The Influence of Price Discrimination from Airports on the Route Development Behavior of Airlines

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Abstract: Given the prominence and magnitude of airport incentive schemes, it is surprising that literature hitherto remains silent as to their effectiveness. In this paper, the relationship between airport incentive schemes and the route development behavior of airlines is analyzed. Because of rare and often controversial findings in the extant literature regarding relevant influencing variables for attracting airlines at an airport, expert interviews are used as a complement to formulate testable hypotheses in this regard. A fixed effects regression model is used to test the hypotheses with a dataset that covers all seat capacity offered at the 22 largest German commercial airports in the week 46 from 2004 to 2011. It is found that incentives from primary choice, as well as secondary choice airports, have a significant influence on Low Cost Carriers. Furthermore, Low Cost Carriers, in general, do not leave any of both types of airports when the incentives cease. In the case of Network Carriers, no case is found where one joins a primary choice airport and receives an incentive. Insufficient data between Network Carriers and secondary choice airports in the time when incentives have ceased means that no statement can be given.

Key words: Airline, rout development, price discrimination.

1. Introduction

Traditionally airports were seen as public infrastructure providers and therefore applied a cost-based pricing approach, which meant that in general, demand did not have a direct impact on the price [1]. With the commercialization and privatization efforts, airports started to charge prices without relation to and also above costs. One of the most recent trends in order to generate further revenues at airports is the usage of more advanced pricing schemes. Airports which still have available capacity try to attract airlines with special discounts. In many cases local governments support these airports by providing subsidies. Yet such funding could be illegal. A recent framework has therefore been proposed by the EU which limits such interventions [2]. The effectiveness of these price policies is, however, so far not clear. On the one hand, from a practical point of view airports have an interest

in whether these price policies can increase their return or not. Two possible effects can be distinguished. In the short term, a discounted price should attract more traffic, while in the long term it is essential to keep this traffic, also with normal prices. On the other hand, researchers so far do not provide satisfactory answers. Indeed, there is a general discussion in the literature regarding the price elasticity from airport charges on airlines [1, 3-5].

The aim of this work is to investigate the influence that incentive policies used by airports have on the route development behavior of airlines. Two questions will therefore be analyzed in detail:

1. Do incentive policies influence traffic (positively, negatively)? / What is the short-term impact of such a policy?

2. Does the newly gained traffic stay with the airport when the incentive is no longer in use? / What is the long-term impact of such a policy?

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These two questions will be answered specifically for Low-Cost Carriers (LCCs), Network Carriers (NCs) as well as two different types of airports.

2. Literature Review

In regard to price incentives to attract new carriers, the literature remains largely silent. So far only two Works have dealt explicitly with this topic. Malina, Albers, & Kroll (2012)[6] investigate the pricing practices in regard to incentives at the 200 largest airports in Europe. Furthermore, do they provide a detailed analysis of airport incentive programs at German airports. Fichert & Klophaus [7] on the other hand classify incentive programs as well as describe their potential advantages, disadvantages respectively. Moreover, they describe potential impacts on the nine largest German airports.

Further relevant literature describes in general price elasticities in the aviation industry. The majority of these works, however, focuses on the price elasticity between passengers and airlines. A comprehensive summary of reports on air travel demand elasticities is provided by Gillen, Morrison, & Stewart [8](2003). However, some works which also deal with the price elasticity from airports to airlines exist. Nevertheless, there is a dispute in regard to the price elasticity in the literature.

A general analysis of the influence of airport charges is provided by Fu, Lijesen, & Oum (2006)or Basso [4](2008). They have developed econometric models in which they show that LCCs and NCs respectively are influenced through variations in airport charges.

Another stream deals particularly with peak hour surcharges. Many theoretical models have been developed to show the effect of surcharges during peak hours, discounts in non-peak hours, respectively, thereby proposing, that airport charges have indeed an influence [3, 9, 10]. Results have shown however, that peak hour surcharges do not seem to be able to move aircraft to off peak-times. Because of this, other authors propose that the price elasticity of airlines in regard to

airport charges is rather low [11](Reynolds-Feighan & Button, 1999). Their explanation is that charges are only marginal in relation to overall costs [5].

The third stream is noise related incentive programs. A general overview of noise related airport charges around the world provides Morrell & Lu(2000)while Hsu & Lin (2005)[12, 13] established a theoretical model to show the influence on airline traffic. They propose, noise charges do have an influence on airline operations. In contrast to the peak charges, it can be concluded that theory is in line with the empirical evidence, since the overall noise level at airports is decreasing while air traffic is still increasing [14]. Hence the price elasticity in regard to noise charges seems to be high.

