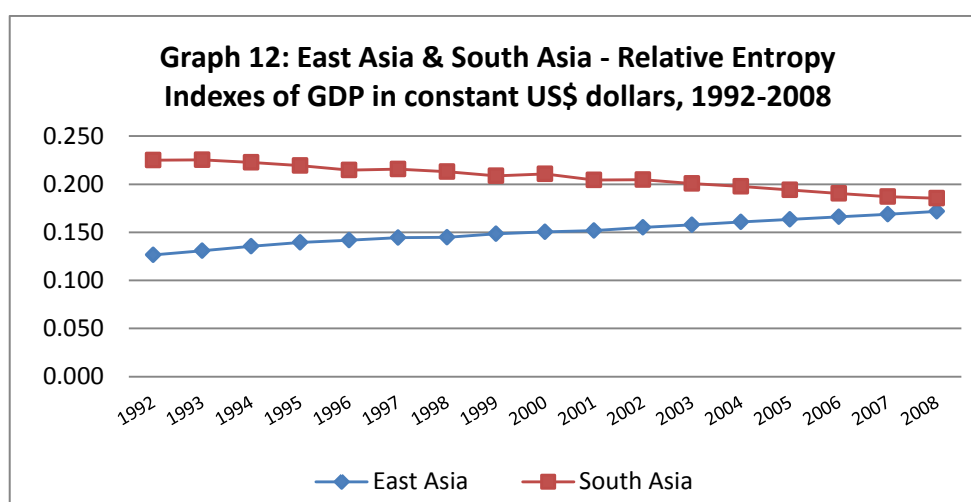
Source: Computations based on World Bank WDI database.

<sup>36</sup> The relative entropy index (IRE) is computed as  $IRE = \sum (Y_{ij} * \ln(1/Y_{ij}) / \max(\ln(1 / Y_{ij})))$ , where  $Y_{ij}$  is the share of GDP of country's  $i$  in total GDP of region  $j$ . Computations are based on the World Bank, World Development Indicators database.

The figures in Table 9 show that the most remarkable performance in reducing the differences among the GDPs of the participant countries has taken place in East Asia, where the entropy index has increased over 15% between the two periods. When considered together with the figures in Table 2 it turns out that a good deal of the dynamism that provided such convergence had to do with the increasing degree of productive complementarities among the economies in this sub region.

This is not an overall characteristic of Asian countries, though. In South Asia, where the regional trade in producer goods is rather limited the dependency upon imports of 'other goods' from third countries is much stronger than regional trade or productive links and therefore the degree of homogeneity in GDP growth of the several countries has if anything been reduced between the 1990s and the 2000s.

Graph 12 illustrates these trajectories.



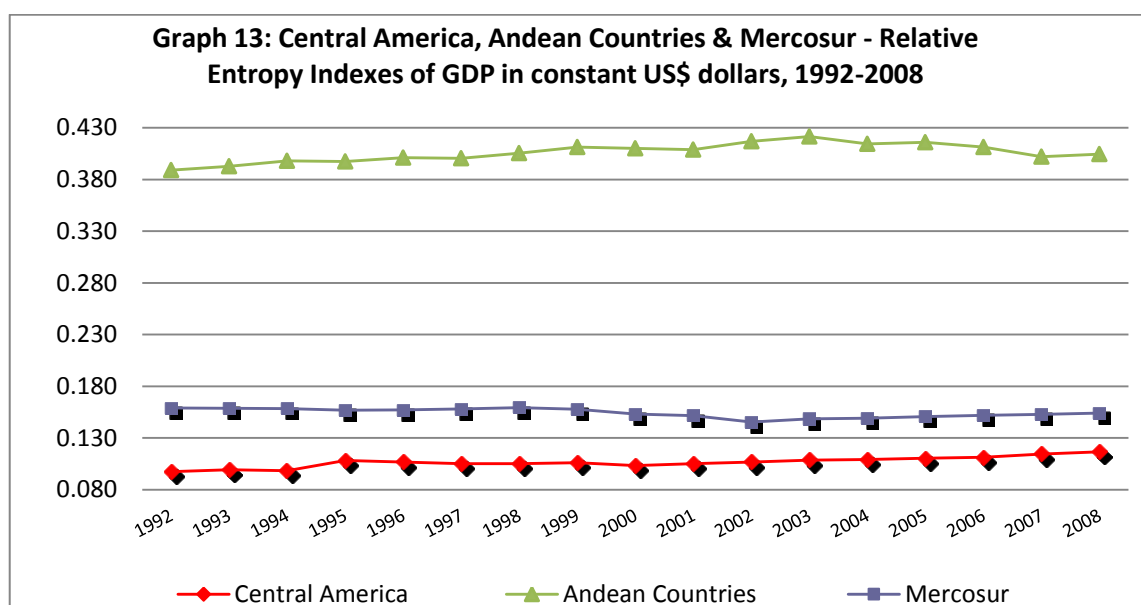
These are two good examples of the importance of building up a 'regional multiplier mechanism'. As Graph 1 has shown, Asian countries have suffered in the 2000s quite significant losses in their terms of trade. While in East Asia this has been more than compensated by the network of sub regional productive and trade relations, which has allowed for an increased homogeneity of the growth process, in South Asia the dependency upon extra-regional trade has actually accentuated the differences among the economies in the sub region.

The Latin American experience is also varied. Regional trade in producer goods is quite low, even where it is most significant, as in Mercosur: in the 2000s on average trade in producer goods within Mercosur corresponded to only 1% of the trade in these products within East Asia.

