

# TRANSPORT PAPERS

TP-6  
SEPTEMBER 2005



## Results of Railway Privatization in Latin America

Richard Sharp



TRANSPORT  
SECTOR  
BOARD



# RESULTS OF RAILWAY PRIVATIZATION IN LATIN AMERICA

---

Richard Sharp



**THE WORLD BANK**  
Washington, D.C.



**TRANSPORT  
SECTOR  
BOARD**

© 2005 The International Bank for Reconstruction and Development/The World Bank  
1818 H Street NW  
Washington, DC 20433  
Telephone 202-473-1000  
Internet [www/worldbank.org](http://www.worldbank.org)  
Published September 2005

The findings, interpretations, and conclusions expressed here are those of the author and do not necessarily reflect the views of the Board of Executive Directors of the World Bank or the governments they represent.

This paper has been produced with the financial assistance of a grant from TRISP, a partnership between the UK Department for International Development and the World Bank, for learning and sharing of knowledge in the fields of transport and rural infrastructure services.

To order additional copies of this publication, please send an e-mail to the Transport Help Desk [transport@worldbank.org](mailto:transport@worldbank.org)

Transport publications are available on-line at <http://www.worldbank.org/transport/>

## TABLE OF CONTENTS

Preface .....	v
Executive Summary.....	vii
1. Overview.....	1
1.1 Regional Comparisons .....	1
1.2 The Latin American Approach to Private Sector Participation .....	4
1.3 Concession Performance .....	4
Traffic Growth .....	5
Productive Efficiency .....	8
Measures Controlling for System Scope.....	10
Allocative Efficiency.....	11
Investment in Rail System .....	12
Accessibility and Affordability of the Rail System to Passenger and Freight Users .....	13
Sustainability .....	14
2. Individual Country Experiences.....	14
2.1 Argentina .....	15
2.2 Brazil .....	20
2.3 Mexico .....	23
2.4 Bolivia.....	26
2.5 Chile .....	28
2.6 Peru .....	31
2.7 Colombia .....	32
3. Closing Comments and Lessons Learned .....	34
Glossary .....	37
Primary Data Sources .....	38
Selected References.....	39

## LIST OF FIGURES AND TABLES

Figure 1-1. Latin American Railways.....	1
Figure 1-2. Railway Concessions, Latin America and Africa .....	2
Figure 1-3. Cumulative Investment in Railway Projects with Private Participation by Region, Developing Countries 1990 to 2001.....	3
Figure 1-4. Latin American Railway Investments with Private Sector Participation (PPI Database).....	3
Figure 1-5. Investment in Land Transport as percent GDP: (Chile, Peru, Bolivia Brazil, Mexico, Argentina).....	5
Figure 1-6. Railway Freight Traffic Seven Latin American Countries, 1985 to 2003. ....	6
Figure 1-7. Railway Freight Traffic: Argentina, Bolivia, Chile, Colombia, Peru, 1985 to 2003. ....	7
Figure 1-8. Index of Latin America Railway Ton-Kilometers, Pre- and Post Concessioning, 1985 to 2003.....	7

---

Figure 1-9. Railway Passenger Traffic (million PKM), Latin American Countries, 1985 to 2001. ....	8
Figure 1-10. Labor Productivity: Freight Rail Concessions in Brazil, Mexico, Argentina and Chile. ....	9
Figure 1-11. Route-Kilometers Since Concessioneing. ....	11
Figure 2-1. Argentina: Indices of Pre- and Post-Concession TKM vs. Constant GDP. ....	16
Figure 2-2. Indices of Pre- and Post-Concession Rail Ridership vs. Constant GDP. ....	17
Figure 2-3. Argentina Railways Traffic Growth Since Concessioneing. ....	18
Figure 2-4. Map of Argentina Railway Concessions. ....	19
Figure 2-5. Brazilian Railway Traffic Growth Since Concessioneing. ....	21
Figure 2-6. Brazil: Indices of Pre- and Post-concession TKM vs. Constant GDP. ....	21
Figure 2-7. Brazil Railways. ....	23
Figure 2-8. Mexico Railway Traffic Growth Since Concessioneing. ....	25
Figure 2-9. Map of Mexico Railway Concessions. ....	26
Figure 2-10. Bolivia Railway Traffic Growth Since Concessioneing. ....	27
Figure 2-11. Map of Bolivian Railways. ....	28
Figure 2-12. Fepasa 2001-2003 Cargo Tonnages 2001-3 and Estimate 2004. ....	29
Figure 2-13. Chilean Railways. ....	30
Figure 2-14. Peru Railway Traffic Growth Since Concessioneing. ....	32
Figure 2-15. Peruvian Railways. ....	32
Figure 2-16a. 2003 to 2004, Traffic of Tren De Occidente (Ferrovia Pacifico). ....	33
Figure 2-16b. 2003 to 2004. Coal Traffic. ....	34
Figure 2-17. Colombian Railways. ....	34
Table 1-1. Average Annual Rate of Productivity Change in Argentina's Railways. ....	10
Table 2-1. Argentina Freight Railway Concessions ....	15
Table 2-2. Argentina Commuter Railway Concessions ....	17
Table 2-3. Argentine Freight Concession Compliance with Investment Commitments, 2002. ....	18
Table 2-4. Brazil Freight Railway Concessions. ....	20
Table 2-5. Brazil Passenger Railway/Urban Transit Concessions. ....	22
Table 2-6. Mexico Freight Railway Concessions. ....	24
Table 2-7. Bolivian Railway Concessions ....	27
Table 2-8. Chilean Railway Concessions. ....	29
Table 2-9. Peruvian Railway Concessions. ....	31
Table 2-10. Colombian Railway Concessions. ....	33

## PREFACE

In 2003, the World Bank's Transport and Urban Development Department initiated a review of international experience of railway privatization. Many of the Bank's countries of operation have adopted such policies over the last fifteen or so years, many with World Bank support or endorsement. The issue of whether to increase private participation in the railway sector remains a live policy issue in many other countries in which the Bank is active. It seemed wise to review the outcomes in countries where it has already been done.

An early report in this series was a review of British Railways privatization published in September 2004. At the same time, the Bank initiated three separate and independent reviews of experience in the three continents where private participation in railways has most substantially increased in recent years: Latin America, Australasia and Africa. This report describes the review of rail privatization in Latin America.

The consultants selected for these reviews were asked to give greatest attention to the **results** of rail privatization. This was partly a matter of resources; over the three continents more than 60 individual railway concessions or sales were implemented. Each country and case has its own history, market characteristics, political context and administrative process: the intention of this work was to look beyond the details of each privatization process and focus on what they actually achieved. Taken over the whole range of experience, the merits or otherwise of private sector participation in railways as a broader policy principle might be discerned.

The terms of reference for the review in each continent were very similar. The authors were asked to consider impacts on the role of rail, productive (or technical) efficiency, allocative efficiency; investment in the rail system (including renewal of assets); accessibility of the rail system to passenger and freight users; and, in the case of Latin America and Africa, possible impacts on the poor. This was a tall order for the very modest budgets available, not least because rail privatization has, in many cases, led to a marked reduction in publicly available information about the railways involved. None of the reviews has been able to come to definitive conclusions on all criteria. But, taken in the round, the three reviews greatly improve our understanding of what may be expected to happen when a railway is privatized.

The authors were asked to take an independent view. The reports are published and disseminated as an input to continuing debate in an area of public policy that is of interest to many of the Bank's countries of operations. The authors' conclusions are their own and carry no specific or implied endorsement by the World Bank.

Paul Amos  
Transport Adviser  
Transport and Urban Development Department  
World Bank





## EXECUTIVE SUMMARY

i. This paper reviews the performance of railway concessions in Latin America over the period extending from the initial Argentina concessions in 1991-1993 through 2004. The bulk of the concessioning processes described herein were supported by the World Bank.

ii. Now over a decade since rail concessioning in Latin America began, the overall assessment of its results is positive, particularly for freight railways. Railway traffic volumes have climbed, with some improvements in surface transport market share. Although numerous data problems exist, measures of productive efficiency almost uniformly show post-concession improvements in cargo transport. Effects on rail rates and service levels have generally received positive reviews. Evidence is less extensive for passenger services, mostly because concessioning was largely limited to commuter services in Argentina and Brazil and because such concessions must be evaluated in terms of complex subsidy and regulated pricing regimes, rather than as market-based private enterprises. Railway concessions have not revived uneconomic intercity passenger services, nor has there been much effort to do so.

iii. While concessioning brought impressive improvements in labor productivity and other efficiency measures, results have been not quite as dramatic as they are sometimes portrayed. This is in part because the initial concessions took place in the volatile Argentina economy, where a precipitous decline in the rail sector just prior to concessioning was followed by a dramatic post-concession revival. Elsewhere the decline in the rail sector was not as severe as in Argentina, nor was the recovery so rapid. Even in Argentina, economic developments after the initial post-concession years led to a modified view of concessioning's accomplishments and, in fact, it is more controversial there than in most other countries.

iv. The accomplishments of Latin American railway concessions, and the limits to those accomplishments, have been driven by the markets they serve. Bidders for the early concessions in Argentina and Brazil (possibly encouraged by the transaction process) overestimated potential traffic growth by wide margins. As a result, investments have fallen far short of assurances made at the time of concessioning and no amount of renegotiation has compelled concessionaires to remedy that shortfall. Private investment has not been sufficient to significantly expand the rail network, or to dramatically transform capacity or to approach US or European equipment standards. Still, a steady stream of private sector investment has occurred sufficient to support substantial traffic growth throughout the region.

v. A principal objective of Latin American railway concessioning was to relieve the large public debt burden that over-staffed and under-performing public railways were imposing on governments. Concessioning accomplished this objective, perhaps too well. While private sector investment increased, public sector investment plummeted, for both railways and roads (where concessioning also was adopted as public policy). As a result, total Latin American investment in surface transport infrastructure as a percent of GNP is now far below levels in the 1980s. Underinvestment in such infrastructure and the need for greater public sector participation is becoming an increasing concern in the region. In the rail sector, as demonstrated by recent commitments in Brazil, Chile and elsewhere, public commitments to modernize infrastructure and help sustain weaker franchises are increasing in recognition of this fact.

vi. By the early 1990s Latin American railways had deteriorated to a marginal role in most surface transport markets and salvaging the networks and reducing debt were the principal motivations for concessioning. As a result, concession design for the most part gave little attention to fostering intermodal competition, achieving social objectives such as accessibility and affordability to small shippers and passengers, or even to such issues as long-term sustainability of the franchises. The limited economic role of the pre-concession railways offered little potential for adverse consequences from the concessioning experience and there is no convincing case that such adverse effects occurred.

vii. With the success of attaining the initial objectives, however, there is now increasing attention to these additional policy issues. Restructuring of the initial concessions is being permitted to go forward and should, along with some public investment, contribute to the sustainability of weaker franchises. Gradual progress toward regional affiliations is underway that should also strengthen concessions. Additional assessments are required as to how to improve accessibility, affordability and other social objectives without undermining the financial stability or service levels of the existing franchises, but the current market-based focus of the rail sector appears to provide a workable framework for such correctives and adjustments.

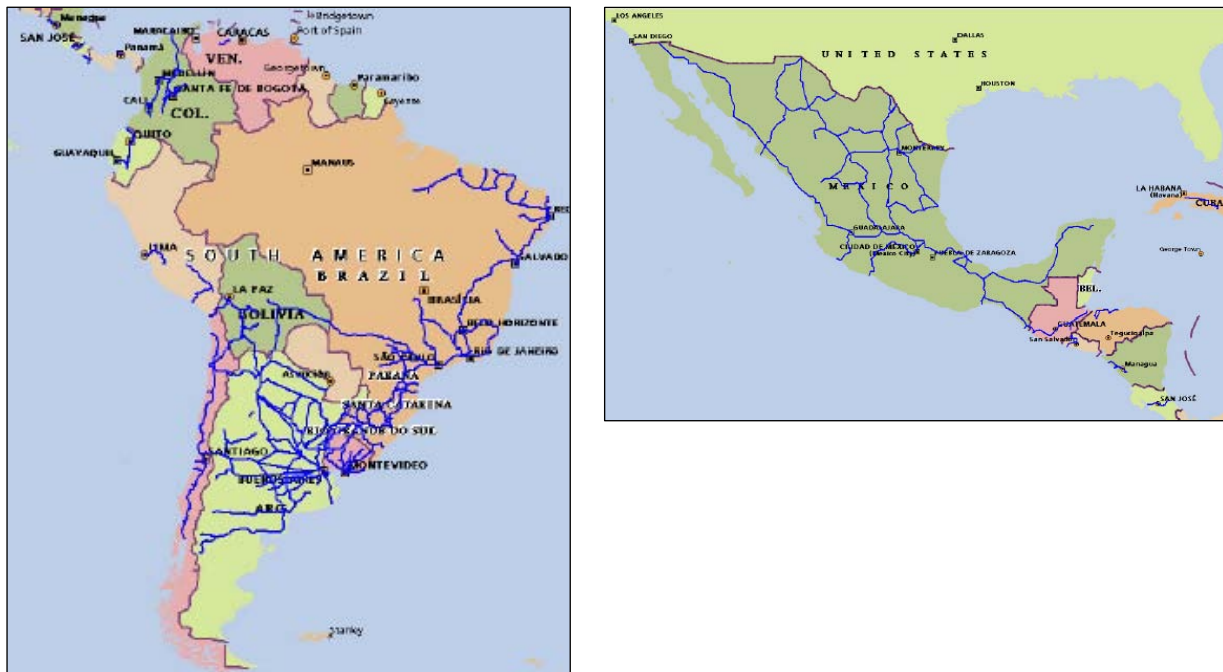
# RESULTS OF RAILWAY PRIVATIZATION IN LATIN AMERICA

## 1. OVERVIEW

Latin American nations have been at the forefront of the global trend toward restructuring State railway companies, with initial efforts toward private sector involvement beginning in the region in the late 1980s and accelerating throughout the 1990s. The path chosen in Latin America, has been the concession, a franchise to operate on existing rail lines and to manage the infrastructure, while leaving politically-sensitive ownership with the State.

The number and size of Latin American railway concessions have overshadowed those of other developing regions. About four dozen State railway properties in Latin America, principally freight railways, but also including urban/suburban passenger lines, have been placed under concession, over three dozen of those being predominantly or exclusively intercity freight carriers. In contrast, less than a dozen State rail properties in Africa have been concessioned, mostly very low volume carriers, and rail concessions elsewhere have been quite scattered. As shown below, the most extensive Latin American rail systems are in Brazil, Mexico and Argentina, but Chile, Bolivia, Colombia, Peru and Uruguay have significant rail networks. Of these, only Uruguay has not concessioned the bulk of railway assets.

Figure 1-1. Latin American Railways.



### 1.1 Regional Comparisons

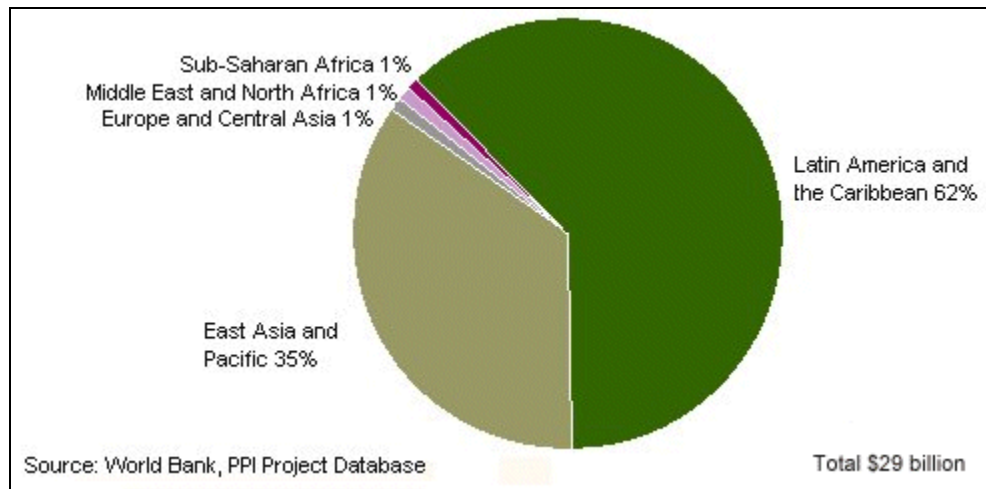
It is safe to say that Latin America has been the testbed for the vertically-integrated concessioning strategy for railway reform. While railway concessioning has been promoted by development banks in both Latin America and Africa, the disparity in implementation is dramatically illustrated by Figure 1-2. *All* of the largest railway networks in Latin America have been largely concessioned, with the main exception being a significant portion of urban railway passenger transport capacity remaining publicly operated (notably in Brazil). *None* of the larger railway networks in Africa have yet been privatized. That may begin to change, with the pending joint concession of the Kenyan and Ugandan rail systems, but Spoornet, the largest system, appears likely to remain a South Africa public entity for some time.

