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# Market Exit of Air Berlin: An Analysis of Competitive Pricing on Domestic O&Ds in the German Market

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**Abstract**

In autumn 2017, Air Berlin, the second biggest player in the German airline market, discontinued its operations due to bankruptcy. Prior to this, the struggling carrier had already been reducing its domestic capacities and adjusting its service patterns, which had impacts on the competitive situation for the remaining carriers on various domestic origin-destination (O&D) markets. This paper aims at identifying resulting changes of, e.g., the yields generated in intra-German air transport. In the German domestic market, the relevant competition per route can be narrowed down to a few players as opposed to continental or intercontinental flights. We found evidence that on 90% of the TOP20 O&Ds, representing 96% of the total passenger volume, revenue per pax (as an indicator for yield) increased. We found FRA-BER and MUC-BER – both O&Ds with intense Easyjet competition to be the only O&Ds that did not show an increase in price/yield after the market exit of Air Berlin.



*Keywords:* Type your keywords here, separated by semicolons ;

## 1. Introduction

Air Berlin's bankruptcy in 2017 marks an important turning point in the German airline market. In the years prior to its market exit, Air Berlin had already gone through a phase of different capacity, route network and strategic adjustments. For this reason, the actual discontinuation of routes and services did not happen synchronized for all O&Ds – while some were already discontinued earlier in the turnaround phase, others were upheld, backed by a government loan, for almost 3 months even after the carrier's official filing of bankruptcy in August 2017 – in order to avoid a scenario where many travelers would have stranded abroad around the general elections.

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This paper aims to identify key demand and yield developments after the market exit of Air Berlin at the intra-German O&D level. Based on this, we derive and discuss impacts and general recommendations for airline customers and policymaking. Even though Air Berlin played an important role in the leisure market ex Germany, this paper focuses on Air Berlin's domestic activities only. Unlike European and worldwide O&D traffic, domestic O&Ds are characterized by a strong proportion of business travel and thus by relatively high yields, and competition from indirect services is almost negligible. Moreover, the Air Berlin case is considered to be an excellent occasion to analyze competitors' behavior as re-entry by the bankrupt carrier was very unlikely. Hence, any competitive response was mainly dependent on the remaining players on the actual O&D's and on domestic O&Ds in general.

## 2. Literature Review and Hypotheses Development

Market exit in air transport is a well-studied subject. A multitude of studies deals with market exits from different perspectives. There are several studies that analyze key drivers for market entry and exit on the U.S. domestic market as well as on other domestic markets (e.g., Abdelghany and Guzhva, 2010; Baran, 2018; Nguyen and Nguyen, 2018; Ma et al., 2019). While the purpose of such studies is to identify key variables driving a market entry or market exit decision, they do not analyze the impacts on price pre- and post-exit levels. There is a vast body of literature about how prices are influenced by route competition, airport dominance, or the presence of low-cost carriers. Several early studies document that prices on routes increase when concentrations increase (e.g., Graham, Kaplan, and Sibley, 1983; Bailey, Graham, and Kaplan, 1985; Call and Keeler, 1985; Morrison and Winston, 1987; Borenstein 1989). Brander and Zhang (1990) analyzed duopoly situations between United Airlines and American Airlines and found that neither a cartel nor a Bertrand competition model applied but rather a Cournot optimization took place. Dresner, Lin, and Windle (1996) analyzed 200 O&Ds and found that the presence of LCCs contributed to lower yields and increased traffic. Similar, Franke (2004), Dobruzkes (2006) and Alderighi et al. (2012) found that Low Cost Carrier (LCC) presence translates to fare decreases and demand stimulation. Morrison (2001) even argued that the entrance of Southwest lowered fares by 46.2 % in the U.S. domestic market. Bilotkatch et al. (2010) found on the NYC-LON route that the pricing strategies of different carriers vary strongly. Budd et al. (2014) studied exit patterns of LCC. The purpose of their study was to identify patterns of failure amongst European LCC that left the market between 1992 and 2012. Interestingly, in this study, Air Berlin was still listed as a "diversified charter operator" focusing on "seat-only low-cost services" (Budd et al., 2014, p. 80) – its former positioning before acquiring the German domestic airline flydba and the holiday and long-haul airline LTU in the second half of the 2000s. The paper by Fageda et al. (2017) - in parts - resembles most to the methodology used in this study. As an introduction to their study subject, Fageda et al. (2017) performed a reduced form of the t-test-analysis used in this study for the analysis of Spanair's market. A reduction in prices was noted on routes that were taken over by LCC which is consistent with what would be expected from the above sources. Grosche et al. (2020) have analyzed the market concentration in the German market before and after Air Berlin using the Herfindahl-Hirschman index. Those results support concerns about Lufthansa Group's increased dominance.

