

# Road Freight in Central America

## Five Explanations to High Costs of Service Provision

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## Background Paper

Economics Unit, Sustainable Development Department  
 Central America Country Management Unit  
 Latin America and the Caribbean Region  
 The World Bank

# LATIN AMERICA AND THE CARIBBEAN REGION

## ROAD FREIGHT IN CENTRAL AMERICA *FIVE EXPLANATIONS FOR HIGH COSTS OF SERVICE PROVISION*

Economics Unit, Sustainable Development Department

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Latin America and the Caribbean Region

The World Bank

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opportunities for all

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# Road Freight in Central America –Five Explanations to High Costs of Service Provision<sup>1</sup>

## Executive Summary

An efficient system to transport goods domestically and internationally is a key element of the logistics chain. Road freight transport has a direct impact on poverty as it employs millions of people and generates a significant portion of GDP, especially in low and middle-income countries. Trucking is the primary form of transportation for domestic, trans-border, and international cargo, in Central America. Road freight transport is now vital to production, distribution, and mobilization, driving economic, social, and environmental progress. In short, trucking is the backbone of economies around the world<sup>2</sup>.

In the past 20 years, the industry has advanced as technology has improved communication, management, productivity, including vehicle efficiency. Their objective in doing so is to expand markets, generate wealth on the basis of efficient specialization, introduce competition, and lower costs for production, distribution, services, and research and development<sup>3</sup>.

When road freight transport services are efficient, they support these objectives; when they are not they act as nontariff barriers to trade—creating delays, raising costs, worsening congestion and pollution. Such barriers prolong and destabilize delivery schedules, hinder “just in time” inventory management and industrial processes, and impede the efficient combination of factors of production<sup>4</sup>.

Accomplishing reforms requires understanding how the industry works, including the logistics services essential to efficiency, and a clear understanding of problems. This paper analyzes information collected through a comprehensive trucking survey implemented in all six countries in Central America. The analysis identifies five key issues that provide an explanation to why transport costs are high in the region. By addressing the following five key issues – (a) access to credit, (b) fuel prices and consumption, (c) security costs, (d) travel times and (e) backhaul issues—, service provision in the region can improve and be more cost-efficient. High vehicle operating costs as revealed by high costs of capital and fuel, increase prices. Increased security costs as a result of increasing crime rates in the region, impact total costs to transport providers. Long travel times, as a result of long waiting and idle times during each trip and high rated of empty runs (backhauls) create inefficiencies that influences final transport prices.

Since inefficiencies in road freight industry services that affect reliability, predictability, and certainty of services impact prices, identifying key explanations to the high cost/high price phenomena is the first step to address the challenges of freight through road transport in Central America.

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<sup>1</sup> The results of this report are based on a Trucking Survey conducted by LCSSD Economics Unit, of The World Bank in Central America between October of 2011 and March of 2012. The survey was implemented in companies that provide “transport for hire and reward”.

<sup>2</sup> Freight transport for development toolkit – Road transport (PPIAF, WB, 2009)

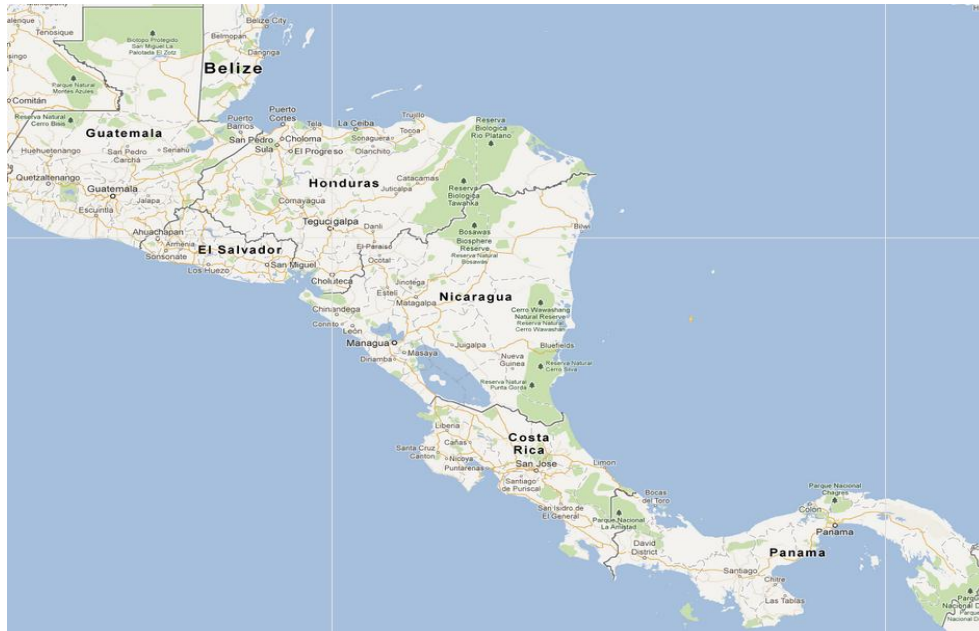
<sup>3</sup> Freight transport for development toolkit – Road transport (PPIAF, WB, 2009)

<sup>4</sup> Freight transport for development toolkit – Road transport (PPIAF, WB, 2009)

## Why Road Transport of Freight is a key element of the logistics chain

The ability to move goods safely, rapidly and cost-efficiently from where they are produced to where they are consumed is crucial for international trade and economic development. Road freight transport is a key element of the logistics chain. The sector plays a fundamental role in market integration and economic development. It is also a determinant of transaction costs for economic agents and is considered a highly cyclical activity. Estimates for Central America show that Transport Costs are between 30-35 percent of total logistics costs<sup>5</sup>. Fluctuations in GDP lead to changes in the demand for freight transport services<sup>6</sup>.

Figure 1: Map of Central America



As shown in Table 1<sup>7</sup>, the contribution of the transport sector<sup>8</sup> to gross domestic product (GDP) accounts for between 2.5 and 14.5 percent of GDP and roughly similar, albeit often smaller, shares of total employment. For some countries, these figures have grown in value and importance over the last few years, usually driven by export growth—mainly through containerized goods. In Panama, for instance, the value of the transport sector experienced an increase of 282% from 1990 to 2010. El Salvador and Nicaragua also registered significant increases in the total value of the sector<sup>9</sup>.

<sup>5</sup> Jose Luis Guasch 2010. World Bank

<sup>6</sup> Ruiz Olmedo, 2007; WTO, 2010

<sup>7</sup> Table 1 provides information for the countries included in the Region, compiled from different information sources. It is important to note that figures for the contribution of the sector to GDP and employment may be underestimating the total economic weight of the sector.

<sup>8</sup> Transport sector includes the value of the air, inland waterway, rail and road freight and passengers movements.

