

# Evaluating rail reform in Latin America: Competition and investment effects\*

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## Abstract

Building on the existing literature and the new data emerged in recent years, this paper discusses the results of the rail restructuring experiences of Latin America countries during the 1990s. We critically evaluate how rail services and infrastructures were transferred from Government hands to private operators, particularly in the three largest economies in the region: Mexico, Brazil and Argentina. The paper analyzes the reasons behind the restructuring decisions and, but is mostly centered on the policy results, which are evaluated focusing on the competition and investment effects on investment decisions. The main purpose of this paper is to draw core lessons in order to provide governments with better information related to how they could structure a reform package in transport to make the best of the growth opportunities within their countries. This should help bring about the economic growth that is central in helping to alleviate poverty in developing countries and moving these economies out of the stagnation that they currently face.

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## 1.– INTRODUCTION

During the 1990s a significant number of developing countries around the world were deeply involved in restructuring and reform processes of their major infrastructure sectors. Latin America and the Caribbean (LAC) countries led the growth in private activity during this period. According to latest figures from The World Bank (2002), this region received on average more than 35US\$ billion every year from 1990-2001, and the total investment in infrastructure projects with private participation in these countries amounted 360.5US\$ billion, representing 47.8% of the world total. This private activity in LAC was marked by large privatizations in telecommunications (44%) and energy (33%), with transport occupying a relevant third place (18%). The changes in this sector affected both infrastructures (roads, railways, airports, ports) and services (mainly, buses and airlines) and were at the forefront of some novel reform mechanisms whose procedures would be later copied elsewhere.<sup>1</sup>

In the case of railways, at the end of the 1980s the industry was characterized in most LAC countries by a steady decline in market share started after the World War II. This was caused both by the failure to respond to the intermodal competition arising from road (freight) and air (passengers) transport and by the rigid market structure, often dominated by government-owned monopolies with a dire financial situation and very low efficiency records. Despite the long distances and the growing demand for transport, these national companies could only survive on public subsidies and the quality of their services and infrastructures were rapidly deteriorating due to lack of investment (Campos and Cantos, 2000).

By the mid-1980s many countries in the region were aware of these problems and realized that, due to their financial weakness, the only long-term viable solution required private sector participation. The rail industry embraced the reform with more or less forced enthusiasm. In most cases, however, even the constitutions or the sectoral laws limited the participation of private sector, not only in the ownership but also in the operation of services, which were attributed to the exclusive responsibility of the existing national monopolies. Under these circumstances, the outright privatization of services and infrastructures was always a difficult policy choice. Important legal changes were needed to sell state-owned enterprises: Argentina and Chile had to change their entire legal systems, Brazil passed a new constitution in 1988; Mexicans had to reform theirs in 1995. Therefore, restructuring mechanisms without full privatization – particularly those involving concession of rail services while keeping the ownership of the assets – were preferred in most countries.

The most relevant concessioning experiences in the region – in terms of the size of the rail industry, the amount of investment involved and the comparability with other countries – were those of in Argentina, Brazil and Mexico. In all three cases, the Government chose to disintegrate the existing national railways into several pieces and awarded each of them separately to private bidders through open auctions. Either explicitly or implicitly, there were two main objectives associated to this process: to alleviate the burden that subsidies represented on the public budget, and to ensure that the railways contributed positively to the overall performance of the country's economy by providing efficient transport services.

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<sup>1</sup> For example, Chile was among the first in the world to undertake a significant reform of the railroad industry and created some innovative methods for road concessioning; Argentina's overall transport reform is viewed as a pioneer in other countries, and Bolivia's capitalization is a model of whole-scale reform later adapted by some economies in transition (Gómez-Ibañez and Meyer, 1993). See also Estache (2001).

Almost a decade after these restructuring processes were completed a growing number of critics have started to talk aloud about the ‘failure of privatization in Latin America’<sup>2</sup>, asserting that (transport) privatizations have failed to deliver the expected results in terms of social improvements for the poor. Even reckoning the necessity and desirability of these improvements, this paper argues that these distributive impacts are a long-term product that may only arise if the sector achieves a degree of sustainability that ensures its overall long-term survival. Predicting whether this will happen or not is very difficult. However, we think that two key variables to evaluate the likelihood of achieving this result are the investment levels compromised by private and public investors and the degree of competition achieved after the concessioning process. These two elements, evaluated altogether, provide useful insights on the real success possibilities of the privatizations.

After stating the background and the objectives of this paper in this introductory section, the remaining of the work will be distributed as follows. Building on previous studies, Section 2 describes the rail reform processes in Argentina, Brazil and Mexico. It focuses on the situation before the rail restructuring and how the change was carried out. Section 3 discusses the consequences of the reforms in these countries in terms of investment (efficiency) and competition using the most recent available databases. Finally, Section 4 concludes summarizing the main findings and extrapolating some core lessons that could be useful for other countries.

## **2.– RAIL REFORM IN LATIN AMERICA**

From a historical perspective, Latin America rail system can be viewed as a network of traffic corridors where the movement of freight and people always started and ended at the main ports in the Atlantic and the Pacific, and was only gradually penetrating the richer areas in the interior. Since the World War II, however, road transport eroded the railways market share and the sector failed to adapt itself to the changing conditions of the economic environment. Regulation remained obsolete and the industry was slow to react. The policies adopted during the 1970s and 1980s did not halt the steady loss of market share, the growing financial deficits, and in some countries, the impossibility of raising the low productivity indices of the industry. Thus, more radical restructuring processes and overall reforms were put into practice. The three largest countries in the region – Argentina, Brazil and Mexico – provide the finest examples. This section explains the purposes of the reforms and summarizes key institutional and economic aspects in these countries that will be later useful for Section 3.

### ***2.1.– The pioneering experience of Argentina***<sup>3</sup>

Mostly driven by fiscal reasons, Argentina was the first LAC country facing a restructuring process based upon extensive private participation. The pressure on the treasury imposed by public subsidies led to the 1989 *State Reform and Public Enterprise Restructuring Law*, whose objective was to revitalize the economy by encouraging the private sector operation in public services. For railways, the government decided that private participation was to be implemented by concessioning the freight and commuter networks that were originally owned as an integrated network by the national monopoly, *Ferrocarriles Argentinos* (FA).

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<sup>2</sup> See for example, McKenzie and Mookherjee (2003), for a recent survey and evidence from four countries.

<sup>3</sup> This subsection draws on Estache *et al.* (2002). Further details on the Argentina rail restructuring process can be found in Estache *et al.* (1996) and Thompson (2000).

The freight network was partitioned into six sub-networks. Between 1990 and 1993, each of the sub-networks was then concessioned for a 30-year period with an optional 10-year extension to private consortia through an auction. Concessions remained vertically integrated and each operator had to undertake all of the activities involved in railroad operations, from the improvement and maintenance of fixed facilities such as stations and tracks to the dispatching and movement of trains as well as marketing and financial control. Concessionaires were free to introduce new working practices but were expected to deliver on the investment commitments made in their bids. They were also expected to hire FA employees, but only those considered necessary. Labor redundancies were financed by the government (with the help of the World Bank). Private operators were to pay the federal government a fee for the use of the rail infrastructure as well as a lease for the use of the rolling stock, which remained in the ownership of the state. Overall, the annual payment commitments to the government added up to US\$140 million. The final main element of the reform was that although freight tariffs were deregulated, operators would still need to file maximum rates for each commodity for approval by the Secretary of Transport.

**Table 1. Main characteristics of Argentina's freight railways concessions**

Line	Length (kms)	Concessionaire	No. of bidders	Takeover date	Payment to government (US\$ mill.)	Employees transferred (% hired from FA)	Proposed investments (US\$ mill in first 15 years)
San Martín	5,493	Buenos Aires al Pacífico (BAP)	2	Aug. 1993	36.4	2,271 (83%)	369
Urquiza	2,751	Ferrocarril Mesopotámico (MES)	1	Oct. 1993	2.8	1,255 (76%)	64
Rosario-Bahía Blanca	5,163	Ferropreso Pampeano (FEP)	2	Nov. 1991	48.4	1,500 (85%)	234
Roca	4,791	Ferrosur Roca (FER)	1	Mar. 1993	18.0	1,133 (86%)	173
Mitre	4,520	Nuevo Central Argentino (NCA)	2	Dec. 1992	33.5	2,322 (78%)	386
TOTAL	22,718	–	–	–	139.1	8,481 (82%)	1,226

Source: Estache *et al.* (2002).