In a nutshell, there is a vast body of literature that combines the topics of pricing, competitive behavior and market exit. Against this background, it is necessary to denotate in how far this study can make a significant contribution to the field. First, methodological-wise, this study stands out by providing an analysis on O&D level instead of route level, acknowledging that a) a certain share of O&D passengers may have alternative – indirect options – which may also affect O&D fare levels and b) route level fare data often contain proportional "prorata" revenues of feeder flights (e.g., average segment [route-level] fares on Berlin to Frankfurt will be blurred by connecting passengers that change planes in Frankfurt). Second, this work is, to our best knowledge, the first scientific paper to take a detailed look at revenue changes pre and post Air Berlin's exit and to analyze competitor pricing behavior post-exit. In this context, the structure of Germany's domestic market is especially interesting as there are three main types of remaining competitors: easyJet and Ryanair as established LCC, Eurowings as Lufthansa's low cost brand and Lufthansa itself as a full service carrier (FSC).

From the above studies, we conclude that prices augment if concentration increases. Moreover, we expect the remaining carriers to increase volumes in order to gain the share of the exiting competitor. This might temporarily lead to overcapacity until the market mechanism rebalances the situation. We therefore postulate the following two hypotheses:

H1: The largest competitor's (in this case Lufthansa/Eurowings) total revenue per passenger (as yield proxy) on the O&D is higher after the market exit of an important player (Air Berlin).

H2: The total passenger volume on the O&D is stable or higher after the market exit of an important competitor (in this case Air Berlin) until the market mechanism rebalances the situation.

## 3. Methodology

We use Sabre's Market Intelligence O&D demand and Innovata's flight schedules data in order to get insights on the domestic competitive pricing behavior of the remaining competitors (mainly Lufthansa, Eurowings/Germanwings, easyJet and Ryanair). We approximate the yield development by analyzing the development of total revenues per passenger for a given O&D, which is a well-known practice in airline sales and revenue management. Su et al. (2019) analyzed the impact of high-speed rail on airline pricing strategies. Even though we acknowledge the impact of rail services, our analysis is focused on the airline domain.

By focusing our analysis on O&Ds instead of actual routes, we avoid blurring average revenues per passenger due to revenues stemming from feeder segments. Domestic flights within Germany are usually driven by corporate demand and thus supposed to be subject to higher yields than other European routes. In order to facilitate the evaluation, we build vice versa O&Ds (abbrev: O&Dvv), i.e. we construct an O&Dvv by adding O&D FRA-HAM to the return O&D HAM-FRA. This can be done as, in the German market, origins and destinations are within one and the same pricing zone and culture. In order not to neglect LCC using alternative airports, we decided to run the analysis at the city-pair instead of the airport-pair level. Even so such flights do not play a major role, by doing so, we do account for some additional competition on domestic O&Dvv by LCC. E.g., Frankfurt Hahn – Berlin Schönefeld (HHN-SXF; SXF-HHN) and Frankfurt International Airport – Berlin Tegel (FRA-TXL; TXL-FRA) would be both regarded as one O&Dvv FRA-BER and thus mentally accounted as the same O&Dvv.