<sup>9</sup> The value of the transport sector in El Salvador grew in 358 percent from 1990 to 2006. In Nicaragua, this value increased in 50 percent from 1990 to 2010. (Cruz, 2006; ASIES-Enrique Lacs, 2009; ECLAC, 2012)

Table 1: Contribution of Transport Sector to GDP

Country	Year	%
Costa Rica	2009	6.6
El Salvador	2010	5.6
Guatemala	2009	2.5
Honduras	2010	3.8
Nicaragua	2010	4.2
Panamá	2008	14.5

Source: World Bank Central America Trucking Survey

Road freight transport exerts great influence on the final cost of what it is produced; goods include the cost of transport from factory to final destination. As such, in modern economies, the positive impacts of more efficient road freight transport sectors – an important component of the logistics system – are becoming increasingly explicit; countries' competitiveness is influenced by this sector.

Transport prices are measures used to determine the competitiveness of the road freight transport sector. These prices are determined by the sum of three elements: (1) vehicle operating costs (VOC's); (2) other indirect costs – usually refers to as cost to transport provider (TC's) – such as licenses and road tolls; and (3) the operator's profit margin.

Transport costs are also a direct function of several factors. Communication, management, vehicle efficiency and quality of road infrastructure affect operating costs. Among many other steps, freight transport companies manage border clearance procedures and pay trade services fees for the goods and services that are produced. These costs are further affected by how information is collected and submitted for declarations or by indirect consequence of border checks in the form of delays and associated time penalties<sup>10</sup>.

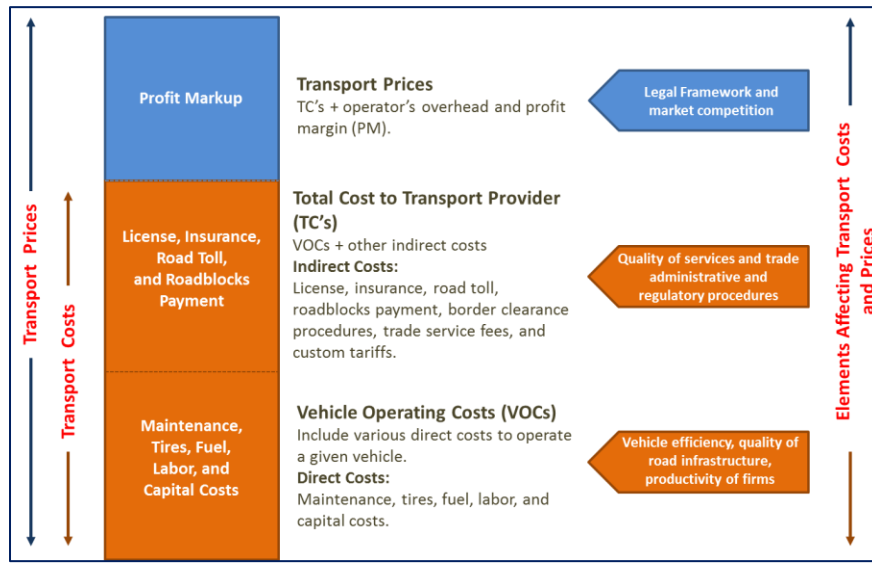
Transport costs are also affected by the quality of transport infrastructure and services, customs tariffs, and non-tariff trade barriers including administrative and regulatory procedures. Regulatory procedures also go beyond mere customs inspections to include fiscal controls, safety and security measures, environment and health checks, consumer protection mechanisms, and trade policy regulations. These costs can also result in forgone business opportunities and reduced competitiveness<sup>11</sup>. Figure 2 shows the elements associated with transport prices by source of cost<sup>12</sup>.

<sup>10</sup> Hansen and Annovazzi-Jakab, 2008; World Bank, undated.

<sup>11</sup> Teravaninthorn and Raballand, 2008, Hansen and Annovazzi-Jakab, 2008

<sup>12</sup> Source: Elaborated from Teravaninthorn and Raballand, 2008 and Hansen and Annovazzi-Jakab, 2008

Figure 2: Elements affecting transport costs and prices



Source: Hansen and Annovazzi(2008). Teravaninthon and Raballand (2008)

In fact, evidence suggests, that for the case of developing countries, improvements only in road infrastructure to facilitate road freight transport have not necessarily resulted in reductions in transport prices. In Africa, the end users of road transport services have not fully benefited from the improved infrastructure as prices of final products remained unchanged<sup>13</sup>. Improvements in infrastructure in the Southern Cone and Andean Region did not increase efficiency and productivity of the road freight transport sector<sup>14</sup>. Furthermore, regulations that impact market access and market operation pose additional barriers that translate in higher prices. Thus by addressing the following five key issues – (a) access to credit, (b) fuel prices and consumption, (c) security costs, (d) travel times and (e) backhaul issues--, service provision in the region can improve and be more cost-efficient. High vehicle operating costs as revealed by high costs of capital and fuel, increase prices. Increased security costs as a result of increasing crime rates in the region, impact total costs to transport providers. Long travel times, as a result of long waiting and idle times during each trip and high rated of empty runs (backhauls) create inefficiencies that influences final transport prices.

**1. Constraints on access to and cost of finance for small companies in the region perpetuate a vicious cycle: older trucks have higher maintenance costs which results on higher operating costs even though initial capital cost is low.**

The trucking industry is in general fragmented, with a larger share of operators falling in the small size category that is operators with less than five vehicles or usually owner operators. Evidence for Central America shows that smaller firms have older trucks. Older trucks drive up costs particularly in terms of maintenance, fuel and the environment. Older trucks require frequent routine and preventive maintenance thus higher maintenance costs per vehicle than more recent model vehicles. Fuel consumption increases with fleet age, thus increasing operating costs. Older vehicles using Euro 1-4 technology have higher emission rates, augmenting the negative impact of the trucking industry to the environment.

<sup>13</sup> Teravaninthon and Raballand, 2008

<sup>14</sup> Baraqui (2003)



Table 2: Small firms have higher maintenance costs

	<i>Small</i>	<i>Medium</i>	<i>Large</i>
<b>Costa Rica</b>	2,040	1,502	354
<b>El Salvador</b>	1,529	1,632	1,066
<b>Guatemala</b>	1,716	1,700	1,321
<b>Honduras</b>	1,563	1,586	1,718
<b>Nicaragua</b>	2,585	2,091	2,575
<b>Panama</b>	5,928	4,223	3,582
<b>CA</b>	2,385	2,191	1,881

Source: World Bank Central America Trucking Survey. Large firms: More than 20 vehicles. Medium firms: between 5 and 20 vehicles. Small firms: less than 5 vehicles

The share of companies that relies on the informal sector (personal savings, family loans, etc) to finance vehicle purchases is higher in small firms vis-a-vis larger firms. This is the case particularly in countries like Guatemala, Honduras, Nicaragua and Panama. Large firms rely heavily in bank loans to finance purchases usually at lower interest rates. A special case is Panama, where fifty percent of the large companies use cash to finance vehicle acquisition. Bank financing is among the main sources of finance in the Region, although the largest firms use more the bank system and face better conditions than the small firms. This difference in interest rates may be explained by the risk profile of small versus larger firms where smaller firms are seen as riskier probably as a result of informal management techniques.

