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Latin America's Response to China and India: Overview of Research Findings and Policy Implications

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Latin America's Response to China and India: Overview of Research Findings and Policy Implications[1]

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Resumen:

El éxito económico de China e India es mirado con admiración pero también preocupación por los efectos que el crecimiento de estas economías pueda tener sobre América Latina y el Caribe (ALC), en especial sobre sectores productores de manufacturas y servicios. La evidencia aquí resumida indica que ciertos sectores productores de manufacturas y servicios, en especial en México y también en menor medida América Central y el Caribe, han sido afectados de manera negativa por la competencia de China e India en terceros mercados. También, las importaciones por parte

de ALC de productos originarios en China e India han sido asociadas a efectos modestos en términos de desempleo y costos de ajuste en el sector de manufacturas. Sin embargo, hay evidencia substancial de efectos agregados positivos para las economías de ALC derivados del mayor peso de China e India en las exportaciones mundiales, flujos financieros, e innovación tecnológica. Más allá de que se observa una alta heterogeneidad de tales efectos para los distintos países de ALC, el crecimiento de China e India implica nuevas posibilidades de producción para ALC, en particular para aquellos sectores con una fuerte incidencia de recursos naturales y conocimiento científico, beneficios que no solo se deben al crecimiento de los mercados domésticos de estos dos países asiáticos, y sus efectos sobre el precio de los commodities, sino también de la existencia de complementariedades con terceros mercados a través de cadenas de producción, disponibilidad de bienes intermedios y de capital mas baratos, y de spillovers tecnológicos. En resumen, el crecimiento de China e India no ha sido un juego se suma cero para ALC, pero los beneficios potenciales no están siendo apreciados en su justa dimensión. Es crucial que para que ALC aproveche la creciente presencia de China e India en los mercados mundiales se adopten estrategias que faciliten la participación de las empresas de ALC en cadenas de producciones globales, así como la presencia comercial en los mercados domésticos de China e India. Los gobiernos de ALC deben evitar las tentaciones de aplicar políticas proteccionistas y deben focalizarse en facilitar el proceso de ajuste en los sectores afectados, así como también el cambio en la estructura de producción dirigida hacia sectores mas intensivos en recursos naturales y conocimiento, adoptando las políticas adecuadas en las áreas de educación, innovación, manejo de recursos naturales y desarrollo rural.

Palabras Clave: Teoría Económica e Investigación, Libre Comercio, Política Comercial, Mercados y Acceso a Mercados.

Clasificación JEL: F1, F4.

Abstract:

The economic success of China and India is looked upon with admiration but also concern about the effects that the growth of these Asian economies may have on the Latin American and Caribbean (LAC) region's manufacturing and services sectors. The evidence summarized here indicates that certain manufacturing and service industries in some countries, particularly in Mexico and to a lesser extent in Central America

and the Caribbean, have been negatively affected by Chinese and Indian competition in third markets. Also, LAC imports from China and India have been associated with modest unemployment and adjustment costs in manufacturing industries. Nevertheless, there is substantial evidence of positive aggregate effects for LAC economies associated with China and India's greater presence in world exports, financial flows, and innovation. Even though there is significant heterogeneity of such effects across LAC sub-regions, China and India's growth is creating new production possibilities for LAC economies, in particular for sectors that rely on natural resources and scientific knowledge, which not only benefit from the growing internal markets of the two Asian economies and their effect on commodity prices, but also from complementarities in third markets through production networks, cheaper inputs and capital, and innovation spillovers. In sum, China and India's growth has not been a zero-sum game for LAC, but the potential benefits are not being fully realized. It is crucial that LAC countries take full advantage of the growing presence of China and India in world markets by adopting offensive strategies that facilitate both the participation of LAC firms in global production networks and their commercial presence in the two Asian economies' markets. Governments should avoid protectionist temptations and should focus on facilitating the adjustment in affected sectors, as well as the emerging structural shift towards more natural-resource and scientific-knowledge-intensive sectors by adopting adequate education, innovation (both patentable and non patentable), natural resource management, and rural development policies.

Keywords: Economic Theory & Research, Free Trade, Trade Policy, Markets and Market Access .

JEL Classification: F1, F4.

I. INTRODUCTION: MOTIVATION AND SUMMARY OF FINDINGS

China and India's fast economic growth during the past decade is paralleled only by their growing presence in policy discussions throughout the Latin America and the Caribbean (LAC) region. The success of these Asian countries is looked upon with admiration, but there is also concern about the effects that growing Chinese and Indian exports may have on the manufacturing and service sectors throughout the region. Blame for the private sector's poor performance in some LAC countries often falls on the

growing presence of China, and to a lesser extent India, in world markets (see Box 1).

Box 1: The impact of China's growth as seen by public opinion in LAC

"[We] must not repeat the mistakes of the nineties, when an 'invasion' of Chinese products destroyed entire sectors of our industry […]." Communiqué of CAME (Medium Enterprises Association of Argentina), April 6, 2004.

 "Countries around the world are bracing for a surge of cheap imports from China, which benefits from cheap, union-free labor and rising productivity." Taipei Times, January 2, 2005.

"*Textiles and shoes are the sectors most harmed by the Chinese,"* says Dilma Rousseff (Brazilian President Lula's chief of staff), Bloomberg, September 29, 2005.

"*CAFTA backers say this will help American nations compete with cheap imports from China and other Asian nations*." AFP, July 30, 2005.

"*I made it very clear to Minister Bo Xilai that we will take the legal steps to give Brazilian industry the right to protect itself*." Luis Furlan, Brazilian Minister for Industry, Development and Commerce after meeting with his Chinese counterpart, October 4, 2005, as reported by Yahoo!

"*It is not clear whether or not China is actually competitive. Perhaps it is, but perhaps its current success is based on the fact that they do not respect a series of rules that other countries, such as Mexico, do respect*." President Fox at the October 2002 APEC summit, as reported on October 22 by Reforma.

Part of the concern in LAC can be attributed to the loss of economic importance *vis à vis* the two Asian economies, in spite of a broad range of reforms in the region, which started in the mid- to late-1980s. In 1980 LAC was twice as large as China and India, which jointly represented 3 percent of world GDP. By 2004, LAC was 20 percent smaller than China and India. Today China is the sixth largest economy in the world when

measured in terms of GDP and India the tenth largest economy. Together they account for 6.4 percent of world GDP[3].

The fast economic growth of China and India was accompanied by their rapid integration into world markets while LAC lagged behind. Today China and India's share of world exports is 50 percent larger than LAC's share, whereas in 1990 the reverse was true. In the late 1980s LAC had a trade-to-GDP ratio roughly equal to the trade-to-GDP ratio of China, and two times larger than the trade-to-GDP ratio of India. By 2004, the trade-to-GDP ratio of China was 35 percent larger than the trade-to-GDP ratio of LAC, and India's trade-to-GDP ratio was only 14 percent smaller than LAC's. China is currently the third largest trading economy in the world (just behind the United States and Germany), while India ranks 25th.

Similar trends are observed in terms of inward flows of foreign direct investment (FDI), trade in services, and innovation. In 1990, the OECD's stock of foreign capital in LAC was 5 times larger than their stock in China and India. By 2004, OECD's stock of foreign capital in LAC was only twice as large. China and India's exports of services to the United States increased more than threefold during the period 1994-2004, whereas LAC exports increased twofold. Similarly, in terms of innovation, the number of patents registered in the U.S. by China and India was 75 percent smaller than the number registered by LAC in 1990. By 2004, China and India were jointly patenting twice as much as LAC, in spite of China's and India's lower levels of development when measured in terms of GDP per capita.

A superficial look at these trends would suggest that China and India's growth has been pushing LAC countries out of world markets, and that is probably why defensive strategies dominate policy discussions in the region. However, China and India's rapid growth can be seen as an opportunity that has been actually helping LAC economies, not only because of the rapid growth of the Chinese and Indian domestic markets, but also because of the opportunities their growth may offer in terms of new production possibilities, FDI and financial flows. The objective of this study is to disentangle these forces and assess how the overall growth of trade, FDI, finance and innovation in China and India has affected LAC, and how LAC firms and governments have adjusted and should respond.

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[3] All calculations are based on GDP data measured at market prices.

The main findings indicate that the growth of China and India has not been a zero-sum game for LAC countries, but there is significant heterogeneity across LAC sub-regions. First, the growth of the two Asian economies, in particular China, offers a growing opportunity for LAC exporters to these markets, although it has not been fully exploited yet. China and India also represent a growing source of financing (Chinese FDI in LAC reached U.S.$4 billion in 2004, and the stock of Chinese FDI in Mexico in 2004 exceeded U.S.$28 billion). As China, in particular, liberalizes its financial sector the potential for becoming an important source of financing for LAC economies is large. In 2004 China was among the top 10 creditors in the world and India will soon be among them if current trends continue. In terms of innovation, the scope for bilateral cooperation is large and is exemplified by the Chinese-Brazilian agreements on satellite development which have led to the joint production of remote sensor satellites used for space imaging. China provided 70 percent and Brazil 30 percent of the financing and technology. There also exist bilateral agreements between Chile and China in the areas of mining and geosciences, plant quarantine, and forestry (Dominguez et al., 2006).

Moreover, there is evidence of positive net overall effects for LAC economies associated with the larger presence of China and India in third markets. For example, the rising correlation between the growth of the two Asian economies and LAC economies (with the exception of Central America and the Caribbean) seems to have been driven mainly by demand externalities and higher prices for commodities where LAC's comparative advantage lies. At the aggregate level, higher levels of Chinese and Indian trade, inward flows of FDI, and patenting are found to be generally associated with higher levels for LAC economies as well, or at least not declining levels of FDI or patenting. The growing presence of intra-industry trade, production networks, and the production opportunities facilitated by cheaper imports, lower cost of capital and innovation, are some additional channels through which trade, FDI and innovation externalities may have positively affected LAC economies. Overall, the evidence suggests that concerns regarding China and India's displacement of LAC from FDI, export and innovation markets are misplaced. On the contrary, LAC has been benefiting from the two Asian economies' growing presence in world markets.