Finally, is an argument against a high price elasticity brought forward by Doganis [1]. His view is based on the limited choices between airports airlines face because of bilateral agreements. Hence it cannot be possible for them to switch to other airports with lesser charges.

3. Hypotheses

In order to explain the effect price setting strategies, pursued by airports, have on the airport choice of airlines, airports, airlines as well as the time need to be clustered into a more detailed pattern, since effects are expected to vary inside these groups. Hypothesis will be established as a second step on top of this cluster.

The primary distinction will be made between Low Cost and Network Carriers (Appendix A). Furthermore, will primary choice and secondary choice airports be separated (Appendix B). The differentiation is necessary since both types have varying difficulties in attiring carriers. Airports which can attract customers more easily are called primary choice airports. Reasons why these airports are attractive to airlines can be as diverse as the proximity to a large population or a special position such as on islands, which hinders effective competition from other airports. Secondary

choice airports on the other hand have problems alluring carriers. They lack sufficient attractiveness factors and therefore compete primarily over the price/incentives. The final differentiation is between the time period in which incentives are paid and the time period when incentives have ceased. This distinction is necessary because it is likely that carriers can be attracted as long as the incentive is high enough. What is unclear so far is if carriers will also stay with the airport when the incentives have ceased or if they will move further. The period where incentives are actually granted is referred to as the short term while the period where incentives have run out is from now on considered as long term.

1st Case: The short-term effect of price incentives undertaken by primary choice airports on the route development behavior of LCCs.

Although monetary incentive programs from primary choice airports are not as common as monetary incentive programs from secondary choice airports, they are nevertheless used. Reasons which could be against an effect between incentives from primary choice airports on LCCs could be as follows. LCCs demand a high efficiency/low cost also in the airport [15-17]. Low costs can be achieved through simple, space efficient terminals. Particularly a rapid and compact check in area, and no extras such as lounges. The costs saved can then be forwarded to LCCs in the form of lower airport charges. Another major criterion is a fast turnaround time, which is the time needed to disembark and load the plane with passengers and goods(Pitt & Brown, 2001) [18]. All of these factors are in general not given at primary choice airports. Hence primary choice airports do not seem to be able to satisfy LCCs operating demands. On the other side, primary choice airports are per the outlined definition already attractive to airlines. That is, they will likely be able to attract carriers in general without incentive programs. Furthermore, the incentive programs will probably diminish the high charges as well as cover partially startup costs which come up when new routes are

opened. Therefore, if the airport is willing to cover some of the initial expenses, the carriers will likely be influenced in a positive way. As a conclusion, it is expected to see an additional effect of traffic on top of the growth through the attraction of price incentives, because it is believed that the attractiveness outweighs the negative drawbacks from operational inefficiency.

Hypothesis 1: LCCs will be attracted through price incentives from primary choice airports in the short term.

2nd Case: The long-term effect of price incentives undertaken by primary choice airports on the route development behavior of LCCs.

If the airline uses the airport as a destination and the incentives run out, it has to decide whether it is worth staying with the airport or not. The initial pricing bonus of the airport certainly supports the long-term collaboration with the carrier. Another aspect which could hinder moving to another airport are switching costs. However, since LCCs in general do operate a point-to-point service, they can change their routes without problems since they operate these independently of each other and therefore are not bound in a complicated network. Hence switching costs can only occur in regard to marketing incentives. These are nevertheless likely to be diminished through incentive programs at other airports. The opposite can indeed be the case. Carriers which switch airports often might have a short-term surplus. In regard to switching costs can it therefore be stated that these acts rather against staying at an airport. On the other hand, do LCCs try to maximize their return without interest in a specific market [19]. It is thought that, in general, primary choice airports offer a better long-term prospect than secondary choice airports through their mere attractiveness level. Therefore, apart from all the factors against staying at such an airport, it is believed that the attractiveness factor outweighs all others and leads to increased traffic levels also when the incentives have ceased.

Hypothesis 2: LCCs will stay with primary choice airports in the long term.

