

# Do Faster Trains Challenge Air Carriers?

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## Fly or Go by Train

Railways boast a 29% share of the Japanese passenger transport market. This is partly because the nation's businesses and government offices are concentrated in Tokyo, Osaka, and Nagoya, providing massive captive markets for railways. In addition, shinkansen services between the major cities facilitate extensive inter-city travel. These factors have pushed train use in Japan to higher levels than in other countries, especially compared to countries like the USA, Canada and Australia that have vast land areas and correspondingly much greater dependence on air travel.

In Japan, airlines play a comparatively small role in domestic passenger transport but their share has grown at a fairly constant rate since the 1960s, and has jumped 5% in recent years. In favorable markets, airlines hold a virtual monopoly.

The Japanese archipelago is only 500-km wide, but stretches about 2800 km north-south, similar to the distance from London to Athens! Consequently, long journeys in Japan are usually made by air. However, for cities less than about 750 km apart, railways are cutting into the airline's market share, while airlines are gaining for cities that are further apart.

More than ever before, airlines and railways are locked in fierce competition for inter-city passengers. Faster trains are seriously eroding the position of airlines on a number of previously popular air routes.

Transport market share is affected mainly by pricing, schedules, and service. Recently, the gap between railway and air fares has shrunk to insignificant levels, so other factors, such as speed and better services now affect passengers' decisions when choosing one transport mode over another.

## Changing Fortunes of Railways and Airlines

Soon after World War II, as Japan's domestic airlines began strengthening their position, they realized that they could make little gain without cutting into railway travel, but air fares were higher than railway fares. For many years, the government had permitted Japanese National Railways (JNR) to act as a price leader. Using JNR fares as a yardstick, air fares were set giving consideration to the price of travel by first-class night train (first-class train fare + express surcharge + sleeper surcharge). However, in the early 1970s and 1980s, airlines began introducing more competitive fares. Today, rail and air passengers can often travel for almost the same fare.

The competitive relationship between airlines and railways has changed for two main reasons.

First, as average income rose, consumers began placing greater priority on time. Domestic passengers have increasingly shown a desire to get to their destination as soon as possible. Passenger response to carrier speed can be measured using a speed/demand elasticity index, showing changes in passenger demand when speeds change on specific routes. As speeds increase, the index shows a definite increase, paralleling the rise in income levels. Technical advances in shinkansen and aviation have considerably shortened travel times between Tokyo and Fukuoka, and (in the case of air) between Tokyo and Sapporo. Passenger traffic increased 250% between Tokyo and Fukuoka from 1979 to 1985, and 320% between Tokyo and Sapporo during the same period. Also of note is that as income levels rose, passengers spent proportionately more on air travel. From 1979 to 1985, passenger traffic jumped an average of 11%, greatly exceeding the average increase of 4.4% in real GNP during the same period.

Second, lower air prices promoted air travel. Technical innovations in aircraft design have resulted in lower unit costs, permitting lower fares. Aircraft became larger during the 1979–1985 period, bringing greater productivity to the airline industry as a whole. As a result, air fares have risen at a lower rate than the overall inflation index.

Starting in 1976, JNR increased rail fares regularly, making travel by air considerably more attractive. Before it was privatized, JNR was hobbled by debt and worsening labour-management relations, both of which led to poorer service. Many passengers abandoned rail travel for air as air fares approached the levels of rail fares. This occurred at a time when the airline industry was protected by government regulations—their greater productivity was not due to their own management efforts. In a market where absolute inter-city passenger volumes were not increasing, we can assume that JNR itself and its problems were the main cause for this growth in the airline industry.

Even so, it cannot be said that the airlines cut into every rail market. After the Tokaido Shinkansen between Tokyo and Osaka started in 1964, Tokyo-Nagoya flights were closed. Similarly, Osaka-Hiroshima flights suffered the same fate after the Sanyo Shinkansen opened in 1972. Shinkansen had a negative impact on air travel on these and other routes. But these high-speed railway lines were constructed to address another issue. For example, JNR built the Tokaido Shinkansen primarily to solve the tight capacity on the old Tokaido main line, reducing travel times was not the top priority. As for conventional lines JNR did not introduce faster services from 1968 until it was privatized in 1987.

