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The Economics of Railways Restructuring in South Korea

Russell Pittman* and Sunghee Choi#

Abstract

South Korea, like many countries, is engaged in a policy debate concerning possible railways reforms. However, unlike most countries, here the focus of discussion has been the government's proposal to open high-speed passenger train lines to a second train company that would supply on-track competition to KTX trains. While such a policy may indeed lead to lower fares and greater efficiency, worldwide experience casts doubt on the government's hope that it would lead to such dramatic increases in ridership that the level of subsidies to the overall rail system could be reduced. We argue that a more promising reform strategy may be to introduce competition into freight rail. Based on the Latin American experience, creating independent, vertically integrated, competing freight railway companies could be expected not only to lower shipper rates and increase efficiency but also to raise considerable revenues from the private sector in franchising fees and new investments.

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1. Introduction

South Korea's fifty-year economic miracle has been achieved to a large degree with policies different from those urged upon developing countries by mainstream economists, neoliberal reformers, and the international lending institutions. Even the decision to subject the important manufacturers to international competition – on its face, one component of the mainstream program – was accomplished through the unorthodox tool of export subsidies and the imposition of export targets rather than the conventional strategy of import liberalization (Rodrik, 2007). More recently, and especially since the Asian crisis of 1998, the country has moved in more conventional neoliberal policy directions, including the relaxation of restrictions on labor markets and foreign direct investment as well as consideration of the privatization and liberalization of important infrastructure sectors such as railways, electricity, and airports. However, implementation of new policies in these areas has been slow, and the reform debates remain controversial and politically difficult.¹

One important component of recent and ongoing reform discussions has been the possible liberalization of the South Korean railways sector. As in many countries, the railway in South Korea has for many years been a state-owned, vertically integrated monopoly enterprise; also as in many countries, the enterprise has over the years lost money regularly and so piled up debts, at the same time lacking the resources to maintain and improve the infrastructure. Reform debates ebbed and flowed through the 1990's, with diverse proposals – to transform the enterprise into a public corporation, to separate operations from infrastructure, and even to begin privatization of train operations – continually adopted and then postponed (Lee, 2004). In 2004 the system was divided into two principal components, both government-owned: a train operations enterprise called the Korea Railroad Corporation, or Korail, and an infrastructure enterprise called the Korea Rail Network Authority, or KR. Also in 2004, Korail introduced a high-speed passenger train operation, called KTX, over the heavily travelled Seoul-Busan route, and subsequently over the Seoul-Mokpo route as well (KOTI, 2012; see Map 1). In the meantime, however, further organizational

¹ See, e.g., Ha-Joon Chang, "South Korea's economic reforms, -- a recipe for unhappiness," *The Guardian*, June 20, 2012, <http://www.guardian.co.uk/commentisfree/2012/apr/01/south-korea-recipe-for-unhappiness>; "South Korea looks to boost foreign direct investment," *Economist Intelligence Unit*, September 25, 2012, <http://country.eiu.com/article.aspx?articleid=1369592521&Country=South%20Korea&topic=Economy&ubtopic=Forecast&subsubtopic=External%20sector>; both accessed 18 January 2013; and Witt (2013). We use the term "neoliberal" in the standard contemporary sense of policies consistent with the "Washington Consensus", while acknowledging that the concept has a richer and more complex history (Jones, 2012).

restructuring has stalled, faced with opposition from both Korail and the rail labor unions.

[MAP 1 ABOUT HERE]

2. *World Railways Restructuring*

The decades of the 1990's and the 2000's were everywhere periods of neoliberal reform and privatization strategies in general and in the railways sector in particular (respectively, Kaletsky, 2010, and Gómez-Ibáñez and de Rus, 2006). As in other infrastructure sectors, railways reforms around the world have tended to focus on the possibilities for the creation of competition in the context of what has been traditionally considered a natural monopoly (Pittman, 2003).

A great deal of the debate regarding railways has concerned the possible creation of competition among multiple train-operating companies (TOC's) over a monopoly track infrastructure. With this possibility has come the logically consequent question of whether such competition would be more effective in the presence of complete "vertical separation" between infrastructure and train operations or whether a less drastic "third party access" regime would be sufficient to support the introduction of competition, perhaps accompanied by some kind of "accounting separation" with the creation of an overall holding company. Minority voices in the debate have called for the creation of competition among multiple vertically integrated railway enterprises – a strategy sometimes termed "horizontal separation" to contrast it with "vertical separation" (Pittman, 2007a).

As the railways reform debate has progressed, not only has there come to be greater appreciation of the possibility that different reform strategies might be appropriate in different countries and environments; there has in many cases also come to be a differentiation in the strategic options pursued for freight rail and passenger rail operations (van de Velde, et al., 2012). The UK is a good example. That country has been one of the pioneers in the creation of competition in railways. Originally the focus was on complete vertical separation and the creation of competition among multiple independent TOC's in both the freight and passenger areas (Foster, 1994). However, eventually it came to be accepted that in an era of both widespread automobile ownership and discount airlines, passenger rail was dependent on government subsidies simply to survive. In that case on-track competition was not sustainable, and the focus of policy moved to the creation of competition for monopoly franchises to control

particular regional passenger rail operations á la Chadwick (1859) and Demsetz (1968).² On the other hand, on the freight side the introduction of on-track competition has led to reported vigorous duopoly competition between the old English, Welsh, and Scottish Railway (EWS, now a subsidiary of the German rail freight company DB Schenker) and Freightliner (Nash, et al., 2013).