Our analysis covers a time horizon of 9 years from 01/2010 to 12/2018 – a timespan which includes several changes to Air Berlin's service patterns in the German domestic market. We systematically analyze the leading competitor's pricing reaction on the exit of Air Berlin for each of the 20 top-domestic-passenger O&Dvv. If multiple carriers are present on an O&Dvv after the exit of Air Berlin, we select the carrier with the highest revenue share of wallet as the main competitor to be analyzed. We use the development of total passenger volumes on an O&Dvv to check if airlines have put or withdrawn seats from the respective O&Dvv to get an indication whether certain price developments can be explained by classic microeconomic theory. Thanks to the strict limitation of our study on domestic O&Ds only, we can derive a much clearer picture of what has happened after the exit of Air Berlin than if we included transfer passengers from European and intercontinental origins. For each O&Dvv, we derive the exact month of the market exit of Air Berlin and determine the development of the total revenue per passenger (our yield proxy) over time. We then split into a pre-exit and post-exit group of equal length of months. We do the same for the total passenger volume.

In order to validate our hypothesis that the revenue per passenger augments for the strongest competitor on the O&Dvv after the exit of Air Berlin, we seek to perform a paired one-sided t-test. We chose a paired test as we collect data from the same entities but at different time frames. It is worthwhile to note that for paired t-tests there is no need to perform an F-test upfront, but especially for small values of N it is necessary to verify if the normal distribution assumption is violated. We use the Shapiro-Wilk-test to test whether the normal distribution assumption holds true. If this is not the case, we make use of the one-sided paired Wilcoxon Rank sum test instead of a paired t-test. This test is agnostic against violation of the normal distribution assumption and might therefore be used in those cases.

As Air Berlin discontinued its services at different moments in time, we define pre-exit and post-exit timeframes of equal length (i.e +-12 month). For all O&Dvv we report the exit date of AirBerlin that we concluded out of our dataset (i.e. we could only partially back these dates with press releases – for those O&Ds where press releases where available they matched our dataset 100%). For the O&Dvv FRA-MUC and BRE-MUC that have been long-existent monopoly O&Dvvs, we compare the timeframe 11/2016-10/2017 to 11/2017-10/2018. This compares the first half with the second half of data and thus verifies whether the revenue per pax augments even under a static monopoly situation.

As we assume augmenting ticket prices after a competitor leaves an O&Dvv, we of course acknowledge that there might be a shortage in capacities after the exit of a competitor and thus prices augment as a matter of the market mechanism. To control for this effect, we also analyzed the development of the overall O&Dvv passenger seats. We expect that if a market exit takes place, airlines will increase their capacities on the respective O&Dvv to anticipate at least a part of the lacking seat capacity. However, this will most likely happen after a smaller phase of higher yield levels as it is difficult to determine the needed amount of seats for the remaining airlines.

## 4. Results and Discussion

In the following, we present the results of our analysis on domestic German O&Dvv. We first give an overview of the selected O&Dvv and their total revenue as per Sabre Market Intelligence data. In the next step, we cluster the existing O&Dvv into different clusters.

### *4.1. Characterization of the Germany domestic O&Dvv profiles under research*

We selected 20 German O&Dvv to be analyzed (see table 1). As mentioned before, the selection was done based on the overall passenger volume on the O&Dvv within the timeframe of this analysis, i.e. 01/10-12/18. Even though two O&Ds have never been operated by Air Berlin (AB), we decided to leave them in the analysis as these O&Dvv (i.e. FRA-MUC, BRE-MUC) do represent long-run monopoly O&Dvv of home market carrier Lufthansa (LH) and may serve as a basis for comparison for the other O&Dvv.