The winning bid was selected based on a complex set of weighted criteria. The largest weight was assigned to the basic investment plan submitted by each bidder, followed by the projected quality of operations and the number of FA staff to be hired by the private concessionaire in its new operation. The points awarded for employment of FA personnel reflected a political compromise and the limited amount of money available for redundancy payments. On average, 82% of FA's former employees were retained. **Table 1** summarizes the winning bids in each freight sub-network. All concessions were won by consortia headed by Argentine investors that included – mostly nominally – rail operators with foreign experience and committed investments of US\$1.2 billion over 15 years.

For passenger services, the restructuring was separated into inter-city and the suburban traffic around Buenos Aires. Since most of the inter-city traffic was not commercially attractive to the private sector, the federal government decided in 1992 to let the provinces decide if they wanted to continue the services at their own expense. The only provinces that agreed to the transfer were Buenos Aires, La Pampa, Tucumán, Córdoba, Salta, Río Negro

and Chubut. The transfers were done with concession agreements between the state and the provinces whereby the state transferred the rolling stock and complementary equipment necessary to run the services. The provinces agreed to subsidize these operations and run the services over the network concessioned to the freight and metropolitan private operators, and to pay a fee to these operators. Most of this traffic has in fact been abandoned now.

The Buenos Aires commuter services were separated in 1991 into seven vertically integrated units, which were actually transferred after an auction to private operators between 1994 and 1995. The concessions corresponded to the seven different lines and networks that had existed prior to the creation of FA in the 1950s: *Mitre*, *Sarmiento*, *Urquiza*, *Roca*, *San Martín*, *Belgrano Norte* and *Belgrano Sur*. The subway, consisting of five underground lines and a surface light rail line, was placed in a bidding package together with the Urquiza line which shared the same track gauge and was physically connected to the subway. As in the case of freight, the government maintained ownership of the assets, and concessionaires were expected to operate, maintain, comply with the service obligation spelled out in the contracts and carry out the investment commitments made in the bids.

The government set maximum fares subject to automatic increases according to service quality and increases in the US CPI. Non-achievement of quality of service levels resulted in financial penalties. The main differences with the freight concessions were that there were no restrictions on reemployment or labor practices, that investments were to be financed by the government and that the contracts were shorter (10 years with an optional 10 year extension, except for the subway and the Urquiza line where the contract is for 20 years). Also, some of the concessions involved subsidies to be paid by the government.

Following an international bidding process, concessionaires were selected on the basis of a single parameter: the lowest subsidy requested by the concessionaire to operate the line and undertake the specified investment and rehabilitation program. Lowest subsidies were measured as the first ten-year present value of the annual subsidy flow required to operate the line and undertake the investments, net of the annual flow of the fee (or “canon”) offered to be paid for the use of fixed assets such as track and stations. The characteristics of the successful bids for each railway concession package are summarized in **Table 2**.

**Table 2. Main characteristics of Argentina’s commuter railway concessions**

Line	Length (kms)	Concessionaire	No. of bidders	Takeover date	Operating subsidy or (fee) (US\$ mill.)	Proposed investments (US\$ mill.)	
						Annual average	
						Year 1	Total
Belgrano Norte	51.9	Ferrovias (FEV)	2	Apr. 1994	196.7	18.1	58.7
Belgrano Sur	58.4	Metropolitano (TMB)	3	May 1994	166.1	13.5	43.8
Roca	252.4	Metropolitano (TMR)	4	Jan. 1995	(70.0)	120.2	136.0
San Martín	55.4	Metropolitano (TMS)	4	Apr 1994	(44.7)	54.9	62.7
Mitre	182.1	Trenes de Buenos Aires (TBA)	3	May 1995	84.1	57.7	221.2
Sarmiento	166.6	Trenes de Buenos Aires (TBA)	3	May 1995	(177.9)	93.6	193.2
Urquiza	25.6	Metrovías	3	Apr. 1994	101.7	24.8	37.8
Subway	44.1	Metrovías	3	Apr. 1994	(438.4)	151.5	399.2
<b>TOTAL</b>	<b>836.5</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>(182)</b>	<b>534.4</b>	<b>1,152.6</b>

Source: Estache *et al.* (2002).

The combined total government payment requested by the consortia to operate and rehabilitate the systems over the duration of the concessions was about US\$1 billion in nominal terms (US\$630 million in 1992 US\$). Most of this amount – which was below the cost of running the system by FA – was intended for capital investment (about US\$550 million), as opposed to government subsidies that mostly financed operational deficits before privatization. The reduction of the operational costs was also based on a sensible staff reduction. In 1991 there were 17,000 employees in the commuter rail services. For all the groups of suburban services, the concessionaires only requested 8,500 agents.

## 2.2.– *The difficult change of Brazilian railways* <sup>4</sup>

Brazil faced similar fiscal restraints than Argentina, although the greater dispersion of the rail network forced a more extensive and difficult geographical restructuring. In fact, the first rail line in Brazil was completed in 1854 by private foreign capital. During most of the following 100 years, private operators dominated the industry, but with an increasing participation of the public sector. In 1957, culminating nationalization policies of previous years, Federal Law 3115/1957 was enacted, incorporating under the jurisdiction of the Ministry of Transport the government-owned Federal Rail Network Corporation (RFFSA or *Rede Ferroviária Federal, Sociedade Anônima*). Twenty years later, a second operator in the form of a state-owned corporation, *Ferrovias Paulistas, Sociedade Anônima* (FEPASA), was created by State Law 10410/1974, which also established rules for the state of Sao Paulo financing of uneconomic rail services, absorbing the contributions to the workers pension fund, and other liabilities of the existing operators within that State.

These two operators provided rail transport services to about 95% of the country's freight shippers, whereas the third important operator (and the largest in terms of output at the beginning of the 1990s) was the *Companhia Vale de Rio Doce* (CVRD), a huge government-owned industrial holding that exploited two specialized rail lines, EFVM (*Estrada de Ferro Vitória a Minas*) and EFC (*Estrada de Ferro Carajás*), from their mining sites to the ports in the north and center of the country. This company only served its own traffic, which mostly consisted of large volumes of iron ore for export.

By 1996, several restructuring procedures had been already tried to tackle the most urgent needs of the industry while maintaining it within the public sector. These policies, however, were not enough and the government started to look at the Argentina experience. Encouraged by this example, Decree 473/1992 included RFFSA in the Brazilian National Privatization Program in a political movement that represented the first major privatization of public infrastructure services. At this moment, in view of the geographic characteristics of the country, the size and state of conservation of the railway network, as well as the significant cross-regional differences in traffic, it was decided that the restructuring process could be more easily implemented if based upon RFFSA's existing regional structure.

RFFSA's network was separated into six vertically integrated monopolies (called *malhas*) whose rail services would be concessioned out by the Ministry of Transport, and whose rolling stocks and existing infrastructures would be simultaneously leased by RFFSA to the private operator. The reason for this double concession-leasing method was that, according to the 1988 Constitution, the federal government had to remain the titular to the right of providing rail transport services in the country and, in addition, retain under its ownership the assets involved in those services.

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<sup>4</sup> This subsection is based on Campos (2001). More details on the reforms in Brazil are found in Alexander *et al.* (1999) and Estache *et al.* (2001).

As shown by **Table 3** six concessions – *Nordeste, Centro-Leste, Sudeste, Sul, Teresa Cristina* and *Oeste* – were awarded between 1996 and 1997. Four of these railroads connected ports along the coast with their respective hinterlands, approximately 400 kms inland. On December 23, 1997, FEPASA was transferred to the federal government and in May 1998 the *Malha Paulista*, as it was also known, was immediately included in the privatization program. Its sale took place in November 1998 and concluded the privatization process of former government-owned rail operators.

**Table 3. Economic characteristics of RFFSA concessions**

	Oeste	Centro-Leste	Sudeste	Tereza Cristina	Sul	Nordeste	Paulista
Concessionaire	FNV	FCA	MRS	FTC	FSA	CFN	FEPASA
Track Length (km)	1,621	7,080	1,674	164	6,586	4,534	4,236
Track Gauge (m)	1	1	1.6	1	1	1	1.6 & 1
Locomotives	88	397	406	10	395	112	408
Wagons	2,777	9,233	11,406	563	10,626	1,919	11,855
Output							
In 1995	1.6	6.26	20	0.10	7.5	0.7	6
2002 (*)	5	26	37	0.16	24	4.4	17.2
Operating revenue							
In 1995	37	175	321	8	187	26	187
2002 (*)	86.0	350.0	490.0	9.7	327.0	70.3	243.1
Employees	2,423	10,982	9,397	343	9,604	3,707	13,432
(Transferred)	(1,800)	(7,900)	(6,600)	(250)	(6,900)	(1,600)	(6,380)
Main Cargoes	Petroleum Soybeans Steel Minerals	Petroleum Cement Steel Soybeans Grains	Iron ore Cement Steel Limestone	Coal and by-products	Soybeans Petroleum Rice Alcohol	Iron ore Petroleum Oil Cement	Petroleum Oil Minerals Grains Pellets

**Source:** Campos and Alexander (1999). (\*) Figures for track and rolling stock and employees correspond to 1998 actual values. Figures for output (in TKU billion), operating revenues (in US\$ million) correspond to 1995 (before the concession) and to the estimates for 2002, the sixth concession year.