For instance, in Panama the interest rate reported by larger firms was in average 11%, while for smaller firms it was 15%. With the exception of Guatemala, where firms report having the same interest rate on average between large and small firms, all other countries have significant differences between the average interest rate and the size of the firm.

Providing mechanisms or programs to support better access to credit at lower costs can be a triple win situation: lower capital costs, lower vehicle operating costs, and lower cost to the environment. By improving the access to credit for

In the Region, with the exception of Honduras and Nicaragua (that have similar maintenance cost between small and large firms), small firms have a higher maintenance cost per vehicle. Small firms are in a precarious situation spending more in both maintenance and fuel.

The effect is compounded by the constraints posed on access to finance. While most firms have access to financing sources in order to acquire vehicles, there are notable differences in the sources of financing between small and large companies. Smaller firms rely more on informal mechanisms to finance vehicle acquisition at higher interest rates.

Table 3: Large firms have greater access to informal financing sources than small firms

		<b>Bank</b>	<b>Cash</b>	<b>Informal</b>	<b>Other</b>	<b>Interest rate</b>
<b>small</b>	Costa Rica	60%	20%	20%	0%	19%
	El Salvador	77%	8%	15%	0%	16%
	Guatemala	25%	25%	38%	13%	12%
	Honduras	29%	0%	57%	14%	17%
	Nicaragua	38%	6%	44%	13%	18%
	Panama	14%	29%	43%	14%	15%
<b>large</b>	Costa Rica					
	El Salvador	100%	0%	0%	0%	10%
	Guatemala	71%	29%	0%	0%	12%
	Honduras	38%	38%	25%	0%	16%
	Nicaragua	63%	13%	0%	25%	15%
	Panama	33%	50%	0%	17%	11%

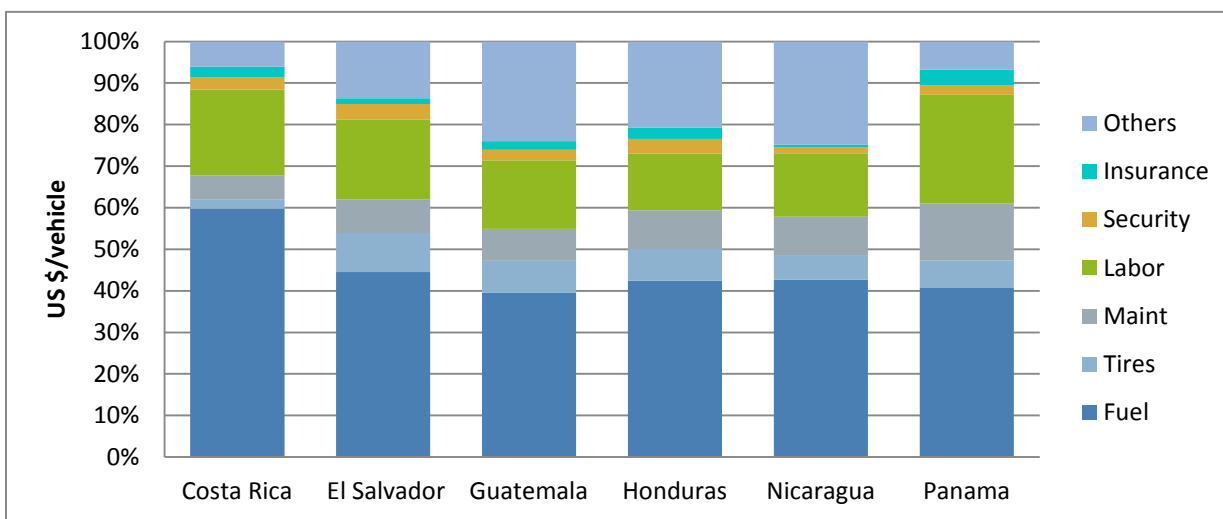
Source: World Bank Central America Trucking Survey

small firms the vicious circle of acquiring old cheap trucks that at the end consume more fuel, have higher maintenance cost and higher overall operation cost for small companies which represent a large share of the market can largely contribute to breaking the cycle.

**2. Fuel costs represent 40-60% of total operating costs. Except for El Salvador, a small percentage of firms report using best operating practices and technologies to improve fuel efficiency.**

**Improving fuel efficiency can have a significant impact on total costs.** Transportation is one of the largest contributors to CO2 emission, particularly from vehicles with pre-EURO technologies. A study done by The World Bank estimates that the cost per vehicle to increase fuel efficiency is US 3,200, and that the annual benefits are USD 2,800. This translates into truckers having a positive return to their investment after 1.1 years.

Figure 3: Fuel Costs represent 40-60% of total operating costs



Source: World Bank Central America Trucking Survey

High transport costs in the road freight sector – specifically VOC’s – are partly a result of the high price of fuel that prevails in the Region. Fuel cost accounts for 40-60 percent of the total variable costs. In Nicaragua, for instance, the sector’s operating costs have soared by rising prices of diesel, reaching US\$4.3 per gallon. Furthermore, Costa Rica has the most expensive fuel in the Region, with prices around US\$4.5 per gallon and a share of the total cost close to 60%.

Despite the importance of the fuel on the total cost for every country in the region, practices to increase fuel efficiency are not generalized.

When asked, 50% of companies interviewed say they do not engage in fuel efficiency practices. In El Salvador, the country that reported the highest levels of fuel efficiency practices, 73% of companies report using compliance with the manufacturer recommendations (tires pressure, use of appropriate fuels and maximum loads) and regular maintenance practices (regular checks) as techniques to increase fuel efficiency. 65% of companies promote fuel savings and have designed fuel theft programs and 59% state using eco-driving techniques.

Table 4: The use of techniques to increase fuel efficiency in not widespread in the region and there is ample room for improvements

	Use Techniques	Manufacturer's Recommendations	Eco-Driving	Savings & Reductions Fuel Theft	Regular Checks
Costa Rica	39%	32%	23%	18%	34%
El Salvador	73%	73%	59%	65%	70%
Guatemala	70%	62%	51%	57%	65%
Honduras	51%	47%	37%	24%	49%
Nicaragua	36%	32%	12%	8%	28%
Panama	52%	43%	31%	31%	40%

Source: World Bank Central America Trucking Survey

For example, Nicaragua and Costa Rica have the lowest use of fuel efficiency practices (36% and 39% companies respectively), where only 8% and 18% of the companies engage in Eco-driving practices respectively.

