Supply Side Substitutability and Potential Market Power of Airports: Case of Amsterdam Schiphol

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Abstract

This study evaluates the issue of market power of Amsterdam airport Schiphol, focusing on the substitutability between this airport and nearby gateways. We focus separately on substitutability with respect to origin-and-destination passengers, and transfer passengers. These two types of passengers represent different markets in terms of both geographical boundaries and competing airports. Analysis of Official Airline Guide data, along with the information obtained during the interviews with stakeholders, clearly demonstrate that Schiphol has a potential to exercise its market power on both markets we identified.

1. Introduction

Airports worldwide have traditionally been viewed as infrastructure objects rather than firms. This view has been challenged since the 1980, and airports have been increasingly recognized as full-fledged business enterprises that provide a number of different services to airline industry customers (Doganis, 1992; Winston and de Rus, 2008; Starkie, 2008). Despite the increasing potential for airports to be innovative businesses that provide services beyond take-offs and landings (e.g., parking, concessions, retail and other related services), it must be recognized that airports generally exhibit many of the classic properties of local monopolies. Thus, the issue of potential abuse of market power gains importance; but studies of airport market power are still at their infancy. In this study, we develop a methodological approach to identifying the markets an airport operates on; and evaluate the supply-side substitutability of Amsterdam airport Schiphol from the point of view of the commercial airlines serving origin-and-destination and transfer passenger traffic. Geographically, the relevant market is outlined by Schiphol's catchment area. If this area does not overlap with that of another airport capable of providing access to the same kind of infrastructure Schiphol offers, we can say the airport is indeed a local monopolist.

For the purposes of this study, we view airport as an entity that provides infrastructure airlines need to perform their operations (land, park, service the aircraft, deplane and enplane passengers and/or cargo, and ensure the aircraft departs to its destination). Based on likely differences in both the nature of the service, and its substitutability, we suggest that the following four markets can be delineated. First, an airport provides services to the airlines serving origin-and-destination passenger traffic. This market is different in some important dimensions from the market for provision of infrastructure to the airlines serving transfer passenger traffic. The other two markets include infrastructure provision for cargo and instructional flights. Available data allows us to evaluate the extent of supply-side substitutability between Schiphol and competing airports on the first two markets. We demonstrate that Amsterdam airport Schiphol is clearly the dominant provider of the infrastructure to the airlines carrying origin-and-destination traffic to/from the area. Also, connections only via Schiphol are available for about 40 percent of all markets with connecting services via Amsterdam or its main competitor hubs, suggesting a potentially strong position of the Amsterdam airport on the market for provision of infrastructure to the airlines carrying transfer traffic.

Up to now, the governments' response to the potential exercise of market power by the airports has normally been to subject them to regulation, in a similar fashion to other natural or local monopolies, such as utilities. Some airports (most prominently, smaller UK airports, as well as most of the airports in Australia and Switzerland) are however allowed to set their charges as they see fit, subject to monitoring by the authorities, presumably enforced by the threat of re-regulation or by general antitrust rules on the abuse of dominant positions as ex-post regulation . The decisions to deregulate the airports are however often made without much regard to the issue of potential market power. This underscores the need for a framework for analyzing market power of airports, along with studies employing such framework in practice. A recent paper by Polk and Bilotkach (2011) contains a thorough review of issues to be considered when evaluating airport market power; our study takes a part of that framework to the data.

The literature on the economics of airports consists of the following strains. First, we see a number of largely descriptive studies of airport regulation. Forsyth et al. (2004) provide a comprehensive overview of the relevant history and practice. In addition to descriptive studies, we also see theoretical scholarship tackling some of the salient issues regarding airports. For example, Czerny (2006) and Yang and Zhang (2011) consider the optimal form of airport regulation, while Brueckner (2002) and Basso and Zhang (2008) explore the airport-airline relationship concerning aeronautical charges in the peak/off-peak context. The existing empirical literature on airports consists mostly of benchmarking studies that examine the factors determining airport productivity (e.g., Oum et al., 2003; Oum and Yu, 2004; ATRS, 2008; Perelman and Serebrisky, 2010; Liebert and Niemeier, 2010; Adler

and Liebert, 2011). Additionally, three studies (van Dender, 2007; Bel and Fageda, 2010; Bilotkach et. al, 2011) focus on determinants of airport charges. In particular, Bel and Fageda find that private unregulated airports in Europe exhibit higher aeronautical charges as compared to the public regulated ones.

The rest of this paper is organized as follows. Section 2 discusses the issue of market definition. Section 3 describes data and methodology. Sections 4 and 5 implement the data analysis. Section 6 discusses a related issue of the role of high-speed rail. Section 7 concludes.

2. Market definitions

The framework for defining markets airport operates on is discussed quite extensively in Polk and Bilotkach (2011). Overall, the relevant concepts to consider when delineating market boundaries are substitutability and geographical boundaries. The former defines markets in the product space while the latter – in geographical terms.

