



Logistics as a Driver for Competitiveness in Latin America and the Caribbean

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Logistics as a Driver for Competitiveness in Latin America and the Caribbean

Jose Luis Guasch

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Inter-American Development Bank and Compete Caribbean

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Abstract

Logistics is becoming a critical element of competitiveness and economic performance both in itself and within the context of increasing globalization. Most Latin American and Caribbean (LAC) countries are focusing on export-led growth strategies. For such strategies to succeed, a key component is an effective and efficient logistics framework that addresses the full spectrum — upstream, midstream, and downstream — of the value and production chain. A logistics framework includes hardware, which is the physical infrastructure needed to move goods effectively, and software, which is the associated services and processes needed to move and trade goods effectively. The impact of logistics costs on competitiveness, productivity, trade, integration, food prices, inequality, and poverty is significant. In LAC, logistics costs range from 18 to 35 percent of product value — and even higher for small and medium-sized enterprises (SMEs) at about 40 percent — compared to benchmarks of around 8 percent of product value in Organisation for Economic Co-operation and Development (OECD) countries. While in recent years most LAC countries have realized the relevance of logistics and have taken some measures to improve this element of their markets, the region still lags behind in developing an effective logistics framework. This report illustrates the relevance and impact of logistics for competitiveness in LAC and provides a framework, priorities, interventions, and solutions to address the issues.

This paper benefitted from the editorial input of Sheila Mahoney.

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Logistics as a Key Component of an Effective Competitiveness Framework

Logistics is becoming a critical element of competitiveness and economic performance both in itself and within the context of increasing globalization. Most LAC countries, given their relatively small size and limited purchasing capacity, are focusing on export-led growth strategies. For such strategies to succeed, a number of key components need to be in place (Guasch, 2004).

Macroeconomic stability is necessary to entice significant (private) investment.

Access to markets is critical to develop a strong export initiative given the small size of the markets in LAC countries and the limited purchasing power of the region's citizens. There are two subcomponents of access to markets. First, a relatively open trade policy needs to be reflected in reasonable external tariffs. Second, favourable trade terms need to be secured with a number of key trade partners, usually through bilateral or multilateral free trade treaties. It is also important to secure preferential treatment in critical markets given the failure of the Doha Development Round.

The supply of exportable goods needs to meet the price and quality demanded by foreign markets for LAC countries to be competitive, thus improving productivity levels is essential. The basic ingredients for improving productivity are quality of human capital and education, the availability of adequate innovation and knowledge transfer, and adequate access to export financing. While having access to markets on favorable terms is critical, it is even more important to have goods (or services) that are in demand both within the country and from trade partners, and that are competitively produced. The productivity effect, which is anchored in productivity gains, entails a whole set of factors, such as

- A quality, standard system to support local production
- A framework for knowledge transfer and innovation
- A method to scale up production
- Diversification of production and exports
- A process to reshape a country's productive structure
- An adequate system to produce human capital

Effective logistics, including infrastructure and associated services, are required to prevent logistics costs from becoming an obstacle to productivity and competitiveness. The two major sources of logistics costs for LAC countries are infrastructure (hardware) and associated services (software), particularly those related to trade logistics, transport, and energy. Effective logistics facilitate the production and distribution of products (or services) at a low cost and in a reliable manner. It is essential that the competitive advantage a country might have in producing a demanded good and the access to markets it may have for that product are not eroded by the costs of moving goods from factory to destination using an unreliable and costly logistics system. As mentioned, there are two subcomponents of a logistics system. The hardware — roads, ports, airports, and railroads — is the physical infrastructure

needed to move goods effectively. The software is the associated services and processes needed to move and trade goods effectively, such as

- Customs processes and procedures
- Licences and fees
- Regulations, inspections, and certificates
- Packaging
- Access to essential facilities
- Dry ports and logistics terminals
- Technological support
- Multimodal operators
- Availability of cold chain, hubs, and silo services
- Consolidated brokers

Small- and medium-sized enterprises (SMEs, which are the majority of firms in LAC countries) need to be moved into the production value and export chain to secure inclusive growth and job creation. Social and production inclusion need to be addressed given the structure in LAC countries. It is also imperative for efficiency, equity, and political and social considerations that any production and export/trade initiative be widely owned and that the benefits be widely shared. Thus it is critical that any logistics system contain components that facilitate the mainstreaming of micro-, small-, and medium-sized enterprises (MSMEs) into the production, export, and value chain. The employment, inequality, and growth impact of mainstreaming actions can be extraordinary, and in some contexts are critical to the sustainability and success of the strategy.

Financial instruments are required to support access to credit and exports. To support vibrant production activity and mainstream SMEs, some reasonable level of access to credit and a move toward universal banking is essential. Also, for exports to be successful there is a need to have a minimum of specialized financing instruments, such as pre- and post-export financing, export insurance, and some acceptable success in access to credit support.

An adequate set of institutions and programs (governance) is required to provide leadership and coherent support and thus ensure that the factors mentioned above are in place.

Ultimately, for an export-led economic growth strategy to succeed, a country needs to promote an overall investment climate that is conducive to doing business and reducing transaction costs and unnecessary regulations.

Logistics is a critical pillar in a structure intended to sustain growth and increase competitiveness and also contributes significantly to the mainstreaming of SMEs into the value chain. Thus an effective and efficient logistics framework that addresses the full spectrum — upstream, midstream, and downstream — of the value and production chain is a key part of any export-led growth strategy.

Definition and Structure of Logistics Costs

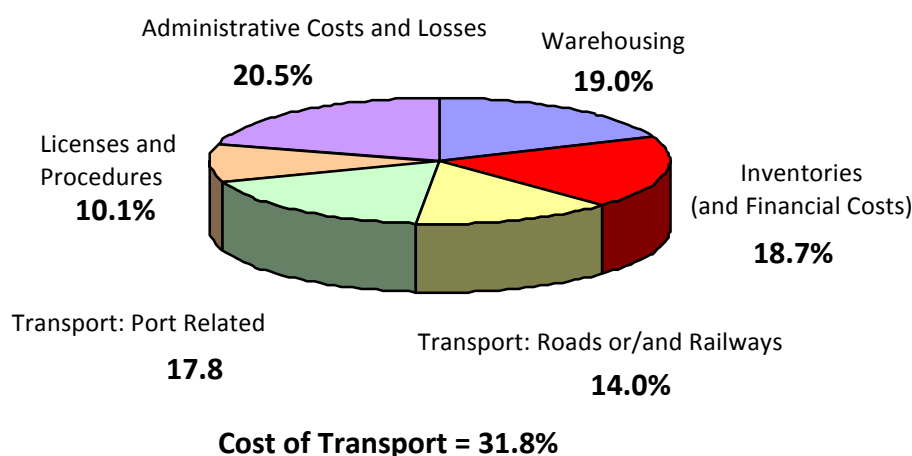
For LAC firms to be competitive, particularly exporting companies, it is crucial that they carefully consider a variety of logistics-related factors when developing their businesses. First, firms must identify their clients and break down the costs that will be incurred along the product's distribution cycle. There are costs associated with processing documentation (permits, certificates of quality and origin, bills of lading, and/or meeting phytosanitary measures), managing inventories, packaging and consolidating the product, customs procedures, insurance, financing, and ocean and road transport, among others. These costs are highly dependent on the type of product to be exported. High-value perishable goods, for example, have to be transported in refrigerated containers and call for expedited delivery using trucks or, if available, using multimodal operators that streamline transport operations.

