G:\DATA\WPDOCS\ae-ag-rp.wpd
http://www1.oecd.org/dev/ENGLISH/NEW/documents/Goldstein-Railways.pdf

preliminary version
comments welcome

PRIVATIZATION AND REGULATORY REFORM IN BRAZIL: THE CASE OF FREIGHT RAILWAYS[1]

by Antonio Estache[*], Andrea Goldstein[†] and Russell Pittman[‡]

[1] This paper owes a lot to joint work by the first author with Ian Alexander, Javier Campos, Jacques Cellier, Tony Gomez-Ibanez and Lou Thompson on Brazil and to an amazing collaboration with the key players in the privatization and ensuing supervision of the Brazilian railways, in particular Ronaldo Magalhaes. The views expressed are not necessarily those of the World Bank, OECD, or the U.S. Department of Justice.

[*] Economic Development Institute, The World Bank, Washington (em: aestache@worldbank.org).
[†] OECD Development Centre, Paris (em: andrea.goldstein@oecd.org).
[‡] Antitrust Division, U.S. Department of Justice, Washington (em: russell.pittman@usdoj.gov).

INTRODUCTION

Until very recently, in virtually all countries the rail industry has been one of the most heavily regulated sectors of the economy. Governments have controlled entry, exit, prices, technology, operating practices, inter-company relationships, and ownership on the grounds that competition was both undesirable and infeasible. This belief was based on the cost characteristics of the industry, where up to 80 per cent of infrastructure costs -- earthworks, track, signalling, and stations -- are fixed in the short run, and on the presence of indivisibilities and economies of scale in the longer run, together with the potential for exploitation of market power and/or monopoly. For many decades, however, public ownership of the railroads had also been an ideological litmus test in many parts of the world. Moreover, in many countries public policy towards rail services was guided, at least partly, by non-economic considerations such as guaranteeing service to outlying areas and providing well-paid and secure jobs to union members, and so rail management has been often mired in pork-barrel politics.

In the broader context of market-friendly reforms, the privatization and deregulation of railways is seen as promoting efficiency and innovation, by freeing railways from government control and by removing subsidies. At the same time, governments have been keen to reduce public expenditure by transferring the financing of rail investment to the private sector. Although with different mixes of ownership change, industry structure, and market liberalization, Australia, Argentina, Bolivia, Chile, Sweden, the United States and the United Kingdom have pioneered railways reforms. In most countries the debate on railways restructuring centers on issues such as the mounting financial and operational deficits accumulated by public-sector companies, their declining market share, and the increasing environment costs caused by other transport means, rather than on competitive issues.

Relative to the rest of Latin America, Brazil launched its public sector reform relatively late, but since doing so in earnest in the early 1990s privatization has been substantial in terms of both sectoral spread and sheer financial revenues. As for the railroad sector, a tight control over tariffs by the federal government as part of various heterodox adjustment plans and the long lasting fiscal crisis resulted in difficulties in investing and even maintaining what ended up being one of the less used rail systems of the region in spite of its tremendous potential. Following the 1992 decision to restructure and privatize rail operations in order to stop deteriorating trends in operating and financial performance, concessions were awarded to private investors between March 1996 and July 1997. This paper aims at setting the privatization of Brazilian railways within the larger framework of that country's divestiture program, while also providing comparative analysis relative to the experience of other OECD and non-OECD countries moving away from government control and introducing market principles in the running of trains. We approach this issue throughout two different, albeit closely intertwined angles, those of economic and institutional analyses.

The paper is structured as follows. Part 1 sketches the main elements of the economics of railways, analyzes the key regulatory questions, and summarizes key characteristics of the process of regulatory reform. We then present a short history of railways in Brazil, from the origins to the recent privatization (Part 2), and the early results obtained through divestiture (Part

3). In Part 4 the main regulatory issues emerging from the post-privatization experience are discussed, while Part 5 concludes by comparing Brazil with other OECD and non-OECD countries where the rail industry has also been privatized.

1. RAILWAYS RESTRUCTURING: ECONOMIC PRINCIPLES AND REGULATORY IMPLICATIONS

1.1 What needs to be regulated[1]

The traditional rationale for economic regulation of an industry has to do with its "natural monopoly" characteristics. Sectors with large fixed-cost components -- for example, capital-intensive network industries such as long-distance electricity transmission, railroads, and oil and natural gas pipelines -- may have significantly declining average costs over all or such a large range of their demanded output that it is less costly for one enterprise to satisfy all demand than it is for more than one.

Unfortunately, a policy decision to allow monopoly production under such circumstances in order to achieve lowest *costs* might have the potential to allow high monopoly *prices*. Thus many governments have sought the best of both worlds by restricting such a sector to only one enterprise but imposing regulation or public ownership on the monopoly enterprise. In recent years, amid growing dissatisfaction with the performance of publicly owned enterprises, particulary in the developing world, there has been a broad movement towards the privatization-and-regulation option.

However, as much as a century of experience with this model in some countries (particularly the United States) has resulted in some skepticism regarding both the wisdom of the model itself and the breadth of its applicability. Several compelling points have been made:

First, regulation is not costless. Economic regulation is a complex task that requires a great deal of information if it is to be done well. It requires the hiring of expert regulatory staff in economies where the skills needed may have a large opportunity cost. Further, because there are typically very large amounts of money at stake in the regulatory process, the regulated enterprise has a strong incentive to dissipate the available rents by hiring its own highly skilled lawyers and economists to try to influence the outcome. Such "rent seeking activity" is largely

---

[1] See I. Kessides and R. Willig (1995), "Restructuring Regulation of the Rail Industry for the Public Interest", World Bank Policy Research working paper, no. 1506; OECD (1997), Competition in the Railways Industry; OECD (1998), Summary Record of the Eighth Meeting of the Working Party No. 2 on Competition and Regulation [DAFFE/CLP/WP2/M(97)3/ANN1/REV1]; and J. Ordover and R. Pittman (1995), "Restructuring the Railway for Competition" in Proceeding of the OECD/World Bank Conference on Competition and Regulation in Network Infrastructure Industries, Budapest.

a waste of resources; these expensive lawyers and economists should be spending their time more productively.[2]

[2] See, e.g., Anne O. Krueger, "The Political Economy of the Rent-Seeking Society," American Economic Review, vol. 64 (June 1974), pp. 291-303, and R. D. Tollison, "Rent Seeking: A Survey," Kyklos, vol. 35 (1982), pp. 575-602.

Second, even the best regulators are not omniscient. Regulated enterprises have better information concerning their operations than do the regulators, and they may use the control of information strategically to try to influence the regulatory outcome.[3] The most common regulatory schemes, which base allowed prices on enterprise costs, both fail to provide strong incentives for the enterprise to operate efficiently and may actively encourage the enterprise to adopt a more capital-intensive production technology than would be most efficient.[4] And even knowledgeable regulators may be "captured" by the enterprises that they regulate, as they come consciously or unconsciously to equate the welfare of the regulated enterprise and sector with the welfare of the public.[5]

Finally, just because an enterprise may operate in the "natural monopoly" portion of its cost curve vis-a-vis some customers does not mean that it has monopoly power vis-a-vis others. A monopoly oil pipeline from point A to point B may compete with oil shipped by water to point B, or with oil shipped by truck from a pipeline serving nearby point C. A monopoly long-distance electricity transmission line from point D to point E may compete with other lines serving D and E from different locations. Either may have its monopoly power attenuated by competition for electricity or oil from other sources of energy. Similar considerations may apply to local telecommunications and to railroads.[6]

Railroads have traditionally been classified as one of the sectors with natural monopoly characteristics: they are characterized by large, unavoidable fixed costs such as tracks and stations, and many of these investments are sunk, with the inputs lumpy and of minimal value for other purposes. Thus, as noted at the beginning of this paper, the worldwide norm over the last half century at least has been the "monolithic railway", an integrated and most often state-owned firm owning and operating its own facilities and rolling stock and protected from competition. On the premise that railroads enjoy market power in freight transport, governments

---

[3] See generally Jean-Jacques Laffont and Jean Tirole, A Theory of Incentives in Procurement and Regulation (Cambridge, Mass.: MIT Press, 1993).

[4] Alfred Kahn, The Economics of Regulation: Principles and Institutions (Cambridge, Mass.: MIT Press, repr. 1988); H. Averch and L. Johnson, "Behavior of the Firm under Regulatory Constraint," *American Economic Review,* vol. 52 (December 1962), pp. 1052-1069.

[5] George Stigler, "The Theory of Economic Regulation," Bell Journal of Economics, vol. 2 (1971), pp. 3-21.

[6] Janusz A. Ordover, Russell W. Pittman, and Paul Clyde, "Competition Policy for Natural Monopolies in a Developing Market Economy," Economics of Transition, vol. 2 (1994), pp. 317- 343.

have controlled entry and exit, financial and accounting methods, and tariffs. Recently, as in other infrastructure sectors, the poor performance of government-owned enterprises has led to worldwide interest in the commercialization and privatization of state-owned railroads.