Empirical efforts to evaluate systematically the outcomes of the recent spate of railways reforms around the world, and especially to isolate the relative performance of different reform models, have foundered on problems of data availability and quality, the short time period involved since reforms were implemented, differences among railways sectors in different countries, and possible endogeneity of reforms. The best and most recent studies suggest that most reform efforts have led to improved efficiency, though in addition to possible endogeneity one possible explanation here is simply that increased attention to industry structure and efficiency by itself leads to improvements. Among the more specific findings:

- It seems by now well established that complete vertical separation increases transactions and operating costs, though the magnitude of increase is very much in dispute.³ Vertical separation seems to increase costs more than otherwise a) in rail systems that are very densely operated, and b) in rail systems with a high proportion of freight traffic vis-à-vis passenger traffic (van de Velde, et al., 2012; Mizutani and Uranishi, 2013).
- It is not at all certain that complete vertical separation is more conducive to the introduction of competition than is a holding company, third party access model (van de Velde, et al., 2012).
- Where competition has been created above the rail for passengers, the European experience suggests that generally fares have been reduced and services have improved, but costs have increased, presumably reflecting the sacrifice of economies of density of operations (Nash, 2011).
- Where competition has been created above the rail for freight, the European experience has been more conspicuously successful, with incumbents in several countries rapidly losing market share to more nimble entrants (Pittman, et al., 2007; Deville and Verduyn, 2012; van de Velde, 2012; Knieps, 2013).

3. Railways Reform in South Korea

² See, for example, Preston (2001, 2009).

³ Compare, for example, Ivaldi and McCullough (2004) and Growitsch and Wetzel (2009), on the one hand, with Merkert, Smith, and Nash (2012).

In South Korea, the differences between the reform discussions regarding freight railway and passenger railway services have been even more stark than in Europe or the rest of the world.

Korail trains carry a large amount of freight, but the volumes have been stagnant of late, with total annual ton-kilometers currently at their lowest level since 1980. Over one-third of the freight traffic (as measured by ton-kilometers) is containers, primarily moving in both directions on the Gyeongbu Line between Seoul and Busan, and another one-third is cement and coal, largely on the Jungang (Seoul-Gyeongju), Taebaek (Jecheon-Baeksan), and Youngdong (Yeongju-Gangneung) Lines. (See Map 2.) By attracting passengers to the (now fully separate) high-speed lines, KTX operations have freed up track capacity for improved freight train operations along the congested Gyeongbu corridor (Ahn and Kang, 2003). Unlike most rail freight operations around the world, Korail freight trains reportedly lose money, relying for part of their operating budgets on cross-subsidies from KTX operating profits.

[MAP 2 ABOUT HERE.]

There were hopes expressed a decade ago for a booming future for freight rail transport in South Korea with the completion and promotion of a Trans-Korean rail line that would haul consumer goods manufactured in East Asia to markets in Europe via either the Trans-Siberian Railway or a new “Iron Silk Road” through China and Kazakhstan (Tsuji, 2004). Lately, however, despite news reports of investments to improve the rail connections between Russia and North Korea, the prospects for regular freight rail traffic between South and North Korea do not seem promising.⁴ A dramatic increase in long-distance freight tonnage might have stimulated discussion of imposing a third party access regime designed to encourage transit freight traffic and the access fee income that would have accompanied it, but as things stand, discussions of reforms in the freight rail regime appear to be limited to complaints on the part of a few private container delivery firms regarding the quality of service provided by the government-owned monopoly.

Recent discussions of rail reforms in South Korea have instead focused on the passenger side, and in particular on high-speed passenger rail services. As noted above, under current arrangements high-speed passenger trains are operated by Korail under

⁴ See, e.g., Bertil Lintner and Gordon Fairclough, “A Railway Line in Limbo,” *Far Eastern Economic Review*, June 12, 2003, reprinted at www.asiapacificms.com/articles/korea_rail_link, and Georgy Bulychev, “The Geopolitics of the North Korea-South Korea Rail Link to China, Russia and Europe”, *Japan Focus*, May 30, 2006, http://japanfocus.org/-Yonhap_News-/2008#, both accessed 17 January 2013.

the KTX nameplate over monopoly infrastructure operated by KR. Both Korail and KR are state-owned enterprises. In 2012 the Ministry of Land, Transport and Maritime Affairs announced its intention to solicit bids for a fifteen-year concession to operate independent high-speed trains, competing with the KTX trains, over the Seoul-Busan and Seoul-Mokpo routes. The private trains would use the Suseo station in southern Seoul rather than the downtown Seoul Station used by KTX, but the track infrastructure used by the two operators would join at Pyongtaek, just south of the city.

According to some reports, the new operator would pay an infrastructure access fee of between 40 and 50 percent of its revenues under current proposals, as compared with the 31 percent paid by KTX, though our closer examination suggests that these figures may be too high.⁵ In addition, we have been unable to turn up any details as to how the access fees paid by either company may be structured, though the world experience suggests that this is an important factor in reform outcomes.⁶ In any case it is notable that the government itself proposes that the new operator pay higher access charges than those paid by the incumbent KTX. The fares of the new operator would be capped at a level 10 percent lower than the (also regulated) fares charged by KTX.

The rationale stated by the Ministry for the proposed reforms is the standard anti-monopoly rationale of setting up strong incentives for the provision of higher quality service at lower fares. A government spokesperson makes the rationale for reforms quite clear:

“The government will abolish Korail’s monopoly by introducing market economy principles to the nation’s train management sector. If the state-run railroad firm is forced to compete with a private enterprise, its operational efficiency will increase. Thus, it will cost less for Korail to operate KTX trains so that the company will be able to pay off its debts more quickly.”⁷

A report commissioned by the Ministry argued that fares would drop by up to 20 percent and that ridership would be stimulated to such an extent that the government could reduce the level of subsidies paid to operate the rail system.

⁵ According to government figures, KTX paid access fees of 300 billion KRW in 2011 on total revenues of 1385 billion KRW; this works out to 22 percent of revenues. One source suggests that the 40, 50, and 31 percent figures may be on revenues from KTX-only track, i.e. excluding revenues from KTX trains sharing conventional KR track with other trains, but we have not been able to confirm this.

⁶ For example, will these be single, 2-part, or multi-part tariffs? Will there be reservation or congestion charges? Will the variable portions of fees be based on train-kilometers, ton-kilometers, passenger-kilometers, something else? In the world experience, these differences matter. See ECMT (2005).

