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Going Places: Rail Transport in Japan

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[Abstract]: The purpose of this short paper is to summarize the state of rail transportation in Japan and to recount recent developments. Points of focus here are organization and types of competition in the rail industry in Japan, the evolution of passenger and freight rail transportation, yardstick regulation as a competition tool, and recent vertical separation in Japan. Several distinguishing factors of the Japanese rail industry are discussed. First, passenger rail transportation is still vital in Japan, but the freight rail business is weaker than in other major industrial countries. The second notable feature of the rail industry in Japan is the extraordinary number of rail operators, the vast majority of which are privately owned passenger railways. Third, most railways are vertically integrated, and entry into and exit from the market are not free but are regulated. Fourth, there are eight types of competition, among which is yardstick competition, an indirect form that is applied to separate markets and has existed in Japan since the 1970s. Fifth, as for the evolution of passenger and freight rail transportation, two developments—the *Ekinaka* business for passenger rail and the Eco-Rail-Mark certificate system for freight—are underway in the rail industry. Sixth, yardstick regulation is effective to some degree, but it is unknown how long the effect will continue. Last, while vertical integration is the norm in Japan, there are cases of vertical separation in some urban area operations. Recently, however, new types of vertical separation have been emerging, mostly for financial reasons. As competition in Japan's rail industry has been very limited up to now, Japanese policy makers would be wise to seek lessons from the European experience.

[Key Words]: Rail industry in Japan, vertical integration, yardstick regulation, *Ekinaka* business, Eco-Rail-Mark certificate system, privately owned railways

[JEL Classification]: L16, L25, L33, L43, L51, L92, R41, R48

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1. Organization and Type of Competition in the Rail Industry in Japan

Passenger rail transportation is still vital in Japan, but the freight rail business is weaker than in other major industrial countries. As can be seen in Figure 1, which shows the mode share of rail transportation in domestic markets, shares in European countries such as Germany, France, and the UK fall between those in Japan and the US. Japan's passenger transportation industry remains robust for several reasons. One is the very important role played by private railways and JRs in urban transportation in large metropolitan areas such as Tokyo and Osaka. These companies have diversified their business and ventured into fields not typically associated with rail transportation but which ultimately strengthen and enhance it. Real estate development along train lines is a typical example. Another reason for Japan's thriving passenger rail industry is the increase in ridership along the core corridor connecting Tokyo-Nagoya-Osaka-Fukuoka, where the Tokaido Shinkansen and Sanyo Shinkansen dominate the market. In fact, Shinkansen demand is still growing nationwide, and construction has recently begun on the Maglev high-speed train (500km/h), slated to open in 2027 between Tokyo and Nagoya, and 2037 between Nagoya and Osaka. Compared with passenger rail transportation, freight rail transportation in Japan has been lackluster but has shown slight improvements in performance since 2010, when there was a modal policy shift by the government, which began to promote rail over truck freight for environmental reasons.

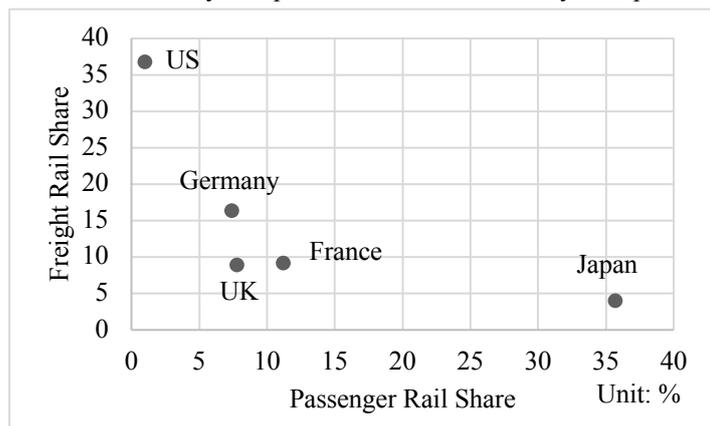
The most distinctive characteristic of the rail industry in Japan is that there are so many rail operators and that the vast majority of these are privately owned passenger railways. Another distinguishing feature is that most railways are vertically integrated. Furthermore, entry into and exit from the market are not free but are regulated. These characteristics are summarized in Table 1.

First, as for rail operators, there are 183 heavy and light rail operators. Of these operators, most are passenger railways: 171 passenger and 12 freight rail operations. Second, most railways are privately owned, well-known examples being the 15 large private railways, which are widely considered the most efficient railway organizations in Japan.

Public ownership is limited to only 11 operators, of which 9 are subway systems in cities such as Tokyo, Osaka, and Nagoya, with each system owned and operated by its respective city government. Although three major JR companies—JR East, JR Central, and JR West—and recently JR Kyushu have been fully privatized, the smaller JRs—JR Hokkaido and JR Shikoku—have yet to be fully privatized, with most of their shares still held by the government.