Regarding issues of competition and regulation in the railroad sector, it is now well accepted that for some commodities, *intermodal competition* -- competition from motor carriers, water carriers, and pipelines -- may protect shippers and so render regulation unnecessary. In particular, commodities that have high value relative to their weight and are being hauled relatively short distances -- a common "rule of thumb" is under 500 miles -- may be more economically hauled by motor carrier than by rail, while commodities that have low value relative to weight or are being hauled very long distances may be more economically hauled by rail than by motor carrier. Furthermore, even in situations where intermodal competition does not protect a shipper from exploitation by a monopolist, *source competition* may do so. Even if there is only a single rail carrier between origin O and destination D, that railroad may have no monopoly power if multiple railroads serve O and can economically carry the shipper's product to alternative destinations, and if multiple railroads serve D and can economically deliver the same prodcut from alternative origins (or "sources"). Finally, there may be situations where *product competition* -- competition at the destination for the products carried by the railroad -- may limit the pricing freedom of even a monopoly railroad carrier.[7]

In the railroad sector, there is a growing consensus that only shippers who are protected by neither intermodal competition nor source competition are at the mercy of anticompetitive treatment by a railroad, and thus need protection by a regulator. Such *captive shippers*, whose commodities are not suitable for haulage by other modes and who do not enjoy the service of alternative railroads, even to other locations, may without regulatory protection be forced to endure monopoly price and service levels from their railroad carrier.

Efforts to avoid even this limited level of railroad regulation -- and to broaden the scope of rail competition in general -- have led to more radical proposals for the separation of financial treatment -- and perhaps even of ownership and control -- of the railroad track and infrastructure and the trains using this track and infrastructure. It is sometimes argued that the natural monopoly component of the railroad is its infrastructure, not its entire operation, and that competition could be created by allowing competing train operators to run on this monopoly track. In fact, as will be discussed below, this model is up and running in the UK and Sweden, though it is too early to judge its success. This model does raise the related issue of whether the public or private entity controlling the monopoly track may also participate as one of the train operators -- that is, whether vertical integration between the two components of the sector will be allowed.

The railroad sector may seem *ex ante* to be one of the less promising in which to apply this model. The portion of long-run final costs made up by the cost of the "natural monopoly"

[7] For a discussion of all of these factors, see Russell Pittman, "Railroads and Competition: The Santa Fe/Southern Pacific Merger Proposal", Journal of Industrial Economics 39 (1990), pp. 25-46, and Ordover and Pittman, "Restructuring the Railroad for Competition", op. cit.

infrastructure is fairly high in the railroad sector -- over 15%, as opposed to under 5% for long-distance electricity transmission[9] -- so that a) if the track owner is allowed to be one of the train operators as well, discriminatory treatment regarding access may have a more serious impact in the railroad sector than in other sectors, and b) it is not clear how much is gained by moving the regulatory process a step backwards, from the integrated railroad sector to the railroad infrastructure sector. On the other hand, it seems likely that it is easier to detect and police discriminatory access in railroads, where it would likely involve mostly dispatch time, than in electricity, where the dimensions of access quality may be much more complex.[10] Moreover, it seems clear that there are important economies of scope to the operation of the infrastructure and the operation of the trains, so that a decision *not* to allow the track owner to be a train operator could be socially costly. As an alternative to remaining regulation, this model must be considered an experiment in progress, and its results will be eagerly awaited.

A final issue of competition and economies of scope concerns the nexus of passenger and freight transportation. Rail passenger transport -- especially local commuter rail but also long-distance passenger travel -- provides significant positive externalities to congested urban areas and is often encouraged as a matter of public policy. Since there is no passenger rail service in the world that is self-supporting, this encouragement has taken the form of government subsidies to passenger rail operations. But subsidies create their own problems, even if (especially if?) there is competition for the right to be the subsidized passenger service provider. In particular, such a provider may have an incentive to undersupply on quality, so that concession agreements must carefully define quality standards.

In Argentina, for example, bidding documents defined the minimum services to be provided in terms of seats per hour, frequency, travel time, and permissible minutes of delay per period of time. Moreover, since rail passenger services have traditionally operated as a network with through ticketing, comprehensive information, and planned connections, and since such a structure may have high value for customers that cannot be fully appropriated by separate carriers, it may be necessary for government of insist upon such arrangements as well. As a license condition in the UK, all passenger operators must participate in through ticketing and information schemes.

Finally, the degree to which there may be economies of scope between the operation of passenger trains and either the operation of freight trains or the ownership of the track is not a settled one by any means. This is another area where the outcome of the UK experiment -- where not only is the ownership of the rail infrastructure separated from the ownership of train operators, but also passenger train operators are chosen in a bidding process that does not take into account whether they are freight train operators -- may be especially instructive.

---

[9] Russell Pittman, "Regulation, Deregulation, and Competition Issues in 'Natural Monopoly' Sectors," Romanian Academy of Sciences Discussion Paper 1999.

[0]0 See, *e.g.*, U.S. Federal Energy Regulatory Commission, Notice of Proposed Rulemaking, "Regional Transmission Organizations," May 13, 1999, at 66-83.

1.2. The experience of selected OECD and non-OECD countries

Over the last 20 years or so, an increasing, albeit still small, number of countries have introduced market principles in their railroad industry. This development results from a wide range of motives. First and foremost are the burgeoning costs of railways to the Treasury coffers. In Italy, for instance, in 1995 the receipts of *Ente Ferrovie dello Stato* could cover 30 per cent only of total costs. Of course, it is important in this regard to consider separately passenger operations, which always lose money, from freight operations, which only sometimes lose money. In 1990, the subsidy to PKP, the Polish National Railway, accounted for 12 percent of the government deficit, even though the freight carrying component of PKP was earning a profit. Second is the wider trend towards private ownership of state assets, including network-based public utilities, possibly in conjunction with the introduction of lighter regulation and/or outright competition. Third is the acknowledgement that inefficient rail transport increases logistics costs and produces serious allocative disruptions, for example in in decisions concerning the location of new investment. And fourth, the economic literature on the sources of growth has highlighted the importance of investment in infrastructure as a key ingredient in the catch-up process. Both continuing deficits and political interference with management decisions are considered harmful to the investment process.

Different options are available "off-the shelf" for a reformist Minister of Transport intent on restructuring the railroads:[11]

"Corporatization", which in the case of railways amounts to organizing the firm into financially-autonomous lines of business. This structure characterized British Rail between 1982 and the privatization in 1996.

Granting competing companies exclusive control over some trackage, on the condition that competitive train access to the trackage is then provided to other users.

Separating ownership and operation of fixed facilities and trains from the actual marketing of services to shippers. The latter would be the responsibility of forwarders providing multimodal transport and negotiating on the open market with the train companies for transport services.

Separating the infrastructure, under the control of a "track authority", from the running of trains on the network, and then choosing the preferred ownership structure for both subsets of firms. As noted above, a sub-option is whether to allow a single firm to be a member of both subsets of firms.

Creating a "track authority", as in the previous example, and then franchising the right to operate particular rail routes or services to the bidder offering the highest price (if the service is profitable) or demanding the lowest subsidy.

Even in countries which have carried out significant rail reforms, ownership transfer to the private sector has been limited, and the increase in competition has been rather circumscribed.

---

[11] Ordover and Pittman, *op. cit.*, pp. 21-2, and J. Dodgson (1994), "Railway Privatization", in M. Bishop, J. Kay and C. Mayer (eds.), *Privatization & Economic Performance*, Oxford University Press.

On the other hand, while it is well known that privatization *per se* may not do enough to maximize economic efficiency,[2] there may be strong reasons to expect benefits from market-oriented reform of the railroads. Separating the track infrastructure from rail operations is in principle an attractive solution, as it may work to reduce unit costs, to introduce intrarail competition, to focus management on the improvement of quality standards, and to render more transparent the costs associated to public policy obligations.[12] To a large extent, the reforms have indeed concentrated on providing rail management with the incentives and the independence to achieve success in a climate of competition, though competition principally with other modes.

---

[2] See, e.g., J.A. Kay and D.J. Thompson, "Privatisation: A Policy in Search of a Rationale," *Economic Journal* 96 (1986), 18-32.

[2]2 The general case is clearly argued by L. Thompson (1997), "The Benefits of Separating Rail Infrastructure from Operations", The World Bank, *Public Policy for the Private Sector Notes*, No. 135.

Attempts to stimulate truly open access operations have generally failed. Existing vertically integrated railways have, not surprisingly, shown little enthusiasm for generating competition with their own services, indeed proving slow to respond to requests for paths and for price quotations, and deliberately obstructive in many cases. This has held true even in Britain, where infrastructure and operations are clearly separated into different companies. Congestion on the network, particularly at commercially attractive times, has been another important problem. So far there has been no attempt to force the incumbent train operator to surrender paths to potential entrants, or to offer them for auction, still less to hold separate auctions or charge separate access fees for peak and non-peak times. And, of course, there may be other substantial barriers to entry. Rail operation is rarely perceived as an area in which it is easy to make profits. Even if assets may be leased, satisfying safety legislation and obtaining trained staff with the necessary skills, experience and route knowledge may be time consuming and expensive. As usual in network industries, it may be difficult for an entrant with a small network to compete for business with an incumbent with a larger network.[13] For freight operations, it may be easier for an entrant to confine itself to marketing the service, whilst hiring an existing operator actually to run it. In the passenger sector, creating a host of new companies via the franchising process may offer the best chance of attracting new entry into markets from competing operators. However, whether such new entry is necessarily desirable, concentrating as it may on duplicating existing services at profitable times of day, and thus reducing the degree of internal cross subsidization in franchisees and raising the necessary subsidies to sustain the required level of service, remains controversial.

