



The Evolution of Modal Split for Goods Transport in South America

Antecedentes

Introduction

This Bulletin Fal describes the evolution of modal split in international transport for intra South America trade, covering Argentine, Brazil, Chile, Colombia, Ecuador, Peru, Uruguay and Venezuela for the period 2000 to 2010.

The information covered in this document includes data available from CEPALSTAT and the ECLAC International Transport Database (BTI). The BTI database was created by ECLAC's Transport Unit in 1999 and derives statistics from the Foreign Trade Data Bank for Latin America and the Caribbean (BADECEL) and has been developed for the years 2000 to 2010. Previously, ECLAC has published individual Trade and Transport Profiles for each country. These are available for the years 2000¹, 2006, and 2010. The information contained in the database covers:

- Mode of transport by which the merchandise leaves from or arrives in the country.

¹ <http://www.eclac.cl/cid.asp?id=11017>

This FAL Bulletin analyzes data for commodities traded and transportation used between nine South American countries, during the years 2000, 2006, and 2010. The aim is to identify the current modal split in intra-regional freight transport in South America, and to ascertain the level and evolution of trade flows, imbalances and the burden of transport and insurance costs. The authors conclude with some policy recommendations.

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- Product, classified according to a) the harmonized system, and b) the Standard International Trade Classification (SITC), Rev 3.
- Country of origin and departure (in the case of imports) and country of destination (in the case of exports).
- Volume in metric tons).
- Value of exports FOB, value of imports FOB, and value of exports CIF in US dollars.²
- Burden of international transport and insurance costs

This FAL compares the data for the years 2000, 2006, 2008 and 2010 including over six million observations in total. The international transport data analyzed in this FAL excludes all shipments of SITC 3 and SITC 9 commodities. These are omitted due to the reporting on these commodities being less reliable and complete than the data for other traffics and also because the energy commodities are unrelated to other trade flows (Hoffmann, Pérez and Wilmsmeier, 2002).

The publication is structured as follows. Section one gives an overview on the relevance of regional trade in comparison to overall global trade and compares the relationship between GDP and transport growth. Section two discusses the modal participation for intra South America trade for the period 2000-2010. Section three presents the regional imbalances in international transport flows. Further, section four describes the burden of transport costs in international transport and section five concludes.

I. Intra-regional Transport development

As far as commodity transport is concerned, growth is due to a large extent to changes in the South American economies and their system of production. The economies in the study region have again become prime exporters of primary goods, partly driven by the high demand and commodity prices during the first decade of this millennium.

Before taking a closer look at the modal participation within the study region, the importance of intra-regional trade to the countries shall be pointed out. Intra-regional trade has always been less important in intra-south American trade than in the European Union, but since the foundation of LAIA intra-regional trade has more than doubled its shares until the year 2000. While intra-regional trade in average over all ten countries is at about 26% in 2000 (Wilmsmeier, 2002), its importance reduced to just above over 23% (2010) for further details also see PANINSAL 2013. This development that stands in contrast to that forecasted by the IADB in 2000, who expected intraregional trade to reach 35% by 2010. However, participation varies throughout the region from around 16% to over 50% for imports and exports in terms of value. Brazil, Chile, Colombia and Peru trade over 75% of their overall trade with markets outside the region in 2010. Bolivia Paraguay and Uruguay are the countries with the greatest share of intraregional share in terms of value in 2010.

² See <http://www.iccwbo.org/products-and-services/trade-facilitation/incoterms-2010/> for a description of INCOTERMS.

The total intra-regional trade³ amounted to 85.4 billion current USD in 2010. The total value of intra-regional trade has therefore increased 2.9 times since 2000. The volume of trade (tons) in the region increased from 60 million tons in 2000, reaching a level of 64 million tons in 2010.⁴

In the year 2010 Brazil and Argentina generated 42% of all intraregional transport flows in terms of volumes and 48% in terms of value. The structure of freight movements reveals the highest concentration of trade flows is within the southern part of the South American cone.

International transport flows did not only increase, but also changed their structure. In terms of overall traded volumes mineral products were responsible for 46% of all transport flows in terms of volume in 2010. In 2000 the same rubric was responsible for 16% of all international transport flows to and from the region in terms of volume. In Intra-regional trade vegetable products is responsible for the greatest volumes transported, 41% in 2000 and 30% in 2010. The increase in volume in equivalent creates higher demand for infrastructure and this has direct repercussions on the regions transport network, especially port infrastructures, road infrastructures and as well as the related services to move these goods. Thus it is important for countries to use these indicators to make necessary adjustments to the investment in these modes in order to reduce the potential for bottlenecks in the future (compare Perrotti and Sánchez, 2011).