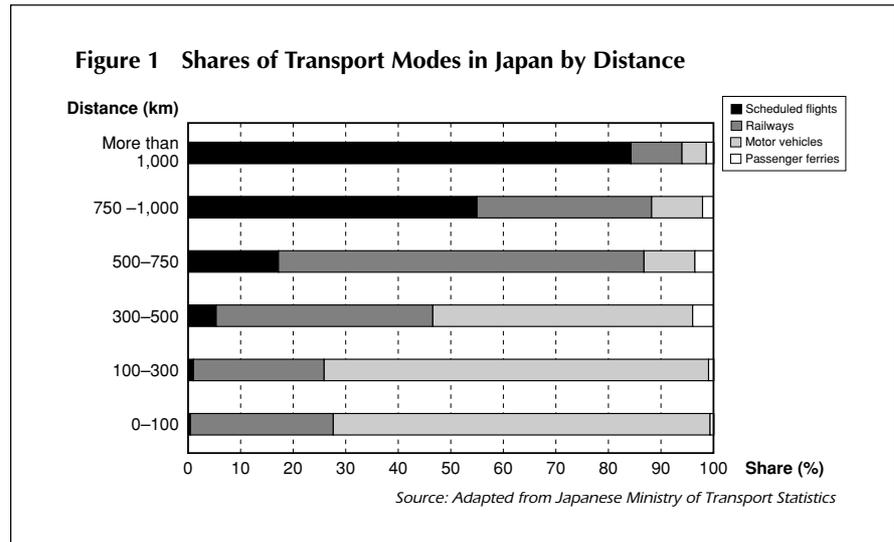
Airport development in many parts of the country permitted formation of a national air network, leading to increased demand for air travel. Even though airports were being built in smaller regional centres

throughout the country, most air passengers continued using the airports in Tokyo and Osaka, so the chronic shortage of seats continued. To solve this problem, the airlines began flying much larger aircraft, enabling them to maintain comparatively stable profitability, with the help of government protective measures preventing new entrants into the airline market. If there had been deregulation, the airline industry as a whole would have been able to take advantage of the latent demand at the time.

### Railways Gain New Strength through Speed

Since JNR's privatization in 1987, the newly formed JRs have enjoyed greater autonomy in their business affairs. Since 1992, they have been pushing to increase speed. The airlines, too, have gained some liberty through government policies promoting competition, but they can hardly increase speed! Technical innovations cannot make today's airplanes fly faster. Although flights could be shortened dramatically by development of supersonic aircraft (new SSTs), the development and operation costs would be enormous. Even if these costs could be offset by revenue, supersonic speeds would have no meaning in Japan, because pilots would have to start their descent soon after achieving cruising speed, meaning that SSTs could only fly on very limited long-distance domestic routes. Environmental standards would pose another hurdle that airlines would find very hard to overcome.

In contrast, in recent years, the railways have introduced various new high-speed trains on inter-city routes, and the Sanyo Shinkansen has achieved maximum operating speeds of 300 km/h. Although this is considerably slower than most commercial passenger airplanes, the long access times to airports greatly reduce the speed advantage of airplanes. By increas-



ing service speeds, the railways have begun turning the medium-distance market to their advantage.

The next century faces growing problems with dwindling energy supplies and global environmental pollution. One consequence will be that railways will be viewed favourably in terms of energy efficiency and environment friendliness. Japan's Ministry of Transport (MOT) is well aware that the country must save energy and reduce pollution and has recommended further improvements to the nation's shinkansen network. Such improvements would answer calls for higher speeds and greater comfort, and would also fulfill two related aims. First, the MOT has proposed raising the average speed of trains on trunk lines, including shinkansen, in the long term to the 120-129 km/h range. Second, the Ministry recommended that the maximum travel times by rail from Tokyo, Nagoya, Fukuoka and Sapporo to smaller important regional cities should be reduced to approximately 3 hours conditional on factors such as passenger traffic flows.

For any transport carrier to be competitive, it must first save the passenger either time or money. Since there is now almost no difference between rail and air fares, the focus is on time. Looking only at the time difference between travelling to a destination by train and plane, if the train is 150 to 200 minutes slower than the

plane, rail and air have almost equal market shares. However, if the difference is 300 minutes or more, air attracts more passengers. Consequently, faster trains would reduce the time difference and tip the balance in their favour. Looking at journey distance, trains have the advantage when the journey is 750 km or less, and they compete equally with planes at distances in the 800-900 km range (so-called borderline range). When the distance is more than 1000 km, planes have a clear advantage (Fig. 1). Faster trains could push the borderline range up. At distances in the borderline range, one mode may gain an advantage over the other by offering more frequent departure times or better services.