In this report, logistics costs refers to the costs involved in the process of moving goods from the factory to the point where the product leaves the country (port, airport, border crossing). These costs include

- Transport costs
- Licenses, permits, and customs processing
- Inventory, warehousing, spoilage, or losses in transit
- Insurance
- Port, airport, or cross border processes
- Financing costs
- Administrative costs

Figure 1 shows an example of the structure and average weights of logistics. Clearly, the structure presented is product specific and there are variations depending on the type of product (Guasch, 2008).

Figure 1. Average Structure of Logistics Cost



Source: Guasch (2008)

Policymakers must in turn understand the needs of firms within this context and support reform programs that foster development.

Measuring Logistics Costs

Logistics performance is difficult to measure (and to interpret). There are three main approaches to evaluating logistics performance and costs (see Table 1):

1. The **macro approach** measures logistics costs as a % of GDP using calculations based on national account numbers.
2. The **micro approach** measures logistics costs as a % of product value, which is obtained by surveying firms.
3. The **Logistics Perception Index** measures subjective notions of logistics performance by surveying freight forwarders.

The three approaches tend to be highly correlated, though they differ in terms of difficulty of measuring and the value of the information. The most appropriate and accurate is the micro approach, which estimates costs as a percentage of product value. Though it is the most useful because it measures real costs, it is also the most labor intensive and costly because it is done by surveying producers and service providers. The Logistics Perception Index is a subjective evaluation (though more and more it tends to be complemented by hard data) and is relatively easy and straightforward to evaluate. The macro approach is the easiest to estimate (you just need national account numbers), yet its accuracy and usefulness is questionable. This report uses the micro concept when referring to logistics costs.

Table 1. Logistics Performance Evaluation

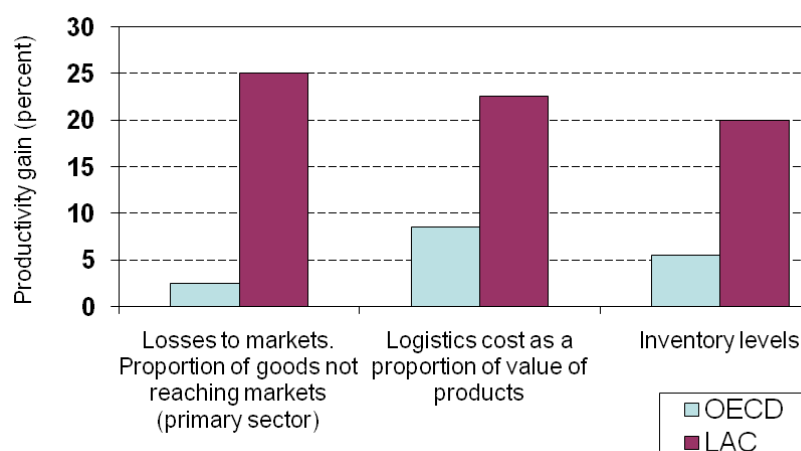
Macro approach	Micro approach	Logistics Perception Index
<ul style="list-style-type: none"> Based on national accounts Logistics costs as a % of GDP Requires some assumptions Quick and easy: Provides overall results Example: Guasch and Kogan (2002) Alternative approaches (Michigan State Univ.) 	<ul style="list-style-type: none"> Based on firm surveys Logistics costs as a % of sales value Other logistics performance indicators Needs large samples for robustness Examples: Peru (Guasch, 1997), Argentina (1999), LALC Observatory Corridor approach (USAid's Fast Path) 	<ul style="list-style-type: none"> New exercise: World Bank, GFP, and Turku Perception: subjective, from pooled information provided by freight forwarders Allows for a unique indicator, which can be correlated to others (WEF, WB, etc.) Other hard data also collected

Source: Guasch (2004)

The Status and Impact of Logistics Costs in Latin America and the Caribbean

In LAC countries, logistics costs range from 18 to 35 percent of product value compared with a benchmark of around 8 percent in OECD countries (see Figure 2). On a macro level, logistics costs in LAC are between 16 and 26 percent as a percent of GDP compared to the OECD benchmark of about 9 percent. For SMEs, logistics costs are significantly higher at around 40 percent of product value (see Figure 3). Two other critical indicators are losses/spoilage rates and inventory levels, which are also shown in the Figure 2. Losses/spoilage rates in LAC are about 25 percent of output and very close to 50 percent for perishables. Inventories in LAC are two to three times those in the United States, which has a tremendous impact on costs and competitiveness. As a result, the impact of logistics costs on competitiveness, productivity, trade, integration, food prices, inequality, and poverty is very high. While in recent years most LAC countries have realized the relevance of logistics and have taken some measures to improve this element of their markets, the region still lags behind in developing an effective logistics framework. Logistics costs, particularly transport costs, are a major barrier to trade in LAC at two to three times the percent of product value higher than tariffs and duties (see Figure 4). Average import tariffs have come down in LAC since the early 1990s and remain at about 11 percent of product value, ranging from 6 to 14 percent, depending on the country, and much lower than logistics costs.

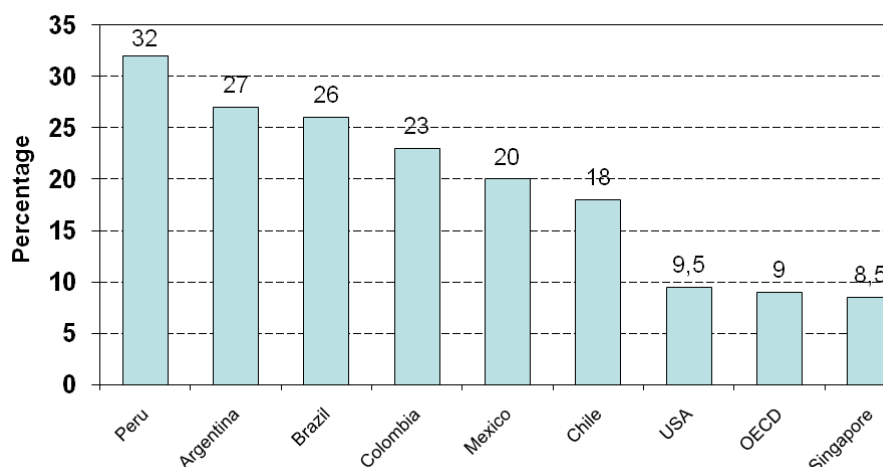
**Figure 2. Deteriorating and Insufficient Infrastructure
Contributes to Uncompetitive Industries, 2004**



Source: Guasch (2008)

There is great variation among LAC countries with respect to the share of logistics costs as a percentage of product value (Figure 3). Peru, for example, is on the higher end of the scale, with average logistics costs representing 32 percent of product value. Chile is on the lower end, with costs representing 18 percent of product value. Developed countries like the United States and Singapore are well below LAC averages, with logistics costs representing roughly 10 percent and 9 percent of product value, respectively.