Finally, when CVRD was privatized in June 1997 its two railroads (EFVM and EFC) were sold with it as part of the industrial holding; they were not concessioned in the same way as the RFFSA network. Since they had been originally designed to connect the company's mines and mills with one another and with the exporting ports of Vitória, Tubarao and Sao Luis, the railroads were kept with the company under control of the new owners. The two railroads essentially now operate as internal departments of CVRD, specialized in iron ore traffics, although they are obligated to carry traffic for other shippers as well.

Except in the case of CVRD, the concessioning was implemented through public competitive bidding for the operation and maintenance of each of the *malhas* for a period of 30 years (renewable for another 30 years at most) with the simultaneous leasing of operational assets by RFFSA and the sale of some small non-operational assets. There were no pre-qualification requirements for candidates and the only limit established to avoid excessive concentration of ownership was that the share of each economic group participating into a concession should be limited to a maximum of 20% of total stock. However, no restrictions were imposed for cross-participation in different concessions or about the participation of major rail users, clients or suppliers as shareholders in privately operated concessions.

Each auction was won by the highest bid consortium, whose bid had to be above a minimum stipulated by the government. The amounts paid by each concessionaire – a down

payment of between 10-30% of the minimum price and quarterly installments for the rest – were shared by the Federal Treasury (5%, corresponding to the concession of rail services) and RFFSA (95%, corresponding to the lease of assets). Five of the seven RFFSA concessions sold for more than the minimum bids. This success was due in part to the fact that the government reduced the workforce by approximately half in advance of the concessioning (see **Table 3**), and also in part due to the relatively stable macroeconomic environment during these years. The government had to receive a total of about R\$1,700 million (US\$950 million) for the seven concessions, although only about R\$400 million was paid in the first installments with the rest due (after a 1-3 year grace period, depending on the concession) in 108-112 quarterly payments over the remaining life of the concessions.

There were no specific investment obligations set in the contracts. They only spelt out two specific targets on output and safety, in terms of minimum net ton-kilometers carried each year and maximum number of accidents per train-kilometer during the first five years. These targets would be reviewed during the third concession year, establishing the new goals for the next five-year period. Although it was clearly indicated that the reviews would be based on substantiated studies of past performance, the process had not yet started in 1999. The implicit idea behind these targets was that in order to meet them the concessionaires would have to carry out investments and therefore they all were obliged to submit in advance a triennial investment plan to obtain clearance.

With regard to the relationship between the concessionaires with the final users, the maximum prices to be charged for transport services were also set in the contracts. Ceilings varied according to the length of the haul, type of product and the geographic region served. These prices were to be periodically revised to correct them according to inflation. There also existed a vague notion regarding the concessionaire's obligation to maintain its financial and economic equilibrium: the concession contract determined that the tariffs should always be above the railroad long run variable costs, although no methodology was provided.

### **2.3.–The institutional change of Mexican railroads**<sup>5</sup>

Railroads began operations in Mexico in the late 19<sup>th</sup> century, when several US companies used imported materials to build lines along the country's Pacific coast. The largest company, *Ferrocarriles de México* (FdM) became Mexican-owned in 1908 and was later nationalized in 1937. In the 1980s FdM and the remaining rail lines were incorporated into *Ferrocarriles Nacionales de México, SA de CV* (FNM), controlled by the Transport Ministry (*Secretaría de Comunicaciones y Transportes*, SCT), and in 1983 the Constitution was amended to formally require that the federal government owned and operated all main railway services.

FNM was an integrated monopolistic railroad that provided freight services in both the national and international markets. It also provided some inter-city passenger services, but did not supply any commuter passenger services to Mexico City or any other major city. In 1996, the overall system was composed of 26,623 kms of track, of which 77% were primary lines divided into three main geographical divisions, Pacific-North, Northeast and Southeast. The remainder formed the short lines, the network that served the metropolitan area of Mexico City and some small private lines. Like many other state-owned rail companies, FNM had developed a production-oriented, rather than a commercial-oriented culture. Although some of its operating performance indicators were comparable to those of similar countries in the region (for example, average hauls of 2,830 tons, train-lengths of 41 cars, etc.), others clearly

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<sup>5</sup> This section relies on Campos (1999) and Campos (2001). More information is found in Gomez-Ibañez (1997).

reflected several sources of inefficiency (for example, average train-speed was only 25 km/h and average daily distance traveled by locomotives was below 250 kms) related to the age and state of maintenance of track and rolling stock. Safety concerns related to the number of accidents, spoiled cargo and theft were also high.

As early as 1980, the Mexican government was aware of the medium-term evolution of the rail sector and reckoned that its poor performance hindered the development of the country. In the period from 1982 to 1989, several institutional reforms within the existing system were attempted but they failed. President Salinas' administration (1989-1994) was marked by more significant improvements in performance but also by a calculated ambiguity about whether the railroad might eventually be privatized. In 1992, a new Director General for FNM was appointed and he announced a Program for Structural Change (*Programa de Cambio Estructural*, PCE) whose main goal was to run a commercially oriented railroad.

The plan was designed to enhance the company's efficiency and productivity by focusing on freight transportation as the core business and eliminating some unprofitable services. Arguably, the most important PCE reform involved labor: the workforce was reduced from approximately 80,000 to 50,000 employees, largely through a program of voluntary retirements. With the unions' cooperation, moreover, the book of work rules, which had been unchanged for many years, was simplified and modified to increase labor and locomotive productivity. Under the PCE the financial performance of the railroad also improved, but not enough to reverse the trend of previous years.

When President Zedillo took office in December 1994, the Finance Ministry was reportedly disappointed with the rate of improvement under the PCE. The pace of the restructuring process was accelerated and, in February 1995, the Mexican Congress approved a new amendment to article 28 of the Constitution, which reclassified railroads as a priority activity, thus opening opportunities for private sector investment within the railway system. In May 1995, the *Ley Reglamentaria de Servicios Ferroviarios* (LRSF), a new sectoral law regulating railway services, outlined the general procedures for these investments and defined the conditions under which private participation in railways was going to be allowed for the first time in forty years.

After discarding some alternative proposals, the scheme chosen for privatization involved the geographical separation of FNM's assets and operations to setup a number of route-based companies according to the pre-existing regional divisions. Each of these companies was awarded a 50-year *concession title* describing service conditions and overall relationship with the federal government and other private operators. The concessions could be extended for up to an additional 50-year term and, in general, they allowed to operate, exploit and, if required, build new lines with the goal of providing public railway transportation and ancillary services specified in their respective titles, real property, facilities and other equipment required for the operation of the company and certain liabilities. Under this format, vertical integration of the different functions or services in FNM was preserved, although functions could be unbundled whenever it was deemed necessary. The final stage of the privatization process was the sale of the shares owned by the government in the concessionaire companies through a public bidding process open to private investors. The government decided to auction first 80% of the shares of the capital stock of each of the companies and retain a 20% stake in each with certain limited rights. The government also obliged itself to sell the remaining 20% stake in each company through public offerings within five years of the disposition of the relevant 80% stake.

The overall privatization scheme recognized that the main demand for rail services in Mexico came from freight carriers. With respect to passenger transport, apart from those lines

already included in the concessions, several services would be privatized by assigning the concessions to companies bidding for the lowest subsidy. This process would only be applied to routes that lacked an alternative transportation mode. In other cases, passenger services would simply disappear since road transport was perceived as a generally adequate transport means for the country.

**Table 4. Main economic characteristics of the Mexican rail concessions**

	Pacific-North	North-East	South-East	Short-lines
<b>Track (as a % of total)</b>	30.3	19.3	10.7	38.7
<b>Freight traffic (as a % of total)</b>	46.2	37.6	8.6	7.8
<b>Revenues (as a % of total)</b>	44.7	37.1	9.8	8.4
<b>Main cargoes</b>	Iron, coal, oil	Corn, wheat, iron	Corn, wheat, oil	Vary across regions
<b>Major industrial cities</b>	Mexico City Monterrey Guadalajara	Mexico City Monterrey Guadalajara	Mexico City	Several
<b>Major ports (*)</b>	Tampico (G) Manzanillo (P)	Tampico (G) Veracruz (G) Laz. Cardenas (P)	Veracruz Coatzacoalcos Salina Cruz	None

Source: Campos (1999). (\*) P= Pacific; G= Gulf.

