Competition in the German Interurban Bus Industry: A Snapshot Two Years After Liberalization

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Abstract

We study competition in the German interurban bus industry two years after its liberalization in January 2013. In addition to a brief characterization of the liberalization process and several general market developments, we provide a detailed analysis of selected market characteristics such as concentration and competitive interaction, fares as well as service quality. We use the gained insights to discuss two recent policy issues – industry consolidation and possible abuses of market power by incumbents – and derive several recommendations to secure effective competition in the industry.

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1. Introduction

Since the beginning of the deregulation movement in the 1970s in the United States, many regulated industries in a large number of countries have been liberalized[1] – with so-called network industries being a major focus of such initiatives. By initiating and implementing deregulation processes, policy makers often aimed at increasing allocative and productive efficiency through the promotion of competition and – at the same time – reducing the amounts of subsidies paid to the respective sectors or industries.

From an academic perspective, the transition from regulated to liberalized industries offers a rich set of research questions. Following a methodology by Perl (1997), focal points of interest have been research into the forces that have given rise to regulatory reform or the structures of the respective regulatory changes. The majority of research, however, focuses on the question after the effects of deregulation processes on key market outcome variables such as industry efficiency, prices or profits.

For a few decades, the German interurban bus industry did not follow the described liberalization trends in most network industries in Europe. However, following constant pressures by especially the European Commission, in 2009, the German government announced plans to liberalize the national interurban bus market – defined as regular (scheduled) bus services above a distance of 50 kilometers. After a considerable transition period – in which the respective paragraphs of the Passenger Transport Act had to be changed – the industry was fully liberalized in January 2013.

Against this background, we study competition in the German interurban bus industry two years after its liberalization. Following a brief characterization of the liberalization process and several general market developments since liberalization in Section 2, we provide a detailed analysis of selected market characteristics such as concentration and competitive interaction, fares as well as service quality in Section 3. Section 4 uses the gained insights to discuss two recent policy issues – industry consolidation and possible abuses of market power by incumbents – before we use the final Section 5 to derive several recommendations to secure effective competition in the industry.

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[1] In the remainder of this article, 'deregulation' and 'liberalization' are used as synonyms.

2. Liberalization of the German interurban bus industry

In this section, we provide an initial characterization of the liberalization of the German interurban bus industry. A brief discussion of the liberalization process in Section 2.1 is followed by a more detailed description of general market developments since liberalization in Section 2.2.

2.1. The liberalization process at a glance

Although deregulation processes were initiated in many industries and countries in the last two to three decades, a mixture of public policy arguments and lobbying activities delayed the implementation of such processes in several sectors or industries. For Germany, this description applies to the interurban bus industry. Since 1931, bus companies were only allowed to offer regular interurban bus services – above a travel distance of 50 kilometers – on routes on which the state-owned German railway company Deutsche Bahn AG (or its predecessors) was unable to provide an acceptable service. Due to the rather dense (interurban) railway network in Germany, the respective law – that aimed at protecting a core business of Deutsche Bahn AG – led to only sporadic interurban bus services except for connections to/from former West Berlin (operated by Berlin Linien Bus) and international connections (by providers such as Eurolines Germany).

The regulation of the German interurban bus industry remained intact until 2009 when the German government announced plans to liberalize the industry (responding to political pressures from the European Union). In the same year, three students established DeinBus.de[2], a company which, whenever a sufficiently large number of travelers to a certain destination was found, rented a bus and offered the respective service. Additionally, Deutsche Bahn AG started to operate its own busses under the new IC Bus brand around the same time. Despite several attempts by different lobbying groups to prevent or at least weaken the deregulation of the industry, the German interurban bus industry was fully liberalized in January 2013 – after the respective paragraphs of the Passenger Transport Act[3] were changed in the usual legislative (and lobbying) processes (see generally Maertens (2012) and Schiefelbusch (2013) for further information).

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[2] See https://www.DeinBus.de/ (last accessed on 22 March 2015).
[3] The most important change – leading to the liberalization of the interurban bus industry – referred to §13(2) Personenbeförderungsgesetz ('Passenger Transport Act') in which the strict entry regulations were codified.

