RAILROAD REFORM:

AN OVERVIEW OF THE OPTIONS

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Introduction

Many countries reformed their railroads in the last two decades in an attempt to reduce deficits, increase efficiency, and improve the quality of service. The reforms are of two main types: one involves efforts to reduce the extent of government involvement in railroad management and the second efforts to introduce more competition in railroad service by mandating that railroads provide other railroads or independent train companies with access to their tracks and other infrastructure.

Both types of reform represent radical departures from past practice. Before the reforms, virtually all of the railroads in the world were either government owned or tightly regulated by government agencies. Government ownership was the norm outside North America. In North America all the major freight railroads in the United States and one of the two in Canada were privately owned, but these private railroads were tightly regulated by government agencies with the power to dictate tariffs and prohibit the abandonment of service or the merger of companies. Beginning in the 1980s, over a dozen countries transferred their government-owned railroads to the private sector either by selling the railroad outright or by granting a private company a concession to operate the railroad for 10 to 50 years. And in North America the powers of government regulators to intervene in the private railroads' affairs were sharply restricted.

Similarly, before the reforms virtually all the railroads in the world combined infrastructure and train operations in a single company, with no or few rights to access other the tracks of other railroads. Different railroads usually served different countries or regions within a country, so that some shipments might originate in the territory of one railroad and terminate in the territory of another. The railroads usually had agreements to exchange cars so that interchange traffic did not have to be unloaded and reloaded in transit. But each railroad owned all or most of the locomotives, tracks, yards, and stations needed for the region it served. In the parlance of economists, the railroads were horizontally separated in that they served different territories but vertically integrated in that they provided all the key functions needed to serve their territories. Beginning in the 1980s, a number of countries began to vertically "unbundle" their railroads by requiring that existing railroads grant other railroads or independent train operating companies access to their tracks. In some cases the incumbent railroads were also broken into separate train operating and infrastructure companies to facilitate the introduction of competition and more seamless through services.

The early results suggest that the privatization and deregulation has been a more successful avenue of reform than vertical unbundling. This conclusion has to be regarded as tentative since many of the reforms are so recent that it is too early to tell how successful they have been and why. And it is important to acknowledge that privatization and deregulation have not always been successful and that mandating track access can produce important benefits, particularly if it is done selectively. Nevertheless, the potential for extra competition that vertical unbundling offers seems to be of limited value because railroads already face such intense competition from alternative modes, locations, and products. In addition, the quality of railroad service depends heavily on

the close coordination of infrastructure and train operations, and this coordination seems much harder to achieve when the two activities are provided by separate companies.

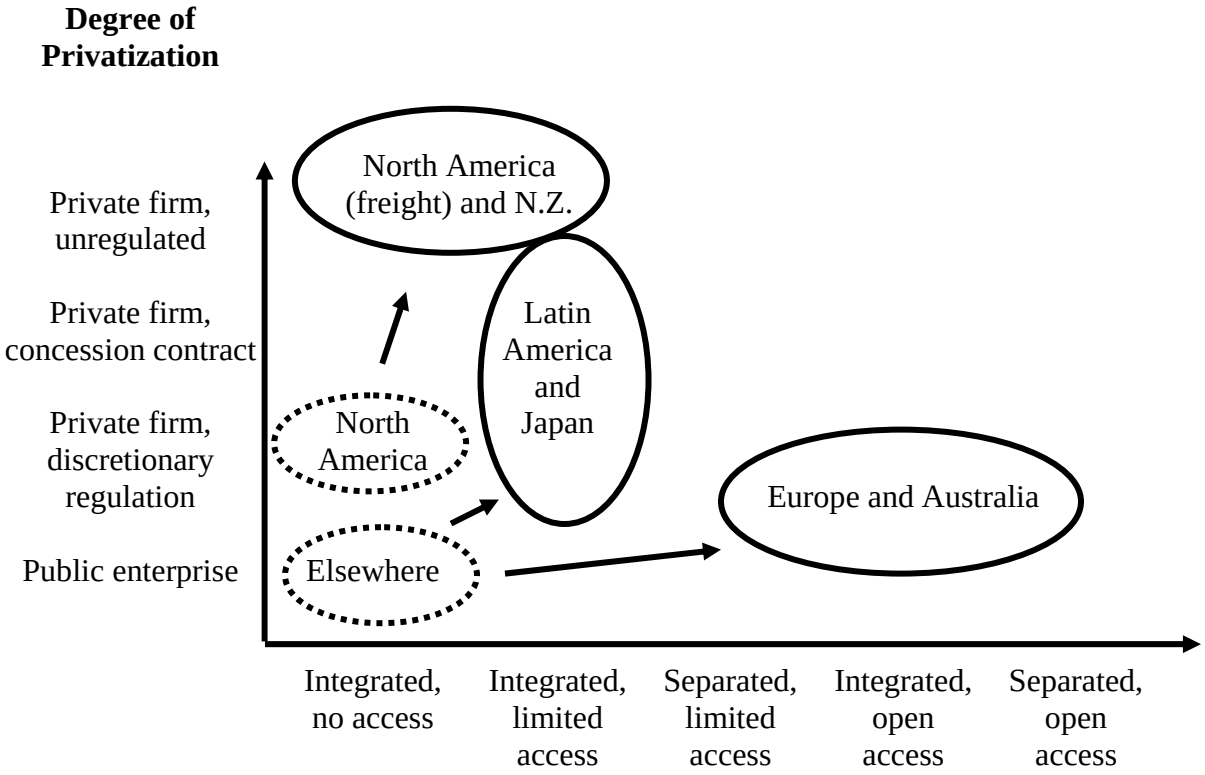
To develop this argument, we first present a menu of reform options, distinguishing the two main types and identifying the different packages or combinations of the two that have been adopted in different countries. The main body of the paper then summarizes the experience with three common packages: one which relies primarily on unbundling and is most closely associated with Europe and Australia, a second that relies primarily privatization and is found mainly in North America and (until 2004) New Zealand, and a third that combines privatization with selective track access as practiced in Latin America and Japan. The final section attempts to draw together the arguments on privatization and vertical unbundling and with some very speculative implications for Spain.

