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Unclogging the Arteries. The Impact of Transport Costs on Latin American and Caribbean Trade

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*El impacto de los costes de transporte en el comercio de Latinoamérica y el Caribe
O impacto dos custos de transporte no Comércio da América Latina e Caraíbas*

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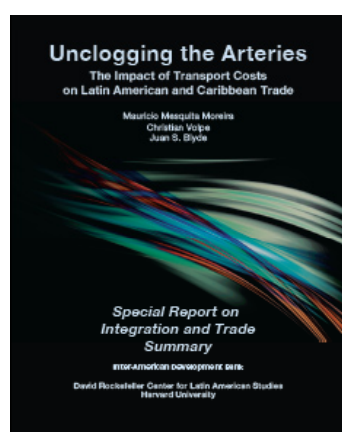
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This article summarizes a report prepared by the Inter-American Development Bank the impact of transport costs on Latin American and Caribbean trade. Based on a robust technical analysis (using large and detailed databases) and a series of case studies, it gives a comprehensive view of the significance of transport costs as a barrier to trade in the region. It calls for a broader and more balanced integration agenda, which would focus not only on the traditional barriers to trade, but also on costs, such as those associated with transport-related infrastructure.

El presente artículo resume un informe preparado por el Banco Interamericano de Desarrollo sobre el impacto de los costes de transporte en el comercio de Latinoamérica y el Caribe. A partir de un sólido análisis técnico (con bases de datos de gran tamaño y detalle) y una serie de estudios de casos, aporta una completa visión de la importancia de los costes de transporte como barrera para el comercio de la región. Apela a una agenda de integración más amplia y equilibrada centrada no sólo en las barreras de comercio tradicionales, sino también en los costes (como los asociados a la infraestructura relacionada con el transporte).

O presente artigo sintetiza um relatório preparado pelo Banco Inter-Americano para o Desenvolvimento sobre o impacto dos custos de transporte no comércio da América Latina e Caraíbas. Com base numa robusta análise técnica (recorrendo a bases de dados de grande dimensão e detalhadas) e uma série de estudos de caso, confere uma visão completa do significado dos custos de transporte como barreira ao comércio na região. Apela a uma agenda de integração mais ampla e mais equilibrada, que se centraria não apenas nas barreiras tradicionais ao comércio, mas também nos custos, como os associados à infra-estrutura relacionada com os transportes.



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1. Introduction

This article is a summary of a report prepared by the Inter-American Development Bank on the impact of transport costs on Latin America and Caribbean Trade. The report combines a robust technical analysis using large and detailed databases with a series of case studies that provide vivid accounts of the problems on the ground. This combination of approaches gives a comprehensive view of the significance of transport costs as a barrier to trade in the region. The report calls for a broader and more balanced integration agenda, which would focus not only on the traditional barriers to trade, but also on costs, such as those associated with transport-related infrastructure. It makes a case for refocusing LAC's trade agenda. It is now time to move our attention beyond tariff related issues to non-policy trade issues, in particular transportation costs.

Trade barriers were clearly “the elephant in LAC's living room” in the late 1980s. At the time, their removal was not only necessary but also inexorable, given the prevailing political climate and limited administrative resources. But one legacy of this liberalization juggernaut was the neglect of other less visible, and therefore politically unattractive, “trade facilitation” issues such as transportation.

If this neglect made sense in the late 1980s, it clearly does not today. Transportation costs have emerged as an issue of unprecedented strategic importance in the region for three reasons:

- The success of the trade reforms in drastically altering the relative importance of policy versus non-policy barriers in a rapidly transforming world economy.
- The growing geographical fragmentation of production and time sensitiveness of trade.
- The rise of huge labor-intensive and resource-scarce markets.

In the chapters that follow, we use the tools of economic theory and econometrics to explore three major databases on freight and tariffs in LAC and in the United States¹. The resulting analysis, combined with other sources of information on distance, the quality of the region's infrastructure and the degree of competition on transport services, provide a telling insight into the magnitude and impact of transport costs in the region.

2. Tariffs, Trends and Comparative Advantage

In this chapter we show that for most Latin American countries transport costs are significantly higher than tariffs. This is true for both import and exports, and especially for intraregional trade. The importance of transport issues is even more overwhelming when we consider the time costs of shipping (i.e. depreciation and inventory costs). Figure 1.2 shows the relative magnitude of transport costs and tariffs for both intraregional exports and exports to the U.S. On the vertical axis shows the ad valorem freight rate and on the

1. They are: the Latin American Association of Foreign Trade's (ALADI) Foreign Trade Statistics System; the U.S. Census Bureau's Foreign Trade Statistics, and the U.S. Department of Transportation's Waterborne Databanks.