**Figure 1-2. Railway Concessions, Latin America and Africa.**

Latin American railway concessioning continues to be impressive under a broader comparison. As shown in the graph below, derived from the World Bank PPI database, investment in Latin American railways that has accompanied concessioning has approached fully two-thirds of total railway investment involving private sector participation in the developing world. Asia and Pacific investment in railways involving the private sector account for all but three percent of the remainder. However, that still understates Latin American dominance of the concessioning strategy in the developing world. The great bulk of private rail investment in Asia has been in connection with urban transit BOT projects and similar new construction arrangements, *not* privatization of existing rail properties. Of private investment solely associated with concessioning of *existing* rail assets, Latin America would easily constitute over 90 percent of the developing world total. Because of its early start in the concessioning process and the number of concession examples throughout the region, Latin America therefore provides the bulk of evidence as to the success or failure of this process. Moreover, most of that evidence is from just three countries. The PPI database indicates that the region's railway infrastructure investment with private participation is overwhelmingly concentrated in: Brazil, 38 percent; Argentina, 33 percent; and Mexico, 24 percent.<sup>1</sup>

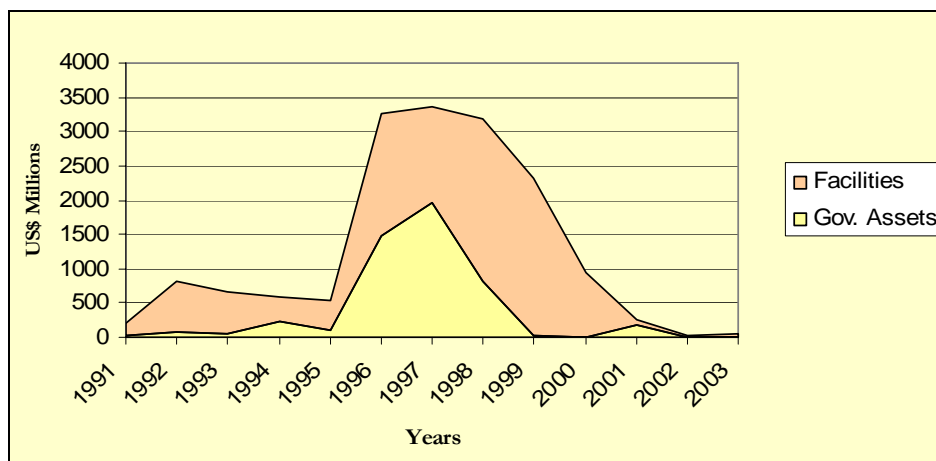
<sup>1</sup> World Bank, On-line PPI Database. Data are 1990-2003. Investment figures are: Brazil, US\$6.1 billion; Argentina, \$5.3 billion; Mexico, \$3.9 billion; Colombia, \$0.5 billion (others each below US\$100 million).

**Figure 1-3. Cumulative Investment in Railway Projects with Private Participation by Region, Developing Countries 1990 to 2001.**



This is an appropriate time for a retrospective examination of the region's concessioning process. The profile of Latin American railway investments with private sector participation, as recorded in the PPI database, shows that the great bulk of such investment occurred in the 1992-1998 period, with investment declining sharply thereafter.<sup>2</sup> (Figure 1-4.) This is partly because the investment commitments are recorded at time of contract closure and include only expenditures on facility expansion, divestiture revenues, and license or canon fees and do not include operational expenses and many infrastructure improvement outlays that concessionaires (and many governments) would consider to be continuing investments. This profile demonstrates, however, that the wave of concessioning transactions of existing rail properties in Latin America is largely complete and that there are few ongoing transactions involving the private sector to create new railway infrastructure. We review the results of those transactions here, focusing principally on the freight concessions and their effectiveness in reviving rail traffic, achieving productivity gains and securing investment in the rail sector.

**Figure 1-4. Latin American Railway Investments with Private Sector Participation (PPI Database).**



<sup>2</sup> The database records total investment in infrastructure projects with private participation, not private investment alone. For all infrastructure projects with private participation in developing countries, the private sector accounted, on average, for 85–90 percent of total investment.

## 1.2 The Latin American Approach to Private Sector Participation

While there are significant variations in the form of private sector participation among Latin American countries, the approaches followed generally shared three major features:

- The former State monopoly has been concessioned, rather than fully privatized, with the private sector concessionaire given rights to operate on and manage the rail infrastructure for periods ranging from a few years to several decades, but with the State retaining ownership of assets, particularly infrastructure. This approach reduced the political and legal challenge of disposing of national patrimony – although permitting private operation itself required substantial redrafting of laws in each country.
- Except in some smaller countries, the main national rail system was divided into multiple franchises, rather than offered to the private sector as a single entity -- an approach of “horizontal separation,” as opposed to the “vertical separation” of infrastructure and operations being adopted in Western Europe. Franchises tended to follow internal operating divisions of the State railway, which, in turn, often grew out of separate private railways that were nationalized at various points in the 20<sup>th</sup> century. In general, this focused the concessionaires on reviving markets served by the preceding railway divisions – often export markets – rather than on radically restructuring railway capacity.
- Although governmental authorities have sometimes made legal provision for compulsory third party operating rights (for passenger service or for both freight and passenger), Latin American railway franchises are extensively vertically integrated and mostly exclusively operated by the infrastructure manager. Intercity passenger service access (typically used by public operators) may be mandated, as in Argentina and Brazil, but such access use has been modest (though a source of disputes between freight operators and local authorities). Some countries, notably Chile and Peru, have a legal framework with features of infrastructure separation from freight operations but market conditions have limited effective entry by third parties and formal distinctions between operators and infrastructure managers have been blurred.<sup>3</sup>

## 1.3 Concession Performance

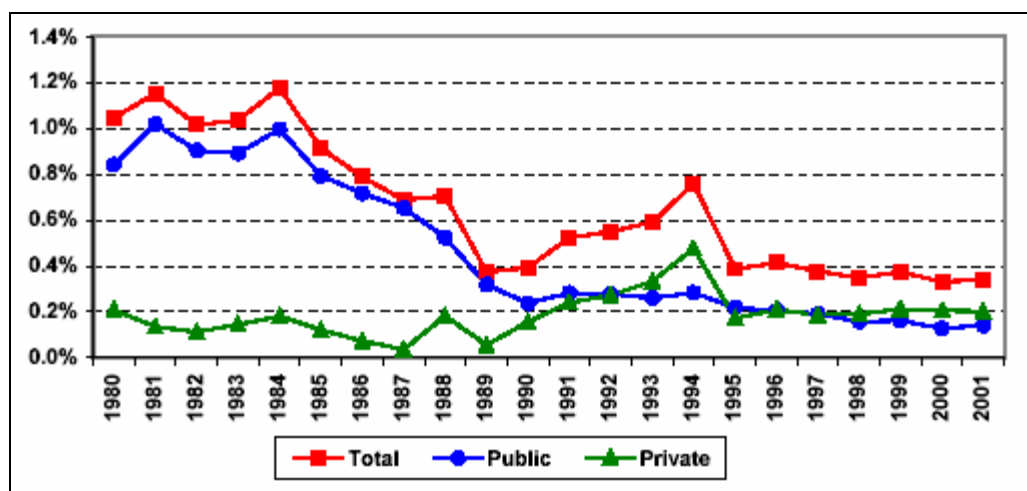
Railway concessioning in Latin America has been subject to some controversy, with majority opinion viewing the process as a moderate to sizable economic success, but with dissent on a number of issues. These include the failure of concessions to meet investment promises/commitments, the severity of labor cutbacks, the continuing need for subsidies (particularly for passenger services), reductions in or elimination of some services (particularly intercity passenger services), rate increases (particularly post-2000), discrimination among shippers and lack of competition. The following review leads to a conclusion that concessioning has been successful overall *in preserving and reviving railway operations on existing assets*. The process also clearly addressed immediate fiscal problems faced by most of the countries that concessioned their railways – the burden of large State rail deficits was quickly relieved (although in counties retaining passenger service, subsidy relief was not as great as hoped). It cannot be concluded, however, that concessioning has contributed as much as hoped to solving the region-wide problem of underinvestment in transport assets adapted to modern economies, nor has it eliminated the need for public investment in railway capacity.

Evidence that concessioned railways have increased productive efficiency is quite strong, as demonstrated in the ensuing regional discussion and the country profiles that follow. Assessment of the impact of the process on allocative efficiency process is less definitive, in part, because railway concessioning in Latin America was part of multi-sectoral change impacting diverse markets: Latin American governments simultaneously extensively adopted highway concessioning, as well as privatization of airlines and airports, ports and non-transport facilities, such as energy and telecommunications. Projects involving private sector investment in railways were less than half of those for highways and are dwarfed by such projects in other sectors. At the same time, *public* investment in railways, highways, other transport facilities and traditional utilities plummeted as a

<sup>3</sup> In Peru, for example, concessionaires were obliged to form two companies, one for infrastructure and one for operations but the franchises are still managed in an essentially vertically integrated manner.

percent of GDP from levels in the 1980s. A reduced rate of decline in railway market share and, in some cases, increases arguably may indicate an improvement of allocative efficiency, but attribution is very much a matter of interpretation. Further comments on these issues follow the regional overview and country profiles.

**Figure 1-5. Investment in Land Transport as percent GDP: (Chile, Peru, Bolivia Brazil, Mexico, Argentina).**



Source. Banco Central de Chile.

### Traffic Growth

Traffic data indicate that private sector participation has contributed to both rail freight and passenger service revival in Latin America, although the results perhaps are not quite as dramatic as generally perceived. Figure 1-6 below provides an overview for freight, indicating that since Argentina's railways were concessioned in 1992-1993, Bolivia, Brazil and Mexico in the 1995-1997 and Peru and Colombia in 1999, there has been a discernable upturn in rail freight traffic. Growth has continued strong through 2004 for those countries for which data were obtained.

**Freight Traffic.** Within Latin America, statistics on railway freight traffic are dominated by two countries: Brazil and Mexico: Brazil's railways account for about 70 percent of total ton-kilometers; Mexico has over 20 percent. Third in volume, Argentina, which has received considerable attention due to its ground-breaking early start in concessioning and substantial public-private investment in the rail network, has only about five percent of the region's rail freight traffic. Of the rest, only Chile accounted for more than 1 percent. As Figure 1-6 indicates, therefore, Latin American railway performance is heavily weighted by trends in Brazil and Mexico. Rail volumes in both countries were growing modestly in the years prior to concessioning (albeit with traffic apart from large bulk movements largely eroding) and private sector participation accelerated growth in bulk transport rather than reversed a steep decline.<sup>4</sup>

<sup>4</sup> Brazil's pre-concession expansion is substantially impacted by the iron ore output of CVRD both on its own lines and certain others, such as MRS Logística. CVRD was privatized along with its rail subsidiaries in 1998.

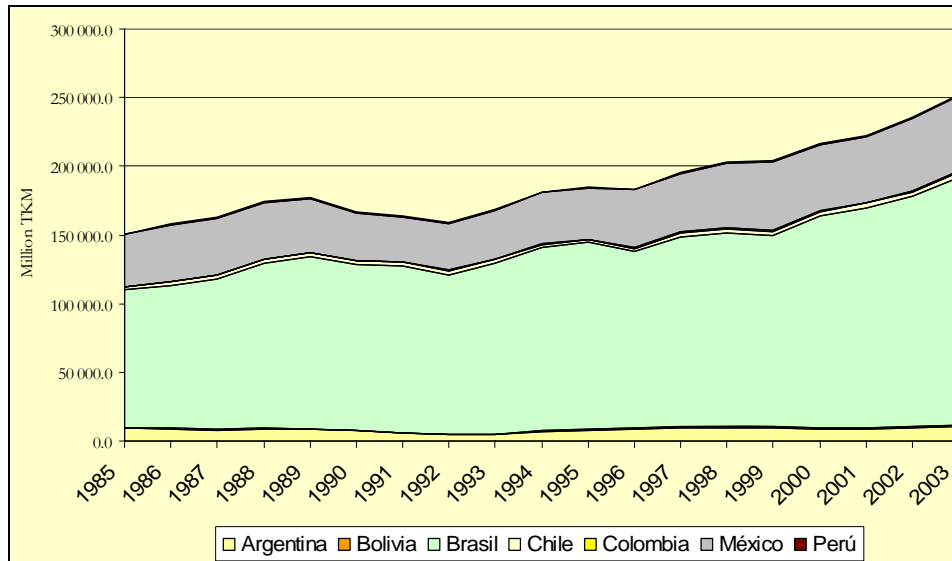
**Figure 1-6. Railway Freight Traffic: Seven Latin American Countries, 1985 to 2003.**

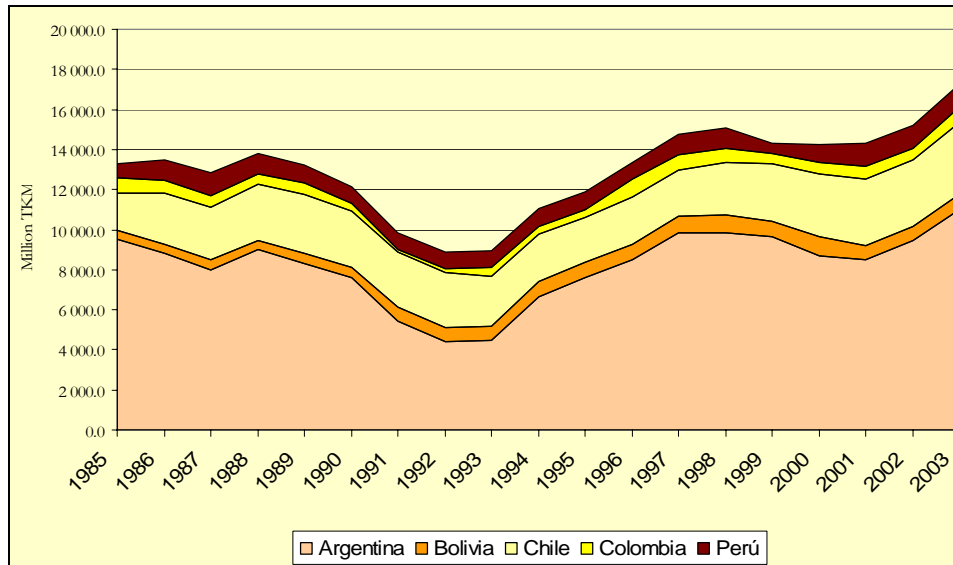
Figure 1-7, excluding Mexico and Brazil and highlighting the extreme fluctuation in Argentine railway volumes, provides a clearer picture of trends in the other Latin American countries with significant rail networks, and may help illustrate why the image of railway concessioning rescuing an industry in collapse has gained currency. *Argentine* railways were, in fact, in rapid decline just prior to concessioning and revived sharply immediately thereafter, generating a large amount of favorable publicity as to the impact of private sector participation and World Bank support for this initiative. That immediate resurrection of Argentine railways after concessioning, however, likely contributed to exaggerated expectations for the immediate impact of railway concessioning in Latin America and elsewhere. Despite the early revival, Argentine rail volumes declined again with the economic crisis of the late 1990s, amid defaults on concessionaire investment commitments and painful concession renegotiations, also producing much of the bitterest criticism of the concession approach. The ongoing revival of recent years has, in turn, moderated some of that revisionist criticism, but to a considerable extent, Argentine railway performance has *followed* the ups and downs of a highly volatile economy, rather than leading it. Private sector concessionaires benefited from fortunate timing of take-over dates as well as their own entrepreneurial capabilities, and then suffered along with the rest of the economy from the financial crisis of the late 1990s. Somewhat ironically, Argentina seems to have generated the strongest claims for *both* success and failure of railway concessioning.

Looking at the Latin American concessioning experience in terms of indices, rather than traffic volume (Figure 1-8), highlights the complex relationship between the economic environment and the impact of privatization. During the late 1980s, over half of the region's railways (Argentina, Colombia, Mexico and Peru) were losing traffic, while Brazil and Bolivia were gaining volume and Chile was fluctuating.<sup>5</sup> By 1997, however, traffic volume had increased over the last five years in all countries but Chile, quite independent of the date of concessioning. Improved economic conditions and export markets in most countries in the 1990s led to increased transport demand, even as restructuring was in the planning stages. It may also be noted, however, that the year or two immediately prior to concessioning saw traffic stagnate or decline in most cases. This is attributable to downsizing measures to make the concessions more attractive, and to shipper uncertainties regarding the pending transactions. In any event, the near-term prospect of concessioning and the dissolution of the State railroad tends to create a slump from which the concessionaire may have an early revival (a "dead cat bounce" in popular jargon).

<sup>5</sup> As noted earlier, Uruguay, not shown on the above chart, did not concession its railway, which remains under the State organization, Administración de Ferrocarriles del Estado (AFE). The Uruguay system carries little freight, less than one million tons in recent years and less than half the ton-kilometers of Bolivia. AFE has been struggling with various measures to retain passenger services, including contracting to private sector operators and there have been a number of curtailments and restorations of passenger service. Both passenger and freight volumes have stagnated since the mid- 1990s, according to AFE statistics.

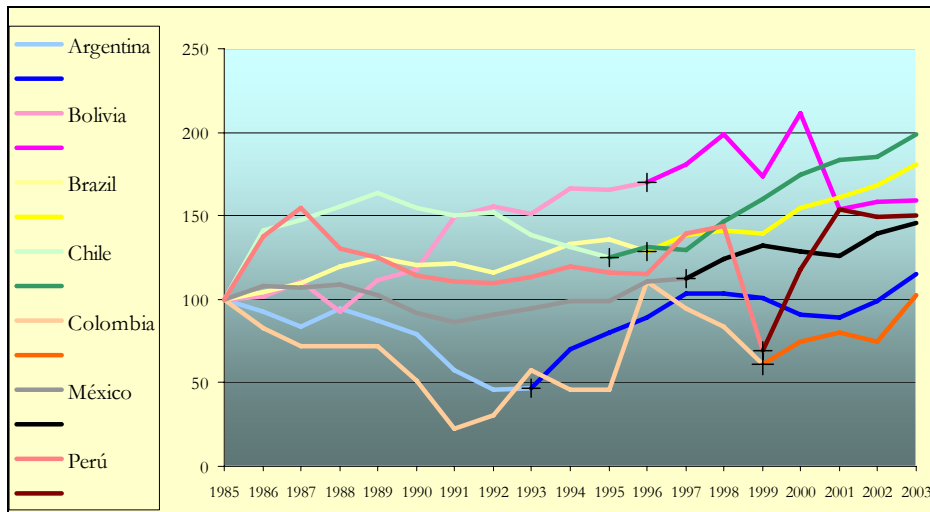


**Figure 1-7. Railway Freight Traffic: Argentina, Bolivia, Chile, Colombia, Peru, 1985 to 2003.**



*Note. Colombia data excludes coal transport on a private internal rail line of a public-private mining and shipping venture that increased from zero to 40 million tons over the period.*

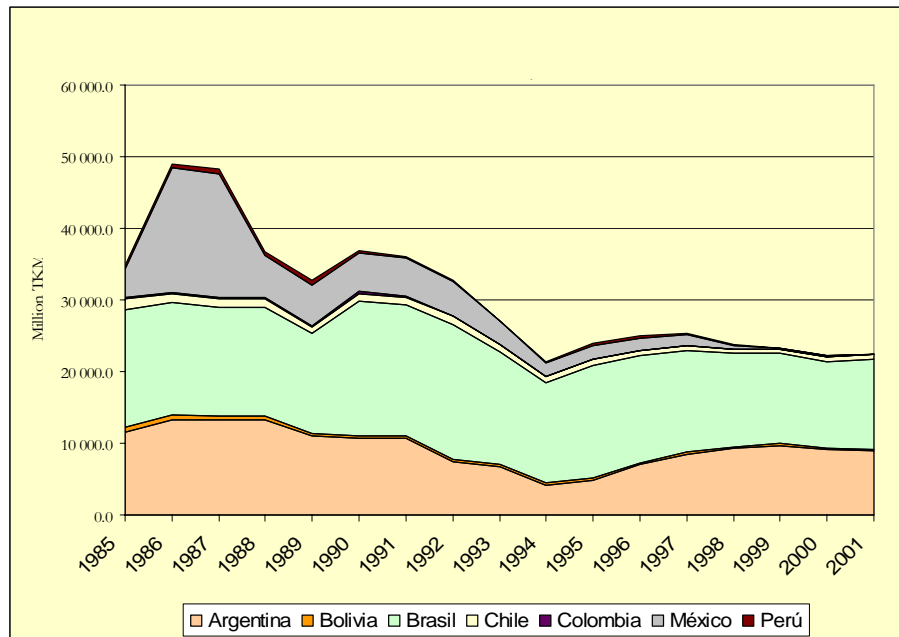
**Figure 1-8. Index of Latin America Railway Ton-Kilometers, Pre- and Post Concessioneing, 1985 to 2003.**



*Primary concession dates indicated by +.*

**Passenger Traffic.** The picture with regard to Latin American passenger traffic is similar to freight, except that the number of cases is much more limited. Over the 1990s, Mexico essentially eliminated rail passenger traffic prior to concessioning, passenger-kilometers declining from 15 percent of the total passenger-kilometers in the region to under 1 percent. Brazil now accounts for about 55 percent of total passenger kilometers and appears to have stabilized traffic declines.