Table 1. Basis of analysis: O&Dvv by 01/10-12/18 passengers, underlined: carrier that is analyzed for price development.

| Nb | O&Dvv | Total O&Dvv Pax (01/10-12/18) | Avg. O&Dvv Pax p.a. (01/10-12/18) | Remaining competitors on O&Dvv after AB exit |
|---|---|---|---|---|
| 1 | BER-MUC | 13.162.504 | 1.462.500 | LH, U2 |
| 2 | BER-CGN | 12.866.810 | 1.429.646 | EW, U2, FR |
| 3 | HAM-MUC | 11.575.477 | 1.286.164 | LH |
| 4 | DUS-MUC | 10.358.796 | 1.150.977 | LH, EW |
| 5 | BER-FRA | 10.225.066 | 1.136.118 | LH, U2, FR |
| 6 | BER-STR | 8.744.694 | 971.633 | EW, U2 |
| 7 | BER-DUS | 8.639.426 | 959.936 | EW, U2 |
| 8 | CGN-MUC | 7.490.452 | 832.272 | LH, EW |
| 9 | FRA-HAM | 6.634.575 | 737.175 | LH |
| 10 | HAM-STR | 6.347.647 | 705.294 | LH, EW |
| 11 | DUS-HAM | 4.438.410 | 493.157 | EW |
| 12 | CGN-HAM | 3.937.264 | 437.474 | LH (as of 06/2013 EW) |
| 13 | FRA-MUC | 3.220.905 | 357.878 | LH (AB never on FRA-MUC) |
| 14 | HAJ-MUC | 2.524.356 | 280.484 | LH |
| 15 | HAM-NUE | 2.120.171 | 235.575 | LH, EW |
| 16 | BER-NUE | 1.938.185 | 215.354 | EW |
| 17 | DUS-NUE | 1.854.203 | 206.023 | EW |
| 18 | HAJ-STR | 1.812.227 | 201.359 | EW |
| 19 | BRE-MUC | 1.793.443 | 199.271 | LH (AB never on BRE-MUC) |
| 20 | DRS-DUS | 1.739.002 | 193.222 | LH, EW |

AB=Air Berlin, LH=Lufthansa incl. CL, EW=Eurowings incl. 4U/HE, U2=Easyjet; FR=Ryanair

### *4.2. Development of O&Dvv revenue per pax for remaining largest competitor and total passengers after exit*

Our study reveals interesting patterns for several domestic O&Dvv. Table 2 sums up the contextual information on the O&Dvv under research. Table 3 reports the results of the one-sided paired t-test or Wilcoxon rank sum test. Table 4 arranges the O&Dvv in interpretation clusters that allow an easier evaluation of the results.

Table 2. O&Dvv with detail of exit, interval length and test for normal distribution

| O&Dvv | AB* end of service | Pre-exit timeframe Post-exit timeframe | Shapiro-Wilk-Test for REVpPAX[2] | Shapiro-Wilk-Test for seat capacity[2] |
|---|---|---|---|---|
| MUC-BER | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .898, p = .149 (ns) | W = .948, p = .602 (ns) |
| BER-CGN | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .818, p = .015* | W = .965, p = .853 (ns) |
| HAM-MUC | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .907, p = .205 (ns) | W = .883, p = .096 (ns) |
| DUS-MUC | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .928, p = .358 (ns) | W = .923, p = .313 (ns) |
| BER-FRA | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .893, p = .128 (ns) | W = .922, p = .299 (ns) |
| BER-STR | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .979, p = .981 (ns) | W = .969, p = .904 (ns) |
| BER-DUS | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .877, p = .378 (ns) | W = .922, p= .301 (ns) |
| CGN-MUC | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .923, p = .309 (ns) | W = .973, p = .937 (ns) |
| FRA-HAM | 2011/09 | 2010/10-2011/09 2011/10-2012/09 | W = .972, p = .933 (ns) | W = .914, p = .239 (ns) |
| HAM-STR | 2017/04 | 2016/05-2017/04 2017/05-2018/04 | W = .817, p = .015* | W = .911, p = .221 (ns) |
| DUS-HAM | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .870, p = .065 (ns) | W = .942, p = .527 (ns) |
| CGN-HAM | 2012/06 | 2011/07-2012/06 2012/07-2013/06 | W = .983, p = .993 (ns) | W = .854, p = .041* |
| FRA-MUC | never AB | 2016/11-2017/10 2017/11-2018/10 | W = .937, p = .462 (ns) | W = .950, p = .643 (ns) |
| HAJ-MUC | 2013/01 | 2012/02-2013/01 2013/02-2014/01 | W = .896, p = .140 (ns) | W = .944, p = .550 (ns) |
| HAM-NUE | 2016/12 | 2016/01-2016/12 2017/01-2017/12 | W = .797, p = .008* | W = .886, p = .104 (ns) |
| BER-NUE | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .956, p = .719 (ns) | W =.853, p=0.04* |
| DUS-NUE | 2017/10 | 2016/11-2017/10 2017/11-2018/10 | W = .960, p = .788 (ns) | W = .889, p = .114 (ns) |
| HAJ-STR | 2017/01 | 2016/02-2017/01 2017/02-2018/01 | W = .844, p = .031* | W = .930, p = .379 (ns) |
| BRE-MUC | never AB | 2013/07-2014/06 2014/07-2015/06 | W = .857, p = .044* | W = .859, p=.047* |
| DRS-DUS | 2017/06 | 2016/07-2017/06 2017/07-2018/06 | W = .927, p=.252 (ns) | W = .950, p = .635 (ns) |