On the aeronautical side, the main product an airport provides to its customers (airlines) is the infrastructure for take-offs, landings, passenger enplanement/deplanement, cargo loading/unloading, etc. Substitutability in this context refers to answering a simple question of whether the airlines have an alternative potential provider of the same infrastructure, which would allow them to operate the same or very similar network, in case the current airport decides to increase price for its services. Geographical market boundary is defined through the concept of an airport catchment area, or the geographical area where airports' customers' customers (passengers or cargo forwarders) originate. The general approach to further delineating boundaries of the markets on which an airport operates involves determining whether different services provided by the airlines to their final customers are substitutable within the airport; outlining catchment areas for each of those services; and determining whether these catchment areas overlap with same for other airports capable of providing equivalent infrastructure to the airlines. Let us consider these issues in more detail, as they apply to Schiphol.

The concept of substitutability between goods A and B implies that if price for good A increases, demand for good B will increase, so there is a clear positive correlation between the two. When the two goods are highly substitutable, we can say they belong to the same market. In the airport context, one can think of the "goods" as the types of service provided by the airlines to their final customers rather than the generic infrastructure for take-offs and landings. After all, airport often prices use of its infrastructure differently, depending on the type of service performed by the airline. For instance, per passenger charges at Amsterdam Schiphol are significantly higher for origin-and-destination than for transfer passengers.

Broadly speaking, airport infrastructure is used by the airlines to transport origin and destination passengers, transfer passengers (in some airports), and cargo; some airports house general aviation and instructional flights. Cargo, general aviation and instructional flights clearly belong to separate markets. The key question to be addressed is then whether infrastructure provision for serving origin and destination passengers and transfer passengers belong to the same market. Indeed, passengers of the two types routinely sit next to each other on the airplane, suggesting that they might belong to the same market. However, a salient question here is whether the airline will be able to respond to higher charges for origin and destination passengers by increasing its share of transfer traffic. In case of AMS, the answer is clearly "no", as illustrated by the 'natural experiment' with the passenger ticket tax in 2008, which only applied to origin and destination passengers. As a result of this tax, Schiphol airport is estimated to have lost about 1.4 million origin and destination passengers in the second half of 2008, while the number of transfer passengers handled by the airport remained nearly unchanged. Based on this fact, we have concluded that provision of infrastructure to the airlines serving origin and destination passengers represents a different market from provision of infrastructure to serve transfer passengers.

Catchment areas for the two markets identified above are also very different. Origin and destination passengers originate in or use the airport to travel to the area located in relatively close proximity to the airport premises. Airports and industry professionals use various techniques to delineate the catchment areas for origin and destination passengers; as a rule of thumb, this area encompasses locations from which the airport can be reached within two hours. Catchment area for the transfer passengers is defined by the destinations where such passengers originate and terminate – encompassing, for a large hub, the entire world.

3. Methodology and data

The aim of our data analysis is to evaluate the degree to which market conditions can potentially constrain Amsterdam airport's market power. Two mechanisms can contribute to this. First, an airline may leave for an alternative gateway if it is not satisfied with the level of charges at Schiphol. Second, even if an airline may choose not to leave the airport, its customers may choose to do so. The customers may leave for either nearby airports or alternative modes of transport, which can undermine market power even if an airport is a local monopolist. This in turn will force the airlines to curtail their services, and can lead to lower revenues for the airport, despite the price increase. Understanding such a possibility, the airport may choose not to raise its charges. Thus, competition on the airline market may contain the airport's market power.

On the former mechanism, we must note that Amsterdam is by and large the most convenient airport for majority of origin and destination passengers originating form and traveling to Amsterdam or the surrounding catchment area; thus other things equal airlines would prefer serving the area via AMS rather than any other airport. Even easyJet in an interview with us indicated that it was not planning to leave Schiphol, which is somewhat in contrast to what is believed about the conduct of low cost carriers. With respect to serving transfer passengers; the airport's main customer, KLM, does not have an alternative gateway for conducting its hub operations. However, KLM is a part of KLM – Air France group, and there is a danger that the airport may lose its hub status if management decided to put more emphasis on developing Paris Charles de Gaulle airport as the company's main hub. Similarly, KLM's Skyteam alliance partners (most notably Delta Air Lines) may choose to channel more of its transatlantic traffic via Paris[1].

Our methodology focuses on provision of infrastructure for the two types of passenger service we have identified, and can be labeled supply side analysis of overlapping markets. It involves determining airports to/from which passengers may substitute, and analyzing the share of markets served by Schiphol, which is subject to this competitive threat. Focusing on the share of affected passenger traffic rather than markets would paint a clearer picture; however, available data does not allow us to do this.

We base our analysis on the Official Airline Guide (OAG) data from 2002 till 2009. OAG is basically a collection of worldwide airline schedules. Reliable data on passenger volumes is unfortunately not available. In particular, it is difficult to estimate passenger volumes on the transfer markets without obtaining access to the data available to individual airlines.