Two Dimensions of Reform

Figure 1 summarizes the menu of reform options with privatization on the vertical axis and vertical unbundling on the horizontal axis. Privatization means the degree of autonomy that railroad management enjoys from government interference. At one extreme is a government-owned enterprise, at the other extreme a privately owned and unregulated enterprise, and in between are private enterprises subject to different forms of regulation. Vertical unbundling means the ease with which railroads can use each other's infrastructure. At one extreme are vertically integrated railroads with no track access, at the other extreme are vertically separated railroads with open or unlimited track access, and in between are different degrees of access and separation. The dotted ovals in the diagram indicate the policies of different countries or regions before the reforms of the 1980s and 1990s and the solid ovals indicate the situation after.

Railroad policy has been shaped by the decline in railroad market share and profitability during much of the 20th century, a trend rooted in increasing competition from autos, buses, trucks, pipelines, and airlines. Before the development of the highway and air modes the railroads enjoyed a near monopoly in transporting intercity freight and passengers, the principal exceptions being on routes where inland waterway or coastal shipping was a realistic option. By the 1920s these new modes had begun to encroach noticeably on the railroads, and after World War II the competition intensified significantly. The railroads' decline provoked an earlier round of reform immediately before and after the world war, when many countries in Europe and the developing world bought out or expropriated their private railways. The hope was that consolidation and reorganization under government ownership, perhaps accompanied by a one-time infusion of new capital, would help arrest the industry's decline. An additional motive among developing countries was economic nationalism, since their railroads were usually owned by foreign investors.

Figure 1: Overview of Reform Options



Within a few decades, many industry observers came to believe that governments' close involvement in the railroads, either as owner or regulator, was counterproductive in that the involvement made it harder for the industry to adapt to its new environment. Public ownership was usually accompanied by public subsidies, which were helpful. But it also was accompanied by requirements to attend to employment, regional development, and other social goals that competed with the railroads' basic transportation function. Railroads were typically pressed to employ more staff than they needed, for example, or to maintain branch lines and services that were lightly used and no longer profitable, and the costs of these obligations often exceeded the subsidies they received. In North America, government regulators usually required the privately owned railroads to attend to many of the same social goals. These privately owned railroads were typically not subsidized, however, since public subsidy was less politically acceptable unless accompanied by public ownership.

The efforts to reduce government involvement in railroad management began in the 1960s and 1970s when some countries experimented with converting their railroads from government agencies into publicly owned corporations. The hope was that the

corporate form would strengthen the accountability of managers for key performance objectives while freeing them from interference in day-to-day affairs. Corporatization proved to be a disappointment, however, largely because it did little to alleviate the pressures to pursue conflicting or unrealistic goals. By the 1980s, some countries were ready to experiment with privatizing or deregulating their railroads as a means to more clearly define and limit the role of government in the industry.

Efforts to introduce competition and improve services by mandating track access and separating infrastructure from train operations also began in the 1980s, but had different roots. The idea was inspired in part by the experiences of the telephone and electricity industries where reformers had begun to separate activities with the potential to be competitive, such as long-distance calling or wholesale power generation, from activities that seemed inherently monopolistic, such as local hard-wire telephony or high-voltage electricity transmission. There were also obvious parallels with road transportation, where competing trucking and bus companies had long shared access to highways that were built and maintained by independent highway agencies. If separation and open access seemed successful in telephones, electricity, and highways, why not in railroads?

The strategy of mandating access and separation is not consistent with that of limiting government involvement in the industry. Separation reduces involvement in as much as government regulation or ownership can be confined to the infrastructure companies, where the fear of monopoly is greatest, while train operating companies can be governed by market forces, with minimal government interference. But as long as some segment of the industry is thought to be monopolistic, the government is likely to continue to be involved as regulator or owner. And mandatory access arguably makes the government's task more complicated since it is now responsible for supervising the coordination of track and train operations provided by separate companies. Concern over the conflict between mandating access and reducing the role of government has led some countries to mandate access only in limited circumstances, where the competitive or service benefits were thought greatest, and to encourage the railroads to negotiate the terms of access instead of having the terms dictated by government.

Vertical Unbundling: Europe and Australia

Motives. At the risk of some simplification, Europe and Australia are associated with reforms that emphasize vertical unbundling more than privatization.[1] There are several motives for unbundling, however, and they vary in their importance from one country to the next. The one motive common to all countries is the hope of improving

[1] For more detailed descriptions of the mandatory access regimes in continental Europe and Australia see Bureau of Transport and Regional Economics, Department of Transport and Regional Services (Australia), *Rail Infrastructure Pricing: Principles and Practice*, Report 109 (Canberra: Bureau of Transport and Regional Economics, 2003); European Conference of Ministers of Transport, *The Separation of Operations from Infrastructure in the Provision of Railway Services* (Paris: OECD, 1997); Stuart Holder, "Recent Developments in Rail Infrastructure Charging in the European Union," *Journal of Transport Economics and Policy*, 33, no. 1 (January 1999):11-118; and Eric Monami, "European Passenger Rail Reforms: A Comparative Assessment of the Emerging Models", *Transport Reviews*, 20 (2000), pp. 91-112.

the efficiency and quality of rail service by introducing competition among train operators. Competition was the primary motive in Australia, for example, where an independent inquiry established to review Australian competition policy recommended open access in all network industries, including railroads. A second objective, stressed more by the European Commission (EC), is to promote improved through services. The EC has long been concerned that the delays and inefficiencies of transferring rail cars between national railroads significantly reduce the quality and inhibit the growth of international long-distance services on the continent. It hoped that through service operated by a single train operator would be much better. A third motive, emphasized mainly in Scandinavia, is to put rail and road transportation on an equal footing. The intention is to develop access charges for railroads and highways that reflect their full social costs, including accidents and air pollution, so that shippers and passengers will make socially responsible choices between the two modes.

Reforms. Differences in objectives and circumstances have led to differences in the extent to which access or separation is required. Australia requires open access over virtually all of its track network, for example, but there is no requirement to separate infrastructure and train operations into different companies.[2] The national interstate track network and the intrastate track of New South Wales are maintained by infrastructure-only companies. The intrastate track in other states is provided by vertically integrated companies, although some of these companies have "ring fenced" the management of infrastructure from that of train operations to provide more assurance that independent train operators will be treated fairly. There is no requirement or consistent policy concerning privatization. The two infrastructure-only companies are both publicly owned but most of the vertically integrated companies have been privatized.