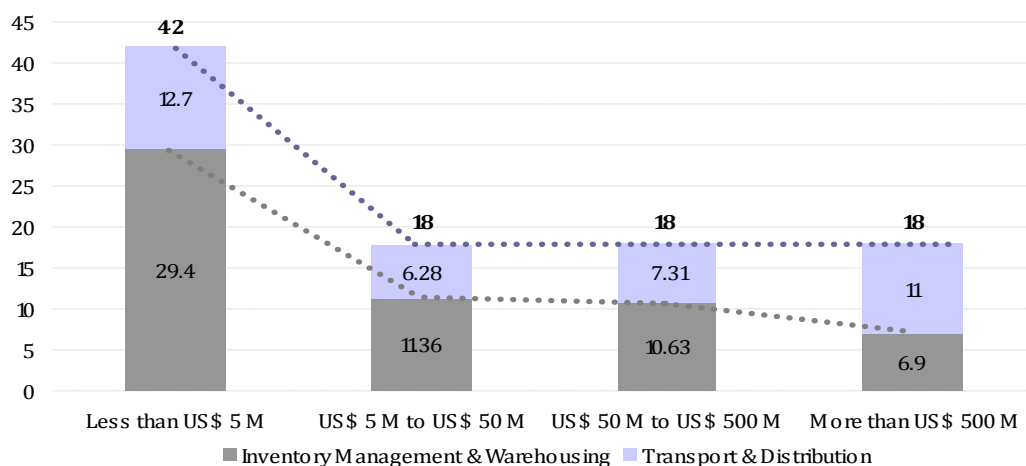
Figure 3. Logistics Costs as percentage of Product Value, 2004



Source: Guasch and Kogan (2006)

For small firms, domestic logistics costs, including inventory management, warehousing, transport, and distribution, can total over 42 percent of total sales (Figure 4). By comparison, larger firms spend between 15 and 18 percent of sales on logistics.

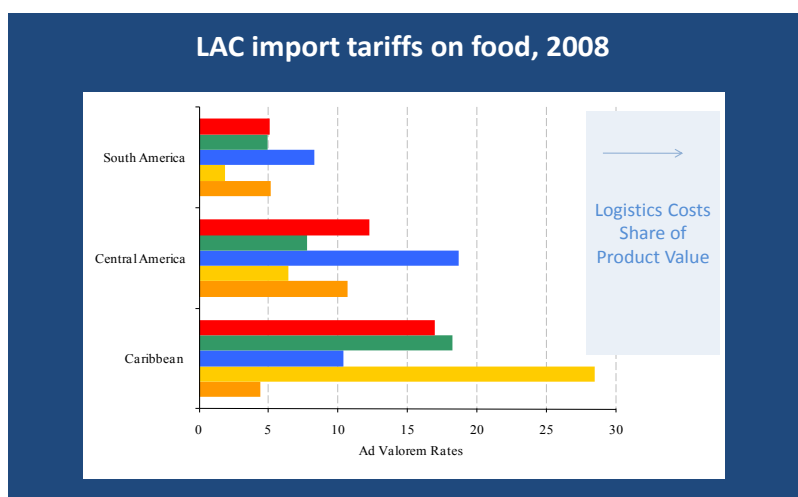
Figure 4. Latin America: Average Logistics Costs by Firm Size (Total Volume of Sales)



Source: Centro Logístico de Latinoamérica

Figure 5 shows that external tariffs, as illustrated by the various bars, are virtually all below 20 percent of product value. As has been shown in previous charts, logistics costs are above that number. Thus, in as much as Latin American countries are placing much effort into securing free trade agreements (FTA) — mostly bilateral — they ought to put comparable effort into reducing logistics costs, since the benefits would be even larger than those secured through FTAs.

Figure 5. LAC's Logistics Costs Are Higher than Tariff Barriers



Note: Ad valorem rates are tariffs that are based on product value.

Source: World Bank, LCCSD Economics Unit (2010). Calculations using TRAINS database, UNCTAD 2008.

Concerns about the region's high logistics costs have tended to revolve around overall export competitiveness and productivity, and derived effects.¹ These effects are multiple and significant. For example, there is a direct impact of logistics on the cost of delivered goods — particularly food products — and thus on the poor, as shown in Figure 6.

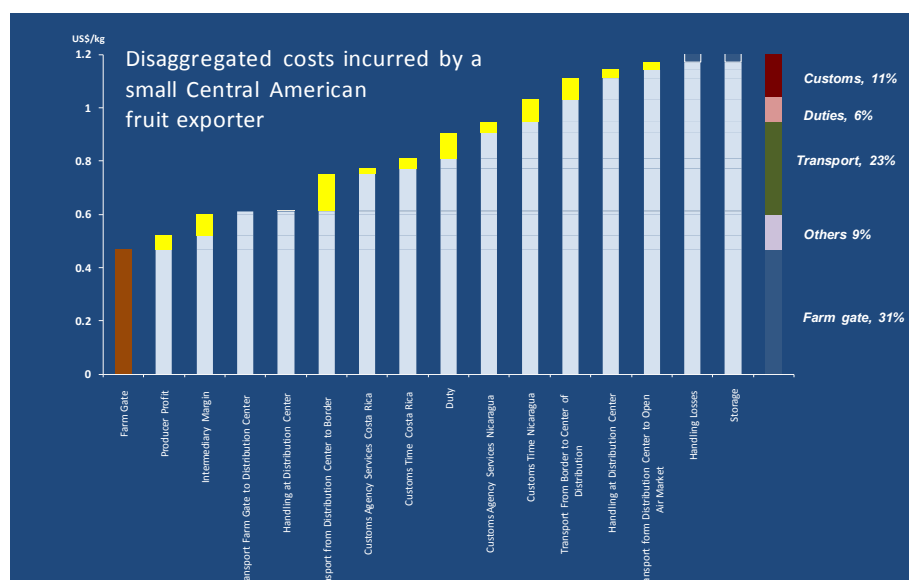
Logistics costs represent a greater barrier to trade than import tariffs and make up a larger part of the delivered cost of food products. In fact, while food import tariffs are heterogeneous across countries and food groups, on average, ad valorem rates (taxes based on value) decreased in the region from 2005 to 2008 and currently range from 3 to 12 percent of product value. On the other hand, with respect to transport costs, the international maritime and road haulage components alone can total about 20 percent of the free-on-board (FOB) value of goods if combined. By the time products are transferred, handled, stored, and distributed domestically, the logistics component of the delivered good is often more than 50 percent of the final price to consumers.

For example, the Caribbean, a net food importing sub-region that has particularly high logistics costs, also has the highest import tariffs, punishing its consumers twice. In 2008, import tariffs across all food groups averaged about 16 percent for Caribbean countries, compared to 11 percent for Central American countries and 5 percent in South America. On a weighted-average basis, import tariffs on all food groups decreased with the exception of dairy, which increased from 2006 to 2008. Such changes

¹ The Inter-American Development Bank (IDB), for example, recently estimated that a 10 percent regional reduction in transport costs would have nearly 20 times more impact on the region's export levels to the United States than a 10 percent reduction in tariffs (Moreira, Volpe, and Blyde, 2008).

have been driven by the Caribbean countries (primarily Barbados, Dominica, and St. Vincent and the Grenadines) and by Mexico. This situation is particularly worrisome given that, in addition to higher import tariffs, the shipping structures in the Caribbean islands provide very little direct service and low connectivity, which research has shown leads to higher ocean freight rates. Regression analysis has shown that if a country can “double” its centrality within the global shipping network, transport costs will decline by over 15 percent.

Figure 6. Local Producers Are Punished by Logistics Costs



Source: LCSSD Economics Unit, World Bank (2010)

Other specific logistics factors and their status in LAC are described below.