Despite that most trucking companies are aware of the advantage of fuel efficiency; they do not acquire technology to do so. Only 34% of the companies in the region report using modern technologies to improve fuel consumption.

Table 5: The use of technologies to increase fuel efficiency varies within countries and is not a common practice

	Use Technologies	Tire & Wheel	Idling Reduction	Aerodynamics	Emission Control Technologies
Costa Rica	32%	23%	5%	18%	11%
El Salvador	57%	30%	32%	30%	38%
Guatemala	41%	30%	32%	30%	38%
Honduras	29%	16%	14%	20%	16%
Nicaragua	10%	6%	6%	4%	6%
Panama	43%	24%	19%	26%	29%

Source: World Bank Central America Trucking Survey

In Nicaragua just 6% of the companies use Tire and Wheel Technologies (aluminum rims, automatic tire inflation, external signal, booster, low rolling resistance tires) to improve fuel efficiency; while in El Salvador and Guatemala around the 30% of the companies use Tire and Wheel Technologies, Idling Reduction<sup>15</sup> and Aerodynamics. In both countries, 38% of the companies implement emission control technologies as diesel Exhaust Fluid (DEF), Diesel Oxidation Catalysts (DOC), inter alia<sup>16</sup>.

<sup>15</sup> Automatic shut-down/star-up systems, auxiliary power units and generators sets, battery air conditioning (BAC) systems, fuel operated heaters, thermal storage system (TSS)

<sup>16</sup> Diesel Particulate Filters (DPF), Selective Catalytic Reduction (SCR), Closed Crankcase Ventilation (CCV), Exhaust Gas Reduction (EGR) and Lean NOx catalyst.

Table 6: Reduction in fuel consumption varies by technology

Type of Technology	Reduction in Fuel Consumption (%)
Aerodynamics	3.0 – 15.0
Weight Management	2.0 – 5.0
Idling Reduction Techniques	5.0 – 9.0
Eco-Driving	15.0 – 40.0
Others	8.0 – 15.0

Source: TRB, 2010

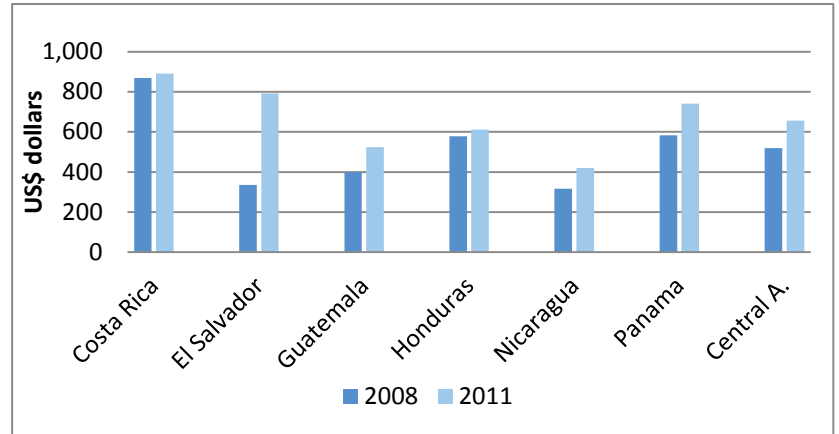
Reducing fuel consumption by adopting fuel efficiency practices and technologies can reduce consumption from 3% and up to 40% in each category. Increasing eco-driving programs in the region have great potential and could save up to 40% of fuel. By adopting a combination of technologies and techniques for fuel consumption reduction, operators could reduce consumption between 33 and 84 percent on aggregated levels. Because of scarce resources to invest in fuel efficiency, promoting programs for fuel efficiency perhaps through private-public initiatives could have a great potential in the region, and can have a significant impact in reducing costs.

### 3. As a result of increasing crime and violence in Central America, security costs have increased for trucking companies and represent between 3-4% of total costs.

Enterprise surveys show that on average in Central America, annual security costs are US\$665 per vehicle. In line with this, for the trucking sector, security cost represents 3-4% of the total costs. On average over the past three years in the region, security costs have increased close to 25%. As security concerns continue, the impact on total costs will probably keep escalating. Trucking companies have adopted a number of techniques to secure cargo, both in their premises and throughout the routes they travel. Among the most popular actions taken we find the use of enhanced vehicle tracking devices, additional security guards on premises and provision of armed escorts to trucks while on the road. The need to adopt such practices continues to increase costs. Freight operators reported that security costs have increased during since 2008. Some countries, as Costa Rica and Panama, show high security costs as a result of higher labor costs (i.e. from using labor intensive security techniques like additional security personnel) and modern technologies to secure cargo (i.e. tracking devices on vehicles). For Costa Rica, growing concerns on security and increasing crime rates, influence costs per vehicle. Operators in Costa Rica have reported stopping operations to neighboring countries as a result of increased security threats.

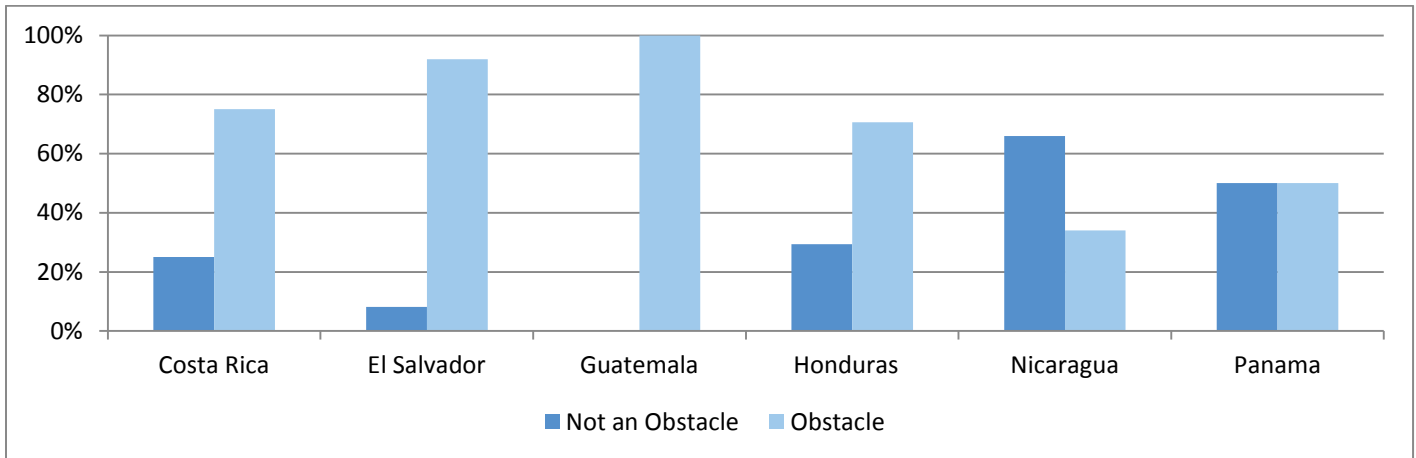
Annual security cost has increased in every country of the region. In El Salvador, costs increased from US\$335 to US\$790 per vehicle showing an increase of 130% (the highest in the area). Guatemala shows an increase from US\$400 to US\$524 representing a 30% increase. In Nicaragua a 32% increase drove costs to US\$420. Panama shows an increase of 27% in three years, to US\$582 per vehicle in 2011 (Figure 4).