The time required to travel from point A to B is the sum of the various parts of the journey, such as the time to travel to and from the railway station or airport terminal, the waiting or check-in time, the embarking and disembarking times, and the actual travel time. Waiting time can be cut by increasing the number of trains or flights. Although a plane is certainly faster than a train, trains often have the advantage once the time spent getting to and from the airport is factored in. Rail travel times between Tokyo and Yamagata dropped after the two cities were linked by shinkansen in 1992, and the same thing occurred when shinkansen services started last year between Tokyo and Akita

(Fig. 2). As a result, airlines on both routes lost part of their market share to rail. Rail fares on the Tokyo–Yamagata route are similar to the air fares, and so are the travel times when airport access times, etc., are factored in (Fig. 3). When the time and cost are the same, passengers base their choice of mode on other factors, such as the timetable and station or airport convenience. Actually, most major Japanese airports are located some distance from the cities they serve. If this problem is not solved, faster trains may take even more passengers from more air routes.

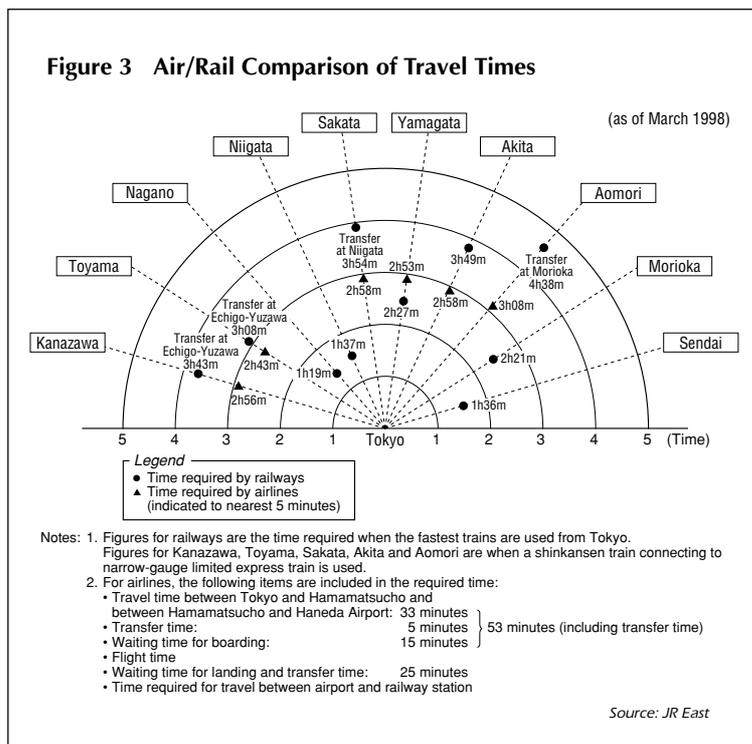
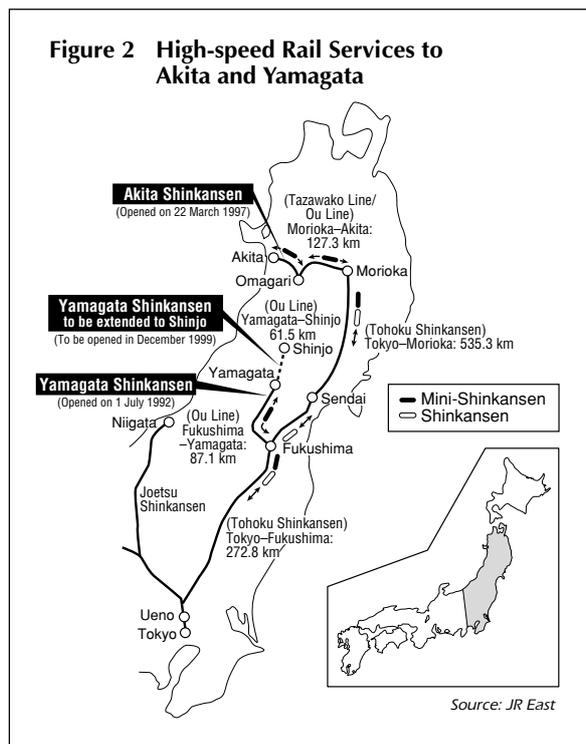
However, some routes like Tokyo–Fukuoka will always be much faster by air, so railways will still find it difficult to attract more passengers even if they reduce travel times by using high-speed trains. Of course, it might be possible to attract more rail passengers by reducing rail fares well below air fares, but if the price gap remains narrow, the railways will not be able to increase their market.

There are also other important factors. For example, the last plane departure of the day often permit businesspeople to make a same-day return trip over considerable distances. Airlines enjoy this advantage because of the physical limitations of trains, showing that one mode can find a niche market unavailable to another. Nowadays, travellers can choose their mode based on a number of considerations. In today's competitive market, it is certainly an advantage to offer fast services from one place to another.