The 1995 railroad law (LRSF) kept the regulation of the privatized Mexican rail industry after the auctions within the SCT, particularly under the control of the *Dirección General de Tarifas* (DGT), a 250-staff regulatory body who was also in charge of tariffs (other than in railroads) and multimodal issues.

According to the concession titles, the concessionaires were free to set their own tariffs in recognition of the extensive competition from trucks and the potential for competition among the concessions. Maximum prices were registered within the DGT, which might intervene if no effective competition existed (in this case, it was also required the favorable opinion of the competition agency) or if users complained of being abused. No subsidies (except for small public service obligations) or other guarantees were granted to overcome potential losses. Concessionaires also retained an exclusivity right to operate services and infrastructures for 30 years in their lines (18, in short lines), including the right to build new ones within their right of way. However, to counteract this monopoly power and in order to promote effective competition among operators, concessions were designed to share several common tracks around major urban and industrial areas (particularly, Monterrey and Mexico City) and several ports (Tampico and Veracruz). For these cases, concession titles included detailed mandatory access and connecting rights between concessionaires. The prices of these rights were to be bilaterally negotiated between private operators, once they started operations, although the SCT should intervene if no agreement was reached before a year or when any of the concessionaires requested it.

The first concession offered for sale, in June 1996, was the longest of the short lines, *Ferrocarril Chihuahua al Pacífico*, which the government thought could constitute a low risk test of its overall bidding system. Unfortunately, the railroad was in extremely poor conditions and only one bid for US\$28 million was offered. Since this was below the government's reservation price of US\$50 million, the sale was canceled and it was decided that the package should be restructured to attract more potential investors. In December 1996, the Northeast Railroad was acquired by *Transportación Ferroviaria Mexicana* (TFM), a consortium formed by a Mexican transportation company (*Transportación Marítima Mexicana*) and the US

railroad *Kansas City Southern Industries*. With a bid of P\$11 billion (US\$1.4 billion) – almost three times the size of the runner-up’s – TFM acquired 80% of the shares of the company: the first 32% had to be paid for soon after the auction, the next 48% within 180 days of the first payment, and the final 20% was planned to be acquired in 1999.

**Table 5. Main results from Mexican rail concessions**

Concessionaire	Concessioned line	Type of concession	Kms.	Date	Amount (in \$P million)	Years
TFM	Ferrocarril del Noreste	Freight	4,283	2-Dec-96	11,071.9	50
Ferrocarril y Terminal del Valle de México	Terminal Ferroviaria del Valle de México	Freight	297	2-Dec-96	-	50
Ferrocarril Mexicano	Ferrocarril Pacífico-Norte	Freight	7,164	22-Jun-97	3,940.9	50
Ferrocarril Mexicano	Línea Ojinaga-Topolobampo	Freight & passengers	943	22-Jun-97	255.8	50
GAN/Peñoles	Línea Coahuila-Durango	Freight	974	14-Nov-97	180.0	30
Ferrosur	Ferrocarril del Sureste	Freight	1,479	29-Jun-98	2,898.0	50
Compañía de Ferrocarril Chiapas-Mayab	Unidad Ferroviaria Chiapas-Mayab	Freight	1,550	26-Ago-99	141.0	30
Ferrocarril Mexicano	Vía Corta Nacozari	Freight	320	27-Ago-99	20.5	30
Ferrocarril del Istmo de Tehuantepec	Ferrocarril del Istmo de Tehuantepec	BOT	207	23-Dic-99	-	50
State Gov. of Baja California (*)	Vía Corta Tijuana-Tecate	Freight	71	1-Apr-00	-	50
State Gov. of Baja California (*)	Vía Corta Tijuana-Tecate	Passengers	71	31-Oct-01	-	30
State Gov. of Aguascalientes (*)	Tramo Adames-Peñuelas de la Vía Férrea Pacífico Norte	Passengers	78	20-Dec-01	-	30

Source: Campos (1999) and SCT ([www.sct.gob.mx](http://www.sct.gob.mx)) (\*) Assigned to State Governments.

In 1997 the *Ferrocarril Pacífico-Norte*, the most sought after of the three main lines, was concessioned. The concession documents allowed competitors to bid for the original Pacific-North concession alone or for a concession that also included the main connecting segment of the failed Chihuahua al Pacífico railroad (Ojinaga-Topolobamba). Although initially three consortia were interested, only one bid was finally submitted including the Ojinaga-Topolobamba line. The North-Pacific railroad was acquired by *FerroMex* in June 1997 for P\$3.1 billion (US\$524 million) for the 80% of capital and, as TFM had previously done, a 25% stake in the Mexico City’s terminal company. The consortium was now integrated by the former losers *Grupo Ferroviario Mexicano* (74%), ICA (13%) and the US railroad, Union Pacific (13%), although ICA reached an agreement in December 1998 to sell its shares to Union Pacific. After private operations started in February 1998, *FerroMex* also acquired the 20% of shares remaining in government hands.

Also in 1997 the short line Coahuila-Durango was concessioned for 30 years to a consortium integrated by Mexican firms *Grupo Acerero del Norte* (GAN) and *Industrias Peñoles*, two of the most important shippers, whose bid of P\$180 billion was over the reservation price. The auction also included several other purchases and leases of rolling stock for about P\$20 million.

The Southeast railroad, now *FerroSur*, was acquired in 1998 for US\$322 million by the Mexican holding *Grupo Tribasa*, which also maintained interests in toll roads and airports. The winning bid for the 100% of the company was twice its only rival's, a consortium of GAN, *Industrias Peñoles* and *Illinois Central*. The main attraction of the Southeast railroad was the line connecting the port of Veracruz to Mexico City. *Grupo Tribasa* announced that it would not exercise the right to acquire the short line Chiapas-Mayab (comprising the railroads in the Yucatan peninsula), so this line was left to be privatized independently, along with the remaining short lines. The private operator took over operations in January 1999 and this transfer closed the sale of the three large companies into which the national network of railroads had been divided.

The Mexico City's Terminal, *Terminal Ferroviaria Valle de México*, is also privately managed since 1998. As scheduled, each one of the main rail operators owns 25% of the shares (included in their auction packages), whereas the government retains the remaining 25%. State governments of Baja California and Aguascalientes also kept control of some minor passenger lines assigned to them between 2000 and 2001. The only exception to all this divestiture process is the greenfield project of the *Ferrocarril del Istmo de Tehuantepec*, a project intended to connect the Pacific and the Caribbean coasts, whose works – under the form of a BOT concession – are just starting now.

### **3.– EVALUATING THE RESULTS: FOCUS ON COMPETITION AND INVESTMENT**

After describing in detail the characteristics of the rail concessioning experiences of Argentina, Brazil and Mexico, this section attempts to evaluate some of the most relevant consequences of these processes. This is a very opportune moment to carry out this analysis for two reasons: firstly, it is almost a decade (4-5 years in Mexico) after the first private concessionaires started operations. We therefore start to have a performance database comparable to the years prior to the privatization. Although the quality of the data should improve and more figures are still necessary, we can now empirically discuss some efficiency and investment results and compare them to what was expected in the contracts. The second reason to justify the opportunity of the evaluation is that all three countries have experienced political changes in recent years. This has implied not only a revision of policies supported by former governments, but also a critical look at how the procedures were carried out and how could be they improved while safeguarding the interests of users, firms and private investors.

#### ***3.1.– Argentina: renegotiation amid political turmoil***

Argentina is the country in the region where the political changes have gone further. During the last two years they have created an unstable and unpredictable economic climate with consequences not only for the concessionaires' rail operations, but also on the concession system itself. From the point of view of the investment and competition effects, the three most relevant issues are the renegotiation process derived from the mistakes in the concessioning process, the performance of the concessionaires despite these mistakes, and how some competition issues could affect the sector in the future. We will examine each of them in turn.

##### **3.1.1.– The renegotiation process**

As described above, the rail concession contracts were generally awarded through auctions to make the most of competition for the market *ex ante* and minimize the need for discretionary regulatory decisions *ex post*. Recent analysis of diverse samples of utilities and transport contracts signed during the 1990s suggest that renegotiation happens in around 50% of the

cases.<sup>6</sup> Moreover, they state that the odds of renegotiations are the highest when the auction criteria is driven by the desire to minimize the average tariff to be paid by users of the services bided out. More generally, the difficulty is often related to a poor initial effort to assess the sources of demand fluctuations, often related to a limited ability to pay of a good share of the population.