**Figure 1-9. Railway Passenger Traffic (million PKM), Latin American Countries, 1985 to 2001.**



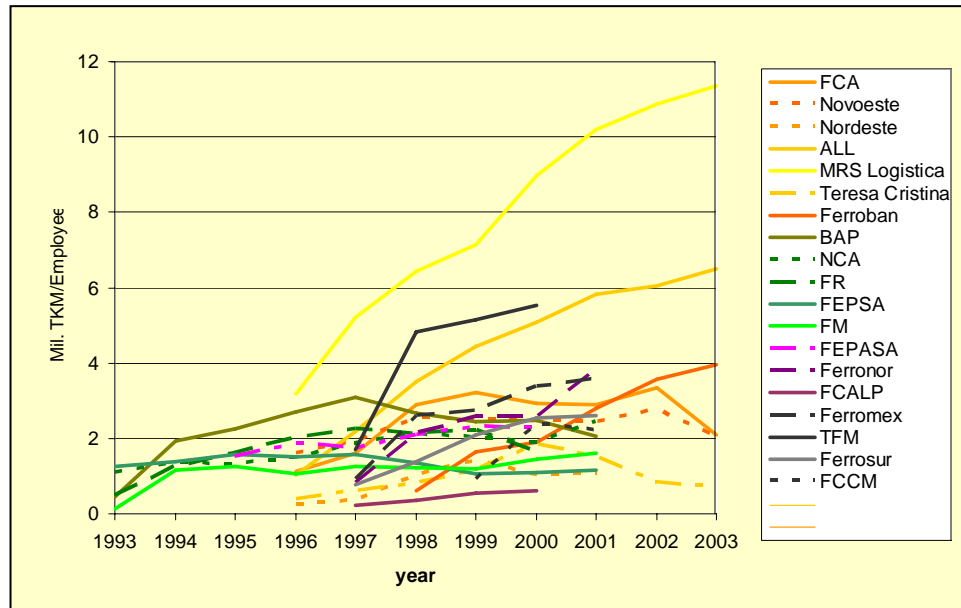
Argentina passenger concessioning has the most dramatic results, as was the case for freight, with concessioning having revived urban/suburban commuter services that were in sharp decline. (As noted in the country profiles, this revival was something of a mixed blessing, as the unanticipated increased ridership increased the Government subsidy requirements and strained concessionaire resources, again stirring controversy.) Argentina rail passenger kilometers now account for over 40 percent of the total for the entire region. As Figure 1-9 indicates, therefore, rail passenger service remains of major importance essentially only in Brazil, Argentina and, to a much lesser extent, Chile, with the great bulk of passenger volume being urban transit and suburban commuter services. Intercity rail has largely been eliminated except for a few scattered services.

### ***Productive Efficiency***

**Labor Productivity.** A number of partial measures of productive efficiency lead to the conclusion that stabilization and revival of Latin American rail traffic volumes are linked to productivity gains. Here, the most commonly available reference point is labor productivity. Figure 1-10 provides basic ton kilometers per employee data for some 19 different railways (seven in Brazil, five in Argentina, four in Mexico and three in Chile) with the remarkable result that 18 of the 19 showed distinct improvements over pre-concession ratios).<sup>6</sup> Labor efficiency gains tend to be particularly great in the early years when labor restructuring is the leading component of improvement and then taper off, or even modestly decline, after a few years, when staff sizes stabilize or even increase and traffic growth comprises a greater component of efficiency gains. It is worth noting that Brazil, the largest system (railways in shades of yellow-orange), has achieved the largest gains, with MRS Logística, a franchise with a large bulk commodity base in ore, steel, cement chemicals and agricultural products, achieving ton-kilometer per employee ratios similar to ratios achieved in the United States (the CVRD-affiliated railways, not shown on the graph, have similarly impressive labor productivity). On the other hand, Argentina concessions (lines in shades of green) have had much less improvement and include the only concession with a labor productivity decline.

<sup>6</sup> The sole exception was Ferropreso Pampeano, SA (FEPSA) in Argentina.

**Figure 1-10. Labor Productivity: Freight Rail Concessions in Brazil, Mexico, Argentina and Chile.**



The dramatic and widespread gains in labor efficiency by Latin American railway concessions have been noted by many analysts and recent developments do nothing to change that picture. Since 2001, traffic growth has been strong and, while current staffing data is now less easy to obtain in some concessions, every indication is that labor efficiency continues to rise. The uniformity of positive results makes the reality of these changes virtually impossible to deny. However, it should be noted that apart from some Brazilian franchises and, to some extent, Mexico, ratios remain much inferior to US standards, the improvements as much indicating the woeful overstaffing of previous State railways in the early 1990s as achievement of best practices.

This review takes note of the observation that labor productivity statistics may overstate efficiency gains to the extent that concessionaires shed non-core activities and then purchase required services from external suppliers. Such outsourcing has the effect of substituting non-labor inputs for labor inputs and, in theory, outsourcing could produce a large apparent gain in labor productivity while total factor productivity actually decreased. While available data do not permit an exhaustive investigation of this point, however, evidence suggests that overstatement of labor productivity gains is likely relatively minor. First, the total factor productivity and production function assessments that have been conducted reached the same conclusion of substantial efficiency gains. Beyond that, State-owned Latin American railways did not diversify into railway supply functions such as equipment manufacture and production of infrastructure components nearly as extensively as that elsewhere, notably in socialist countries. Railway performance of social safety net functions was also comparatively limited. Further, in the major concession programs there were major reductions of staff and curtailment of non-core functions by governments prior to concessioning. Consequently, post-concession labor efficiency gains appear genuinely reflective of gains in productive efficiency.

**Total Factor Productivity.** Only two analyses of total factor productivity in Latin American rail franchises were found, both conducted by Antonio Estache and colleagues.<sup>7</sup> Both strongly indicated that efficiency gains were also achieved in terms of total factor productivity. Estache et al., for example, developed the following results for Argentina's concessions:

<sup>7</sup> Estache, A., M. Gonzalez and L. Trujillo (2002), "What does Privatization do for Efficiency? Evidence from Argentina's and Brazil's Railways", *World Development*, 30, 11, pp. 1885-97.

**Table 1-1. Average Annual Rate of Productivity Change in Argentina's Railways.**

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

Source. Estache et al. (2002). (\*) FEP and NCA cover 1993 to 1999. FEV and TBA cover 1995 to 1999.

During the post concessioning period in the 1990s, TFP efficiency gains for Argentina were calculated as 9.8 percent for passenger concessions and 5.3 percent achieved for freight. Moreover, all passenger concessions had a positive TFP, as did all of the freight railway concessions except Ferropreso Pampeano (FEP in the above table), the same rail line with declines in labor productivity through 2001. Given the fact that Argentina does not stand out impressively in comparison with other countries in terms of labor efficiency gains, the TFP figures for Argentina strengthen the case that concessioning indeed has resulted in productive efficiency gains. Estache et al. also reported that four of Brazil's six concessions had positive TFP in the first two years of private operation (the data available at the time of his study).

Due to data availability on non-labor inputs and questions of comparability among national statistics, this review was unable to undertake a broader total factor productivity analysis across the seven nations reviewed or to update the earlier studies.<sup>8</sup> However, the uniformity of results of labor productivity results, TFP results and the production function assessment noted below leave little doubt that productive efficiency gains have been achieved post-concession.

**Production Function Assessment.** A recent (2004) Masters thesis by Anne Jones<sup>9</sup> has attempted to measure the technical efficiency of Latin American railways before and after concessioning using a production function analysis. The assessment, relying heavily on the World Bank database and covering 19 railways in five countries (five Argentinean, six Brazilian, three Chilean, two Bolivian and two Peruvian concessions) is a rigorous econometric assessment. While its methodology is too technical to summarize adequately in this short paper, the results reinforce the above conclusions. Employing a conventional production function analysis using the Cobb-Douglas form, the study controlled for time trend and country- and firm-specific effects. The results of the model indicated that improvements in technical efficiency occurred in *each* country in the study, not just in the sample in general. Results were statistically significant in each country except Peru, where there were the fewest years of post-privatization data.

#### **Measures Controlling for System Scope.**

A number of measures in the World Bank database involve relating input and output statistics to the length of rail routes. These are useful to employ in comparing rail networks of differing length or to control for systems that are expanding or contracting in system length. Examples include employees/km of route; traffic units/km of route; wagons/km of route, etc.). Measures related to system length, however, are not much use in assessing the efficiency of Latin American rail

<sup>8</sup> TFP computations are also notoriously controversial as to methodology and to adjustments necessary to take into account technological changes and to control for changes in input and output mix. In the US, proceedings concerning the proper way of computing railway productivity indices have continued for many years under the Interstate Commerce Commission and subsequently, Surface Transportation Board. The results remain controversial, even given a homogeneous railroad environment and rich database compiled under uniform rules.

<sup>9</sup> Anna Jones, "Measuring the Technical Efficiency of South American Railways before and After Privatization" University of Minnesota, 2004 (Masters Plan B Paper).

concessions, as kilometers have scarcely expanded or contracted since concessions were first let. Figure 11 demonstrates this dramatically.

**Figure 1-11. Route-Kilometers Since Concessioning.**



Route kilometers have mostly been frozen by the concessioning process (seeking to abandon concession lines is politically difficult and Governments with some exceptions – notably in Brazil and recently Chile – have not invested in line expansions). The figure does, however, vividly demonstrate that concessioning has *not* been a vehicle to expand railway infrastructure. Overall, Latin American and Caribbean rail trackage, according to UN-CEPAL data, has declined from 119,640 kilometers in 1990 to 106,589 kilometers in 2003, mostly due to abandonment of trackage not concessioned.<sup>10</sup> If expanded railway networks would be beneficial to regional economic development, concessioning has not had a discernible impact on that objective.

### **Allocative Efficiency**

The review sought to develop indicators of whether railway privatization or concessioning has contributed to an improved allocation of resources that has increased the net benefit from transport investment, including enhanced service quality through focusing rail investments on appropriate market segments. This proved, however, to be a difficult area in which to derive quantitative measures that contribute to a consensus and results are impressionistic and ambiguous.

Fiscal benefits to the Government and improvements in productive efficiency were clearly the primary objectives when railway concessioning was launched, with the former of greater importance where large deficits had been allowed to accumulate and the latter where public systems simply had been allowed to deteriorate. Allocative efficiency objectives appeared of secondary importance in all cases. Nevertheless, concessioning was accompanied in most instances by the replacement of administratively set tariffs by market-based pricing subject to rate caps (a notable exception being urban/suburban passenger rail where Government rate setting continued) and rates fell significantly and probably contributed somewhat to allocative efficiency. Louis Thompson calculated that for 18 concessions examined, all but two from Latin America, 16 had tariffs lower in 1999 than in the beginning year of concessioning. Applying the reductions achieved to the ton-km carried in 1999, he calculated that the countries involved were paying about PPP\$1 billion annually less in rail freight

<sup>10</sup> United Nations, Comisión Económica para América Latina y el Caribe (CEPAL), Anuario estadístico de América Latina y el Caribe, 2004.

charges than they would have paid had rail freight tariffs not fallen.<sup>11</sup> These rate changes, accompanied by some evidence of improvement in rail market share (Brazilian railways are estimated to have improved their share from 20 percent of freight traffic at time of concessioning to 24 percent in 2004) may be indicative of some improvement in allocative efficiency, but are hardly definitive. There have been significant recent rail rate increases in current terms in several countries, which may prove to be PPP increases as well. Moreover, the focus of much rail transport in Latin America is on limited sectors of the national economies, notably bulk products for export (agricultural products in Argentina, ore and agricultural products in Brazil, NAFTA exports in Mexico). This renders aggregate rail data particularly sensitive to shifts in product mix related to differential growth in the export and domestic sectors.

As will be observed in the individual country profiles, concessions in Latin America were acquired predominantly by local enterprises, many of which used the rail lines as shippers. External investment, especially investment by foreign transport companies was comparatively minor, although a few foreign companies have been passive investors and others have taken minority share holdings and provided management expertise. As concessions have evolved, foreign participants have dropped out in a number of cases, increasing the dominance of local control, with a few exceptions (such as Genesee and Wyoming's interests in Mexico and Bolivia and the recent acquisition of a controlling interest in Mexico's TFM by Kansas City Southern). The productive efficiency improvements noted above, coupled with declining rates and improved service, have no doubt benefited the shippers using the existing lines, who are sometimes shareholders. Again, this may represent an improvement in allocative efficiency, but there are certainly legitimate questions as to whether the allocation of resources resulting from the ownership profile of the concessions has been optimal.

### ***Investment in Rail System***

The assessment of investment growing out of concessioning is very much an issue of "how much is enough." According to the PPI database previously cited, Latin American railway investment commitments involving private sector participation totaled \$16.2 billion between 1991 and 2003; however, toll road projects were over double that amount \$34.3 billion. Argentina railway investment commitments have been high relative to toll roads and to other countries: \$5.3 billion rail versus \$4.6 billion on toll roads. Mexican investment commitments with private participation were \$3.9 billion rail; \$7.8 billion toll roads. Brazil's larger system saw \$6.1 billion investment commitments in rail, but \$12.2 billion in toll roads. Despite shortfalls, actual investments have not been trivial – in Brazil, some \$1.5 billion though 2004 with another \$3 billion forecast through 2008. This, however, is again in the context of sharply reduced public and total investment in surface transport relative to GDP from 1980s levels.

In those transactions where investment commitments were part of the concession contracts, concessionaires have failed to reach promised levels, requiring forgiveness or renegotiation. Argentina is the most notable example of this shortfall (see country discussion below), but indirect investment commitments made in Brazil were also unfulfilled. Investment in physical plant nonetheless has been sufficient to sustain significant rail sector traffic growth and anecdotal accounts support a conclusion that infrastructure and equipment quality is generally improved over the last years of public sector operation. At the same time, however, concessioning to the private sector has resulted in a narrowing of focus of railway investment. Whereas Latin America's public sector railways invested in marginal or money-losing services, private sector operators focused on profits have naturally put their money into infrastructure and equipment that generate positive returns, such as bulk transport and high volume container movements. Money-losing intercity passenger traffic has all but disappeared under concessioning, with such services that have continued operated in old equipment with minimal upgrading. Small volume domestic freight movements also appear to have received less attention, just as they have been deemphasized in private sector operations in the US and elsewhere.

While private sector investment appears to have preserved existing rail assets better than the public sector predecessors, its adequacy for modernization of infrastructure and equipment is less certain. There have been few programs to broaden gauges or upgrade track to dramatically improve capacity and improve train speeds. Consequently, it can be argued that, despite preservation of assets, Latin

---

<sup>11</sup> Louis S. Thompson, Karim-Jacques Budin and Antonio Estache, "Private Investment In Railways: Experience From South And North America, Africa And New Zealand" European Transport Conference, September 2001.

American rail concessions overall are falling further behind European and North American standards and that the technology employed is increasingly outdated. This lag, of course, cannot be attributed solely, or even principally, to a failure of private sector concessions, but clearly reflects weaknesses in transport demand and in national economies more broadly. Nonetheless, it is worth observing that there is very little evidence that concessioning of rail transport services results in supply-driven economic modernization except in some limited sectors – for example, bulk export services integrated with port operations in Brazil, automotive and container exports from Mexico to US markets or specialized tourist services, as in Peru.

### ***Accessibility and Affordability of the Rail System to Passenger and Freight Users***

A significant issue with respect to railway privatization/concessioning is whether “common carrier” services are reduced in favor of specialized services to selected users, for example, large corporations or extractive industries shipping in trainload quantities and wealthy passengers willing to pay for premium services. Critics claim, in effect, that the pattern of ownership in Latin American railway concessions results in a loss of allocative efficiency for small freight shippers, arguing that there has been a shift away from carrying small-scale freight, with shipper owners investing principally on investment in transport of their own bulk cargo for export markets and subsidizing their own traffic by discriminatory rates for other traffic. There has been some investigation of these claims both in Argentina and Brazil, but without definitive outcomes and the aggregate data available is insufficient to reach firm conclusions.