2.2. General market developments after liberalization

Prior experiences with deregulation processes in transport industries in general (see, e.g., Williams (1993), Morrison and Winston (1986, 1995) or Borenstein and Rose (2007) for the US airline industry) and interurban bus industries in particular (see, e.g., Robbins and White (1986, 2012) for Great Britain or Aarhaug et al. (2012) for Norway) would expect – at the early stages of a liberalized industry – substantial market entry by both new and incumbent firms leading either to the creation of new lines and routes or an increase in the number of competitors on existing lines and routes.

The German interurban bus industry appears to follow this general pattern. Following full liberalization in January 2013 many providers decided to apply for an operating license. According to the German Office for Goods Transport (2014, p. 15), the number of licenses increased from 86 in December 2012 to 158 in June 2013 and finally 301 in September 2014 (an overall increase of 350 percent). The increase in licenses is also reflected in an increase in both available lines and frequency of service on these lines. Comparing a week in August 2013 with the same week in August 2014 reveals that the number of lines increased from 113 to 244 (an increase of about 116 percent) while the number of journeys jumped from 2,360 to 7,088 (an increase of about 300 percent; see German Office for Goods Transport (2014), p. 17).

A key strategy of most new entrants to the industry – such as especially MeinFernbus or FlixBus – to quickly extend their route networks was to avoid buying their own fleet but rather to develop a subcontractor-type business model in which already existing local bus companies agree to offer services under the respective (regional or national) interurban bus brand. At least in terms of market share gained, this strategy has proven successful as in August 2014 – on the basis of the number of offered routes – MeinFernbus was the market leader with a share of 29 percent, followed by FlixBus with 24 percent (see German Office for Goods Transport (2014), p. 18) and all remaining operators with substantially smaller market shares – partly because they entered the industry at a later point in time but partly also because they either concentrate on the provision of regional services or operate on a limited selection of lines with a particularly high demand.

Despite the clear growth trend in the German interurban bus industry in the last two years, the overall size of the industry must still be considered as rather small. For example, according to data from the German Federal Statistical Office, 8.2 million passengers travelled (in sum about 2.7 billion passenger kilometers) by regular interurban busses in 2013, compared to

about 131 million passengers which travelled on long-distance railway connections in the same year.[4] According to the most recent traffic forecast conducted by a consortium that was commissioned by the German Federal Ministry of Transport and Digital Infrastructure (2014), a growth to about 25 million passengers (generating in sum about 8.8 billion passenger kilometers) is expected in the German interurban bus industry until the year 2030.

3.   Detailed analysis of selected market characteristics

In this section, we provide a detailed analysis of selected characteristics of the German interurban bus market. Based on the description of our detailed route-level data set in Section 3.1., we will especially shed light on concentration and competitive interaction (Section 3.2.), fares (Section 3.3.) as well as service quality (Section 3.4.).

3.1.   Construction of the data set

The data set used in this article was constructed by merging data from different sources. The basic data set was obtained from http://www.fernbusse.de[5], one of the leading online search engines for interurban bus travel in Germany for both national and international services.[6] For all connections, the data set includes information on the date, time and city of origin and destination, duration, provider, included amenities, and price. For our analysis we restricted the data set to, first, connections within Germany and, second, to 'large providers' that offered at least 100 trips in the observation period from Tuesday, 11 November 2014 to Monday, 17 November 2014. For this week, the data has been queried three times, 14 days, seven days, and one day prior to the respective day of departure. However, as the data (structure) are found not to vary to a larger extent across the three different queries, we use the data collected seven days before travel in this article (if not stated otherwise). Additionally, road distances between the respective origin and destination cities were retrieved from Google Maps.

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[4]   Although in sum about 2.6 billion passengers travelled by rail in 2013, the large majority of about 2.5 billion passengers used local trains. As interurban busses by definition operate on medium- and long-haul routes only, it appears more appropriate to relate the 8.2 million bus customers to the 131 million long-distance rail customers. See https://www.destatis.de/DE/ZahlenFakten/Wirtschaftsbereiche/TransportVerkehr/Transport Verkehr.html (last accessed on 22 March 2015) for further information.