4. Analysis of market for provision of infrastructure to airlines serving origin and destination traffic

We have identified, examining airport locations and following interviews with stakeholders, overlaps in catchment areas between Schiphol and the following nearby airports:

[1] In fact, Delta has had a longer term relationships with Air France prior to purchasing Northwest Airlines – a long-term KLM partner.

- Brussels, Belgium (BRU)
- Düsseldorf, Germany (DUS)
- Eindhoven, Netherlands (EIN)
- Enschede, Netherlands (ENS)
- Rotterdam (RTM)
- Groningen (GRQ)
- Maastricht, Netherlands (MST)
- Charleroi, Belgium (CRL)
- Weeze, Germany (NRN)

The former two airports are served by many of the traditional carriers, and feature a number of scheduled transcontinental services; whereas other gateways are used predominantly by the low cost carriers, with Ryanair playing a major role.

To evaluate, from the supply side point of view, substitutability between Schiphol and airports with overlapping catchment areas for origin and destination passengers, as well as to trace development of substitutability over time, we have conducted a simple analysis to identify the destinations served out of each of the nine airports mentioned above, which overlap with those served out of AMS. A destination served out of an airport was recorded if fourteen or more services to that destination were scheduled during a year. The analysis was performed at both the airport-pair market and city-pair market levels. In the latter case, as an example, all London area airports (Heathrow, Gatwick, City, Stansted, and Luton) were considered indistinguishable. Making this differentiation is very important, as low cost carriers often serve a metropolitan area via secondary airports.

Results of the analysis are presented in Tables 1 through 8. Total number of destinations served out of each of ten airports involved (including Schiphol) can be found in Tables 1 and 2. Tables 3 and 4 give a simple count of overlapping destinations – at both airport-pair market and city-pair market levels. From these numbers, one can easily see that for five of the nine airports included into our analysis the trend has been towards more overlapping destinations with AMS. Charleroi, Eindhoven, and Weeze effectively emerged as new competitors with Schiphol for origin and destination passengers. These are also airports with substantial presence of Ryanair.

Four tables put the numbers reported in Tables 3 and 4 into perspective. First, we calculate relative exposure of AMS to the nearby airports, by simply dividing the numbers reported in Tables 3 and 4 by the total number of unique destinations served out of Schiphol, at both airport-pair market and city-pair market levels. Second, we evaluate exposure of each of the nearby airports to AMS; for this, we divide the numbers in Tables 3 and 4 by the total number of destinations served from the corresponding airport. Two facts clearly stand out from this analysis. First, despite the trend towards more overlap in the absolute number of destinations as reported above, in relative terms Schiphol's exposure to the nearby airports changed only modestly. This is related to the fact that over the same time period airlines serving AMS added more destinations to their schedules. Second, exposure of the nearby airports to AMS is more substantial than exposure of AMS to the nearby airports.

Note also the difference in the figures at airport-pair market and city-pair market levels for the airports used by Ryanair – they clearly demonstrate this carrier's use of secondary airports in the metropolitan areas served out of Schiphol. Additionally, in relative terms, exposure of Eindhoven, Charleroi and Weeze to AMS is surprisingly modest – less than same for Brussels and Düsseldorf.

One might rightfully argue that the number of overlapping destinations might not adequately measure competition between the airports. Share of affected passengers may also be important. We have not conducted a detailed analysis of this issue because of data availability . While we can suspect higher overlap in terms of the shares of passengers; it is also true that AMS handles substantially more origin and destination passengers than do nearby smaller airports; and many overlaps of AMS with BRU and DUS represent entirely different markets (for instance, flag carriers view these airports as separate destinations in their networks). Additionally, even though OAG data includes the aircraft capacity, we will only be able to speculate about the volume of O&D traffic on some of the flights, as the airlines operate hub-and-spoke networks.

In conclusion, it is clear from this supply side analysis that Schiphol faces only modest competition from the nearby airports. There is substantial overlap of destinations served from AMS with those offered from BRU and DUS (cumulative over 60% of the offered routes)[2]; also, three small nearby airports have emerged as new potential competitors. At the same time, Schiphol airport's dominant position in the area – in terms of both the number of O&D passengers transported and destinations served – remains undisputed. As an illustration, in 2008 airlines serving AMS flew to 231 unique airports, which is 1/3 more as compared to carriers serving BRU (the airport with the second largest number of destinations served, 169).

5. Analysis of market for provision of infrastructure to airlines serving transfer traffic

Many airport-pair markets worldwide lack non-stop air services. Passengers traveling on those routes will be required to change planes and sometimes carriers along the way. These transfer passengers have a choice among airports hosting airlines that offer such transfer services. Such airlines (KLM in case of Schiphol) are effectively captive users of the airport infrastructure. These carriers are unable to leave the airport; at the same time, the airport stands to lose a lot in case its largest carrier curtails its services. At AMS, the share of transfer passengers has fluctuated between 40-45 percent over the last decade.[3] Without its hub operations, Schiphol would lose its status as one of Europe's largest and most important airports.