Customs Clearance and Border Crossings

Evidence suggests that delays in customs clearance in LAC increase transport costs by between 4 and 12 percent. That is, if the time for customs clearance could be halved, transport costs could be reduced by that same percentage (Guasch and Schwartz, 2008). This finding is consistent with LAC firm perception surveys from Investment Climate Surveys (ICS), Doing Business Surveys, and the Logistics Performance Index (LPI). In terms of customs efficiency and organization — the LPI’s first dimension — in the 2007 survey, the LAC region received a score of only 2.5 out of 5.

Furthermore, the analysis of border crossing and customs to freight rates suggests that the existence of direct land access of any type reduces transport costs by around 6 percent. Moreover, a doubling of the number of border crossings could reduce transport costs by another 6 percent. The burden of border crossings can affect food prices given the importance of intra-regional trade in primary staples such as grains and beef. Also the studies show that “over” costs from inefficiencies in the logistics chain,

particularly at border crossings, represent around 20 percent of the total costs incurred in the import of Paraguayan soy beans into Brazil and beef into Chile (Schwartz, Guasch, and Wilmsmeier, 2009).

Inland Transport: Roads

On a value basis, 38 percent of all food imports into South America are handled using road transport. Further, nearly all domestic movements and a significant share of inputs to food exports are moved by road — particularly in Central America and Mexico. Given this fact, the lack of road maintenance is emerging as the greatest threat to affordable and reliable delivery of basic goods in LAC, even for the region's more advanced economies, such as Brazil and Costa Rica. High post-harvest losses in LAC can largely be attributed to the poor state of the roads in the region, especially secondary and access roads, and the lack of cooling capacity and services. More importantly, the poor quality of the road network makes access to even local markets difficult, let alone regional or national markets.

Road quality, or lack thereof, affects the timeliness of shipments and, consequently, a firm's costs and competitiveness. According to the Logistics Survey of three key export sectors in Costa Rica, road quality is identified as one of the three main impediments to business in 80 percent of responses. According to the survey for Costa Rica's ICS, road quality is a major or very severe constraint on the business environment for 40 percent of the firms surveyed. The poor and worsening quality of Costa Rica's road network also causes direct losses from delays in shipments, breakage, and theft (which combined account for 8 to 12 percent of the sales value of exported goods). The declining road quality can be partly explained by the decline in public investment on transport infrastructure (decreasing from 1.5 to 2.1 percent of GDP in the mid-1980s to less than 0.5 percent in 2003) even though transport accounted for most of Costa Rica's public investment during that period, at 71 percent of investment on roads, 13 percent on ports, and 8 percent on airports. While Costa Rica today has 30 percent more paved roads per worker than the next most densely paved country in Latin America, only 32 percent of those roads are of good quality [*unclear from the paper whether 32 percent of paved roads or of the entire road network*], and the paved road density overall has been declining along with investment in the sector from a peak in 1998. The road infrastructure quality overall is the worst in the central region, which produces about 80 percent of the country's exports. A more extensive use of railroads would be part of the solution.²

Inland Transport: Trucks

The efficiency of a country's trucking sector plays a role in its overall import cost structure. Trucking regulation, in particular, presents a paradoxical problem for many governments: costly if they do, costly if they don't. Shippers argue that tougher rules and enforcement related to weight restrictions, overloading, and truck quality and safety will immediately increase transport costs, which will be passed

² The possibility of addressing this problem through the alternative use of railroads is limited. In Argentina, for example, the railroad's relative share in transporting cereals and oilseed to Rosario fell from 20 percent in 1998 to 15 percent in 2004. It has been estimated that, in the case of this particular traffic alone, rail participation could be increased to 30 percent, with a consequent saving in freight costs per ton.

on to consumers. While it is true that transport regulations lead to costs that can be estimated, it is also true that the lack of regulation and/or enforcement of trucking regulations creates costs, although these are indirect and take time to manifest themselves. Typically, smaller producers and local agriculture traders are the most heavily affected by dilapidated roads and failures in trucking regulation, while large shippers using the main highways and trade corridors between large cities and ports are less affected.

Warehousing, Storage, and Inventory Costs

High inventory costs are an important logistics bottleneck for the region, in turn driving up the cost of delivered products. For LAC businesses, inventory costs equal 35 percent of GDP, compared to only 15 percent for businesses in the United States (Guasch and Kogan, 2006). When compared to inventories in the United States, raw material inventory levels held by LAC businesses across all industries are approximately 2 to 5 times as high, significantly increasing unit costs and diminishing competitiveness (Guasch and Kogan, 2001). Within the sample considered for this analysis, Ecuador is the country with the highest inventory levels, followed by Bolivia and Peru. Mexico is the country with the lowest inventory levels. Beyond poor road infrastructure, high inventory levels can also be explained by sub-standard storage networks in many of the region's countries, a lack of competition for warehouses, high rates for storage space rental in LAC compared to other regions, and a lack of effective instruments for financing inventories. Moreover, increasingly there is a lack of sufficient warehousing capacity in the agricultural sector, which has been proven to be particularly costly for small shippers. In the United States, the rental cost for a square meter of storage is US\$100 per year; in Colombia, rental costs in Bogota on the Free Zone in the Pacific is greater than US\$350 per year. The need for additional storage capacity is also a consequence of the shortage of efficient intermodal transfer terminals. According to estimates, Brazil's warehousing shortage alone is currently about 40 million tons per year. If Brazil were to double its number of intermodal transfer terminals from the current 250, the total inventory and warehousing costs could be reduced by as much as US\$1 billion per year.

On average, total inventory carrying costs in LAC represent 19 percent of final product value, although they range from 9 to 50 percent of product value. These costs can be divided into

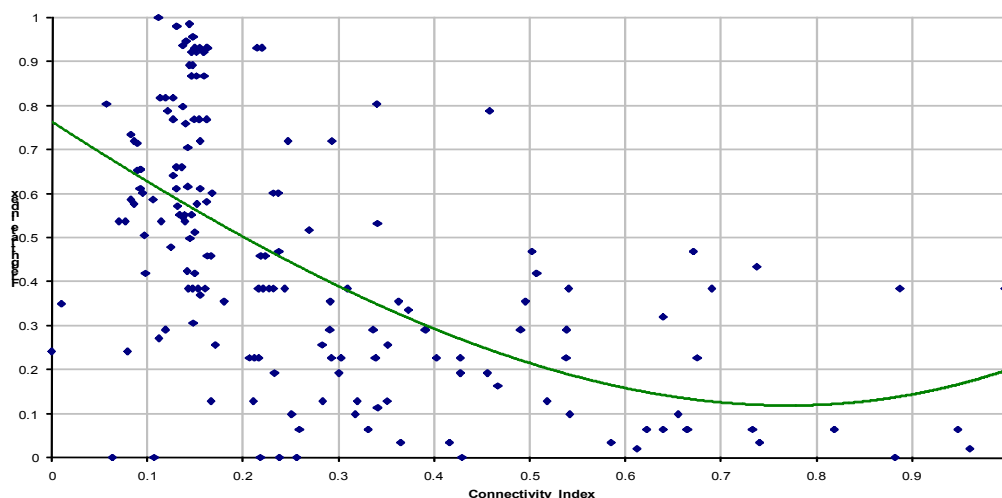
- Capital costs
- Taxes
- Insurance
- Obsolescence
- Storage

Among these, capital costs are the highest, averaging 15 percent of product value, followed by storage costs (2 percent), and obsolescence costs (1 percent).