[5]   See http://www.fernbusse.de (last accessed on 22 March 2015).

[6]   Although it appears very likely that www.fernbusse.de contains the large majority of bus connections of (at least) all larger providers – justifying the use of the respective data for an analysis of the industry – it remains an open question how good the coverage of the connections available on the site is compared to the overall number of connections available in Germany during the respective observation period. Generally, it is reasonable to assume that competition between these platforms provides strong incentives for the respective operators to maximize the number of connections displayed – under the condition that the platforms operate independently and are not owned (or captured) by one or more providers of the respective bus services. Furthermore, industry studies are typically forced – for practical reasons – to restrict their analysis to firms above a certain size anyway and we therefore do not expect our results to underlie any significant (structural) biases.

Before we continue with a detailed characterization of selected market characteristics, it is important to clearly define our unit of analysis. Generally, three different levels of analysis can be differentiated: the line, the route and the connection (trip). A line is defined as an offered regular (scheduled) service from a particular origin (departure) city to a particular destination (arrival) city, e.g., from Hamburg to Munich. A line usually contains several stops, i.e., passengers are able to board the bus at a later city and/or get off the bus at an earlier city than the final destination. Each combination between two different stops on a line is defined as a route, i.e., if a line has N stops, the number of routes is $\sum_{i=1}^{N-1} i$. The route is our unit of observation and analysis. In case a provider operates on a route in both directions, e.g., from Hamburg to Bremen and back to Hamburg – as it is usually the case – we count outward and inward trips as two separate routes as, first, in contrast to, e.g., airlines, bus tickets are typically sold separately for outward and inward journeys. Second, different modes of transport can be used by travelers for outward and inward trips – depending on the individual valuation of time and other trip costs – leading to potentially significant differences in demand (and price). Last but not least, it is important to remark that for all routes in our data set, we observe the number of connections (trips) per day and week. This information is important to, e.g., analyze the role of daily frequency of service as important strategic decision variable. In sum, our data set contains of 1822 routes with 40,568 route-level fare observations.

Last but not least, it is important to clearly state the restriction of our data set to one week in November 2014. Although this week was chosen for no particular reason, it cannot be ruled out that, e.g., seasonal effects and/or other demand- or supply shocks might bias our results. Although there is no doubt that any findings or conclusions derived from such a cross section must therefore be handled with great care (and should not be generalized whatsoever), we believe that our analysis still provides important first insights on the inner workings of a recently liberalized industry.

3.2. Concentration and competitive interaction

A substantial amount of research in industrial organization is somehow related to market concentration and its impact on market conduct and market performance. Although especially more recent research has clearly questioned any deterministic relationship, few researchers would disagree that the study of market concentration is helpful to understand competition processes in an industry.

Although the analysis of market concentration and competition on the route-level will be the main focus of this section, transport markets by definition have a spatial dimension thereby raising the question after the general availability (and spatial concentration) of the respective services. Figure 1 therefore provides a map showing all 177 German cities in our data set with (at least one) interurban bus connection per week in November 2014.
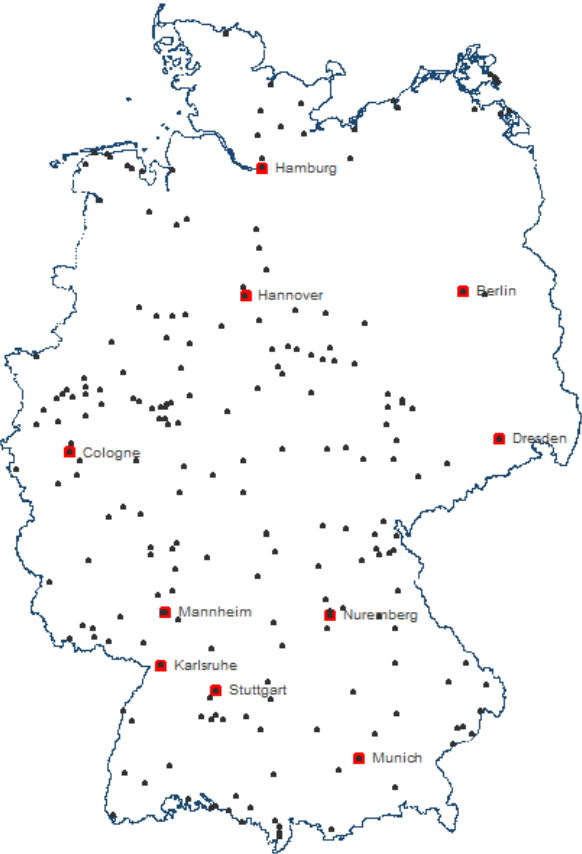