⁷ *Korea Times*, January 12, 2013.

4. Evaluating the Reform Proposal

4.1 Recent world experience with attempts to create “above-the-rail” competition in passenger train operations

As mentioned, it has been widely assumed among policy makers that the survival of passenger rail in many current circumstances depends on government subsidies: forced to pay its full way, passenger rail must charge fares that are too high to persuade shorter distance travelers to leave their autos or longer distance travelers to forego airplanes (Thompson, 2009). Passenger rail subsidies that may attract travelers from these other modes are then justified on grounds of the avoidance of negative externalities imposed by the latter, including congestion, air pollution, carbon accumulation, oil imports, and noise (Lalive, et al., 2013). But in that case, and under the assumption of economies of scale in train operations, there is little reason to believe that above-the-rail competition makes much sense, and policy makers seeking to harness the forces of competition have opted for a bidding competition for the smallest subsidy required to operate a monopoly franchise under constraints of frequency and service quality.

It is possible, however, that in some cases the unprofitability of passenger rail transport is related to requirements that the trains carry at least some passengers at reduced rates. This requirement dates back at least to the British “parliamentary trains” of the mid-19th century (Simmons and Biddle, 1997), and the issues raised are not different from those raised by “public service” or “universal service” obligations in other infrastructure sectors such as electricity and telecommunications (Laffont and Tirole, 2000; Harker, et al., 2013). In that case, of course, an important issue for profitability and sustainability is whether the subsidies required come from governments or are ordered to be provided from other, profitable operations of the provider. This has been a central issue in the debate over railways restructuring in Russia, for example (Pittman, 2013).

In some countries there have been recent, cautious attempts to create or encourage competition in passenger rail services through the somewhat complex instrument of continuing subsidies to franchise operators but allowing unsubsidized entry subject to certain restrictions. Russia continues to control and subsidize the rates for the lowest class (“platskart”) of passenger service, but has both allowed the incumbent Federal Passenger Company to raise rates on higher level service and permitted the entry of two “super-premium” passenger train companies on the popular

Moscow-St. Petersburg route.⁸ In the European Union, the “third railway package” of 2007 required member countries to allow track access to independent train operating companies offering international passenger services beginning in 2010, and a fourth package of reforms currently under consideration would similarly require open access competition for domestic passenger services (Preston, 2012). Several individual countries have on their own opened domestic services to open access competition, but sometimes under restrictive conditions; for example, both Italy and the UK have required that entry by a new TOC not result in a significant loss of passengers by the (subsidized) incumbent.⁹

Still, in the past few years there have been a few other instances of rail infrastructure being declared “open access” for passenger train services and new private TOC’s entering the market. In the UK, the franchised monopoly services have been supplemented by open-access passenger operators between London and Hull, London and Sunderland, and London and Bradford. In Germany there is now open-access competition between Hamburg and Cologne; in the Czech Republic between Prague and Ostrava; in Austria between Vienna and Salzburg. Probably most significant up to this point has been the entry by Nuovo Trasporto Viaggiatori into high-speed passenger service between Turin and Salerno via Milan and Rome.¹⁰ As shown in Table 1, the travel distances for Seoul-Busan and Seoul-Mokpo trains are squarely within the range of distances represented by these already existing – though still decidedly new – “open access” passenger train operators.

[TABLE 1 ABOUT HERE]

Some of these unsubsidized, privately owned passenger TOC’s operate on domestic routes and some on international. Most are of fairly recent vintage. Many, as in the UK and Germany, are mainly fringe operators not competing directly with mainline services (Crozet, et al., 2012). Some prospective entrants are reportedly waiting in the wings. Some entrants have already failed, sometimes the victims of strategic behavior by the incumbent integrated operator. It seems fair to say that the jury is still out as to whether full-fledged competition among independent TOC’s will be

⁸ Elena Ushkova, “Passenger Transport: Adaptation to Current Times,” *RZD-Partner International* 24 (2010), 25-26; Oksana Perepelitsa, “Unprofitability Barrier,” *RZD-Partner International* 31 (2012), 48-49.

⁹ See, for example, ORR (2004): “The Regulator ... notes the SRA’s [Strategic Rail Authority’s] views as set out in its capacity utilization policy that, whilst competition between operators can bring benefits (e.g. on some parallel routes between major conurbations), the SRA supports the Regulator’s policy to date of not granting access rights to services that primarily abstract revenue from other operators and do not increase the overall market significantly.” (at 3.9)

¹⁰ See, e.g., “The Dawn of Open Access,” *European Tribune*, December 10, 2011, <http://www.eurotrib.com/story/2011/12/10/55036/375>, accessed 8 February 2013.

sustainable, and if so under what conditions. Should South Korea proceed along the lines outlined by the government's reform plan, it will join Italy as the countries with the most significant experiments in this area.

4.2 *The Critics*

On its face, the decision to focus reform discussions on high-speed rail is a bit puzzling, since it is not KTX but the traditional passenger (Mugunghwa and Saemaoul) and freight operations of Korail that are reported to have been losing money over the years. KTX, on the other hand, has reportedly been a successful operation that runs an operating profit (though it has not been able to pay back the costs of construction); it carries two-thirds of non-commuter rail passenger-kilometers in South Korea and earns a profit for Korail despite paying an access fee to use the KR tracks reportedly of the equivalent of about 7.5 euros per train-km – within the range paid by high-speed rail TOC's in Europe (Sánchez-Borràs, et al., 2010; Sánchez-Borràs and López-Pita, 2011). According to the Korail Research Institute, the modal share of airlines in Seoul-Busan traffic fell from 49 to 24 percent between 2003 and 2008, and in Seoul-Daegu traffic from 19 percent to zero.¹¹

Both Korail management and its labor unions have been fighting the government's reform proposal. Opponents argue that adding a second train company to high speed operations would increase rather than decrease costs because of coordination issues and/or the loss of economies of density, and this would be consistent with the European experience noted above. They also argue that any cost reductions would likely come only as a consequence of replacing permanent, full-time employees with temporary and/or part-time employees. The principal results of this and other proposals for the privatization of South Korean government-owned enterprises, argue the government's political opponents, would be financial benefits for the chaebol and other business-related supporters of the government.¹²

¹¹ KDI (2012). See also "Bullet trains steal planes' thunder," *Korea JoongAng Daily*, April 2, 2009, <http://koreajoongangdaily.joinsmsn.com/news/article/article.aspx?aid=2903012>, accessed 18 January 2013; Kim (2005); and Suh, et al. (2005).