KEY WORDS

**Transportation.
Latin America.
Freight and
freightage.
International
trade. Trade
barriers.**

PALABRAS CLAVE

**Transporte.
Latinoamérica.
Flete. Com-
ercio interna-
cional. Barreras
comerciales**

PALAVRAS- CHAVE

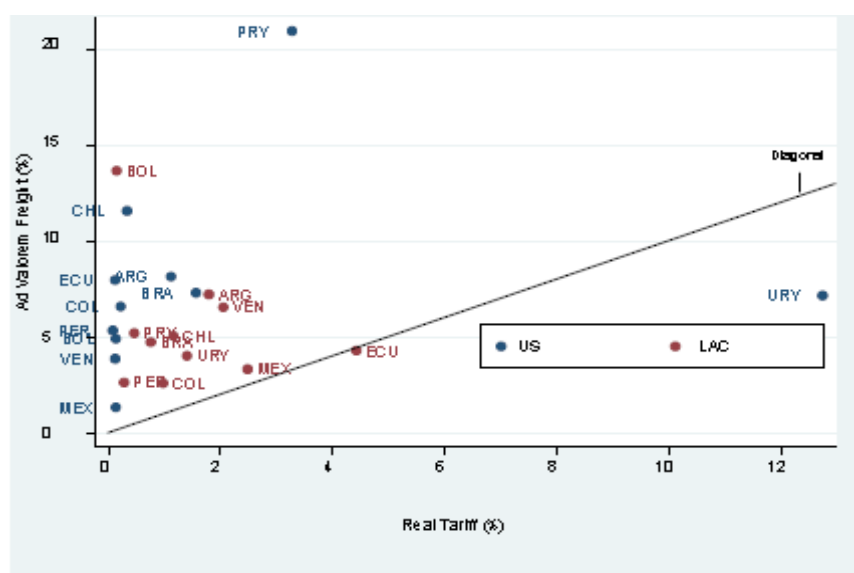
**Transporte.
América Latina.
Frete e freta-
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cio internacio-
nal. Barreiras
comerciais**

JEL CODES

**F120, F140,
O100**

horizontal axis the ad valorem tariff on exports calculated as tariff revenue divided by the value of exports. We plot both intraregional and U.S. freights and tariffs. Countries on the left of the graph diagonal have average (trade weighted) freight rates that are higher than average (trade weighted) tariffs. The dominance of freight over tariffs is clear: All the countries fall to the left of the diagonal, except for Ecuador's intraregional exports and Uruguay's exports to the United States. A similar pattern emerges in the data on imports.

Figure 1.2 Ad valorem Freight and Real Tariffs for Intraregional Exports and Exports to the U.S. Selected LAC Countries. 2005



Note: Graph is based on import data from export markets ad valorem.

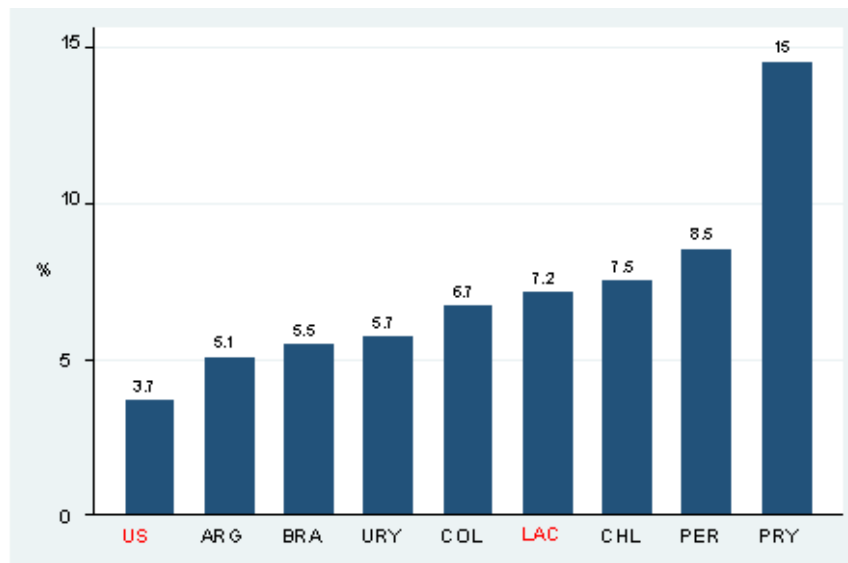
Freight is the ratio of freight expenditures to imports. Real tariffs are the ratio of tariff revenue to imports. Intraregional exports include Brazil, Argentina, Chile, Peru and Uruguay. See Table 1.A.2 in the Appendix for the raw data.

Source: Author's calculation based on U.S. Census Bureau and ALADI data.

In this chapter, we also demonstrate that the region spends nearly twice as much as the United States to import its goods (see Figure 1.3), and that the trends in transportation costs are mixed. While LAC is closing the gap with the developed countries in ocean freight costs, this gap is growing for the increasingly important airfreight. Figure 1.9 shows that airfreight expenditures in LAC are sharply higher than other exporters to the U.S., particularly China. In fact, 2006 airfreight costs were well above the 1995 level, by as much as 36 percent in subregions such as the Caribbean. In contrast, China and the other exporters managed to keep costs below the 1995 mark despite the rise in petroleum prices. Mercosur and Chile have done better than other LAC subregions, but the exceptional gains of the 1990s were rapidly reversed in the 2000s.