The aggregate gains have been accompanied by some pain as some industries, firms, and sub-regions have been negatively affected by the rapid growth of the two Asian economies. The background studies found

this to be the case, for example, in industrial and electrical machinery, electronics, furniture, textiles, and transport equipment, mainly in Mexico and to some extent in Central American countries. However, most of the deterioration in the position of LAC exports in third markets relative to China's and India's has to do more with domestic supply-side conditions than with lower demand for LAC products due to China and India's increase in market shares.

In terms of FDI, there is also some weak evidence of inflows of FDI into LAC's manufacturing sector being substituted for FDI in China and India's manufacturing sector, particularly Central America and the Southern Cone. But these effects are not statistically robust and complementarities are the norm even in manufacturing. Furthermore, China has become a large net exporter of capital, due to its accumulation of reserves which has contributed to keeping international interest rates low and ample global liquidity.

In the service sector India has outperformed Latin America in terms of export growth over the last decade. However, LAC's exports of services to the United States (its main export market) are seven times larger than China and India's exports to the United States. This partly reflects one large advantage of LAC over China and India for the delivery of services to American consumers: proximity. This is particularly important in the tourism sub-sector, where LAC has been performing relatively well when compared to the rest of the world,[4] but also in health and retirement services. In terms of displacement of LAC service exporters by India, in only one of the eight service sub-sectors examined (other business, professional and technical services) is there robust evidence of India's export of services displacing LAC exports. For other sub-sectors the impact of India's growth on LAC exports of services is not robust across specifications.[5]

It is also true that there is an impact of growing imports from China and India on manufacturing unemployment and factor adjustments costs in LAC, as expected, given the lower labor costs in the two Asian economies,

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[4] This may be explained by proximity, but also endowments and entrepreneurship. There are 116 UNESCO Heritage sites in LAC, versus 33 in China and 26 in India.

[5] In an alternative specification where exports from China are weighted by the lagged share of Indian exports, Freund (2007) found a negative and statistically significant impact in four service sub-sectors, a positive and statistically significant impact in one service sub-sector, and no statistically significant impact in three service sub-sectors.

but its economic significance is found to be marginal.[6] This, of course, does not mean that addressing the high unemployment levels in the manufacturing sector of some LAC countries, as well as the factor adjustment costs faced by LAC firms, is not a priority.

Moreover, the specialization pattern of LAC is changing in favor of natural-resource and scientific-knowledge-intensive industries, and part of this change can be attributed to China and India's rapid growth. There is also evidence that China and India may be pushing some LAC manufacturing sectors in some countries toward more low-wage unskilled-labor-intensive activities (e.g., the apparel sector in Haiti and Nicaragua), as, for them, there is more scope for substitution in skilled-labor-intensive industries. In other countries and sectors, in contrast, firms are adjusting towards higher-quality and skilled-intensive products (e.g., apparel in Costa Rica and Dominican Republic). Such differential effects are explained by variations in both factor endowments and the quality of policies and institutions.

The move towards natural-resource-intensive products implies a more concentrated export bundle in LAC. This raises concerns regarding the vulnerability of LAC to future (negative) terms of trade shocks, but more importantly there is also a feeling within LAC that the gains associated with natural-resource-intensive exports are not being widely spread. The economic, but also political, sustainability of this specialization in natural-resource-intensive sectors depends on the extent to which gains are shared with owners of other factors of production.

In sum, there is strong evidence that at the aggregate level the effect of China and India's growth on LAC has been positive, even though some industries in some countries may have been negatively affected. The rapid growth of China and India's demand for LAC products (commodities but also manufactured products), which is not being fully exploited by LAC exporters, and complementarities in trade flows, FDI, and innovation are the forces that explain why LAC countries should be rooting for more growth in China and India. But there is no gain without pain. To be able to take advantage of the opportunity offered by China and India's growth,

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[6] In the early 2000s, according to statistics provided by UNIDO's INDSTAT database, the average monthly salary in manufacturing in China and India oscillated between U.S.$120 and U.S.$150 per month. The equivalent figure in Argentina was U.S.$1112, in Uruguay U.S.$1010, in Chile U.S.$882, in Brazil U.S.$860, in Mexico U.S.$670, in Costa Rica U.S.$495, in Colombia U.S.$350, in Bolivia U.S.$262, in Guatemala U.S.$120.

some industries will need to adjust as they will be subject to stronger competition from the two rapidly growing Asian economies. The need for adjustment varies across LAC countries depending on their factor endowments and their exposure to direct competition from China and India. For example, even though the trend changed around 2003, Mexico is the only country in LAC whose comparative advantage has been moving in the same direction as the comparative advantage of the two Asian economies. This obviously calls for larger adjustment needs than in the rest of the region.

In terms of policy implications, the evidence suggests a change in the policy priorities for the LAC region. To help the emerging adjustment of firms towards higher-quality and scientific-knowledge-intensive products, more emphasis should be placed on education policies that would help workers acquire the necessary skills. Support to both patentable and non-patentable innovations should also be strengthened to help private-sector firms adjust towards more scientific-knowledge-intensive sectors and products. Policies to facilitate rural development and natural-resource-based industries and management should also see their importance rise to help LAC economies respond well to the higher demand and prices for commodities. Also, policies and private-sector initiatives should aim to exploit the untapped opportunities offered by the growth of the two Asian economies' internal markets through export and FDI promotion activities, as well as helping LAC firms better integrate in global production chains. In the short term, negatively affected industries and factors of production require stronger safety nets to help workers during the transition.

The rest of this paper is organized as follows. Section II summarizes the evidence about the positive aggregate effects of China and India's growth in world trade markets, FDI flows, and innovation activities on LAC economies. Section III presents evidence on the effects of China and India's growth within industries, concluding that negative effects are limited to certain manufacturing and service sectors, in particular in Mexico and to a lesser extent in Central America and the Caribbean. Section IV summarizes evidence of the effects of China and India's growth on specialization patterns and factor adjustments, and actual and potential policy responses by LAC Governments. Section V concludes by summarizing the policy implications.

II. The Growth of China and India is Not a Zero-Sum Game for LAC

As mentioned, the growth of China and India could have affected LAC economies through at least three channels, namely trade, FDI and financial flows, and innovation. These topics are covered in the following paragraphs.

Trade

Since the mid-1990s there has been a rising correlation of business cycles between LAC and the two Asian economies. The exceptions are Central America, where the correlation with China has been declining, especially after 1999, and Mexico which has had a stable correlation with China, even though it has been increasing since the late 1990s (see Figure 1). This suggests that the growth of China and India is being partially mirrored by most LAC economies.

Figure 1.a
Explaining the Rising Output Correlation between LAC and China
Output Co-Movement: 10- year Window Rolling Correlations
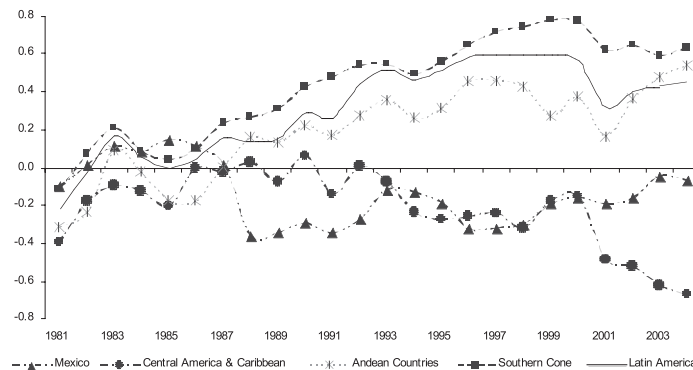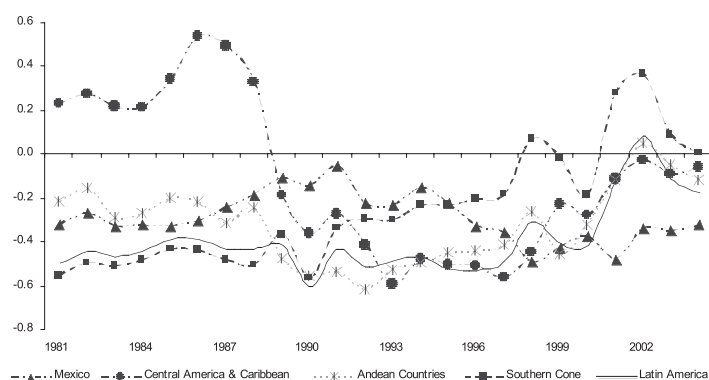**LAC Sub-regions vis-à-vis China**

Figure 1.b
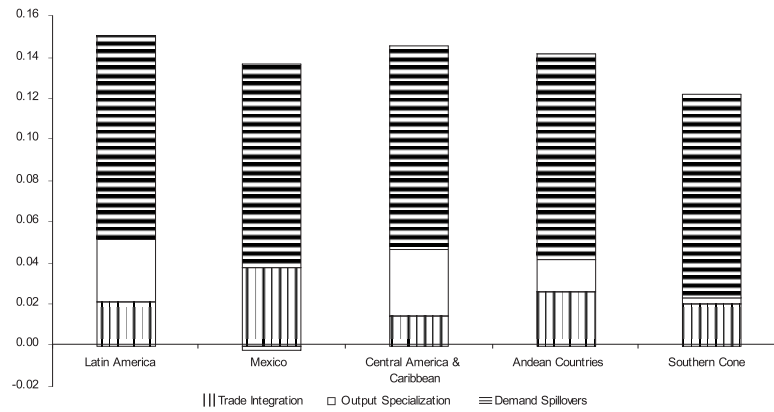**LAC Sub-regions vis-à-vis India**

Source: Calderón (2007)

In a background paper for this study, Calderón (2007) built an empirical model to disentangle the forces behind this synchronization of business cycles. The author explains 55 percent of the change in output correlation between LAC and China and 50 percent of the change between LAC and India through demand spillovers, changes in production structure asymmetries, bilateral intra-industry trade, and inter-industry trade.[7] As shown in Figure 2, most of the rising correlation with China can be attributed to demand spillovers,[8] particularly in small LAC economies. [9] The same pattern is observed for India.