¹² Kim (2012); "Railway reform," *Korea Times*, January 15, 2012, http://www.koreatimes.co.kr/www/news/opinion/2012/01/170_102914.html; David Briginshaw, "Korail fights HS privatization plan," *International Railway Journal*, January 25, 2012, <http://www.railjournal.com/index.php/high-speed/korail-fights-hs-privatisation-plan.html>; "Private KTX Operator," *Korea Herald*, April 20, 2012, <http://nwww.koreaherald.com/view.php?ud=20120420000466>; Chung Hee-hyung, "Economics of privatization: Why government's rationale for KORAIL's privatization makes little sense?" *Korea Times*, June 24, 2012, http://www.koreatimes.co.kr/www/news/bizfocus/2013/01/330_113655.html; Kim So-hyun, "Major

A more detailed question raised by at least one commentator is the degree to which the trains of KTX and the new entrant TOC would actually compete with each other very closely. Kim (2012) argues that any competition between the two regarding fares or service quality would be much less important to riders than the relative locational convenience of the Suseo Station in southern Seoul (Gangnam), below the Han River, vis-à-vis the Seoul Station in northern Seoul (Gangbuk), above the Han River: “The time elasticity is bigger than the price elasticity for passenger rail services.” This raises the additional question of why, if above-the-rail passenger TOC competition is such a powerful force for good, the trains of the new entrant should not be able to serve both Seoul stations if the entrant sought to do that.

A related issue is whether a second high-speed passenger line operating out of a second Seoul station will succeed in attracting many new passengers to high-speed rail as opposed to solely taking ridership away from KTX. In the latter case, while the competition from a new entrant might force KTX to improve, the incremental revenues brought into the system from reform may not make up for the incremental costs. As noted above, government spokespersons argue that the introduction of competition will not only be good for travelers, as lower costs lead to lower ticket prices, but also good for Korail and even the exchequer, as better service stimulates demand to such an extent that profits increase and government subsidies to the rest of the system can be reduced. Again, this is possible, but it is not the international experience.

4.3 An alternative proposal?

If Korail freight and passenger train operations are indeed money-losing operations – and we have not seen the accounts – then KTX fares are likely kept higher than they would be otherwise by the requirement that KTX profits contribute to the subsidization of these losses. Such requirements for internal cross-subsidization are generally considered to be inconsistent with, indeed antithetical to, the creation of competition (Harker, et al., 2013); KTX and the entrant TOC would be able to compete away more passengers from autos, air, and traditional passenger rail absent the requirement to cross-subsidize. (Note, however, that according to KDI [2012] KTX fares are already “very low compared to that in Japan, France, or Germany.”) A standard “good-government” reform package in these circumstances might consist of the following:

privatization projects in doldrums,” *Korea Herald*, August 22, 2012, <http://nwww.koreaherald.com/view.php?ud=20120822000973&cpv=0>; all accessed 18 January 2013.

- End the cross-subsidization of Korail freight operations. Freight railways all over the world operate without subsidies (though admittedly in some cases paying very low access charges); there is no obvious reason why this should not be the case in South Korea as well. Steps short of structural change might include increasing freight tariffs to high enough levels to cover costs and allowing freight tariffs to be set in a discriminatory fashion – for example, as Ramsey prices or multi-part tariffs – as is standard practice in the rail freight sector around the world and indeed encouraged by US government policy as an efficient way of recovering large fixed costs (Pittman, 2010). (We discuss the possibility of structural change in freight below.)
- If policy makers desire to make passenger rail service affordable for the poorest citizens, subsidize their fares directly from government revenues rather than indirectly from other railway revenues. One interesting outcome of world experience has been that when governments are forced to subsidize passenger rail directly as opposed to ordering someone else to do it, they discover how much cheaper suburban and intercity bus service is than suburban and intercity train service.
- Those two steps should allow a third step of lowering fares for KTX (and an entrant TOC). Consider then whether access charges should be lowered – a form of direct government subsidy to high speed rail – in order to reflect the externalities of less highway congestion and lower airline carbon emissions. Of course, a corresponding policy would be to tax the latter two modes to reflect these negative externalities that they impose on society – for example, higher highway tolls, road congestion pricing, and airport slot auctioning.¹³

5. Other issues raised by the government's reform proposal

5.1 Is above-the-rail competition in passenger rail feasible and sustainable without greater separation between KR and Korail?

As noted above, one of the most important follow-on questions to the decision to seek above-the-rail competition among TOC's is whether to allow the incumbent track company to continue to run its own trains. On the one hand, the modern history of neoliberal policies seeking to create competition at one level of infrastructure industries is full of examples of integrated firms discriminating against their non-

¹³ We do not take a position as to KTX fares should be lowered; as noted, they are low already compared with high-speed rail fares in Japan, France, and Germany. Still it is a possibility that such a step could be considered if the requirements to cross-subsidize money-losing operations were removed.

integrated new entrant rivals in the charges and other terms of access to the infrastructure – this is exactly what the paradigmatic case of *U.S. v. AT&T* was all about (Brennan, 1987; Pittman, 2003). On the other hand, the decision to prevent such discrimination via a policy of complete vertical separation of operations from the network sacrifices any vertical economies enjoyed by the integrated going concern (Pittman, 2005, 2007b). Furthermore, as mentioned above, the importance of vertical separation as a condition for successful competition in the railways sector in particular has not been conclusively demonstrated (van de Velde, et al., 2012). As with access charges themselves, to be discussed below, there is no single best answer to this question.