The above point can be well illustrated through example of Brussels airport, which has not recovered after the fall of Sabena. In 1999, BRU handled 20 million passengers; the volume in 2008 was 18 million. In 2002, the first full year after the bankruptcy of Sabena, Brussels airport handled only 14.4 million passengers (a 28 percent drop from 1999). By contrast, passenger volume at AMS in 1999 was 36.4 million; it grew to 40.5 million in 2002, and reached 47.4 million in 2008.

Modern hub-and-spoke networks are linked with the global airline alliances. Currently, three such groupings exist: Skyteam, Star Alliance, and oneworld alliance. KLM is a member of Skyteam, with Delta being its main partner on the other side of the ocean. Any analysis of competition between the hubs has to take account of this alliance framework.

Both KLM and Schiphol indicated that their main competitors for transfer traffic are Frankfurt (FRA), Paris Charles de Gaulle (CDG), and London Heathrow (LHR) airports; thus, we have decided to only include these gateways into our analysis of hub connectivity and competition between the hubs. To evaluate the extent of competition between the four European gateways (AMS, CDG, FRA, and LHR) for transfer passengers, we performed the following analysis. OAG data for third Monday of July (to focus on the peak travel time) were analyzed for each of the years from 2002 till 2009. At each airport,

[2] However, many airlines serving all three airports view them as separate destinations in their networks rather than as three ways of serving the same geographical area.

3 KLM stated in an interview that their transfer traffic is close to 70 percent of all passengers.

all reasonable guided connections were obtained within a two-hour and three-hour window after the minimum connecting time of one hour. A guided connection is defined as connection from and to a flight of a carrier belonging to the same global airline alliance. We defined connections to be reasonable or realistic if total distance did not exceed the distance of a hypothetical non-stop service by more than 40 percent. This filters out itineraries similar to New York to Boston via London. A two-hour time window after a minimum connecting time of one hour means, for instance, that for a flight arriving at 8:00 a.m. we will look for reasonable guided connections between 9:01 a.m. and 11:59 a.m.

The data are illustrated on Figures 1, 2, and 3. Figure 1 simply shows the number of airport-pair markets with available non-stop services (either by a single airline or within an alliance) via each of the four hub airports. Figure 2 shows on how many airport-pair markets connected with one-stop service via Amsterdam Schiphol one can also travel via each of the three hubs. Figure 3 simply puts Figure 2 into relative terms.

The following general conclusions stand out from our exploration. First, as a transfer hub, AMS has maintained a rather strong position, with KLM and Skyteam members offering passengers more connecting options as compared to British Airways and Oneworld alliance members via LHR. Second, following the Air France – KLM merger in 2005, the management appears to prioritize CDG over AMS as the main hub in the joint network. This can be inferred from we observe faster growth of the hub connectivity at CDG versus AMS in terms of the number of markets served. Third, following the Air France – KLM merger, despite continuing growth in membership across all three alliances, Schiphol's exposure to competition for transfer passengers grew only modestly. Fifth, Schiphol appears to have very limited exposure to transfer passenger competition with any of the three individual airports covered in the analysis. Finally, **on over forty percent of all airport-pair markets serviced via guided connections, AMS does not meet an immediate competitive threat from either of its main competitors on the market for transfer passengers.**

The identity of non-overlapping routes also tells an important story. If non-overlapping routes involve on average smaller airports, then exposure of AMS to competition for transfer passengers in terms of the share of travelers rather than markets would be much more extensive. For purposes of illustration, consider data from 2008. In this data, there are 122 origin airports with at least one transfer market, on which connections only via AMS are available. The average number of such connections per airport is 23.5; however, across airport variability is substantial. The airport least connected via alternative hubs is Norwich, UK; with connections to 85 markets available via AMS only. Other airports in the top ten of this list include Leeds (81 markets via AMS and neither of its competitors); Humberside, UK (76 markets); Durham Tees Valley, UK (72 markets); Cologne-Bonn, Germany (69); Cardiff (68); Luxembourg (63); Sandefjord, Norway (58); and Manila (57). On the other side of the distribution, we have such airports as Hong Kong, San Francisco, Dubai, Los Angeles, Chicago O'Hare, Bangkok, New Delhi, Mexico City, Singapore, etc., each featuring fewer than ten endpoints not available via Schiphol's main competitors. Most of the bigger European airports feature guided connections to between 10 and 25 endpoints available only via AMS (among the hubs included in our analysis). The above said suggests that in terms of the share of travelers, Schiphol's exposure to competition for transfer passengers exceeds the approximately sixty percent figure implied by the number of non-overlapping routes. Coming up with a more precise estimate would require data on passengers' actual traffic patterns, which we do not have. Using the available information, however, we can suggest that competition for transfer passengers may be rather strong, especially taking into account the price sensitivity those travelers tend to exhibit. This could contribute to Schiphol charging less for transfer passengers.