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[7] The degree of business cycle synchronization between countries is measured by the correlation between the cyclical components of real output. The cyclical component of real output is obtained using the band-pass filter proposed by Baxter and King (1999). Once the business cycle is computed for each country, Calderón (2007) calculates the correlation between de-trended output in countries *i* and *j* over the following non-overlapping 10-year periods: 1965-1974, 1975-1984, 1985-1994, and 1995-2004. He then regresses these correlations on variables that measure the degree of trade integration, output specialization and demand spillovers controlling for other factors.

[8] A word of caution is warranted here, as demand spillovers are identified using time dummies in a regression explaining the correlation of output. Other factors (common supply shifts for example) could be captured by time dummies.

[9] For Central America, demand spillovers also explain a large share of the declining output correlation. This signals that the relative demand in China for goods produced in Central America has been declining, especially since the late 1990s.

Figure 2
Explaining the Rising Output Correlation between LAC and China

0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
-0.02

Latin America   Mexico   Central America &   Andean Countries   Southern Cone
                              Caribbean

|||Trade Integration   □ Output Specialization   ≡ Demand Spillovers

Source: Calderón (2007).

Part of these demand spillovers can be explained by the rising correlation between Chinese and Indian business cycles, and world commodity prices, in which LAC tends to have a natural comparative advantage (see Figure 3).

Figure 3
LAC's Comparative Advantage in
Natural-resource-intensive Products

100000
50000
0
-50000
-100000
-150000
-200000

MENA   LAC   EAS   SSA   China   ECA   India   SAS   HOECD   TIG
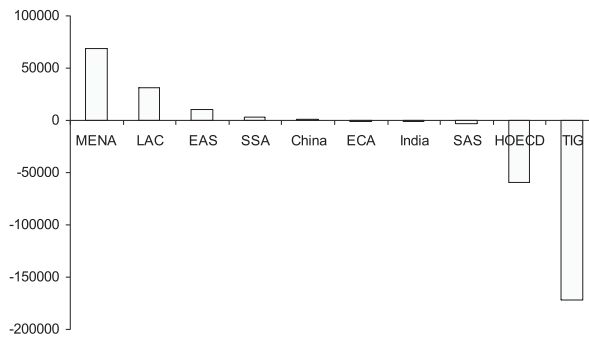
Note: The natural resource index is calculated as the trade balance (exports minus imports) in ores, mineral, fuel, agricultural raw materials and food divided by the labor force. Units are U.S.$ per worker. MENA stands for Middle East and North Africa, EAS for East Asia, SSA for Sub Saharan Africa, ECA for Eastern and Central Europe, SAS for South Asia, HOECD for high-income OECD countries and TIG for the three original East Asian Tigers (Korea, Singapore and Hong Kong). Source: Perry and Olarreaga (2007).

The largest increase in correlation with China's industrial production index occurred in metals and minerals (driven by copper, and since 2004 by iron ore and zinc) as well as beverages (driven by coffee): see Figure 4. Although one has to be careful inferring causation from these results, the coefficient on the impact of Chinese industrial output on the world price of crude oil is also large and increased from 0.81 at the beginning of 2000 to 1.88 by the end of 2005. Sugar prices also seemed to have benefited from the growth of China and India, whereas the price of soybeans and wheat shows a strong and rising correlation with the Chinese production index until late 2004, but has been declining since then. Similar patterns are observed with the correlation of Indian industrial output and world commodity prices, with the exception of minerals.

This rising correlation occurred as the share of China and India in world demand for commodities increased significantly.[10] Figure 5 shows the share of China and India in world markets for selected commodities in 1990 and 2004. For most commodities in Figure 5, China and India's share of world consumption has more than doubled over the period and is as high as 25 percent.

Figure 4.a
China and India: Impact on Commodity Prices
Industrial Production in China vs. World Commodity Prices Indices

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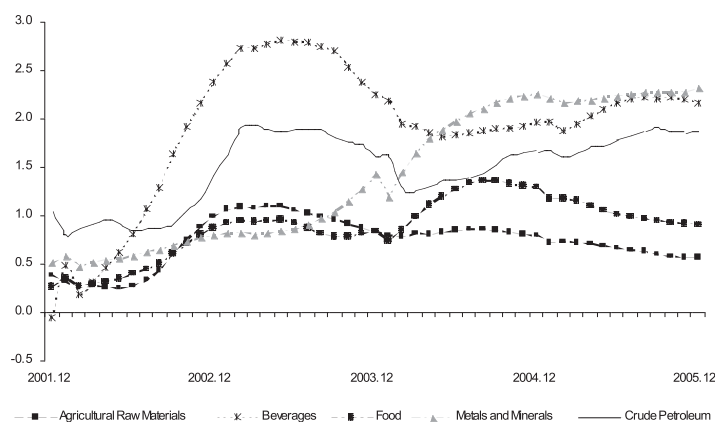
[10] The statistical significance of the correlation coefficients increases more sharply and the coefficients are statistically different from zero from 2002 onwards.

Figure 4.b
Industrial Production in India vs. World Commodity Price Indices
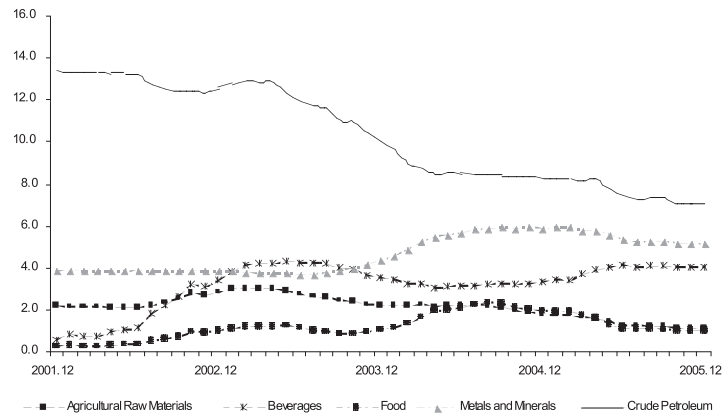
Source: Calderón (2007)

Moreover, even though the absolute level is still small in some commodities (e.g., petroleum), the change in quantities consumed by China and India accounts for a larger share of world prices movements observed during the period (Figure 6).[11]

Figure 5
Share of China in World Markets: Selected Commodities
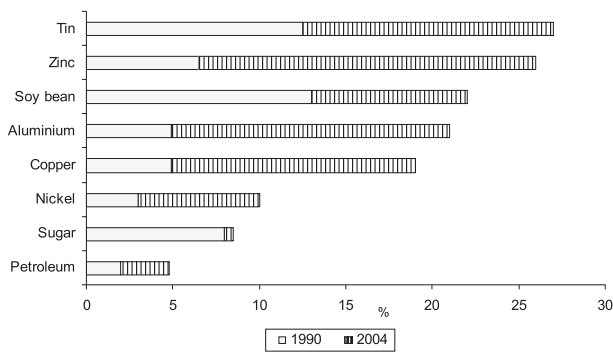
Source: Lederman, Olarreaga and Rubiano (2007).

[11] China and India have contributed on average to 12 percent of the increase in demand in world markets over the period 1990-2004.

Figure 6
China and India's Contribution to the Growth in World Demand,
1990-2004: Selected Commodities
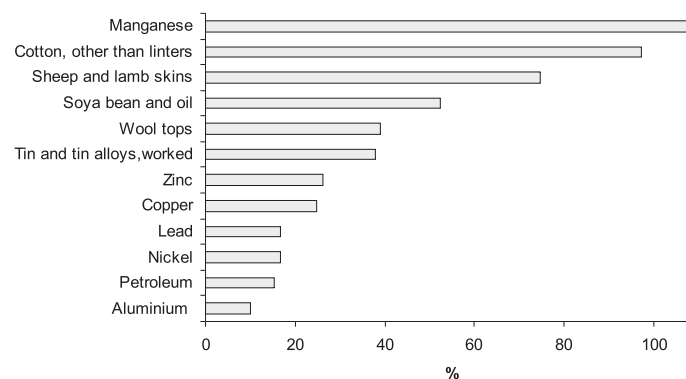
Source: Authors' calculations using import data from the United Nations' Comtrade.

The fact that the rising correlation in business cycles seems to be better explained by demand externalities, rather than by increases in bilateral trade flows, is confirmed by Lederman, Olarreaga and Soloaga (2007), who utilize a traditional gravity model of trade to explain both the impact of China and India's GDP growth on LAC's exports to these two markets, as well as the impact that the growth of China and India's presence in world markets had on LAC exports to third markets.[12] The positive impact of the former is large but is dominated by the latter.