The EU, a leader in seeking to create competition among TOC's, has moved steadily in the direction of requiring complete vertical separation in member country railways, but it is not there yet; as of now it requires complete accounting separation (for purposes of transparency of access charges, for example) but nothing further. Thus, for example, DB Schenker Rail, the incumbent German freight rail carrier, is a fully owned subsidiary of Deutsche Bahn AG, the government-owned enterprise that also controls the German rail infrastructure, and Trenitalia, the incumbent Italian passenger rail carrier, is a fully owned subsidiary of Ferrovie dello Stato Italiane S.p.A., the government-owned enterprise that also controls the Italian rail infrastructure. These two examples are apropos because each of these vertically integrated infrastructure operators has been sanctioned by its respective country competition authority for discriminating against an independent entrant TOC regarding the terms of access to the infrastructure.¹⁴

It seems quite relevant, then, that the situation of KR and Korail is in some sense similar to the situations in Germany and Italy, in that the separate infrastructure and operations companies are subject to common government control. Especially for passenger rail operations, not only access charges but also other access conditions make a great deal of difference as to whether an independent TOC can function as an effective competitor to the incumbent; one need mention only scheduled time slots and station services as two areas in which equal treatment of a related TOC vis-à-vis an

¹⁴ For Germany, see Hasse (2001) and Pittman (2004). For Italy, see Alessandro Speciale, "Italy's state owned rail crushes a private competitor," *Global Post*, October 8, 2011, <http://www.globalpost.com/dispatch/news/regions/europe/italy/110909/italy-business-italian-economy-trains?page=0,1>, and "Italy: The Italian Competition Authority fines Rail Incumbent FS for Abuse of dominant Position by hindering Access to Passenger Rail Services," European Competition Network, *ECN Brief* 04-2012 (October 2012), http://ec.europa.eu/competition/ecn/brief/04_2012/it_fs.pdf, both accessed 14 February 2013.

independent TOC may be as crucial to competition as access charges themselves. Should South Korea proceed along the lines of the government's reform plan, the effectiveness of subsequent above-the-rail competition may depend on the ability of the Korean Fair Trade Commission (and/or other government regulatory body) to enforce requirements for nondiscriminatory access by the new entrant TOC to the KR infrastructure.

5.2 How will access charges be determined going forward?

The setting of access charges for infrastructure networks is a fascinating topic for economists but a difficult one for policy makers. Infrastructure networks by their nature exhibit high levels of fixed and sunk costs. If policy makers wish a particular infrastructure sector to pay its own way – and this is one common rationale for liberalization and privatization – then access charges must cover both the variable charges imposed by a particular user and some share of the fixed charges. This creates at least two difficult problems: a) the share of fixed charges imposed on particular users is inherently arbitrary, and b) prospective users that could pay the variable costs that they impose but not their share of fixed costs are denied access, and this denial is in an important economic sense inefficient.

One way around this dilemma is to ignore it and restructure without requiring the sector to pay its own way – to set access charges at marginal cost and make up the fixed costs through government subsidies. But this solution has its own problems, including the poor incentive properties of long-term subsidies, the shadow cost of government funds, and the accompanying historic inability of governments to commit to devote scarce budget resources to maintaining infrastructure. Another way around the dilemma is a form of Pigovian price discrimination such as Ramsey pricing or multipart tariffs; such charges by their very nature seek to minimize the welfare cost of covering high fixed costs. The main problem with this solution is that competition authorities have not looked favorably on discriminatory access terms, even those that are set up with the stated rationale of efficient recoupment of fixed network costs.

Again, there is no single solution to this problem, no way to make the single regulatory tool of the access charge achieve so many goals simultaneously (Laffont and Tirole, 2000; BTRE, 2003; Pittman, 2004). Different countries currently restructuring their railways have made different decisions in this regard, all the way from access charges close to short-run marginal cost (pioneer railways reformers Sweden and the UK) to access charges something like fully allocated cost (the Baltic countries, Hungary,

Russia) (ECMT, 2004, 2005). And we have not even mentioned the complication of access charges that seek to include payments for additional factors such as congestion.

In general, however, governments have set access charges for *high-speed* trains very high, especially if the trains run on new constructed, specialized infrastructure. Sánchez-Borràs, et al. (2010) and Sánchez-Borràs and López-Pita (2011) have estimated the marginal costs of high-speed train operation, including externalities, applied ranges of estimates for elasticities of demand, and concluded that in general European countries especially have set access charges for high-speed trains considerably above even those that would be justified by Ramsey pricing. They conjecture that governments are adopting these policies because of the high costs of high-speed rail network construction, and they raise the concern that demand may be inefficiently discouraged as a result.

As noted above, it appears that KTX is currently paying access charges within the range of the world experience with high-speed rail (though, again, we have no information regarding the important question of the more detailed structure of the access charges). According to reports, the reform plans call for the new TOC to pay a somewhat higher charge. It appears likely that these charges are intended to reflect something like the fully allocated costs of network operation, including sunk construction costs, and that the higher charges imposed on the entrant may reflect extra infrastructure that is being constructed for the sole use of the entrant. Nevertheless, since one of the frequent difficulties in the creation of above-the-rail competition without complete vertical separation is the inability of the government to prevent the incumbent infrastructure operator from discriminating against the entrant TOC, it is striking that in this respect such discrimination is a part of the design of the restructuring.

A second issue is a broader policy question. Arguably, high-speed rail exists in Korea only because of the positive externalities that were anticipated to flow from it: increased economic growth, increased population mobility, reduced auto congestion, reduced air pollution, as well as the transfer of technology and skills (KDI, 2012). From an economic standpoint, those benefits are worth spending government money on. Once the construction expenses are sunk, economic efficiency would suggest basing access prices on the variable costs imposed by train operations, with, as noted above, mark-ups over those costs as appropriate. However, the focus of the discussions of access charges in Korea – as far as we can tell – has been solely on the ability of the charges accrued to allow KR to recoup the costs of construction, plus interest. We have

seen no discussion of access charges in the context of the variable costs imposed by train operations. This focus on accounting rather than economic factors risks access prices and hence user fares being set so high as to inefficiently discourage use.