Finally, we show that the region's exports to the U.S. and other key markets are on average more "transport intensive" than those of its competitors. The reason is that the region increasingly relies on two key comparative advantages: abundant natural resources and proximity to the world's largest markets. Figure 1.13 illustrates this point by showing correlations between LAC countries' comparative advantages in the U.S. market (the share of a product in the country's exports to the United States divided by the share of this product in total U.S. imports) and two measures of the goods' "transport intensity," that is, weight-to-value, and time costs. As regards the former, the heavier a dollar's worth of the good exported, the higher are its transportation costs. Natural resources are quintessential "heavy" goods; a dollar's worth of iron ore is many times heavier than a dollar's worth of semiconductors. The second measure, time costs, represents the dollar value of a day of transportation in terms of depreciation and inventory maintenance measured as a percentage of the price of the good.

Figure 1.3 Total Import Freight Expenditures as a Share of Imports, U.S. and Selected LAC Countries, 2005 (%)

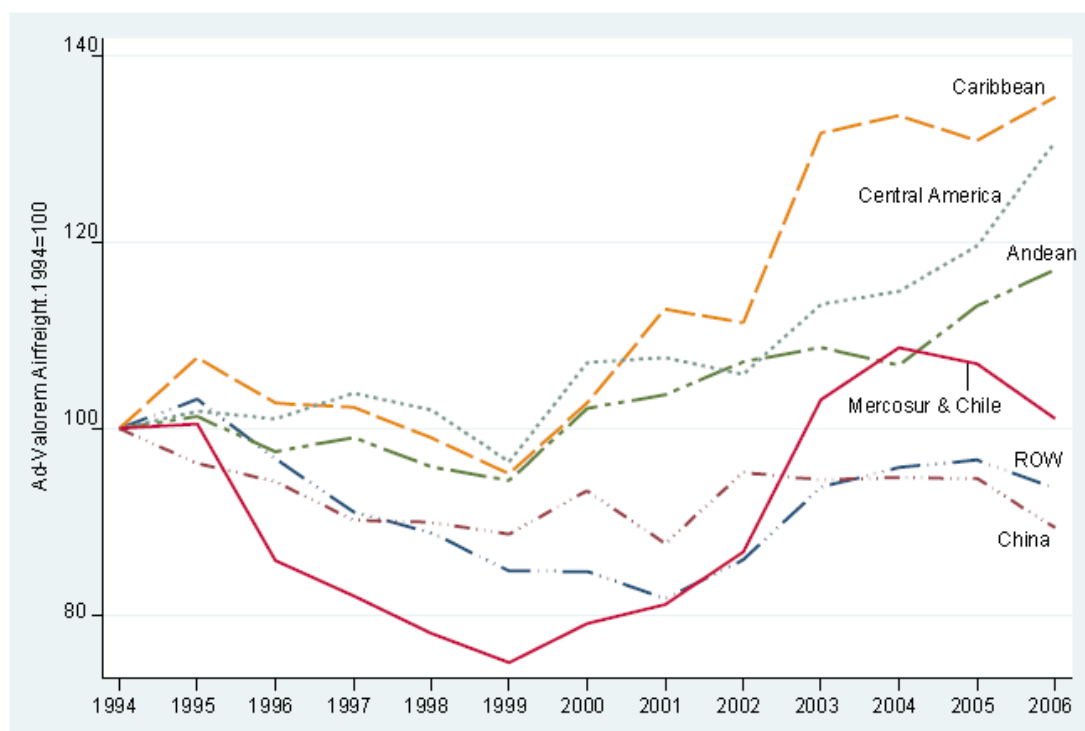


Note: Latin America (LAC) is the simple average of Paraguay (PRY), Peru (PER), Chile (CHL), Colombia (COL), Brazil (BRA), Uruguay (URY) and Argentina (ARG)

Freight expenditures include freight and insurance.

Source: Author's calculations based on ALADI and U.S. Census Bureau data.