The impact of China's GDP growth during the period 2000-2004 on its demand for LAC goods can explain around 7 percent of LAC's exports in 2004. In spite of the rapid increase in bilateral exports to China (and India) over the period 1990-2004 (see Figure 7) the estimated growth in China's demand for LAC exports was 28 percent higher than the observed

[12] The gravity model of trade explains bilateral trade flows with economic size (GDP) of importers and exporters, the bilateral distance between trading partners, and other control variables. To capture the impact of China and India's growth on LAC exports to the two Asian economies' markets in a sample composed of Latin American exporters to and importers from the world, Lederman *et al.* (2007) isolate the impact of China and India's GDP growth on LAC's bilateral exports by estimating sub-region-specific effects that vary by exporting and importing country or sub-region. To control for the correlation between the expected value of bilateral trade flows among country pairs and the variance of their regression errors, which itself may be increasing with trade flows, thus biasing estimates from linear regressions, they use a Negative Binomial estimator (see Santos Silva and Tenreyro 2005).

increase in exports, signaling some missed opportunities. The growth in Chinese demand for commodities[13] was even larger, representing 10 percent of LAC exports in 2004, and accounting for 74 percent of the actual growth in LAC exports of commodities to China.[14]

Figure 7
Share of LAC exports to China and India
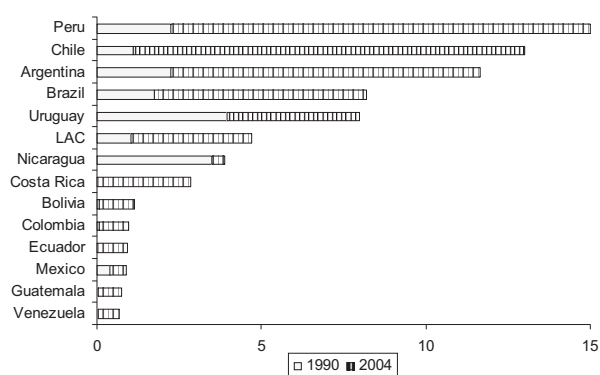
Source: United Nations' Comtrade

The estimated growth in Chinese demand for LAC goods was quite uneven across LAC sub-regions. The last two columns of Table 1 present the estimated impact of China's GDP growth on LAC exports to China by region, both as a share of total LAC exports in 2004 and as a share of LAC bilateral export growth. The largest estimated increases in Chinese demand were for Southern Cone and Andean goods (with an increase equivalent to 15 and 10 percent of their total exports, respectively). The estimated growth in Chinese demand for Central American and Caribbean products represented only 2 and 1 percent, respectively, of their total exports in 2004.

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[13] Commodities are here defined as goods falling in the HS 01 to HS 24 classification of the Harmonized System.

[14] Thus, there is less evidence of missed opportunities in commodity exports.

Table 1
Impact of China's (and LAC's) GDP Growth on
LAC Non-fuel Exports to China

	Estimated Coefficient α_R (i)	p-value (ii)	$\Delta Y_{i \text{ or } j}$ (iii)	(iv)= (iii)*(i)	(v)=(iv) in %	M_{ijt} (v) as % of total 2004 exports	(v) as a share of bilateral export growth
Andean countries							
Own supply	0.38	0.19	0.20	0.00	0%	0%	0%
China demand	**4.42**	**0.00**	**0.38**	**1.66**	**427%**	**10%**	**203%**
Caribbean countries							
Own supply	-0.81	0.24	0.10	0.00	0%	0%	0%
China demand	**4.49**	**0.00**	**0.38**	**1.69**	**441%**	**1%**	**60%**
Central America							
Own supply	-2.10	0.00	0.20	-0.42	-34%	0%	-11%
China demand	**4.25**	**0.00**	**0.38**	**1.60**	**394%**	**2%**	**125%**
Southern Cone							
Own supply	-0.09	0.58	-0.18	0.00	0%	0%	0%
China demand	**4.69**	**0.00**	**0.38**	**1.76**	**483%**	**15%**	**203%**
LAC							
Own supply						*0%*	*-1%*
China demand						***8%***	***135%***

Source: Lederman et al. (2007).

Note: When the p-value on the estimated coefficient is smaller than 0.10 the authors set column (iv) to 0, i.e., the predicted change in the left hand side variable is not different from zero. Numbers in bold are for the impact of China's GDP growth on LAC exports (China demand). "Own supply" captures the impact of LAC's GDP growth on their exports to China. The first column reports the estimated coefficient on the impact that China or LAC's GDP has on bilateral exports of each LAC sub-region to China. The second column reports the p-value for the statistical significance of the estimated coefficient. For any p-value above 10 percent, the authors set the estimated coefficient equal to zero in all other columns. The third column contains the in-sample change in the explanatory variable (the log of the GDP of China or LAC). The fourth column gives the product of the estimated coefficient with the change in the relevant explanatory variable. The fifth column calculates the percentage change in bilateral exports to either China associated with the values calculated in the fourth column. The sixth column provides the change on bilateral exports as a percentage of each sub-region total exports in 2004. The last column gives the contribution to bilateral export growth over the period that can be attributed to the growth in China's demand or LAC's sub-region supply associated with their respective increases in GDP

Table 1 also gives the estimated contribution of LAC's sub-regions' GDP growth to their exports to China. With the exception of Central America, whose GDP growth had a marginally positive impact on its exports to China, the impact of all other sub-regions' GDP growth on their exports to China is not statistically different from zero.

The estimated change in Indian demand for LAC products was also impressive. It represented 112 percent of LAC exports to India over the period, again signaling some missed opportunities. However, given that the size of the bilateral trade with India is quite small, this growth in Indian demand for LAC products only accounted for less than 0.5 percent of LAC exports in 2004 (driven by Andean countries and the Southern Cone). The increase in Indian demand for LAC commodities was negligible.

In terms of the impact of the growing Chinese presence in world markets on LAC exports to third markets, Lederman *et al.* (2007) found no evidence of net substitutability.[15] Rather, the growth in Chinese exports to third markets led to an increase (although not statistically significant) in LAC exports to these markets, signaling demand complementarities at the aggregate level. However, it is likely that these opportunities have not fully materialized. The authors also found a positive and statistically significant impact of Chinese exports to LAC on LAC exports to third markets, suggesting that imports of a larger variety of cheaper Chinese intermediate goods are positively affecting LAC's competitiveness in third markets. There is also evidence of "learning by exporting", as LAC exports to China have a positive and statistically significant impact on LAC exports to third markets. In the case of India, however, there is some mild evidence of net substitutability between Indian trade flows and LAC exports to third markets through some channels (Indian imports from third markets), but that is partly compensated by complementarities through other channels (exports of India to third markets, and exports of India to LAC).

Overall these results suggest that the growth of China and India in world markets has created opportunities for LAC. The growth of China and India's demand over the period 2000-2004 accounts for 8 percent of LAC exports in 2004 (mainly driven by China). However, this remains an untapped opportunity that has not been fully exploited, especially by exporters in the Southern Cone and among Andean countries. There is also

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[15] The growing Chinese or Indian presence is captured by exports of China or India to the same third market.

no economically significant evidence of substitution between China and India's trade flows and LAC's exports to third markets. On the contrary, LAC exporters seem to have been benefiting from the growing presence of the two Asian economies in world markets, particularly China.

Another of the background papers for this study examines the impact on LAC economies of future trade policy changes in China and India. Suescún (2007) builds a dynamic general equilibrium model of the world economy to assess the short- and long-term implications of future tariff reductions in China and India. The first experiment considers a unilateral gradual reduction of tariff and non-tariff barriers on primary goods to the levels observed in developed countries (an 80 to 90 percent reduction of trade barriers on primary goods). The second experiment also includes the reduction of tariffs on manufactured goods to the levels observed in developed countries. The third experiment takes into account that these tariff reductions may take place in a high-growth environment in China and India, by increasing the initial productivity growth rate of the two Asian economies by 2 percent.

Results from Suescún (2007), as shown in Figure 8, suggest an improvement in LAC exports under the three scenarios, driven mainly by LAC manufacturing exports. The reason for this is that China and India's protection of the manufacturing sector is above the level of protection of their agricultural sector.[16] As the Chinese and Indian economies liberalize, this creates relatively larger opportunities for LAC exporters of manufacturing. Figure 8 shows the deviation from the trend in LAC's total exports and manufacturing exports under the three scenarios mentioned above. Thirty years after having introduced the initial shocks, LAC's total exports increased between 1 and 3 percent depending on the experiment relative to their trend level.[17] The increase in LAC's manufacturing exports under the second and third experiments is much larger: an increase

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[16] Although agricultural domestic subsidies are not included in these calculations, these are quite important in both China and India.

[17] Note that the first experiment E1 has a positive impact on LAC's manufacturing exports. The reason for this is twofold. First, as primary good prices in China and India fall, their producers of intermediate goods based on primary goods redirect their sales to world markets. This benefits users of such goods in LAC and other regions. Second, as the price of these goods declines in China and India, this leads to a positive income effect in China and India that will lead to an increase in their demand for manufacturing goods, and therefore an increase in LAC's manufacturing exports. Obviously, the increase in LAC's primary good exports under experiment E1is larger than the increase in LAC's manufacturing exports.

of between 3 and 5 percent relative to their trend level thirty years after having introduced the initial shock.

This suggests that bilateral trade agreements with China and India or multilateral agreements in the current Doha Round of trade negotiations may help LAC exporters, particularly in the manufacturing sector, which is where China and India's growth has been associated with some economic adjustment, particularly in Mexico.[18]

Figure 8
LAC Export Growth after Simulated Tariff Reductions
in China and India
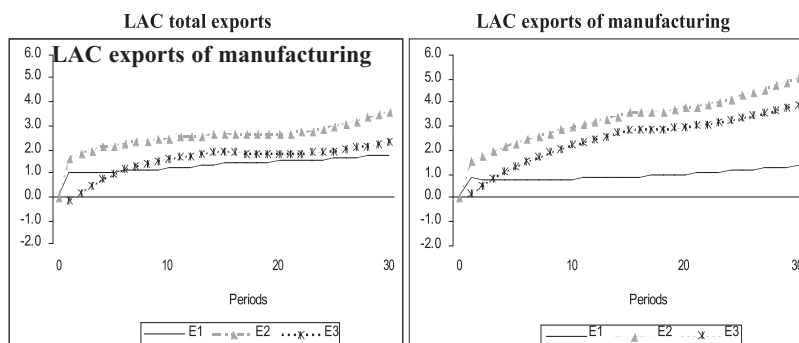
Notes: Each line denotes the percentage deviation from the trend in export growth in LAC after three different shocks. Experiment E1 considers a gradual reduction of tariff and non-tariff barriers on primary goods to the levels observed in developed countries. Experiment E2 also includes the reduction of tariffs on manufactured goods to the levels observed in developed countries. The third experiment E3, in addition to tariff reductions, increases the initial productivity growth rate of the two Asian economies by 2 percent.
Source: Suescún (2007).

FDI and financial flows

Chinese and Indian FDI in the region has been growing steadily since the mid-1990s. Chinese FDI in LAC reached U.S.$4 billion in 2004, and both Chinese and Indian FDI in the region has been growing fast in recent years.[19] This simply reflects the emergence of China and India as

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[18] Note that Suescún does not consider bilateral or multilateral tariff reductions in his setup.