In Europe, the EC has issued a series of directives beginning in 1991 specifying deadlines for the railroads to provide access for certain types of services. These directives also mandate that vertically integrated railways separate accounts for infrastructure and train operations and take other steps to make their infrastructure costs and access charges more transparent. While the EC directives eventually envision access for a wide variety of services, the EC's priority, in keeping with its concerns, is to require access for international services first.[3] The countries of continental Europe have embraced the idea of open access and vertical separation with varying degrees of enthusiasm. Sweden reorganized its national railway into separate infrastructure and train companies in 1988, three years before the first EC directive. Sweden also forced the incumbent train company to compete with independent operators for contracts to provide subsidized passenger services. Denmark, Germany, and Netherlands have vertically unbundled their railways as well, and Germany has encouraged its regional governments

[2] If a rail infrastructure provider refuses access on reasonable terms, then the access seeker can appeal t the National Competition Council (NCC) to determine that the track involved is a bottleneck with natural monopoly characteristics. With an affirmative NCC finding, the access seeker can ask the Australian Competition and Consumer Commission to arbitrate any dispute over access terms. For a more complete description of access terms and industry structure see Bureau of Transport and Regional Economics, *Rail Infrastructure Pricing*, pp.58-64.

[3] Freight access was to be open on selected international corridors by 2003 and on all international movements by 2006, Bureau of Transport and Regional Economics, *Rail Infrastructure Pricing*, p. 112.

to procure commuter and other passenger train services competitively. Spain has also created a separate infrastructure company, but only for the new high-speed lines it is constructing. Privatization has been even less of a priority in continental Europe than in Australia; none of the large publicly-owned railways has been privatized yet, although a few small private independent operators have appeared.[4]

Britain is unique in that it has pursued both vertical separation and privatization more aggressively than the rest of Europe or Australia, although with some important restrictions on access. Britain divided its national railway into more than 70 different companies, the most important being Railtrack, which was responsible for track, stations and other infrastructure, and 25 passenger train operating companies, each specializing in a particular type of service and route. Beginning in 1996, the government sold Railtrack through a public stock offering and tendered the train operating companies as franchises ranging in duration from 7 to 15 years. A separate regulator was established to set the charges the train operating companies paid Railtrack for using its tracks and stations. The regulator allowed open access for freight operators, capacity permitting, but severely restricted the access that other passenger train companies could have to a franchisee's routes. Most of the passenger train franchises were unprofitable and were to be awarded to the bidder requesting the least subsidy, and the regulator and the Department of Transport were concerned that allowing open access would increase the franchise risk and the amount of subsidy the bidders would request. Railtrack went bankrupt in 2001 because of unexpected costs caused by a series of fatal train accidents and by difficulties encountered in a major upgrade of the West Coast Main Line. By that time the Labour Party was in control of government and, being less sympathetic to private companies, it took the opportunity to reorganize Railtrack as a not-for-profit company called Network Rail.

Entry. The early experience with vertical unbundling schemes suggests that encouraging entry by independent train operators is harder than expected. Where an integrated railroad was broken into separate infrastructure and train operating companies, the incumbent train operator has typically faced few successful challengers. And where an integrated company was left intact but with a mandate to open access, there have been few access seekers. Only a handful of new international freight services have emerged in continental Europe, for example, despite over a decade of EC directives to encourage them. In Australia, relatively few competing freight services developed between 1995 and 2002, and the most important were operated by existing freight forwarders who took the not-very-risky step of shifting their own freight to their own trains.[5] Similarly, incumbent train operators have lost only a small fraction of the passenger train service contracts that have been tendered in Sweden and Germany, although the challengers are gradually becoming more successful.

Entry may be discouraged because existing operators and services are already fairly efficient. Railroads have always had incentives to interchange cars or trains

[4] One exception is in France where light rail lines in some cities have long been operated by private concessionaires.

[5] Bureau of Transport and Regional Economics, *Rail Infrastructure Pricing*, pp. 101-102.

smoothly if they fear that otherwise they will lose through traffic, for example, so that the advantages of through service provided by a single operator may be less than the EC presumes. And if incumbent operators are not efficient at first, the threat of entry may be as effective as actual entry in stimulating improvements. Some Australian shippers report, for example, that the presence of an open access regime alone has been enough to stimulate incumbent railroads to offer lower freight rates.[6]

Most observers suspect, however, that entry is discouraged less by the incumbents' efficiency than by the difficulties challengers face in assembling the necessary inputs and complying with conflicting technical standards and regulations.[7] Finding suitable locomotives, rolling stock, and train crews can be difficult, especially since the equipment and skills are fairly specialized and the markets for experienced workers or used equipment are likely to be thin or non-existent. The British managed to attract reasonable numbers of bidders for their train operating franchises but only because they essentially auctioned their existing train companies intact, complete with a trained labor force and leases for the necessary locomotives and rolling stock. The problems of new entrants are compounded for train services that cross international boundaries since the countries may have incompatible technical standards and regulations. The EC is now considering the creation of a European railway agency with a mandate to harmonize standards so as to reduce barriers to entry.

Coordination. A more troubling lesson of the recent experience is that vertical unbundling seems to cause coordination problems that are far more serious and difficult than proponents expected. Vertical unbundling involves a tradeoff between the benefit of introducing competition to more activities and the cost of reduced coordination between the newly separated segments of the industry.[8] A train operating company cannot offer reliable, high-speed passenger service, for example, unless the infrastructure company maintains the tracks to a high standard and makes them available when scheduled. Before unbundling, the coordination of infrastructure and train operations took place within a single company. The two activities may have been in separate divisions of the company, but at least they reported to a common boss. After unbundling, by contrast, coordination must be arranged through contractual agreements between separate firms that have some common but many conflicting interests. And if the infrastructure provider is thought to have elements of monopoly power, those agreements may have to be supervised by a government regulator. The fact that most railroads were vertically integrated before the reforms strongly suggests that integration once offered important opportunities for coordination that were difficult to achieve with separate firms.