In Argentina, as early as 1995 (just within 3 years of the first contract), the government started to face a growing dilemma about whether it should renegotiate the railway concession contracts or enforce them as written. Minor problems had arisen. Some consortia bidding for the freight concessions had promised to hire large numbers of FA employees, since that was one of the criteria for the final award. Once the consortia were awarded their concessions, however, some argued that they could not meet their commitments because most FA employees were not qualified for the new jobs. Similarly, immediately after the award of the urban commuter concessions, some of the winners argued that there were ambiguities in the contracts – particularly regarding the investment commitments – that had to be resolved before they could take over the lines. The main outstanding issue since then with the freight railways was that if the government strictly enforced the contracts, it would force at least three of the five concessions into bankruptcy. For the commuter railways, the main issue was excess demand and its impact on quality, and hence, on prospective riders.

The renegotiation process that started with the concessionaires in 1997 was partly concluded in 1999 just before the change of the administration. After the government change, the renegotiation issue was reopened and, although they had not been concluded yet, at least it has been agreed a common procedure to tackle all the renegotiations. All the contracts are being discussed, according to the latest news from the Secretary of Transport, but the outcome of the process will be highly conditioned to the overall performance of the country's economy.

### 3.1.2.– The performance of the private operators

In spite of this on-going renegotiation process, many would argue that the reforms have been at least a qualified success on the basis of a comparison of the perceived quality and level of service before and after the reform. Fiscal costs have dropped – although they are becoming higher than expected because of the return of subsidies – and output and quality have clearly improved. Commuter rail services duplicated their output figures above expectations in just 3 years of private operation. Rail freight shipments have more than doubled FA levels—although the macroeconomic crisis of the last two years has slowed the growth rate and outputs remain below the projections in the contract. For shippers, savings on rail freight charges can reasonably be estimated to be over US\$70 million annually, to a large extent reflecting improvements in labor productivity – from 0.1 to 2 million tons per worker – and in locomotive availability – from 50% to 80%. Commuter services enjoy greater frequency, fewer delays and cancellations, and improving levels of comfort and customer attention.

There are some concerns that for the rail system as a whole, the number of accidents has increased in absolute terms since 1995. The main issue arising at this stage of the reform, however, is the renegotiation of all contracts. With freight concessions, weak contractual compliance reflects an incentive to over-optimize, which was built into the design of the auction and resulted in unrealistic formal investment promises—quite different from those built into the actual business plans of each bidder. Only one operator (NCA) achieved 50% of

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<sup>6</sup> See Kartacheva and Quesada (2000) and Guasch (2001).

its physical investment commitments, with the rest ranging between 10% and 39%. The operators have been subject to about US\$10 million in penalties, most of which are being disputed in court and remain unpaid. Also, several of the freight and passenger concessionaires have also defaulted on their canons. For passenger contracts, the investments to be carried out by the government have been updated and reduced and tariff increases (by 60% over a 6-year horizon) have been secured to raise funds to compensate for the debt of the government to the operators and to finance investment (managed through a trust fund). Changes in TBA tariffs have been contested by the users, but renegotiation with other concessionaires continues.

The availability of performance data already allows to empirically detect efficiency gains achieved in passenger and railways after the privatization. Using the total factor productivity (TFP) as the measurement instrument, Estache *et al.* (2002) show in **Table 6** how TFP has grown and its sources for each freight and passenger operator.

**Table 6. Average annual rate of productivity change in Argentina's railways**

<b>Freight (1994-1999)</b>	<b>TFP</b>	<b>Output</b>	<b>Input</b>		<b>Passengers (1995-1998)</b>	<b>TFP</b>	<b>Output</b>	<b>Input</b>
<b>BAP</b>	3.9	4.0	0.1		<b>FEV (*)</b>	14.5	13.7	-0.7
<b>MES</b>	0.9	-6.8	-7.6		<b>TMB</b>	21.5	9.7	-9.8
<b>FEP (*)</b>	-1.6	0.5	2.2		<b>TMR</b>	9.2	7.5	-1.6
<b>FER</b>	11.0	9.2	-1.6		<b>TMS</b>	19.1	13.6	-4.7
<b>NCA (*)</b>	10.3	17.1	6.2		<b>TBA (*)</b>	3.2	20.9	17.1
<i>Overall freight</i>	<b>5.3</b>	<b>5.9</b>	<b>0.6</b>		<i>Overall passenger</i>	<b>9.8</b>	<b>16.9</b>	<b>6.5</b>

Source: Estache *et al.* (2002). (\*) FEP and NCA covers 1993-1999. FEV and TBA covers 1995-1999.

Note that a few interesting points emerge from these results. The first one is that, in Argentina, the passenger concessions must have been a much better deal than the freight concessions. The potential operators knew this, since the average number of bidders for passengers was 3, while it was 1.5 for freight concessions. The 9.8% efficiency gains achieved in passenger concessions are almost twice the 5.3% achieved for freight. Moreover, all passenger concessions have managed to have a positive TFP, while the outcomes are not as positive on the freight side where FEP saw its TFP growth deteriorate and MES did not achieve much growth. When comparing this with the information on the value of the bids for each concession provided in Section 2 it seems that the payment levels committed by the winning bidders to the governments are not well-correlated with the ex-post performance revealed by the TFP analysis. Worse yet, in freight railways, the highest payment was for FEP, which it turns out is one of the only operators with a negative TFP growth.

Another noticeable observation is that in addition to major differences in the performance levels, there are differences in the factors driving TFP. All passenger operators, except TBA, have improved both their output and input performance (i.e. reduced their use of inputs for a given level of output) but the output gains have been larger than input cuts. This result allows the questioning of one of the strongest criticisms of privatization, which argues that efficiency gains are only due to input reductions. TBA's experience reinforces this questioning. Indeed, TBA has increased its input uses so much that for the passenger system as a whole, it offset the input efficiency gains achieved by the other operators. In spite of this, TBA is still better off under private operation since its increased output levels sufficiently to achieve an overall increase in TFP.

For freight operators, the situation is not as clear-cut. First, BAP and NCA's performance suggests that there is scope for win-win situations in terms of input use and output delivery. Both managed to increase output and input uses (most importantly jobs), a result very similar to the one observed for TBA. Second, the case of MES reveals a private operator achieving an improvement in TFP with a larger reduction in input use than in output. The main reasons for the deterioration on the output side are a major deterioration in aggregate demand combined with a particularly strong competition from the trucking industry in its service region, and probably most importantly, major flood problems which tend to inundate the tracks and stop service for several days in a row. Third, one of the operators has clearly not benefited from the privatization since it has a negative TFP. Indeed, the FEP performance is similar to the one characterizing many public operations and justifying the shift away from public operations. The positive output growth is more than offset by the increase in input use. Over time, of course, it may simply reflect the fact that the private operator is making the input adjustment to promote longer-term growth in outputs.

### 3.1.3.– The competition issues that will emerge in the near future

Even if renegotiation arrives to a satisfactory end, another consequence of the Argentina rail concessioning experience is the emergence of some competition issues that will undoubtedly affect the performance of the sector in the near future. First of all, there is an extended belief among the rail concessionaires that they are facing unfair competition from trucks. The unfairness, they believe, results from the asserted fact that trucks do not pay for the full costs of the service they provide, and from the asserted fact that smaller trucking companies are not paying value added tax on the services they provide to shippers.

According to Thompson (2000), the argument that trucks do not pay for the full costs of the service they provide has two separate pieces. The first is that they are not paying for the full costs of the damage they cause to the highway network, particularly as many trucks assuredly are overloaded and therefore cause exceptional damage to the road network. To the extent that trucks travel on concessioned toll roads, a reasonable toll road concession agreement will permit the toll road owner to recover the costs of the damage trucks cause and will provide the concessionaire an incentive to ensure that trucks using the toll road are not overloaded. If the road concessionaire does not have an incentive (and the opportunity) to recover the full costs the trucks impose on the highway and to enforce weight limits, that is a problem with the concession agreement for the toll road and should be addressed in that forum.

Recovery of the costs of damage caused by the operation of trucks on public highway networks typically is achieved through some combination of vehicle registration fees, excise taxes on equipment and tires, fuel taxes, and ton-mile taxes. To the extent that Argentina relies primarily on a fuel tax to recover from the trucking industry the cost of damage trucks cause to the non-concessioned highways, the rail concessionaires may have a valid argument. The rail concessionaires contend that they pay the same diesel fuel tax as do the trucks, yet the railways are responsible for maintenance of their infrastructure from their own revenues (indeed, they are responsible for a capital improvement program as well); they receive no help from the government. A review of the extent to which trucks are fully covering the damage they cause to the highway system appears to be warranted. If such a review shows that only some of the cost of the damage trucks do to the highways is recovered through the diesel fuel tax, compensatory measures may be warranted for the rail concessionaires to establish a level competitive playing field.