Figure 1.9 Trends in Export Airfreight to the U.S. after Controlling for Trade Composition, Selected LAC subregions, China and the Rest of the World (ROW), 1994-2006.
1994 = 100

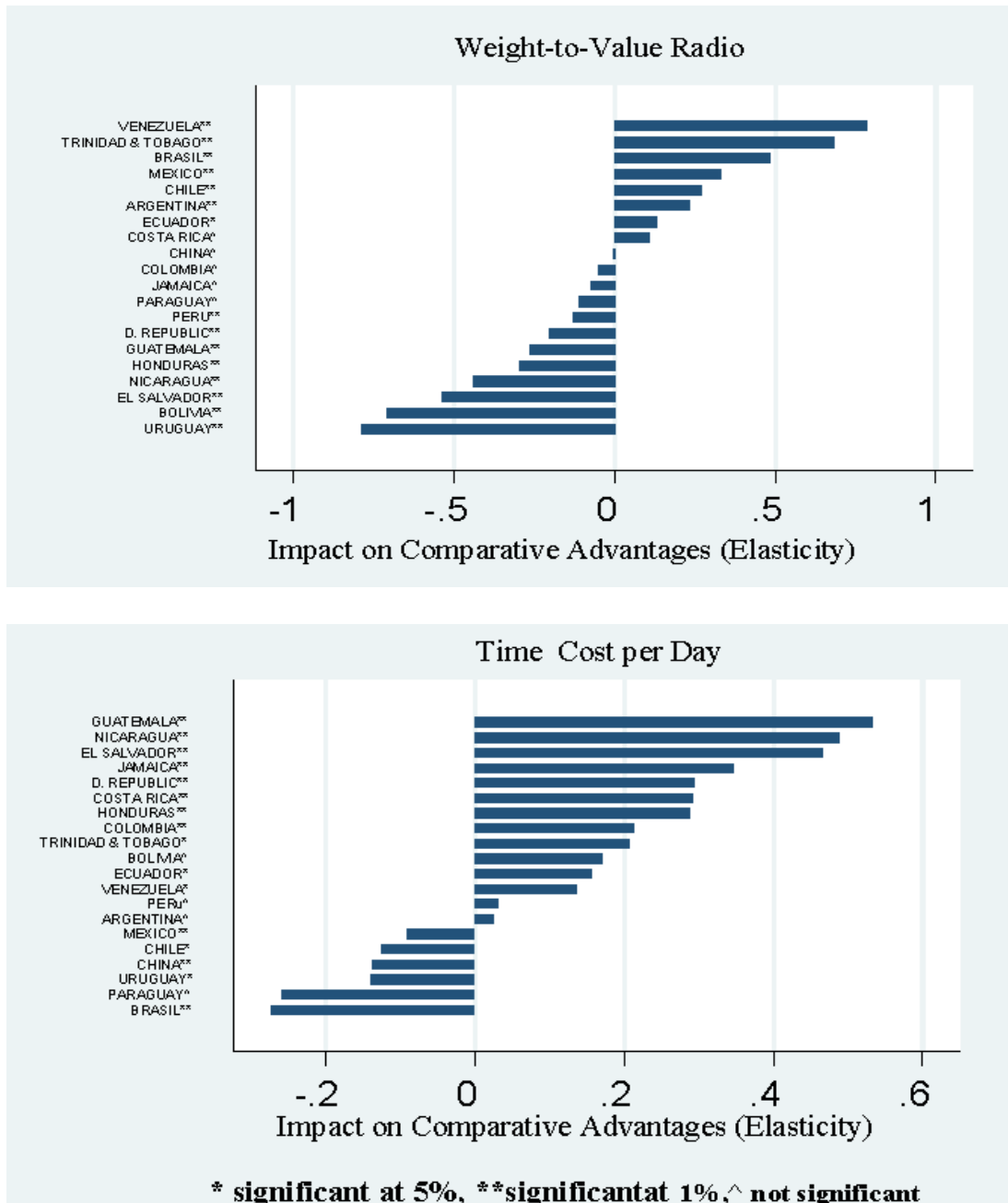


Note: Ad valorem airfreight is freight plus insurance as a share of imports. It was estimated by regressing ad valorem freight on the weight to value ratio of the goods imported and on year and partner-good fixed effects. See text for details.

Source: U.S. Census Bureau.

As Figure 1.13 shows, LAC's comparative advantage in the U.S. market is closely correlated with transport-intensive goods, making it very sensitive to changes in transport costs, whether freight, time costs, or both. This is true in the case of both "heavy" goods (South America and Mexico) and time-sensitive goods (Central America). In contrast, China's comparative advantage does not seem in any way associated with either time-sensitive or "heavy" goods, again helping to make the case that the transport intensity of LAC's exports can be one important asset for strengthening the region's competitiveness in U.S. and regional markets.

Figure 1.13 The Impact of Time Costs and Weight on LAC's Revealed Comparative Advantage, U.S. Market, 1994-2006



Note: The impact figures are coefficients of a regression of revealed comparative advantages on time costs and weight-to-ratio with controls. See text for details.

2. Benchmarking Costs and Sorting Determinants

In this chapter, we find that LAC's transport costs are considerably higher than those of developed economies. Much of the difference is due to the composition of the region's exports--and to a lesser degree imports--which are considerably "heavier" than those of the United States or Europe. But composition is only part of the story. Once we get out its influence, we see that factors related to infrastructure efficiency actually explain the bulk of the difference between LAC and its developed partners.