A 2003 paper by McKenzie and Mookherjee examined the impact of privatization in Latin America on consumers, workers and on the Government’s fiscal condition.<sup>12</sup> Their findings indicate significant Governmental fiscal improvements, with no evidence of significant consumer losses in these countries, no pattern of price increases, labor losses connected with downsizing minor in relation to the size of the aggregate labor force and no evidence of increased inequality or poverty following privatization of public utilities. This review, while not able to make a strong case that railway concessioning greatly promotes accessibility and poverty alleviation objectives, concurs in McKenzie and Mookherjee’s general findings that negative effects appear minor – largely because the predecessor State railways had deteriorated to the point that services were already badly constricted in scope prior to the concessioning transactions. The roughly 20 percent railway share of surface transport in Brazil represented perhaps the largest pre-concession rail sector share in Latin America, with rail shares extremely modest in most other countries.<sup>13</sup> Given the scant significance of the Latin American rail sector in national transport sectors prior to concessioning, there simply was little further erosion of accessibility and affordability that private management could accomplish.

That said, private sector rail management will be driven by profit-maximizing behavior: high priority will be placed on traffic generating high profit margins, lower priority on low margin traffic, and no priority on money-losing traffic unless supported by subsidy. If excess capacity is available, a private operator will seek lower margin business, but capacity constraints will drive the private operator to give preference to higher margin traffic, perhaps to the exclusion of profitable, but lower margin business. Private sector operation does not necessarily produce diversification, broader accessibility to those diverse services and greater affordability *unless* there is both adequate capacity and competitive incentives. With the notable exception of Mexico, Latin American rail concessions were not designed to create intramodal competition and attention has been focused on restoring a level of service necessary for the railway to retain or recapture core bulk business where an efficient railroad should have a competitive advantage over truck.

To the extent that the concessions have successfully preserved and expanded core bulk business, they have provided those shippers continued access to a rail alternative at prices sufficiently affordable to keep that traffic off the road. The scope of rail services, however, has not appreciably broadened – there is virtually no intercity passenger service, performance of subsidized suburban passenger services has been mixed, large bulk shippers for export and major domestic industries have benefited more than small domestic shippers and there has been little network expansion. This is essentially the

<sup>12</sup> David McKenzie and Dilip Mookherjee, “The Distributive Impact of Privatization in Latin America: Evidence from Four Countries” IED Discussion Paper 128, February 2003.

<sup>13</sup> Including such situations as Colombia, Costa Rica and Guatemala where most to all State rail lines had been closed.

same pattern as in North America after deregulation, where rail carriers have increased profitability by focusing resources on a narrower segment of surface transport where railways have greater comparative advantages. While concessions might arguably have been better designed to promote diversification of services and greater competition, that strategy likely would have required greater government intervention and investment, undermining somewhat the principal near-term objective of the concessioning process, relief of the State railway debt burden.

### ***Sustainability***

Many of the Latin American rail franchises have been financially shaky in their early years, a number showing up on “troubled company” rankings and being characterized as high risk for private financing. There has been a substantial turnover in shareholders in many of the concessions, some mergers and, a dropout of foreign company participation in some cases (such as RailTex in Brazil and RailAmerica in Chile). On the other hand, there has been little reduction in railway capacity, closure of branch lines, or bankruptcies of carriers. Not surprisingly, there is a wide range of financial performance based on the quality of the franchise itself and management capabilities. In Brazil, the CVRD- affiliated lines, MRS Logística, and America Latina Logística have been profitable, while FCA, Ferronorte, Tereza Cristina and Novoeste have experienced continuing difficulties. The same is true in Argentina, where concessions range from the well-performing Nuevo Central Argentino to the anemic Ferroexpreso Pampeano, or in Bolivia, divided between a strong and weak franchise. Nonetheless, none of the franchises has simply collapsed, requiring a takeover, and willing private sector partners have been found when restructuring has been required.

In retrospect, one can readily argue that a number of the concessions created too many franchises, especially since the separation of franchises was not designed to promote transport competition. The four weak Brazilian carriers might have better been combined with each other or other franchises and the eight Argentina commuter concessions certainly might have been reduced to a smaller number. While increasing the number of concessions and reducing their size could in principle have attracted smaller investors, experience suggests this was not necessary, as concessions resulted in firms investing in multiple franchises, with most awards made to consortia that included smaller investors even in the largest franchises. Overlapping ownership (the eight Argentina commuter concessions, for example, were acquired by only three consortia) and subsequent mergers have been a corrective to possibly excessive segmentation of franchises, but sustainability might have been enhanced by greater consolidation at the outset. Among other factors, finding adequate private sector railway and management expertise to operate over 40 new concessions in the course of a decade has been a challenge and especially so for the weaker franchises.

Looking to the future, sustainability of the existing rail network, and certainly its expansion and modernization is likely to require 1) a more active continuing public sector role than envisioned in the 1990s and 2) additional private sector consolidations, including more international affiliations on the model of America Latina Logística or the KCS “NAFTA Rail” development (candidates including Argentina-Chile, Argentina-Bolivia, Brazil-Bolivia, Central America and Central America-Mexico). Concession results to date support a conclusion that those franchises that are well structured to serve growing domestic or international transport requirements can be self-sustaining in the private sector. A significant part of Latin America rail infrastructure, however, was constructed to serve patterns of economic activity that have declined in importance or are now better served by road, or which require major upgrading of technology to make rail competitive. Where major adaptations or extensions of systems are necessary to serve contemporary needs, public investment often will be needed and modifications in the scope of existing franchises will be necessary to attract additional private sector interest. Recent developments in several countries point toward a more active public role in the rail sector. This, along with openness to concession restructuring and consolidation, enhances prospects for long-term sustainability.

## **2. INDIVIDUAL COUNTRY EXPERIENCES**

The following sections address concessioning experiences in the seven Latin American countries with multiple railway concessions: Argentina, Brazil, Mexico, Bolivia, Chile, Peru and Colombia. Two other countries, Panama and Guatemala have successfully concessioned a single rail property, while Costa Rica, El Salvador and Honduras have explored this path, but for various reasons not yet completed the process. As noted earlier, while there are a number of distinctive characteristics in individual country



programs, the strategies for achieving private sector participation in Latin American railways share many common features: the concessioning technique, retention of vertical integration in most cases, and creation of multiple geographic franchises. The World Bank was actively involved in most of the successful programs (least in Chile and Colombia), which may help account for some of the commonalities.

## 2.1 Argentina

By the end of the 1980s Ferrocarriles Argentinos, the State railway of Argentina, consolidating an array of rail lines nationalized in the late 1940s, had become the single largest drain on the Argentine national treasury, consuming an estimated US\$800 million to US\$1.4 billion annually. At the same time, Argentina freight volume fell to about ten million tons and passenger ridership also plummeted and could not justify such outlays. Driven principally by the need to reduce this subsidy burden, Argentina in 1989 passed its *State Reform and Public Enterprise Restructuring Law* that led to the concessioning of rail freight and commuter services of Ferrocarriles Argentinos in a number of separate geographically-based transactions.

Between 1991 and 1993, five freight concessions were let,<sup>14</sup> as follows:

**Table 2-1. Argentina Freight Railway Concessions**

Line Segment Designation	Concessionaire	Date Concessioned	Length of Line Concessioned (km)
Rosario-Bahia Blanca	Ferroexpreso Pampeano (FEP) <sup>15</sup>	November 1991	5,163
Mitre	Nuevo Central Argentino (NCA) <sup>16</sup>	December 1992	4,520
Roca	Ferrosur Roca (FER) <sup>17</sup>	March 1993	4,791
San Martin	Buenos Aires al Pacifico (BAP) <sup>18</sup>	August 1993	5,493
Urquiza	Ferrocarril Mesopotámico (MES) <sup>19</sup>	October 1993	2,751
<b>TOTAL</b>			<b>22,718</b>

The five freight concessions (shown on the map, Figure 2-4, at the end of this section) were each designed for a 30-year duration with an optional 10-year extension. Concessioning procedures favored local bidders as evidenced by the winners noted below.)

The key issues in bid evaluation and subsequent concession oversight were the combination of the “canon” (the fee paid by the private operator for use of State facilities and services), required concessionaire investment, quality of service provisions, rules regarding employment of the preexisting labor force, and access charges to other rail system users (for example, public or privately operated commuter/passenger services). Given their limited market share and vulnerability to truck competition, little attention was given to rate assurances, though Government retained regulatory oversight. The most troublesome criterion would prove to be the requirement for a contractual investment commitment. Investment promises proved to be greatly in excess of subsequent outlays, generating a wide range of explanations from sheer dishonesty on the part of bidders to flaws in the bidding process. It is now generally acknowledged that demand was greatly overestimated by bidders in Argentina compared to Brazil and other Latin American countries, and that Argentina’s rail markets simply did not generate the revenues to support the agreed investment levels, even though traffic levels rose sharply. In retrospect, the cause of pre-concession railway decline in Argentina may have been over-attributed to government mismanagement relative to greater structural problems in the

<sup>14</sup> A sixth concession offer, for the meter gauge Belgrano line, failed to attract bidders. With a poor traffic outlook and major rehabilitation requirements, private sector interest has been minimal. Subsequent efforts to establish a viable concession were initiated in 1998 and 2004. The concession remains unresolved.

<sup>15</sup> Conifer consortium of Argentine and US investors.

<sup>16</sup> 65 percent Aceitura General Deheza (oilseed producer).

<sup>17</sup> 65 percent Loma Negra (Argentine cement firm).

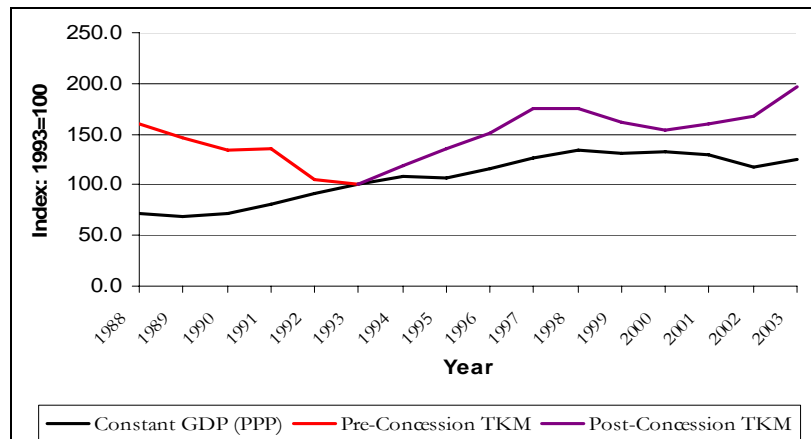
<sup>18</sup> 65 percent Industrias Metalurgicas Pescarmona (Argentine industrial firm); majority interest later acquired by America Latina Logistica. Minority interest, US railway operator Railroad Development Corp.

<sup>19</sup> 70 percent Industrias Metalurgicas Pescarmona (Argentine industrial firm); majority interest later acquired by America Latina Logistica. Minority interest, US railway operator Railroad Development Corp.

economy and that, combined with bidding incentives to overstate prospects and some hubris concerning the impact of private sector management per se, produced unrealizable commitments. That is, a combination of the bidding process encouraging bidders to “push the envelope” of best case scenarios, gross overestimation of pending expansion in the Argentine economy, and – in this first major set of railway concession transactions – arrogance as to what private sector management alone could accomplish, probably contributed to the extreme commitments. Whether or not there was also a cynical dismissal of the enforceability of the commitments, unenforceability in fact has proved to be the case. As a result, continuous and contentious contract renegotiations have plagued the Argentine railway concessions for a dozen years without resolution, while governments and private sector bidders in later Latin American concessions both approached investment commitments more cautiously and have avoided some (but by no means all) renegotiation disruptions.

Viewed in terms of freight traffic volume (Figure 1-7, earlier), the Argentina freight concessions appeared in the near term to be an overwhelming success as total tonnage increased from the 10.2 million ton/5.9 billion ton-kilometer levels in 1992 to about 18.9 million tons and 9.8 billion ton-kilometers in 1997. However, as noted previously, the record of Argentina railway performance has substantially followed trends in the economy as a whole, but with exaggerated effect. From the late 1980s through 1992, the Argentine economy, suffering from runaway inflation (over 5000 percent in 1989), stagnated performed badly and railway traffic had slumped sharply along with it. Ferrocarriles Argentinos carried some 13.3 billion ton-kilometers as recently as 1983 and still 9.0 billion ton-kilometers in 1988. While the economy stagnated after 1988 and with dissolution of FA in prospect, rail traffic plummeted. In 1991, new government policies began to get inflation under control and from 1993 through 1998 (with the exception of a brief slump in 1995) the economy boomed and the new concessions not only shared in, but outstripped that growth. Following on the financial crises in Asia, the Soviet Union, and finally Brazil, the Argentine economy went into a deep recession in 1999, leading to a crisis in interest rates, debt and capital flight which only grew worse from 2000 into 2002, when the Argentine economy contracted by 11 percent. The new concessions performed even worse. The second five years after the start of concessioning reflected the shaky economy – Argentine freight rail traffic declined to 8.9 billion ton kilometers in 2000-2001, below 1988 levels. Since 2002, however, the Argentina economy has again rebounded and, once again, railway traffic responded strongly. Ton kilometers reached over 11.6 billion in 2004. To illustrate, the table below compares GDP (constant PPP) and rail ton-kilometers over this period.

**Figure 2-1. Argentina: Indices of Pre- and Post-Concession TKM vs. Constant GDP**

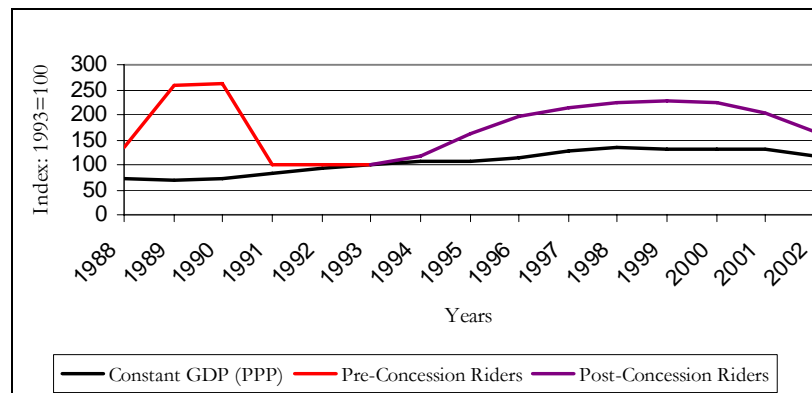


In the passenger sector, almost 20 percent of the Ferrocarriles Argentinos subsidy or around \$200 million annually, went towards covering the operating deficit for Buenos Aires suburban rail services. In addition, the subway required an estimated US\$40 million per year in operating subsidies, while deteriorating service had led to a sharp decline in patronage in both subway and suburban service. Consequently, within the two years following the freight rail concessions, Buenos Aires commuter services were concessioned in seven lots (plus the subway network) to four private sector operators, as per the following table:

**Table 2-2. Argentina Commuter Railway Concessions**

Line Segment designation	Concessionaire	Date Concessioned	Length of Line Concessioned (km)
Urquiza	Metrovias	April 1994	25.6
Subway	Metrovias	April 1994	44.1
Belgrano Norte	Ferrovias	April 1994	51.9
San Marin	Metropolitano	April 1994	55.4
Belgrano Sur	Metropolitano	May 1994	58.4
Roca	Metropolitano	January 1995	252.4
Mitre	Trenes de Buenos Aires	May 1995	182.1
Sarmiento	Trenes de Buenos Aires	May 1995	166.6

In contrast to the freight concessions, the Argentina commuter concessions were for significantly shorter time periods (20 years, with a possible 10-year extension for Metrovias; 10 years with a possible 10 year extension for the others). As in the case of the freight concessions, immediate post-concession increases in passenger traffic volume outpaced growth in the economy, but ridership declined more rapidly than the economy when the economy slumped. Tariffs in passenger services remain controlled by Government, with close monitoring of service performance and an array of penalties for not meeting standards. While space does not permit detailed review of these urban/suburban concessions in Argentina (or in Brazil), it must be noted that they exist in a highly regulated environment in which the concessionaires can only partly respond to market incentives. While adopting the concession format, the passenger concessions retain many features of a regulated public utility, rather than a market-driven commercial enterprise.

**Figure 2-2. Indices of Pre- and Post-Concession Rail Ridership vs. Constant GDP.**

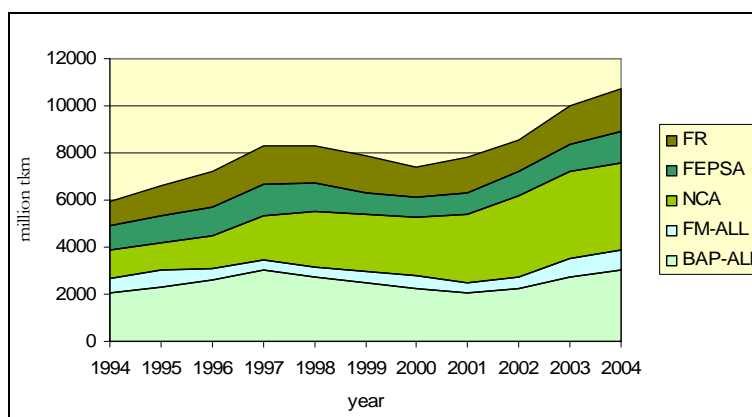
As of January 2005, Argentina's main freight concessions have thus been in operation for over ten years and the principal commuter operations for about ten years. As might be expected from the severe fluctuations in the Argentine economy and railway traffic volumes, concession operators have had some serious financial difficulties and some companies have restructured. The most dramatic of these was the acquisition in early 1999 of the lead investor's shares of Buenos Aires Al Pacífico (BAP) and Ferrocarril Mesopotámico (MES) by the investors in adjacent southern Brazil concession, Ferrovia Sul Atlântico.<sup>20</sup> The operation was renamed America Latina Logística (ALL), and the component concessions (all legally separate companies) designated as ALL Central, ALL Mesopotámico and ALL Brazil, creating a combined transnational network of almost 15,000 kilometers (in 2003, moving about 27 million tons).

As can be seen in Figure 2-3, the Argentine freight concessions have varied substantially in their ability to attract traffic, with total growth reflecting the volatility discussed earlier. Generally, the larger volume concessions have performed better than the smaller franchises, with the clear leader

<sup>20</sup> Industrias Metalúrgicas Pescarmona (IMPESA) held shares in both BAP and MES that were purchased by ALL. The American company Railroad Development Corporation had minority shares in BAP and was the chosen operator for BAP and MES and provided operational expertise, but is not the operator of ALL-Brasil. Each of the three components thus has a different shareholder makeup and operational arrangement.

being Nuevo Central Argentino (NCA). Buenos Aires al Pacífico (BAP) and Ferrocarril Mesopotámico (FM) had mediocre records until merged with ALL and are now in their fourth year of expansion.