The rail concessionaires make a second argument that the trucks do not incur the cost of complying with safety regulations while they, on the other hand, have to bear the cost of

complying fully with safety regulations. This argument would have merit in two circumstances: where the safety regulatory system applicable to the trucking industry is not cost justified, or where the cost of truck-caused accidents is not fully internalized into trucking industry costs. If the trucks are avoiding compliance with “safety” regulations that are not cost-justified, it is difficult to argue that the railroads are disadvantaged in any real sense. If the trucks are avoiding compliance with cost-justified safety regulations, they are only benefited if the trucking industry can pass some of the costs of its operations (including unsafe operations) to third parties. It is not clear whether the costs of accidents caused by unsafe trucking practices are fully internalized in the trucking industry’s costs by the Argentine legal system.

The rail concessionaires’ argument that a large part of the trucking industry is not paying value added tax is, from a competitive standpoint, perhaps not as significant as may appear on the surface. With a value added tax rate of 21%, a truck competitor’s ability to avoid paying value added tax on its *sales* would give it a significant advantage so long as the truck competitor gave an otherwise valid VAT invoice to the shipper, and the truck competitor’s costs are largely labor and do not include significant purchases on which it has to pay value added tax. The rail concessionaires assert that the small trucking companies are giving VAT invoices to their shippers, thus permitting the shippers to use the VAT stated on the invoice as a credit against their VAT obligations. With respect to the second factor, though, it is reasonably clear that in the case of a small trucking company a very significant percentage of the total cost of the service provided is represented by the capital cost of the truck, fuel cost, and tires and other parts costs, all of which represent purchases on which the truck competitor would have paid VAT which would be creditable. In the case of a small owner-operated trucking company, VAT comes down to being an additional tax on wages, which, in light of intensely competitive conditions in the industry likely are low. While the trucking industry may obtain some competitive advantage through the ability of small truckers to evade some VAT payments, the advantage likely is quite modest.

The second competition issue in the current Argentina rail system is derived from the structure chosen to vertically disintegrate former FA operations. Under the terms of the concession agreements, freight concessionaires are required to permit passenger trains to operate over their tracks in return for a fee (“peaje”). Indeed, the level of the peaje was an explicit element in the bid evaluation, and there is no doubt than an expectation of revenues from track access fees played a part in the calculations of the concessionaires. These agreements for passenger track access were initially with the federal operator of passenger services (FA and FEMESA) but were transferred to the provincial governments when the Federal Government ceased operating passenger trains. Even though the contracted access fees have been reduced in response to requests from provincial governments, they provincial governments have generally refused to make their payments, even while continuing to operate trains. In fact, some provincial governments appear to be planning even more passenger services, presumably while continuing non-payment of their access fees. In some cases the obligations for unpaid access fees are as high as the unpaid canon obligations of the concessionaires.

Passenger operations over the lines of the freight concessionaires present two cost issues. The first issue is that of costs imposed directly on the freight concessionaire by the operation of passenger trains. So long as the freight concessionaire is not obligated to maintain its lines at a higher level than needed for freight operation and so long as the freight concessionaire has adequate track capacity available, operation of a limited number of passenger trains imposes only a modest incremental cost. An appropriate peaje for such access would be modest, based on US experience, likely in the area of P\$1.00 to P\$2.50 per

train-km, depending on speed and capacity requirements. If renegotiated concession agreements contain a revised passenger access charge, mechanisms should be included to ensure that the agreed amounts are actually paid. Therefore, the solution of this issue will be part of the overall outcome of on-going renegotiations.

### ***3.2. – Brazil: regulatory changes for the management of a complex network***

The political evolution of Brazil in recent years has been less dramatic than its southern neighbor. There has been, however a change in the government and a profound institutional reform – started since mid-1990s – which has affected the regulation and oversight of the privatized railways. As described in Section 2 above, until 2001 both the concessioning and regulatory responsibilities in the rail industry concurred in the *Secretaria de Transportes Terrestres*. Since June 2001 it was created the *National Agency of Surface Transport (ANTT)*, a separate regulatory entity whose main goal is to supervise the concessionaires' performance. This change has clarified the regulatory panorama, providing clearer mechanisms and facilitating the communications between operators and government. As in the case of Argentina, we can now evaluate the performance of the private railways and the competition issues that have emerged so far.

#### **3.2.1. Performance of private concessionaires**

The institutional change of regulation of the Brazilian rail system has been accompanied by the availability of performance databases that, as in Argentina, allow for comparisons between the pre-concession and post-concession periods. Again, Estache *et al.* (2002) have used TFP to evaluate the efficiency gains. They conclude that TFP has clearly improved since the private operators took over the sector. The average TFP growth has been 8.4% since all systems were operated privately, up from 5.5% before the change.

Using data directly provided by the ANTT, **Table 7** provides a more detailed view on this issue, showing for example that all operators have improved their figures dramatically, even taken into account their different sizes and geo-economic characteristics (see Table 3 above). Most of them managed to obtain significant improvement in output growth rates with an average growth rate of 6% for the system as a whole, including some dramatic turnaround for FCA, CFN and FSA. These very large efficiency gains in outputs largely offset the somewhat modest performance with respect to inputs.

The efficiency gains achieved before the reform were on the input side, while after the reform, they focused on the output side. The main reason is that the before figures reflect the fact that the reform started with a progressive reduction in employment from 150,000 workers in 1985 to 42,000 just before the reforms in 1996. Note for example the changes in the labor productivity numbers. The last stage of the reform cut another 25,000 workers and the operators themselves eventually cut 14,000, but most of the improvements in labor efficiency had already been achieved. As a result, inputs are cut throughout the period, but even more so before than under the private sector operation.

With regard to the investment figures, After years of underinvestment, the state in which most Brazilian railroads were concessioned between 1996 and 1998 was far from optimal. However, instead of including minimum investment obligations in the concession contracts, it was decided to give indirect incentives for investment through the compulsory achievement of the annual output and safety targets mentioned above. If the targets are not met, a system of penalties should be used. According to the contracts, the concessionaires must submit a triennial investment plan to the Ministry, and then they are evaluated taking into account their partial achievements.

**Table 7. Performance of Brazilian rail concessionaires 1992-2000**

Period	Concessionaire	Tons-Km (million)	Employees	Labor productivity	Revenues (US\$ mill.)	Investment (US\$ mill.)
1992-1993	FCA	6,656.5	13,758.0	7.4	n.a.	n.a.
	FCN	855.5	5,093.5	8.1	n.a.	n.a.
	FSA/ALL	7,951.0	11,683.5	7.7	n.a.	n.a.
	MRS	20,925.0	11,503.5	9.1	n.a.	n.a.
	FNV	1,836.0	3,111.0	9.7	n.a.	n.a.
	FTC	91.0	449.5	8.4	n.a.	n.a.
Average (1992-1993)		6,385.8	7,599.8	8.4	n.a.	n.a.
1994-1998	FCA	6,279.8	7,110.6	11.3	117,338.3	40,831.2
	FCN	699.2	2,834.6	7.6	3,154.7	15,193.8
	FSA/ALL	7,729.0	6,585.6	10.3	62,693.1	19,177.9
	MRS	20,150.8	6,665.2	13.9	127,329.7	37,527.4
	FNV	1,604.4	1,525.6	10.3	10,214.3	2,842.5
	FTC	121.2	257.4	7.4	4,124.8	1,108.2
Average (1994-1998)		6,097.4	4,163.2	10.1	54,142.5	19,446.8
1999-2000	FCA	7,518.5	2,569.0	9.3	360,119.0	103,696.7
	FCN	807.5	639.3	7.3	23,593.9	7,836.3
	FSA/ALL	9,817.0	2,117.0	12.0	249,978.0	68,533.0
	MRS	24,326.5	2,928.3	13.3	420,651.3	70,509.5
	FNV	1,607.5	631.3	7.9	35,554.3	5,032.8
	FTC	223.5	142.3	7.8	15,825.3	3,596.3
Average (1999-2000)		7,383.4	1,504.5	9.6	184,287.0	43,200.8

Source: Elaborated from SIADE ([www.transportes.gov.br](http://www.transportes.gov.br)).