### Future Developments and Challenges

As railways find ways to run ever faster services, they will strengthen their competitive position vis-à-vis airlines. Deregulation will probably add fuel to this competition. In December 1996, the MOT decided to eliminate the so-called supply-and-demand adjustment rules limiting entry of new carriers into the

transport market within 3 to 5 years. Some regulations affecting domestic air carriers will be lifted during fiscal 1999, and the airline authorities are now considering measures that would permit greater flexibility in allocating arrival and departure slots at airports. Japan's railways and domestic airlines must now address how they should meet future challenges arising in the new market environment. The airlines face a number of challenges. First, they should become more environment friendly. Also, since technical limitations make it almost impossible to shorten flight times any further, they must find ways to shorten waiting and travel times on the ground. For example, they could try to cut check-in times, and modify timetables and flight routes as navigation systems are improved. They could also try to cut airport access times. Fares are another issue. Airlines are now free to set fares within certain parameters approved by the MOT. The upper fare limit is calculated by the MOT, while the



lower limit is 75% of the MOT upper limit. Airlines are competing against each other by setting their fares at the lower end of the scale, and by introducing a wide array of discount fares.

After the deregulation, discounts below the lower limit are allowed, and as long as the discount price is not less than 50% of the upper limit, the airline need only notify the government of its intent. The lower fare limits were established to prevent cut-throat competition on air routes served by more than one carrier, but as the regulations based on the supply-and-demand adjustment rules are abolished, it would make sense to eliminate the lower limits as well. Airlines offer different discount fares designed to appeal to specific types of passenger, but with deregulation, the airlines will need to introduce an even more attractive variety of discounts if they wish to serve a wider clientele.

And as rules restricting the entry of new carriers are lifted, airlines will need a more flexible fare system that appeals to different types of passengers and creates more demand. For example, since most passengers on domestic flights are on business, airlines could take more aggressive marketing initiatives to attract domestic tourists, instead of simply depending on travel agents. In the heady days of the bubble economy when the yen was strong, Japanese tourists tended to board planes for overseas destinations, but today there is greater latent demand for domestic tourism within Japan. Statistics from the Japan Tourist Association show that the average domestic trip taken by Japanese tourists involves only a two-night stay away from home. If Japanese employees had longer holidays, they would travel more and the airlines would benefit accordingly.

The railways face a number of challenges as well. First, they must plan any investments in expanding the high-speed lines and the shinkansen network very carefully. As things stand now, the railway

companies are basically responsible for construction costs. One difficulty they face is the prohibitively high cost of buying land for new tracks, making the investment very risky too. Since the railway companies must remain profitable and are answerable to their shareholders, they have almost no incentive to make the necessary massive investments. One solution might be joint investment in construction of new shinkansen and joint sharing of operating expenses. Since 1988, the government adopted a series of schemes under which construction costs for new shinkansen would be shared by the national government, local governments, and the JRs.

The first Tokaido Shinkansen between Tokyo and Osaka runs through a densely populated corridor and is very profitable, but future shinkansen lines will run through less crowded areas with much less favorable market conditions. Instead of building new standard gauge shinkansen tracks, perhaps it might be better to adapt the gauge of some existing tracks to permit operations of both shinkansen and normal trains on the same track, like the Akita mini-shinkansen (see *JRTR* 11, p. 66). Another option could be to improve ordinary tracks to accommodate faster trains. The railways should also carefully develop new marketing and pricing strategies that will ensure their prosperity in today's competitive market.

We cannot forget that over the long term, as some new trains begin travelling much faster, they will attract a narrower range of customers with super-high-speed carriers catering exclusively to long-distance

passengers. With these changes, the economies of less-populated areas will depend even more on the metropolises, and the movement of people and goods will flow even more from the former to the latter, reversing recent trends. Small population centres near super-high-speed lines will not be served by the trains rushing from one metropolis to another. Moreover, the present arrangement under which freight trains run on tracks leased from passenger companies, will be threatened. To address these issues, careful consideration should be given to constructing new tracks parallel to existing ones, where local conditions and demand make this feasible.

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## Conclusion

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The recent trends show that when transport carriers have greater control over their own affairs, airlines offer more discount fares to compete on a price basis with railways, while railways offer faster services that improve their competitive position. These changes offer consumers a number of fare and service options to choose from. Introduction of faster services is a response to consumer demand for ways to save time. But it is also true that as the needs of Japanese consumers become more diverse, the carriers must provide more diverse services. For this reason too, passengers are best served by having many options to choose from. At any rate, future service improvements, including higher speeds, will surely increase both demand and productivity. ■



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