Figure 4: Annual security costs have increased in the region during the past three years.



Source: World Bank Central America Trucking Survey

Figure 5: Perception on security costs as an obstacle to service provision are high



Source: World Bank Central America Trucking Survey

Furthermore, truckers report that increasing security costs are indeed an obstacle to service provision. In Guatemala, for example, 100% of the survey respondents report that security costs are an obstacle to service provision. Nicaragua reports having the lowest security costs in the region as a result of having some of the lowest crime rates, and over 60% of truckers report that security costs are not an obstacle to service provision.

As crime and violence continues to escalate in the region, it is expected that annual security costs will continue to increase resulting in higher prices for trucking services. Additionally, interviewees with operators show growing concerns in cross-border operations. In specific cases, operators in countries like Nicaragua and Costa Rica with lower crime rates are choosing not to travel to countries like Honduras and Guatemala due to security concerns, and escalating costs.

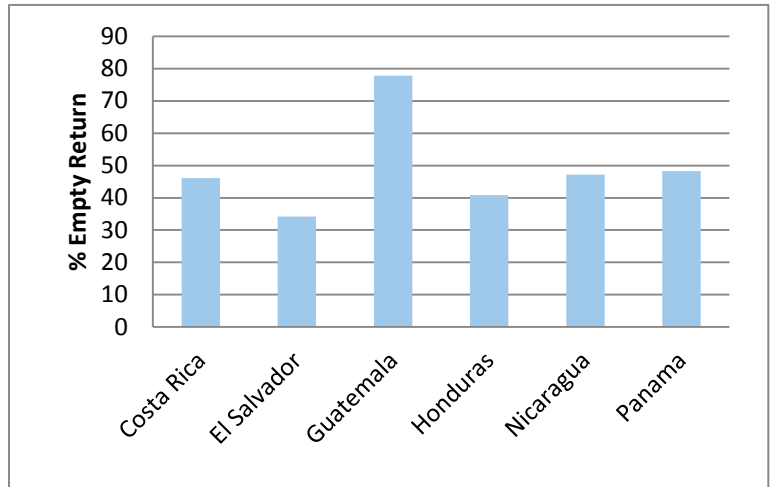
**4. A large share of cargo trips in the region, return with empty backhauls, resulting in prices for one leg of the trip that cover the costs of empty return trips.**

Backhaul practices are extremely important in explaining differences in prices; i.e. the truck companies are compensating their expenses on the empty backhaul in the first leg of the trip. Empty backhauls are particularly high in Guatemala about 77% of trips are returning empty. El Salvador has the lowest share of empty backhauls with 30% of empty returns in line with other developing and developed countries.

Empty backhauls affect all firms, irrespective of size. In Costa Rica, El Salvador, Guatemala and Panama, the “large” firm category (with more than 20 vehicles) presents the highest empty backhaul percentage; while in Nicaragua and Honduras the percentage is higher for the “small” firm category (with less than 5 vehicles).

Presumably, larger firms can afford smaller profits per vehicle and implicitly higher empty backhauls, while keeping the prices acceptable for the customers, because they have direct contracts with large clients i.e. shipping companies that assure them a steady flow of cargo.

Figure 6: Empty backhauls comprise a large share of return trips



Source: World Bank Central America Trucking Survey

Table 7: The method by which cargo is obtained by companies varies by firm size and impacts backhauls prices.

Country	Size of the fleet	Contracts	Agents	Lorry Parks	Others	Empty Backhaul
Costa Rica	Large	74.2	25.8	0.0	0.0	53.5
	Medium	61.8	33.5	1.8	2.9	47.8
	Small	64.8	24.0	6.3	5.0	42.3
	<b>TOTAL</b>	<b>64.9</b>	<b>27.6</b>	<b>3.9</b>	<b>3.6</b>	<b>45.7</b>
El Salvador	Large	71.7	20.0	0.0	8.3	75.0
	Medium	69.3	29.3	0.7	0.7	33.3
	Small	76.4	16.9	6.7	0.0	30.6
	<b>TOTAL</b>	<b>73.0</b>	<b>22.4</b>	<b>3.6</b>	<b>0.9</b>	<b>35.2</b>
Guatemala	Large	76.7	22.6	0.7	0.0	97.5
	Medium	72.9	25.9	1.2	0.0	73.8
	Small	75.0	16.7	8.3	0.0	71.3
	<b>TOTAL</b>	<b>74.3</b>	<b>21.9</b>	<b>3.7</b>	<b>0.0</b>	<b>77.0</b>
Honduras	Large	24.6	65.4	0.0	10.0	31.7
	Medium	35.0	59.0	1.3	4.7	32.8
	Small	41.9	42.5	11.7	3.8	57.2
	<b>TOTAL</b>	<b>36.5</b>	<b>51.8</b>	<b>6.4</b>	<b>5.3</b>	<b>45.0</b>
Nicaragua	Large	65.5	22.5	10.0	2.0	26.8
	Medium	60.0	40.0	0.0	0.0	42.3
	Small	42.9	43.9	7.5	5.7	49.6
	<b>TOTAL</b>	<b>50.6</b>	<b>39.3</b>	<b>6.3</b>	<b>3.8</b>	<b>44.0</b>
Panama	Large	57.5	15.8	0.0	26.7	66.0
	Medium	81.5	13.0	2.0	3.5	45.9
	Small	63.5	28.8	3.8	3.8	38.5
	<b>TOTAL</b>	<b>71.2</b>	<b>19.4</b>	<b>2.4</b>	<b>6.9</b>	<b>46.0</b>
CA	Large	58.2	32.1	2.5	7.3	50.5
	Medium	64.7	31.9	1.3	2.1	46.3
	Small	57.1	31.6	7.8	3.5	48.6
	<b>TOTAL</b>	<b>60.0</b>	<b>31.8</b>	<b>4.6</b>	<b>3.6</b>	<b>48.0</b>

Source: World Bank Central America Trucking Survey. Large firms: with more than 20 vehicles. Medium firms: between 5 and 20 vehicles. Small firms: with less than 5 vehicles.