Figure 1: German cities with interurban bus connection (in November 2014)

As shown in Figure 1, the large majority of connected cities – each represented by a small dot – are located in former West Germany which is largely driven by the substantially higher concentration of population – and therefore both higher actual and potential travel demand – in these areas of the country. The same reason is likely to drive the differences within former West Germany with a substantially larger number of connected cities in the South and the West compared to the North. Furthermore, Figure 1 allows – as indicated by the larger squares in combination with the printed city names – the identification of several focal cities, i.e., cities with an exceptionally large number of weekly departures. In November 2014, such cities with more than 1100 weekly departures were (in descending order) Berlin, Munich, Cologne, Hamburg, Dresden, Stuttgart, Karlsruhe, Hannover, Nuremberg, and Mannheim (i.e., exclusively large or very large cities in Germany). As connecting services – at least currently – do not play a significant role in the German interurban bus industry, the

concentration of traffic is largely driven by the large local demand (rather than the respective cities operating as hub cities for connecting services).

Under the strong assumption that the German interurban bus industry constitutes an own relevant antitrust market[7], a suitable starting point for a description of market concentration on the route-level is a simple analysis of the number of routes and the number of firms operating on these routes. Figure 2 below presents the respective results for the week in November 2014 that constitutes our data set.
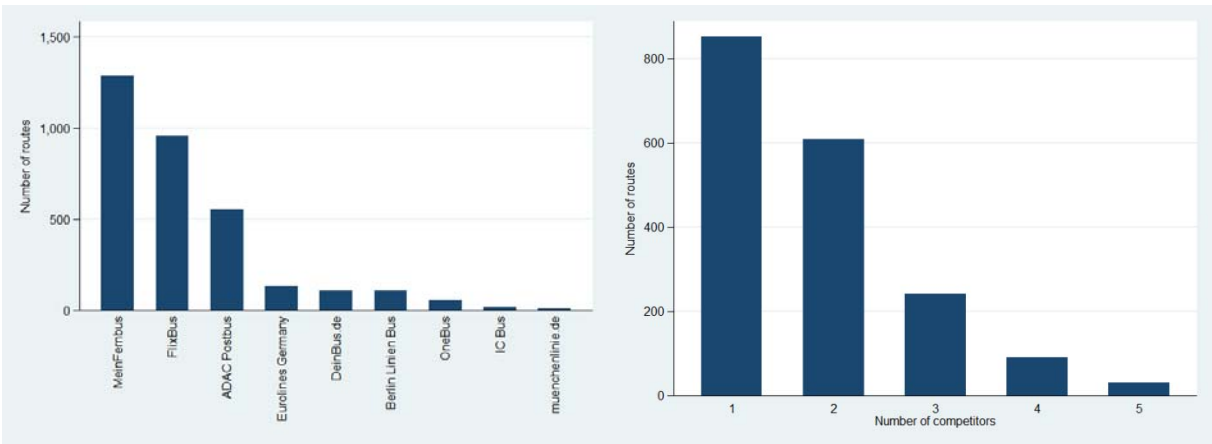

Figure 2: Number of routes differentiated by largest providers and number of competitors