Second, while most rail operators in Japan are vertically integrated, other systems are allowed. There are three classes of railways. Class 1 railways operate both passenger and/or freight services and owns their own infrastructure. Class 2 railways provide only rail passenger and/or freight services. Class 3 railways provide only rail infrastructure.

Third, as for entry and exit regulations, it is necessary for a rail organization to secure permission from the Minister of Land, Infrastructure and Transport in order to enter the market. In the event of exit from the market, regulation requires only that operators notify the Ministry of Land, Infrastructure and Transport one year prior to terminating rail services. While both regulations may seem lenient on the surface, in fact there are many criteria that operators must meet in order to get



(Note): This figure was created by the author and is based on data from the Ministry of Land, Infrastructure and Transport (2017; pp.18-21). Numbers are calculated based on passenger-km and tonne-km in 2009.

Figure 1 Share of Rail Passenger and Freight Transport in Domestic Transportation

permission to enter or consensus to exit. With these regulations in place, the market structure cannot be described as free entry and exit.

Table 1 Characteristics of Organization of the Rail Industry

Item	Remarks
Rail operator	(1) 183 rail operators (6 passenger JRs and 1 Freight JR; 15 large private railways, 10 subway systems), (2) Most railways are privately owned railways, (3) Most railways are passenger railways (171 passenger rails, 12 freight rails)
Vertical structure	(1) There are three classes: Class 1 (Integrated rail organization), Class 2 (Rail operation organization), Class 3 (Infrastructure organization), (2) Most railways are vertically integrated systems
To and from the market	(1) Entry: Permission system (individual operator basis) (2) Report in advance (1 year prior to exit)

(Note): This table was created by the author and is based on information from the Ministry of Land, Infrastructure and Transport (2017) and Mizutani (2012, 2015a).

Table 2 Types of Competition in the Rail Industry in Japan

Type of competition	Explanation	Market	Status of competition
Modal competition	Competition with other transportation modes	Same market	Passenger: heavily existent Freight: existent
Modal competition strengthened by cooperation with other railways	Competition with other transportation modes (e.g. Shinkansen: JR Central & JR West vs. airlines; JR West & JR Kyushu vs. airlines)	Same market	Passenger: existent Freight: existent in main trunk lines
Line competition	Competition with other railways	Same market	Passenger: existent in large metropolitan areas Freight: nonexistent
Competition for the market	Competitive tendering	Same market	Passenger: almost nonexistent Freight: nonexistent
Competition on the track	Open access or on-track competition	Same market	Passenger: nonexistent Freight: nonexistent
Yardstick competition/regulation	Competition by the management measures such as costs	Different market	Passenger: existent (JRs, large private railways, public subways) Freight: nonexistent
Line-haul competition	Competition among different line-hauls to attract residential and commercial activities	Different market	Passenger: existent in Tokyo and Osaka metropolitan areas Freight: nonexistent
Terminal station competition	Competition among different line-hauls to attract commercial activities	Different market	Passenger: existent in Tokyo and Osaka metropolitan areas Freight: nonexistent

Eight types of competition and their relevance to the rail industry in Japan are summarized in Table 2. The first is modal competition with non-rail transportation modes: the private auto for short travel and airlines for long travel. The second type is modal competition involving some cooperation between separate railway companies to strengthen their ability to compete with non-rail transportation modes, for example when JR companies combine Shinkansen operations to create a direct line as an alternative to air travel. The third type is line competition, when railways compete with others in the

same market. In large metropolitan areas, some rail lines are literally parallel to each other, so that railways must compete to attract passengers with identical destinations. The fourth type, competition for the market, has been largely nonexistent in Japan until recently. The fifth type is competition for rail tracks, such as open access or on-track competition. This does not exist in Japan. In different markets, however, indirect competition exists in Japan in the form of yardstick competition, which has been used since the 1970s. This scheme, to be explained later, is indirect competition among railways operating in different markets. Then there is line-haul competition. Private railways in Japan employ business diversification strategies to attract residents and commercial activities, a typical example being the real estate development private infrastructure-owning in which railways engage to make their own lines more attractive than those of other private railways. Railways also engage in terminal station competition, which aims to attract or generate commercial activity. One strategy to enhance terminal attractiveness is *ekinaka* business, a tool developed in the evolution of terminal competition. This will be explained in the next section.

2. Evolution of Passenger and Freight Rail Transportation

To illustrate the recent evolution of both passenger and freight rail transportation, here we will explain two developments—the *Ekinaka* Business for passenger rail and the Eco-Rail-Mark certificate system for freight.