Given the difficulties of introducing competition *in* the market, especially on the passenger side, in Britain a solution has been sought in instituting competition *for* the market.[14] Concessions are franchised through a competitive process in which all successful bidders must comply with certain minimum service levels and maximum fares. Where competition is strong, it is assumed that this is enough to enforce appropriate quality standards, but where it is weak, or where revenues are low relative to costs, other aspects such as reliability, punctuality and overcrowding are also regulated as part of the franchise agreement. For freight services, grants are available to cover part or all of access charges and investment in terminals and rolling stock where the external benefits are seen as sufficient to justify them. The franchise agreements on the passenger side also provide for guaranteed connections in cases where this is seen as sufficiently important to offset the costs. These problems might have been eased if franchising had taken the form of a smaller number of larger franchises. However, there was concern that this might have reduced the degree of competition for franchises; as it was, franchisees were

---

[3]3 Michael Katz and Carl Shapiro, "Network Externalities, Competition, and Compatibility," *American Economic Review* 75 (1985), 424-440.

[4]4 The idea's first modern presentation was in Harold Demsetz, "Why Regulate Utilities?", *Journal of Law and Economics*, v. 11 (1968), pp. 55-65. Its original presentation was in Edwin Chadwick, "Results of Different Principles of Legislation and Administration in Europe; of Competition for the Field, as compared with Competition within the Field of Service," *Journal of the Royal Statistical Society* 22 (1859), 381-420. See Robeert Ekelund and Edward Price, "Sir Edwin Chadwick on competition and the social control of industry: railroads," *History of Political Economy* 11 (1979), 213-239.

able to spread their risks by bidding for a portfolio of franchises of different size, duration and types of traffic.

Regardless of the different durations of franchise awards, in Sweden, Great Britain, and South America franchising has substantially reduced costs and increased productivity. It has the major advantage that it can be employed whether rail services are profitable or unprofitable and whether governments wish to intervene in the levels of prices and services or not. It is thus consistent with aims of maintaining levels of service even on unprofitable lines, and achieving environmental benefits by diverting traffic from other modes and other non-commercial aims. What is not clear is whether long franchises including the infrastructure, or short franchises covering operations only, are to be preferred. The former should facilitate scheduling plus aid long term planning and investment, whilst the latter augments competitive pressures by increasing both the number of potential bidders and the frequency with which franchises are offered.

Whichever of the above approaches to introduction of competition into the provision of rail services is adopted, it may be combined with competitive tendering for the provision of inputs such as track maintenance and the provision and maintenance of rolling stock. Again it appears that, whilst some problems may arise in integrating the services of a host of suppliers, these measures will usually increase efficiency.

2. RAILWAYS IN BRAZIL

2.1. A short history

While Brazil is an enormous country, investments to develop a railways network linking the agricultural production centers of the interior to the production areas of São Paulo and Rio -- as well as to export markets overseas -- started relatively late. Nineteen years passed between the issuance of the first railways law in 1835 and the completion of the first railroad in 1854. A great leap forward occured between 1890 and 1914, but in 1914 the length of the network, heavily concentrated in the South East, was still equal to only 26,000 kms, a threshold that the United States had reached almost 70 years earlier. According to Nathaniel Leff, this late and minor growth reflected both the low investment return for private (and to a large extent foreign) capital and the insufficient attention that Brazilian authorities paid to public goods such as transport infrastructure, despite the potentially huge external economies.[15]

However, while ownership was initially two-thirds private, mostly British, public intervention was important in the determination of freight tariffs. Their rise was kept well below economy-wide inflation, which proved particularly high in the early part of the century. The relative prices

---

[5]5 N. Leff (1991), *Subdesenvolvimento e desenvolvimento no Brasil. Volume I - Estrutura e mudança econômica, 1822-1947* [originally published in 1982 as *Underdevelopment and Development in Brazil. Volume I - Economic Structure and Change, 1822-1947*, PUBLISHER], pp. 162-73.

of goods transported by railways decreased markedly, with important consequences on the regional distribution of income and wealth, but the financial viability of the railways themselves also suffered. The amount of government subsidies grew, but so also did the need to bail out faltering companies, a consequence of the minimum rate-of-return guarantees that the state had extended to private investors. Nationalization eventually proved cheaper for the Treasury, and by 1917 more than 50 per cent of the network was publicly owned, by federal and state governments.[16]

[6]6 *Ibid.*, pp. 110 and 230, quoting two different sources.

Built to service the export economy, especially coffee, the Brazilian railroad network fostered regional, rather than national, integration. Road construction proceeded comparatively more quickly than rail after World War I. By 1939, following 20 years of virtual stagnation in railways investment, the rail network was 34,200 kms long, whereas there were 258,400 kms of (mostly unpaved) roads.[17] North-south trade was still conducted mostly by sea, and German attacks off the Atlantic coast during World War II exposed the vulnerability of the country's supply routes. Further harm to the position of railways in Brazil was the acceleration of road construction following approval of the National Road Fund in 1945, financed by a special tax on the consumption of petroleum products, a tax which "unduly favored [motor vehicles] at the expense of alternative modes of transportation".[18] As industrialization accelerated, the share of road transport in total cargo doubled in the early 1950s, whilst the amount of replaced track and crossties and the number of new locomotives did not cover the minimum requirements of repair and replacement. The currency overvaluation, by lowering the relative price of imported motor vehicles and fuel, further biased inter-modal competition.

The political climate in the 1950s and 1960s, when Brazil experienced one of the fastest growth rates in the entire world, was such that the allure of auto and road modernization far surpassed the relatively less glamorous prospect of an efficient railway system. Rede Ferroviária Federal (RFFSA), a mixed-economy company under the control of the Ministry of Transport, was created in 1957, putting under the umbrella of a holding company various railroads that the federal government had had to bail out in the previous decades (Table 1). RFFSA actually owned two distinct networks, one of one meter gauge and the other of "broad gauge" (1.60 meter). A second large railways enterprise was created in 1971, when various systems operating in the state of São Paulo -- Estrada de Ferro Araraquara, Estrada de Ferro São Paulo-Minas, Estrada de Ferro Sorocabana, Companhia Paulistana de Estradas de Ferro, and Companhia Mogiana de Estradas de Ferro -- consolidated into FEPASA, owned by the local state. State-owned Companhia Vale do Rio Doce (CVRD) -- one of the the world's largest iron ore producers and exporters as well as the biggest gold producer in Latin America and one of the biggest aluminum and steel companies in Brazil -- controlled Estrada de Ferro Vitória a Minas (EFVM) and Estrada de Ferro Carajás (EFC).[19] Finally, RFFSA and Rede Federal de Armazéns Gerais Ferroviários (AGEF, a company owning railways depots) controlled two different suburban passenger networks (Companhia Brasileira de Trens Urbanos [CBTU] and Empresa de Trens Urbanos de Porto Alegre [Trensurb]).

---

[7]7 M. Abreu and D. Verner (1997), *Long-Term Brazilian Economic Growth 1930-94*, OECD Development Centre, Table 4.4, pp. 88-9.

[8]8 H. Shapiro (1994), *Engines of Growth. The State and Transnational Auto Companies in Brazil*, Cambridge University Press, p. 39.

[9]9 EFVM, created in 1903, was bought in 1919 by Percival Farquhar, the American financier who controlled Itabira Iron, which was then nationalized in 1942 in the framework of the Washington Agreements, defining the co-operation between Brazil and the Allies during World War II. Both railroards operate freight traffic only, the freight consisting of mining products and, in the case of EFVM, wheat. Interconnection between EFVM and RFFSA was made possible only in 1992, whereas the EFC network connects with the Malha Nordeste, privatized in 1996 to a consortium formed by CVRD and its controlling shareholder.