[19] For example, Bolivia is expected to approve in fall 2006 a $2.3bn bid by Jindal Steel and Power of India to extract one of the world's largest untapped iron ore deposits. See Aykut and Goldstein (2006).

exporters of capital to world markets. In 2004 China was among the top ten countries in terms of net foreign asset holdings, and while India was still a net debtor the trend was towards becoming a net creditor. As discussed by Lane and Schmukler (2006), more than 80 percent of these holdings were in reserve assets. However, as China and India liberalize private capital outflows, the potential for them to become a major source of portfolio and foreign direct investment in LAC is large.[20] More importantly, regardless of whether China and India's capital flows are aimed at LAC markets, their growth accompanied by an increase in net foreign lending has contributed to lowering the cost of capital for LAC net debtors.

Moreover, China has become active in the region in terms of bilateral aid, especially in Central America and the Caribbean region. Bahamas, Dominica, Grenada, Haiti, and Honduras have benefited from Chinese aid in the last ten years, including the construction of hospitals, schools, and roads, reconstruction after hurricanes, etc.[21] Part of this aid could also be used to promote bilateral investment and trade relationships which, as argued above, are below potential (at least in Central America).

In terms of China and India's potential to displace inflows of FDI into LAC, similar aggregate patterns to the ones observed for trade are found using an empirical model based on the Knowledge-Capital Model (KCM) of multinational enterprises, which allows for both horizontal and vertical motivations for FDI.[22] In a background paper for this study, Cravino, Lederman and Olarreaga (2006) explore the extent to which

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[20] A Chinese 2002 pilot scheme to promote outward FDI was extended nationally last year, and earlier this year, the government launched a qualified domestic institutional investor program aimed at increasing the ability of domestic residents to invest in foreign securities including stocks and bonds. Restrictions to outflows of FDI in India are also being removed (Lane and Schmukler, 2006).

[21] Part of the motivation behind this bilateral aid is associated with the recognition of Taiwan: of the 26 countries in the world that recognize Taiwan, 11 are in Central America and the Caribbean region (Dominguez, 2006).

[22] See Carr, Markusen, and Maskus (2001). In the Knowledge-Capital Model (KCM), bilateral FDI stocks are explained by variables that capture horizontal and vertical motives for FDI. Horizontal motives are captured by the sum of source-country and host-country GDPs as a measure of total market size, and the squared GDP differences. According to the KCM, the coefficient on the sum of GDP should be positive, since larger markets should attract multinational enterprises. The KCM predicts that, controlling for the sum of GDP, differences in country size discourage horizontal FDI. The intuition is that when one of the countries is small, multinational firms would open production facilities mostly in large economies. Vertical motives are captured by the absolute value of differences in skilled labor abundance between the source and the host country. The model also includes other control variables to capture investment and trade costs.

[23] Cravino, Lederman, and Olarreaga (2006) use various estimators: OLS, Poisson to correct

increases in OECD's aggregate FDI in China and India came at the expense of FDI in LAC. They found that China and India's FDI inflows had a positive effect overall on the stocks of OECD capital in LAC, but also in the rest of the world.[23] There are some exceptions when the authors focus on the manufacturing sector (using U.S. data), but results are not robust across specifications and will be discussed in the next section.

Regardless of whether LAC's FDI is a complement or a substitute to growing stocks of FDI in China and India, Cravino, Lederman and Olarreaga (2007) assess the overall performance of LAC relative to China and India, by comparing the stocks of FDI in LAC relative to the two Asian economies. In spite of the rapid growth of foreign capital in China and India, OECD's stocks of FDI in LAC in 2003 were much larger than the stocks of FDI in China and India, after controlling for the relative size of the economies. Table 2 shows the ratio of stocks of FDI divided by GDP in some LAC countries relative to the same ratio for China, India, and Hong Kong and China together.[24] The first column on each of the three control groups provides the values of the aggregate stock of FDI from the OECD, the second column provides values for U.S. stocks of FDI, and the third column provides values for U.S. stocks of FDI in the manufacturing sector. As can be seen from Table 2, stocks of FDI in LAC were larger than stocks of FDI in China or India in most countries in 2003 after controlling for the economic size of the host-country economy. This even holds for U.S. stocks of FDI in the manufacturing sector with the exception of Argentina and Guatemala relative to China and Hong Kong.

In sum, the results of Cravino *et al.* (2007 and 2006) suggest that fears of a global competition for FDI seem misplaced in light of the data. The overwhelming evidence is that growing investment opportunities for the OECD in the Chinese and Indian markets have led to more OECD FDI in LAC, as production possibilities expand for OECD's multinational firms.

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for the correlation between the expected value of bilateral capital stocks and the variance of their regression errors, and Negative Binomial to control for over-dispersion (the increasing correlation between the expected capital stocks and the variance of their regression errors).

[24] Hong Kong has been a part of China since 1997 and therefore should be considered part of the Chinese economy. Moreover, some observers have argued that China's and Hong Kong's trade data should be combined to approximate the trade flows coming from China mainland due to transshipments of merchandise through Hong Kong.

[25] There is also an indirect effect of China and India's growth on the price of new technolo-

Table 2
OECD Stocks of FDI in LAC Relative to their Stock of FDI in China and India, Controlling for Host-country Economic Size, 2003

Relative to:	China			China and Hong Kong			India		
Source / Host economy	OECD	U.S.	U.S. Manufac-turing	OECD	U.S.	U.S. Manufac-turing	OECD	U.S.	U.S. Manufac-turing
Argentina	9.24	10.37	1.17	4.10	2.70	0.81	13.67	10.50	3.99
Brazil	4.93	7.70	3.68	2.19	2.01	2.54	7.29	7.80	12.58
Chile	10.55	15.63	2.67	4.68	4.07	1.85	15.61	15.83	9.14
Colombia	4.23	4.54	1.99	1.88	1.18	1.38	6.26	4.60	6.80
Costa Rica	2.60	6.06	3.96	1.15	1.58	2.74	3.85	6.14	13.53
El Salvador	1.47	5.30	N.A	0.65	1.38	N.A	2.17	5.37	N.A
Guatemala	0.71	1.51	1.20	0.32	0.39	0.83	1.06	1.53	4.09
Mexico	4.34	11.35	3.17	1.93	2.96	2.19	6.43	11.49	10.84
Venezuela	4.77	13.42	4.15	2.12	3.50	2.87	7.06	13.59	14.20

Note: Values represent the ratio of stocks of FDI divided by GDP in each LAC country relative to the stock of FDI divided by GDP in either China, China and Hong Kong, or India. In the case of manufacturing FDI we take the stocks of FDI relative to manufacturing value added. Data is from UNCTAD, OECD, BEA, WDI and China Statistical Yearbook, 2003.
Source: Cravino et al. (2007).

Innovation

The rising integration of India and China with the global economy might also have had repercussions for the growth of other economies through their contributions to global knowledge. For instance, innovations produced by Indian and Chinese researchers might have commercial applications that could provide learning opportunities for innovators residing in other countries.[25] It is also possible, however, that the patterns of innovation of these emerging economies could be competing with innovations emanating from other countries. When these innovations are patentable, then this competition might imply losses of economic rents for innovators in other developing countries, including in LAC. Figure 9 shows that, in fact, the growth of India and China and their increasing global economic integration during the 1990s has been associated with increased patenting activity in the United States Patent and Trademark Office (USPTO). It is particularly noteworthy that Indian and Chinese patenting

gies for LAC. As their growth as export processors increases the demand for new technologies, this increases incentives to invest in R&D in the OECD, which lowers the price of new technologies in LAC.

[26] See Government of Chile. 2004. *Joint Feasibility Study on a Free Trade Agreement*

activity came from very low levels in the late 1980s and recently surpassed LAC's total patent counts. Nevertheless, these facts do not necessarily suggest that LAC is losing out from India's and China's performance.

Figure 9
Indian, Chinese and LAC Patenting Activity in the United States,
1963-2004
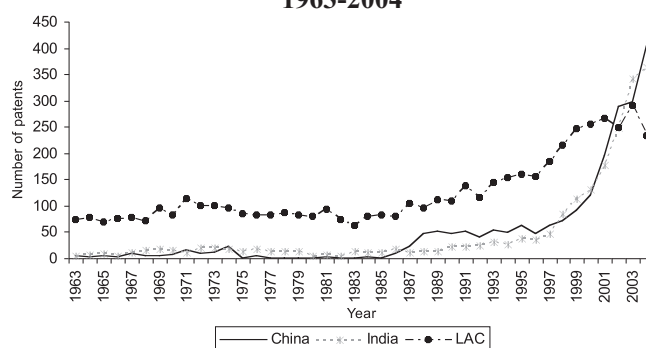
Source: Authors' calculations.

To assess the extent to which patenting activity by China and India is affecting the patent counts received by LAC innovators, we conducted an econometric investigation of the empirical links between past patenting activity in LAC, China, India, and the rest of world, while estimating at the same time the effects of contemporaneous patenting activity across these regions of the world. The intuition behind these econometric models is simple: innovation in LAC today can be affected by past accumulated knowledge, by current patterns of innovation, and by current investment in research and development (R&D). The results suggest that there are no apparent significant effects of contemporaneous patenting by India and China on patents received by LAC innovators. The results do suggest, however, that past knowledge provided by the stock of patents accumulated prior to 1981 is feeding the process of innovation in contemporary LAC. The main policy implication that can be derived from this evidence is that there is potential for promoting innovation with commercial value in LAC by learning from innovators in India and perhaps China. Consequently, scientific exchange and cooperation programs between LAC and these emerging economic powerhouses should be pursued. In fact, some LAC countries are already pursuing this agenda. For example, Chile's recent signing of a trade agreement with

China was accompanied by a scientific and research cooperation agreement.[26]

III. IMPACT OF CHINA AND INDIA'S GROWTH WITHIN INDUSTRIES

If, at the aggregate level, the rapid growth of China and India seems to be helping LAC, or at worst has no impact, this is not necessarily the case when measuring the impact at the industry or firm level, when positive externalities (complementarities) across industries are not taken into account. When focusing the analysis at the industry level the potential for substitutability between LAC exporters and Chinese and Indian exporters to third markets is much stronger.