5.3 Can high speed rail tariffs be deregulated?

As noted above, a number of countries have deregulated passenger tariffs for high speed rail and middle and luxury class traditional passenger rail, while maintaining controls on basic passenger tariffs in order to preserve affordability for the poorest citizens. Tariff deregulation is mainly justified by the competition to passenger rail offered by airlines – especially low-cost airlines – and auto and bus transport for middle and upper income travelers. Additionally, middle and upper income travelers are judged not to merit cross-subsidization of their expenses on equity grounds, and in an imperfect world the poor may have to be satisfied with the slower, conventional passenger trains, or even buses.

Despite the importance of those competitive forces in South Korea – despite also the government study claiming that competition will result in the lowering of high speed rail fares by up to 20 percent – the railways restructuring plan calls for both continued regulation of KTX fares and regulation of the fares of the entrant TOC that will require them to be 10 percent below KTX fares. The international experience seems to suggest that the presence of both intermodal and now intramodal competition may permit South Korea to allow market forces rather than regulators to determine fares for high speed rail.

5.4 Could freight rail services be liberalized?

As noted above, the world experience suggests that there is no good reason for policy makers to accept loss-making freight rail operations, and thus that the lowest-hanging fruit for railways reforms in South Korea is likely on the freight side. The first, and simplest, strategy would be simply to announce an end to subsidies for Korail freight operations, requiring the company to pay its own way going forward. Now that the majority of traffic on the conventional rail infrastructure is made up of freight, freight should arguably be subject to access charges somewhere between variable cost and fully allocated cost, as in Europe. With that regime established, Korail freight railway operations should be able to charge shippers prices that cover their costs – prices that, in the world experience, may be discriminatory – and Korail should be expected to provide service of a quality sufficiently high to attract shippers.

Might there be further benefits to South Korea from the creation of competition in freight rail? As noted above, the EU's third rail package imposed open access for freight rail operations throughout the Union. As with EU competition law restrictions on geographic trade restrictions, part of the rationale for this policy is the further integration of the Union. However, part is also the desire for the benefits of competition as opposed to local rail monopolies. Many European countries had anticipated the requirement by opening up access to their national rail networks already. As noted above, opening freight rail operations to independent TOC's has worked to the great benefit of shippers, as entrants have rapidly stolen market share from incumbents in a variety of countries.

On the one hand, South Korea is a relatively small country. Unless and until freight can move across the border into North Korea and thence into China or Russia, there is not a lot of obviously untapped potential for growth in rail freight volume. The economics literature examining the cost structure of railways suggests the presence of economies of system size that are likely not exhausted in the South Korean setting (Waters, 2007). On the other hand, South Korea has one of the most densely operated railways in the world (Table 2), so that economies of density, at least, may not be a barrier to the creation of freight competition. Again there is no obviously correct policy. However, if policy makers are considering creating competitive markets for passenger rail, why not for freight rail as well?

[TABLE 2 ABOUT HERE]

Two alternative strategies seem worth examining. Either of these might seek to take advantage of a worldwide trend toward vertical integration by ocean shipping and logistics companies (Pittman, 2009; ITF, 2010).

First, and most consistent with the reform experiments in Europe, the existing reform plan examined in this paper could be altered to allow for the entry of one or more independent freight TOC's, competing with the incumbent Korail freight trains on the KR infrastructure. One can imagine that an international ocean shipping, logistics, and/or railway company might be attracted by the idea of running container trains on the Gyeongbu line between Seoul and Busan, for example, though service to and from Seoul via Gwangyang, Incheon, or even Mokpo may be alternative possibilities. As in EU countries, infrastructure operator KR would be required to set equal and transparent access terms for the Korail trains and those of an independent TOC, enforced by the Korean Fair Trade Commission and/or a separate regulatory agency. One could also

imagine domestic shippers of cement and coal on the Jungang, Taebaek, and Youngdong lines running their own trains to and from their plants in competition with the Korail trains – as large domestic shippers have done in Central and Eastern Europe (Pittman, et al., 2007) – or threatening to do so in order to discipline Korail rates and service.

Alternatively, and most consistent with reform experiments in the Americas, South Korean policy makers could consider splitting off a section or sections of the KR infrastructure to a market entrant that would create a new vertically integrated railway company, running its own trains over its own track. The infrastructure could be controlled by the entrant under terms of a very long term lease, as in Mexico and Brazil. In both of those countries, mixed consortia of domestic and international firms bid hundreds of millions of dollars for long-term franchise rights, as well as committing hundreds of millions of dollars more in future investment commitments (Garcia de Alba, 2000; Estache, et al., 2001).

The idea here would be for the new company to serve Seoul from a different direction than that of the remaining Korail/KR trains and track, and so to offer both shippers and receivers in the Seoul region independent rail access to the water. As in Mexico City and many US cities, the track infrastructure in and around Seoul would be competitively neutral, perhaps jointly owned and controlled by the two railway companies as well as the city of Seoul. More specific options might be either of the following:

- The new train company could simply take over the relatively short section of track between Incheon and Seoul, expanding the container and bulk terminal capacities at Incheon to compete more strongly with the container ports in Busan and Gwangyang that would continue to be served exclusively by Korail trains (See Map 3); or
- The new train company could take over the container port of Gwangyang (near Suncheon) and the track from there at least as far as Daejeon. This strategy would then involve either a) joint use of the track from Daejeon to Seoul by the new train company and the Korail freight trains, or b) granting the new company the Daejeon-Seoul track infrastructure as well, and requiring the Korail trains to and from Busan to take the eastern route to Seoul via Yeongju and Jecheon. (See Map 4.)