In general, the majority of the cargo is allocated through direct contracts with the shippers and cargo owners -- about 60% in CA--, while independent brokers deliver 30% of the cargo. The relation among sizes, methods of allocation and the empty return practices it is not straightforward, but there is reason to believe they impact the percentage of empty backhauls.

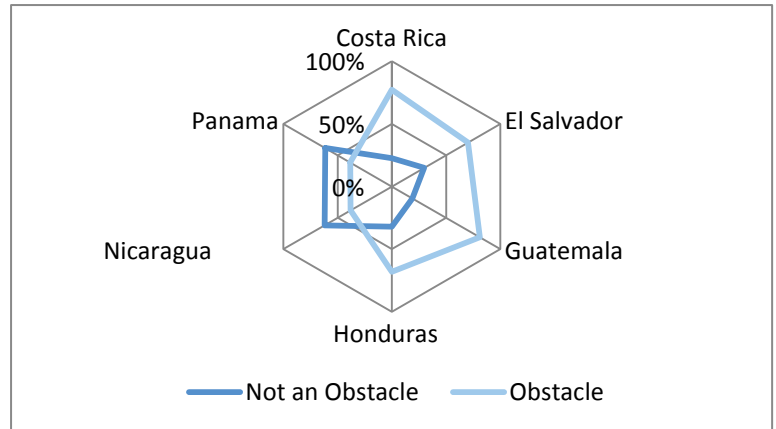
Furthermore, distance between Origin and Destination has a negative impact on the empty returns; i.e. for longer turnaround trips, truckers are less likely to return empty. Shorter trips, i.e. capital city to ports, are more likely to return empty. This is perhaps a result of the costs associated to longer trips and the fact that firms (or single truckers) are not willing to return empty and consumers are not willing to assume the costs associated to the empty returns.

For companies that allocate a larger share of their cargo through independent agents, the percentage of empty backhaul is less than for companies that allocate cargo through direct contracts with the shippers and cargo owners. Operators waiting at the lorry park as a way to allocate their cargo have the highest rates of empty return. In countries like Costa Rica, El Salvador, Guatemala and Panama, larger firms have direct contracts, and therefore the highest empty backhaul rates. In countries like Honduras and Nicaragua, the largest firms tend to have lower empty backhaul rates because that

method of allocation varies more widely. Additionally, firms that belong to a Transport Association tend to have lower empty return rates perhaps as a result of increased opportunities for finding cargo.

Furthermore, trucking companies in Costa Rica, El Salvador, Guatemala and Honduras report that empty backhauls are an obstacle to service provision in the region. Empty backhauls are a result of market inefficiencies not of regulations. The regional regulations give traffic rights to truckers from all countries in the region to move and transport cargo freely within the region. The only restriction on cargo movements is cabotage, that is local companies have the exclusive right to transport goods that have domestic origin and destination.

Figure 7: Perceptions of empty backhauls as an obstacle to service provision



Source: World Bank Central America Trucking Survey

Empty backhauls are a consequence of inefficiencies in the market; the lack of opportunities for most truckers to get cargo for return trip and the lack of coordination mechanisms that match supply and demand result in lower efficiency for the sector and higher prices. The oversupply of trucks and long waiting times for profitable cargo are the result of the lack of coordination and the low third-party services involvement. Transport associations and Independent Freight Agencies that coordinate the network of movements of the cargo can be efficient ways to solve the information asymmetry problems in order to avoid high empty running rates. The use of specialized websites that assist operators in finding cargo is an alternative currently in use in the United States and in Europe. Encouraging such mechanisms are essential for solving the empty backhaul problems.

## 5. Increased waiting times and significantly high idle times for trucks while in route impact transport costs.

High travel times translate into high logistics costs. In the Central America trucking industry, waiting time defined as the time spent loading, downloading, and mandatory times at weight stations or to fulfill mandatory inspections represents around 20% of the total travel time in the main routes of the region. Border times defined as the time spent in customs and inspections reaches about 15%-20% of the total time. For example, in the round-trip from San Jose to Managua, if speed averages 60 km per hour, for the 984 kilometers, a truck should turnaround in about 16.4 hours (without stops). Instead it takes about 107 hours to turnaround. In this case, 48 hours are spent between waiting times and border crossings. It takes an average of 16.4 driving hours to make the round trip. The other 42.6 hours are idle times including mandatory rest stops, potential delays in route, etc. Logistics providers require flexibility, speed and reliability. Any gains in travel times, translate into better service provision, and lower transport costs.



High travel times in the region are a result of a combination of multiple factors including unpredictable border time crossings, congestion around urban areas, inability to travel after dark in certain areas because of security concerns, excessive document control and inefficient customs procedures, poor infrastructure (along the route, at the origin and destination, and at the border crossings) and long hours waiting for loading and unloading.

For the route San Jose – Managua the time spent at the border Peñas Blancas (for a turnaround trip) is 24 hours on average representing 22% of the total time of the route. The route from San Salvador to Tegucigalpa shows a Border Time of 10 hours, representing a 14 % of the Total Time. For the route Ciudad de Guatemala to San Pedro Sula it takes 11 hours to cross the borders, 13% of the Total Time, and for the route San Pedro Sula to Managua it takes 23 hours to cross borders, a 10% of the Total Time of the route.

Table 8: Travel Times in Main Routes in Central America

	Origin	Destination	KM (turnaround trip)	Total time	Waiting Time *	Border Time	WT/TT	BT/TT
<b>Costa Rica</b>	San Jose	Ciudad Guatemala	2,688	219	41.8	34.4	19%	16%
	San Jose	Ciudad Panama	1,702	102	13.8	12.4	14%	12%
	San Jose	Managua	984	107	23.6	23.9	22%	22%
	San Jose	San Pedro Sula	2,360	216	50.3	35.5	23%	16%
<b>El Salvador</b>	San Salvador	Ciudad Guatemala	554	50	6.7	6.5	14%	13%
	San Salvador	Managua	1,108	111	12.8	9.5	12%	9%
	San Salvador	San Jose	2,086	242	31.1	15.7	13%	6%
	San Salvador	San Pedro Sula	823	70	10.3	5.3	15%	8%
	San Salvador	Tegucigalpa	717	75	9.8	10.2	13%	14%
<b>Guatemala</b>	Ciudad Guatemala	San Pedro Sula	1,056	83	19.6	11.1	24%	13%
	Ciudad Guatemala	Managua	1,644	113	15.4	9.4	14%	8%
	Ciudad Hidalgo	Ciudad Guatemala	541	72	33.0	7.5	46%	10%
	Ciudad Guatemala	San Salvador	543	45	11.0	5.0	25%	11%
<b>Honduras</b>	San Pedro Sula	Tegucigalpa	528	54	23.8		44%	
	San Pedro Sula	Ciudad Guatemala	944	129	32.2	13.5	25%	10%
	San Pedro Sula	Managua	1,318	221	64.9	22.9	29%	10%
	San Pedro Sula	San Jose	2,175	324	77.2	25.5	24%	8%