Maritime Transport

The belief that maritime shipping costs are unrelated to logistics conditions in a particular country has been proven false. The linkage is the connectivity of the ports and the time in port. When a country is better connected and the turnover faster, the shipping rates decline. This is illustrated in Figure 7, which provides the results of a regression analysis of ocean service data for Caribbean countries. The graph shows a statistically significant correlation between connectivity and ocean freight rates, which confirms the importance of regular and reliable ocean services using the Transshipment Connectivity Index, a measure of the centrality of a country within the global shipping network. In this case, if a country can double its centrality in the network, which would require significantly increasing its direct liner services to a wider range of countries, transport costs could decline by over 15 percent. While harder to control in the short-term through direct policy interventions or investments, a country's connectivity is an important long-term result of port reform, cargo agglomeration, and the resulting attractiveness of a country as a major port of call or transshipment center.

**Figure 7. Relationship between Freight Rates and Connectivity,
Container Shipping Caribbean Basin, 2006**



Source: Wilmsmeier (2008)

Time and Financial Costs

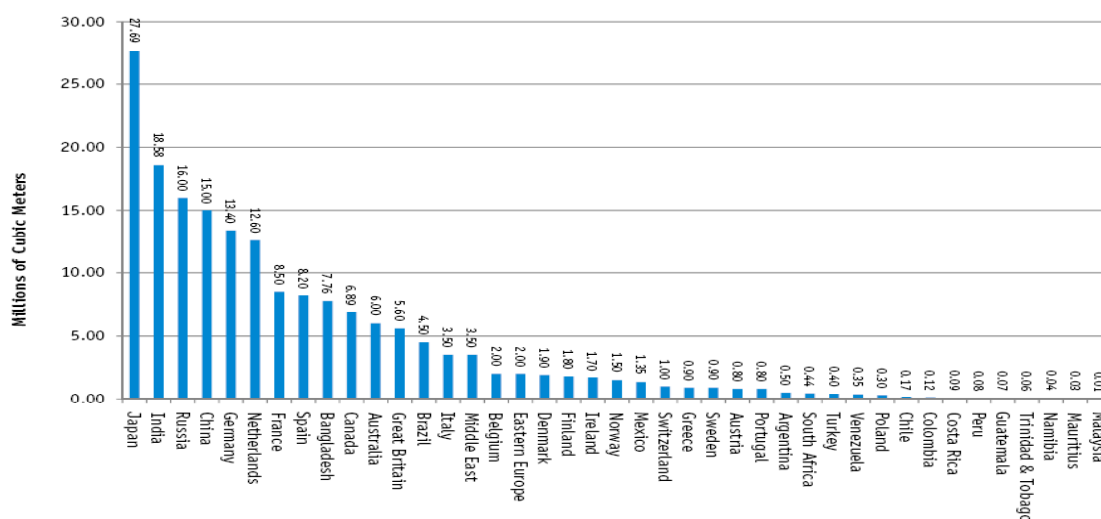
Another critical determinant is the financial costs associated with lengthy transport trips and delays at different points in the distribution chain.

Cold Capacity

A country's capacity to provide cooling services for perishables is a critical element of its logistics system. Deficient services lead to high rates of spoilage and stunt the development of the sector. Figure 8 shows that the LAC region does not fare well in cooling capacity (even when normalized based on GDP).

In 2008, public refrigerated warehouse (PRW) capacity was led by Japan, with a total of 27.7 million cubic meters, followed by India (18.6M m³), Russia (16.0M m³), and China (15.0M m³). LAC countries were far behind. At the time, Brazil had the most PRW capacity at 4.5 million cubic meters, while island countries like Trinidad and Tobago were shown to have very limited capacity, with a meagre 0.1 million cubic meters.

Figure 8. Global Public Refrigerated Warehouse Capacity in 2008



Source: International Association of Refrigerated Warehouses (IARW), 2008

Impact on Food Prices (And thus on the Poor)

At a regional level, the impact of logistics costs on the final price of food products becomes even more relevant considering that, in 2006, more than 71 million tons of food products with a value of over US\$21 billion were imported into South America and Mexico. A little over a third of imports are intra-regional trade. The remainder (well over 50 million tons of food products per year) is imported into LAC from outside of the region. The majority of those food products arrives by ocean shipping and is thus subject to every step of the logistics chain, including

- Maritime transport
- Port transfers
- Customs clearance and inspection
- Warehousing
- Modal transfers
- Domestic rail, trucking, and/or barge shipping
- Final distribution

These steps typically add 30 to 100 percent onto the price of delivered goods. And, in exceptional cases, such as fruit imports to the Caribbean islands, logistics can triple the cost of a product from the time it leaves its home of origin to the time it arrives at market.

There is great heterogeneity in the way in which LAC countries are affected by logistics costs, depending on the relative shares of different types of food imports. An analysis of the breakdown by food types suggests that for net importers of food, costs associated with refrigerated cargo capacity and services are the critical bottlenecks because meat, fish, and dairy represent the largest share of all food imports by value (26 percent). On the other hand, for LAC countries that are net exporters of food, bulk storage, handling, and transport are the primary concerns because, on a weighted-average basis, dry bulk items constitute by far the biggest share of food imports, at 31 percent by value. Thus, the data suggests that the island countries of the Organization of Eastern Caribbean States, for example, should work on reducing the cost of refrigerated containerized traffic. Peru, Brazil, Bolivia, and Colombia, on the other hand, would benefit from improvements in the importing and distribution process for dry bulk goods.

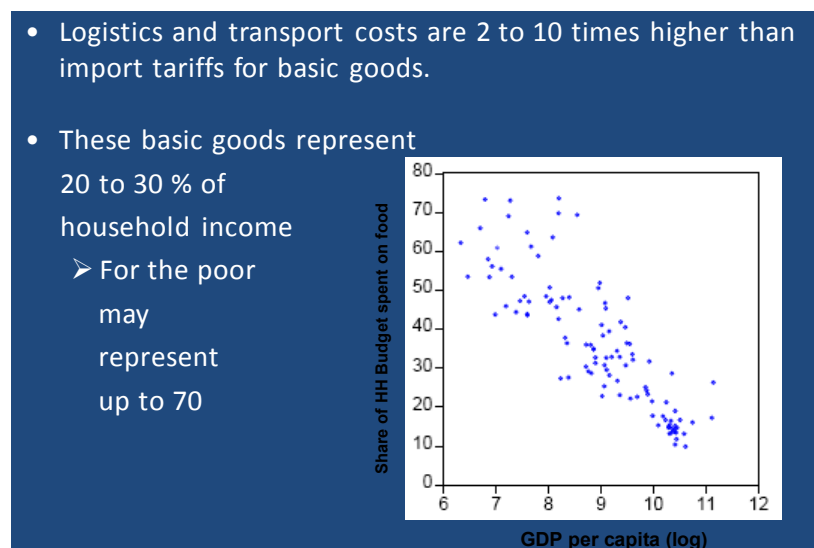
Regardless of the shifting prices of staple commodities in global markets, a large portion of foods by volume are low-value goods and thus highly sensitive to international and domestic transport, warehousing, and transfer costs. In fact, in recent years, international and domestic shipping costs have risen and fallen along with commodity prices, leaving the impact of logistics costs on food prices relatively constant. In other words, the burden (share of freight rates as FOB cost for food) for both maritime and trucking elements of costs remained relatively constant as the delivered price of food rose. As ocean rates doubled from 2002 to 2007, the maritime burden fell by only 1 percent. As trucking rates increased by 50 percent over the same period, the land burden rose by 0.5 percent.