3rd Case: The short-term effect undertaken by primary choice airports on the route development behavior of NCs

The attraction of incentive programs from primary choice airports to NCs is less clearcut as the effect of these airport`s incentive programs towards LCCs. On the one hand provide primary choice airports comfort offers such as sufficient check-in facilities as well as lounge offerings for First and Business Class passengers. Furthermore, a good travel connection from other modes of transport to the airport, in order to allow the passengers fast access and exit times, is in many cases given [17]. Therefore, do they fulfill all relevant needs for NCs and their passengers. On the other side is it expected that NCs are not as influenced by the incentive programs because airport charges make up a lower proportion of their overall costs [5]. Furthermore, many NCs within Europe are former flag carriers of their respective country [20](Doganis, 2006, p. 230). That means the majority, if not all of the important cities, are already served by them. As a result, the incentive programs are open basically only to NCs from countries outside Europe, which have not served the destination so far, as well as NCs which have come up after the deregulation of the market. In regard to the short-haul /intra-European market is it therefore estimated that the market for NCs is to a large degree saturated. The medium and long-haul market on the other hand still could show opportunities as described. Airport charges are here, however, a smaller cost factor than in the short haul market and therefore will likely be uninteresting. In addition, do bilateral agreements limit flights to and from the European Union, therefore long-haul traffic is to a certain degree restricted in the airport choice [1]. As a final conclusion, it is expected that there will be no additional effect through price incentives towards NCs on top of those prevailing.

Hypothesis 3: NCs will not be attracted by price incentives from primary choice airports in the short term.

4th Case: The long-term effect undertaken by primary choice airports on the route development behavior of NCs.

As mentioned in Hypothesis 3, NCs are not expected to be attracted by price incentive programs. Therefore, if Hypothesis 3 is correct, it is not possible to find a result whether these types of carriers stay with the airport after the incentives have run out or not. Nevertheless hypothesis 3 could also be found out to be false. In this case, it would be expected that NCs stick with the airport. Reasons which lead to this conclusion are as follows: First: Primary choice airports are, principally, as described, attractive to carriers in the long term. Therefore there is no need to cancel the route, because a high utilization is likely. Second: Network carriers face high switching costs when planning to switch or eliminate routes. This is due to the use of a hub and spoke system, which makes the routes interdependent of each other [21]. The result is that routes cannot be changed without creating major disturbance. Third: Primary choice airports are often congested. If a route is cancelled and the slot is given up, there is a risk that the airline will not be able to get a slot at the same time at the airport in the future. Hence the airline has to take into account possible destinations/ connections which could be served from this airport in the future which would require the specific slot. Moreover, the holding of slots is especially important to NCs in contrast to LCCs because of the high interdependence between routes. In order to keep connection times for transfer passengers low, those specific slots are needed. LCCs in contrast would probably not mind getting a slot at another time. Hence in regard to congestion, NCs might keep certain slots at airports, and therefore produce traffic just because they anticipate a use for the slot in the future.

Hypothesis 4: NCs will stay with primary choice airports in the long term.

5th Case: The short-term effect undertaken by

secondary choice airports on the route development behavior of LCCs.

If price incentives are able to attract carriers at all, it is expected that the effect will be most visible with LCCs and secondary choice airports. Although secondary choice airports fulfill the requirements of the LCCs such as a high operational efficiency as well as rapid turnaround times are they lacking, the probably most important factor, the allure of their counterparts, the primary choice airports. In many cases, as stated in interviews with primary as well as secondary choice airports, secondary choice airports simply lack a sufficient catchment area. In order to gain traffic, their incentive programs have to be higher to compensate for the missing bonuses. Traffic will therefore come exclusively because of the incentives. In addition are LCCs, as described, more dependent upon costs, than NCs and will therefore more likely be attracted through the remunerated programs than NCs. Indeed, NCs complain that certain LCCs, seem to hunt especially for these incentives(Lufthansa, 2010) [22]. Because of the above-mentioned reasons, it is expected that the general low traffic levels will make a jump when the incentive programs come into place.

Hypothesis 5: LCCs will be attracted by price incentives from secondary choice airports in the short term.

6th Case: The long-term effect undertaken by secondary choice airports on the route development behavior of LCCs.

It is estimated that secondary choice airports are not able to bind LCCs in the long term. Although this view is strongly contrasted by the secondary choice airports themselves in interviews conducted with them, two reasons indicate that LCCs will move somewhere else as soon as the incentives have run out. In regard to airport attractiveness, this can still be considered as low, if the airport can only rely upon monetary incentives. An argument often used by those airports is that a new customer base, who did not fly before, is created and attractiveness therefore gained. Although this might be true initially, the majority of new passengers are, however, attracted by low prices from other regions and airports, if the LCCs pass the reduced charges to the passengers [23]. Therefore, if the incentives cease, prices would rise again, which makes the airport unattractive for these customers, letting them return to their initial airports. A part of the newly created passenger base will also likely be eliminated, because they are highly price sensitive and not willing to pay normal tariffs. [1] Concerning switching costs, holds the argumentation from hypotheses 3. LCCs do not face high switching costs because they only offer point to point flights and can therefore start and quit routes without an influence on the others. Indeed can switching be, as explained, especially worthwhile as long as incentive programs for newcomers at other airports exist. As a conclusion, it is likely that the carrier will ask for further incentives or move away.