First, the promotion of *ekinaka* business with the construction of elaborate station complexes is an important strategy among private railways hoping to attract more users. The literal translation of *ekinaka* is ‘inside the ticket gate’ (Mizutani, 2015b). Until the onset of the *ekinaka* trend, the only shops to be found inside station ticket gates were kiosks or other tiny establishments. The *ekinaka* idea stems from the fact that passengers must buy a ticket before entering a station in Japan, so *ekinaka* commerce is a way for private railways to transform captive passengers into retail customers as they make their way through stations. Actually, many more people pass through railway stations in Japan than visit theme parks such as Tokyo Disneyland and Universal Studios Japan in Osaka. In fact, certain important stations in large Japanese cities have well over 1 million users per day. In recent years, to target this multitude of potential customers, JR East has constructed numerous shopping malls inside terminals such as Tokyo, Shinagawa, and so on. JR East’s shopping malls, under the brand name “Ecute,” are no different from ordinary shopping malls, except for their location, and may be considered somewhat similar to shopping facilities inside large international airports. *Ekinaka* business has been growing rapidly, and its revenues far exceed those of other forms of retail. However, one negative effect of the *ekinaka* trend is that shopping areas outside railway stations have been in decline because *ekinaka* business reduces or eliminates the need for users to exit the station.

Another example of the evolution of the Japanese railway industry is the introduction of the Eco-Rail-Mark certificate system as a policy to reduce CO₂ emissions. The national government has been promoting a modal shift from truck transport to rail transport for this purpose. With the Eco-Rail-Mark certificate system, a company can obtain a certification mark on products or companies when it makes a modal shift in the distribution of products and switches to rail cargo transport with low carbon dioxide emissions. The certificate can be awarded when the following criteria are satisfied. As for products, a company must use rail to transport more than 30% of its products being transported more than 500km. As for companies, they must use rail to transport more than 15% of all their products being transported more than 500km. As of September 20, 2018, 206 products and 87 companies have been awarded certificates. Certified companies have the right to display the certification emblem in product packaging, catalogs, advertisements, environmental reports, and so on, and be recognized in society as companies attentive to environmental protection. Although we cannot separate out and measure the effect of the Eco-Rail-Mark system only, the modal shift from trucking to rail has been strengthening steadily since 2010.

3. Yardstick Regulation as a Competition Tool

Competition for and within the market among rail operators is almost unheard of in Japan, but this does not mean that rail competition policy does not exist. As explained above, there are many kinds of competition, the most important of which is the indirect form known as yardstick regulation. In particular, competitive tendering for railway lines and railway networks in general does not occur in Japan. Instead, yardstick regulations are applied to 15 large railways, 10 public subways, and six passenger JR companies. Yardstick regulation is used to evaluate rail operators when individual operators change rail fare. A regulator sets up several performance measures, such as operating cost

(e.g. rack costs, catenary costs, rolling stock costs, train operating costs, station operating costs), and evaluates rail operators' performance. In this scheme, the standard costs for these cost measures are obtained by using each individual rail operator's data. The standard cost of each individual rail operator is considered as the cost, excluding noise and conditional differences in markets. In addition, by comparing the actual cost of each rail company with its standard cost, the performance of each rail company is evaluated. As an example, a rail operator whose actual costs are lower than its standard costs may be rewarded for its efficiency by being remitted half the difference between the actual and standard costs.

As for the effectiveness of yardstick regulation, when the scheme was first instituted, there was positive empirical evidence. For example, the Committee of the Regulatory Impact Study on Government-Regulated Public Service Charges (2005) showed that yardstick regulation provides total user benefits in the Tokyo metropolitan area, and Mizutani et al. (2009) found that railways subject to yardstick regulation improved cost efficiency between 1995 and 2000. However, recent studies do not show positive effects. For example, Mizutani and Usami (2016) showed that yardstick regulation does not improve productivity. Despite the disparity in results, however, it is necessary to refrain from drawing conclusions. It can be assumed that yardstick regulation is effective to some degree, but that it is unknown how long the effect will continue.

4. Recent Vertical Separation in Japan

While vertical integration is the norm in Japan, there are cases of vertical separation in some urban area operations, such as Kobe Rapid Transit, Narita Airport Rapid Transit, and Kansai Airport Rapid Transit. Recently, however, new types of vertical separation have been emerging, mostly for financial reasons. In the rail industry in Japan, the full-cost principle is still the ideal, and it is expected that costs, including even infrastructure costs, be covered by fare revenues. However, railways in rural areas have been facing difficulties in maintaining services due to declining rail ridership. As a result, many private railway companies in small urban areas cannot maintain their business without relying on operating subsidies. In order to reduce the financial burden on the railway company, a vertical separation policy is sometimes being adopted. However these recent unbundling schemes in Japan are quite different from what is seen in Europe. The main purpose of vertical separation in Japan is as a tool whereby financial support can be supplied by local governments, and there has been no competition when selecting rail operators. In 2014, however, something new happened in the Japanese railway industry. Kyoto Tango Railways, which owns rail track in rural areas in northern Kyoto Prefecture, selected Willer Trains through competitive tendering by four companies. A subsidiary of Willer Express, which is a highway bus company group, Willer Trains is the first non-rail company to take over a rail service. This is a small step, but it may be a harbinger of things to come in the rail industry, where stimulating competition by promoting new entrants through competitive tendering will become commonplace. If this turns out to be the case, policy makers in Japan have lessons to learn from the European experience.

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