The key to resolving the coordination problems is to establish charges and other terms of access that provide the appropriate incentives for both the infrastructure and the train operating company. One oft-cited complication is that infrastructure is

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[6] See the account of the Hunter Valley coal exporters at Bureau of Transport and Regional Economics, *Rail Infrastructure Pricing*, p. 101.
[7] For example, Bureau of Transport and Regional Economics, *Rail Infrastructure Pricing*, pp. 118-119.
[8] For a more extended discussion of this tradeoff see José A. Gómez-Ibáñez, *Regulating Infrastructure: Monopoly, Contracts, and Discretion* (Cambridge: Harvard University Press, 2003), pp. 247-263.

characterized by substantial sunk costs and economies of scale, so that the marginal cost of carrying an additional train is typically less than the average cost, especially if the network has excess capacity. Charges set at marginal costs will encourage the efficient use of existing capacity, but they will not generate enough revenue to make the infrastructure company financially self-supporting. One solution, adopted primarily in Scandinavia, is for the government to subsidize the infrastructure company to make up the losses from marginal cost pricing. A more popular alternative is to allow the infrastructure company to discriminate among its customers by charging the least price sensitive customers more than their marginal costs. Price discrimination avoids the drain on the public treasury and the potential incentive problems of public subsidies, but it makes charge setting more subjective and controversial.

An even more troubling difficulty is that the appropriate access charges and conditions can vary greatly among trains because the infrastructure requirements of train operations are so varied. For high-speed passenger trains, for example, it is very important that the track is relatively straight and super-elevated on curves and that there are few or no grade crossings. For slow-speed freight trains, by contrast, straight track and few grade crossings are less important while super-elevation increases maintenance problems by shifting heavy axle weights onto the inside wheel and rail. The variety of train and infrastructure types makes synchronizing the design of the infrastructure and the train operating plan important to a railroad's financial success. This problem of tailoring and optimization is less critical if there is excess capacity in the infrastructure, so that different services can share the facilities with minimal extra cost and conflict. But when the infrastructure reaches capacity and new investment is needed, the level of required access charges is likely to increase and the very specific and often conflicting needs of operators become more apparent and serious.

The complexity of the coordination problem has led to a debate as to whether infrastructure companies should be required to post a standard schedule of access charges and conditions or whether charges and conditions should be negotiated on a case by case basis. Standard posted charges and conditions are more transparent and avoid the potentially considerable delays and other costs of negotiation. Unless the posted schedules are very complex, however, they may not provide sufficient opportunities for price discrimination or for tailoring infrastructure services and charges to train operations. The EC favors standard charges because of the difficulties it has faced in encouraging international services, for example, while Australia relies somewhat more on negotiated access charges.

The problems of coordination have been most apparent in Britain because Britain is the first country where infrastructure demands have greatly exceeded capacity in the wake of vertical unbundling.[9] Britain's railroad reforms were a major success initially because they cut the amount of public subsidy the railway system required while maintaining or improving the quality of service. But problems with the access charges

[9] For a more extended account of the British experience see Stephen Glaister's paper at this conference "Competition Destroyed by Politics: British Rail Privatization," draft, August 11, 2004; or Gómez-Ibáñez, *Regulating Infrastructure*, pp. 264-297.

soon caused congestion and a host of related problems to develop. The access charges for train operators were posted as long as there were paths available in the network. If the train operators wanted Railtrack to increase the capacity of the tracks they used, however, they had to negotiate with Railtrack over additional fees with the government regulator to intervene in the event of an impasse. The posted access charges were set on the assumption that the network had excess capacity, so that they consisted of a large fixed annual fee plus a very small variable charge per train operated. But the small variable charge encouraged the train operators to ask for so many more train paths that the network quickly became congested. Meanwhile, the capacity improvements that have provided relief proved very difficult to negotiate because the train operators, Railtrack, and the regulator often disagreed about the design of the improvements needed, how much they should cost, and how those costs should be shared. The congestion on the system made track maintenance more difficult, contributing to the accidents that helped bankrupt Railtrack. And the difficulties of negotiating capacity improvements seem to have played a role in the poor design of the West Coast Main Line enhancement project, the other main cause of Railtrack's failure. The collapse of Railtrack forced the government to substantially increase its financial support of the rail system.

In a paper written for this conference, Stephen Glaister argues that the British government gave up too soon, without allowing vertical unbundling a fair chance.[10] The reforms were complex, he argues, but carefully designed to introduce competition. The regulator had amended the access charge scheme to better include congestion costs just before Railtrack collapsed. Railtrack's accident rate was no different or better than that of its predecessor, and the company's bankruptcy could have been resolved in the more traditional manner: by allowing the bankruptcy trustee to sell the assets to the group of private investors willing to pay the most for them.

The fact that vertical unbundling has not caused serious problems in the rest of Europe or Australia seems, at first glance, to support Glaister's argument. Perhaps their more gradual or piecemeal introduction of vertical unbundling has, or will, allow other countries to fix coordination problems before they become too serious. One might also argue that the rest of Europe and Australia have been spared because the few infrastructure-only companies they have created are still in public rather than private hands, and thus possibly less dogged in pursuing their self interest at the expense of the train companies. But it is also striking than the rest of Europe and Australia has seen relatively little entry and competition for infrastructure capacity compared to Britain. The lesson seems to be that vertical unbundling works best when there is excess infrastructure capacity, and that encouraging coordination when capacity is constrained is very challenging.

Deregulation: North America and New Zealand

The Reforms. North America and New Zealand have pursued privatization to its extreme by largely deregulating their vertically integrated private railroads. The United States and Canada escaped the wave of railroad nationalizations that swept most

[10] Stephen Glaister, "Competition Destroyed by Politics."

countries in the decades immediately before and after World War II. But the U.S. and Canadian railroads were tightly regulated by government agencies. In 1887 the U.S. Congress established the Interstate Commerce Commission (ICC) to prevent railroads from exercising "undue prejudice" in pricing by, for example, charging more to small shippers or shippers served by only one railroad. Over the next few decades Congress expanded the agency's powers to allow the ICC to specify the tariffs a railroad could charge and to make ICC permission necessary before a railroad could abandon track or merge with another.