[1] = Air Berlin, [2] normally distributed if not significant, ns = not significant, * p<.05

Table 3. Pre- and post-exit interval mean, standard deviations for REVpPAX, TTL PAX and test statistics

| | | REVpPAX | | TTL PAX | | REVpPAX | TTL PAX |
|---|---|---|---|---|---|---|---|
| O&Dvv | | M1<br>M2 | SD1<br>SD2 | M1<br>M2 | SD1<br>SD2 | t-statistic or<br>Wilcoxon RST | t-statistic or<br>Wilcoxon RST |
| | | | | | | increase [decrease] | decrease [increase] |
| MUC-BER | pre | 208.91 | 25.59 | 132927.50 | 11718.30 | t=-0.73 (ns), df=11 | [t=-8.39*, df=11] |
| | post | 205.66 | 22.78 | 165829.20 | 17863.91 | | |
| BER-CGN | pre | 173.17 | 24.05 | 205901.70 | 15938.87 | V=0*, p < .01 | t=3.82*, df=11 |
| | post | 271.44 | 55.58 | 162360.00 | 38182.11 | | |
| HAM-MUC | pre | 200.09 | 18.49 | 194980.80 | 15921.29 | t=-4.33*, df=11 | t=1.03(ns), df=11 |
| | post | 231.80 | 27.58 | 189460.20 | 18775.35 | | |
| DUS-MUC | pre | 216.21 | 18.62 | 210751.50 | 24719.96 | t=-7.13*, df=11 | t=7.56*, df=11 |
| | post | 263.31 | 24.05 | 171905.60 | 13312.13 | | |
| FRA-BER | pre | 186.56 | 19.23 | 224381.60 | 17816.17 | t=-0.55 (ns), df=11 | [t=-3.68*, df=11] |
| | post | 194.06 | 30.22 | 266817.20 | 44681.98 | | |
| STR-BER | pre | 157.02 | 21.48 | 120041.80 | 14672.60 | t=-11.67*, df=11 | t=-1.49 (ns), df=11 |
| | post | 243.80 | 29.56 | 131589.50 | 25360.50 | | |
| DUS-BER | pre | 157.31 | 20.11 | 143713.00 | 10143.09 | t=-9.55*, df=11 | t=1.35 (ns), df=11 |
| | post | 243.63 | 24.77 | 132247.30 | 25746.76 | | |
| CGN-MUC | pre | 203.81 | 19.73 | 129298.80 | 20038.57 | t=-9.36*, df=11 | t=0.53 (ns), df=11 |
| | post | 250.70 | 22.03 | 127008.80 | 7613.29 | | |
| FRA-HAM | pre | 108.25 | 9.53 | 209951.10 | 14697.53 | t=-4.84*, df=11 | t=12.18*, df=11 |
| | post | 137.20 | 17.64 | 178186.20 | 12381.99 | | |
| HAM-STR | pre | 155.74 | 12.78 | 79943.83 | 4857.16 | V=3, p<.01 | t=1.76 (ns), df=11 |
| | post | 235.59 | 49.81 | 75996.17 | 7324.94 | | |
| DUS-HAM | pre | 183.73 | 20.32 | 76769.67 | 3612.27 | t=-3.25*, df=11 | t=4.91*, df=11 |
| | post | 211.61 | 17.90 | 64270.25 | 9486.70 | | |
| CGN-HAM | pre | 117.71 | 18.04 | 71527.67 | 8983.80 | t=-3.14*, df=11 | V=77, p <.01 |
| | post | 139.48 | 11.53 | 49452.75 | 8228.83 | | |
| FRA-MUC | pre | 282.86 | 10.61 | 150040.50 | 12676.76 | t=-5.26*, df=11 | [t=--6.71 (ns), |