[MAPS 3 AND 4 ABOUT HERE]

Again, it seems not at all unlikely that an international ocean shipping, logistics, and/or railway company might find this path for entering the South Korean market quite

attractive, with Korean shippers and customers the direct beneficiaries. In addition, and unlike the introduction of a second high-speed passenger TOC, this strategy may be reliably expected to raise significant sums of revenues for the government.

6. Conclusion

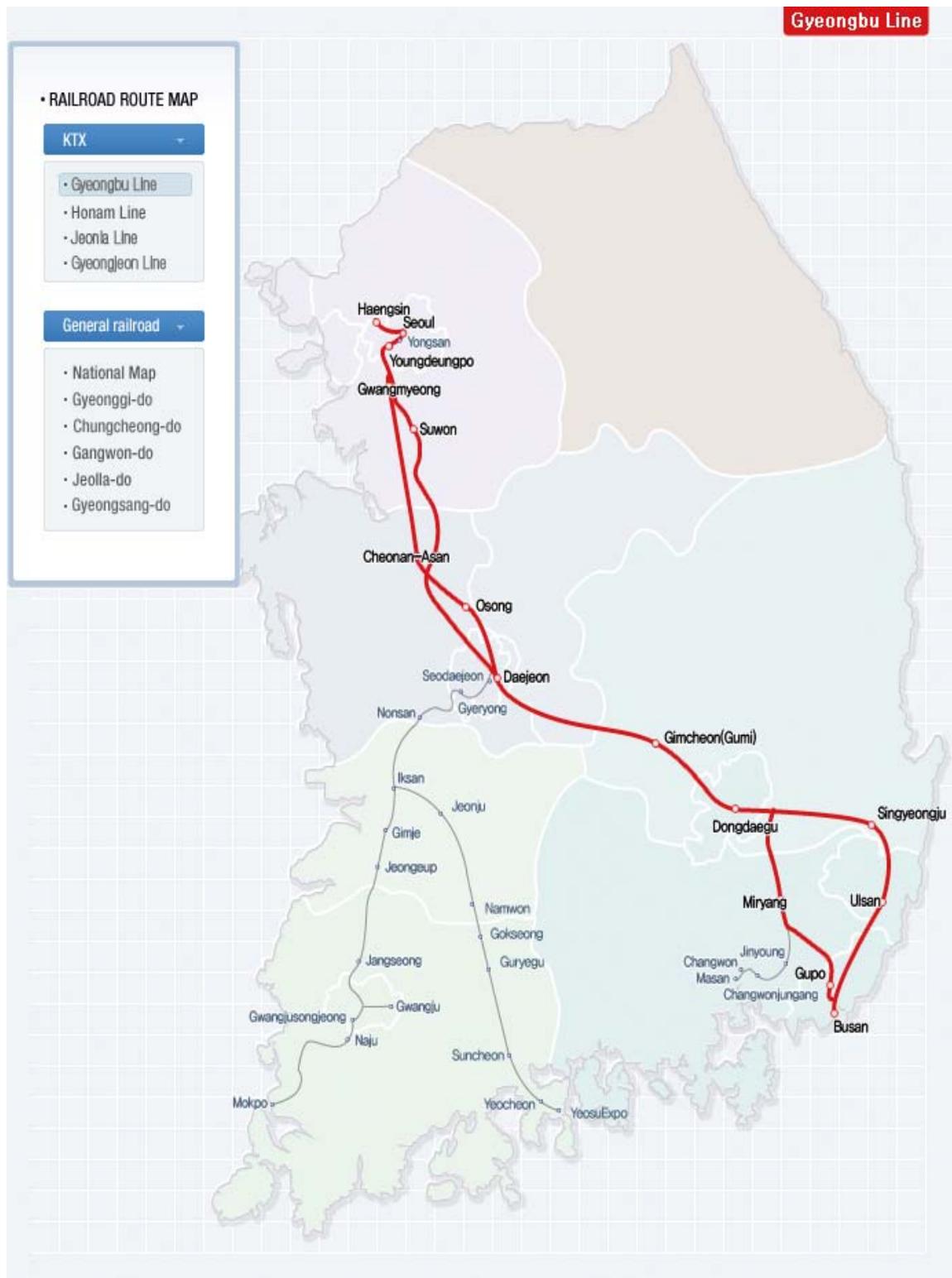
Many countries have chosen to cross-subsidize losses from their passenger rail operations with profits from their freight rail operations – though this practice is in decline as policy makers seek to create competition in freight rail. South Korea is one of the small group of countries where freight rail operations reportedly lose money as well, and in this case both freight and conventional passenger rail operations are cross-subsidized with operating profits from high-speed passenger rail.

The worldwide experience with railway operations suggests that a logical first step in reducing the need for subsidies in this situation would be to require freight rail operations to be self-supporting. Whether this small country can support multiple, competing freight railways is unclear, but its ability to support one profitable freight railway should not be in doubt.

At that point, the only system losses left to be made up would be the (probably relatively small) losses of conventional passenger trains subject to rate ceilings in order to protect the availability of transportation for the poorest citizens. Those losses could continue to be cross-subsidized from the profits of high-speed rail, though international best practice would argue instead for direct subsidies from the budgets of national and/or regional governments. The international experience does not seem to suggest that the introduction of a second TOC on the high-speed lines would lead to an increase in sector profits and thus a reduction in the government subsidies required for the maintenance of conventional passenger service. The introduction of competition on the freight side has a more consistently successful track record in world experience, including – when the long-term franchising of infrastructure is part of the package – raising considerable sums from private bidders.

In closing, we emphasize that all of this is not to say that introducing competition for KTX trains on the KR high-speed lines is a bad idea. It is pushing the envelope, but a) Korea has pushed the envelope with success before, and b) Italy, and to some degree the Czech Republic and Austria, are pushing this particular envelope now as well. It is simply to suggest that whatever the benefits of that policy, they seem unlikely to include higher profits for KTX and so lower government subsidy requirement for Korail

passenger operations, whereas more attention to creating competition on the freight side might offer tangible benefits.