Using a gravity-type empirical model for bilateral exports at the industry level, based on a monopolistic competition model of trade, and abstracting from general equilibrium effects, Hanson and Robertson (2007) explored the impact of the increased supply capacity of China on Argentina, Brazil, Chile and Mexico's manufacturing exports at the industry level. Their analysis focused on the top manufacturing exports of these four countries which represent at least 85 percent of their manufacturing exports (metals, machinery, electronics, transport, and industrial equipment).

More specifically, they ran a regression of bilateral sectoral exports on importer country dummies, exporter country dummies, and factors that affect trade costs (bilateral distance, sharing a land border, sharing a common language, belonging to a free trade area, import tariffs). When these importer and exporter dummies are allowed to vary by sector and by year, they can be interpreted as functions of structural parameters and country-specific prices and income levels that determine a country's export supply and import demand. They then decompose manufacturing export growth for the four LAC countries into three components: (a) changes in sectoral export-supply capacity, (b) changes in import-demand conditions in a country's trading partners, and (c) trade costs and other residual factors. Changes in import-demand conditions can, in turn, be decomposed into two parts, one of which captures changes in income levels in import markets and another of which captures changes in sectoral import price indices for those markets, which are themselves a function of other countries' export-supply capacities, including China.

between Chile and China. www.direcon.cl

[27] Causality is derived using Chinese tariffs as instruments for Chinese export variety.

Results suggest that within manufacturing industries, Latin America's export capabilities tend to be relatively strong in industries in which China's export capabilities are also strong, suggesting the region is relatively vulnerable in these specific sectors to export-supply shocks from China. While changes in Latin America's export-supply capacities have contributed to growth in exports, changes in Latin America's import-demand conditions have not, at least since 2000. They examined two sources of negative import-demand shocks: China's growth in export supply, which may have lowered import prices in destination markets and diverted import demand away from Latin America; and the slowdown in the growth of the U.S. economy, which may have reduced growth in demand for the region's exports. The results suggest that had China's export-supply capacity remained constant after 1995, exports for the four Latin American countries would have been 0.5 to 1.2 percentage points higher during the 1995-2000 period and 1.1 to 3.1 percentage points higher during the 2000-2004 period. Had U.S. GDP growth been the same over the 2000-2004 period as it was over the 1995-2000 period, Latin American manufacturing exports would have been 0.2 to 1.4 percentage points higher (see Table 3).

Table 3
Counterfactual Decompositions of Latin American Export Growth

	Counterfactual Growth in Manufacturing Exports		
Period	Actual Growth in Manufacturing Exports	Exporter Coefficients in China Constant over Time	U.S. GDP Growth 2000-2004 = 1995-2000
Argentina			
1995-2000	0.081	0.085	--
2000-2004	-0.045	-0.034	-0.043
Brazil			
1995-2000	0.130	0.137	--
2000-2004	0.111	0.125	0.119
Chile			
1995-2000	0.071	0.079	--
2000-2004	0.053	0.076	0.060
Mexico			
1995-2000	0.165	0.177	--
2000-2004	0.024	0.055	0.038

Notes: This table reports actual and counterfactual export growth in Latin American countries based on two scenarios: U.S. GDP growth over 2000-2004 equals that for 1995-2000, and China's export-supply capacity remains constant over the sample period (1995 to 2004) at levels equal to 1995 values. Source: Hanson and Robertson (2007).

In another background paper for this study, Freund and Ozden (2007) undertook a similar exercise covering all manufacturing and agricultural goods. They estimated a trade-gravity model in first differences, where the change in LAC exports by country at the industry level is explained by exporting country dummies that vary by year to capture changes in export supply conditions and importing country dummies that also vary by year to capture changes in overall demand conditions in each market, as well as product dummies that vary by year but only at the two-digit level of the ISIC. The impact of China on LAC exports to third markets is captured by the change in China's exports to third markets. A negative and statistically significant coefficient on this last variable would indicate that in that industry Chinese exports are hurting LAC exporters of the same products.

Freund and Ozden also found that increased exports from China are mainly hurting Mexican exporters of manufacturing goods, namely textiles, electronics and electrical appliances, and telecommunications equipment. In spite of the differences in specification and estimation techniques, the results by Freund and Ozden are qualitatively similar to those estimated by Hanson and Robertson. Freund and Ozden found large impacts for Mexico in electronics and telecommunications equipment. In other industries, such as textiles, they found smaller numbers which indicate that Mexico's exports are 1 percentage point smaller in the absence of China's export growth to third markets. Freund and Ozden do report some negative impacts for other LAC regions (i.e., Central America), and again for manufacturing exports only, but the impacts are not economically meaningful. When focusing on the impact by industry (two digits of the Harmonized System), they found that of the 97 two-digit industries only 16 experienced a statistically significant decline in exports to third markets due to growing exports of those same products by China to these same markets. Overall, the results of Hanson and Robertson and Freund and Ozden suggest that there is some evidence of substitutability between LAC exports and Chinese exports to third markets within industries, but these effects are limited to a few countries (mainly Mexico and, to a minor extent, Central America) and a few manufacturing sectors.

Services is a sector where India in particular has outperformed LAC in terms of export growth. However, LAC's exports of services to the United States are still seven times larger than exports of services by China and India combined (see Figure 10). This partly reflects the importance of proximity for the delivery of services, for example in tourism, which is

particularly important for the Caribbean region, and where Indian and Chinese competition may not be very strong.

Using a similar approach to the one in Freund and Ozden (2007) described above, Freund (2007) explores the extent of substitutability between LAC and Indian exports of services to the United States. Using panel data on business, professional, and technical services, she finds no evidence that Indian exports have significantly displaced LAC exports of services. When the analysis is undertaken by service industry, she finds robust evidence of displacement in only one sub-sector, namely other business, professional and technical services, where a one percent increase in growth from India has been associated with a 0.3 percent decline in growth from LAC. However, this is a "catch all" category so it is difficult to pinpoint the true economic importance.

Figure 10
United States' Imports of Services by Region, 1994-2004
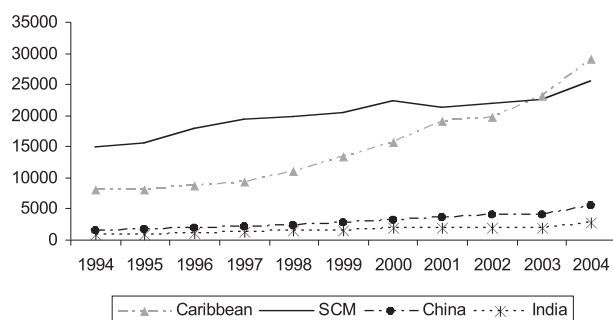
Notes: SCM stands for South America, Central America and Mexico.
Source: Freund (2007).

In the other eight service sub-sectors considered, there is either no impact or a positive and statistically significant impact on LAC exports to the U.S., again suggesting some complementarities. Nonetheless, when India's export growth is weighted by the importance of India in each market, Freund finds a negative and statistically significant impact in four sub-sectors (legal services, research and development and testing services, industrial engineering, and other business, professional and technical services), and a positive and statistically significant impact in one sub-sector (construction and engineering services). In the other four industries there is no statistically significant effect.

China's export growth to third markets may not only be hurting existing LAC exporters (the so-called intensive margin), but also exporters of goods and services that have not yet been exported (the so-called extensive margin). In a background paper for this study, Feenstra and Kee (2007) focus on the extent to which the growing export variety from China to the U.S. market decreased the extent of export variety from Mexico. They found that every 1 percentage point increase in export variety from China (which has been growing at an average of 3 percent per year) has led to a half percentage point reduction in export variety from Mexico.[27] However, this has been more than compensated by Mexico's preferential access to the U.S. market which has led to a 2 to 4 percent increase in export variety from Mexico for every percentage point reduction in preferential tariffs. In fact, the semi-elasticity between tariff cuts and export variety estimated by Feenstra and Kee is *higher* when the competition from Chinese exports is taken into account. This result has long-term implications, as increases in export variety have been shown to positively affect total factor productivity and growth in a sample of developing countries (Feenstra and Kee, 2006).

In terms of FDI substitutability and complementarities within industries, Table 2 above provides some numbers regarding the relative importance of U.S. stocks of FDI in LAC's manufacturing sector relative to U.S. stocks of FDI in China and India. With the exception of Argentina and Guatemala when compared to the aggregate of Hong Kong and China, all countries in LAC have a larger stock of U.S. manufacturing FDI. Cravino, Lederman, and Olarreaga (2006) use the KCM model we described above for aggregate FDI to measure the extent of substitutability with respect to U.S. FDI in the manufacturing sector. As mentioned, these authors found no robust evidence of substitution or complementarities between LAC's stocks of U.S. FDI in the manufacturing sector and China and India's. Fears of losing foreign capital in the manufacturing sector to China and India seem unfounded. However, given that at the aggregate level they found strong complementarities, the fears may be explained by the relative performance.

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[28] Part of the higher price of Mexico, Costa Rica, and the Dominican Republic in Figure 11 is explained by their increasing preferential access to the U.S. market, but results regarding quality

IV. FACTOR ADJUSTMENTS, SPECIALIZATION PATTERNS, AND POLICY RESPONSES

Positive impacts of China and India's growth at the aggregate level in LAC, together with some negative impacts at the industry level, suggest within- and across-industry adjustments, as well as some potential policy responses by LAC's governments.

Freund and Ozden (2007) found evidence of quality downgrading in Central America, using a price equation that explains changes in LAC unit export prices to third markets as a result of changes in the size of the export market and changes in prices and imports from China. For the other sub-regions, there is no statistically significant evidence one way or the other, except on overall exports of LAC to the OECD where there is weak evidence of quality upgrading as competition from China intensifies.