Source: World Bank Central America Trucking Survey (2012). \* Waiting time does not include the Border Time

Border crossing affects travel times, and reliability of service provision. There is a high variation amongst waiting times in the different borders, which shows border services are not consistent amongst the different countries in the region. This is a result of differences in the application of regulations by different countries, efficiency of the customs and immigrations authorities, poor border infrastructure, and border congestion. For example, in the route Ciudad de Guatemala – San Pedro Sula truckers spent on average of 11 hours crossing the border (the turnaround trip), but variability is high. The reported low end is 2 hours, while the high end is 2 days. Figure 8 summarizes the variability

between average border crossing times. Data collected from the trucking companies, shows that delays are not necessarily associated to a particular type of cargo, but more associated to the lack of standardized services at the border posts.

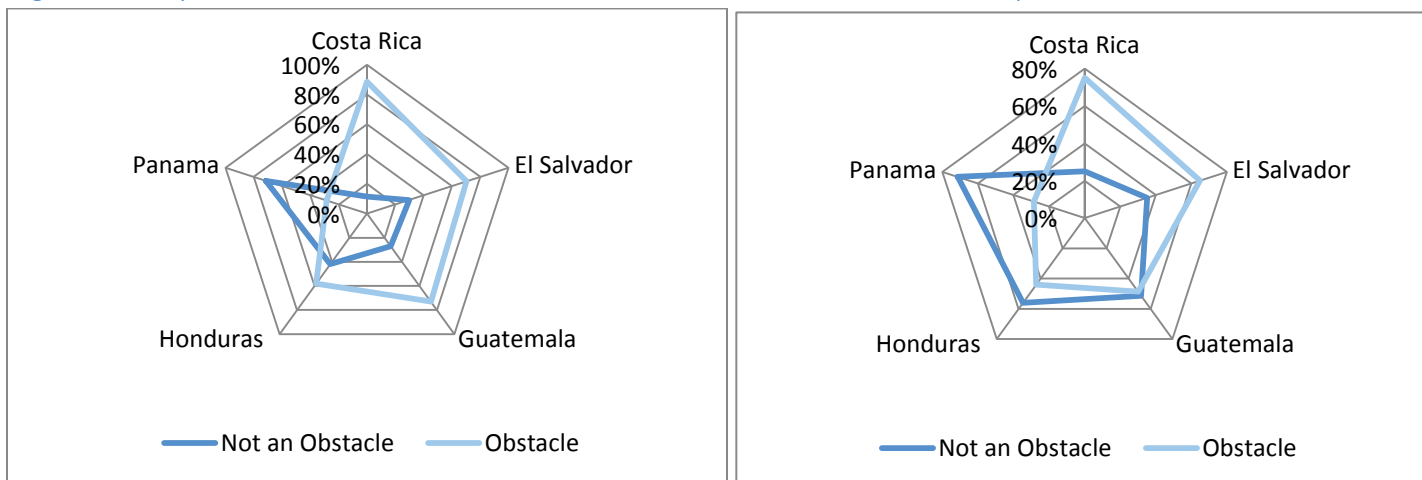
Figure 8: Variation amongst border times in the Region



Source: World Bank Central America Trucking Survey 2012

Moreover, trucking companies (with the exception of Panama) report that custom procedures, immigration procedures and excessive document control are obstacles to efficient service provision.

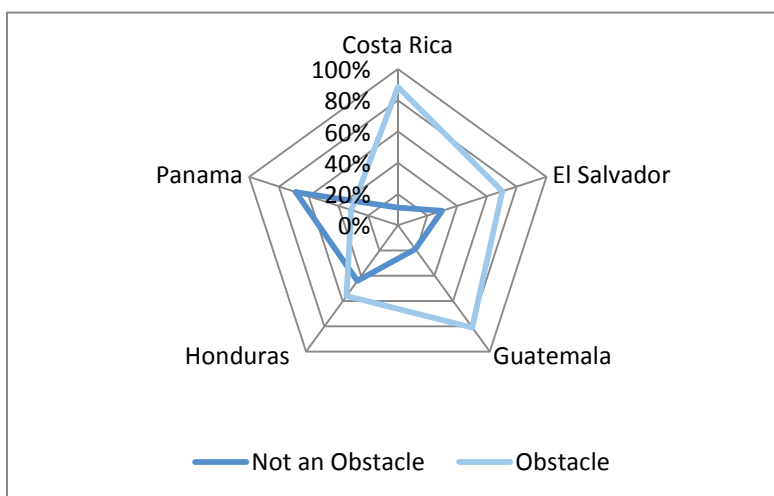
Figure 9: Perceptions on Customs Procedures and Document Control as obstacles to service provision.



Source: World Bank Central America Trucking Survey

Furthermore, infrastructure in border crossing posts can be an obstacle to service provision as reported by trucking companies in Costa Rica, El Salvador and Guatemala (Figure 10).

Figure 10: Perceptions on Poor Infrastructure at Border Crossing as obstacle to service provision