**Figure 2-3. Argentina Railways Traffic Growth Since Concessioneing.**



The results of the Argentina railway concessioning can be evaluated quite differently, depending on whether the criteria are performance versus the promises and expectations at the time of concessioning or are performance versus the prior performance of the State railway, Ferrocarriles Argentinos. Judged by the first standard, performance may well be described as disappointing. The winning bidders had each submitted an investment plan that was a major factor in their selection. As shown in the following table, as of 2002, investments of all of the freight concessions have been far short of commitments made at the time of concessioning. On the other hand, it is difficult to argue that the level of business from the Argentina concessions has merited a larger investment commitment. While traffic has increased substantially, the total for all five Argentina freight concessions *combined* reached some 20 million tons only in 2003 – a level about equal to the ALL-Brazil concession and about 25 percent of Brazil's MRS Logística concession. As of 2003-4, ALL Brazil had invested about \$220 million and MRS Logística about 293 million.<sup>21</sup> By these benchmarks, the \$358 million actually invested by the Argentine freight concessions does not appear especially low in relation to business opportunities. Further, the percentage of revenues devoted to investment by Argentina's concessionaires has been shown to be higher than for US railroads.<sup>22</sup>

**Table 2-3. Argentine Freight Concession Compliance with Investment Commitments, 2002.**

	NCA	BAP/ALL	MES/ALL	FR	FEPSA
Presented in bid (\$ millions)	239.0	273.3	41.2	121.8	172.5
Realized (\$ millions)	92.0	101.5	15.9	78.4	69.8
Percent Overall Compliance	38 %	37%	39%	64%	39%

Source. *Comision de Renegociacion de Contratos de Obras y Servicios Publicos, Resolución 158/2002.*

The problems confronted in the passenger markets in Argentina have been twofold. First, with regard to intercity passenger transport, those provinces that elected to continue services (mostly in Buenos Aires province and routes served by FEPSA), have simply not paid the access fees per the concession agreements, arguing that concessionaires have not made the investments required to enable proper passenger service to be offered. Second, and of larger financial significance, in contrast to disappointing freight volumes (at least in terms of bidder projections), suburban/urban passenger services revived much more substantially than anticipated. Unlike the freight concessions, where infrastructure investments were the responsibilities of the concessionaires, basic infrastructure

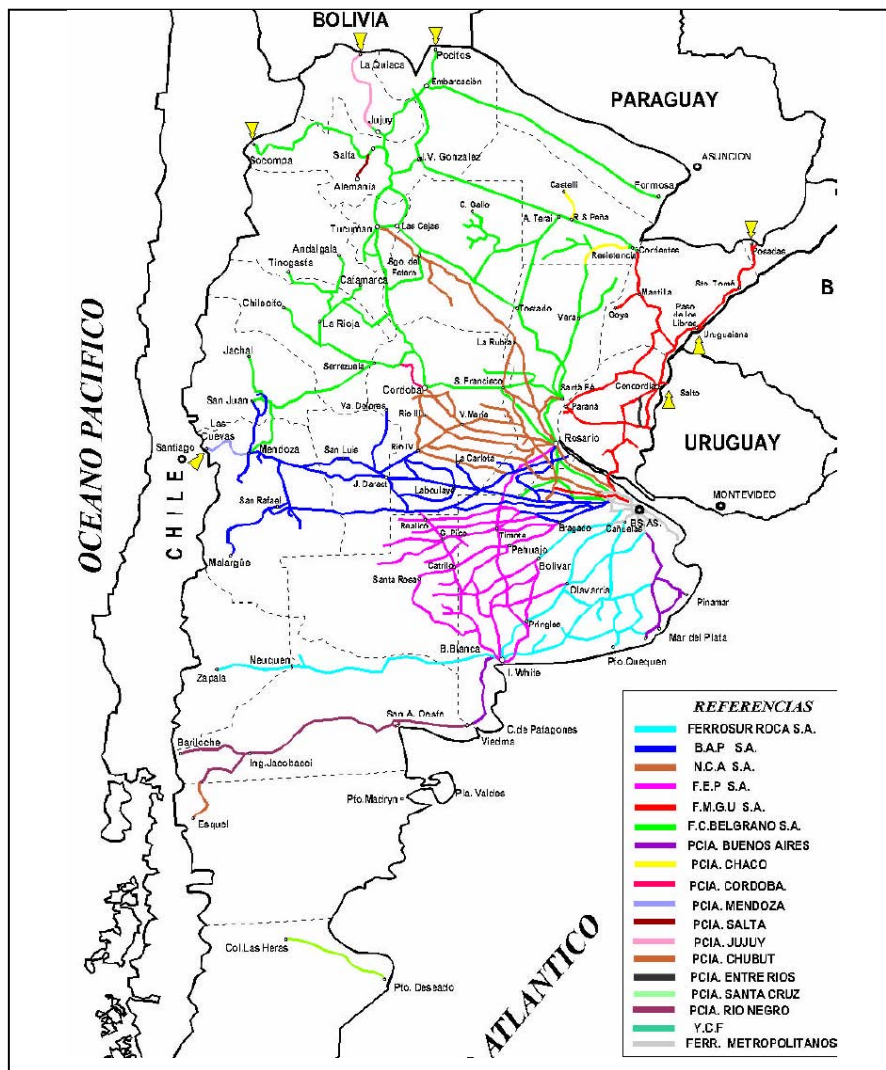
<sup>21</sup> Constant Dec 31, 2003 dollars, except TFM (which overstates its investment). Sources: Agência Nacional de Transportes Terrestres, Brazil.

<sup>22</sup> Louis S. Thompson "Investment Issues and Analysis in Concessioneing Railways: Experience in the Argentine Freight Concessioneing, World Bank, 2001.

investments were to be made by the Government and implemented by the concessionaire; Government controlled rates and had substantial powers to impose fines for failure to meet quality targets and other factors. Unexpected ridership increases resulted in a greater National Government investment and subsidy burden, and with provincial and municipal interests added to the mix, the concession strategy created the preconditions for an extremely contentious environment.

The Argentina experience raises some important questions as concerns the roles of the market versus government regulation in a concession environment. As noted by Javier Campos-Mendez et al.,<sup>23</sup> Argentina's "rail concession contracts [were] intended to be very specific about the way in which tariffs, quality, investment, exclusivity, etc. would have to evolve over time." In other words, the strategy was privatization, *but not deregulation*. In fact, regulation has not been very effective in the freight sector and those concessions have had considerable freedom in pricing and service options, while passenger regulation is arguably over-intrusive. Some of the difficulties encountered in Argentina, however, appear due to the tension between a continuing a continuing public sector preference for more active regulation and a distinct preference from operators and investors for light regulatory oversight – a tension that has yet to be resolved.

Figure 2-4. Map of Argentina Railway Concessions.



<sup>23</sup> Campos, Javier, Estache, Antonio and Trujillo, Lourdes "Processes, Information and Accounting Gaps in the Regulation of Argentina's Private Railways," 2001.

## 2.2 Brazil

Also compelled largely by the need to reduce the subsidy burden, amounting to approximately \$300 million annually, Brazil in 1992 began to develop a concessioning process modeled largely on the Argentina experience, although structured in a somewhat more complex fashion. The concessioning design was completed in 1995 and concessions let over the next two years. As in the case of Argentina, the terms of freight railway concessions were set at 30 years, but with extensions possible for another 30 years.

Between 1996 and 1998, six freight concessions were developed from the Federal railway (Rede Ferroviária Federal) and one from the Sao Paulo State railway, as follows:

**Table 2-4. Brazil Freight Railway Concessions.**

Segment	Concessionaire	Date Concessioned	Length of Line Concessioned (km)
Oeste	Ferrovias Novoeste <sup>24</sup>	July 1996	1,621
Centro-Leste	Ferrovias Centro Atlântico (FCA) <sup>25</sup>	September 1996	7,080
Sudeste	MRS Logística <sup>26</sup>	December 1996	1,674
Tereza Cristina	Tereza Cristina <sup>27</sup>	February 1997	164
Sul	Ferrovias Sul Atlântico (FSA) <sup>28</sup>	March 1997	6,586
FEPASA (former Sao Paulo State railway)	Ferrovias Bandeirantes (Ferrobán) <sup>29</sup>	December, 1997	4,236
Nordeste	Ferrovias Nordeste(FCN) <sup>30</sup>	January 1998	4,534
<b>TOTAL</b>			<b>25,895</b>

In addition, the huge State mining and industrial enterprise, Copanhia Vale de Rio Doce (CVRD) was privatized in June 1997, along with its two private rail lines serving its own traffic: Estrado de Ferro Vitória a Minas (EFVM) and Estrada de Ferro Carajás (EFC). As of 2005, there is thus 7-8 years of experience with private sector operations on the main freight lines in Brazil.

As in the case of Argentina, a huge contribution to the labor productivity of the new concessions was made by the Government in advance of concessioning. Prior to finalizing a concessioning strategy, the State railway, RFFSA, had reduced staff from 110,000 in 1975 to 42,000 in 1995. Then, prior to transfer to the private operators, that number was almost halved, to 23,712. The new concessions thus began life with only some 22 percent of the labor force that RFFSA had at its peak.<sup>31</sup> Concessionaires, in turn, reduced staff numbers to 8,951 by 2001, only 37 percent of the employees they initially absorbed and about 8 percent of RFFSA at its peak.

As in Argentina, there has been a range of experience in the ability of concessioned railways to attract traffic (Figure 2-5). Again, the larger railroads, MRS Logística followed by ALL, have been more successful. (The large CVRD affiliates, not pictured, would reinforce this finding.) Those railways are also leaders in profitability and labor productivity and the results suggest that the larger railroads are able to take advantage of economies of scale or size in their transport operations, the same conclusion that led to the United States railway mergers of the 1980s and 90s.

<sup>24</sup> Consortium of Brazilian investors and US Noel Group.

<sup>25</sup> Tacuma mining, National Metallurgical Company (Brazil), other Brazilian interests including CVRD, RailTex (US, sold interest), Ralph partners (US).

<sup>26</sup> Brazilian concerns MBR, Ferteco Mineração, and four steel companies.

<sup>27</sup> Brazilian consortium.

<sup>28</sup> Banco Garantia, Judore, Interferrea, Ralph Partners (US) and RailTex, which sold interest.

<sup>29</sup> Brazilian investors including CVRD.

<sup>30</sup> Brazilian consortium, led by Taquari and including CVRD.

<sup>31</sup> Antonio Estache, Jose Antonio Schmitt de Azevedo and Evelyn Sydenstricker, Labor Redundancy, Retraining and Outplacement during Privatization: The Experience of Brazil's Federal Railway (200) pp. 3 and 14.

**Figure 2-5. Brazilian Railway Traffic Growth Since Concessioneing.**

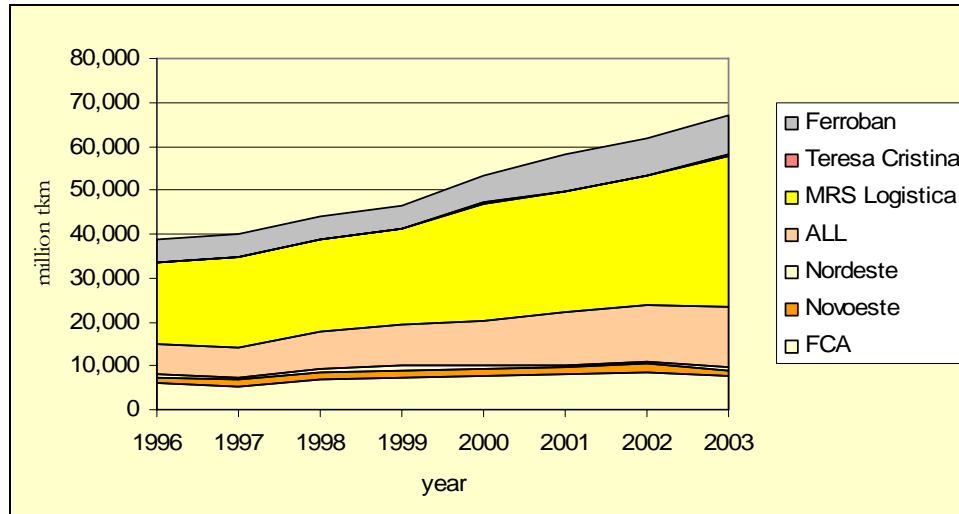
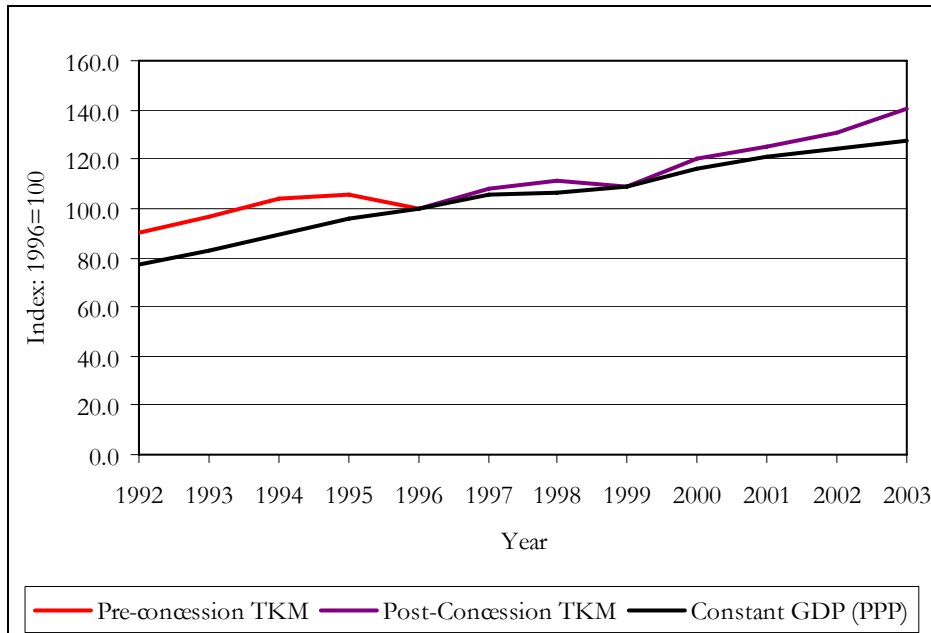


Figure 2-6 indicates that after an initial period in which concession traffic growth did not outperform GDP expansion seems to be accelerating. That growth is led by the larger franchises shown in the preceding chart.

**Figure 2-6. Brazil: Indices of Pre- and Post-concession TKM vs. Constant GDP.**



In the passenger sector, Brazilian experience, as in Argentina, focused on urban transit, specifically Rio de Janeiro. Budget deficits and the need to reduce state subsidies to the city subway and commuter rail (Flumitrens) led to the concessioning decision. The Rio de Janeiro metro system was concessioned in December 1997 to a consortium (Consórcio Oportrans), including Cometrans, the owner of the Mitre and Sarmiento passenger rail concessions in Buenos Aires. Operational control was transferred in April 1998. The Flumitrens concession was signed in July 1998 and went into effect in November 1998, so there is now about six years experience with these concessions.

**Table 2-5. Brazil Passenger Railway/Urban Transit Concessions.**

Line Segment Designation	Concessionaire	Date Concessioned	Length of Line Concessioned (km)
Metrô Rio (Rio de Janeiro subway)	Consórcio Opportrans	April 1998	41
CBTU commuter rail line	Supervia	November 1998	220

As in Argentina, both Brazilian passenger and freight railway concessions have been faulted for not living up to their investment commitments (here, indirect and derived from output targets and safety commitments). There has nonetheless been a continuing stream of investments from concessionaires, which rose from an annual average of 780 million Brazilian Real in 1997-2000 to 1,125 million in 2001-2004; a fairly stable investment flow after taking inflation into account. Overall, private investors claim to have invested about \$1.5 billion in the rail network and project spending another \$3 billion by 2008.

The great bulk of the Brazilian rail network was concessioned in the 1996-98 period, but the Federal Government has increasingly recognized that public support is required for network expansion. It has therefore sponsored, for example, *Ferrovias Norte Sul*, a 2,200km federal project of some US\$1.6 billion to link agricultural areas of the interior to the coast, though due to funding limitations only some 215 kilometers has been completed to date. Government is currently seeking private sector investment partners to participate in the project. Lower priority projects necessary to improve agriculture export capacity were initially left to concessionaires, but the fragile financial state of many concessionaires forestalled implementation of these projects.

Recognizing that the concessionaires were not in a position to invest in line expansions, in May 2003 the Ministry of Transport announced a rail revitalization plan intended to stimulate increased private investment by modifications to regulatory framework, and by restructuring concessions to permit government expenditure alongside private investment in order to stimulate expansions. One such project was expected to be a rail cargo bypass line ("rail beltway") around the city of São Paulo with participation of the Federal Government, state of São Paulo and private sector concessionaires (MRS Logística and Ferrobán). Similarly, the Nordeste (CFN) concession is discussing a potential line extension ("Transnordestina") to involve Governmental participation and concessionary funding from the Brazilian development bank, BNDES.

BNDES is playing an increasing role in the more troubled concession arrangements, in May 2005 announcing its equity participation in restructuring *Brasil Ferrovias* Group. *Brasil Ferrovias*, in previous restructurings came to administer three railways services—*Ferromonte*, *Ferrobán* and *Novoeste*—and two new projects—*Nova Brasil Ferrovias* and *Novoeste Brasil*. The restructuring will create two entities; the first, in which BNDES will participate, will control the standard gauge lines, *Ferromonte* and *Ferrobán*. The second will control *Novoeste*, which will operate the narrow gauge corridors. This will restore Government participation where the BNDES already has credits and which concentrates most of the cargo volume and the best financial performance. Investments in the narrow gauge routes, operated by *Novoeste*, will be executed with resources from current shareholders, largely pension funds.<sup>32</sup> Agência Nacional de Transportes Terrestres (ANTF), which is responsible for concession oversight, now expects that Government, through BNDES and other vehicles will commit some \$1.6 billion through 2008 to rail projects beyond the concessionaire funding noted previously. In Brazil, any vision that the rail sector could be converted to exclusive private sector funding is at an end.