Table 1. Economic Characteristics of ex-RFFSA Concessions

	OESTE	CENTRO-LESTE	SUDESTE	TEREZA CRISTINA	SUL	NORDESTE	PAULISTA
RFFSA Sector	SR-10	SR-2 SR-7 SR-8	SR-3 SR-4	SR-9	SR-5 SR-6	SR-1 SR-11 SR-12	FEPASA
States Served (*)	RS, SP	BA, DF, ES, GO, MG, RJ, SE,	MG, RJ, SP	SC	PR, RS, SC	AL, CE, MA, PB, PE, PI, RN	SP
Track Length (kms)	1,621	7,080	1,674	164	6,586	4,534	4,236
Track Gauge (m)	1	1	1.6	1	1	1	1.6 & 1
Locomotives	88	397	406	10	395	112	408
Wagons	2,777	9,233	11,406	563	10,626	1,919	11,855
1995 Output TKUbn	1.6	6.26	20	0.10	7.5	0.7	6
Year 6	4	13	30	0.12	14.9	2	8.3
2002 (est.)	5	26	37	0.16	24	4.4	17.2
Invest. US$mn							
Years 1-6	89.0	327.4	227.0	9.4	276.0	18.4	304.8
Years 7-30	270.0	982.4	1,408.0	19.3	1,083.0	49.2	588.2
1995 Op.Rev.US$m	37	175	321	8	187	26	187
Year 1	45.0	195.0	384.0	5.5	202.0	41.3	132.4
Year 6	86.0	350.0	490.0	9.7	327.0	70.3	243.1
Employees	2,423	10,982	9,397	343	9,604	3,707	13,432
(Transferred)	(1,800)	(7,900)	(6,600)	(250)	(6,900)	(1,600)	(6,380)
Main Cargoes	Petroleum Soybeans Steel Minerals	Petroleum Cement Steel Soybeans Grains	Iron ore Cement Steel Limestone	Coal and by-products	Soybeans Petro. Rice Alcohol	Iron ore Petroleum Oil Cement	Petroleum Oil Minerals Grains Pellets

Notes: (*) Abbreviations AL=Alagoas, BA=Bahía, CE=Ceará, DF=Distrito Federal, ES=Espiritu Santo, GO=Goiás, MA=Maranhão, MG=Minas Gerais, PB=Paraiba, PE=Pernambuco, PI=Piaui, RJ=Rio de Janeiro, RN=Rio Grande do Norte, RS=Rio Grande do Sul, SC=Santa Catarina, SE=Sergipe, SP=São Paulo. Figures for track and rolling stock and employees correspond to 1998 actual values. Figures for output, planned investment, operating revenues and employees correspond to 1995 (before the concessioning) and to the estimates for the concessioning years.

Source: RFFSA (1998), *Relatório da Acompanhamento Trimestral das Concessões, 4º Quarter* and Gómez-Ibáñez (1998)

The 1973 oil crisis could have modified the official transport policy, and the 1974 railroad plan did indeed put a great emphasis on the development of non oil-intensive modes. The share of roads in total transport investment, which had passed from 73.8% to 83.1% between 1960 and 1970, fell to 68.8% in 1975. RFFSA ton-kilometres increased substantially in the second half of the 1970s, at a rate that far exceeded the rate of growth of the economy as a whole and of leading sectors such as steel and electricity. The underlying problems -- in particular price controls and low productivity -- remained unsolved, however, so that in 1977 the RFFSA freight market share was still only 17 per cent.[20] Financial results reflected this trend, with net real rates of return constantly negative in the 1970s, putting RFFSA apart from other public enterprises that showed positive rates.[21] Schroeder and de Castro observe that "the oil crisis did not bring about deep structural reforms, since the policy response was seen more as an opportunity to realize the self-sufficiency potential [of oil] rather than as the need to readjust the transport sector, responsible for the bulk of petroleum consumption".[22]

2.2. Autonomy and performance

Examining the degree of autonomy enjoyed by Brazilian state-owned enterprises, Thomas Trebat ranks RFFSA very low.[23] Political considerations, in particular the perceived need to subsidize tariffs so as to attain distributional goals, deprive railways worldwide of managerial and organizational autonomy. These problems were compounded in the case of RFFSA by "a lack of secure access to investment finance [and] a parallel inability to control its internal resources".[24] Finally, multiple regulatory agencies failed to tackle the significant hurdle to interconnection posed by the different gauges in use, a legacy of the fact that the individual lines were originally built by foreign investors from different countries.

---

[0]0 T. Trebat (1983), *Brazil's State-Owned Enterprises. A Case Study of the State as Entrepreneur*, Cambridge University Press, Table 5.9, p. 135 and pp 149-51. Sérgio Henrique Abranches and Sulamis Dain (1978), *A empresa estatal no Brasil*, FINEP, p. 103, quoting a RFFSA manager, observe that "the railroad could have the best possible corporate structure and the best executives, and still be unable to solve its problems. Because these are not technical issues, they are political problems" (our translation).

[1]1 See Trebat, *Brazil's State-Owned Enterprises*, Table 6.9, p. 168.

[2]2 É. Schroeder and J. de Castro (1996), "Transporte Rodoviário de Carga no Brasil: Situação Atual e Perspectivas", *Revista do BNDES*, vol. 3, no. 6, p. 175. It is also possible to conclude that the decision to reduce oil import through subsidiziation of sugar alcool, rather than through investment in non-automative transport, reflected differential lobbying power.

[3]3 See Trebat, *Brazil's State-Owned Enterprises*, especially chapter 4.

[4]4 *Ibid.*, pp. 94-5.

The regulatory framework imposed considerable burdened RFFSA, especially two particular aspects. First, until 1989, tariff levels and structure were set specifically by the government, and even afterwards their changes were subordinated to the wider framework of anti-inflation policy. Second, universal service obligations, often politically motivated, prevented the closure of chronically loss-making routes, in particular passenger ones in the North-East, therefore lowering traffic density and preventing the railroads from earning revenues in excess of variable costs. The very low level of investment in equipment provision and maintenance, as well as the quasi-endemic inefficiency of the company, have been further obstacles to its expansion.[25] Subsidies, while obviously much needed to assure the day-to-day funtioning of RFFSA, also increased its subordination *vis á vis* the government.

[5]5 See Abranches and Dain, *A empresa estatal*, pp. 126-30.

With respect to their financial performance, both RFFSA and FEPASA obtained in 1994 higher unit revenues than most of the freight railroads in the continent (4.7 and 6.7 US cents per ton-km). The difference between these prices charged in Brazil and similar figures from privately operated companies at that time (for example, the US railroad Conrail was obtaining 2.7 US cents per ton-km) reflects the lack of intramodal competition faced by the Brazilian railroads. [WHAT ABOUT ALL THE ROADS TALKED ABOUT ABOVE (AND IN THE NEXT PARAGRAPH)?] These high revenues, though, were not associated with a sound financial position, and, particularly in the case of RFFSA, its poor revenues/cost ratios demanded continual support from public funds, amounting on average to more than US$250 millions per year. A cost structure in permanent disequilibrium, in which the wage bill was almost 75% of operating expenditures, was largely responsible for this situation.[26] Financial liabilities, consisting mainly of short-term accumulated payment arrears, including interest on such arrears, and debts with the staff pension funds, amounted to almost US$ 3bn by end-1995.

The unsatisfactory operational and financial performance of RFFSA led to underinvestment, insufficient maintenance, and the deterioration of tracks, motive power, and rolling stock. Locomotive availability, a critical determinant of production capability, fell below 60 per cent for the first time in 1994, and kept decreasing; at this time about one-third of RFFSA's network was also considered in substandard condition owing to deferred track maintenance. In the first eight months of 1995 more than 200 accidents occurred, and the continued deterioration of the roadbed meant further reductions in speed and service quality. Inter-city passenger service was phased out almost completely, and the railroads' market share in the transport of freight has been declining. RFFSA has been competing with success in handling grains, grain products, and petroleum products, despite losing some of the latter traffic to newly-built pipelines; rail companies also have an advantage in handling long-haul mineral ores. As regards general cargo traffic, however, the railroads have lost most of their market share to trucking, even in the Southern regions characterized by relatively higher average traffic densities. Low number of operating locomotives and high chance of failure en route has imposed two costs on the system: traffic is refused because there are not enough locomotives available to haul the traffic on offer, and operating costs are much higher than necessary because on-line failures are more costly than preventive maintenance.

---

[6]6 These results should be qualified in two ways. First, the performance was in fact very heterogeneous across regions. Second, just before the concessioning program started, significant restructuring efforts resulted in major performance improvement . As an example of the reorganization measures, between 1994 and 1995 more than 6,000 employees retired or were laid off. In the previous years the redundancy figure was about 1,500 employees per year, on average. On the other hand, the "pride effect", mentioned by some of the consultants that worked on the privatization studies, varied across RFFSA's regional divisions and implied a relative upwards distortion on the demand estimates for the 1995-2000 period. [RP: WHAT'S THE 'PRIDE EFFECT'?]

Further evidence of the low operational performance of railways, and public utilities more in general, is provided by indicators of rent sharing. A railroad with market power for particular traffic can charge a price higher than the marginal cost of producing transport service with a low risk of driving customers away; moreover, state-owned enterprises typically do not face a hard budget constraint. In this setting, an implicit equilibrium may emerge, whereby managers (and their principals, i.e. politicians) decide to share rents with suppliers and employees, to the detriment of clients. One indicator of this activity is provided by the literature on inter-sectoral wage difference. Castelar Pinheiro and Ramos estimate that, correcting for differences in age, education, family situation, and geographical location, in 1990 railways personnel enjoyed a significant wage premium relative to other branches, indeed the seventh largest wage premium among the 46 sectors of the economy.[27] At the same time, however, RFFSA was hampered by the need to negotiate national wage rates, rather than rates that reflected local labor-market conditions. Serious shortages of skilled workforce emerged in some regions, notably in the South-East, while there were no problem of recruitment elsewhere.