| | post | 338.53 | 35.84 | 164207.80 | 16927.48 | | df=11] |
| HAJ-MUC | pre | 132.10 | 16.65 | 80522.58 | 7570.71 | t=-2.28*, df=11 | t=6.23*, df=11 |
| | post | 148.63 | 20.79 | 68733.75 | 7169.95 | | |
| HAM-NUE | pre | 168.24 | 20.49 | 28268.25 | 3962.54 | V=17, p=.046 | t=4.17*, df=11 |
| | post | 192.72 | 49.08 | 21750.17 | 4269.89 | | |
| BER-NUE | pre | 162.19 | 18.57 | 28539.50 | 1964.66 | t=-7.01*, df=11 | V=78, p<.01 |
| | post | 263.26 | 47.04 | 14797.17 | 3391.88 | | |
| DUS-NUE | pre | 149.90 | 23.53 | 36007.50 | 2375.98 | t=-12.32*, df=11 | t=18.34*, df=11 |
| | post | 262.74 | 24.07 | 18425.25 | 2584.77 | | |
| HAJ-STR | pre | 175.19 | 20.15 | 27725.00 | 1825.06 | V=12, p=.02 | t=2.95*, df=11 |
| | post | 213.95 | 39.43 | 25056.50 | 3095.08 | | |
| BRE-MUC | pre | 234.10 | 28.50 | 41529.67 | 4307.76 | V=11, p=.01 | [V=0, p<.01] |
| | post | 252.55 | 45.42 | 47238.33 | 6223.34 | | |
| DRS-DUS | pre | 163.34 | 21.46 | 34518.17 | 3399.69 | t=-4.70*, df=11 | t=10.78*, df=11 |
| | post | 268.50 | 74,38 | 18787.50 | 3467.72 | | |

ns=not significant; RST=rank sum test; *p<.05

Table 4. Resulting O&Dvv clusters

| | REVpPAX major carrier remaining | Market capacity | Cluster | Carriers | Description |
|---|---|---|---|---|---|
| O&Dvv | increase/decrease | increase/decrease | A-D | after exit | |
| BER-NUE | increase | decrease | A | EW/ NOOP[1] | yield[3] increase capacity reduction |
| BER-CGN | increase | decrease | A | EW/U2/FR[2] | |
| DUS-MUC | increase | decrease | A | LH/EW | |
| FRA-HAM | increase | decrease | A | LH | |
| DUS-HAM | increase | decrease | A | EW | |
| CGN-HAM | increase | decrease | A | EW | |
| HAJ-MUC | increase | decrease | A | LH | |
| HAM-NUE | increase | decrease | A | EW | |
| DUS-NUE | increase | decrease | A | EW | |
| HAJ-STR | increase | decrease | A | EW | |
| DRS-DUS | increase | decrease | A | EW | |
| HAM-MUC | increase | ns | B | LH/EW | yield[3] increase stable capacity |
| BER-STR | increase | ns | B | EW/U2 | |
| BER-DUS | increase | ns | B | EW/U2 | |
| HAM-STR | increase | ns | B | EW | |
| CGN-MUC | increase | ns | B | LH/EW | |
| FRA-MUC | increase | increase | C | LH | yield[3] increase capacity increase |
| BRE-MUC | increase | increase | C | LH | |
| BER-MUC | ns | increase | D | LH/U2 | stable yield[3] capacity increase |
| BER-FRA | ns | increase | D | LH/U2/FR[2] | |