The left-hand chart in Figure 2 shows the number of (inner German, directional) interurban bus routes operated by the largest nine bus companies in November 2014. It is shown that the new entrants MeinFernbus (1288 routes), FlixBus (960 routes) and ADAC Postbus (556 routes) have become the by far largest providers on the in sum 1822 routes within Germany leaving the incumbents such as Eurolines Germany (136 routes), DeinBus.de (111 routes), Berlin Linien Bus (111 routes) or IC Bus (18 routes; the latter two owned by Deutsche Bahn AG) with substantially smaller route presences. Interestingly, as all new entrants follow comparable subcontractor-type business models, the respective (firm) sizes – measured here in number of operated routes – can at least partly be explained by the respective times of entry: MeinFernbus entered first in April 2012, followed by FlixBus in February 2013, and

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[7]   From an antitrust perspective, it remains an open question whether the German interurban bus market constitutes an own relevant market or must be considered as a (rather small) fraction of a much larger transportation market (possibly including car sharing agencies, railway services etc.). While the narrow delineation of the relevant market would (by construction) lead to high market shares and therefore competition concerns, the latter broader delineation is likely to result in the conclusion that anticompetitive effects are unlikely to exist. In this respect, it should also be taken into account that the demand for interurban bus travel must be considered as highly elastic and market entry barriers as rather low (thereby reducing the possibilities to abuse market power through the implementation of permanent price increases).

ADAC Postbus in October 2013.[8] Berlin Linien Bus, Eurolines Germany, DeinBus.de and IC Bus were all active before 2013, however, they were constrained substantially in their growth by the existing regulations until January 2013.

In addition to an analysis of the number of routes per provider, an important determinant of competition intensity on the route-level is the respective number of operating firms. The right-hand chart in Figure 2 therefore shows the number of routes that are operated by one, two, three, four or five firms. It is revealed that the majority of 852 routes (out of in sum 1822 routes, i.e., about 47 percent) is operated by only one provider, followed by two providers on 609 routes (about 33 percent), three providers on 241 routes (about 13 percent), four providers on 90 routes (about 5 percent) and the maximum number of five providers on 30 routes (about 1.6 percent).

Despite the fact that the number of monopoly routes in the German interurban bus industry is found to be quite large, it is important to add that monopoly markets are typically expected to be rather small in terms of overall demand compared to routes on which a larger number of providers is operating. In other words, in most of the monopoly markets, competition is likely to be undesirable from a welfare perspective due to the respective small levels of overall demand on those routes. Figure 3 below provides some further insights in this respect by plotting the (absolute) number of connections (i.e., weekly trips) and well as the average trip length, both differentiated by the number of competitors.

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[8] MeinFernbus and FlixBus are both startups (supported by external investors), while ADAC Postbus is run by a consortium of the German automobile club ADAC and the (formerly state-owned but now privatized) German postal service (Deutsche Post AG). In November 2014, ADAC announced to end the consortium contract leaving the German postal service as the sole operator of the service.
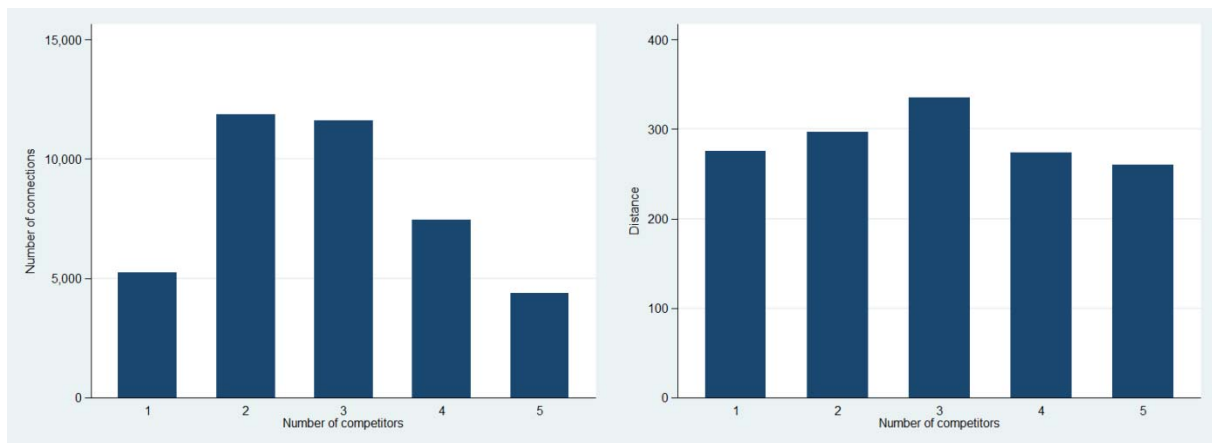
Figure 3: Number of connections and average trip length differentiated by number of competitors