3. PRIVATIZATION AND REGULATION

3.1. Privatization

While not particularly large in size and scope, the Brazilian state-owned enterprise sector has played a key role both in the country's economic and industrial modernization and in causing the problems of macroeconomic imbalances that have considerably slowed the pace of the catch-up process over the past 2 decades.[28] After a number of false starts in the 1980s, the privatization program began in earnest in 1991 with the approval of the *Programa Nacional de Desestatização* (PND), a far-reaching program which has remained the main privatization policy document through three different administrations. The PND clearly spelled out the objectives of privatization:

allow the state to modify the nature of its intervention, focusing actions and resources on social policy;
reduce the public debt;
increase investment;
stimulate competition, contributing to the qualitative improvement of goods and services; and
strengthen the stock market, through widespread shareownership (*pulverização*).

The PND established a clear and transparent legal and regulatory framework for state retrenchment, which has been integrated through a series of successive measures, sometimes responding to new pressures emerging in the course of the privatization process itself.

In March 1992, RFFSA and AGEF were included in the PND (Decree no. 473). In August

[7]7 A. Castelar Pinheiro and L. Ramos (1995), "Diferenciais Intersetoriais de Salários no Brasil", *Revista do BNDES*, vol. 2, no. 3, Table 2, pp. 207-8.

[8]8 See A. Goldstein (1999), "Brazilian Privatization: The Rocky Path from State Capitalism to Regulatory Capitalism", *Industrial and Corporate Change*, vol. 8, no. 4.

1993, RFFSA and AGEF transferred to the federal government their shareholdings in the suburban passenger lines CBTU and Trensurb (Law no. 8693). Preparation for sell-off was the responsibility of BNDES, a public sector medium-term credit institution that has been the government's agency in charge of the overall privatization strategy. The network was divided into 5, and then 6, regional companies. First created were Malhas Nordeste, Centro-Leste, Oeste (or Bauru), Sul Sudeste, and Teresa Cristina. Then, on December 23, 1997, FEPASA was transferred to the Federal Government as a part of the financial agreement between the latter and the State of São Paulo. The incorporation of FEPASA into RFFSA was effectively carried out on May 29, 1998 in conjunction with the termination of FEPASA as a State-owned independent railroad. The *Malha Paulista*, as FEPASA is also known, was then immediately included in the privatization program of RFFSA by BNDES. Other structural options were also considered by BNDES, including vertical separation -- keeping the track under public ownership -- with or without free entry for the provision of service over the rail network, and the leasing of the RFFSA system under a competitive bidding process. RFFSA's fixed assets have been leased to the new private operators, whilst financial administration, technical fiscalization, and operational surveillance and safety remain responsibility of RFFSA. Non-rail assets – mostly real estate property -- are being offered for sale to settle RFFSA's debts.

A much debated issue concerns the merits of SOE restructuring in advance of privatization. Corporatization may achieve management independence, clarify corporate goals, effect the governance of non-commercial operations through contractual relationships, and separate the railway into different business units. According to some observers, however, the goal of reform is incompatible with the political logic of the state-owned system: Kikeri *et al.*, for example, strongly argue against rehabilitation prior to sale, maintaining that "there is little evidence that governments recover the costs of physical restructuring in the form of higher sales prices". On the other hand, if the purpose of the restructuring is to create competitive markets, a higher sale price may not be the point (and, in fact, would not be expected). In the case of Chile in the early 1980s most firms had been previously restructured.[29] In the case of RFFSA, restructuring has mainly taken the form of a labor redundancy program, implemented with World Bank funds. Total staff shrank from about 110,000 in 1975 to about 42,000 in May 1995, leading to a substantial increase in productivity.[30] In addition to legally required severance payments, the redundancy package included incentives for early retirement and voluntary separation, involuntary separation grants for the remaining redundant staff, retraining programs aimed at regional employment opportunities, and job search and outplacement assistance. On average, the total package corresponded to about 21 months of salary. The program was phased. Before concessioning, it introduced the incentive schemes for early retirement and voluntary separation, with involuntary separation possible, depending on the results. In the second phase, after concessioning, RFFSA paid or will pay involuntary separation grants to the remaining redundant staff not hired by the concessionaire. Compensation for any additional employees laid off is the responsibility of the concessionaire.

---

[29] See S. Kikeri, J. Nellis and M. Shirley (1992), *Privatization: The Lessons of Experience*, The World Bank, p. 8, and M. Marcel (1989), "La privatización de empresas publicas en Chile 1985-88", *Notas Tecnicas CIEPLAN*, no. 125.

[30] See L. Thompson and K.-J. Budin (1997), "Global Trend to Railway Concessions Delivering Positive Results", The World Bank, *Public Policy for the Private Sector Notes*, No. 134.

Thirty-year concession rights for the operation and maintenance of the systems were then auctioned on the Rio stock exchange between March 1996 and July 1997 (Table 2). The rolling stocks and existing tracks and infrastructures would be simultaneously leased by RFFSA to the service operator for the same period. The reason for this double concession-leasing method was that, according to the 1988 Constitution, the Federal Government had to keep the right of providing rail transport services in the country and, in addition, keep under its ownership the assets involved in those services. The leasing (instead of sale) solution was also adopted to avoid attracting investors interested only in RFFSA's non-rail assets (particularly several estates strategically located around industrial areas). Concessionaires are required to make an up-front payment immediately after the auction, and then a stream of predetermined payments over the life of the concession, and to lower the accident rate in the first five years of operation. Once the RFFSA program began, the Brazilian government decided to sell its equity in CVRD, which resulted in privatization of the two CVRD-owned railways and the FEPASA concession in 1998.

There were no pre-qualification requirements for candidates (in terms of previous rail experience, for example), and the only limit established to avoid excessive concentration of ownership was that the share of each economic group participating into a concession should be limited to a maximum of 20% of total stock.[31] However, no restrictions were imposed for cross-participation in different concessions or concerning the participation of major rail shippers or suppliers as shareholders in privately operated concessions. In contrast to Argentina, where the freight bidding process favoured domestic interests, there were no specific provisions concerning the nationalities of individual shareholders, although Brazilian pension funds cannot account for more a fifth of voting rights altogether. The new concessionaires are mostly US rail operators (Noel Group, Railtex) and Brazilian industrial groups and banks (Bradesco, Garantia, Banco Interfinance). One of the more interesting outcomes of the concessioning process is the fact that many of the shareholders of the new concessionaires have direct or indirect interests in firms that are railroad customers. In particular, the Vicunha group is both an owner of the steel-maker CSN and, through CSN, an owner of the railroad CVRD. Cross-participation is also relevant, particularly in the cases of CVRD, which participates directly in CFN, FCA and Ferroban, whereas other companies such as CSN or Railtex have important cross-interests in FCA and FSA. CVRD, the world's largest iron-ore exporter, thus consolidates its domination of the Brazilian rail market. These ownership patterns may create a variety of competitive problems, in particular the lessening of competition among different railroads for particular traffic and the entrenchment of the steel market dominance of CSN at the expense of its steel-making competitors, who must ship iron ore over CVRD.

Table 2. Main Results from the Concessioning Process

	Oeste	Centro-Leste	Sudeste	Tereza Cristina	Sul	Nordeste	Paulista
Auction date	05/03/96	14/06/96	20/09/96	22/11/96	13/12/96	18/07/97	10/11/98
Transfer date	01/07/96	01/09/96	01/12/96	01/02/97	01/03/97	01/01/98	01/01/99
Nr of bidders	n.a	2	3	1	4	4	2
Private operator	Ferr. Novoeste	Ferr.Centro Atlântica	MRS Logística	Ferr. Tereza Cristina	Ferrovia Sul Atlântico	Co. Ferr. Nordeste	Ferroban (FBN)

[11] This threshold also reduced the number of potential bidders, since each consortium had to include at least five partners.

	(FNV)	(FCA)	(MRS)	(FTC)	(FSA)	(CFN)	
Shareholders (in *italics*, main ones)	*Noel Group,* Brazil Rail Partners, Western Rail Invest., Bankamerica DK Partners, Chem Lat, Amer Eq	*Min.Tacumã*, Interférrea, *CSN*, Tupinam., *Railtex*, Varbra *Ralph Partners*, *Judori* CVRD	*CSN MBR* Ferteco *Usiminas* Celato Caemi Cosigua	*Banco Interfinance*, *Gemon G Eng Mont*, *Sta. Lúcia*	*Ralph Partners,* Varbra, Judori Ad Emp Part Railtex *Judori* Interférrea Brazil.	*CSN ABS Taquari CVRD*	Previ Funcef U. de Comercio Chase Latin *CVRD*
Bid							
Minimum	60.2	316.9	888.9	16.6	158.0	11.5	233.4
Actual	62.4	316.9	888.9	18.5	216.6	15.7	245.0
Premium (%)	3.5	0	0	11.3	37.1	37.9	4.9
To Govmt:	3.0	15.8	44.4	0.83	7.9	0.5	11.6
To RFFSA:	57.2	301.5	844.4	15.8	150.1	10.9	221.7
Down payment							
(% min. bid)	10%	20%	30%	10%	20%	20%	20%
Total	6.0	63.3	266.7	1.6	31.6	2.3	11.6 (*)
Other payment							
Grace period	2 yrs.	2 yrs.	1 yr.	2 yrs.	2 yrs.	3 yrs.	2 yrs.
# Quarters inst.	112	112	116	112	112	108	112

Notes: All figures are in R$ millions.
(*) In the case of Malha Paulista there was a second installment of R$ 35 million.
The information on the number of bidders was provided by Rio's Stock Exchange.