The evaluation of the investment performance of the RFFSA concessionaires is not completely positive and could become a problem in the near future. Practically all the concessionaires (with the exception of CFN) have started important medium-term maintenance projects aimed at correcting the most urgent needs of their respective network, although most of them have not achieved the goals described in their investment plans. In 1997 a total amount of R\$ 243 million was invested by FNV, FCA, MRS, FTC and FSA. Most of this amount was devoted to infrastructure, except by MRS and FSA that started a plan to renew some of their wagons and locomotives.

For most operators, however, the real problem lies in the fact that, since the vast majority of their assets are leased from RFFSA, they cannot be used as collateral for borrowing funds from financial intermediaries. Thus, access to relatively cheap funds becomes harder. The same issue creates other financing problems due to the existing debts of RFFSA. Some creditors, or even former RFFSA employees have obtained judiciary provisions regarding RFFSA's assets leased to the concessions, jeopardizing the normal operation of the companies.

In the current context, alternative sources of external funds to overcome these problems and promote long-term investment are scarce. Although foreign capital has only a minor presence in this sector as compared to the rest of the Brazilian economy, US\$ denominated debts may shortly constitute an increasing burden for many operators, as exchange rate weakens and with respect to domestic financing, several operators claim facing cost of capital above 40%. Despite being a contractual obligation, only two concessionaires are quoted in the Stock Exchange and most firms rely heavily on new capital from their actual shareholders.

### 3.2.2.- Competition and access issues

With respect to competition issues, since the payment to RFFSA for the leased assets (including tracks) was clearly specified in the contracts, the most important access issue that

faced the Brazilian rail industry at the moment of the privatization was the development of cross-concession traffic. Traditional cargoes, such as ores, iron and steel, needed to travel from inland to the main cities and seaports, i.e. east to west. New products, final goods and half-elaborated commodities, however, were creating an increasing need for north-south traffic, particularly to access the cities of Sao Paulo and Rio, and their respective ports. Since the concessions were let on the basis of the old approach, north-south traffic needed to cross several concession areas.

Establishing a process to allow this cross-concession traffic was identified by all the players within the industry as a key issue to be addressed soon, so that the growth potential of these new markets could be unleashed. Thus, the Brazilian concession contracts included special provisions for captive shippers, joint traffic and access rules to other networks. In general, it was expected that the interested parties would reach an agreement on these issues. If not, the government, through the Ministry of Transport, had the power to review the problem and set rates for shippers that were captive to the railroad. Railroads were also obligated to carry joint traffic or, if they could not, to allow the connecting railroad access to its tracks so that it could complete the movement. The two railroads were to negotiate the tariffs for joint traffic, but again the government could step in to set the rates or order access if the negotiations failed.

Although the restructuring model chosen for Brazilian railroads intended to minimize access issues by reorganizing the industry into separate and relatively little interconnected networks, the horizontal separation model made it clear that in most cases a concessionaire would have to use its neighbors' tracks when carrying long-distance traffic. In principle, the government did not worry excessively about this issue during the privatization of RFFSA because the six RFFSA companies that were formed interchanged little traffic with one another. But they interchanged with the CVRD railroads and with FEPASA, and the privatization of FEPASA in 1998 (and particularly the access to the port of Santos, which included an internal rail network of about 200 kms) brought the issue of joint traffic to the forefront again.<sup>7</sup>

In fact, according to available figures, despite the historical lack of connection among several lines due to distance or different gauges, the interconnectivity issues have been very important since 1995, particularly in central and southern Brazil. However, some railroads were much more dependent on joint traffic than others. For example, as shown by Table 3, of the 17 million tons originating on FEPASA, almost 2.5 million tons was transferred to MRS, mostly to be shipped out of the port of Santos. From MRS' perspective, however, this cargo accounted for less than 10% of MRS' total tonnage, and even less of its ton-kilometers because they traveled only the last 22 kilometers or so of their journey on the MRS system. In 1999, complaints about joint tariffs were common among the carriers. FEPASA and FSA were in a tough dispute over through rates, for example, and FEPASA regarded the rates that MRS charged for access to Santos as excessive. However, no complaints had been brought to the regulatory agency so far, which suggests that the railroads were still hopeful of negotiating reasonable solutions without appealing to external control mechanism.

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<sup>7</sup> The port of Santos – the most important maritime port in Brazil – constitutes the hottest access issue at the moment. During 1998-99, there was an important conflict between rail operators and the port administration (Codesp), but since January 2000, an agreement for joint operation of the internal network has been reached. More recently, in July 2000, the port authority formally transferred the control of the tracks to the private firms, which now jointly operate the internal network. Again, access prices and rules are set by bilateral contracts, without government intervention.

**Table 8. Interchanges of traffic in 1998 ('000 of tons)**

Destination Origin	CFN	FCA	MRS	FSA	FNV	FTC	FEPASA	CVRD	Total	% ending own line
CFN	1,862	68	-	-	-	-	-	-	1,930	96.5
FCA	14	11,558	2,573	-	-	-	794	2,589	17,528	65.6
MRS	-	77	43,850	-	-	-	2,928	399	47,254	92.8
FSA	-	-	-	14,460	-	-	791	-	15,251	94.8
FNV	-	-	-	-	1,736	-	727	-	2,463	70.5
FTC	-	-	-	-	-	1,336	-	-	1,336	100.0
FEPASA	-	914	3,869	1,597	928	-	11,814	-	19,112	61.8
CVRD	-	2281	600	-	-	-	-	84,913	87,794	96.7
<b>Total</b>	1,876	14,898	50,892	16,057	2,664	1,336	17,054	87,901	100	-
% originated on own line	99.3	77.6	86.2	90.1	65.2	100.0	69.3	96.6	-	-

Source: Campos and Alexander (1999).

As mentioned above the general policy set in the contracts on access rights, mutual traffic, multimodality, etc. favored bilateral, market-based solutions, giving again only the power of arbitrage to the Ministry of Transport. This implicitly reflected the idea that if regulatory authorities prevented the abuse on captive shippers then there was no need for them to also regulate the division of tariffs for joint traffic or to order one carrier to allow another access to its tracks. In theory, such matters could be handled by negotiations among the carriers, much as they would be in a normal competitive market. However, in the case of Brazil, this approach required two prequalification criteria hardly met: that the regulators were able to regulate tariffs for captive shippers and that the railroad management was experienced and sensible about negotiating joint tariffs. This final point required the management of the concessions to have a single objective, that of profits, which was not necessarily the case of Brazil.

### 3.3.- Mexico: too early or too slow to change?

Although the process has just concluded, the initial (and not very abundant in comparison to the other countries) figures provided by the Mexican *Secretaría de Comunicaciones y Transporte* seem to offer a positive evaluation of the rail concessioning experience. For example, it has been recorded that the new operators have already invested more than P\$3 billion during 1997-1998 and it is estimated that another P\$3.3 billion will be spent during 1999. According to the proposed business plan in their technical bids, the present value of investments during the first five years of private activity will be about P\$9.0 billion. In terms of the fiscal burden of now extinct FNM, subsidies to passenger traffic has been mostly suppressed and the revenues from the canon and taxes paid by the concessionaires are flowing into the federal treasury. Users have complained about the increase in tariffs, but firms replied that they were in line with quality improvements.

According to the detailed description provided in Section 2, and following Campos (2002), several factors can be now identified in the railroad privatization model in Mexico related to competition and access among private railroads. The potential for this intramodal rivalry, which was one of the goals of the reform, is large but it could still be affected, positively and negatively, by three factors embedded in the system.

### 3.3.1.– Intramodal competition and concentration favored by structural design

When the packages of major rail lines to be concessioned and the short-lines related to them were designed, it was considered that, where possible, no concessionaire should have exclusive access to major cities (Mexico City, Monterrey and Guadalajara), industrial areas (Center-North of the country) or ports (Tampico and Veracruz). This restriction required the mandatory imposition of trackage and haulage rights in the key routes, in order to grant a railway concessionaire access to other railway's licensed tracks, upon payment of a fixed fee. It also implied the limitation of exclusivity rights in the concession titles by not hindering other companies from operating the same routes, whenever they were willing to invest in parallel tracks.

This design was particularly difficult in the case of the North-Pacific (*FerroMex*) and Northeast (TFM) networks, since the Southeast was connected to them only through Mexico City. These two railroads compete with each other in the Queretaro-Mexico City line, and in the access to Tampico, Aguascalientes and Monterrey. In the border crossings of Nuevo Laredo and Matamoros, TFM faced no competition, and neither did *FerroMex* over the crossings in Mexicali, Nogales, Ciudad Juarez and Piedras Negras. Both TFM and *FerroSur* had access to the largest port in the country, Veracruz, and all three concessionaires jointly operate Mexico City's terminal.