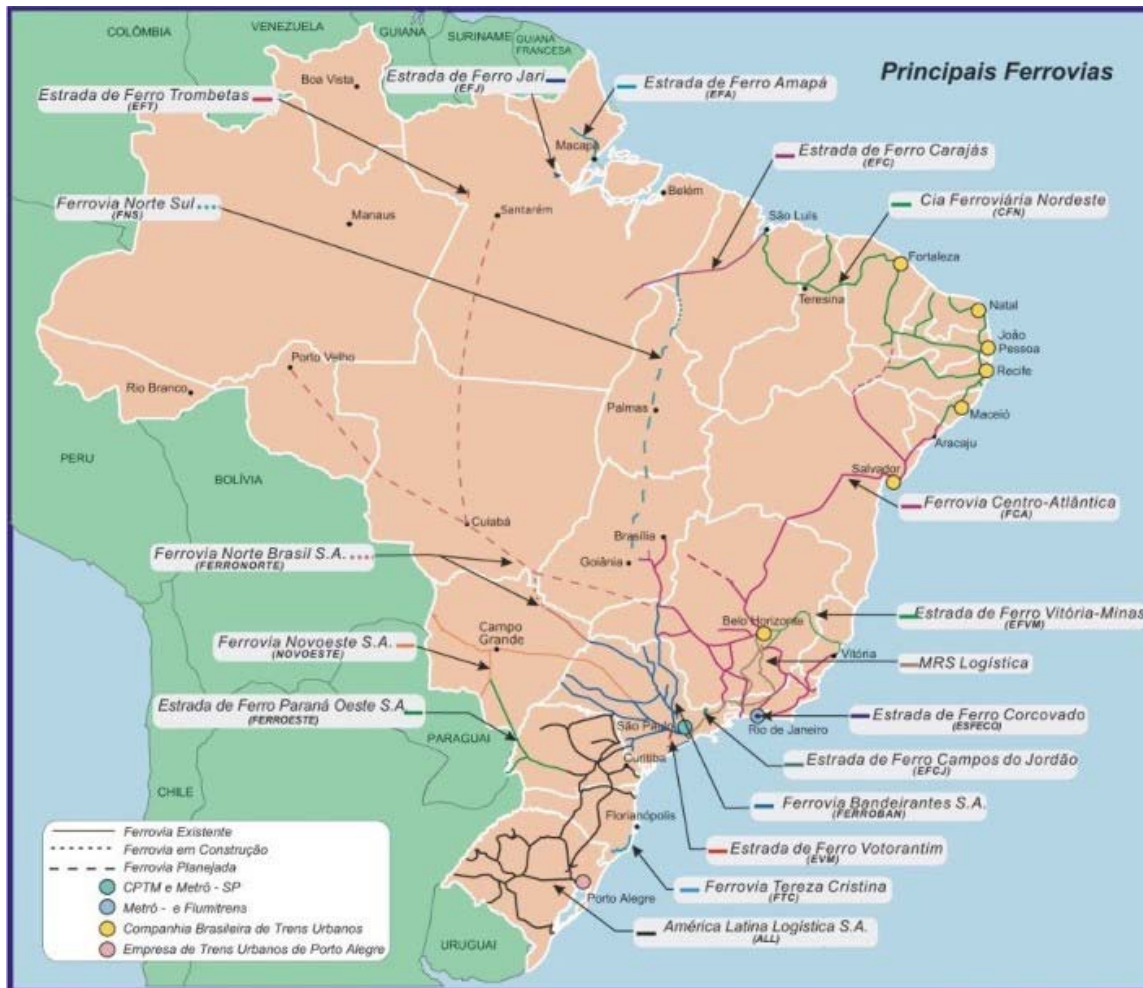
There have been a number of changes in freight railway ownership affiliations since concessioning. The *Novoeste* concession merged with other São Paulo based railways to create *Brasil Ferrovias*. Perhaps equally significant is the affiliation of *Ferrovias Sul Atlântico* with Argentine concessions *Buenos Aires al Pacífico* and *Ferrocarril Mesopotamia* and subsequent name change to *América Latina Logística do Brasil*. The current restructuring of *Brasil Ferrovias* under the leadership of BNDES is another major development. It suggests that while operation of the existing franchise configurations under exclusive private sector operation may be sustainable, major upgrades to system capacity do

<sup>32</sup> Shareholders are Previ (20.8 percent), Funcef (20.8 percent), Constran (18.6 percent), LAIF (17.7 percent), Bradesco (4.11 percent), BRB (6.47 percent), JP Morgan (5.5 percent) and others.



require public sector participation, now in Latin America as they have historically throughout the world.

Figure 2-7. Brazil Railways.



### 2.3 Mexico

Freight railway concessioning in Mexico began at about the same time as in Brazil, but stretched out over a somewhat longer period, with nine line segments concessioned to some six private operators. Motivations for concessioning were similar to that elsewhere in Latin America: Ferrocarriles Nacional de Mexico (FNM) was running a deficit averaging about US\$400 million a year prior to concessioning and accounted for about 5 percent of Mexico's internal debt. To remove this burden, in 1995 constitutional provisions that declared railway transport an activity exclusive of the State were amended and a railway regulation law setting out the terms for concessioning was passed.

After discarding some alternative proposals, the scheme chosen for privatization was similar to those of Argentina and Brazil – The Secretaría de Comunicaciones y Transportes (SCT), which assumed lead responsibility for the concessioning, divided FNM's assets into a number of route-based concessions largely following pre-existing regional divisions. These divisions operated less autonomously than those in Brazil, however, and there was greater need to eliminate uneconomic segments from the concessions, so preparing the packages took longer than in Brazil. Each of these concessions was given a 50-year term that could be extended for up to an additional 50-years. In general, concessionaires were allowed to operate freely 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 were transferred to each concession.

Vertical integration of the different functions or services in FNM was preserved, although functions could be outsourced if it was deemed necessary. As shown below, the process was largely completed between 1997 and 1999 and there is now some 5-8 years of experience with the Mexico freight concessions.

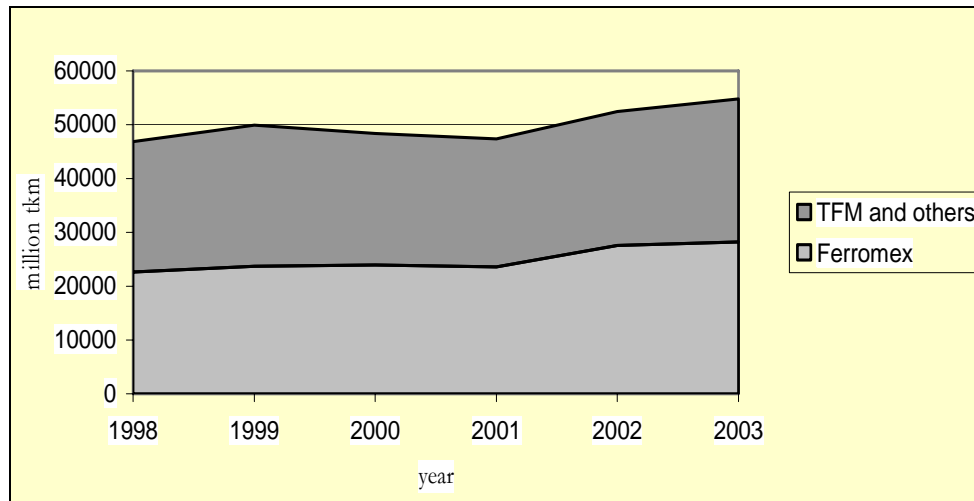
**Table 2-6. Mexico Freight Railway Concessions.**

Line Segment Designation	Concessionaire	Date Concessioned	Length of Line Concessioned (km)
Northeast	Transportación Ferroviaria Mexicana (TFM)	December 1996	4,283
Mexico City terminal lines	Terminal Ferroviaria del Valle de México (TFVM)	December 1996	297
North Pacific	Ferrocarril Mexicano (Ferromex)	June 1997	7,164
Ojinanga-Topolobango	Ferrocarril Mexicano (Ferromex)	June 1997	943
Coahila-Durango	GAN/Peñoles	November 1997	974
Southeast	Ferrocarril del Sureste (Ferro-sur)	June 1998	1,479
Chiapas-Mayab	Unidad Ferroviaria Chiapas-Mayab	August 1999	1,550
Southeast short line	Ferrocarril Mexicano (Ferromex)	August 1999	320
Nacozari	Ferrovias Nordeste (from State of Baja California)	April 2000	71

The Northeast segment was seen as the most valuable concession (carrying over a third of all Mexico rail cargo) and was won by Grupo Transportación Ferroviaria Mexicana (TFM), a consortium of Grupo TMM, formerly Transportación Marítima Mexicana, (37.7 percent), KCS (37 percent), FNM (the Mexican government, 24.5 percent) and Grupo Servia, TMM's parent company (0.8 percent).. The next most desirable segment and with comparable traffic volumes was the North Pacific property, which was acquired by the Grupo Ferroviario Mexicano (Ferromex) consortium involving the mining company Grupo Mexico (74 percent) and Union Pacific (26 percent). The third major property, with less than half the traffic of the first two, was Ferrocarriles del Sureste (Ferro-sur), acquired by Tribasa, a construction company, which later sold its shares to investors, Grupo Financiero Inbursa and Grupo Frisco. The Mexico City terminal railway (TFVM) was established to assure competitive access to the metropolitan area and is jointly owned by the above three carriers and the Mexican Government (which interest may be conveyed to a future suburban passenger carrier). Of the rest, the most important is Ferrocarriles Chiapas-Mayab S.A. de C.V. (FCCM) is a regional carrier located within the Yucatan and other southern Mexico states. It has only about a tenth of the traffic volume of TFM or Ferromex. The US shortline operator, Genesee and Wyoming, became a major investor in that property.

SCT does not disseminate as extensive or detailed reporting as ministries and regulators of some other Latin American countries.<sup>33</sup> However, available information indicates, as shown on Figure 2-8, that growth has occurred, but has been relatively modest compared to the larger franchises in Argentina and Brazil. Timing is again a critical factor. Traffic on the two large Mexican carriers is closely linked to export demand in the US and the economic weakness in the post 9/11 period inhibited early expansion.

<sup>33</sup> Ferromex, TFM and TFVM are "special members" of the Association of American Railroads and provide some reporting to that body.

**Figure 2-8. Mexico Railway Traffic Growth Since Concessioneing.**

Note. Separate data on TFM not reported by SCT.

Mexico paid considerable attention to designing its concessions to protect competition. The competition commission participated actively in the privatization process and the development of the regulatory framework in an effort to head off potential problems before they arose. The railroad concessions were divided into regional networks, each sold to different interests, and the Comision Federal de Competencia (CFC) screened bidders for issues potentially harmful to competition before the privatization. Particular care was given to avoid cross-holding and cross-subsidization between the new owners of the regional lines (in contrast to Brazil), with the latter issue deemed important in terms of preserving competition with other forms of ground transport. CFC claims a “radical improvement in the efficiency rates of railroad operations” because of this approach, although there have been complications arising from vague aspects of the rules regarding financial terms for right-of-way access that have undermined the extent of competition in the sector. More recently, the CFC has acted to protect the integrity of competition in the railroad industry by blocking a 2002 merger proposal between Ferromex and Ferrosur, rejecting arguments of efficiency and alternative forms of competition that were proposed by the solicitants. In 2003, however, the Commission did provide its blessing to the proposed purchase of TFM, by US-based Kansas City Southern, as noted below.

As with concessioning programs elsewhere in Latin America, the Mexico program has not been free of disputes. TFM has been engaged in litigation with the Government essentially from the date of takeover relating to whether the concession have complied with all of the legal obligations they assumed during the process of the privatization and to the application of the value added tax (“VAT”) and refunds thereon.

As in the cases of Argentina and Brazil there have been a number of changes in ownership structure of Mexican concessions since awards were made. Similar to those cases, and of even greater potential import, the most significant of these was a transnational affiliation. As of April 1, 2005, Grupo TMM transferred the controlling interest in TFM to Kansas City Southern (KCS), forming the so-called “NAFTA Railroad” linking TFM, KCS and The Texas Mexican Railway Company (TexMex) under common overall leadership, creating a seamless transportation corridor that promises to increase the preeminent position of TFM in Mexico-US traffic.

Concessionaire investments in Mexico have been substantial and have received much less negative criticism than in Argentina and to a lesser extent Brazil. Driven by growth in the NAFTA market, TFM, for example, claims investing over \$1.2 billion in its concession, including \$285 million in infrastructure, \$360 million in locomotives and \$350 million in freight wagons. Ferromex also documents major investments. Combined TFM and Ferromex investment in 2005 alone has been estimated to be \$240 million.

**Figure 2-9. Map of Mexico Railway Concessions.**

## 2.4 Bolivia

The national railway company of Bolivia (ENFE, Empresa Nacional de Ferrocarriles) was concessioned for essentially the same reasons as the larger systems discussed above. By 1995, partly due to State price controls, ENFE had an outstanding debt of US\$ 240 million and operating costs exceeded operating income by a wide margin. Rail freight transport had declined from almost 50 percent of total cargo to only about eight percent in 1992. Bringing in private sector participation was conceived, following the Argentina experience, as a solution to this crisis.

ENFE had been created in the 1960s by merging an old privately owned railway (the "Andina") in western Bolivia with the more recently Government-built eastern rail lines ("Oriental"), constructed to connect Bolivia's agricultural plane to Brazil and Argentina and their Atlantic ports; The two segments are quite different. The Andina lines in the West traversed the mountains to Pacific ports, while the Oriental lines served Bolivia's substantial soybean production region. Not surprisingly, therefore, the Bolivia transaction created two separate companies based on the above divisions. Each company was assigned assets corresponding to the respective operations of these divisions: locomotives, rolling stock, maintenance facilities, etc. Each company was awarded licenses for 40 years for use of infrastructure.

Interest in the transaction proved disappointing. In December 1995 it was announced that only two firms had submitted proposals, each for both properties, and one applicant was disqualified for not complying with the concessioning procedures. However, the remaining bidder, Empresa Cruz Blanca S.A., was judged to have made an acceptable bid, with a sales price of \$25.9 million for Ferrovial Oriental and \$13.2 million for Ferrovial Andina. Cruz Blanca eventually took a majority (75 percent) share in the Oriental concession and a minority (25 percent) share in Andina, with the majority interest going to another group of investors, Lucsik Group.

**Table 2-7. Bolivian Railway Concessions**

Line Segment Designation	Concessionaire	Shareholders	Date of Concession	Length of Line (km)
Andina	Ferrovial Andina	Lucsik Group, Empresa Cruz Blanca	1996	2,274
Oriental	Ferrovial Oriental	Empresa Cruz Blanca*	1996	1424
<b>TOTAL</b>				<b>3,698</b>

*Note. Minority share sold to Genesee & Wyoming in 2000.*

While following the same general pattern as Argentina, Brazil and Mexico, Bolivia also had some particular characteristics distinguishing it from the others. First, Bolivia styled its approach “capitalization” rather than concessioning, the distinguishing difference being that private operators would contribute resources in cash to the State railway company that it would then operate – capitalizing it for investment and growth – rather than making direct payments to the State itself. (This is a rather fine distinction, and we will generally refer to the transaction as a “concession” while recognizing this unique attribute.) In addition, under Bolivian law the new operator was obliged to offer shares in the enterprise to rail labor and extensive obligations were undertaken to mitigate the social impact of labor reductions. The process has been praised for its effective treatment of labor transition.

On a smaller scale than in the preceding concessioning programs, but with similar results, an outcome of the Bolivian process was that the larger pre-concession franchise with the broader bulk commodity traffic base has outperformed the smaller. While Bolivia was impacted by Argentina’s end-of-century financial crisis, Ferrovial Oriental’s rich agricultural franchise began growth immediately after concessioning and resumed expansion briskly in 2001. In contrast, Ferrovial Andina’s ton-kilometers have actually shrunk since the private operator took over. Private sector management alone cannot always overcome a weak traffic base.

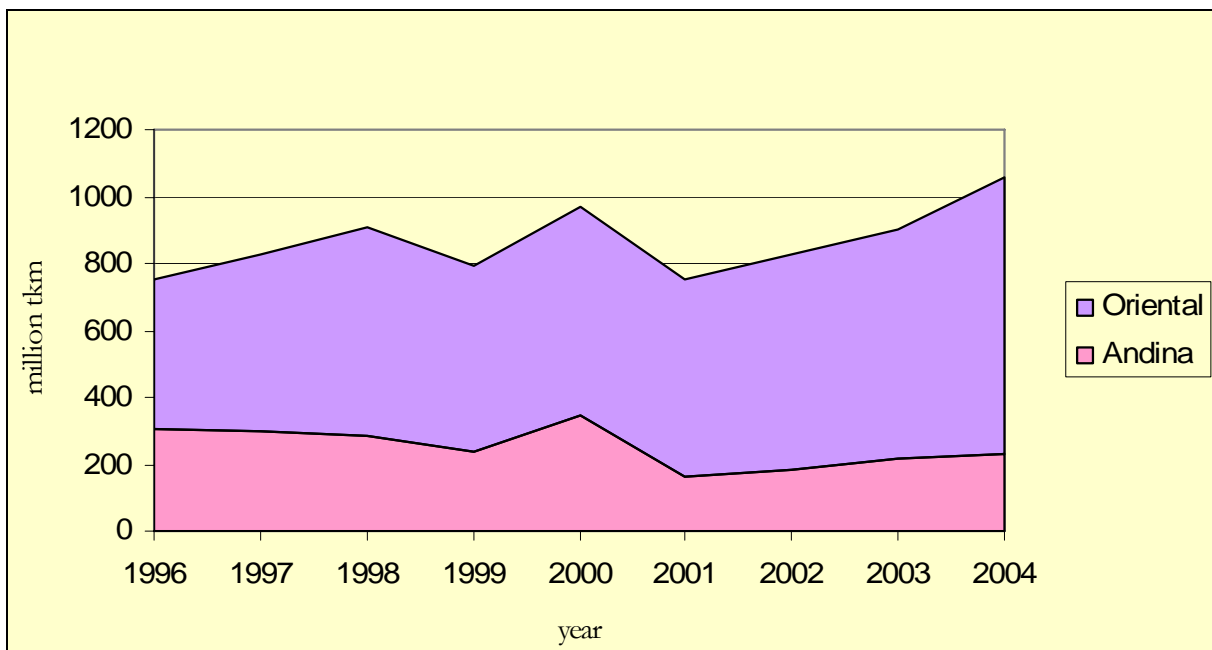
**Figure 2-10. Bolivia Railway Traffic Growth Since Concessioning.**

Figure 2-11. Map of Bolivian Railways.