Figure 2.4 breaks out the various determinants that account for differences in ocean shipping prices between the Netherlands, whose port facilities rank among the top in the world, and selected LAC countries in their exports to the United States. First, we see that LAC's exports to the U.S. pay freight rates that average 70 percent higher than those from the Netherlands. The chart then shows that the main factors explaining the differences in the transport costs are weight-to-value ratios and port efficiency, followed by the degree of competition among shipping companies and, to a lesser extent, volumes of trade. Only minor roles can be attributed to differences in the level of containerization and demand elasticity (market's sensitivity to price changes). Finally, differences in import tariff rates, trade imbalance and distance from markets tend to work in favor of Latin America because, on average, its exports face lower tariffs in the United States, are associated with more favorable trade imbalances, and must travel shorter distances than imports from the Netherlands. We should note that, in line with economic theory, import tariffs should raise freight rates since they reduce the impact of transports costs on the final price of the product, giving shippers a powerful incentive to increase their margins.

Figure 2.4 Decomposing Differences in Ocean Freight Rates between LAC and the Netherlands. Exports to the U.S. (2000-2005)

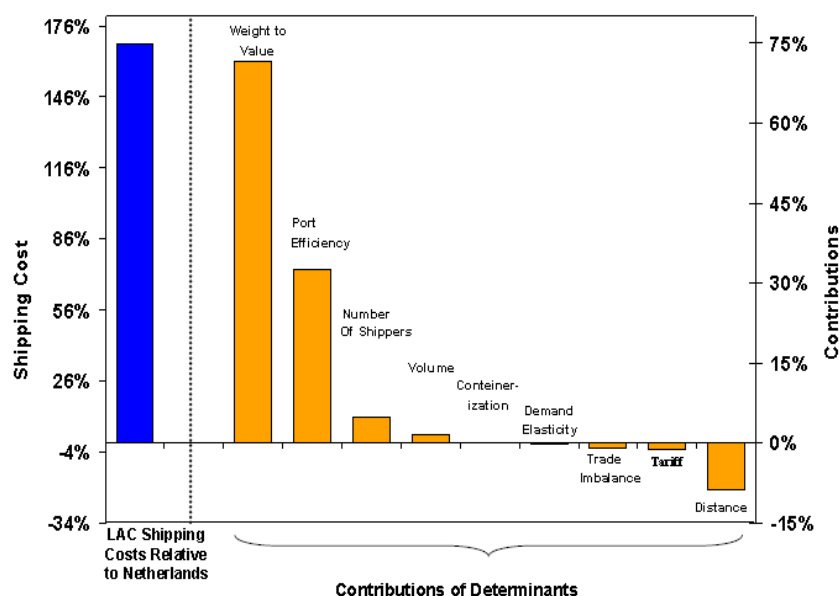
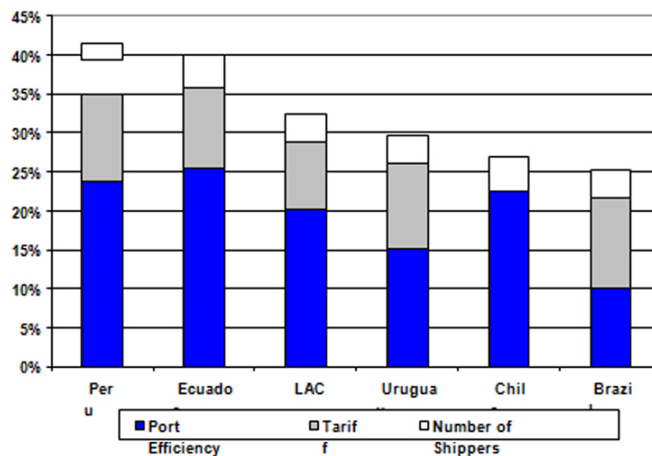


Figure 2.5 shows even more clearly the potential gains that LAC can achieve by cutting transport costs and adjusting public policy. The question posed here is how much transport costs would be reduced if countries in the region had the same levels of port efficiency, tariff rates and shipping competition as the United States. The answer is that, for the typical Latin American country, improving port efficiency to the U.S. level would lower costs about 20 percent. Reducing tariff rates and increasing competition to the U.S. levels would further reduce transport costs by 9 and 4 percent, respectively.

Figure 2.5 Percentage Reductions in Transport Costs from a Change in Port Efficiency, Tariff Rates and Number of Shippers to U.S. Levels, Base Year 2005



Airfreight rates display even higher disparities between LAC and the U.S., although determinants remain similar. In Table 2.5, the first row shows that airfreight rates for LAC'S imports are more than twice those of the United

States. The other rows show the relative impacts of each factor. Setting aside the contribution of the weight-to-value ratio, a large part of the difference in the shipping prices is once again explained by infrastructure efficiency. The lesser efficiency of LAC airports compared with those in the United States explains around 40 percent of the difference in shipping charges. The role of import tariffs is also important. Higher tariffs in LAC account for on average about 17 percent of the differences in shipping costs.