Analysis of a number of supply chains in LAC countries illustrates that high logistics costs, including transport, can punish not only low-value goods such as wheat, but also high-value goods such as pineapple (Schwartz, Guasch, and Wilmsmeier, 2009). Tracking pineapple imports from Costa Rica to St. Lucia via Miami suggests that distance is not a central driver of costs and that a country's connectivity within the cost structure of its imports should be highlighted when tackling logistics, particularly transport, costs. The analysis shows that the producer price of the pineapple represents only about 10 percent of the final delivered price, while transport costs related to land and ocean transport and handling account for 43 percent. In addition, storage, warehousing, consolidation, and the retail and wholesale profits together represent another 33 percent, half of which is also logistics. Ocean shipping represents a particularly large part of the transport costs: 3.5 times as much as the producer price for the pineapple itself. Yet, this is not a function of distance considering the ocean shipping leg from Miami to St. Lucia is an order of magnitude more costly than the leg from Costa Rica to Miami even though the trip to St. Lucia is shorter.

Tracking a kilogram of wheat from the time it leaves the Port of Vancouver, Canada, until it arrives at the mills of Ecuador confirms that distance and market size are less likely to drive transport costs than

infrastructure quality and competition among transport providers. The analysis shows that once the wheat cargo is unloaded in Ecuador, the cost of domestic transport to Quito is minimal due mainly to the high degree of competition in the Quito market and the availability of good roads linking the coast and the capital city. However, when the price of wheat flour to other cities is assessed, domestic transport costs are more significant. The delivered cost to a city such as Ambato adds another 20 to 25 percent onto the cost of the product. The large price difference is mostly explained by the quality of the road infrastructure and the ability of trucks to make a return trip within a day when traveling to and from Quito. Additionally, the analysis suggests that the manner of transport matters if it can capture economies of scale. The distance from Canada to Ecuador is many thousands of nautical kilometers, while the distance from the port at Manta to the mill in Quevedo is only 171 kilometers. Yet, somehow, shipping a kilogram of wheat from Vancouver to Manta costs less than half of the cost of trucking that same kilo of grain from Manta to Quevedo. If competing modes of transport are available, agglomeration of cargo may mean economies of scale, which becomes important in discussing competition in domestic shipping.

Figure 9. Logistics Costs Affect the Poor



Source: Dessus (2008). Data from household surveys.

Benefits of Decreases in Logistics Costs

A reduction in logistics costs translates directly in lower costs of produced goods, which in turn generates a significant number of benefits.

Increased Demand, Production, and Employment

A 10 percentage point decrease in logistics costs would increase demand for various industries and employment levels to differing degrees as a function of each industry's elasticity. For example, demand in the leather and shoes sector would increase by 12 percent, followed by wood and furniture (10 percent), and the agro-industry (9 percent). Employment would see the highest increases in the wood and furniture sector (12 percent), followed by leather and shoes (10 percent), and textiles (7 percent).

Table 2. Impact of a Decrease of 10 percentage Points in Logistics Costs

Sector	Demand Increases	Employment Increases
Agro-Industry	9%	5%
Wood and Furniture	10%	12%
Textiles	6%	7%
Leather and Shoes	12%	10%
Mining	7%	2%

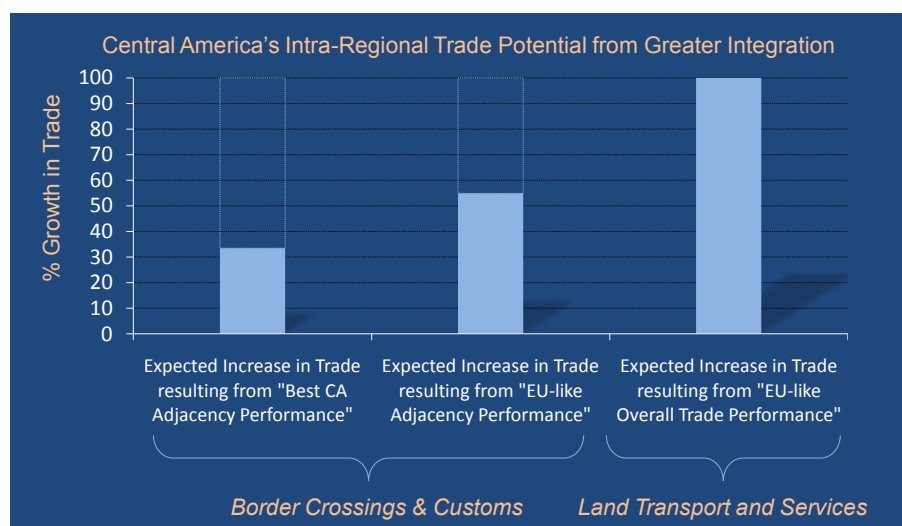
Source: Guasch (2008)

Increased Trade Flows

According to Wilson (2008), bringing below-average member costs halfway up to the global average in terms of border measures, such as port efficiency and customs environment, and inside-the-border measures, such as service sector infrastructure and regulatory environment, would result in a total of US\$377 billion in additional trade flows of both imports and exports. This would represent an increase of 10 percent from 2004 levels.

It appears that the variable with the strongest potential influence on increasing trade flows of both importers and exporters is the inside-the-border measure of developing service sector infrastructure, followed by the border measure of increasing port efficiency.

Figure 10. Better Logistics Means More Intra-regional Trade



Source: LCSSD Economics Unit, World Bank (2010)

Table 3. Overview of Simulation: Bring Below-Average Members Halfway up to the Global Average (change in trade flow in US\$ billions)

	Change in Trade Facilitation		Total
	Importer	Exporter	
Border Measures			
Port Efficiency	23.40 (0.6%)	84.53 (2.2%)	106.93 (2.8%)
Customs Environment	32.87 (0.8%)		32.87 (0.8%)
Inside-the-Border Measures			
Service Sector Infrastructure	36.64 (0.9%)	117.38 (3.0%)	154.02 (4.0%)
Regulatory Environment	24.39 (0.6%)	58.86 (1.5%)	83.25 (2.1%)
Total	117.30 (3.0%)	259.77 (6.7%)	377.06 (9.7%)

Source: Wilson (2008)

An IDB study shows that a 10 percent reduction in regional transport costs would have nearly 20 times more impact on the region's export levels to the United States than a 10 percent reduction in tariffs (Moreira, Volpe, and Blyde, 2008).

Increased Earnings for the Poor

Good-quality infrastructure in rural areas is critical to facilitating access to markets. Annual earnings per capita in rural areas with road rehabilitation projects, and thus increased access to markets, were 35 percent higher than those in rural areas without road rehabilitation projects, 18 months after the improved access.

Increased Number of New Products and Volume in Product and Export Basket

As the cost of production falls, products that previously were not competitive or exportable become competitive for either or both the domestic and external markets.

Reduced Food Prices, with a Positive Impact on Poverty and Nutrition

As described, logistics costs affect food prices and thus disproportionately affect the poor. Any improvement in logistics will significantly benefit the poor, particularly if the interventions reduce the spoilage rate of perishable food, which is currently near 50 percent of output.

Other Benefits

Benefits of improved logistics can also be estimated based on distance, time, and shipping costs, three other important factors. Distance has traditionally been and continues to be a subject of study as it relates to transport and other logistics costs. Time costs also matter when analyzing the impact of logistics costs. In fact, it has been calculated that each day saved is worth 0.8 percent of an ad valorem tariff (Hummels, 2007) and that a day lost is equivalent to 1 percent of trade or 70 kilometers (Djankov, Freund, and Pham, 2006). Finally, shipping costs are important because bottlenecks constrain trade and reduce a country's competitiveness. Studies show that eliminating market power in shipping, thus increasing competition among shipping companies, would increase trade by 5 to 15 percent (Hummels, Lugovsky, and Skiba, 2009). See Table 4 for a broad illustration of the economics of logistics.