In 1980, the U.S. Congress responded to the dire financial condition of the American railroads by sharply limiting the ICC's powers to regulate freight tariffs, mergers, or abandonment. The ICC could still set tariffs, for example, but only if it determined, first, that the shipper in question was "captive" to the railroad in the sense that he had few practical alternatives and, second, that the tariffs were in excess of 180 percent of the railroad's variable costs. Even then, the ICC had to determine whether the railroad involved was earning a reasonable return on its investments as a whole and, if not, had to take the railroad's revenue shortfall into account in the agency's tariff decision. These restrictions have limited the number of tariff cases in which the ICC intervenes to a handful per year. Most tariffs are now set by private negotiations between railroads and shippers with the ICC, which was later renamed the Surface Transportation Board (STB), involved in only the most egregious suspected cases of monopoly abuse.

Mandatory track access plays only a relatively minor role in the new U.S. deregulated system. American railroads have long exchanged track rights on a voluntary basis, where one railroad has a more direct or level route, for example. But these arrangements are uncommon and usually do not include the right to pick up or drop off traffic on the host's track. Government mandated track access was extremely rare before 1980, if only because ICC tariff regulation made it unnecessary, but the practice expanded somewhat as the industry consolidated after deregulation. By 1997, several waves of mergers had left the United States with only four major freight railroads: two to the east and two to the west of the Mississippi River. The STB conditioned its approval for the last few mergers on specific exchanges of track rights so that shippers who had a choice of two railroads before the merger would still have the same choice after. However, the percentage of track involved is relatively small.[11]

As Clifford Winston explains in his paper prepared for this conference, deregulation brought about a remarkable revival of the U.S. freight railroad industry.[12] The average tariff per ton-mile dropped by roughly half in real terms, stimulating an increase in railroad traffic of all types. And the railroads were able to cut costs faster than they cut tariffs, so that the industry's profitability was restored. The railroads complain that they still earn less on their investments than other comparable private

[11] Statistics on track rights are hard to come by but the Association of American Railroads estimated that 14 percent of the route mileage in the United States, Canada and Mexico is under voluntary or mandatory track access agreements. Association of American Railroads; *North American Freight Railroad Statistics*, 2002.

[12] Clifford Winston, "The Transformation of the U.S. Rail Freight Industry", draft, August 2004.

industries, and some shippers argue that they have not enjoyed much tariff relief because they are still captive to a particular railroad. But the industry is once again able to attract capital, and even the so-called captive shippers are paying less than they had before deregulation.

Canada took a different path to deregulation, but its experience is similar. In 1967, concerned that regulation was hindering the railroads ability to compete with other modes, the government gave the railroads more pricing freedom by restricting the circumstances under which the Canadian Transport Commission[13] could set maximum rates and by allowing the railroads to set rates collectively. By 1987, however, the government had become convinced of the need to promote competition among railroads as well, and to that end eliminated collective ratemaking, introduced confidential contracts with shippers, and made best-and-final offer arbitration available in case of an impasse in negotiations between a shipper and a railroad. Competition was also aided after 1987 by an "inter-switching" requirement that dated from the early 1900s and had been originally designed to prevent railroad overbuilding in urban areas. The inter-switching provision allows a shipper with access to only one railroad to ask that the shipment be transferred to a second railroad at standard regulated rates as long as the distance from the origin or destination to the interchange point is no more than 30 kilometers.[14] In 1995 the government took the further step of selling off the Canadian National Railway, so that both of Canada's transcontinental railways are now privately owned. Freight rates declined by approximately one quarter in real terms in the decade immediately following the 1987 reforms, although there are signs that large shippers have enjoyed the biggest rate reductions while small shippers may have been left out.[15]

In 1993, New Zealand leased its railroad to a private company for 80 years, and that company operated reasonably successfully with minimal regulation for over a decade. New Zealand is a small country and wanted to avoid establishing a large regulatory bureaucracy when it began to privatize its telecommunications and other utilities in the 1980s. Accordingly it established a single Competition Commission with the responsibility over all sectors. Utilities were enjoined by law from abusing their "dominant position" and competitors or customers could sue in the courts for relief. As a last resort, the government could ask the Commerce Commission to set prices.[16] The Commission's price setting powers were never invoked for the railroad, perhaps because it faced so much competition from trucks and coastal shipping. The railroad's profitability declined after 1996, when the government decided to allow foreign ships to carry cargo between New Zealand ports. The government bought back the rail

[13] Since renamed the Canadian Transportation Agency.

[14] The 1987 reforms also allowed a shipper outside the 30 kilometer interswitching zone to establish a "competitive line rate" for moving the shipment over the originating railway to a connecting point. Applicants for a competitive line rate must meet a variety of restrictions that are so onerous that it is rarely used. See Canada Transportation Act Review Panel, *Vision and Balance: Canada Transportation Act Review* (Canada: Minister of Public Works, 2001), pp. 33-34 and 64.

[15] Canada Transportation Act Review Panel, *Vision and Balance*, pp. 39-41.

[16] For a more extensive description of the New Zealand system of regulation see Alan Bollard and Michael Pickford, "Utility Regulation in New Zealand", pp. 75-131 in Michael E. Beesley (ed.), *Regulating Utilities: Broadening the Debate* (London: Institute of Economic Affairs, 1997).

infrastructure from the company in 2004 after the railroad, near bankruptcy, announced its intention to abandon passenger service and some freight lines. The railroad will still operate freight trains, but the government wanted the flexibility to improve the infrastructure to support services that might be unprofitable but that it thought socially worthwhile.[17]

Competition and long-term contracts. Deregulation was successful in North America because the rail freight market proved far more competitive than traditionally believed. North America's railroads specialize in carrying bulk commodities that are of too little value and high weight to warrant transport by truck and inter-modal containers moving over long distances. In the short run, some railroad shippers have effective transportation alternatives. Shippers of containers from east or west coast ports to the center of the country usually can choose between two railroads or more, for example, while shippers located on or near a waterway may have barges as an option. But the vast majority of rail shippers—such as mines, electricity generating stations, refineries, and manufacturing plants—are served by only one railroad and not located on a waterway. In the long run, however, these apparently captive shippers often can avoid high railroad tariffs by shifting to other locations and products. For example, an electric utility with a coal-fired generating station can relocate the station to the tracks of another railroad or to a waterway, buy power wholesale over the grid from other utilities, or convert the station to burn natural gas or oil. The threat to relocate or shift products may not be credible in the short run because the shipper's plant is valuable, durable, and expensive to move or modify. But these threats become real once the shipper's investment reaches the end of its economic life and has to be renewed.