In conclusion, if one simply counts the number of non-overlapping airport-pair markets, exposure of AMS to competition for transfer traffic appears limited. However, both relatively larger sizes of the markets on which there is competition for transfer passengers, as well as the price sensitivity of those

passengers imply higher potential impact of hypothetical price increases on part of Schiphol airport than exposure figures we presented may suggest.

6. High speed rail and Schiphol's market power

While we do not have the data to provide an adequate analysis of the issue of ground competition; it is important to recognize that high speed rail can play an important role in restraining the airport's market power. Therefore, at least a qualitative depiction is in order.

Some competition for origin and destination traffic can come from high speed rail, which can offer passengers an attractive alternative to air travel, especially on shorter-haul (800 km or less) routes, provided passengers are offered comparable degree of mobility via sufficiently high frequency of service. While being able to achieve only a fraction of the speed of commercial passenger aircraft, train services can make up for this difference via departures from centrally located train stations and absence of security checks. At the same time, high-speed rail can enlarge the airport's catchment area and bring more origin and destination passengers to the airport. Even if the net effect of HSR is to increase the total number of passengers at an airport, it is not evident that such a development will increase airport's revenue. The reason for this is that some of the passengers will be diverted from flights to trains (also reducing the number of flights and/or size of aircraft), and the airport will no longer be able to collect the related charges. In the data, this will manifest itself in reduction in transfer passenger traffic and increase in the O&D traffic.

Impact of HSR on Schiphol has so far been limited. It is true that development of rail network has shut down domestic services, but those were a negligible share of the total flights. Of important (in terms of the volume of air travel) short haul city - pair markets, Amsterdam - Paris route is perhaps the most exposed to competition from rail (Thalys), with about 45 percent of rail market share. Yet, at about 4 hours' journey time and only six weekday departures, the Thalys service can be viewed as a somewhat inferior alternative by a number of travelers. This situation will change soon, with the launch of HSL-South, which will link Schiphol and the city of Amsterdam to the higher-speed portion of Thalys network. HSL-South will also link Schiphol to Eurostar HSR services from Brussels to London. In sum, Both Amsterdam - Paris and Amsterdam - London routes will be affected; travel time to Paris will decrease to about 3 hours (by 25 percent); and travel time to London will fall from six to four hours, also making travel by train on this route more competitive to air travel.

Stakeholders and the available literature offer different opinion on the likely effect of HSL-South on Schiphol airport. Schiphol itself is the most cautious of all stakeholders. It expects that the substitution to HSR will decrease the share of air travelers on the Amsterdam-Paris route by about fifteen percent. The expected effect on share of air travelers on Amsterdam-London market is even more dramatic: Schiphol estimates that the HSR share on this route will increase from current 17 percent to about fifty. Overall, Schiphol expects a loss of 800 thousand to 1 million passengers a year to HSL-South services. EasyJet did not give a specific evaluation; however, it stated that it is difficult for the airlines to compete with HSR on routes where travel time by rail is four hours or less; meaning the airline is likely to expect a significant effect on both Amsterdam - Paris and Amsterdam - London markets. KLM has been much less pessimistic in its assessment. The airline does not expect a serious reduction in air travel on Amsterdam - London route.

7. Conclusions

In our assessment of the market position of the Amsterdam Schiphol airport with respect to the four markets for the provision of infrastructure for landing and take-off, we have found a different intensity of competition in each.

With respect to the market for the provision of infrastructure for airlines serving origin and destination passengers, we analyzed the effects of overlapping catchment areas and intermodal competition. Our

supply side analysis suggests that some customers are indeed willing to switch between airports, responding to various factors, such as airfare, schedule convenience, airport's proximity, etc. This potential pressure on airlines serving Schiphol to offer competitive services also affects the market position of Schiphol airport. Nevertheless for most customers in the origin and destination market, there are only very limited possibilities for substituting Schiphol with some other airport. Therefore, in this market Schiphol remains a dominant supplier. Some rough estimates of a hypothetical SSNIP-test - based on price elasticities of demand and the current level of airport charges - show that a price increase on the wholesale market might be profitable for the airport.

We observed more intense competition in the market for the provision of infrastructure for airlines serving transfer passengers, due to the presence of substitute transfer hubs, with the degree of competition differing between broadly defined market segments (e.g., Europe to North America versus Europe to Middle East). In a hypothetical SSNIP-test, only for those markets where fares for transfer flights are rather low and the price elasticity of demand is rather high, would an increase in airport charges would not be profitable for the airport. This is due to the fact, that airport charges are only a rather small part of the overall costs of an airline. Nevertheless, there might be significant differences between the individual markets.

However, large airlines, which are the most important customers of Schiphol airport, have only very limited options. They have significant sunk investment at Schiphol airport and in their network system based on AMS. This, together with possible slot constraints at other airports and restrictions due to international traffic agreements and will therefore make it difficult if not impossible for those carriers to move larger parts of their operation from AMS to alternative airports. This is certainly an indication that Schiphol has market power in the market for the provision of infrastructure for airlines serving transfer passengers. But there is also some supply side competition with respect to the transfer market, which lessens this effect.