Source: RFFSA (1998), *Relatório da Acompanhamento Trimestral das Concessões, 4º Quarter*.

3.2. Regulation

The new rail regulation (Decree no. 1832), issued in March 1996, defines multiple key factors: (i) operators are allowed to freely set their prices for services if they face effective competition, including tariff differentiation to account for the needs of individual shippers; (ii) operators are required to enter into reciprocal switching or, when this is not possible, they must quote unbundled rates and provide connecting service for joint hauls; (iii) the regulators must allow operators to set prices that are responsive to differences in demand and in marginal costs, and to enter into voluntary shipper contracts with individualized terms and conditions; and (iv) the prices which a railway sets for captive shippers over whom the railway has monopoly power, are constrained using to a revenue ceiling defined by the stand-alone cost of providing service (as in the US). The regulation also obliges concessionaires to seek permission from the federal government before closing rail lines.

The concession contracts also addressed the relationship between concessionaires and shippers and defines the maximum prices to be charged for transport services. Ceilings vary according to the length of the haul, type of product, and the geographic region served. These maximum prices are to be revised periodically to correct for inflation. There also exists a vague notion regarding the concessionaire's obligation to maintain its financial and economic equilibrium: the concession contract stipulates that tariffs should be above the railroad's long run variable cost (although no methodology is provided for the calculation of those costs).

Finally, the provisions of the concession contracts regarding captive shippers and joint traffic are worded in very broad terms. In general, the interested parties are expected to reach an agreement on these issues. If they do not, the Government, through the Ministry of Transport, has the power to review the problem and set rates for captive shippers. As noted above, railroads are obligated either to carry joint traffic or to allow connecting railroads access to the tracks necessary to complete the movement. The two railroads are to negotiate the tariffs for joint traffic, but again the Government can step in to set the rates or order access if the negotiations fail.

The institutional setting for the monitoring and enforcement of regulation has been evolving overtime. It started with a fairly straightforward enforcement of the contractual commitment by the residual RFFSA. This responsibility was then moved to Department of Rail Transport in the Ministry of Transport (MoT). As of mid-2000, a proposal for a new regulatory agency for land transport is in Congress and this should settle the matter of assigning responsibilities. Any issues relating to competition would remain a responsibility of CADE, the antitrust agency.[32]

4. PRELIMINARY RESULTS

While there is a consensus that privatization significantly improved performance of the industry since 1997 and contributed substantial fiscal savings for the Treasury, it is far too early to assess the broad, long-term effects of the program. What is available is rather a collection of raw data giving some evidence of what is happening at the enterprise level. In order to facilitate the comparisons, we first analyze output, productivity, financial results, and fiscal performance, and then move on to contractual targets (output and safety), investments, and quality of service.

---

[2]2 On the general issue of the split-up of responsibilities and duties, see OECD (1998), *Relationship between Regulators and Competition Authorities*, DAFFE/CLP(98)6.

For the total of concessions, output in ton-kilometres increased from 38.7 million in 1996 to 46.3 million in 1999 or about the peak level for the decade reached in 1993. Employment decreased from 32187 in 1996 to about 12,000 in 1999.[33] The combination of these two figures implies that labor productivity (measured by TKU/employees) experienced important increases overall. In fact, in all cases except for the *Companhia Ferroviária Nordeste* (CFN), a minimum of 1 million TKU per employee per year was achieved. The overall revenue figure is much less spectacular. In dollars, as a result of the dramatic devaluation of the last couple of years has decreased by almost 50%, from US$956 million in 1996 to $532 in 1999. In local currency, however, after an initial decline, the revenue in 1999 has now recovered in 1996 levels. Operating revenues per TKU decreased initially but has recovered its 1997 level in 1999.

The increase in labor productivity is one of the most striking consequences of the privatization process, especially in the RFFSA concessions, and the reduction in labor costs is indeed the main reason for improved financial performance. Most concessionaires are continuing to reduce their workforces, which are now on average only about a third as large as they were in 1995. However, the different structure of output and cargo composition makes it difficult to generalize about the experience of the *Malhas*. In 1998, three of the four railroads that depend heavily on iron ore, coal and other minerals (FTC and the two CVRD railroads) were earning enough in freight revenue to cover total costs, while the fourth (MRS) was earning enough to cover operating costs. By contrast, none of the four railroads that depend on agricultural and mixed bulk traffic (FSA, FNV, FCA, and CFN) were earning enough to cover total expenses, and only two were covering operating expenses.[34] The two largest ore railroads – MRS and CVRD – enjoy very high traffic densities and rely heavily on unit trains. As a result, they are relatively profitable despite the fact that they charge relatively low tariffs per ton kilometer. The railways that rely heavily on agricultural products also have the potential for high traffic densities, particularly FSA, FNV and FCA, but agricultural traffic is more seasonal and more susceptible to competition from trucks and waterways. Moreover, the agricultural railways are in danger of losing some of the other traffic that they have used to balance their system, such as petroleum products, fertilizers, and construction materials. Petroleum traffic revenues in particular have fallen off recently because of both changes in Government petroleum pricing policies and the construction of new pipelines. Brazilian railroads had been able to charge fairly high petroleum tariffs in the past because the Government-owned oil company (Petrobrás) had a policy of trying to keep retail prices relatively similar throughout the country and was not sensitive to the

---

[3]3 The figures provided by RFFSA (1998) do not include the activities formerly performed by the RFFSA network that were subcontracted after the privatization process.

[4]4 A second qualification is that the financial figures for the CVRD railroads may not be comparable to those for the RFFSA railroads since the CVRD railroads still operate much like departments of the larger mining company, which may create differences in how costs and revenues are allocated or accounted for. CVRD also still retains minor intercity passenger services, while RFFSA's passenger services were spun off as separate companies before privatization.

transportation costs it paid. FSA lost a substantial portion of its petroleum traffic in 1996 when a new pipeline opened to Curitiba, and FCA will lose traffic when a pipeline under construction opens in its territory. CFN is in a class of its own in that it serves a poor region with little prospect for generating dense traffic flows.

The second overall positive effect resulting from the privatization of RFFSA is the amount of fiscal savings obtained by the Federal Treasury through the reduction of its subsidy payments. Although the company has the structure of a corporation, with 100% of capital under the control of the Federal Government, it has never paid dividends since its creation in 1957.[35] In the decade 1985-1995 the volume of subsidies received from the Federal Treasury amounted to more than US$3 billion. In 1995, RFFSA lost R$300 million and, in December, had accumulated debts for R$4 billion. Before the concessioning process, RFFSA earned sizeable losses on its operations each year (US$84.5 and $159.1 millions in 1993 and 1994, respectively). In 1996 and 1997, after the start of the restructuring process, RFFSA operating losses were progressively reduced and subsidies for public service obligations completely removed. Net operating profits turned positive in 1996, although the debt burden continues to require large interest payments (about US$500 millions per year) that will keep the total profit figures in the red during the next five years at least.

Table 3. RFFSA Financial Performance Before and After the Privatization

All figures in US$.

	1993	1994	1996	1997	1998	1999
+ Gross operating revenues	757.8	799.4	572.6	34.1	77.9	21.9
+ Other income	28.1	35.8	473.4	273.8	1714.2	768.8
= Total gross revenues	785.9	835.2	1046.0	307.8	1792.1	790.7
- Taxes	34.5	40.9	66.0	15.3	12.6	18.8
= Net operating revenues	751.4	794.3	980.0	292.6	1779.5	771.9
+ PSO Subsidies	14.5	21.3	0.0	0.0	0.0	0.00
= Total net revenues	765.9	815.6	980.0	292.6	1179.5	771.9
- Total operating expenses	850.4	974.7	533.3	63.8	821.2	520.1
= Net operating profits	-84.5	-159.1	446.7	228.9	958.3	251.8

Notes: PSO Subsidies are compensations for public service obligations

Source: World Bank (1996) and RFFSA (2000), *Relatório da Acompanhamento Trimestral das Concessões*

RFFSA no longer has operational activity, and its main economic role is limited to the monitoring of its assets and the repayment of its existing debt. Many of these debts with suppliers and financial creditors, and most of the labor liabilities associated with the workers reduction programs, have already been rescheduled or settled through revenues from the lease of the assets and the sale of non-rail related property, which amounts to US$1491 billion to be received during the next 30 years. From the Treasury's point of view, the savings arising from reduced operating subsidies and the proceeds from the concession contracts can be estimated to be more than US$300 million a year.

---

[5]5 Brazilian public "Sociedades Anônimas" are commercially-oriented corporations that – as opposed to the "Autarquias" – are supposed to conduct profit-seeking strategies.