Apparently, the effect of this intramodal competition design on the tariff levels has not been large yet. Although concessionaires must register their prices under the DGT and the SCT may intervene if "no effective competition" exists, no major complaints have been forwarded by the shippers at the moment. Prices have increased with respect to past years, but since services and quality have also done so, it is difficult to perceive a generalized negative response. Over the competitive tracks neither the authorized (maximum) tariffs nor the effective ones seem to differ too much among concessionaires, although detailed information on this topic is difficult to obtain. Since the definition of "effective competition" refers to lack of two or more rivals in the route, the risk of collusive practices could have been underestimated and its potential harm should be evaluated in the medium-term. With respect to the non-competitive routes, both the SCT and the competition agency retain a clear watchdog role and, since intermodal competition from the trucking industry is strong, no actions have been taken so far.

### 3.3.2.– Conflicts on defining the access rights

Although trackage and haulage rights were included in the concessions to favor competition among the operators, they could also pose several difficulties if they are not flexible enough. The 1995 railroad law (LRSF) ruled that the prices of these rights were to be bilaterally negotiated between private operators, although the SCT should intervene if no agreement was reached before a year or if the concessionaires requested it. This had not happened and in June 1999 a final agreement over this issue in the most conflictive case, between TFM and *FerroMex*, was reached.

The huge difference in the bids made by each concessionaire and, particularly the lack of a detailed methodology on how to include these differences in the access prices was the major controversial issue that had prevented a previous agreement. The regulations developed by the LRSF were not very detailed and only requested the inclusion of the maintenance and operating costs, the incremental costs associated to the other firm's operation, depreciation and a reasonable profit for the provider of access. Since 1999 the DGT seems to be working on a detailed methodology to implement these prices if needed, although they could possibly lack enough detailed information to cope with this task. In the future, the problems could re-

emerge, not only with the short lines and *FerroSur*, but also with the other larger ones, since the law also provided the possibility that concessionaires could negotiate additional trackage and haulage rights. In this case, the authorities could intervene only to review the agreements entered into.

In general, the Mexican concessions cover a long period of time over which the transportation circumstances and economic environment may vary significantly. Thus, the transported cargo volume may in the future permit the coexistence of more than one carrier. Therefore, a more flexible mechanism for the assignment of trackage and haulage rights could be needed. Such mechanism should not discourage investment but rather allow the imposition of trackage and haulage rights whenever necessary and in the absence of effective competition.

To overcome this possibility, the 1995 law allows the SCT to grant concessions to third parties, in order to provide transportation services (cargo or passengers) over a licensed track, but only after the specific exclusivity period (30 years for main lines, 18 for short ones, as mentioned in Section 2) or whenever monopolistic practices have been engaged into by the concessionaire (previous opinion from the competition agency is required). In this case, the trackage or haulage rights which can be imposed do not include the right to serve intermediate points at the route subject to those rights and shall apply only for the transportation of a product or products for which feasible alternative transportation does not exist and for which the petition was made.

### 3.3.3.– The operation of Mexico City's terminal

A final source of potential access conflict among private operators is the ownership of *Terminal Ferroviaria Valle de Mexico* (TFVM), the concessionaire of Mexico City's complex 20-station network. The corporate governance of TFVM is rather peculiar, since it is jointly owned by the three main rail concessionaires (a 25% stake each). The remaining 25% (currently held by government) belongs to the future suburban rail operator. The owners are simultaneously the customers of TFVM, to whom they pay the services (not for access rights and slots, which are determined by a central traffic control). The firm apparently operates since April 1998 with total commercial autonomy and exquisite neutrality with respect to the owners.

However, although this organizational form intended to prevent the external spread of conflicts, it also creates a long-run internal instability risk. A potential problem, for example, is the owners' asymmetry (in terms of traffic volume, number of connections with the Mexico City's network and even in the price paid for their concessions). Even so, they all have the same voting power and a majority of 75% is required for all decisions. If, for example, cargo volume discounts are introduced in the future, this could create fears of discrimination and trigger conflict.

Finally, TFVM is now self-financing through its operational revenues. No additional equity was needed from owners apart from the initial disbursements and profits emerged just eight months after starting operations, mostly thanks to cost control and improved performance. In the future, if additional capital is needed, the owners might seek to renegotiate their stakes.

## 4.– CONCLUSIONS

During the last decade, there has been a dramatic increase in the liberalization of transport policies and a strengthening of the role of private operators and investors in transport infrastructure and services in the Latin America and Caribbean region . This increased private sector participation has often reflected changing ideologies about the role of the state and dissatisfaction with publicly provided services. However, the main driving force behind it has generally been the pressure to look for private financing imposed on governments by lasting fiscal crises. This change in the financing of the sector is also providing an opportunity to restructure the transport industry in an attempt to improve its efficiency and sustain these improvements.

This paper has focused on the reform of the rail sector in the three largest economies in the region. The Argentine, Brazilian and Mexican cases represent rail industries similar to several medium-size European countries, which were completely dominated by a major government-owned monopoly before the restructuring and opted by a wide scale concessioning process as the main mechanism of reform. The changes have sought to increase private operators' participation in the sector while retaining a crucial regulatory role for the government. Although some changes were more radical than others, there is a shared generalized element of experimentation and example setting.

Taking this into account, the main purpose of our work has been to draw core lessons from the experience of these Latin American countries in order to provide new and old governments in the region and elsewhere with better information related to how they could structure a reform package in transport to make the best of the growth opportunities within their countries. This should help bring about the economic growth that is central in helping to alleviate poverty in developing countries and moving these economies out of the stagnation that they face. Latin America is a good example to base this paper on because most countries in the region display many of the social and economic problems experienced throughout the developing world but, on the way to achieving our aim, some useful lessons could also be extracted.

The first one is that available data suggest that performance has improved in general after the privatization year, although it is difficult to attribute this effect to purely technical, operational improvements or to newly generated demand. Although in all cases the concessionaires' financial position immediately after taking over was very weak, one of the most important lessons from Argentina, Brazil and Mexico is that concessioning can reverse the deteriorating trend of the industry. Domestic and foreign companies in Brazil and Mexico demonstrated that even a narrow private capital sector can be quickly mobilized under long-term concessioning contracts. This may be the only alternative when governments need funds to pour in the transport sector without compromising too much other sources of public expenditure or when legal restraints preclude other forms of private participation.

Second, the long-term viability of concessioning or any other privatization approach depends on surviving the initial years of difficult economic conditions, which are highly affected by many competitive factors new to the industry and the quality of management of the resulting concessionaires. It is probably too early to make such a judgment on the Brazilian and Mexican cases and, in general, these success factors cannot be predicted in advance with certainty. What the Argentine case particularly suggests is that they can be partly anticipated from the form under which the auctions and the transfer of railways to private hands take place. In Brazil, many shippers cross-participated in different winning consortia, thus creating incentives to collusive or predatory behaviors. In Mexico, the design

of the concessions relied too much in bilateral negotiations among the concessionaires. Therefore, the regulatory role of the government after the restructuring process is always embedded in such process.

As a consequence, the third lesson is that changes should be addressed with clear rules, in an open, contestable, simple, and easily understood way. Unless it is effectively managed, the design of concessions, for example, can become a contentious and politicized aspect of the privatization process and can slow it down or even derail it. Railway concessions are always difficult to value. Unclear or conflicting criteria may engender miscalculations on the part of bidders. The idea is that getting it right is more important than getting it done. As shown in Mexican case, if a first round bid is unrealistic, a second round may be needed or the government may need to sweeten the concession by assuming additional liability or be investing in concession prior to privatization. Concessioning is not necessarily a one-shot process. In addition, not all private sector ventures succeed, even under the best of circumstances. Hence, it is important to have a fallback plan for re-concessioning should the first attempt fail.

Finally, and in particular reference to post-privatization problems such as access prices or track-usage rights, the main lesson to be learned here is that they derive from the privatization model. LAC countries opted for horizontal separation schemes that limited and controlled the number of interconnections among the concessionaires. They showed that access issues and charging principles can be setup in concession contracts, proving that – in principle – these complicated issues can be addressed through ex-ante negotiations. The role of the government could be then limited to arbitrage. However, this solution might not work when capacity is limited and congestion relevant, something that only occurs in few areas in the region, but not in other parts of the world.

In summary, the relatively smooth way in which private participation has been introduced in a sector where many countries thought at the beginning that it was not possible should be viewed as a success by itself. The fact that social results have not emerged yet should not obscure the idea that the former situation of national subsidized monopolies was no longer sustainable. Once the industry is on-rails again, the delivery of social results may become a central regulatory objective.

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