Thus the question emerges by which modes this trade is transported and what repercussions the development in trade has had over the last decade. Therefore it is necessary to look in detail at evolution of modal participation in the region.

Trade to GDP ratio graphs represent the total import and export value of each country compared to the country's total GDP for the year. The import to GDP ratio informs the value of goods being brought into a specific country from the other South American (SA) countries compared in the data set. This ratio reveals the percentage of value of these goods based on the overall GDP for the country. The comparison between this ratio and the export to GDP ratio reveals the effect the value of imports and the value of exports have on the overall GDP. For example, Peru has an average import to GDP ratio of 3.8% and average export to GDP of 2.5% for the four years analyzed. This reflects the value of goods being imported into the country make up a larger portion of the total GDP than the value of goods being exported. When the import value of traded goods is larger than the export value of traded goods, there is a negative trade balance or trade deficit. Having a negative trade balance reduces the GDP as the imported value is larger than the exported value, and therefore reducing the net export which is factored into total GDP. Discussion can be further made to analyze the effect the value of goods being imported or exported have on the total GDP for a country.

II. Modal Split

³ Excluding SITC 3 and 9 Commodity Group Products.

⁴ Personal data research based on the International Transport Database of ECLAC's Transport Unit (BTI)

The volumes in intra-regional transport increased by less than 7% between 2000 and 2010, this stands in strong contrast the countries' trade outside the region where international transport volumes increased more than 5 times during the same period. This also shows that the demand for infrastructure development is principally driven by demand for external trade out with the region.

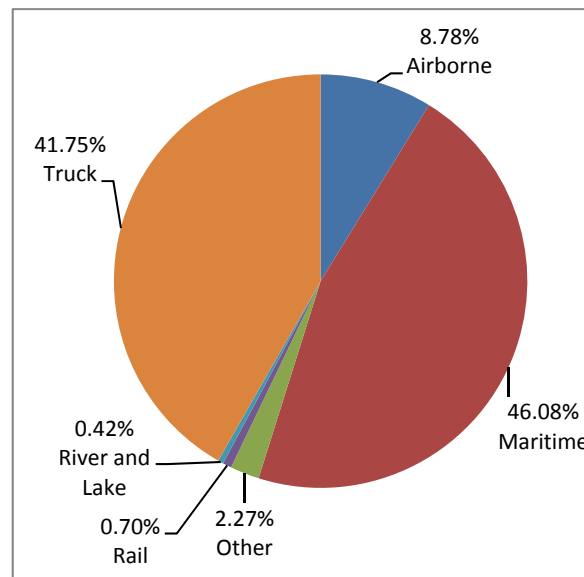
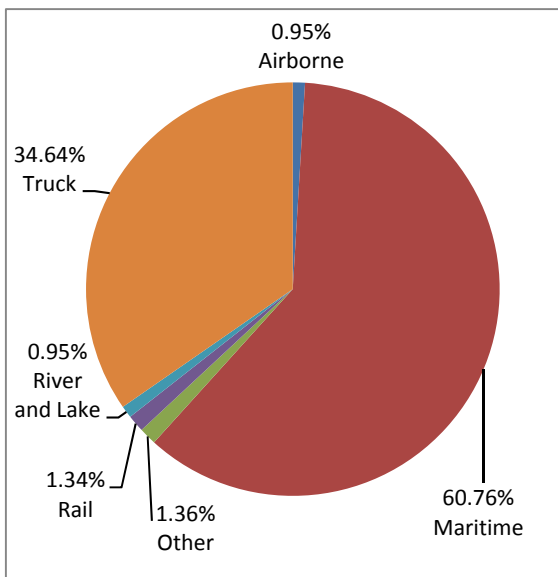
Analyzing the development in the region, maritime transport continues to be the dominant mode, being responsible for transporting 39 million tons of cargo in 2010. It is also important to note that the actual volumes transported by airborne transport have decreased in the period under study. Road transport continues to be the second most important mode of transport in terms of volume (Figure 1).

Figure 1: Total Volume of Transport within South American countries (in hundred thousand tons)



Source: BTI, various years.
 Notes: Other modes include not declared, postal and pipeline.