Hypothesis 6: LCCs will not stay with secondary choice airports in the long term.

7th Case: The short-term effect undertaken by secondary choice airports on the route development behavior of NCs.

Although examples can be found in which NCs serve secondary choice airports(Przybilla & Szymanski, 2011) [25], is this expected to be rather an exception than the norm. Interviews with industry experts supported this statement. A wide shared view shared during the interviews with airport managers was, that it is basically possible to attract any kind of carrier to a secondary airport as long as the incentive is high enough. In a second step the interview partners agreed, however, that the monetary incentive for NCs would have to be much higher than in the case for LCCs.

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[1] Cf. for example the study on additional departure tax from ADV [24]. Especially airports which were served by LCCs had a decline in passenger numbers

Therefore, NC attraction was not seen as likely. An interview with a large European airline showed it even more clearly. It was said that monetary incentives are not used in the decision whether to fly to an airport or not. Reasons for this behavior are obvious. On the one hand, NCs have a different cost structure, which makes incentive payments less tempting since NCs receive relatively less than LCCs. On the other hand, it can also be difficult to connect these secondary choice airports to hubs. Hub airports tend to be crowded and, generally, have no room for additional flights [26]. The destination from the secondary airport to the hub would therefore be competing for limited space with other highly profitable routes to primary choice airports around the world. In conclusion, taking the interviews, the cost structure of NCs as well as the congestion at their hubs into account, it is not believed that carriers will be attracted through incentive programs by secondary choice airports.

Hypothesis 7: NCs will not be attracted through price incentives from secondary choice airports in the short term.

8th Case: The long-term effect undertaken by secondary choice airports on the route development behavior of NCs.

In the case Hypothesis 7 shows up as false (NCs cannot be attracted by the incentive programs from secondary choice airports) and therefore hypothesis 8 is not obsolete, the following is expected: NCs will not stay with the airport when the incentives have run out. On the one hand, against this argument are the already in hypothesis 4 discussed problems regarding route changes for carriers which use a hub and spoke system. The interdependence between the routes would probably involve higher switching costs in contrast to only direct services. In addition does the secondary choice airport not only lose one city which it is connected to, but rather all the indirect connections through the hub airport. This could lead to a higher reputation damage within the region the carrier used to serve. On the other side an interview with a large

European Carrier made clear, that it will not run unprofitable routes. As the market for secondary airports seems to be rather non-lucrative, it is assumed that it is rather difficult for NCs to earn money on these routes. Furthermore, the abolishment of non-lucrative routes, frees up scarce slot capacity at the connecting hubs. Hence, they can use these "new gained" slots at the hub airport for other more valuable destinations.

Hypothesis 8: NCs will not stay with secondary choice airports in the long term.

5. Analysis

5.1 Data and Research Design

The research itself consisted of two consecutive steps. Open interviews with experts from the aviation industry were conducted primarily. The interview partners were selected out of three different groups. First group: Five airports, whereby two of them are large European hubs and three are smaller regional airports. Furthermore, are three of them classified as primary choice and two as secondary choice airports in regard to the classification scheme. The interviews were conveyed with members of the respective marketing team from the airports. Second group: One large European Network Carrier. The interview was done with a member of Network Planning department. Third group: Independent industry experts. Interviews were conducted with Prof. Dr. Edmund Krieger, former head of Marketing and Strategy at Düsseldorf airport and Thomas Fabian from Arbeitsgemeinschaft Deutscher Verkehrsflughäfen (ADV) responsible for traffic policy. The goal of the interviews was to challenge and form, on the one side, the hypotheses, on the other side, it was tried to identify other variables which could influence whether a carrier would serve an airport or not. The newly gained insights are then used in the second step for the quantitative review.

In a second step, a fixed effects regression was undertaken. The fixed effects regression can handle correlation between data, which is important in this case, since panel data is used, as well as cover

influencing variables, which so far have not been found or where data was not sufficiently available. Sources for the data as well as the data preparation are described within the respective variables in the next chapter. In general is the regression carried out using the 20 largest German commercial airports (Appendix A) with the exception of Frankfurt and Munich. Both airports have a too high level of congestion so that no further carriers could obtain slots at these airports. Since no change of traffic could be measured there, would this disturb the analysis. Data was collected from 2004 until 2010 for each of the 20 German airports.[2]

5.2 Variables

5.2.1 Dependent Variable

The route development behavior is measured with the help of the relative growth in offered passenger seat capacity for LCCs and NCs (Appendix B) respectively at the airports in the 46th calendar week[3]in contrast to the previous year. The data here for was taken from the official airline guide. The airline guide, in our case, shows all single starts (flight numbers), for each single airport and the operating carrier with the respective aircraft type in the week 46 from the years 2004-2010. Then, with the help of the aircraft type and the operating carrier, the number of offered seats for each flight could be gained through the respective airline homepages or sites which show seat maps for all airlines such as seatguru.com. The amounts of seats offered in each annual week was then calculated for each airline for each airport. The data was afterwards aggregated to the level of LCCs and NCs for each airport, for each annual week. Finally, the relative growth for seats offered at an airport for LCCs as well NCs could be calculated for the years 2005-2010.