## 2.5 Chile

Chile's route to privatization is unusual in that it was not as driven by a huge subsidy burden, the military government having ceased subsidy payments in 1979, deliberately allowing the rail system to deteriorate. Freight volumes consequently fell from 14.7 million tons in 1980 to 6.6 million tons in 1990. Nonetheless, the railroad was overstaffed and inefficient and Government began the process of private sector participation, one unique to Latin America: the State railway Empresa Ferrocarril del Estado (EFE) was to continue to be responsible for infrastructure of the main network serving central Chile and freight operations were vertically separated on the European model. EFE would retain a minority interest in the freight operating company, and EFE would retain responsibility for passenger services.

In 1993 the State railway Empresa Ferrocarril del Estado (EFE) created Ferrocarriles del Pacifico, SA (FEPASA)<sup>34</sup> and by 1995 had concessioned a 56.3 percent interest to the private sector for a 20 year period and independent operations began. In 1996, the northern railroad line, Ferrocarril del Norte (Feronor), was concessioned as a vertically integrated concession, as was the railway linking Arica and La Paz in 1997.

<sup>34</sup> No connection with Brazil's Fepasa, the state railway of Sao Paulo, that was concessioned to Ferrovias Bandeirantes in 1999.

**Table 2-8. Chilean Railway Concessions.**

Line Segment Designation	Concessionaire	Shareholders	Date of Concession	Length of Line (km)
Central Chile	Empresa Ferrocarril del Pacifico S.A. (Fepasa)	CB Transportes e Infraestructura S.A and others	1995	2,379
Northern Chile	Ferrocarril del Norte (Feronor) S.A.	APCO (Chile), RailAmerica*	1996	2,229
Arica – La Paz	Ferrocarril de Arica a La Paz S.A	CB Transportes e Infraestructura S.A and others	1997	206
<b>TOTAL</b>				<b>4,814</b>

*Note. RailAmerica shares sold to APCO affiliate, 2003.*

Chilean public data on railway concessions are limited due to the country's confidentiality rules; however a partial profile can be gleaned from EFE and Fepasa annual reports. The primary Chilean railway concession, Fepasa, had a slow beginning, with numerous problems relating to labor and line rehabilitation. Traffic volume was 5.1 million tons in 1994 and did not reach or exceed that level again until 2001. As shown below in Figure 2-12, however, after 2001 volume increased rapidly, reaching 6.3 million tons in 2002 and 7.3 million tons in 2003. Summary Feronor reporting indicates that 2004 volume in the northern concession should also be over seven million tons or in the range of 850 million ton kilometers, an increase of about 360 percent from the year of concessioning.

Under its continuing responsibility as infrastructure manager, and anticipating continuing traffic growth, EFE approved during the first quarter of 2003 an investment of \$700 million to upgrade and modernize the railroad system between 2003 and 2005. Based on the success of the freight concessions, Government now plans to concession to private firms the right to operate the company's passenger services as well.

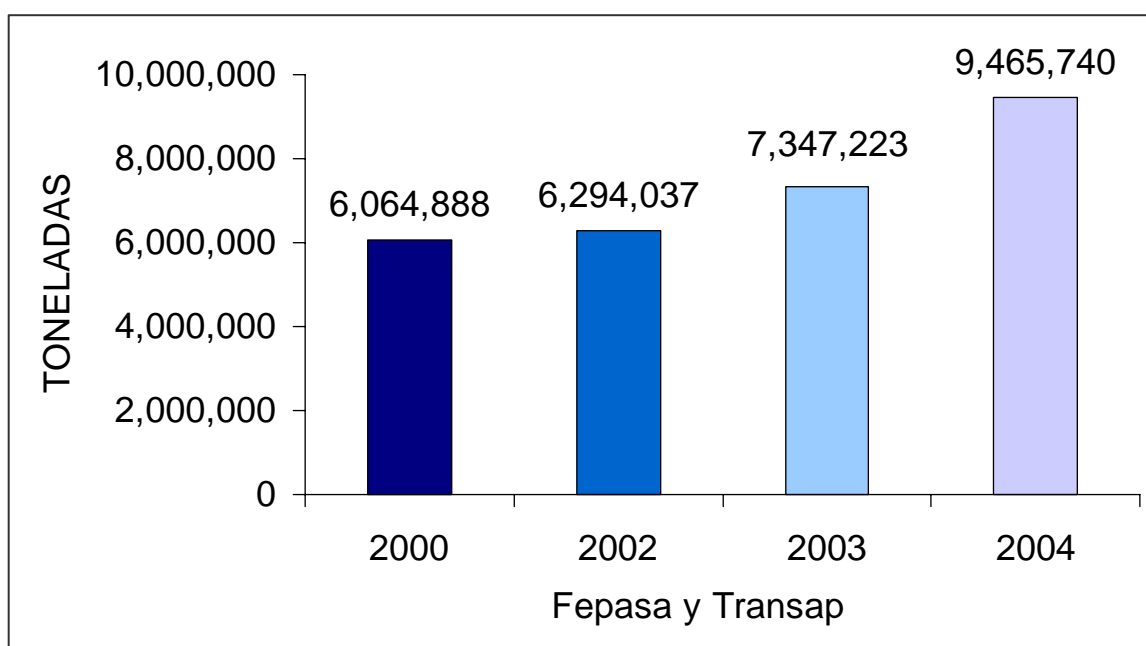
**Figure 2-12. Fepasa 2001-2003 Cargo Tonnages 2001-3 and Estimate 2004.**

Figure 2-13. Chilean Railways.





## 2.6 Peru

The path toward concessioning in Peru also was similar to that in Argentina and Brazil but proceeded more slowly. As in other Latin American countries, Peru's railways had been operated by the private sector, but were taken over by the government after World War II (in fact, later for Peru, 1971). By 1990 the government railway, Empresa Nacional de Ferrocarriles de Perú (Enafer) had deteriorated to a similar extent as those in Argentina and Brazil and for similar reasons: reluctance to raise tariffs for social reasons, a bloated staff and payroll, under-investment in infrastructure and deteriorating service (compounded in some sections by guerilla sabotage). By 1991, the Peruvian government designated Enafer for concessioning, but proceeded deliberately, not awarding concessions until 1999.

The design and award of the railway concessions was managed by a privatization agency, Comité Especial de Privatización (CEPRI), which decided on a rather complex concessioning process given the limited size of a network of less than 1500 kilometers (less than any of the five Argentina freight concessions and all but one of the seven Brazilian freight concessions). Three separate concessions were designated, each for 30 years, with up to six possible five-year extensions. While winning bidders were to receive both the track infrastructure and the rolling stock, they were required to create separate infrastructure and train operations companies with independent accounts and to permit independent train operating companies access to its tracks on non-discriminatory terms relative to their own train operating services. A transport regulator, Organismo Supervisor de la Inversión Privada en Transporte (OSITRAN) was created to monitor the compliance of concessionaires with the conditions and standards of the concession contracts (for both rail and other transport modes), with the power to fix tariffs in markets where it determined there was insufficient competition. Bidders had to bid for all three railways as a package, but they had the option of dividing and transferring concessions afterwards. In the end, only four bidders pre-qualified and two made final offers. A consortium led by Orient-Express and Peruval won by a narrow margin and then sold their interest in the Ferrocarril del Centro concession to largely Peruvian interests that had been in their consortium, keeping the remaining lines as Ferrocarril Transandino S.A. The result of this process is shown in the table below.

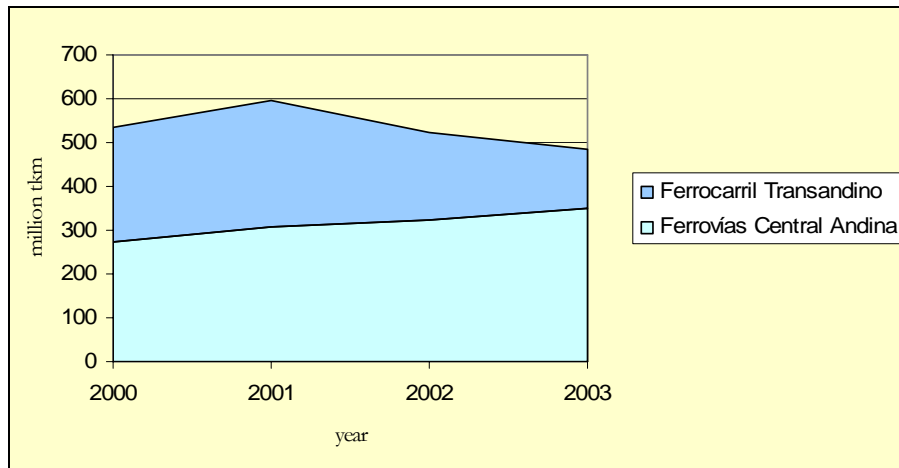
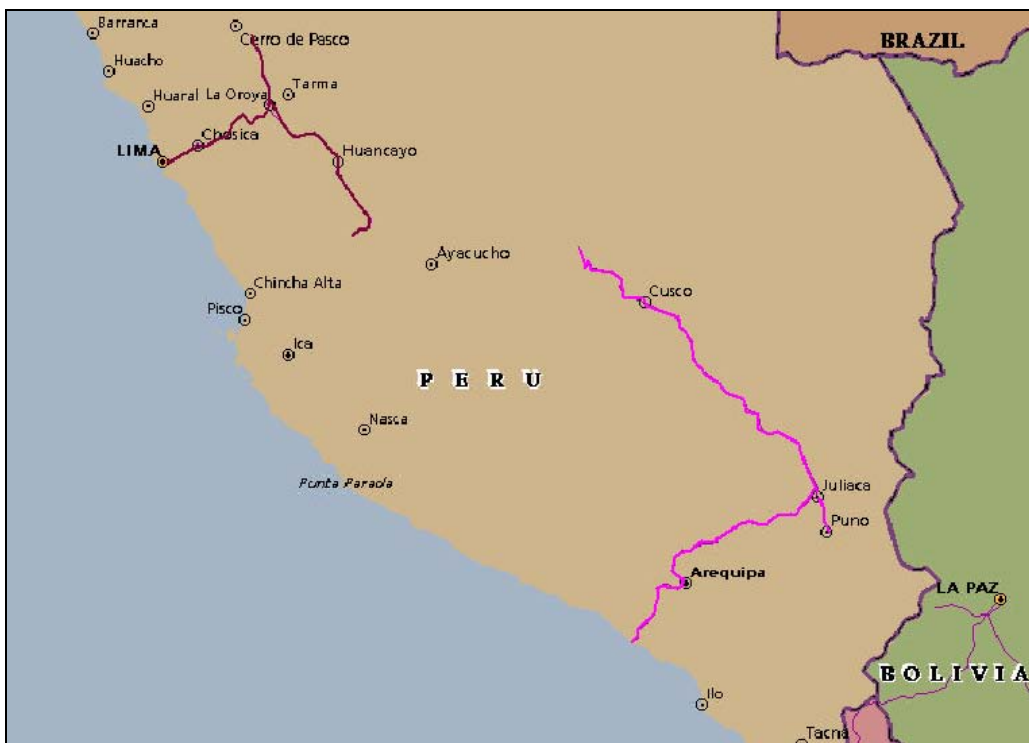
**Table 2-9. Peruvian Railway Concessions.**

Line Segment Designation	Concessionaire: Infrastructure	Operator	Date of Concession	Length of Line (km)
Ferrocarril del Sur	Ferrocarril Transandino S.A.	PeruRail <sup>35</sup>	1999	835
Ferrocarril del Sur Oriente	Ferrocarril Transandino S.A.	PeruRail	1999	121
Ferrocarril del Centro	Ferrovías Central Andina S.A.	Ferrocarril Central Andino S.A. <sup>36</sup>	1999	346
<b>TOTAL</b>				<b>1,302</b>

As in Bolivia and elsewhere, the larger Peruvian freight franchise (although quite small by standards of Argentina or Brazil) has performed better. As shown in Figure 2-14, Ferrovías Central Andina has had slow but steady growth since concessioning, while PeruRail has placed primary emphasis on the tourist passenger service to Machu Picchu and the freight business has deteriorated. (The tourist service is reported to be a large success in that the new operator improved service greatly, increased ticket prices bringing in added tourist income and tourist passenger volume increased. However, the operation has nevertheless been criticized for enabling the operator to also dominate the Machu Picchu hotel industry, for potential adverse impacts of additional tourists and for curtailments of unprofitable local services.)

<sup>35</sup> Orient-Express Hotels Ltd. (50 percent) and Peruval Corp. S.A. (50 percent), a privately owned Peruvian company mainly engaged in the tourism, infrastructure and real estate sectors.

<sup>36</sup> Peruvian businessman Juan Oleachea, a Chilean mining company, a Peruvian cement company, Mitsui and Company and Commonwealth development Corporation of UK. Railroad Development Corporation of the US took a minor shareholding and provided railway management personnel.

**Figure 2-14. Peru Railway Traffic Growth Since Concessioneing.****Figure 2-15. Peruvian Railways.**

*Ferrovías Central Andina; top of map; Ferrocarril Transandino, bottom of map.*

## 2.7 Colombia

Colombia's railway concessions have received little attention due to the small scale of the concessioned railways, late date of concessioning and the limited extent of international rail industry participation in the transactions (other than the minority participation of RITES in one concession, investors were Colombian and Spanish firms with construction and engineering competencies). The story, however, is familiar, although Colombian railway statistics have to be read carefully.

Colombia has two large operations, each with their own internal railway and both dedicated to coal transport. The largest by far is a partnership between the Colombian government's Caribcol

(Carbones de Colombia) and Intercor (International Colombia Resource Corporation), a fully-owned subsidiary of Exxon that was developed in the 1980s to produce coal, shipping largely to utilities in the southern United States. The project includes a 150 km railroad from the mining to the coast a dedicated port. This coal business has steadily increased from its inception to about 40 million tons per year and is a highly efficient, dedicated service, a private public partnership from inception. The second, Paz del Rio serves Colombia's steel producer.

Aside from the dedicated coal operations (and following the Chilean policy of neglect rather than the Argentine pattern of supporting large deficits), Colombia's railways were allowed to deteriorate into the 1990s with even more devastating results than elsewhere. The length of line in operation dropped from 3,468 km in operation in 1970 to 1,852 km in 1997. Tonnage volume declined from about 1.9 million tons in 1980 to 295,000 tons in 1992. Volumes began to rise after that nadir, but the surviving national network was in urgent need of rehabilitation in order to have the capacity to handle increased volume. At first Colombia in 1989 attempted a scheme based on joint participation, with vertical separation of infrastructure and operation. Infrastructure remained the responsibility of the State-owned Empresa Colombiana de Vias Ferreas (Ferrovias), while operation of rolling stock was conveyed to Sociedad Colombiana de Transporte Ferroviario (STF) and the Sociedad de Transporte Ferroviario de Occidente (STF-O), joint ventures with majority participation by the private sector. Lacking public funds infrastructure rehabilitation, however, Colombia turned to full concessioning in 1998 and private operations began in 1999 as shown on the table below.

**Table 2-10. Colombian Railway Concessions.**

Line Segment Designation	Concessionaire	Shareholders	Date of Concession	Length of Line (km)
Red Ferrea del Atlantico	Ferrocarril Carriles del Norte de Colombia, S.A.	Grupo Dragos (62 percent), RITES (India), three Colombian firms	1999	1,493
Red Ferrea del Pacifico	Tren de Occidente S.A.*	Four Colombian firms	1999	121
<b>TOTAL</b>				<b>1,302</b>

\* Formerly *Sociedad Concesionario del Pacifico S.A.*, two Spanish companies were in the concession initially, along with Colombian firms.

Results of the current concessions in Colombia cannot be properly assessed at this time because the initial work is largely a construction project to restore largely unusable rail line and the project is subject to civil disturbances. The Pacific concession has now opened some line segments that moved a few thousand tons in 2003 and looked to exceed 125,000 tons in 2005. The Atlantic concession reported no traffic on its concession but carries very large tonnages as a third party contractor on the Carbocol private rail line – an estimated 42 million tons in 2004. (Figures 2-16a and 2-16b) If these were concession volumes, it would be one of the larger carriers in the region (larger than ALL's Brazil and Argentina operations combine in terms of toms (but not tkm).

**Figure 2-16a. 2003 to 2004, Traffic of Tren De Occidente (Ferrovia Pacifico).**

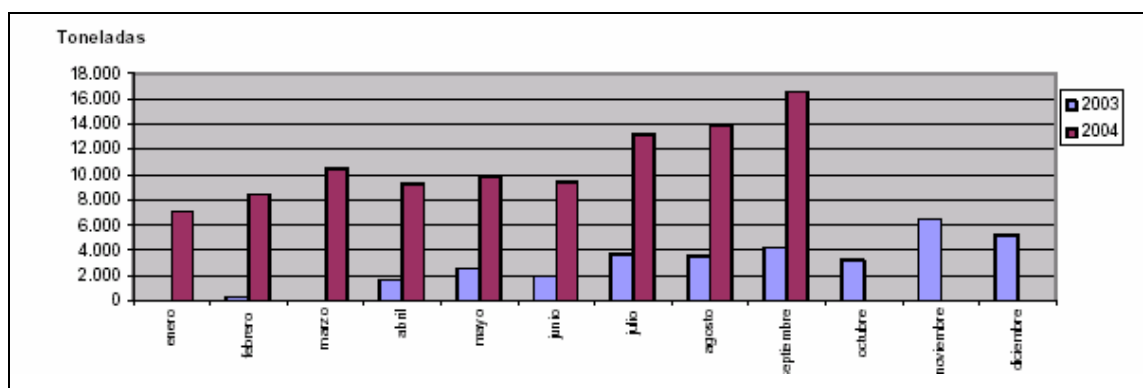


Figure 2-16b. 2003 to 2004. Coal Traffic.