Instead of specifying direct investment requirements, the concession contracts for all ex-RFFSA networks gave indirect investment incentives to the concessionaires by compelling them to meet two targets (or *metas contratuales*) within the first years of the concession period, the first in terms of minimum TKUs billions per year, the second in terms of accidents per million train-kms a year. With respect to the first target, despite the steady growth in output experienced during the 1997-1999 period (as compared to the output before the privatization, and taking into account the distortion of immediate pre-privatization years of 1995-1996) no operator could meet its *meta*. As of end of 1999, the concessionaires have reached only 68% of the traffic [RATHER THAN "INVESTMENTS", RIGHT?] expected to be achieved by 2001. Ferroban has been the poorest performer with only 33% of what is expected for 2001. The Government has noted the shortfalls but not moved to sanction the concessionaires. Slightly better results are being obtained with the safety target, which is required after the second year of the concession. Two concessionaires could meet this target during the first control period. At the moment, the regulatory entities are devising new ways of monitoring the performance of the companies and still consider that most concessionaires will be able to meet their targets within the five year period. According to the contracts, the concessionaires must also submit a triennial investment plan, and then they are evaluated on their partial achievements. In 1997 only 3 out of the 5 early concessionaires were able to match effective and planned investment. This is due in part to lack of enforcement and in part to the fact that in most cases the operators have not been able to generate sufficient funding. In general, despite all parties reckoning that the volume of investment during 1997-1998 was larger than the amounts invested by RFFSA in equivalent periods, it is expected that the planned investments for the first six years as spelled out in the concession terms of references will be barely completed. This failure of the output and safety incentives that are in place is the only post-privatization performance issue which is not regarded as a success by the Government.

Finally, quarterly figures for punctuality, reliability, availability of locomotives, damage to the cargo, etc. show a clear improvement with respect to the international standards, but in many cases are hardly comparable with pre-privatization period data due to different accounting procedures. A survey conducted by RFFSA in late 1997 showed that principal customers were satisfied with regard to the quality of service received, although they still considered tariffs to be too high. The latest survey conducted at the end of the first quarter of 2000 confirms the trend of improved satisfaction. The only decline is for Estrad de Ferro Vitoria Minas where the degree of satisfaction is still close to 70%. Teresa-Cristina has the best rating with 86.7%. Ferroban has the lowest with 54%.

5. POST-PRIVATIZATION REGULATORY PROBLEMS

Although the privatization of the Brazilian rail system is generally viewed so far as a success, a number of important issues either have started to emerge already or are expected to emerge in the near future if no action is taken. In several cases these issues represent old problems that were not fully addressed in the design of the transition from the RFFSA model to the present privately operated concession model. In other cases they are a direct consequence of the way in which the process was designed. In both circumstances, these post-privatization regulatory problems can be interpreted as warning signals that – once they receive adequate attention – should help to keep the process in shape. With the caveat that all the issues

addressed in this section are closely related, it is possible to identify at least five major problem areas at the moment.[36]

Institutional design

The main institutional problem is that three years after the first concessions were awarded, the assignment of regulatory responsibilities is not clearly sorted out yet. The creation of an independent regulatory agency is still a project sitting in Congress and the operators have already had to deal with at least three agencies responsible in some way for monitoring compliance. Although since 1999, the Ministry of Transport took over from the residual RFFSA and is controlling the sector until the Agency gets cleared by Congress, the efforts to build up capacity are slow since it not clear who the regulators will be. The MoT has issued some guidelines to operators on procedures and format of information requirements but these have continued to be vague and a source of conflict with many operators who sometimes have complained of the intrusiveness of the process.

Limited investment and financing options

[6]6 Although some of the issues may also affect CVRD railroads (EFVM and EFC), the institutional problems deal primarily with the relationship between the Government and ex-RFFSA concessions.

Almost all the concessionaires (with the exception of CFN) have started important medium-term maintenance projects aimed at satisfying the most urgent needs of their respective networks.[39] For most operators, however, the real problem lies in the fact that, since the vast majority of their assets are leased from RFFSA, they cannot be used as collateral for borrowing funds from financial intermediaries. Thus, access to relatively cheap funds is quite limited. Additional financing problems arise from the existing high level of indebtedness of RFFSA. Some creditors, including even former RFFSA employees, have obtained judicial restrictions on certain of RFFSA's assets that are leased to the concessions, thereby jeopardizing the normal operation of the companies. In the current context, alternative sources of external funds to overcome these problems and promote long-term investment are scarce. Foreign capital has only a minor presence in this sector as compared to the rest of the Brazilian economy, and the cost of servicing dollar-denominated debts increased in the wake of the 1998 devaluation. With respect to domestic financing, several operators claim to face costs of capital above 40%. Despite a contractual obligation, only two concessionaires are quoted in the Stock Exchange (and one of them on *SOMA*, a small specialist exchange) and most firms rely heavily on new capital from their existing shareholders.

Some ambiguities regarding tariffs

The contractual requirement of minimum prices above long-term variable costs for each service, so as to avoid predatory behavior [I THOUGHT IT WAS TO INSURE LONG-TERM VIABILITY, AS MENTIONED ABOVE. THIS IS THE FIRST WE'VE HEARD OF PREDATORY BEHAVIOR.], is general, unspecific, and controversial. As in other sectors, calculating these costs is usually difficult, in part because they may widely vary among different types of services and cargoes and in part because it is often difficult both conceptually and operationally to differentiate clearly between fixed and variable costs, as well as to separate out joint costs. In certain cases, true long-run variable costs can be extremely low (for example, in return trips). One way of justifying the restriction is to see it as an explicit limit to the possibility of users that also participate in the concessionaires as shareholders to set lower prices for themselves and higher-than-normal prices for other users, thus obtaining an unfair cross-subsidization. An alternative is to see it as a way to allow the concessionaire to refuse non-economic services despite pressures (for example, from regional or local authorities) to do so. However, it should also be kept in mind that lower limits on pricing can be quite harmful to competition. In the context of the concession contracts, this harm to competition could impose perverse restrictions on the achievement of both the investment targets and the output targets set in the contract, by discouraging the attraction of new customers.

The second issue related to contractual tariffs is a requirement for the concessionaire to pursue its "economic and financial equilibrium." In most cases this could be interpreted simply as the need to revise tariffs according to inflation, something which is already explicit

---

[9]9 In 1997 a total amount of R$243 million was invested by FNV, FCA, MRS, FTC and FSA. Most of this amount was devoted to infrastructure, except by MRS and FSA, which started a plan to renew some of their wagons and locomotives. Under the caption of "other investments" are included information systems and improvements in the workforce.

in the contract but which is not under the control of the concessionaire. More dangerously, some concessionaires fear that that this clause could also be interpreted in a long-term sense in order to demand more investments than initially planned. This provision of the concession contract seems quite vague, and a potential conflict could emerge in the future if interpretations are dependent on the Government's attitude on the issue. Clarification of this ambiguity will be an important priority for the new regulator.

The problem of captive shippers

If the question of minimum prices concerns primarily the concessionaires, the question of the maximum price, when and how to apply it, and whether it is possible to set up other ceilings in certain cases, is a matter of major importance for many users. Existing contracts set relatively loose price caps, but in general firms were prevented from charging the maximum price by existing, strong intermodal competition. However, for captive shippers – those without access to alternative means of transport – this market method of control does not work, and they can face high tariffs and/or abusive conditions for services. The regulators have prepared some guidelines intended to satisfy the general obligation established in the contracts for the Ministry to act in these cases.

The first issue is the need for a straightforward definition of a "captive shipper." Following international experience, the method proposed by the regulators requires a petitioning shipper to submit information aimed at providing a complete definition of the market served, the volume and type of affected cargoes, the current and potential competition in the transport and final product markets, and the cost structure of the company. An important regulatory challenge -- as in the US -- will be to insure that these requirements are not so burdensome as to render captive shipper protection ineffectual. The second step is the determination of the maximum tariff to be charged to these captive shippers. The rules developed by RFFSA are based on a calculation of the costs associated with the service offered to that particular shipper -- frequently not an easy task, as noted in the previous section. Usually the major problem here is the allocation of common costs. In addition, in Brazil some qualifications are needed, since the concessionaires do not own, but only lease, the assets used to provide rail services. A particularly clear accounting treatment of both the revenues and the expenses associated with the assets is required.

The regulators are to step into the fray if the parties involved cannot reach an agreement. There are several examples of this problem in various concessions, and not all the cases should be given the same treatment. Perhaps the most serious captive shipper cases involve allegations of discriminatory treatment of nonintegrated rivals to the manufacturer shareholders of the EFVM and MRS railroads.[40] In the case of the EFVM network, partially owned by giant steel producer CVRD, some users assert that they are required to carry out specific investments in order to be served by EFVM, which then uses high tariffs to "squeeze" them, thus giving a competitive advantage to CVRD products. A similar reasoning explains

---

[0]0 These cases have started to be examined by the Servicio de Defesa Economica (SDE), an organ of the Ministry of Justice that works with the competition tribunal CADE in investigating possibly anticompetitive behavior. However, this process is often slow (about 2 years has been the average, though there are efforts underway to reduce this) and the problem may worsen in that time. COFER, the Federal Rail Transport Commission, has not been used.

the behavior of MRS, whose shareholder-customers account for more than 70% of total output. They are paying particularly low tariffs as compared to nonintegrated shippers lacking alternatives. For instance, when RFFSA operated *Malha Sudeste* in 1996, the average shipping tariff was about R$9.15/ton, down from R$11.00 in 1993. Following this trend it was estimated that the post-privatization full cost tariff for all users would be around R$7.00 per ton. The figure for some shareholders-customers in 1998 was estimated in R$4.00 per ton. This shows that, far from only affecting the user-operator relationship, the captive shipper issue demands the attention of the regulatory authority from the point of view of competition in downstream markets.