One of the keys to making locational and product competition more effective has been to allow shippers and railroads to sign long-term contracts. A shipper can protect himself from future exploitation by making any investment on the railroad's network conditional on a long-term service contract; the contract locks in the leverage the shipper enjoys when a new investment is made or an old one is renewed. Long-term contracts also proved useful in helping the railroads to reduce costs. As Winston explains, since deregulation the railroads cut their costs per ton-mile carried by investing in cost-saving technologies, negotiating work rule changes with their unions, and abandoning lightly used routes. But contracts also played a role by allowing the railroads and shippers shape services in mutually advantageous ways. The contracts often include volume guarantees, for example, which allow the railroads to invest in specialized cost-saving equipment or to commit to frequent or regular schedules without sacrificing train or crew productivity. Indeed, the cost-saving advantages of contracts are so great that even non-captive traffic often moves under long-term contracts.

Long-term contracts are commonly used in other industries to protect parties that are making relationship-specific investments. A parts supplier would not invest in

[17] The original investors had sold out to an Australian trucking company shortly before the government bought back the infrastructure. The government paid NZ$1 for the infrastructure, but as part of the deal the government agreed to invest NZ$200 million in improvements and the private railroad agreed to invest NZ$100 million in new rolling stock.

specialized machinery useful for only one customer, for example, without the protection of a long-term contract from that customer. Before deregulation the ICC prohibited railroads from signing private contracts with shippers for fear that contracts would be a device for favoring large shippers unduly. By permitting contracts, deregulation restored to the industry an important tool for protecting shippers and railroads from opportunistic behavior so that they could agree to make investments that were to their mutual advantage.

Deregulation has its problems and limitations, perhaps the most important being that it works better for large shippers than small. Large shippers with multiple plants may not even need the protection of long-term contracts since the railroads realize that if they take advantage of the shipper at one location they stand to lose the next plant they build. Moreover, the time and costs spent negotiating a contract usually do not increase proportionately with the contract's size which makes long-term contracting more worthwhile or practical for a large shipper than a small shipper. Freight forwarders and other intermediaries that consolidate small shipments may serve as effective negotiators on the small shipper's behalf. But deregulation was possible in 1980 in part because most of the small shippers who were so dependent on the railroads in late 19th century had long since shifted to trucks. Even so it is politically helpful to have, as a safety valve, the option of appealing to the STB (or its Canadian or New Zealand equivalent), even if the regulatory agency can intervene only in extreme cases.

Privatization with Selective Access: Latin America and Japan

Horizontal vs. vertical separation. Latin America and Japan have pursued an intermediate option that does not go quite as far in privatization as North America nor as nearly as far in vertical unbundling as many countries of Europe or Australia. In both Latin America and Japan, privatization was accompanied more by horizontal rather than vertical separation. In some cases this horizontal separation was a deliberate strategy to create direct or indirect competition among several vertically integrated railways instead of creating competition among vertically separated train operating companies.

In Japan, the territories of the new railways did not overlap so the emphasis was on indirect forms of competition. Passengers are the key concern in Japan since the relatively short overland distances and the availability of coastal shipping severely limit rail's share of the freight market. The Japanese national railway was broken into six regional passenger railways, three for the eastern, central, and western parts of the main island of Honshu and one each for three smaller islands. A seventh company was created to operate freight trains over the tracks of the passenger railways. The hope of reformers is that the six regional railroads will ease the task of government regulation by allowing regulators to benchmark the performance of each railroad against those of its peers. The passenger railroads might also conceivably compete to attract customers to locate in their territories, although this form of competition seems less plausible with passenger than freight service.

In some Latin America countries the territories of the new railroads were designed to overlap enough to encourage more direct competition between them. Mexico was arguably the most successful in this regard, in part because it was one of the last to privatize and restructure its railroads and benefited from the experience of others.[18] Freight is the main concern in Mexico, as there is very little passenger service. Mexico divided its national railway into three main freight railways, two to the north of Mexico City and one to the south.[19] The three railway networks were carefully designed so that all three railroads serve Mexico City, each railroad serves a major port on the Pacific and the Caribbean, two railroads each serve the major industrial cities of Monterrey and Guadalajara, while each northern railroad connects with different U.S. railroad at the border. The three railways together own a small railway that serves the valley of Mexico City, which provides all of them direct access to customers in the capital. In addition, there are some exchanges of track rights in Monterrey and Guadalajara to allow the two railways that serve those cities access to all of the customers in the metropolitan area. The resulting system gives shippers in Mexico's three main markets a choice between at least two railroads, each with access to a Pacific and a Caribbean port and each connecting to a different U.S. railroad. The required access rights are strictly limited to a few locations, however, and railroads are expected to negotiate access charges and terms, with the Secretary of Transport empowered to break impasses.

Other countries, such as Brazil and Argentina, were less successful in encouraging competition among railroads both because their networks were less suitable and because competition was an afterthought in restructuring.[20] Brazil's freight network did not lend its self to an obvious competitive design since most of the main routes connect a separate port to its hinterland. The Brazilians made matters worse, however, by awarding the inner and outer portions of some routes as separate concessions, forcing the inner railroad to negotiate joint rates or access rights to get to a port. Argentina's intercity network consists mainly of lines that radiate out from Buenos Aires and is used almost exclusively for freight. The lines were awarded as five separate freight concessions, with the condition that provincial governments be allowed to access the tracks if they chose to inaugurate intercity passenger service.[21] The five concessions do not overlap in the hinterland, but are close enough to one another that some shippers may have an effective choice of railroads. Nevertheless, the Argentine and Brazilian freight railroads have more to fear from trucks than from each other, especially since distances are short enough that trucking direct to the ports is often competitive with rail.