Map 1. KTX lines from Seoul to Busan and Mokpo. Source: Korail.



Gyeongbu Line



Taebaek Line



Jungang Line

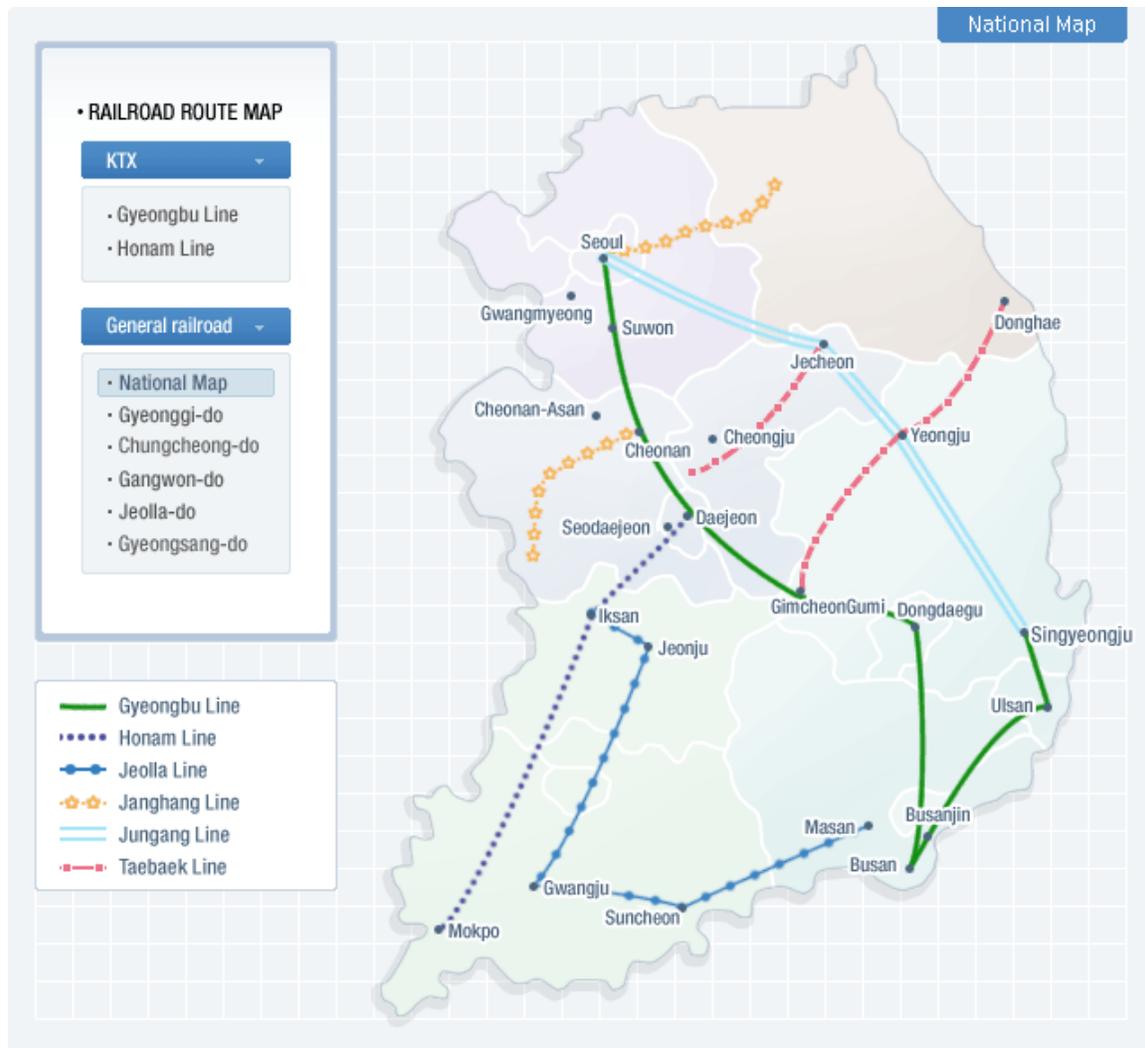


Yeongdong Line

Map 2. Most important freight lines. Source: Wikipedia.



Map 3. Gyeonggi-do section of Korail map, including Incheon-Seoul. Source: Korail.



Map 4. National railroad map. Source: Korail.

| ORIGIN | DESTINATION | DISTANCE BY RAIL (KM) |
|--------------|----------------|-----------------------|
| Turin | Milan | 125 |
| Rome | Salerno | 234 |
| London | Hull | 257 |
| London | Bradford | 274 |
| Vienna | Salzburg | 300 |
| Seoul | Mokpo | 353 |
| Prague | Ostrava | 360 |
| London | Sunderland | 386 |
| Seoul | Busan | 424 |
| Milan | Rome | 548 |
| Moscow | St. Petersburg | 650 |

Table 1. Distances between cities served by competing “above-the-rail” passenger train operating companies.

| Country | Passenger density* (PD) | Freight density** (FD) | Total train density*** |
|---------------|----------------------------|---------------------------|------------------------|
| China | 12.0 | 38.5 | 50.6 |
| Russia | 1.8 | 21.8 | 23.6 |
| India | 12.0 | 8.6 | 20.6 |
| United States | 0.1 | 15.0 | 15.0 |
| Kazakhstan | 1.0 | 13.9 | 14.9 |
| Japan | 12.3 | 1.1 | 13.4 |
| South Korea | 9.6 | 2.9 | 12.5 |
| Ukraine | 2.2 | 9.1 | 11.3 |
| Estonia | 2.8 | 7.2 | 10.0 |
| Belarus | 1.3 | 7.8 | 9.1 |

Table 2. The world’s 10 most densely operated railways

*Passenger-kilometers (in thousands) divided by Rail kilometers

**Freight ton-kilometers (in thousands) divided by Rail kilometers

*** PD + FD

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