Perhaps the most important limitation of this study is that we have viewed the airport itself as an object in this analysis. The supply-side substitutability analysis we performed relates to an important extent to the competition between the airlines, and the airport plays a role here to the degree that it is capable of offering the relevant infrastructure to the airlines. We take this view largely because over the time period we consider the available airport infrastructure can be taken as given. In the longer term, however, the airports can take steps to increase their competitiveness, such as investing into new infrastructure, and/or changing their pricing policies to attract customers (i.e., airlines). We leave examination of airports' competitive strategies for future research.

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Table 1 Total destinations served, airport-pair market level

Year	AMS	BRU	CRL	DUS	EIN	ENS	GRQ	MST	NRN	RTM
2002	197	134	10	149	5	0	0	4	0	18
2003	215	130	12	152	5	0	2	3	1	17
2004	231	122	17	147	8	1	3	7	21	19
2005	237	133	14	160	8	1	2	1	6	20
2006	231	132	23	165	16	0	2	3	6	15
2007	245	144	31	167	19	0	2	4	18	15
2008	231	169	45	162	21	0	1	4	33	21
2009	235	165	63	159	31	0	4	5	59	22

Table 2 Total destinations served, city-pair market level

Year	AMS	BRU	CRL	DUS	EIN	ENS	GRQ	MST	NRN	RTM
2002	182	126	10	142	3	0	1	4	0	16
2003	200	122	12	144	3	0	2	4	1	15
2004	214	112	17	138	6	1	3	7	21	17
2005	220	121	14	150	7	1	2	2	6	18
2006	214	121	23	153	15	0	3	4	6	13
2007	225	134	30	156	18	0	3	5	18	13
2008	216	157	44	153	19	0	2	5	32	18
2009	219	153	61	148	28	0	4	5	55	20

Table 3 Number of overlapping destinations with AMS – airport-pair market level

Year	BRU	CRL	DUS	EIN	ENS	GRQ	MST	NRN	RTM
2002	105	5	84	4	0	0	3	0	16
2003	99	7	98	4	0	2	3	1	15
2004	99	9	105	5	1	3	5	17	14
2005	105	6	114	6	0	1	0	1	15
2006	110	13	114	14	0	2	1	2	11
2007	111	19	121	14	0	2	3	11	13
2008	120	26	109	16	0	1	3	19	15
2009	127	32	111	24	0	2	4	32	16

Table 4 Number of overlapping destinations with AMS – city-pair market level

Year	BRU	CRL	DUS	EIN	ENS	GRQ	MST	NRN	RTM
2002	100	8	81	3	0	1	4	0	15
2003	95	11	95	3	0	2	4	1	14
2004	94	13	101	6	1	3	7	21	15
2005	98	10	111	7	1	2	2	5	16
2006	102	17	109	15	0	2	3	5	10
2007	105	24	115	17	0	2	4	14	12
2008	115	31	104	18	0	1	4	24	15
2009	120	39	104	25	0	2	5	37	16

Table 5 Exposure of AMS to nearby airports – airport-pair market level

Year	BRU	CRL	DUS	EIN	ENS	GRQ	MST	NRN	RTM
2002	53.30%	2.54%	42.64%	2.03%	0.00%	0.00%	1.52%	0.00%	8.12%
2003	46.05%	3.26%	45.58%	1.86%	0.00%	0.93%	1.40%	0.47%	6.98%
2004	42.86%	3.90%	45.45%	2.16%	0.43%	1.30%	2.16%	7.36%	6.06%
2005	44.30%	2.53%	48.10%	2.53%	0.00%	0.42%	0.00%	0.42%	6.33%
2006	47.62%	5.63%	49.35%	6.06%	0.00%	0.87%	0.43%	0.87%	4.76%
2007	45.31%	7.76%	49.39%	5.71%	0.00%	0.82%	1.22%	4.49%	5.31%
2008	51.95%	11.26%	47.19%	6.93%	0.00%	0.43%	1.30%	8.23%	6.49%
2009	54.04%	13.62%	47.23%	10.21%	0.00%	0.85%	1.70%	13.62%	6.81%

Note: Reported percentages correspond to the share of overlapping destinations relative to the total destinations served out of AMS

Table 6 Exposure of AMS to nearby airports – city-pair market level

Year	BRU	CRL	DUS	EIN	ENS	GRQ	MST	NRN	RTM
2002	54.95%	4.40%	44.51%	1.65%	0.00%	0.55%	2.20%	0.00%	8.24%
2003	47.50%	5.50%	47.50%	1.50%	0.00%	1.00%	2.00%	0.50%	7.00%
2004	43.93%	6.07%	47.20%	2.80%	0.47%	1.40%	3.27%	9.81%	7.01%
2005	44.55%	4.55%	50.45%	3.18%	0.45%	0.91%	0.91%	2.27%	7.27%
2006	47.66%	7.94%	50.93%	7.01%	0.00%	0.93%	1.40%	2.34%	4.67%
2007	46.67%	10.67%	51.11%	7.56%	0.00%	0.89%	1.78%	6.22%	5.33%
2008	53.24%	14.35%	48.15%	8.33%	0.00%	0.46%	1.85%	11.11%	6.94%
2009	54.79%	17.81%	47.49%	11.42%	0.00%	0.91%	2.28%	16.89%	7.31%