In short, Japan and the countries of Latin America all mandate track access but only in very limited way. Where one use of the network predominates—passengers in

[18] For a more complete description of the Mexican system see Javier Campos, "Lessons from Railway Reforms in Brazil and Mexico", *Transport Policy* 8 (2001): 85-95.
[19] There were a number of short-line concessions in addition to the three main concessions.
[20] For further descriptions of the Brazilian and Argentine systems see Campos, "Lessons from Railway Reforms in Brazil and Mexico" and Gómez-Ibáñez, *Regulating Infrastructure*, pp. 84-108.
[21] A sixth freight concession attracted no bidders, and was eventually given to the employees. In addition, the commuter rail lines and the subway serving Buenos Aires were awarded as seven concessions. Finally, the most important intercity passenger rail line (connecting Buenos Aires with Mar del Plata) was given to the Province of Buenos Aires to operate.

the case of Japan or freight in the case of Argentina's intercity lines—access is usually required for the rare train of the minority use. And rights to use specific and relatively short segments of track are sometimes mandated to enhance competition (as in Mexico) or to correct flaws in concession design (as in Brazil). However, widespread access on the scale permitted in Europe and Australia is not required.

Regulation by concession contract. Latin America and Japan switched from public to private management, but they did not follow North America's footsteps and deregulate as well. Instead, Latin America deliberately adopted a form of regulation designed to be less intrusive than the approach used in North America before deregulation.

Regulatory systems can be classified into two broad types: discretionary and contractual.[22] Under the discretionary approach, a regulatory agency has broad latitude to set the tariffs charged by the companies it regulates. The agency is usually limited by its authorizing statute, which sets out the factors it must consider in reaching its decisions. Moreover, the company or its customers usually can appeal the agency's rulings to some independent body, often the courts, if they feel the agency has violated its statute. But the statutory guidance is fairly broad, so that the agency has substantial discretion in its interpretation. Under the contractual approach, by contrast, the government awards the company a contract that specifies in detail the tariffs the company can charge and other conditions of service. The contract is usually for a fixed term and awarded through competitive bidding. A regulatory agency monitors the company's compliance with the contract and, if warranted, imposes any fines or penalties for poor performance provided for in the contract. But the regulatory agency does not have the discretion to unilaterally change the terms of the contract.

The discretionary approach has long been the norm for regulating private railroads and other utilities in the United States, but the contractual approach is more popular among developing countries. Many developing countries privatized not just their railroads but electricity, telecommunications, and other types of infrastructure during the 1980s and 1990s. Potential investors were concerned about the governments' commitment to private infrastructure, however, especially since many of the newly privatized companies had been nationalized only a few decades earlier. Investors were being asked to buy or build infrastructure that was durable and immobile, and once they did the government might be tempted to take advantage of the situation by reneging on promises to maintain reasonable tariffs. In this context, the contractual approach was more appealing than an approach that granted the government substantial discretion. The key limitation of the contractual approach is that one must draft a contract that is "complete" in that it foresees all major developments that might affect the contract and provides appropriate contingencies. The more uncertain the industry or the government's needs, the harder it is to draft a complete contract. As a result, developing countries often used discretionary regulation for infrastructure such as telecommunications, where the

[22] For a more complete discussion of the differences between discretionary and contract regulation see Gómez-Ibáñez, *Regulating Infrastructure*, pp. 18-36.

technological or other uncertainties seemed great, but they relied more on contractual regulation for other forms of infrastructure, including railroads.

Freight and passenger concessions generally take different forms because governments typically expect freight service to be financially self-supporting while they are often willing to subsidize passenger service, particularly on urban commuter lines that serve congested metropolitan areas. As a result, freight concessions are typically awarded to the firm offering the highest payment to the government or promising to make the largest investment and freight tariffs are only loosely controlled.[23] By contrast, the passenger concessions are usually awarded to the firm requesting the minimum subsidy with both the minimum level of service and the maximum fare carefully specified. Freight concessions are often for 30 or more years (with comparable extensions allowed), a term dictated by the expected lifetimes of investments in rolling stock and track. Passenger concessions are much shorter, often 10 or so years, because the government wishes to exercise greater control over its financial obligations and the level of service.

Performance. The privatized railway concessions were generally successful in improving service for shippers and passengers while significantly reducing the level of public subsidy the railroads absorb. A survey by Louis Thompson and his colleagues at the World Bank of freight concessions in five Latin American and one African country found, for example, that tariffs had declined in 15 of the 17 concessions for a savings to shippers of $900 million in 1999 and that traffic was above pre-concession levels in every case.[24] Urban commuter railway and subway concessions in Buenos Aires and Rio de Janeiro have substantially reduced the amount of public subsidy required while also increasing ridership.[25]

While mandatory access is not a central element of most of these schemes, it seems to have worked relatively smoothly. Complaints about the difficulties of negotiating the charges and other conditions for that access are common, but seldom reached the level where government regulators are asked to intervene. It probably helps that the access rights are relatively limited and that in some cases, such as Mexico, that they are reciprocal. A railroad may be more sympathetic to a competitor requesting terms for accessing its track if that railroad is at times dependent on gaining access to the competitor's track.[26]

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[23] Often multiple criteria were used, but the most important was usually the payment offered by the concessionaire; for a description of some of the criteria see Louis S. Thompson, Karim-Jaques Budin, and Antonio Estache, "Private Investment in Railways: Experience from South and North America, Africa, and New Zealand", paper prepared for the Public-Private Infrastructure advisory Facility under project C060200/S/RWS/ST/1W, 2003 (?), pp. 5-6.

[24] Thompson, Budin, and Estache, "Private Investment in Railways", pp. 10-11.

[25] Jorge Rebello, "Rail and Subway Concessions in Rio de Janiero," World Bank Private Sector Note no. 183, April 1999; and Gómez-Ibáñez, *Regulating Infrastructure*, pp. 94-95.

[26] This argument presumes the access rights of the two railroads are reasonably balanced; a concern raised by Campos in his discussion of Brazilian and Mexican access at "Lessons from Railway Reforms," pp. 89-90 and 93-94.

The principal problem with these railroad concessions is that drafting a complete contract has proved to be much more difficult than expected. Virtually every railroad concession has had to be renegotiated at one time or another because economic crises, faulty traffic forecasts, or other unexpected developments have made it difficult for the concessionaires, the government, or both to comply with their obligations under the contract. The renegotiations have undermined both the security that the investors had hoped for and the support of railroad users and the general public for the concession system. If the concession is awarded through competitive bidding both the investors and the public are likely to accept the initial terms as fair. But there is no similar, transparently fair way to renegotiate a concession once it is awarded, which often raises investor and popular concerns about corruption or incompetence.[27]

Competition, Vertical Unbundling, and Privatization

The most recent round of railroad reforms was stimulated by the industry's long-term decline in market share and financial strength, trends caused primarily by the rise of competing modes. Europe, Australia, Japan, and Latin America experimented with various combinations of vertical unbundling and privatization because their government-owned railways were losing market share and absorbing unsustainable levels of public subsidy. The United States and Canada deregulated because their private railroads were at or near bankruptcy. The perilous condition of the railroads has made policymakers more willing to experiment with novel ideas. What seems sometimes lost in the debates, however, is how much the root cause of the railroads' problems—intense competition—should shape the resulting reforms.