5.2.2 Independent Variables

The time in which airport incentives are paid is modeled with the help of 2 binary variables. Although the use of binary variables does not allow an accurate description of the level of rebate needed to attract a carrier in general (if they can be attracted at all) this method does help to overcome another problem. As described by other authors, such as Malina, Albers, & Kroll(2012), there exist general rules, which are not always followed for the establishment of such incentives programs, therefore the level of rebates is, in many cases, unknown and can thus not be quantified, but illustrated using a binary variables.

The first binary variable "Incentiveon" will get the value 1 when the airport gives a significant monetary incentive to an airline for the first time in a certain year, or if the incentive is significantly raised because, for example, a carrier opens new routes. Otherwise, it will stay 0. To get this information, interview partners as well as newspaper articles were checked primarily to see directly whether incentives were paid. Furthermore, the airport charges documents from the respective airport homepages, the airportcharges.com database, which basically shows charges and rebates for different airports as well as a recent investigation were used for identifying airports which give rebates at all. It was then checked with the help of the flight data from the official airline guide whether carriers would fulfill the requirements to receive a rebate such as being new at an airport or opening a new route.

The second binary variable "Incentiveoff" will turn to 1 from 0if the incentive or a significant part of the incentive has run out, or is thought to run out because, for example, of the EU commissions intervention. To decide whether an incentive has ceased, newspaper articles as well as interviews were used directly. Where this was not possible, it was calculated, outgoing from the "Incentiveon" analysis if incentives would cease. Therefore, the respective airport charges guidelines from the airport homepages, as well as airportcharges.com were used to identify the duration

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[2] Actually was data collected from 2003 until 2011. The data from 2011 could, however, not be used due to the introduction of the new departure tax, which had a strong effects on flights.

[3] The 46th week was used, since it did not have any special holidays, which could influence the outcome in a positive or negative way.

of significant rebates at each airport. In the unlikely case that this was also not possible, a maximum duration of four years for the incentives was assumed.[4]

The growth of the gross domestic product (GDP) of Germany is included as a control variable. This was not only suggested by the industry experts during the interviews (Thomas Fabian ADV, Prof. Dr. Edmund Krieger), but is also well documented in the literature(Doganis, 2006, pp. 5-6). The growth is considered as an annual percentage in comparison to the previous year, in prices from the previous year. The data was taken from Statistisches Bundesamt [28](2011).

5.4 Discussion of Results

From a descriptive perspective was it found out that 3 out of 9 primary choice airports, and 8 out of 11 secondary choice airports granted rebates to carriers during the observation period to attract them. Nevertheless, are these numbers rather the lower bound. It is expected that in many more cases rebates are given. Hence other airports might add to the list.

Figure 1 presents the results of the fixed effects regression model. Overall, the results were in line with the expectations. Hypothesis 1 suggests that there is a relation between incentives from primary choice airports and LCCs. It is found out in the regression that there is an influence between primary choice airports and LCCs (Sign.0,00). Thus Hypothesis 1 is supported. One possible limitation for hypothesis 1 is, nevertheless, that the most important primary choice airports, Frankfurt and Munich, are not included in the analysis since they lack free capacity at least partly during the observation period. That means there is no chance for LCCs to gain slots at these airports. Furthermore, the next most important airport in Germany Düsseldorf which still has ample capacity, does not grant substantial rebates for carriers. However, the airport is also able to attract LCCs and offer more

LCC traffic than the majority of airports aiming especially for LCC traffic. On the contrary, other airports classified as primary choice have gained significant traffic through the use of incentive programs in regard to LCCs, which they would probably not have gotten without the incentives. Therefore, it seems that a more detailed classification is needed.

Hypothesis 2 proposes that there is no relationship between growth and the cease of such incentives from primary choice airports on LCCs. The model shows no significance (0,903). Therefore hypothesis 2 is assisted. A constraint comes, however, with the implications derived from hypothesis 2. A first consideration is that incentives do make sense for primary choice airports in the case of LCCs, since they are able to hold them in the long term. Nevertheless, LCC passengers have different needs than passengers of NCs [29-31]. Therefore, they will not use the facilities available such as restaurants and shops in the same way as passengers from NCs. Hence, the revenue per passenger might decline while at the same time terminal utilization increases, worsening the experience for passengers of NCs.