Focusing on the apparel industry, which has been hit strongly by competition from China and India after the removal of GATT's Textiles and Clothing Agreement quotas under the Multi-Fiber Agreement, Ozden (2006) observes that different countries have shown different adjustment patterns. Costa Rica, the Dominican Republic, and Mexico took advantage of the Caribbean Basin Initiative preferences and NAFTA to initially increase their export volume. However, with the removal of MFA quotas, they moved to higher priced/quality exports (see Figure 11).[28] El Salvador, Guatemala, and Honduras did not seem to implement any structural changes in their apparel industry but simply increased their production and exports at the same quality/price level. Nicaragua and Haiti were new entrants to the apparel markets and their exports increased dramatically, but under competition from Asian countries they moved down the quality ladder to lower priced/quality exports.[29]

upgrading for Costa Rica and Nicaragua hold after controlling for tariff preferences.

[29] One has to be careful in attributing these changes to the removal of the MFA quotas and the growing presence of China and India in these markets. Other factors such as preferences to the United States markets (which Ozden controls for in his econometric framework) may be partly driving these results.

[30] The RCA index used corresponds to the Vollrath (2001) measure, which captures the net comparative advantage of a country in a given industry by also taking into account imports. The

Figure 11
Relative Export Prices of Apparel, 1989-2004
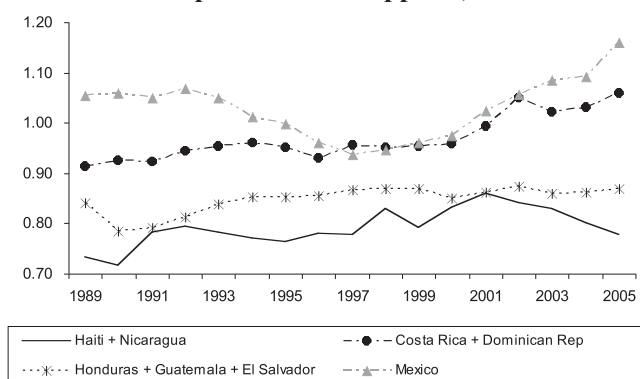
Note: Export prices for each group are calculated relative to the average U.S. import price.
Source: Ozden (2006)

Using an index of potential industry wages –measured by the export weighted sum of GDP per capita— Freund and Ozden (2007) observed that LAC is moving toward higher-wage products, though at a rather slow rate, especially when compared with China. There is also some evidence that China is depressing LACs's upward movement, as China is displacing LAC in some relatively high-wage industries.

This is also confirmed by Lederman, Olarreaga, and Rubiano (2007), who found that LAC and China's specialization patterns exhibit some substitutability for skilled-labor-intensive industries but appear unrelated in unskilled-labor-intensive industries. In the case of India, however, there are signs of strong substitutability in both unskilled and skilled-intensive industries suggesting that India is putting pressure on labor at both ends of the skill spectrum. Lederman, Olarreaga, and Rubiano also found evidence of strong complementarities between LAC's and China and India's specialization pattern in natural-resource-intensive industries and to some extent industries intensive in scientific knowledge. Without China and India's growth, and the induced increase in their demand for commodities since the mid-1990s, LAC's revealed comparative advantage in natural resources would have been 30 percent smaller, and the revealed comparative advantage in scientific-knowledge-intensive industries would have been 17 percent smaller. This suggests that the growth of China and India may be pushing LAC towards sectors intensive in these two factors and away from both skilled- and unskilled-

labor-intensive industries. Indeed, they found that there may have been some scope for substitutability in the trade specialization patterns of LAC, and of China and India in the early 1990s, but with the exception of Mexico, LAC and the two Asian economies have been moving apart in their trade specialization pattern.

The evolution of the correlation between Chinese and Indian Revealed Comparative Advantage (RCA) and the RCAs for an aggregate of thirteen LAC countries between 1990 and 2004 is shown in Figure 12.[30] The line indicated with a "star" shows the correlation with China and the straight line the correlation with India. At the beginning of the period, the correlation between Chinese and Indian RCAs and LAC RCAs was positive but modest (around 0.2), suggesting that China and India were specializing in the same products as LAC. However, the trend is clearly downwards and by the end of the period, the correlation with China was around -0.2 and the correlation with India was close to zero. This suggests that by the end of the period, LAC's trade specialization pattern was complementary to the Chinese specialization pattern and unrelated to the Indian one. The same pattern is observed for all countries with the exception of Mexico.

Figure 12 also shows the evolution of an export concentration Herfindhal index (higher values indicate a more concentrated export bundle), where the vertical axis on the right provides the scale and the line with triangles shows the evolution of the index. The evidence suggests that LAC as a whole has been moving towards higher concentration of its export bundle since the mid-1990s.[31] During the same period China has moved towards a more concentrated export bundle, in particular since the mid-1990s, whereas India has shown some diversification. Overall this suggests that the explanation behind the falling correlation between LAC and China is that LAC and China are moving towards more specialization but in a different set of products. In

RCA index is also normalized by the country-year means so that it is comparable across time and countries.

[31] There is a move towards export diversification at the beginning of the 1990s, probably prompted by LAC's trade reforms in the late 1980s and early 1990s, as also shown in De Ferranti et al. (2002), but this has been followed by a move toward specialization as trade theory would predict, but also partly explained by the commodity boom. The trends in Figure 12 are dominated by the large LAC economies, Brazil and Mexico.

[32] This assumes that production and adjustment costs are separable. But without this assumption it is impossible to estimate factor shortages without having a measure of adjustment costs.

the case of India, the trend would also be explained by the diversification of India's export bundle.

Figure 12
Is LAC Competing in the Same Products as China and India?
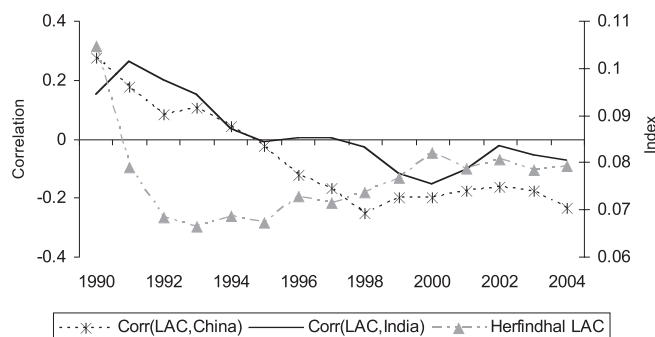
Source: Authors' Calculations

Concerns about the potential adjustments costs faced by Latin American firms subject to increased import competition from China and India in their domestic market led Casacuberta and Gandelman (2007) to examine whether firms that were exposed to competition from the two Asian economies were subject to higher adjustment costs for unskilled labor, skilled labor, and capital. They measured the impact of adjustment costs on firms' behavior by looking at the extent to which firms adjust to their factor shortages from one period to the next. Factor shortages are defined as the difference between actual levels of factor employment and desired levels of factor employment; the latter are given by optimal factor demands derived from a Cobb-Douglas production framework in a frictionless world.[32]

Casacuberta and Gandelman found that only a small share of factor shortages or surpluses are addressed by firms from one period to another, which they interpret as a signal of large adjustment costs in a sample of Uruguayan manufacturing firms. However, increasing competition from China and India only marginally changes the extent of the adjustment,

[33] Wages, capital stock, and import and export penetration are instrumented using lagged values, the share of unskilled labor in the industry, and a proxy for transport costs.

even though adjustment costs seem to be marginally higher for both skilled and unskilled labor in the presence of factor surpluses (i.e., when firms would like to reduce their level of factor employment) when competition from China and India is strong. On the other hand, adjustment costs seem to be marginally lower for skilled and unskilled labor in the presence of factor shortages (i.e., when firms would like to hire).

A potential explanation for this asymmetry lies in the perceived volatility of Chinese and Indian imports. If these are perceived to be more volatile than imports from other regions (because they are new players in world markets, with a relatively more distant trading partner and with widely different cultural and business practices), then one would expect firms to be more reluctant to fire workers and more willing to hire workers when exposed to more import competition from China or India rather than from more established and better understood trading partners. The data confirms this with a coefficient of variation for imports from China and India that is twice the coefficient of variation of imports from the rest of the world. Addressing the causes of this volatility (which can sometimes be policy-induced, e.g., antidumping duties, non-tariff barriers, etc.) is likely to help reduce the adjustment cost in the presence of surpluses.

An important concern for policymakers associated with the growing presence of China and India in LAC markets (see Figure 13) is the impact this competition may have on employment, and in particular labor-intensive manufacturing employment, where China and India's comparative advantage lies. Manufacturing employment has significantly declined in the region, while imports from China and India were growing. A quick back-of-the-envelope analysis would suggest that the two Asian economies carry the blame for the loss of employment opportunities in manufacturing activities in LAC.