Table 2.5 Decomposing Differences in Airfreight Rates between LAC and the U.S., Imports 2005

	LAC Simple Average	Brazil	Chile	Ecuador	Peru	Uruguay
Ad Valorem Shipping Cost: $\hat{f}_{LAC} / \hat{f}_{US}$	278%	284%	388%	240%	311%	156%
<i>Contribution to Differences in Fitted Values:</i>						
Weight-to-Value Ratio	48%	20%	56%	65%	44%	42%
Port Efficiency	40%	65%	40%	27%	35%	46%
Tariff	17%	18%	4%	23%	25%	30%
Foreign Infrastructure	0%	-1%	1%	1%	1%	1%
Demand Elasticity	0%	0%	0%	0%	0%	0%
Distance	-6%	-1%	-1%	-16%	-6%	-20%

Source: Author's calculations based on results from the regression in Table 2.B.4 (Appendix 2.B). See Table 2.2 for an explanation of this type of decomposition.

This body of evidence suggests a number of conclusions. First, the prominent role played by weight in explaining LAC's higher shipping costs means that the region is destined to pay more for transportation (on an ad valorem basis), whatever the quality of its infrastructure. This reinforces the point made earlier about transport intensity: Export composition plays a strategic role in LAC's transport costs.

But distance generally plays only a minor role, making it even more urgent to improve the region's logistic chains. If distance does not matter that much, competitors can easily overcome the advantage of LAC's proximity to large markets if the region's transport infrastructure falls short. How exactly should the government tackle this infrastructure gap?

This question takes us to third insight. As far as we can see—and we do not have the whole picture because we didn't look at transport costs within countries (except for the case studies in Chapter 4)—the region can reap the highest returns by improving the efficiency of its ports and airports. In fact, a full 40 percent of the differences in shipping costs between LAC and the United States and Europe are due to differences in port and airport efficiency.

Another important step would be to increase competition among shipping companies, although the potential for gains here would appear much more modest than that related to infrastructure efficiency. But this should not be read as an endorsement of the status quo, nor of the current state of government regulations in the region. In reality, it is difficult to measure competition in the shipping industry, and particularly for airfreight. Nevertheless, it is clear that an anachronistic web of bilateral air service agreements are resulting in costly competitive distortions in the airline industry. Analysts often use the expression "spaghetti bowl" to describe the myriad of trade agreements governing trade in goods in the region. Yet, when these distortions are compared to those arising from airline industry regulations, the spaghetti bowl appears to be just a side dish. Brazil's recent proposed "open air agreement" for South America would certainly be a step in the right direction.

Finally, a less intuitive insight concerns the impact of import tariffs on transport costs. Hig-

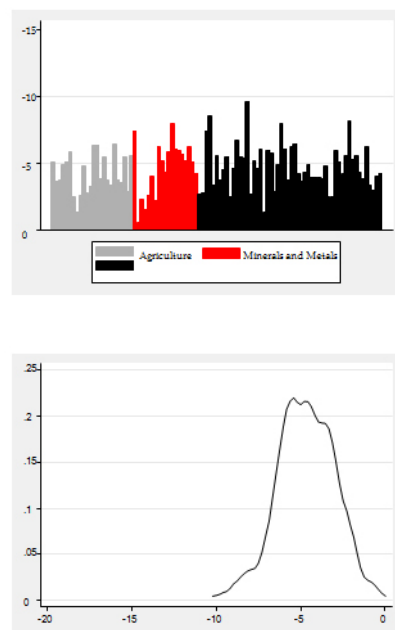
her tariffs mean that transport costs are less visible to consumers and producers since they reduce the share of these costs in the total price of goods, giving shippers a powerful incentive to increase their margins. Our estimates suggest that reducing LAC's average tariff rate to the level of the United States can cut ocean shipping costs by an average of 9 percent. Countries with tariffs above the average, such as Argentina and Brazil, would reap the bulk of the gains. Even higher gains can be expected in airfreight.

3. What Are The Trade Gains?

In this chapter, we show how a trade agenda that incorporates transport costs can increase the volume and diversification of the region's trade, particularly when compared to a traditional, tariffs-only agenda. Even now, with the China-led commodity boom, LAC's share of world trade clearly remains below its potential, both in volume and in diversity.

Our sector-level estimates confirm that an effort to bring down import tariffs and freight rates simultaneously can substantially increase both the volume and diversity of goods traded by the region. When we isolate the impact of these costs from other trade factors, we find that a 10 percent decrease in freight costs and tariffs would boost LAC's imports by 50 percent. But behind this average impact lies substantial variations from one sector to another (Figure 3.7). The effect ranges from 5.5 percent in the case of salt, sulfur and stones to 96.6 percent in the case of leather articles. In general, the average increase of bilateral imports brought about by a 10 percent decline of trade costs would be larger for manufacturing (48.4 percent) than for minerals and metals (47.1 percent) and agricultural products (42.9 percent).