Table 4. The Economics of Logistics: Evidence of Impact

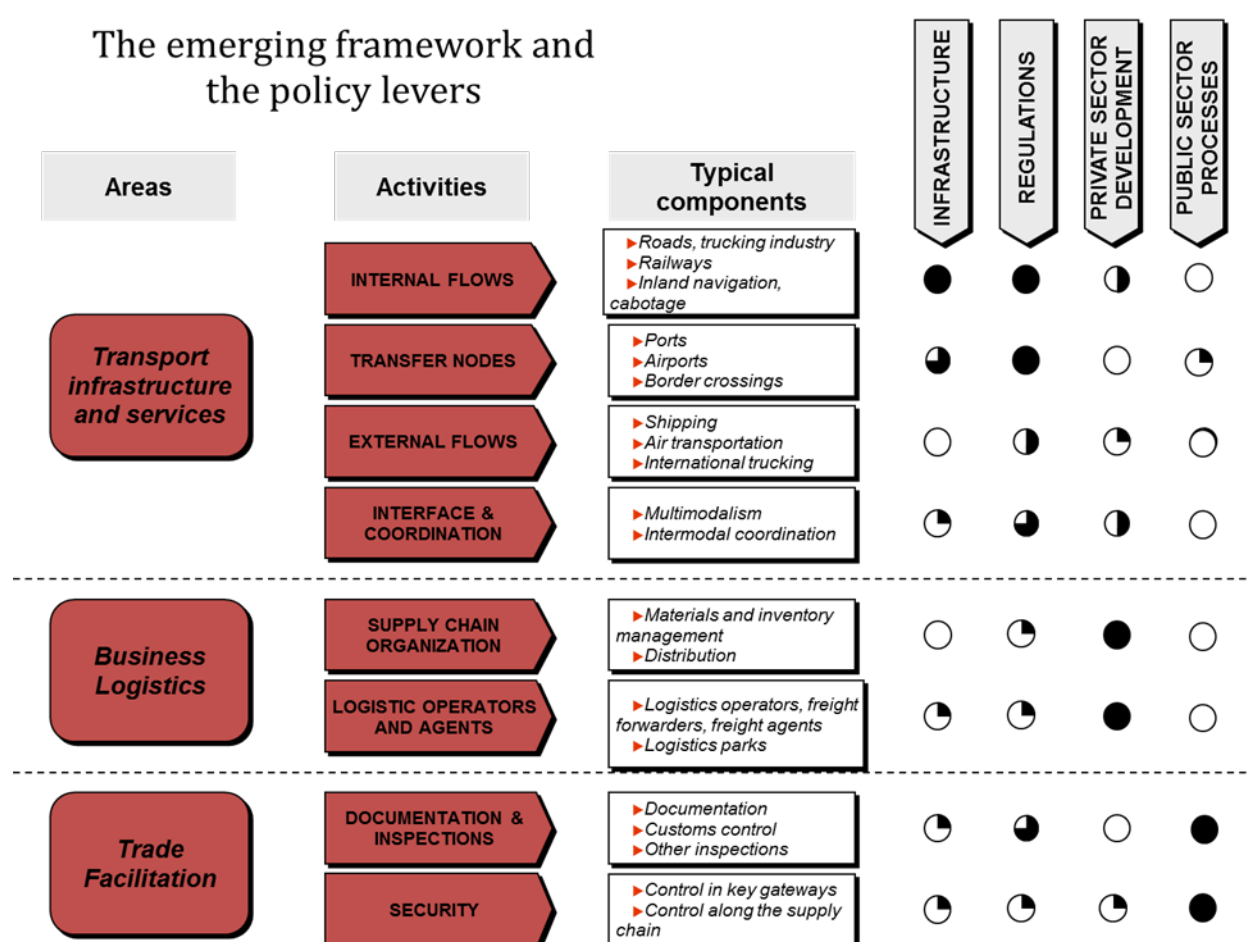
Logistics Component	Trade, Income, and/or Productivity	Transport Cost/Transit Times/ Reduction in Prices of Goods
Macro-analysis of logistics, trade infrastructure	<ul style="list-style-type: none"> - Reducing logistics costs can positively affect the share of trade in GDP. - Improving infrastructure produces large real income gains and reduces the Gini coefficient. 	<ul style="list-style-type: none"> - Each day saved is worth 0.8 ad valorem tariff. - A day is equal to 1 percent of trade.
Road corridors, trucking services	<ul style="list-style-type: none"> - Consumer surpluses from improved access. - Expanding hinterlands for rural producers. - Large elasticity for intra-regional trade. 	<ul style="list-style-type: none"> - Largest share of logistics costs for most goods & time loss for small shippers. - Competition in trucking, maintenance of travel speeds (ROW) required to reap benefits of improved roads.
Port efficiency, ocean shipping	<ul style="list-style-type: none"> - Port efficiency reduces maritime transport costs. 	<ul style="list-style-type: none"> - Freight rates decrease when countries are connected by direct shipping service and with broader competition.
Air shipping, airports	<ul style="list-style-type: none"> - Open skies agreements reduce airport costs and increase trade. 	<ul style="list-style-type: none"> - Improving infrastructure and regulations reduces costs.
Border crossings, Customs	<ul style="list-style-type: none"> - Without borders, trade responds to “gravitational pull” of neighboring economies — by product and overall. 	<ul style="list-style-type: none"> - Delays in customs increase costs while direct land access reduces costs. - Distance increases transport costs. - Unified procedures and compatible IT systems reduce times. - Delays in transit have a negative effect on trade.
Storage, warehousing	<ul style="list-style-type: none"> - Financial burden of high inventory typically > 3x GDP. 	<ul style="list-style-type: none"> - Third-party access to storage critical for independent shippers. - Lower inventory holdings reduce production costs.

Source: Schwartz, Guasch, and Wilmsmeier (2009)

Policy Recommendations to Reduce Logistics Costs

While a share of the costs of logistics services lies in the hands of the private sector, LAC government actions and inactions have a critical role in the overall logistics burden. As shown, logistics costs are excessively high in the region, adversely affecting growth, trade, employment, and poverty. Reducing them would have a major impact, even larger than securing FTAs, and government can indeed reduce such costs through proper actions. The following figure illustrates the framework and policy levers needed to build an effective logistics system.