The latest instance of this problem, in March 2000, confirms that the issue is still far from being resolved. Iron ore producer Samitri was victimized by CVRD's control of its only access to the port of Vitoria. Samitri spent 30 days trying to get 250,000 tons of iron onto a ship bound for a major European mill. It ended up having to pay stiff penalties for delays in shipping ($120,000/month). The explanation offered by CVRD was that Samitri had exceeded its quarterly quota. Overall, Samitri may have lost 1 million tonsin sales as a result of this type of conflict and is looking forward to the creation of an agency with the ability to draw new guidelines to help captive shippers.

Access prices, joint traffic and interconnection

The question of interconnection and access rights stems the restructuring model chosen for Brazilian railroads. The regional structure chosen is such that only in relatively few cases will a concessionaire not have either to exchange traffic or to cross its neighbors' tracks when carrying long-distance traffic. The six RFSSA companies that were formed interchanged little traffic with one another. However, these railroads do interchange traffic with the CVRD railroads and with FEPASA. It is the privatization of FEPASA has brought the issue of joint traffic to the forefront again. Most notably, any shipper wishing to ship by rail to the port of Santos -- whether originating on FEPASA, FCA, Ferronorte, Novoeste, Ferropar, or FSA -- must interchange for the final 22 km of the journal with MRS. For example, of the 19 million tons originating on FEPASA, almost 4 million tons was transferred to MRS, mostly to be shipped out of the port of Santos. From MRS's perspective, however, those 4 million tons were not very important: they accounted for less than 10 percent of MRS's total tonnage, and even less of its ton-kilometers because of the very short distance involved between the interchange point and the port. In general, the policy set in the contracts regarding the connectivity issues (access rights, mutual traffic, etc.) favored bilateral, market-based solutions, giving again only the power of arbitration to the MoT. However, for this approach to be effective requires two conditions which are rarely met in Brazil: that the regulators have the information necessary to set tariffs for captive shippers and that the railroad management is experienced and sensible about negotiating joint rates. This latter point requires the management of the concessions to have a single objective, that of profits, which, as will be seen later [IS IT?], is not necessarily the case of Brazil. Therefore, from the regulatory policy point of view, the fact that negotiations over joint tariffs have not broken down yet is a hopeful sign -- for example, it appears that FEPASA and MRS have reached an agreement for FEPASA to have trackage rights to the port of Santos -- but the potential for conflicts over interconnection issues remains high.

Ownership structure and its consequences

A final potential problem that will be demanding regulatory attention – either from sectoral regulators or from the competition agency CADE – relates to the ownership structure of the consortia who won the concessions. Since one of the primary objectives of the Government was to ensure the sale of the existing RFFSA malhas, no tight controls were imposed on the ownership structure of the resulting private rail operators in terms of who should own them. The only restriction, a 20% limit as the maximum stake that any single party could own in any given concession,[41] did not effectively restrict indirect controls or cross-participation that might result in more ownership concentration than was intended or in conflicts between different rail users. Although it is not immediately clear or straightforward to guess which controlling group is behind every shareholder, it is clear that the limit of 20% was applied only to nominal capital (Table 5). When voting rights are accounted for, several shareholders own more than 20%, although in no case more than 50%. Also, the volume of (merely directly perceived) cross-interest is relatively important in all cases except for Ferrovias Novoeste, which is mostly owned by foreign capital, and the smaller Ferrovia Tereza Cristina, which only has three shareholders. These interests are represented in italics in the table.

Table 5. Ownership Structure of RFFSA Concessions

FNV	Noel Group (38.11%), Brazil Rail Partners (6.70%) Western Rail Investors (7.58%) Bankamerica Internac. (8.55%) DK Partners (0.95%) Chemical Latin America (38.11%)	**FTC**	Banco Interfinance (33.33%) Gemon Geral Eng Mont (33.33%) Sta. Lúcia Agro Industria (33.33%)
FCA	Mineração Tacumã (11.24%) Interférrea SA (9.73%) *CSN (12.82%)* Tupinambarana SA (9.73) *Railtex International (12.97%)* *Varbra SA (6.25%)* *Ralph Partners Inc. (17.81%)* *Judori Adm. Empr e Part. (12.97%)* *Fundacion CVRD (3.48%)* Banco de Boston (3.00%)	**FSA**	*Ralph Partners Inc. (44.20%)* *Varbra SA (7.00%)* *Judori Adm. Empr e Part. (18.40%)* *Railtex International (6.00%)* Interférrea SA (7.00%) Brasil Private Equity (13.05%) Brazilian Equity Invest III (3.44%) Brazilian Equities (0.91%)
MRS	*CSN (33.08%)* MBR (23.20%) Ferteco (9.50%) Usiminas (11.28%) Funcape (9.88%) Cosigua (2.99%) Celato (2.40%) Ultrafertil (5.00%) ABS (2.67%)	**CFN**	*CSN (20%)* *ABS* (20%) Taquari Participações (40%) *CVRD (20%)*

Note: Percentages are calculated over total capital, except for CFN, where they have been calculated over voting capital

Source: RFFSA (1998), *Relatório da Acompanhamento Trimestral das Concessões, 4º Quarter*.

The possibility of competitive concerns regarding either horizontal or vertical restrictions is apparent. The case of CVRD is quite illustrative. First, this company holds major shares in both the EFVM and EFC and controls several ports in areas close to its mines. As noted above, CVRD competitors in a variety of sectors must use the CVRD railroads and ports in

[41] In practice, in the FTC and CFN cases the limits were set at 33.3% and 40%, respectively.

order for their products to reach their markets. Furthermore, CVRD has participated in almost all bidding for rail concessions and now holds additional direct controlling stakes in at least CFN, FCA and Ferroban concessions, and indirect participation in most of the remaining networks. If CVRD succeeds in controlling the management of most of ex-RFFSA concessions---it is already involved in 5 of them!--, the harm to competition, to shippers, and to the Brazilian economy could be very great.

The critical issue here is not only how these problems should be addressed but who should address them. The answer is not simple, since the entire sector still lacks a well-oriented regulatory policy and structure. In principle, problems of price discrimination or predatory behavior should be dealt with by the regulatory agency, CADE, as in any other industry.[42] However, many of these items, plus questions regarding the issue of captive shippers or the simple concentration in ownership, appear to be stipulated in the contracts and should then be addressed by the body in charge of monitoring contract compliance, possibly in conjunction with CADE. In practice, the lack of independence of COFER, the powerful positions enjoyed by concessionaires, the weak position of RFFSA, and the lack of experience of the Ministry of Transport means that all these issues have fallen into the lap of the *Servicio de Defesa Economica* (SDE), which investigates cases to be referred to CADE. An urgent clarification of competencies is needed on this topic, along with an urgent increase in the powers of the agencies involved, but no major advances have occurred so far.

CONCLUSIONS

Overall, the rail's sector transformation can be called a success. Rail services are far better than they used to be and the fiscal savings are quite impressive. However, the sustainability of the achievements is threatened by three problems that would require swift action

the need for to get the expected new Regulatory Agency in place

the need to finalize the definition of key regulatory instruments (accounting rules, access rules and review of captive shippers concerns in particular in view of the increasing concentration of ownership of the sector)

the risks resulting from limited investment and financing options.

The critical issues here are how to address these problems and who should do what. The answer is not simple because the sector still lacks a well-oriented regulatory structure and while there is no formal evidence, it is quite likely that the regulatory uncertainty is one

---

[2]2 Brazilian antitrust legislation makes reference to three different entities: CADE (Administrative Council for Economic Defence, an autonomous agency composed of six commissioners and a President, all appointed by the President of Republic and confirmed by the Senate for a fixed term), SDE (Secretariat for Economic Law, in the Ministry of Justice) and SEAE (Secretariat for Economic Monitoring, in the Ministry of Finance). Their responsibilities, according to the law, are as follows: SDE is in charge of starting and conducting investigations related to antitrust cases, as well as monitoring the market for anticompetitive practices. SEAE is responsible for preparing non-binding economic opinions on merger cases and may issue opinions in the case of anticompetitive practices. CADE is an autonomous agency that enforces the competition law by adjucating cases, deciding on what constitutes a violation of the law, and applying penalties when needed. CADE can also conduct additional investigations when necessary.

of the reasons why investment is slower than expected and why Brazil's railway system is still far from being the player it should be in the Southern American transport sector.