Note: Reported percentages correspond to the share of overlapping destinations relative to the total destinations served out of AMS

Table 7 Exposure of nearby airports to AMS – airport-pair market level

Year	BRU	CRL	DUS	EIN	ENS	GRQ	MST	NRN	RTM
2002	78.36%	50.00%	56.38%	80.00%	N/A	N/A	75.00%	N/A	88.89%
2003	76.15%	58.33%	64.47%	80.00%	N/A	100.00%	100.00%	100.00%	88.24%
2004	81.15%	52.94%	71.43%	62.50%	100.00%	100.00%	71.43%	80.95%	73.68%
2005	78.95%	42.86%	71.25%	75.00%	0.00%	50.00%	0.00%	16.67%	75.00%
2006	83.33%	56.52%	69.09%	87.50%	N/A	100.00%	33.33%	33.33%	73.33%
2007	77.08%	61.29%	72.46%	73.68%	N/A	100.00%	75.00%	61.11%	86.67%
2008	71.01%	**57.78%**	67.28%	76.19%	N/A	100.00%	75.00%	**57.58%**	71.43%
2009	76.97%	**50.79%**	69.81%	77.42%	N/A	50.00%	80.00%	**54.24%**	72.73%

Note: Reported percentages correspond to the share of overlapping destinations relative to the total destinations served out of the corresponding airport

Table 8 Exposure of nearby airports to AMS – city-pair market level

Year	BRU	CRL	DUS	EIN	ENS	GRQ	MST	NRN	RTM
2002	79.37%	80.00%	57.04%	100.00%	N/A	100.00%	100.00%	#DIV/0!	93.75%
2003	77.87%	91.67%	65.97%	100.00%	N/A	100.00%	100.00%	100.00%	93.33%
2004	83.93%	76.47%	73.19%	100.00%	100.00%	100.00%	100.00%	100.00%	88.24%
2005	80.99%	71.43%	74.00%	100.00%	100.00%	100.00%	100.00%	83.33%	88.89%
2006	84.30%	73.91%	71.24%	100.00%	N/A	66.67%	75.00%	83.33%	76.92%
2007	78.36%	80.00%	73.72%	94.44%	N/A	66.67%	80.00%	77.78%	92.31%
2008	73.25%	70.45%	67.97%	94.74%	N/A	50.00%	80.00%	75.00%	83.33%
2009	78.43%	63.93%	70.27%	89.29%	N/A	50.00%	100.00%	67.27%	80.00%

Note: Reported percentages correspond to the share of overlapping destinations relative to the total destinations served out of the corresponding airport