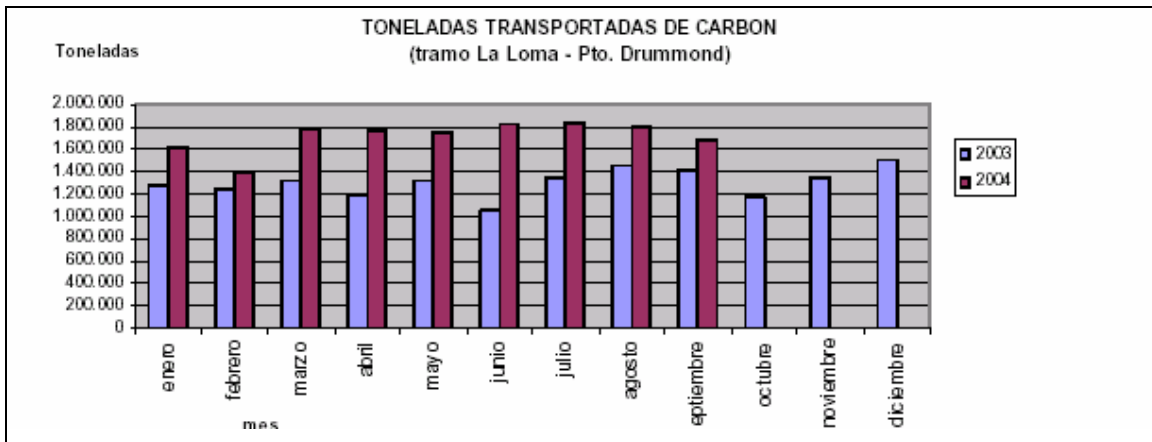
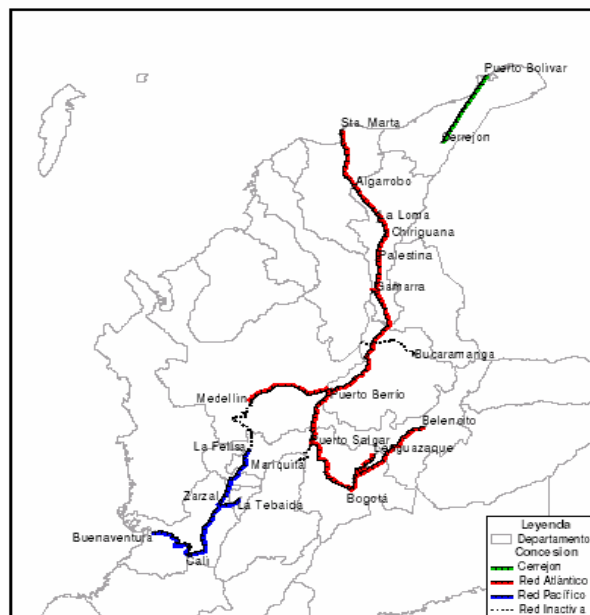


Figure 2-17. Colombian Railways.



\* La longitud total incluye la red concesionada del Atlántico, la red concesionada del Pacífico, la línea El Cerejón, Línea Paz del Río y las líneas inactivas

### 3. CLOSING COMMENTS AND LESSONS LEARNED

The Latin American railway concessioning experience overall supports the conclusions of Estache and Serebrisky that "private initiatives work for some things for a while, then some internal but often major shock external to the sector takes place and the public sector comes into the picture first as a regulator, then as an owner or at least financier ... and eventually hybrid solutions are found to ensure the survival of a sector for which the demand is strong, the economic impact brutal, but for which the financing structure needs to better account not only for the financial cost of the business but also for the major economic, social and political dimensions."<sup>37</sup>

An initial lesson from Latin America, therefore, is that privatization/concessioning is a quite useful and broadly successful strategy in reviving the rail sector, but is not a complete solution. Among the Latin American countries that turned to railway concessioning to resist the decline in railway competitiveness and/or simply relieve the drain on the national treasury, Brazil has been among the

<sup>37</sup> Estache, Antonio and Serebrisky, Tomás (2004) at 3-4.

first to clearly acknowledge that concessioning cannot be the entire answer and that if the existing network configuration does not fully serve the needs of a modern economy, significant public as well as private investment will be required. Chile also is moving in this direction. Colombia's largest rail transport activity is part of a public-private joint venture. Argentina maintains a public presence in sustaining passenger service, but has not yet proceeded as far as Brazil in committing public resources to restructuring those freight franchises that have proved marginal in order to enhance their sustainability and contribution to the economy. The trend, however, is in that direction.

Healthy franchises may be encouraged to continue to develop as purely private enterprises, but other segments of the industry that require substantial investment to rehabilitate the network or to extend the system may require more aggressive public participation and investment in public private partnerships in order to be viable. The concessioning form itself, giving the State ultimate title to infrastructure and equipment, can be an inhibition to external private financing for riskier franchises unless the State provides mitigating guarantees. Concessioning has demonstrated that it can revive railway operations large and small assuming that there is market demand for the network's services as presently configured. Where major rehabilitation and/or reconfiguration are required, however, public-private partnerships involving a greater public role may be more effective.

Another of the major lessons learned from Latin American railway concessioning is that it is very difficult to reverse course once a concession contract has been finalized and management turned over to a private sector operator. Despite the positive accomplishments addressed in this paper, over half of the concessions in the region have been in technical violation of their contracts, but there has not been a serious move toward voiding contracts and either renationalizing or transferring the concession to another private party. Painful renegotiations and admonitions may, in some cases, have nudged concessionaires to marginal changes in investment levels, service improvements or rate decreases that they may not otherwise have made. On the other hand, the uncertainties generated by continuing disputes over concession contracts are not conducive to the concessionaire obtaining financing for system improvements or for expanding its own commitments. Overall, the concessionaires have the greater leverage after the transaction is completed and appear guided in their investment commitments and scope of service offerings principally by the near-term profitability of the enterprise (or lack thereof), whatever assurances were given during the bidding process. The initial structuring of the transaction process to select competent bidders with adequate financial resources is therefore critical.

It is difficult to conclude that any particular legal-regulatory framework has had a decisive impact on the success of concessioning: Latin American countries have differed greatly in terms of both transaction procedures and in terms of the implementation of post-concession oversight (including agency powers, location in government, the timing of setting up oversight and the relation of external regulation to the contractual terms of the concession agreement). In assessing why concessioning works and what are its limitations, however, the example of US railways is instructive. US railways have from the outset largely been under private sector control, but from the 1930s until largely deregulated in 1980 they were extremely inefficient, losing markets share to roads and in financial crisis – a situation not too different in many respects from that of Latin America's State railways in the 1990s. The US railway revival did not occur overnight, but gained momentum over the decade following deregulation and involved many mergers and restructurings over the period. There are at least three lessons from this history. First, it is not an inherent advantage in technical or management capabilities that allows private railways to operate more efficiently than State railways, but rather commercial incentives and pricing freedoms. Where concession performance in Latin America has been disappointing, the overhang of regulation needs to be assessed for the constraints being placed on market driven behavior. Second, it does often take some time for management to take advantage of commercial freedoms. There is some evidence concession performance after 2001 is accelerating in the older concessions, Argentina, Brazil and Chile. Finally, restructuring and mergers of private railways are not indicative of a lack of sustainability or a failed process, but are rather symptoms of the rail sector adapting to the marketplace. Policies that allow rail concessions to be restructured to better serve the market appear more effective than a static approach toward enforcing the original concession terms.

The World Bank and other development banks have increasingly emphasized factors such as accessibility and affordability that were not at the forefront of railway concessioning strategy in the 1990s, when the burden of public railway debt and stemming the deterioration of rail networks were

at issue. As noted earlier, the Latin American concessioning experience cannot be said to have much of a negative impact on social welfare factors because of the very weak state of the rail sector prior to concessioning. On the other hand, salvaging the industry and reducing debt burdens clearly had priority over designing concessions to maximize competition, to preserve service to smaller freight service or intercity passengers, or to promote other social objectives. In retrospect, one may question whether the situation was so bleak that greater competition among concessions might not have been designed or whether the withdrawal of public support from the rail sector that accompanied concessioning was excessive. Social welfare objectives were not optimized in the concessioning process. Whatever one's views on past concessioning priorities, with the generally improved post-concessioning condition of the rail sector, more attention to these issues likely is forthcoming.

A balanced view of Latin American railway concession performance is a positive one, but does not support a doctrinaire conclusion that private sector management of railways is the exclusive solution or that the public sector does not have a major role to play in railway sector investment. As might be expected, individual concessions have varied greatly in the quality of franchises and performance, but although some are financially fragile, freight concession results have been predominantly positive.

Passenger concessions have been limited largely to computer services in Brazil and Argentina, with both positive and mixed reviews, with performance conditioned by subsidy and oversight arrangements with public authorities on several governmental levels.

Concessioning has not produced a static outcome, but has only opened the door to a more market-based rail sector that is responding to dynamic changes in the national and regional economies and adjusting for weaknesses in original concession structures. Public objectives initially given less priority under pressures to salvage a faltering industry and relieve financial burdens on government are receiving greater attention as the revived rail sector evolves.

## GLOSSARY

**Allocative Efficiency:** The market condition whereby resources are allocated in a way that maximizes the net benefit attained through their use. Allocative efficiency is also defined as the production of the quantity that is most beneficial to society.

**Concession:** A concession, as used herein, is a contract arrangement between a government and an independent (usually private) entity, involving the transfer of control of the assets (but not transfer of asset ownership) to the independent management partner for a fixed period defined in the agreement. For purposes of this study, such a contractual arrangement is considered a concession regardless of whether the government party to the agreement is the chief executive, a ministry or a State-owned corporation (as in Bolivia's "capitalization" model).

**Labor Productivity:** The quantity of output produced by a given quantity of labor input. For freight railways, the most common measure of output is the number of ton-kilometers (computed by multiplying the weight in tons of each shipment transported by the distance hauled in kilometers) of cargo carried and labor input is measured by number of employees; similarly for passenger railways the most common measure of output is the number of passenger-kilometers (computed by multiplying the number of passengers transported by the distance carried in kilometers), while input is measured by number of employees. While alternative, more elaborate, measures of both input and output are sometimes employed, difficulties in data comparability lead to reliance on these measures (with freight and passenger outputs sometimes combined as "traffic units").

**Private Participation in Infrastructure (PPI) Project Database:** The World Bank's PPI database tracks information on more than 2,700 infrastructure projects with private investment in the energy (electricity and natural gas), telecommunications, transport, and water and sewerage sectors in low- and middle-income countries.

**Production Function:** A mathematical description of the various technical production possibilities faced by a firm. The production function gives the maximum flow of output(s) in physical terms for quantity flows of the factors of production in physical terms and represents the transformation of input flows into output flows. The production function calculate the maximum output obtainable from every input combination under conditions of technical efficiency and may be used to measure improvements or decreases in technical efficiency against that standard.

**Productive Efficiency:** Achievement of a specific level of output or objective using the most cost-effective means; a precondition for achieving the best allocation of resources among different uses.

**Purchasing Power Parity (PPP):** a measure of the relative purchasing power of different currencies. It is measured by the price of the same goods in different countries, translated by the exchange rate of that country's currency against a "base currency".

**Total Factor Productivity (TFP):** The weighted average productivity of all inputs, where the weights to these inputs are their shares in the total cost of production.

**Vertical Integration:** In a vertical integration structure, one party (the operator) takes responsibility for the management and operation of train services and the infrastructure network as well as for maintenance and renewals of track and other infrastructure assets. Most Latin American rail networks remain largely vertically integrated, but with some significant vertical separation in Chile and Peru.

**Vertical Separation:** Under a vertical separation structure, operators of transport services are expected to work at arm's length from the provider of the fixed facilities. In railway networks, separation ranges from merely keeping the accounts for infrastructure and operations separate, to having different entities to own, provide, and control the infrastructure, and an entirely independent set of operators.

---

## PRIMARY DATA SOURCES

- (i) United Nations, Comisión Económica para América Latina y el Caribe (<http://www.eclac.cl>)
- (ii) Argentina:
  - Ministerio de la Planificación, Inversión Pública y Servicios, Secretaría de Transporte ([www.transporte.gov.ar](http://www.transporte.gov.ar))
  - Comisión Nacional de Regulación del Transporte (<http://www.cnrt.gov.ar>)
  - Ministerio de Economía y Producción - República Argentina ([www.mecon.gov.ar](http://www.mecon.gov.ar))
  - Comisión de Renegociación de Contratos de Obras y Servicios Públicos (<http://www.uniren.gov.ar/>)
- (iii) Brazil:
  - Ministerio dos Transportes ([www.transportes.gov.br](http://www.transportes.gov.br))
  - Agencia Nacional de Transportes Terrestres ([www.antt.gov.br](http://www.antt.gov.br))
- (iv) Bolivia:
  - Superintendencia des Transportes ([www.suptrans.gov.bo](http://www.suptrans.gov.bo))
- (v) Chile:
  - Empresa de los Ferrocarriles del Estado ([www.efe.cl](http://www.efe.cl))
  - Ferrocarril del Pacifico, S.A. ([www.fepasa.cl](http://www.fepasa.cl))
  - Instituto Nacional de Estadísticas ([www.ine.cl](http://www.ine.cl))
  - Ministerio de Obras Públicas, Transporte y Telecomunicaciones ([www.moptt.cl](http://www.moptt.cl))
- (vi) Colombia:
  - Subdirección de Transporte de Carga, del Ministerio de Transporte ([www.mintransporte.gov.co](http://www.mintransporte.gov.co))
  - Superintendencia de Puertos y Transporte ([www.supertransporte.gov.co](http://www.supertransporte.gov.co))
  - Instituto Nacional de Concesiones ([www.inco.gov.co](http://www.inco.gov.co))
- (vii) Peru:
  - Ministerio de Transporte y Comunicaciones ([www.mtc.gob.pe](http://www.mtc.gob.pe))
  - Organismo Supervisor de Inversión en Infraestructura de Transporte de Uso Público ([www.ositran.gob.pe](http://www.ositran.gob.pe))
- (viii) Mexico:
  - Secretaría de Comunicaciones y Transportes ([www.sct.gob.mx](http://www.sct.gob.mx))
  - Instituto Mexicano del Transporte ([www.imt.mx](http://www.imt.mx))
  - Instituto Nacional de Estadística, Geografía e Informática ([www.inegi.gob.mx](http://www.inegi.gob.mx))



---

## SELECTED REFERENCES

- Campos, Javier. 1999. "An Updated Assessment of the Privatization of Mexican Railroads." Background paper for the World Bank Transport Regulatory Framework Study.
- Campos, Javier. 2002. "Competition Issues in Network Industries: The Latin American Railways Experience." Brazilian Electronic Journal of Economics, Department of Economics, Universidade Federal de Pernambuco, vol. 5(1).
- Campos, Javier and Juan Luis Jiménez. 2003. "Evaluating Rail Reform in Latin America: Competition and Investment Effects." University of Las Palmas, Spain.
- Campos, Javier, Antonio Estache and Lourdes Trujillo. 2001. "Processes, Information and Accounting Gaps in the Regulation of Argentina's Private Railways." World Bank, Washington, DC.
- Antonio Estache and Lourdes Trujillo. 2001. "Processes, Information, and Accounting Gaps in the Regulation of Argentina's Private Railways." World Bank, Washington, DC.
- Estache, Antonio and Serebrisky, Tomás. 2004. "Where Do We Stand on Transport Infrastructure Deregulation Public-Private Partnership?" World Bank, Washington, DC.
- Estache, Antonio, M. Gonzalez and Lourdes Trujillo. 2002. "What Does Privatization do for Efficiency? Evidence from Argentina's and Brazil's Railways." World Development, 30, 11, pp. 1885-97.
- Estache, Antonio, Andrea Goldstein and Russell Pittman. 2001. "Privatization and Regulatory Reform in Brazil: The Case of Freight Railways." U.S. Department of Justice Antitrust Division, Washington, D.C.
- Estache, Antonio, J. A. Schmitte Azevedo, E. Sydenstricker. 2000. "Labor Redundancy, Retraining and Outplacement during Privatization: The Experience of Brazil's Federal Railway." World Bank, Washington, DC.
- Gómez-Ibáñez, José A. 2004. "Railroad Reform: An Overview of the Options." Conference on Railway Reform, Rafael del Pino Foundation, Madrid.
- Jones, Anna. 2004. "Measuring the Technical Efficiency of South American Railways Before and After Privatization." University of Minnesota, Minneapolis, MN (Masters Plan B Paper).
- Kessides, I. "The Brazilian Railroad Industry: Options for Organizational Restructuring." World Bank, Washington, DC.
- López-Calva, Luis F. 2001. "Private Participation in Infrastructure and Labor Issues: The Privatization of Mexican Railroads." Colegio de Mexico, Mimeo.
- McKenzie, David and Dilip Mookherjee 2003. "The Distributive Impact of Privatization in Latin America: Evidence from Four Countries." IED Discussion Paper 128.
- Rebelo, Jorge M. 2003. "The Rail Decentralization and Modernization Program in Brazil: Lessons Learned." World Bank, Washington, DC.
- Rebelo, Jorge M. 1999. "Reforming the Urban Transport Sector in the Rio de Janeiro Metropolitan Region: A Case Study in Concessions." PRWP-2096. World Bank, Washington, DC.
- Thompson, Louis S. 2000. "Argentine Rail Freight Concessions: Achievements and Challenges." World Bank, Washington, DC.
- Thompson, Louis S. 2001. "Investment Issues and Analysis in Concessions Railways: Experience in the Argentine Freight Concessions." World Bank, Washington, DC.

Thompson, Louis S., Karim-Jacques Budin and Antonio Estache. 2001. "Private Investment in Railways: Experience from South and North America, Africa and New Zealand." European Transport Conference.

Tomayo, Gonzalo. 2002. "The Machu Picchu Railway." For the Universidad del Pacifico's Centro de Investigación Area de Economía de la Regulación.

Valdez, José A. 2002. "Case Studies on Human Resource Issues in Private Participation in Infrastructure: Railroads in Bolivia." Public-Private Infrastructure Advisory Facility, Washington, D.C.