[1]NOOP=no operations after EW market exit 06/2019 [2]service to SXF [3]approximated by REVpPAX

As table 4 shows, in 18 out of 20 O&Dvvs we see evidence for yield increase (approximated by revenue per pax) after the exit of Air Berlin. These 18 O&Dvvs combined represent 96% of the total passenger volume of the TOP20 O&Dvv. MUC-BER and FRA-BER are the only exceptions with stable yield. This is most likely due to the fierce competition with Easyjet. Of course, this raises the question why we see increased yields on BER-CGN, BER-DUS and BER-STR that are also served by Easyjet. On BER-CGN, BER-DUS and BER-STR, different to BER-FRA and BER-MUC, the remaining carrier with highest volume share is Eurowings and not Lufthansa. On BER-CGN, the capacity was reduced and on BER-DUS and BER-STR TTL market capacity was at least not increased

To conclude, analyzing the revenue per pax and passenger demand on these routes, we do not see clear and sustainable countermeasures to boost seat volumes on most of the O&Ds (except for 2 O&Ds from cluster D) to recover the volumes transported by Air Berlin – despite initial action with high publicity like the use of Boeing 747-400 long haul aircraft on flights between Frankfurt and Berlin (cluster D).

## 5. Policy implications and Outlook

While our work is retrospective, it still contains important aspects for future policymaking as it shows how monopoly gains are made (or not made) in situations when competitors decide to exit markets. One important aspect of our study is rooted in the careful selection of the right data to be analyzed when drawing conclusion on price reactions by airlines in the case of a competitor's market exit. The right selection of data can have huge impact on the overall assessment of a concrete market situation.

We argue that pricing reactions to market exits should be 1) analyzed for discrete O&Ds rather than on an aggregated level and 2) on an O&D basis instead of a flight segment/coupon basis as only the O&D fares really reflect actual and relevant O&D supply and competition. Our analysis shows a significant difference in pricing reactions to market exit between comparable O&Ds even in a domestic market. Overlaying the effect of a multitude of O&Ds tends to blur the picture and might lead quicker to the result that no harm to the competitive landscape can be identified (risk of a false negative observation). Especially in the European continental traffic, there are a multitude of routes that are flown in strong competition with low yields. If those are overlaid with high yield domestic routes that differ from one to the other O&D, the low European O&D yield can hide the price augmentation that indeed happens on individual, e.g. domestic routes. It is important to remind policymakers that the consumer does not experience a market on an aggregated level but on an O&D level. In consequence, O&D-specific pricing should be subject to competitor price evaluations.

This work does not intend to judge carriers for their pricing policies. As all companies, airlines are seeking to maximize their profit for the good of the company and all its employees. Given the latest flight shaming debates, one could argue that high prices on domestic traffic are positive from a policymaking perspective as this could help to fulfill other society goals, e.g. development of more multi-modal traffic and fostering high speed trains instead of flights on short-haul operations. The policy question is whether the monopoly gains should be used to increase the bottom line of the producing airline or whether these monopolistic gains should be used to fund structural change. From our analysis, one could conclude that domestic travel might contribute significantly to airlines' bottom line and help them to outweigh losses on other European O&Ds leading to a market failure constellation in which monopolistic domestic flights help to compete on low yield levels leading to an over-supply on such O&Ds.

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