Figure 11. The Emerging Framework and the Policy Levers



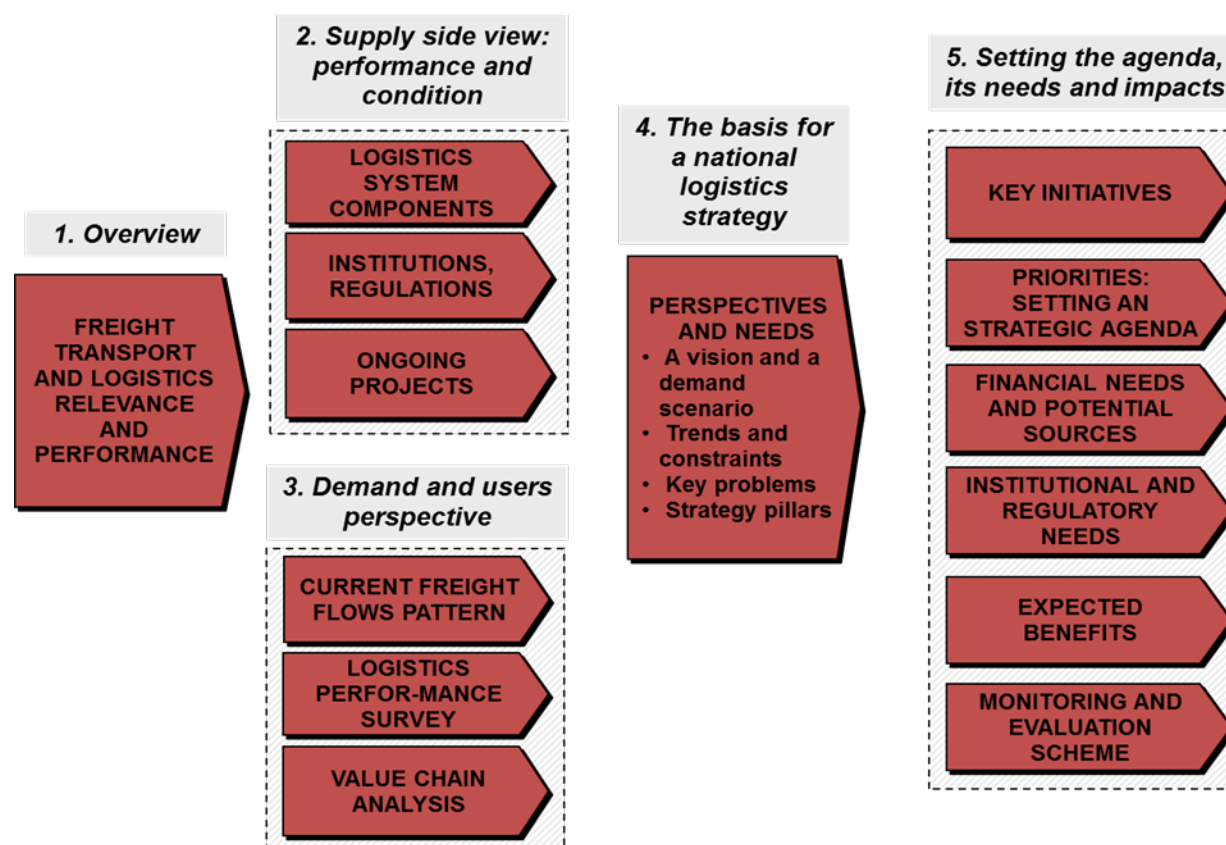
Source: Guasch (2008)

The three areas — transport infrastructure and services, business logistics, and trade facilitation — can be divided into several activities each. Transport infrastructure and services, for example, consists of internal flows (e.g., roads, trucking industry, railways, inland navigation, and cabotage), transfer nodes (e.g., ports, airports, and border crossings), external flows (e.g., shipping, air transport, and international

trucking), and interface and coordination (e.g., multimodalism and intermodal coordination), which are each then divided into different components. The operationalization of these typical components, in turn, depends on the interaction between infrastructure, regulations, private sector development, and public sector processes.

The development of national logistics strategies should look at both the supply side and the demand side. On the supply side, policymakers should look at the components of the current logistics system, the existing institutions and regulations, and ongoing projects in the area. On the demand side, current freight flow patterns must be identified, logistics performance evaluated, and value chain analyses conducted to identify potential areas of improvement through an identification of logistics bottlenecks. Based on analysis of both supply and demand, a national logistics strategy should be developed based on the country's needs and an agenda and monitoring and evaluation scheme can be pushed forward to fulfill key priorities.

Figure 12. A Blueprint for a National Logistics Strategy Study



Source: Guasch (2008)

Moving Forward: Toward an Effective Logistics Platform

Another way of thinking about an effective system is to break it into its two key components — hardware and software — and their respective subcomponents, as listed below. Policymakers ought to devise a strategy to bring these elements to reasonable levels of effectiveness.

Hardware

- Export (and tourism) corridors
- Network of service sites
- Port and accesses
- Regional exit points: ports and airports
- Logistics terminals network
- Access to transport facilities
- Export zones
- Border crossing

Software

- Single windows
- Dedicated lines: perishables
- Privileged lanes: based on track record
- Customs
- Warehousing
- Cool chain storage and transport facilities
- Multimodality law
- Transport services: trucking
- Certifications on quality and phytosanitary compliance
- Digitalization of Certificates of Origin

Building on the stated framework and along the lines of the identified determinants of logistics costs, the following are some areas for potential action by policymakers.

Ports and Maritime Transport

- Focus on investments, operational efficiency, and landside linkages for greater connectivity
- Anticipate growth and invest in landside and waterside capacity
- Introduce spatial planning into the notion of port location and expansion
- Encourage consolidation or coordination of small private operators
- Use competition authority to investigate vertical and horizontal integration issues

Airports

- Focus on linkages with other transport modes and access issues
- Develop cooling capacity, since most perishables use that mode of transport
- Implement single window procedures and dedicated inspections
- Decentralize services in larger countries

Customs Clearance and Border Crossings

- Improve clearances/inspections through better cross-border collaboration and coordination between phytosanitary and customs services
- Implement digitalization of Certificates of Origin
- Set export clearance times as the standard for import clearance times
- Simplify customs declarations forms, procedures, and clearance, and move into a single window framework
- Use risk-based selectivity process for inspections and deploy dedicated lines for perishables and safe profiles
- Harmonize customs standards for sub-regions
- Reduce fines for minor documentation errors

Inland Transport: Roads and Trucks

- Focus on speed and ease of travel, competition in service provision, and access and capacity of transfer and storage facilities
- Improve road quality, keeping in mind that the present value of maintaining a road regularly is an order of magnitude less than rehabilitating it once every ten years
- Strengthen trucking regulations and enforcements
- Facilitate the development of ample storage, warehousing, and transfer facilities
- Strengthen logistics planning based on more sophisticated freight flow modeling
- Corridor program
- Selective feeder road
- Access and linkages

Cold Chain

- Implement program of network of silos with cold capacity (as a public–private partnership or with sunset clauses)
- Implement program of warehousing with cold capacity at exit points, such as ports and airports (as a public–private partnership or with sunset clauses)
- Incentive program for trucks/containers with cooling capacity

Decentralization of Export/Imports Related Services

Particularly for medium and large countries, a selective and educated decentralization of exports and imports services and facilities is critical. As of now, in many countries the tendency is to have those services concentrated in a single point or location, which adds to the logistics cost since goods have to be moved through that location, regardless of where they are being produced.

Special Economic Zones

Since the process, expenses, and time to provide or facilitate an effective logistics system can be quite lengthy and costly, it is often desirable to create dedicated zones with state-of-the-art logistics to jump

start the process and capture relatively quickly the benefits. Thus developing special economic zones near the exit points is suggested.

Packaging Program

As mentioned, an important source of logistics costs is poor and deficient packaging of the goods leading to high rates of damage and spoilage. To address this issue, governments could consider facilitating Centers for Knowledge Transfer and Services on packaging to assist producers in their packaging needs. This could be done as a public-private partnership.

Multimodality Program

An effective logistics system needs to develop and use multimodality and multimodal operators. The transport system has to be integrated, not a system of uncoordinated transport modes. Integrated transport planning (strategic corridor development) is thus critical, as is appropriate legislation to facilitate the use of multimodality and multimodal operators.

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