Benefits and costs of vertical agreements between airlines and high speed rail operators

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Abstract

There are many examples of airline-high speed rail vertical agreements, where the airline buys train seats to sell the multimodal product. We discuss the formation of such agreements, depending on the sunk costs of cooperation and firms' bargaining power, and their welfare effects, depending on hub airport capacity and mode substitution. We argue that, contrary to mergers, vertical agreements largely benefit passengers. We propose a simple test as a 'safe harbor', which provides a sufficient condition for consumer surplus to be higher under vertical agreements. It may be optimal to subsidize desirable agreements when they are not incentive-compatible for firms.

Keywords: Air-rail cooperation; Vertical agreements; Hub capacity; Competition policy

1. Introduction

European Union (EU) leaders have endorsed the objective of developing a EU-wide multimodal TEN-T (Trans European Network-Transport) by 2030, which will connect major airport hubs to the high-speed rail (HSR) network by 2050, when the majority of medium-distance passenger transport should go by rail (EC, 2011, pp.9,19). This is because of the projected increase in demand for flights, which makes capacity at hub airports scarce and the impact of aviation on the environment a growing concern (ICAO, 2014).

In this framework, air transport and HSR are not simple competitors, but become complementary modes. Airline-HSR cooperation may consist of offering a combined transportation service to connecting passengers, which bundles domestic HSR and international air services through a multimodal hub. Such cooperation increases product variety, but raises competition concerns. Nonetheless, antitrust authorities have not yet investigated how it affects passengers.

The relevant literature is still sparse. Jiang and Zhang (2014) find that airline-HSR integration improves welfare when mode substitution is low, or the hub capacity is tight.

However, it may improve consumer surplus only if the hub is not capacity-constrained (see also Socorro and Viecens, 2013). Xia and Zhang (2016) find that after integration, when the hub is capacity-constrained, the airline withdraws from the market where it has less competitive advantage over HSR. They also find that integration can improve welfare when the hub is capacity-constrained, but are silent on consumer surplus. These papers consider full-scale cooperation resembling airline-HSR mergers, and find that the welfare gains from cooperation are largely driven by firms' profits rather than consumer surplus. Hence, antitrust authorities would hardly approve such mergers.

We contribute to the debate on two counts. First, we study the formation of airline-HSR agreements. In reality, cooperation is different from a merger. It often consists in vertical agreements where the airline buys train seats to sell the combined transportation service. Clearly, each firm should have incentives to sign such intermodal agreements. These depend on the sunk costs to make cooperation effective and firms' bargaining power in negotiation. Second, we address the impact of airline-HSR vertical agreements on consumer surplus, depending on the hub capacity and mode substitution. We propose a simple test as a 'safe harbor' for vertical agreements, which provides a sufficient condition for consumer surplus to be higher under cooperation. Our arguments rely on the theoretical results in Avenali et al. (2017).

This paper is organized as follows. Section 2 describes examples of airline-HSR vertical agreements. Section 3 analyzes firms' incentives to sign such agreements, and their welfare effects. Section 4 discusses policy implications. Section 5 concludes.

2. Airline-HSR vertical agreements: examples

There are increasing examples of cooperation between airlines and HSR operators. Most intermodal agreements signed worldwide relate to international connecting passengers. Chiambaretto and Decker (2012) point out that there are no agreements involving direct coordination on prices. Indeed, such agreements would not pass antitrust scrutiny. We focus on vertical agreements where the HSR provides the airline with a key input, since it sells train seats at a wholesale price to the airline, which decides how many seats to buy and sets the price of the entire multimodal trip to passengers.

This type of agreement is not rare, particularly in Europe (Eurocontrol, 2005), with varying degrees of seamlessness and intensity of cooperation. At a minimum, passengers should be able to purchase a single ticket for the multimodal trip. This requires operators to integrate information technology and computer reservation systems. In addition, operators may coordinate air and HSR schedules. They could take the risk of delays on each segment of the journey, and provide passengers with warranties. Operators could even offer coordinated baggage handling and/or supplementary services on trains (e.g., dining).

The AIR&RAIL agreement between Thalys and Air France is a prominent example. The intermodal service is available to passengers from/to Brussels-Midi Railways Station and Paris Charles De Gaulle (CDG) airport. It is handled by Air France and included in the Air France booking system. Air France forecasts traffic volumes yearly to book one or two carriages per journey from Thalys. It can book additional seats on an ad-hoc basis, subject to availability. After the agreement, Thalys has adapted train schedules to match Air France timetables. It has also introduced integrated ticketing and dedicated luggage hold for Air France passengers at the Brussels check-in counter.

3. Airline-HSR vertical agreements: formation and effects

We can draw from previous Section that airlines and HSR operators must incur sunk costs to ensure compatibility, and thereby create complementarity between modes (EC, 2006), otherwise the air-rail travel is not a feasible alternative. Thus, compatibility is a strategic decision. Eurocontrol (2005) lists some critical barriers to intermodal transport, as costly infrastructure investments or limited willingness to collaborate.

Airlines benefit from intermodal agreements since they can divert some short-haul traffic to HSR, thereby making slots available for routes that are more profitable (Givoni and Banister, 2006). For instance, multimodal passengers using Lufthansa-Deutsche Bahn AIRail Service can take flights or HSR from Frankfurt to Stuttgart, while flights from Frankfurt to Cologne are no longer available. In turn, HSR operators benefit from cooperation since it increases their load factor and market share on short-haul routes.