Hypothesis 3, there will be no incentives from primary choice airports to NCs, is also in line with the expectations (Therefore hypothesis 4, NCs will stay with primary choice airports, becomes obsolete). No evidence was found that an incentive was paid when a NC came to a primary choice airport. Indeed, European carriers particularly were already represented at nearly all airports with sufficient capacity. NCs which could be attracted to certain airports were mainly from the Middle- and Far East. Thus, incentives would have reduced the overall costs only marginally. In addition, the intercontinental market is not fully liberalized and thus subject to bilateral agreements, which in many cases limits the assortment of airports, which are allowed to accept this traffic, and slots for foreign carriers. Hence, there is only rare competition for

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[4]Although the European Commission [27] limits the duration of incentive schemes to 3 years. Many cases are known where incentives are running longer. However, since the rebate is decreasing over time, 4 years is seen as an appropriate time in which incentives can be considered as significant.

intercontinental traffic, other than from North-America. However, the situation could change in the future with the ongoing liberalization, giving airports, which are today not allowed to receive such flights, a chance to attract this traffic.

Hypothesis 5 suggests that there is an influence between incentive schemes from secondary choice airports and the attraction of LCCs. It is found that the regression also suggests a high relationship (Sign. 0,00). Thus hypothesis 5 is supported.

The results for hypothesis 6 are somewhat surprising. The relationship between "Incentiveoff" and "Growth" at secondary choice airports is not significant (0,219). This suggests, in contrast to the hypothesis that they are able to keep the traffic once attracted. One possible explanation for this outcome is that only the largest German airports were taken into account. Smaller airports such as Altenburg are disregarded. Because of this, it is possible that these even less attractive airports would have changed the outcome, most likely to a higher significance. Moreover, the data situation for "Incentiveoff" was also very limited. While it was clear when a certain carrier started to receive an incentive, the situation is worse in the "Incentive off" case as described in the independent variable section. Therefore, further calculation errors might have accrued.

Surprising was also the result for hypothesis 7. The results suggest the opposite of what was expected. There is a strong influence between price incentives from secondary choice airports on NCs (0,00). However, this result must be interpreted carefully. There were only 2 cases found where incentives were paid and a NC joined the airport. Furthermore, the attracted airline in both cases was Air Berlin [32]. Although Air Berlin can be classified meanwhile as a normal NC, therefore aiming at higher revenue traffic (this was suggested during interviews in which airports as well as airlines classified them as a network carrier), the airline is still also active in the market for price sensitive customers, as some acquisitions and cooperations suggest(Air Berlin, 2010). Hence, there is a risk that the results are not representative for all NCs.

Hypothesis 8, NCs will not stay with secondary choice airports when the incentives have ceased, could not be challenged since no case was found where an incentive was stopped in the case of NCs. In one of the cases Air Berlin left the secondary choice airport while the incentive was still running, in the other case the incentive has so far not ceased while Air Berlin is still with the airport. Therefore, no inferences can be taken.

Apart from the individual limitations, some general concerns should also be mentioned. The control variable, the GDP growth, showed no significant influence. This result is rather astonishing as influence from economic growth on the airline industry is well illustrated (Doganis, 2006, pp. 5-6). One explanation might be that the global connection of the industry is, possibly higher than in any other industry. Therefore, next to the German GDP growth, the growth of the most important destinations should be considered. Another explanation is that airlines do not cut the capacity as much as the lower GDP growth reduces the number of travelers. Generally, airlines reduce fares as a first step. Furthermore, they are willing to accept reduced utilization in the aircraft. The cancelling of routes and temporarily decommissioning of planes is only the last resort. Fixed costs for the planes have to be paid further, while the image suffers from the closing of routes. In addition, airlines can lose important slots at an airport. Hence, airlines might be willing to provide capacity during economic low points without sufficient demand. Another aspect which was also different than expected was the correlation between errors. It was expected that errors are correlated within a subject but are independent across subjects. Furthermore, it was estimated that observation close to each other will have a higher error correlation than observations further apart. Therefore, the first-order autoregressive (AR1) covariance structure was taken initially. However, the