Another difference between Latin America and Asia – as shown in Graph 1 - is that the former (especially South America) benefitted significantly from the gains in terms of trade in the 2000s. This has had, of course, an expressive impact on GDP growth.

Graph 13 illustrates the trajectories of the entropy indexes for Central America, the Andean countries and Mercosur. The first thing to notice is that since the beginning of the period of analysis the Andean countries showed a far more homogeneous degree of GDP growth than observed in Mercosur and – even more – in Central America<sup>37</sup>. The degree of homogeneity in the Andean countries has increased up to 2003 and reduced lightly since then. But the degree of variation is very low.

In Central America and in Mercosur the variations between the two decades are also minimal, meaning that the differences among the potential of the economies in these groups of countries have essentially remained the same over two decades.



This is not to say that there has been no growth or even that growth in the second decade was worse than in the former. Table 10 summarizes the rates of growth in these groups of countries in the two periods. Except for Central America in the 2000s every other grouping of countries showed more dynamism than in the 1990s.

	Average 1992-99	Average 2000-08
East Asia	2.9	4.0
South Asia	5.7	6.7
Central America	3.2	3.0
Andean countries	3.0	4.7
Mercosur	3.1	3.7

(\*) weighted average

Source: World Bank, World Development Indicators, 2010

<sup>37</sup> Or even in Asia, if compared to the height of the indexes shown in Graph 12.

The argument is that out of these five groups of countries it was only in East Asia where the existence of intense productive complementarities have allowed to deal with a worsening of the terms of trade and at the same time increase the average rate of GDP growth and foster the degree of homogeneity among the economies, at a quite significant pace. At the same time Latin American economies have profited from favourable international conditions but the differences among them have remained constant over two decades. And in South Asia the average rhythm of GDP growth increased far less intensely than in East Asia and at the same time the differences among the economies of participating countries have increased sharply.

## **VI – Final Remarks**

This work aims at providing some empirical evidence with regard to an aspect that has often been disregarded by the literature on regional integration. Namely, the important role of productive complementarities to provide dynamism to the participating economies, as well as to help improve the degree of homogeneity of the economic potential of the several countries in a given region, even (or perhaps precisely) in moments when these economies suffer negative shocks, as reflected in the losses stemming from negative variation of their terms of trade.

Based on the appraisal of the experience in the last two decades of six sub regional groups of countries in Asia and Latin America it was shown that there are marked differences in terms of the composition of trade flows among the several groups, the degree of diversification of trade flows and even more specifically the participation of producer goods in the regional and external trade relations.

It came out clearly that the recent improvement in terms of trade has benefitted most Latin American economies and this has allowed them to reach higher rates of GDP growth. Nevertheless, these economies remain as different in their relative economic potential as they were in the beginning of the 1990s, and are suffering increasingly from the competition of imports from third parties. Even though this is a region with a long history of efforts to promote regional integration the arguments used to justify preferential trade treatment have never comprised the sum of efforts to improve competitiveness in third markets, hence the concern with promoting productive complementarities has seldom been in the negotiating agenda.

A different outcome is found in Asia, East Asia in particular. The last two decades were adverse for their terms of trade and yet these economies have been able to grow at quite fast pace and (not shown here) to increase sharply their share of the international market. A good deal of their competitiveness is clearly associated to a large extent to an increasingly intense regional trade in producer goods, coupled to dynamic regional demand for 'other goods'. This is the scenario that we have called here as a 'regional multiplier', where demand stimuli for the products of one country have indirect effects on the demand for the production of a number of others in the region. This is a natural process of trade creation, independent from the existence or not of preferential trade conditions.

This is not to say that East Asia has found most of its dynamism in the regional market. The trade surpluses of several of these countries with the Rest of the World make daily headlines. The point to emphasize here is that a good deal of the competitiveness that allows for this performance has to do with the systematic employment of inputs produced elsewhere within the region at lower costs, the very logic of complementary productive structures, and this has been instrumental in periods of negative impact from the terms of trade.

This outcome is explained in part by the very competitiveness of the smaller economies in that region. As shown, the 'spoke' countries in East Asia seem to be as competitive as the large countries, insofar as the indexes of comparative advantages in producer goods are concerned. Furthermore, there are indications of an even more significant competitiveness of these countries in the regional trade in producer goods. This is a totally different scenario than the one found in Latin America.

In Latin America, even where some indications of the existence of such 'regional multiplier' are found, as in Mercosur in recent years, they are extremely limited and only marginally may contribute to alter the overall scenario. Trade with the Rest of the World still absorbs most of the regional demand. This is hardly a sustainable structure in the long run, in particular when there is a need for more active policies in order to face the competition of products coming from outside the region, especially East Asia.

What we have tried to show here is that the East Asian experience provides lessons to be observed carefully and eventually reproduced elsewhere. This is not only due to its particularities: facing the competitiveness achieved by these very productive complementarities is a challenge in itself.

Latin America has shown significant rates of growth of GDP in recent years and the forecast for the coming years tend to be positive, largely due to the expected favourable conditions in the international market for commodities. This seems to be an adequate time to rethink regional economic relations from a new perspective, creating the conditions to foster competitiveness in a more sustainable way, by exploiting the possibilities for reducing production costs and at the same time generating the dynamism required to provide the weaker economies in the region with basic conditions to improve their participation in the international market.

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