Source: World Bank Central America Trucking Survey

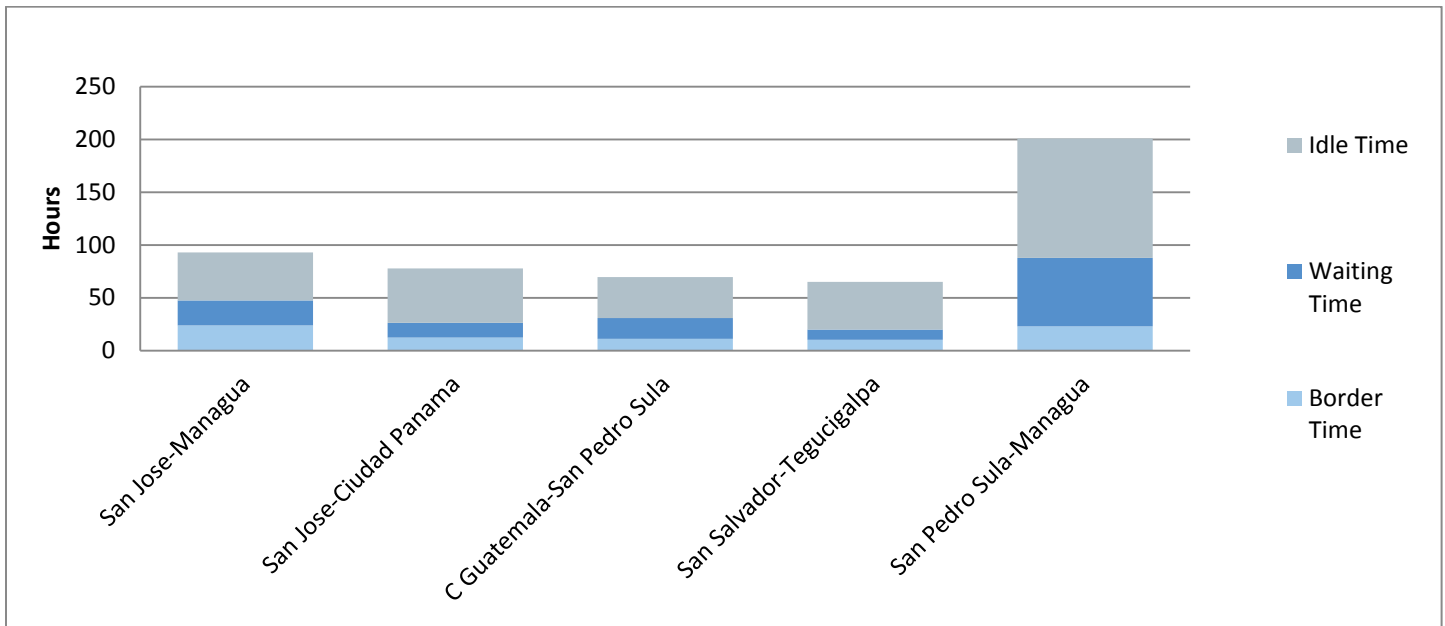
Idle times that consider a) arrival times at the borders, (b) mandatory recovery periods, (c) restrictions on traveling times (i.e. arrival and exit to/from metropolitan areas<sup>17</sup>), (d) inability to travel late at night due to lack of security, can represent more than 40% of the Total Time. In routes like San Salvador – San Jose the Idle time can reach 167 hours

<sup>17</sup> Ciudad de Guatemala and San Jose in Costa Rica have placed restrictions in the times that trucks can enter/exit the city. These restrictions are a result of local efforts to reduce travel times during high congestion peak hours.

representing 69% of the Total Time. Any efforts to reduce idle times will positively impact the productivity of the industry.

Figure 11 compares waiting time, idle time and border time. Idle time represents the largest share of time of the road.

Figure 11: Total Route Times separated by Waiting, Border and Idle Times.



Source: World Bank Central America Trucking Survey

By addressing the root causes of high travel times, in particularly identifying the specific reasons for high idle times, costs can be lowered and service provision can become more efficient. Average speeds (as reported by the firms are high) are not the main constraint. The analysis shows perhaps high idle times are a result of unexpected stops along the route (i.e. for inspections, at weight stations), long voluntary or mandatory rest, congestion, constraints on times to enter/cross main cities, etc.

## Conclusions

Trucking services are prone to vicious circles that affect the cost effectiveness and efficiency of the service. In the case of Central America the existence of such circles are making costs high comparable to other regions. A combination of high fuel prices and fuel consumption, long waiting and idle times, inefficient border processes that increase trip times, lack of cargo that generates large percentages of empty return trips, and lack of vehicle financing programs that leads to the purchase of older vehicles with higher recurrent maintenance costs generate upward pressure to costs and thus to transport prices.

There is no one way to address the main issues of service provision in the region. Although, the regional regulations are in place to resolve many of the market inefficiencies, in practice, each individual country needs to address key issues that once addressed will have overall impact in the region, and lower prices for road cargo movements across countries. In some cases, like for example taking measures to reduce security costs, a regional effort is needed; in some other cases, like addressing fuel efficiency, firm level actions or even actions at the transport association level like for example Eco-Driving Courses can have a great impact in the overall performance of the industry. Ensuring coordination amongst all actors involved in the logistics chain will for sure have positive impacts in the movement of cargo across borders in Central America.

## Annex 1: Survey Methodology

During the months of September 2011 and March 2012, a survey directed to Trucking Companies and Operators in the six Central America countries was conducted by an independent consulting firm hired by The World Bank. The survey implemented follows similar methodologies (in particular has similar questionnaires) to previous World Bank surveys in other regions. For the past few years the World Bank has embarked in similar endeavors worldwide. This is the first survey of this type conducted in Latin America and the Caribbean that enables cross-country and cross-region comparisons. Over 250 trucking firms in Central America were interviewed for this survey. Jointly, they operate over 3,400 vehicles that transport goods across borders or to and from ports of entry or exit in more than 260 routes in the region.

The sample was selected based on a comprehensive data set of trucking services in each country, provided by the main trucking associations in the region and by drawing lists from publicly available documents (i.e. phone books, etc.). The sample targeted 120 data points for all types of routes in each country, for a total of 120 vectors of information (or O-D combinations), as shown in the table below, with a minimum of 15 trucking firms and a maximum 30 truck drivers (or owner operators). The sampling strategy was a non-stratified random selection of respondents, with saturation approach for O-D combinations. In essence, randomly selected respondents who transported internationally traded goods were randomly selected and could provide information on a maximum of 4 routes; which in this case presented 4 data points on the 120 targeted.

	Country	Trucking Companies	Truck Operators
<b>No. Respondents</b>	<i>Costa Rica</i>	14	30
<b>No. Routes</b>	<i>Costa Rica</i>	53	67
<b>No. Respondents</b>	<i>El Salvador</i>	15	30
<b>No. Routes</b>	<i>El Salvador</i>	60	60
<b>No. Respondents</b>	<i>Honduras</i>	15	30
<b>No. Routes</b>	<i>Honduras</i>	60	60
<b>No. Respondents</b>	<i>Guatemala</i>	15	30
<b>No. Routes</b>	<i>Guatemala</i>	60	60
<b>No. Respondents</b>	<i>Nicaragua</i>	16	34
<b>No. Routes</b>	<i>Nicaragua</i>	44	76
<b>No. Respondents</b>	<i>Panama</i>	15	30
<b>No. Routes</b>	<i>Panama</i>	60	60

The questionnaire was divided into eleven sections including: control information, general information, characteristics of vehicle fleet, transport service characteristics, market pricing, employment, regulations and technologies, and constraints to service provision. The sample is representative of both the formal sector, defined as formal firms with five or more vehicles in their fleet, and the informal sector, defined as operators with less than five trucks, firms with less than five employees and owner-operators. Serving as data gathering tool that helps identify bottlenecks affecting the transport of goods in the region, the trucking survey also allows for an in-depth micro-level analysis of determinants of transport costs and prices, and firm behavior.

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