Hypothesis	Evaluation	Test Format:	Variable Significance
Hypothesis 1: LCC will be attracted through incentives from primary choice airports	✓	There is a relation between Growth and Incentiveon in the case of primary choice airports and LCCs	0,00
Hypothesis 2: LCC will stay with primary choice airports when the incentives have ceased	✓	There is a relation between Growth and Incentiveoff in the case of primary choice airports and LCCs	0,903
Hypothesis 3: NC will not be attracted through incentives from primary choice airports	✓	There is a relation between Growth and Incentiveon in the case of primary choice airports and NCs	No cases were found in which primary choice airports paid NCs an incentive
Hypothesis 4: NC will stay with the primary choice airport when the incentives have ceased	✓	There is a relation between Growth and Incentiveoff in the case of primary choice airports and NCs	
Hypothesis 5: LCC will be attracted through incentives from secondary choice airports	✓	There is a relation between Growth and Incentiveon in the case of secondary choice airports and LCCs	0,00
Hypothesis 6: LCC will not stay with secondary choice airports when the incentives have ceased	✗	There is a relation between Growth and Incentiveoff in the case of secondary choice airports and LCCs	0,219
Hypothesis 7: NC will not be attracted through price incentives from secondary choice airports	o	There is a relation between Growth and Incentiveon in the case of secondary choice airports and NCs	0,00
Hypothesis 8: NC will not stay with the secondary choice airport when the incentives have ceased.	o	There is a relation between Growth and Incentiveoff in the case of secondary choice airports and NCs	No Incentives found which have ceased

Fig. 1   Fixed Effects Model Results.

first results suggested that the "AR1 rho" parameter is not relevant. Because of this, the more simple "scaled identity" structure, which basically means that there is no correlation between the errors, is used in the analysis.

6. Conclusion

Airport incentive programs are one of the most recent trends to generate further revenues at airports. The main aim of this paper was to describe the relationship between these incentive schemes and the route development behavior of airlines. Therefore, a formal framework for the analysis of the relationship between price incentive schemes from airports on the route development behavior of airlines was established. Here first primary choice airports, which are basically already attractive to airlines, were discerned from secondary choice airports, which miss this attractiveness (Appendix B). Furthermore, NCs were separated from LCCs since both airline types have different needs and desires (Appendix A). The final distinction was made on the time horizon. The time

when an incentive is actually paid at an airport is referred to as the short term, while the time when the incentive has ceased is referred to as the long term. As a result eight hypotheses were given. Before the eight hypotheses were actually challenged in a quantitative analysis, interviews with airport as well as airline managers were conducted to see if all aspects have been covered in the model. These then followed the quantitative analysis which was done through a fixed effects regression.

The results were in general in line with the expectations. It was found that incentives from primary choice airports on LCCs have a significant influence (Hypothesis 1). Furthermore the LCCs did not leave the airport when the incentives had ceased (Hypothesis 2). The results for NCs in regard to primary choice airports were also clear-cut. There was no case found where a NC joined a primary choice airport. Hence, it can be stated that there seems to be no relation between price incentives from primary choice airports on the route development behavior of NC. Given that hypothesis 3

has shown as correct, hypothesis 4 (NCs will stay with the airport when the incentives have run out) becomes obsolete. Hypothesis 5 was also as proposed. There is a strong positive relationship between incentive programs from secondary choice airports and new traffic from LCCs. In the case where incentives run out, traffic was, however, not significantly reduced from LCCs at secondary choice airports. Therefore, hypothesis 6 is false. Nevertheless, this result should be interpreted carefully, since only the largest German airports are taken into account. The results might change when smaller ones, which will likely be less attractive, are included. The outcome from hypothesis 7 is also somewhat problematic. It was suggested, that there will be no visible effect since NCs will not be attracted by secondary choice airports. The analysis, however, clearly suggested the opposite, that there is a positive relationship between new traffic from NCs and incentives paid from secondary choice airports. Only two cases were, however, found which secondary choice airports attracted a NC with the help of incentives. Hypothesis 8 (NCs will not stay with the airport if incentives run out) could not be checked for validity, since from the cases in hypothesis 7, one incentive is still being granted and in the other case the airline quit the newly established routes only shortly after it had been established.