It is hard to argue that railroads enjoy much monopoly or market power anymore, particularly in intercity freight and passenger service. In freight, trucks long ago stole the small and high value shipments, and even compete effectively for bulk commodities in countries, like Japan or Argentina, where the lengths of haul are relatively short. Barges and pipelines are an option for some longer hauls, but even where those modes are absent the railroads usually face intense competition from other locations and other products. In intercity passenger service, the automobile and the airline now dominate, particularly in North America where railroads account for less than 1 percent of the market. Even in Europe, which has been investing heavily in high-speed trains, rail's share of the passenger market has fallen to 6 percent while air's share is rising steadily and, with the spread of low-fare airlines, should soon exceed that of rail (see Table 1). Only in urban passenger service might railroads enjoy some market power, and even then only for commuting in the most congested metropolitan areas, where there are no parallel metro lines, and where buses are not given priority in traffic.

The intensity of competition is one of the factors that make vertical unbundling less attractive in railroads than in the other industries where it has been tried, such as telephones, electricity, or highways. As noted earlier, vertical unbundling involves a tradeoff between the benefits of introducing competition to new activities and the costs

[27] For a more detailed description of the causes and consequences of the renegotiation of the Argentine railroad contracts see Gómez-Ibáñez, *Regulating Infrastructure*, pp. 84-108.

from lost coordination when activities are provided by separate firms. There are reasons to believe that the coordination problems are more severe in railroads than in other industries where unbundling has been tried.[28] Train operations are more varied in their technical characteristics than telephone calls, electrons, or motor vehicles, for example, and thus the basic infrastructure required for railroads is less standardized than it is in other industries. Moreover, infrastructure accounts for a relatively large portion of railroad costs, particularly for passenger service, which makes the strategy of reducing coordination problems by building excess infrastructure capacity more expensive. We may have underestimated the coordination difficulties in other vertically unbundled industries—witness the growing concern in the electricity industry about the need for incentives to build additional high-voltage transmission lines. But coordination problems seem at least as hard, if not harder, in railroads than in any other industry where a policy of forced separation has been attempted.

If the extra competition introduced by unbundling is of little value, however, then there seems little point in risking the loss of coordination. Indeed it is striking that Britain, which completely separated its infrastructure and train operations, decided to that it was unwise to encourage train-on-train competition in passenger service. Most of the British passenger services were going to require public subsidy, in large part because they already faced such stiff competition from other modes. And the competition among bidders for the train operating franchises promised to be intense enough to significantly reduce the government's subsidy bill. In this context, the government thought it risky and unnecessary to introduce still more competition by allowing train operators to compete with one another over the same tracks. If train-on-train competition was to be prohibited, however, what was the point of unbundling? The government might have been better served by auctioning off vertically integrated franchises and avoiding the types of coordination problems that brought down Railtrack.

The case for vertical unbundling seems plausible only if it is very limited and selective. Voluntary exchanges of track rights among railroads should be allowed and even encouraged. But mandatory access also may make sense if, as in Mexico or Canada, it is limited to a few key portions of the network where access provides a significant increase in competition. Even in such cases, however, it may be important to be sure that there is some symmetry in access requirements so that the railroads have incentives to behave reasonably when negotiating with one another over access terms and charges.

The intensity of competition is also, of course, the key factor that makes railroad privatization and deregulation attractive. Indeed, the developing countries that privatized but kept the concession form of regulation probably were too timid, especially where intercity freight and passenger services were involved. Competition from trucks and buses is intense in most cases, and private long-term contracts might ameliorate most of the remaining competitive problems. In short, those countries might have avoided concession regulation, and the attendant problems of drafting complete concession

[28] This comparison of the coordination problems caused by vertical unbundling in different industries is developed further in Gómez-Ibáñez, *Regulating Infrastructure*, pp. 326-339 and especially pp. 331-337.

contracts. They might have maintained a regulatory agency with powers to intervene only in the most troubling cases, so that, as in Canada and the United States, the railroads were largely deregulated but regulation was available as a safety valve to solve serious problems that may arise.

Applying these lessons to the Spanish railways, there is a strong case for more privatization and less vertical unbundling. Of course, Spain must comply with EC directives to provide open access, but it should go only as far as required and avoid unbundling more than it has to. Vertically separating the new high-speed passenger lines seems a mistake, for example, especially since they will almost surely face intense competition from auto, bus, and air. To the extent that the conventional lines can be neatly divided into those that serve predominantly freight, regional passenger, or commuter services, it probably would make sense to establish one or more separate vertically integrated companies for each of those services. Intercity passenger and freight almost surely could be privatized and deregulated, as in North America. If the urban commuter lines were thought to have market power, they might be awarded as concessions of limited duration but vertically integrated, as in Argentina or Brazil, rather than separated, as in Britain.

Table 1: Passenger Kilometers by Mode in the 15 Countries of the European Union

	Passenger cars	Buses and coaches	Tram and metro	Railway	Air	Total
Passenger kilometers traveled (billions)						
1970	1582	269	39	219	33	2142
1980	2295	348	41	248	74	3006
1990	3199	369	48	268	157	4041
1995	3506	382	47	274	202	4410
2000	3789	413	53	303	281	4839
Share of passenger kilometers						
1970	73.9%	12.6%	1.8%	10.2%	1.5%	100.0%
1980	76.3%	11.6%	1.4%	8.3%	2.5%	100.0%
1990	79.2%	9.1%	1.2%	6.6%	3.9%	100.0%
1995	79.5%	8.7%	1.1%	6.2%	4.6%	100.0%
2000	78.3%	8.5%	1.1%	6.3%	5.8%	100.0%

Source: European Commission, *Panorama of Transport: Statistical Overview of Transport in the European Union, Data 1970-2000*, Part 2 (Luxembourg: European Communities, 2003), p.