Clearly, each transport operator signs an intermodal agreement when it achieves benefits larger than costs. This depends on firms' bargaining power in signing the agreement (when sharing sunk costs) that, in turn, derives from the level of congestion at hub airports and the intensity of mode substitution. We might expect that, under hub congestion, intermodal agreements more likely occur between companies with similar market power, as air and HSR incumbents, than when one company (HSR) is a dominant firm and the other (airline) faces strong competition.

We can now reason about two fundamental questions. First, how do airline-HSR vertical agreements affect traffic volumes in the network and hub congestion? Second, can airline-HSR vertical agreements improve consumer surplus, and thereby social welfare?

To fix ideas, consider the hub-and-spoke network in Figure 1 (see Jiang and Zhang, 2014). An airline and a HSR operator serve the short-haul (domestic) route AH (overlapping market). The airline also serves two long-haul (international) routes, namely, HB (direct flight) and the connecting market AB (one-stop flight). Node H is a multimodal hub, since there is a HSR station at the airport. Consistent with the foregoing discussion, we assume that multimodal trips (where travelers from A to B use HSR from A to H, and then fly from H to B) may occur given that firms have signed an intermodal agreement to offer the combined transportation service.

Figure 1: Network structure

First, we argue that vertical agreements raise traffic volumes in the network. Under an agreement, we expect that the airline substitutes some feeding flights for HSR rides in market AB. However, the airline may use the capacity made available at the hub airport to accommodate new demand brought about the combined service, and to simultaneously increase air traffic in markets AH and HB.

Airline-HSR cooperation raises competition concerns, particularly in overlapping markets. Jiang and Zhang (2014) find that airline-HSR integration reduces traffic in market AH. Contrary to common wisdom, we argue that the total traffic in market AH may increase under the vertical agreement, because of an increase in air passengers. This occurs when the agreement alleviates hub congestion or when, if the hub is capacity-constrained, transportation modes are strong substitutes. In turn, this is because the HSR sets a relatively low wholesale price for train seats. In doing so, the HSR benefits from high traffic volumes for the combined service in market AB, while suffering a small loss in market AH, where flights increase at the expense of HSR rides.

It follows from above that airline-HSR vertical agreements do not necessarily reduce hub congestion, particularly if the hub capacity is limited.

Remark 1. Compared to intermodal competition, airline-HSR vertical agreements increase traffic in the connecting market and in the whole network, and may increase traffic in single-leg markets. Therefore, such agreements do not necessarily reduce traffic at hub airports.

Second, we argue that vertical agreements largely improve consumer surplus. If the hub airport is not capacity-constrained, the impact of the agreement on consumer surplus in each market should reflect the impact on traffic in the same market. Thus, when traffic in a market increases (decreases) because of the agreement, consumer surplus in that market also increases (decreases).

Things might change when the hub is capacity-constrained. We expect that the total consumer surplus is lower under the agreement when transportation modes are very weak substitutes and the hub is of moderate size. This is because passengers in single-leg markets suffer from a decrease in traffic volumes, and even airline-HSR passengers may be negatively affected (despite the increase in traffic in market AB) by a high price for the combined service, due to a high wholesale price per train seat. Nonetheless, aside from this exception, vertical agreements generally benefit consumers, even if hub airports are congested. This contrasts with airline-HSR integration (Jiang and Zhang, 2014).

Remark 2. Contrary to mergers, airline-HSR vertical agreements largely improve consumer surplus.

4. Airline-HSR vertical agreements: formation and effects

Consistent with remarks 1 and 2, we propose a simple two-tier test that gives a sufficient condition for airline-HSR vertical agreements to improve consumer surplus. This test provides a 'safe harbor' for vertical agreements. If this test is satisfied then the agreement complies with competition law, and antitrust agencies should approve it without need of costly investigations.

The first step of the test consists in checking whether traffic in the overlapping market increases under the vertical agreement. If the total traffic in market AH increases after the agreement, then the overall consumer surplus also increases and the agreement should be approved. If traffic in market AH decreases after the agreement, then (from the discussion of Remark 2) the second step of the test requires checking that the wholesale price per train seat for the combined service is lower than the retail price per train seat in market

AH. If this condition holds then the vertical agreement improves consumer surplus and should be approved, otherwise further investigations are necessary.

Remark 3. A sufficient condition for airline-HSR vertical agreements to improve consumer surplus is that they increase traffic in the overlapping market, or that the wholesale price per train seat is lower than the HSR ticket price in the overlapping market.

In some cases where airline-HSR vertical agreements are desirable, firms may not have incentives to cooperate (see section 3). Then, it may be optimal to subsidize agreements: a publicly owned airport may participate in infrastructure investments to make cooperation effective (especially if transport operators have different bargaining power). For example, the government has properly funded the construction of the railway station at Schiphol airport (Eurocontrol, 2005).

Remark 4. It may be optimal to subsidize airline-HSR vertical agreements in some cases where they are not incentive-compatible for firms.

5. Concluding remarks

We have discussed the formation of airline-HSR vertical agreements, depending on sunk costs and firms' bargaining power, and their welfare effects, depending on the hub airport capacity and mode substitution. Airline-HSR vertical agreements (to offer a bundle of domestic HSR and international air services) may not reduce hub congestion. Contrary to mergers, such agreements largely benefit consumers. A sufficient condition is that they increase traffic in the overlapping market, or that the wholesale price per train seat is lower than the HSR ticket price in that market. In some cases where vertical agreements are not incentive-compatible for firms, it may be optimal to subsidize them. Future empirical research should further investigate the welfare effects of vertical agreements to fine-tune policy remedies.

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