As shown in the left-hand chart in Figure 3, markets with the lowest or highest number of competitors have substantially lower absolute numbers of connections in the week in November 2014 that constitutes our data set. While 5,234 trips were operated in monopoly markets, 4,379 trips took place in markets with five providers compared to 7,468 connections in markets with four providers. The majority of about 58 percent of all connections, however, is conducted in duopoly (11,880 trips) and triopoly (11,607 trips) markets. However, relating the respective number of connections to the absolute number of routes in the respective categories reveal that monopoly routes have on average only 6.1 weekly trips per route while the respective values increase to 19.5 weekly trips for duopoly routes, 48.2 weekly trips for triopoly routes and 124.5 and 146.0 weekly trips per route on markets with four or five competitors, respectively. These results therefore confirm the expectation above that routes with more competitors – although rather small in absolute numbers – are of great importance when studying the overall significance and impact of the industry.

Turning to the right-hand chart in Figure 3 above, the average trip length for the five route categories is shown. It is revealed that the highest average distance of 335 kilometer is found on routes that are served by three providers while both the least and most competitive routes have substantially lower average distances of 275 km for monopoly routes and 260 km for routes with five competitors. Furthermore, although not shown in the chart, our analysis revealed that FlixBus offers the longest connections with about 304 kilometers on average, however, closely followed by MeinFernbus and ADAC Postbus with 303 km and 298 km (on average), respectively. Smaller providers with correspondingly smaller networks, however, are found to have lower average distances with muenchenlinie.de and DeinBus.de being at the

end of the spectrum with an average trip length of (on average) 182 km and 170 km, respectively.

Although the number of competitors at the route-level is likely to be an important determinant of market competition (and fares), research in industrial economics also suggests that the degree of competitive interaction can have an important effect on market conduct and market performance. For example, providers that meet on many routes may behave differently than providers who interact on a couple of routes only. In order to allow a more detailed study of these relationships for the German interurban bus industry, Table 1 shows a matrix of monopoly routes and the number of overlaps on competitive routes (i.e., routes with more than one provider).

Table 1: Matrix of monopoly routes and overlaps on competitive routes

	Mein Fernbus	FlixBus	ADAC Postbus	Berlin Linien Bus	DeinBus. de	Eurolines Germany	OneBus	muenchen linie.de	IC Bus
Mein Fernbus	451	691	343	144	115	205	67	4	12
FlixBus	691	159	671	109	241	180	65	0	14
ADAC Postbus	343	671	136	52	57	155	61	0	4
Berlin Linien Bus	144	109	52	42	0	12	0	0	4
DeinBus.de	115	241	57	0	29	10	22	3	0
Eurolines Germany	205	180	155	12	10	18	15	0	0
OneBus	67	65	61	0	22	15	11	0	0
muenchenlinie.de	4	0	0	0	3	0	0	4	0
IC Bus	12	14	4	4	0	0	0	0	2

Note: Number of monopoly routes in shaded cells; number of competitive routes in remaining cells

Starting off with a discussion of monopoly routes, Table 1 shows that MeinFernbus (451 routes) has the largest number of monopoly routes, followed by FlixBus (159 routes) and ADAC Postbus (136 routes). All other providers have substantially smaller numbers of monopoly routes. Turning to the overlaps on competitive routes, MeinFernbus and FlixBus meet most often (on in total 691 routes). An almost equally high number of 671 overlaps is found for FlixBus and ADAC Postbus (while MeinFernbus only competes with ADAC Postbus on 343 routes). Ceteris paribus, these findings suggest that FlixBus is facing greater competitive pressures than MeinFernbus. All remaining providers are substantially smaller thereby showing a correspondingly reduced number of both monopoly routes and competitive route overlaps.