The analysis of modal split in terms of value of transported cargoes (Figure 2) shows a different result in comparison to the volume analysis. The value of intraregional air transport flows almost doubles between 2000 and 2006 to almost 5 billion USD and augments further to 6.6 billion USD in 2008. The value of goods transport in maritime transport more than triple between 2000 and 2010 reaching 39 billion USD. Road transport flows follow a similar pattern to that of air and maritime transport, however, road transport flows in 2010 account for 37.2 billion USD. After 2008, there a decreasing trend can be observed for modes (except other and not declared) in terms of value. The value of maritime and road transport decline around 2 billion USD each between 2008 and 2010.



Source: BTI, various years.

Notes: Other modes include not declared, postal and pipeline.

Given the different affinities of cargoes to transport modes the average value per ton of the cargo moved by the different transport modes in intraregional trade was calculated (Table 1). As expected air transport carries the cargo with the highest average unit value. The unit value in road transport reached 1,837 USD/ton in 2010, almost double the unit value in Maritime transport. Rail and inland shipping move cargo with the lowest average unit value. These patterns are consistent between 2000 and 2010.

Table 1: Cargoes Value for South American Countries (in USD per ton)

Mode	2000	2006	2008	2010
Airborne	\$18,844	\$50,493	\$55,869	\$46,783
Maritime	\$389	\$722	\$1,118	\$992
Rail	\$291	\$696	\$812	\$737
River and lake	\$296	\$658	\$704	\$797
Truck	\$686	\$1,390	\$1,912	\$1,837

Source: BTI, various years.

The airborne transport is used for high value cargoes such as specific chemicals and allied industries, machinery and electrical products, but also fresh produce. While these commodities are of high unit value the overall volumes shipped are low.

The following two tables depict the evolution of modal split at country level for imports and export as well as by value and volume. Waterborne transport flows between 2000 and 2006 for both imports and exports remained stable for all countries with exception of Chile which experienced a

large increase of volume in imports (cereals and animal fats) and exports (mineral products including copper).

Table 2: Modal Split imports in intraregional international transport, 2000, 2006 and 2010

		share by value (USD)					share by volume				
	To	Air- borne	Water- borne	Truck	Rail	Other modes	Air- borne	Water- borne	Truck	Rail	Other modes
2000	All	9.11%	44.74%	43.04%	0.68%	2.43%	0.84%	56.80%	32.14%	1.14%	9.07%
	Argentina	10.17%	34.47%	53.26%	1.32%	0.78%	2.55%	64.21%	31.46%	1.76%	0.02%
	Brazil	7.16%	51.32%	40.50%	1.01%	0.01%	0.10%	71.07%	26.71%	2.12%	0.01%
	Chile	11.56%	33.52%	54.79%	0.12%	n/a	0.21%	28.42%	71.25%	0.12%	n/a
	Colombia	9.89%	56.23%	32.01%	0.01%	1.86%	0.43%	64.44%	34.74%	0.02%	0.37%
	Ecuador	12.38%	58.76%	28.84%	n/a	0.02%	0.94%	76.47%	22.59%	n/a	0.01%
	Peru	9.76%	81.76%	8.36%	0.01%	0.11%	0.22%	91.08%	8.46%	n/a	0.23%
	Uruguay	6.37%	8.83%	84.63%	0.12%	0.04%	0.19%	28.76%	69.69%	1.34%	0.01%
	Venezuela	11.13%	56.93%	31.92%	n/a	0.02%	0.56%	77.99%	21.44%	n/a	0.01%
2006	All	9.43%	47.40%	38.72%	0.68%	3.77%	0.18%	65.06%	31.09%	1.02%	2.65%
	Argentina	7.17%	37.90%	39.71%	1.57%	13.65%	0.07%	65.90%	23.68%	1.37%	8.98%
	Brazil	7.38%	45.99%	45.29%	1.32%	0.03%	0.11%	56.47%	40.83%	2.59%	0.01%
	Chile	7.72%	37.00%	55.07%	0.03%	0.19%	0.20%	49.17%	49.19%	0.05%	1.39%
	Colombia	12.80%	59.02%	25.72%	0.04%	2.42%	0.38%	77.44%	21.48%	0.02%	0.68%
	Ecuador	12.18%	60.40%	27.41%	n/a	0.01%	0.35%	77.42%	22.22%	n/a	0.01%
	Peru	8.70%	77.05%	14.24%	n/a	n/a	0.18%	90.76%	9.07%	n/a	n/a
	Uruguay	5.70%	14.61%	78.99%	0.06%	0.65%	0.11%	33.20%	66.06%	0.36%	0.27%
	Venezuela	16.18%	53.74%	30.08%	n/a	n/a	0.47%	72.77%	26.75%	n/a	n/a
2010	All	7.63%	48.30%	41.45%	0.63%	1.99%	0.22%	64.73%	33.24%	1.17%	0.64%
	Argentina	3.89%	38.86%	48.97%	0.87%	7.42%	0.10%	65.46%	31.92%	1.30%	1.22%
	Brazil	7.17%	49.23%	42.58%	0.66%	0.36%	0.20%	56.52%	41.21%	2.06%	0.01%
	Chile	7.60%	38.39%	54.01%	n/a	0.00%	0.14%	56.07%	41.20%	0.02%	2.57%
	Colombia	12.08%	73.13%	14.56%	n/a	0.23%	0.30%	87.89%	11.75%	n/a	0.06%
	Ecuador	11.49%	54.93%	33.49%	n/a	0.09%	0.36%	75.27%	24.35%	n/a	0.03%
	Peru	7.09%	77.01%	15.90%	n/a	n/a	0.24%	86.23%	13.53%	n/a	0.00%
	Uruguay	4.05%	12.47%	81.49%	0.01%	1.99%	0.13%	24.49%	75.12%	0.02%	0.24%
	Venezuela	16.39%	67.01%	16.60%	n/a	n/a	0.67%	85.45%	13.88%	n/a	n/a