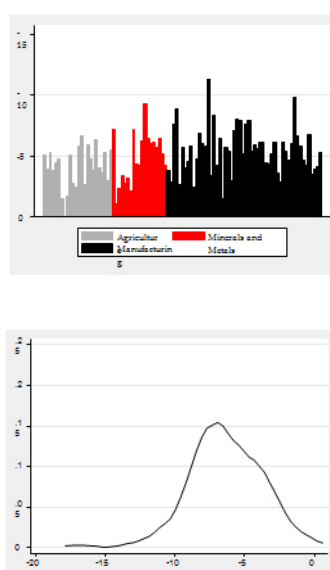
Figure 3.7 Impact of Trade Costs on Sectoral Imports



The figure presents the impact of trade costs on sectoral imports as estimated at the product level (6-digit HS) pooling at the sector level (2-digit HS) (top) and the share distribution of these sectoral impacts over their levels (bottom), based on the specification including importer, exporter, and years fixed effects and excluding the United States. Within broad sectors (agriculture, minerals and metals, and manufacturing), observations are correlatively ordered according to the respective 2-digit HS.

We also find significant impacts on exports (Figure 3.8). Our estimates suggest that a 10 percent cut on trade costs would raise intraregional exports by more than 60 percent on average. As in the case of imports, there is substantial variation across sectors, with the largest effect in tin (169.2 percent) and the smallest in salt, sulfur and stones (3.6 percent). On average, the expansion associated with a 10 percent decline of trade costs would be larger for manufacturing (66.3 percent) and minerals and metals (69.2 percent) than for agricultural products (54 percent).

Figure 3.8 Impact of Trade Costs on Sectoral Exports



The figure presents the impact of trade costs on sectoral exports as estimated at the product level (6-digit HS) pooling at the sector level (2-digit HS) (top) and the share distribution of these sectoral impacts over their levels (bottom), based on the specification including importer, exporter, and year fixed effects and excluding the United States. Within broad sectors (agriculture, minerals and metals, and manufacturing), observations are correlatively ordered according to the respective 2-digit HS.

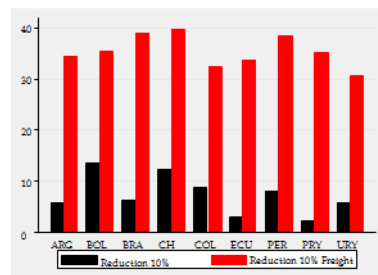
Lower trade costs not only increase trade volume, but also produce sizeable gains in the diversity of goods being traded. According to more conservative estimates, a 10 percent decline in average trade costs would be associated with a 9 percent increase in the number of products imported and an expansion of more than 10 percent in the number of products ex-

ported to the region. For Argentina, on average, a 10 percent decline in costs would increase by 210 the country's exports (broadly defined) to other LAC countries. For Brazil, Colombia and Peru the figures would be 253, 53 and 51 products, respectively.

These figures further strengthen the case for a broader trade agenda. As discussed in Chapter, transports costs typically account for the largest share of the trade costs included in these estimates. In the case of intraregional imports and exports, and of exports to the U.S., they account on average for more than 70 percent of the LACs' trade costs, even without factoring in time costs. But now we go a step further to determine the separate impact of both freight and tariff rates on the trade volume and diversification of each LAC country in our sample. Specifically, we examine how much export volumes and diversification would change in each country if either transport costs or tariffs were reduced by 10 percent.

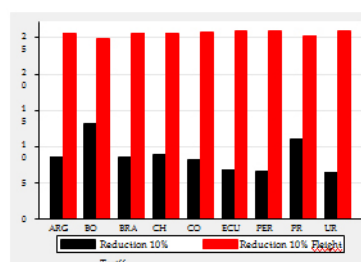
Figures 3.9 and 3.10 shows that for all LAC countries, the positive impact of a 10 percent reduction in transport costs on intraregional exports and on the number of products exported far exceed those of a similar reduction in tariffs. In particular, such a reduction in transport costs would lead to a median expansion of intraregional exports almost five times larger, and to a median increase in the number of products exported to the region nine times larger, than that from tariffs. This result is hardly surprising. For while the LAC countries have made substantial progress in liberalizing intraregional trade over the last two decades, investment in infrastructure, especially in cross-border, trade-related projects, has been low.

Figure 3.9. Reductions in Transport Costs and Tariffs and Median Response of Sectoral



The figure shows the median predicted percentage change of exports across sectors as a consequence of a 10 percent reduction in transport costs and a 10 percent reduction in tariffs for selected Latin American countries, as computed using estimation results from the specification including importer, exporter, and year fixed effect and excluding the United States, and taking 2004 as a benchmark. Exporter countries are on the horizontal axis.