A more careful analysis suggests otherwise. Castro, Olarreaga, and Saslavsky (2007), explored the impact that growing imports from China and India had on manufacturing employment in Argentina, which is among the countries in the region that experienced the largest declines in manufacturing employment over the last decade (31 percent), while experiencing an important increase in import penetration from China (see Figure 13). These authors built a dynamic econometric model where labor demand in each industry is a function of wages, the capital stock, prices, and productivity. The last two (prices and productivity) are a function of import and export penetration, which allow them to identify the impact

that trade with China and India is having through these two channels on labor demand in Argentina's manufacturing sector.[33]

Figure 13
Share of China and India in Latin American Imports,
1990 versus 2004
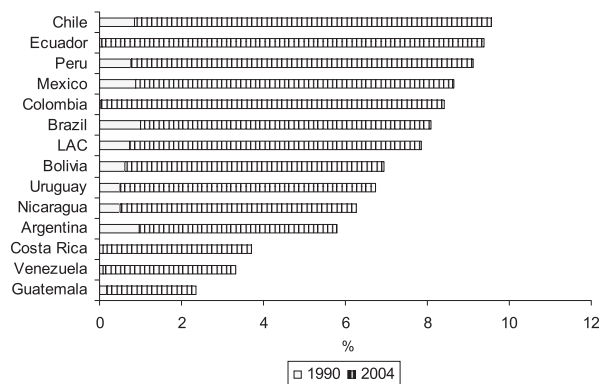
Source: United Nations' Comtrade

Results suggest that increased trade with China can only explain a negligible share of the decline in Argentina's manufacturing labor demand. Moreover, the increase in overall import penetration during the period could only explain a relatively small share of the decline in manufacturing employment.[34] To be more precise, a 1 percent increase in import penetration leads to a 0.07 percent decline in labor demand. Given that import penetration increased by 79 percent over the sample period (1991-2003), the decline in labor demand that can be attributed to the increase in import penetration is around 6 percent. As manufacturing employment declined by 31 percent over the sample period, the increase in import penetration can at most explain 20 percent of the observed loss in manufacturing employment. The other 80 percent had other causes (labor legislation, privatization, technological change, etc…). Moreover, the increased importance of China as a source of imports had an almost

[34] Hoekman and Winters (2005) in their recent survey of the evidence on the links between trade and employment conclude that there is no robust evidence either way, particularly in the manufacturing sector of developing countries.

[35] The use of antidumping duties by LAC on imports from China will be limited by most LAC countries' recognition of China as a "market economy" last year. This affects the flexibility

negligible marginal impact on the decline in labor demand associated with the increase in overall imports. An increase in the share of imports from China of 1 percentage point led to an additional 0.02 percent decline in the growth of Argentina's labor demand. Thus, the six-fold increase in the share of imports from China over the period (from 1 to 6 percent) could only explain an additional 0.1 to 0.2 percent of the observed decline in labor demand. Results for India suggest that the increase in its share of Argentina's imports has had no impact on labor demand (beyond the overall impact of import penetration on labor demand).

Perhaps surprisingly, export penetration does not seem to affect labor demand in Argentina's manufacturing industry. The reason could be that exports do increase output and therefore labor demand, but they are also often accompanied by export-induced technological change that is labor-saving. The evidence suggests that in Argentina these two forces cancel out and there is no large impact on employment. This implies that Chinese and Indian competition in third markets may not be having much of an impact on Argentina's manufacturing employment either. This result, however, may not carry over to countries subject to a higher degree of competition in third markets, such as Mexico.

In terms of LAC governments' responses to the growth of imports from China and India into the region, Facchini et al. (2007) found that tariffs tended to be higher on products heavily imported from China, but lower on goods imported from India. The evidence they provide is not limited to tariffs, however: non-tariff barriers have become a predominant form of protectionism and Chinese exporters have been particularly hit by LAC countries, while Indian exporters enjoyed below-average levels of protection in LAC. For example, Brazil initiated 15 antidumping cases against China as notified to the WTO; Argentina, 40 cases; and in the early 1990s Mexico imposed antidumping duties over 1,000 percent on imports of shoes, toys, and textiles from China (Dominguez et al., 2006). Together they have initiated more cases against China than the European Union, the United States, or Canada.[35]

They explained the differences in protection levels *vis à vis* China and India using a lobbying model with imperfect substitution between

they enjoyed earlier under WTO rules to set high and discretionary duties, even though Article VI of GATT which regulates antidumping duties is quite flexible and subject to abuse.

[36] Quality proximity is proxied by the absolute value of the difference in the share of industry level exports to the TRIAD.

domestically produced goods and imported goods. They found that incentives to lobby were higher when products were close substitutes to the ones domestically produced, resulting in higher tariffs in equilibrium. After bringing the model to the data, they found that this was a reasonable explanation for the higher tariffs observed on goods imported from China, as estimates suggest that they are closer substitutes to domestically produced goods than goods imported from the rest of the world. Similarly, it can also explain the lower levels of protection on goods imported from India, as estimates suggest that goods imported from India are more distant substitutes to domestically produced goods than goods imported from the rest of the world. However, given that production efficiency losses are likely to be higher in goods with higher substitution, this suggests that the protectionist response is occurring in sectors where they most hurt.

Protectionist responses can also occur behind the border. Baroncelli, Krivonos and Olarreaga (2007) measured the degree of discrimination *vis à vis* foreign applicants in the trademark registration process in China, India, and Latin America, with the differences in the rate of registration of foreign and domestic applicants. They found some significant differences in the rate of registration of LAC trademarks in China with respect to domestic applicants, as well as between the rate of registration of Chinese and domestic trademarks in LAC's trademark registration offices (see Figure 14 for evidence of trademark protectionism towards China in LAC).

They explain this pattern using a model with vertically differentiated goods, and show that incentives to discriminate against relatively close substitutes are larger, as they lead to larger increases in profits for domestic producers and smaller declines in consumer welfare. On the other hand, incentives to discriminate towards products at opposite ends of the quality spectrum are small, as any discrimination would be captured by other producers in the middle of the quality spectrum. They then confront the model to the data and find some evidence that discrimination in the trademark registration process tends to be higher against applicants from countries that produce goods that are of similar quality.[36] The high substitutability between Chinese goods and LAC's goods estimated by Facchini *et al*. (2007) would then explain why there may be higher trademark protectionism between LAC and China.

[37] As shown by Lederman, Olarreaga and Payton (2006) in a background paper for a Regional Study on *Enhancing Firm Capabilities*, export promotion agencies in Latin America have been particularly successful at promoting exports in recent years. However, their focus has

Figure 14
Trademark Protection or Protectionism towards China in LAC?
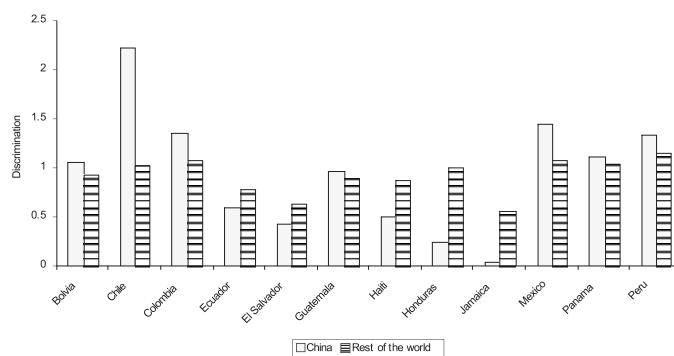
Notes: The discrimination in trademark registration index is measured as the ratio of foreign applications divided by foreign registrations, divided by domestic applications divided by domestic registrations. Any value above 1 suggests that there is a tendency towards registering a lower number of foreign trademark applications than domestic applications.
Source: Baroncelli, Krivonos and Olarreaga (2007)

V. Policy Implications

In general, the evidence discussed in this study suggests that LAC countries should reshuffle their development-policy priorities in response to the emergence of China and India in global markets. The higher correlation between the business cycles of LAC and the two Asian economies is mainly driven by demand spillovers, largely explained by the high correlation between China and India's industrial output and world commodity prices. This suggests that the current commodity boom that is benefiting LAC is largely dependent on the continuing growth of the two Asian economies. Fragilities in China and India's economies, or changes in consumer preferences, should therefore be tracked with particular attention by those LAC economies that have a large share of their economy attached to natural-resource-intensive products.

As indicated, partly under pressure from China and India, LAC's specialization patterns have been shifting towards higher natural-resource and knowledge-intensive activities and products. To facilitate this shift and increase the potential benefits from it, LAC countries should improve their natural resource management and rural development policies, while at the same time strengthening policies and institutions for the promotion of skills and innovation (patentable or not).

In terms of trade policies, both at the border and behind the border, there is evidence that there has been a protectionist response on the part of LAC governments to the growth of imports from China in particular, partly due to the larger vertical and horizontal product substitutability between domestically produced goods and goods imported from China. This is costly in terms of efficiency and also for users of imported intermediate goods, who cannot take full advantage of cheaper inputs to improve their competitiveness in world markets. Giving more weight to consumers and users of imported intermediate goods in the trade policy formation process may yield better outcomes.

One area where some LAC countries seem to have been under-performing is on bilateral exports to the two Asian economies. Negotiating free trade agreements (as some countries are already doing) and export promotion activities focused on these two markets may help reverse this trend.[37] Also, special attention should be given to integration into global production networks that involve Chinese and Indian firms.

In terms of FDI promotion via specialized agencies, it seems that there is no need for a change of course as LAC has benefited from growing FDI to China and India. LAC has been quite successful in attracting FDI and should continue to improve the overall investment climate and the role of specialized promotion agencies in order to maintain their lead.[38] It is unfortunate that a couple of countries in the region have been recently backtracking from the generalized open environment towards FDI in the region.

In services, there may be a need for enhancing the relative competitiveness of LAC *vis à vis* India in business, professional and technical services (as well as legal and industrial engineering services). The literature suggests that this could be achieved by developing internet penetration through investment in telecommunication infrastructure and reforms that expand internet access, but also correctly aligned exchange rates that correct, in particular, for over-valued exchange rates (see Freund and Weinhold, 2002).

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been almost exclusively on the Western Hemisphere and Europe to some extent. Addressing the Asia deficit would help them take advantage of the growing opportunity that China and India represent.

[38] For a recent study on the role of FDI promotion agencies in attracting FDI, see Harding, Javorcik and Sawada (2006).

Also, in order to exploit the evidence of synergies in innovation patterns between LAC and India, governments may want to consider scaling up scientific exchange programs and cooperation in R&D programs. The same may eventually also be useful in some areas with China.

As some industries are negatively affected by the growth of China and India, and these tend to be labor-intensive industries, adjustment assistance for workers may need to be considered. For those countries adjusting towards skilled-intensive and scientific-knowledge-intensive industries, short-term adjustment policies should focus on helping unskilled labor in the transition, while focusing on skill improvements and innovation policies in the long term. For the few countries adjusting towards unskilled-intensive industries, the short-term adjustment policies should probably focus on the higher end of the skill spectrum, while also trying to improve the overall endowment of skilled labor and scientific knowledge in the long term.

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