Source: BTI, various years.

Notes: Other modes include not declared, postal and pipeline.

Air transport interestingly has slightly lost in value share between 2000 and 2010. Interesting is the high share of air transport in intraregional transport for Venezuela, Colombia and Ecuador.

Table 3: Modal Split exports in intraregional international transport, 2000, 2006 and 2010

		share by value (USD)					share by volume				
	from	Air- borne	Water- borne	Truck	Rail	Other modes	Air- borne	Water- borne	Truck	Rail	Other modes
2000	All	5.40%	42.86%	40.32%	0.31%	11.11%	0.11%	67.29%	20.99%	0.77%	10.84%
	Argentina	5.75%	45.93%	48.22%	0.08%	0.02%	0.10%	76.46%	23.33%	0.10%	0.01%
	Peru	11.43%	73.46%	14.98%	0.00%	0.12%	0.37%	86.47%	12.86%	0.00%	0.29%
	Uruguay	6.08%	37.68%	53.56%	2.67%	0.00%	0.29%	57.86%	32.81%	9.04%	0.00%
	Venezuela	0.15%	2.65%	6.58%	0.16%	90.46%	0.01%	1.94%	9.86%	0.01%	88.17%
2006	All	8.33%	50.41%	39.07%	0.98%	1.21%	0.19%	68.73%	28.40%	1.96%	0.72%
	Argentina	4.23%	43.44%	50.11%	0.74%	1.47%	0.11%	67.38%	31.40%	0.97%	0.15%
	Brazil	12.32%	49.26%	35.94%	1.46%	1.02%	0.20%	72.74%	23.42%	3.17%	0.46%
	Chile	4.66%	66.63%	28.08%	0.12%	0.52%	0.15%	81.14%	18.21%	0.50%	0.00%
	Colombia	6.25%	34.97%	58.78%	0.00%	0.00%	0.65%	48.11%	51.23%	0.00%	0.00%
	Ecuador	6.64%	50.22%	43.13%	0.00%	0.01%	0.40%	52.65%	46.95%	0.00%	0.00%
	Peru	8.30%	78.52%	13.02%	0.00%	0.16%	0.45%	80.58%	18.55%	0.00%	0.42%
	Uruguay	5.43%	33.89%	54.47%	6.14%	0.07%	0.20%	31.23%	54.94%	13.62%	0.01%
	Venezuela	2.11%	63.82%	16.61%	0.00%	17.46%	0.08%	73.08%	10.52%	0.00%	16.32%
2010	All	6.30%	49.45%	41.77%	0.69%	1.78%	0.40%	68.35%	29.62%	1.34%	0.29%
	Argentina	3.22%	46.03%	48.94%	0.42%	1.39%	0.10%	63.29%	35.37%	1.03%	0.20%

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