3.3. Fares

The level of fares is an important measure of both market conduct and market performance. On the one hand, firms actively develop pricing strategies trying to outsmart their competitors (leading to increased revenues and eventually profits). On the other hand, fares influence the size of the aggregated consumer surplus realized by the respective market or industry. Generally, fares can be studied by presenting various breakdowns of the raw data. In the following, we restrict our analysis to a discussion of average prices differentiated by largest providers and number of competitors, day and time of booking as well as trip distance (haul).

A straightforward way to start a characterization of fares is two compare the major providers in the market with respect to their average fares. Although it is obvious that the calculation of such average prices hide much information – especially with respect to route-specific differences – it still allows an initial classification of providers. An important precondition for the calculation of average prices is to derive a suitable measure. Although on the surface, 'price per kilometer' appears to be the measure of choice, frequent stops – requiring additional kilometers by leaving the highway to reach the respective bus stops in the inner cities – can bias this measure. In Figure 4 below, we therefore not only report the standard 'price per kilometer' measure but also the 'price per minute' as alternative measure for our descriptive analysis.
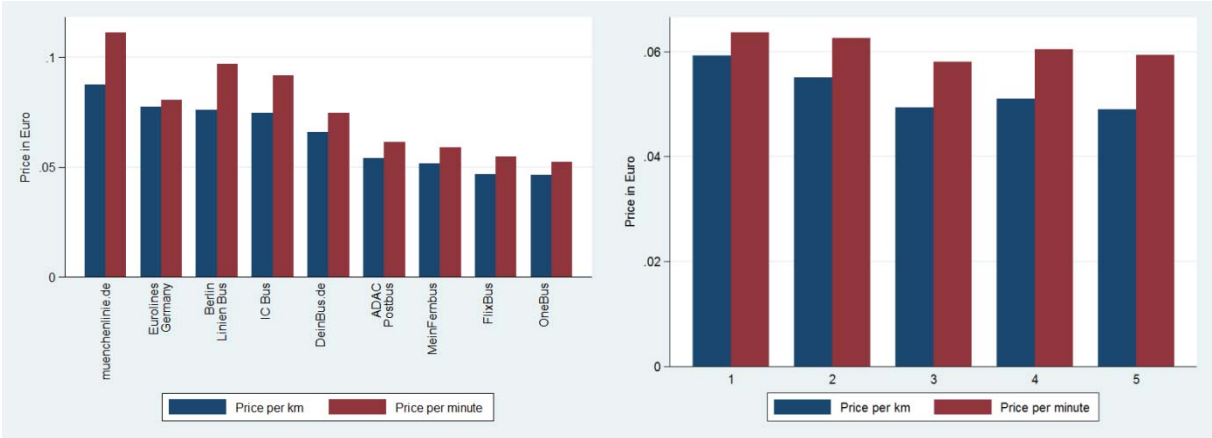

Figure 4: Average prices differentiated by largest providers and number of competitors

The left-hand chart in Figure 4 plots the average prices of the nine largest providers and reveals substantial between-firm variation. While muenchenlinie.de is the most expensive provider on a price per kilometer (0.087 EUR/km) as well as price per minute (0.112 EUR/min) basis, the three largest providers MeinFernbus, FlixBus, and ADAC Postbus apparently offer relatively low average prices. The cheapest provider is DeinBus.de with an

average price of 0.046 EUR/km or 0.052 EUR/min, respectively. Interestingly, the two companies owned by the (state-owned) provider of railway services Deutsche Bahn AG – Berlin Linien Bus and IC Bus – are relatively expensive providers with 0.076 EUR/km (0.096 EUR/min) or 0.075 EUR/km (0.092 EUR/min), respectively. As main service quality drivers appear rather similar between the different providers (as, e.g., most offer services such as free Wi-Fi on board, free luggage, snacks, bike transport, restrooms etc.), the observed differences might either reflect different cost structures (e.g., due to different general business concepts or different technical specificities of the respective route portfolios (e.g., in terms of average travel distances)) and/or different pricing strategies (partly driven by a varying importance of brand recognition etc.).