Overall, the paper provides first insights into the so far unknown relationship between price incentive policies from airports and their effects on airline traffic. From a practical point of view the results are of special importance to airports and public institutions, which provide, in many cases, the subsidies which the airports use, since it seems a bit clearer where marketing should focus on. This paper also makes a contribution to the sparse literature on airport marketing. Nevertheless, while old questions have been answered, new questions arose. What remains unclear so far is the exact interaction between attractiveness of an airport, the height of the incentives and the resulting traffic levels. When, for example, can an airport be considered as

attractive? While there will, most probably, be no single definition, guidelines would help to determine the current position of the airport and further strategic moves. In addition, the incentive programs are only roughly covered. Future studies would have to go beyond the simple substantial/ non substantial incentive classification, and provide a detailed view of which level of incentives are actually needed to attract a carrier at the different types of airports. Apart from a more substantial description of the variables used here, following studies should also take into account more factors such as interactions between airlines. If, for example, a new carrier is attracted with the help of incentives at an airport, the existing airlines could feel discriminated against and also claim rebates or decide to leave the airport (Büchner, Knuf, & Wache, 2007)[33]. Furthermore, rivalry between airlines could influence the decision whether to join an airport or not. Throughout the interviews it was suggested by a secondary choice airports, that only one of the three big European LCCs could stay at secondary choice airport, for example. Therefore, traffic gains for these airports are limited to the already existing carriers. Hence, this influence might also be taken into consideration.

Acknowledgements

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Appendix A

Primary Choice Airports	Secondary Choice Airports
BRE	DTM
CGN	ERF
DRS	FDH
DUS	FKB
HAM	FMO
NUE	HAJ
STR	HHN
SXF	FHL
TXL	LEJ
	PAD
	SCN

Appendix B

Network Carriers:

Adria Airways, Aegean Airlines, Aer Lingus, Aeroflot, Aerosvit, African Safari Airways, AFRIQIYAH AIRWAYS, Air Astana, Air Algerie, Air Alps, Air Baltic, Air Berlin, Air Canada, Air China, Air Comet, Air Dolomiti, Air France, Air India, Air Kenia Express, Air Malta, Air Mauritius, Air Moldova, Air Namibia, Air Seychelles, Air Taxi Europe, Air Zimbabwe, Albanian Airlines, Alitalia, All Nippon Airways, Amber Air, American Airlines, Ariana Afghan Airlines, Armavia, Asiana Airlines, Astraeus, AVIA Traffic, Austrian Airlines, BelAvia, Blue1, Biman, BMI, British Airways, Brussels Airlines, B&H Airlines, Bulgaria Air, Cathay Pacific, Carpatair, China Airways, China Eastern Airlines, Cimber Sterling, Collective Name Misc, Cirrus Airlines, Continental, Croatia Airlines, Cyprus Airways, Czech Airlines, Delta Air Lines, Denim Air, DONBASSAERO, Egyptair, El Al, Emirates, Eritran Airlines, Estonian Air, Ethiopan Airlines, Etihad Aiways, Finnair, Finncom, Flexflight, Flexticket, Flylal, Georgian Airways, Germania, Ghana International, Gulf Air, Hahn Air, Hainan Airlines, HEMUS AIR JOINT-STOCK COMPANY, Iberia, Icelandair, Iran Air, Japan Airlines, Jat Airways, Jet Air, KAVMINVODYAVIA, Kenya Airways, KLM, Korean Air, Kuban Airlines, Kuwait Airways, Lan Airways, LGW, LOT, LTU, Lufthansa, Luxair, Lybian Airlines, Macedonian Airlines, Mahan Air, Malaysia Airlines, Malev, Miat, Middle East Airlines, Montenegro Airlines, Moscow Airlines, Northwest, Nouvelair Tunis, OLT, Olympic Air, Oman Air, Polet, Pia, Qantas, Qatar Airways, Robin Hood, Rossiya, Royal Air Maroc, Royal Brunei, Royal Jordanien, Safi Airways, SAS, Saudi Arabian Airlines, Singapore Airlines, Somon Air, South African Airways, Smart Aviation Company, Spanair, Srilankan, Swiss, Sylt Air, Syrian Arab Airlines, S7 Airlines, TACV, TAP, Tarom, Thai, Transaero Airlines, Tunisair, Turkish Airlines, Turkmenistan Airlines, Ukraine International Airlines, UM Air, Ural Airlines, United, US Airways, UTair, Uzbekistan Airways, Varig, Vietnam Airlines, VLM, Welcome Air, Yamal, Yemenia

Low Cost Carriers:

Air Arabia, Alnaser Airlines, Atlasjet Airlines, Belle Air, BMI Baby, Blue Air, Blue Panorama, Blue Wings, Central Wings, Condor, Donavia, Correndon Airlines, Dniproavia, Easyjet, Flybe, FlyHellas, EUROCYPRIA AIRLINES, Germanwings, Hamburg International, Hello, INTERSKY LUFTFAHRT GMBH, Israir, Jet2.com, Jetx, Maersk Airlines, Niki, Norwegian Air Shuttle, Pegasus Airlines, Ryanair, Sky Europe, Smart Wings, Sterling Airlines, Sun Dor, Sunexpress, Thomson Airways, Transavia, Tuifly, Windjet, Wizzair