Figure 1 Total airport-pair markets covered by guided connections

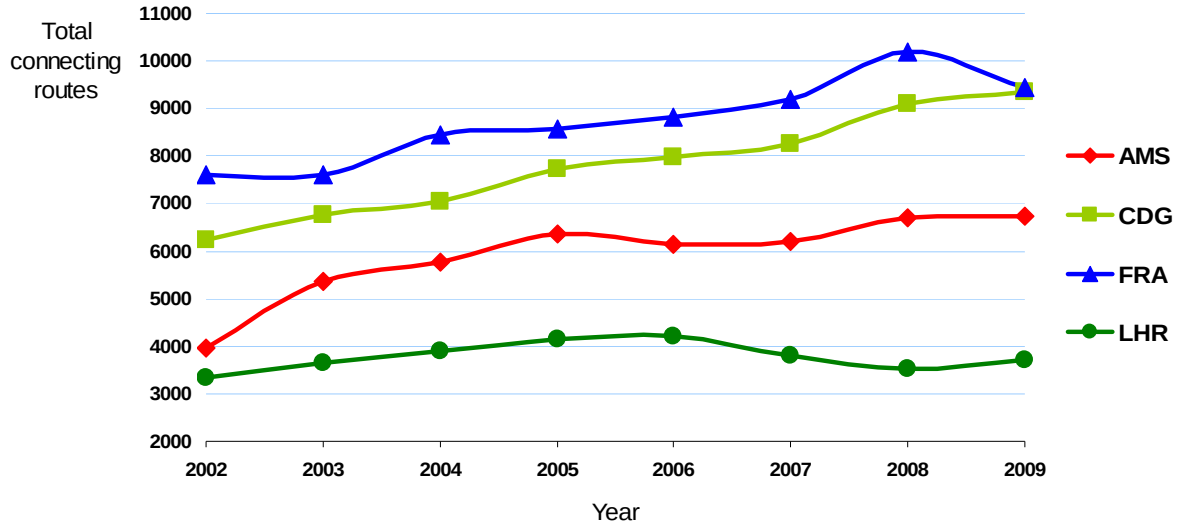


Figure 2 Overlapping airport-pair markets, connecting traffic

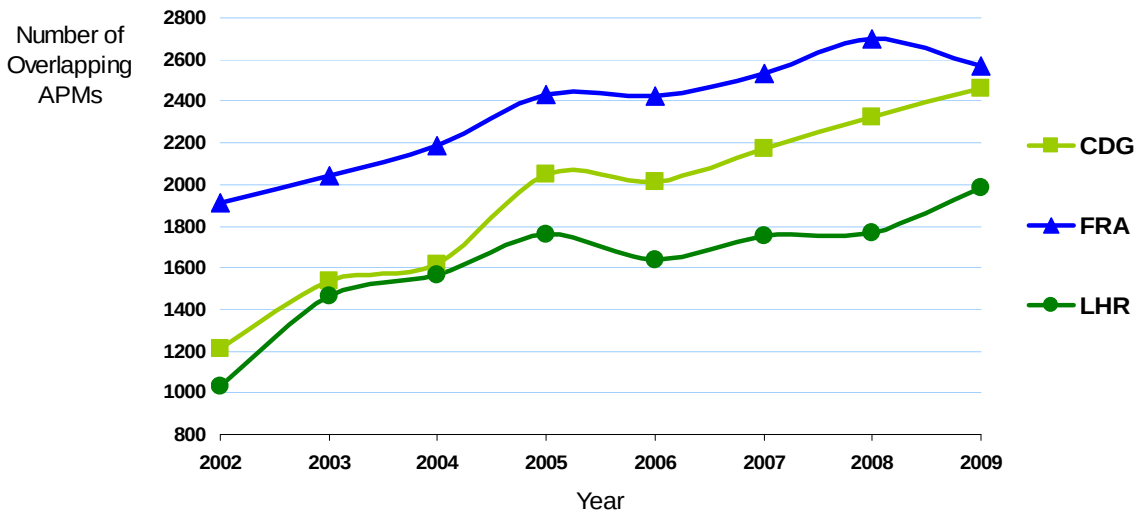
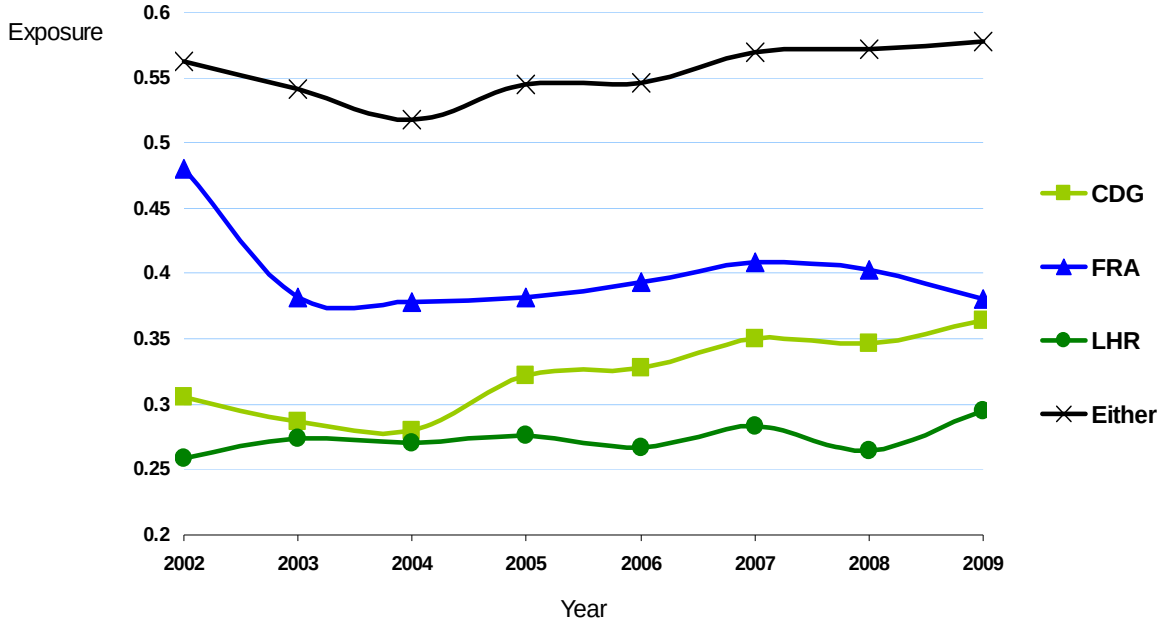


Figure 3 AMS exposure to competition for transfer passengers



Note: Reported here are the numbers of overlapping airport-pair markets divided by the total number of guided connections available via AMS. "Either" refers to markets where AMS overlaps with at least one of the three gateways.

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