Figure 3.10 Reductions in Transport Costs and Tariffs and Median Response of Export Diversification

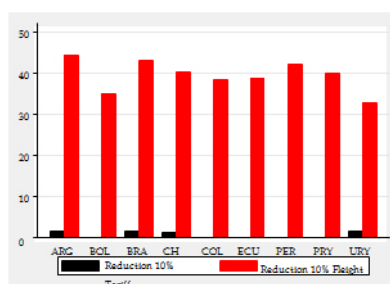


The figure shows the median predicted percentage change of the number of products exported across trade partners as a consequence of a 10 percent reduction in transport costs and a 10 percent reduction in tariffs for selected Latin American countries, as computed using estimation results from the specification including importer, exporter, and year fixed effects and excluding the United States, and taking 2004 as a benchmark. Exporters are on the horizontal axis.

Moving to the sector level, our estimates indicate that lowered transport costs in - manufacturing - would result in the highest average percentage increase of exports in Brazil, Chile, Colombia, Ecuador, and Uruguay. In Argentina, on the other hand, the largest effect would be felt in - minerals and metals-. In Bolivia, Paraguay, and Peru, most of the gains would be in agricultural exports. But it should be noted that most countries show a substantial variation across sectors within each group of activities, making it difficult to identify a clear cross-grouping pattern.

The overwhelming importance of freight costs over tariff reduction is also seen in LAC's exports to the United States. Here again, transport costs strongly influence trade volumes and diversification. For instance, Figure 3.12 shows that the ratio of the effects of transport costs on export volumes to the effects of tariffs has a median value (over countries and sectors) of 12, with even higher median ratios for two countries that enjoy preferential access to the U.S. market, Peru (48 times larger) and Colombia (24 times larger). We found a similar pattern regarding the number of products being exported to the United States.

Figure 3.12 Reductions in Transport Costs and Tariffs and Median Response of Sectoral Exports to the U.S.



The figure shows the median predicted percentage change of exports to the United States across sectors as a consequence of a 10 percent reduction in transport costs and a 10 percent reduction in tariffs for selected Latin American Countries, as computed using estimation results from the specification including importer, exporter, and year fixed effects and including the United States, and taking 2004 as a benchmark. Exporter countries are on the horizontal axis.

4. The Reality on the Ground

The case studies vividly show how an inefficient transport network hurts a country's trade. In Ecuador, for example, we see how the advantages of proximity and the time sensitiveness can be undermined by shortcomings in infrastructure. In Brazil, we see a commodity boom in which farmers should be reaping major benefits, but where dysfunctional logistics are eating away a substantial part of their rents. The case study of Argentina shows the importance of major transportation investments in efforts to export new products to new markets, a factor that is often overlooked. Mexico provides a cautionary tale about the importance of non-policy trade costs for countries where proximity, interacting with local resources, plays a key role in their comparative and competitive advantages.

5. Moving Beyond Tariffs

We have shown that putting transport costs at the center of the region's trade agenda will produce great gains in volumes and diversification of trade. But we did not examine the additional political and economic benefits that better transportation would produce in improving the distribution of the gains of trade, both within a country and within members of a trade agreement. In an area marked by profound regional inequalities, this dimension of the trade-transport nexus must be included in the policy debate. While collecting data on domestic transport is a challenging exercise, to say the least, it is certainly worth the effort. We see this subject as a natural follow-up to the research presented in this article.

Of course, it is one thing to argue that transport costs should be brought into the trade agenda, and quite another to overcome the formidable political and technical hurdles that stand in the way. For example, politicians know that announcing a trade agreement has far greater potential for getting voters' attention than building ports and railroads. Similarly, a grand plan to move the country into the "knowledge society" tends to generate much more publicity than moves to reduce delays at border crossings or deregulate air transportation.

On the technical front, governments must resist the temptation to turn a decision to improve transport infrastructure into a license to launch any project, whether it has real merit or not. All transport projects must undergo rigorous cost benefit analysis and adhere to fiscal, macroeconomic and environmental standards.

Another challenge is finding resources to carry out projects. Although the recent commodity boom filled the coffers of resource-rich countries, most LAC governments still cannot

provide funding for their urgent social and economic agenda. Public and private partnerships are far from a panacea—particularly because of contractual intricacies and contingent liabilities—but experiences such as those of Chile and Brazil suggest that they can be an interesting way to reconcile the need for state coordination and intervention with the lack of managerial and financial resources.

Finally, transport projects that involve two or more countries present special challenges, such as externalities and failures in coordination. There seems to be a clear role here for regional initiatives such as the Initiative for Integration of Regional Infrastructure in South America (IIRSA) and the “Proyecto Mesoamérica”, formerly known as Plan Puebla Panamá (PPP). With the support of multilateral finance institutions such as the IDB and CAF, these initiatives are helping governments in the region to coordinate and finance infrastructure projects. The challenges are far from trivial but the payoff is clear: a region better positioned to use trade to fuel economic growth and raise standards of living.