In addition to the identified variation of average fares on the provider level, our discussion of market concentration in the preceding section suggests that average prices should fall with an increasing number of firms on the respective routes. The right-hand chart of Figure 3 therefore plots the average prices differentiated by the number of firms operating on the respective routes. Supporting main insights of Cournot-type oligopoly models, average prices are highest (with an average of 0.059 EUR/km or 0.064 EUR/min) if only one provider is operating on the respective route and decrease significantly if a second (0.055 EUR/km or 0.063 EUR/min) and third operator (0.049 EUR/km or 0.058 EUR/min) is present. A fourth and fifth provider, however, do not have any additional (larger) effect on average prices in the respective markets.

Another breakdown of fare data that is likely to generate interesting further insights is a differentiation by days of the week and time of booking. Generally, it can on the one hand be expected that an effective yield management together with varying absolute demand levels is reflected in price differences (leading to higher prices in times of high demand and vice versa). On the other hand, experiences with yield management systems in other network industries (such as, e.g., airlines) raise the expectation that the time of booking has a measurable effect on the average fare paid. Ceteris paribus, it can be expected that bookings in advance are cheaper than last minute bookings on the day before the departure. Figure 5 below allows an investigation of both issues.
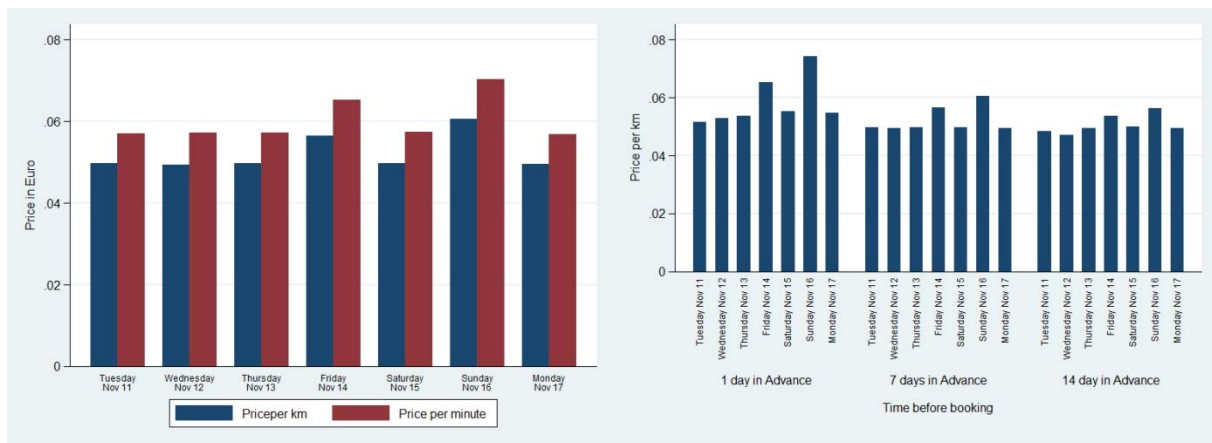
Figure 5: Average prices differentiated by days of the week and time of booking

As shown in the left-hand chart in Figure 5 (for bookings 7 days in advance), the weekdays of high demand – Friday and Sunday – do show higher average prices than the other days of the week. In fact, focusing on the price per minute reveals that average prices on Friday (0.057 EUR/km or 0.065 EUR/min) and Sunday (0.061 EUR/km or 0.070 EUR/min) are about 12.28 percent (12.5 percent) or 18.03 percent (18.3 percent), respectively, higher than the average of 0.050 EUR/km (0.057 EUR/min) for the remaining five days of the week. Furthermore, as revealed by the right-hand chart in Figure 5, the price pattern between a booking 14 days in advance, seven days in advance and one day in advance looks very similar. While the change from 14 to 7 days in advance only leads to the addition of a rather small price premium of on average about 6 percent on the two days of high demand (Friday and Sunday), the change from seven days to 1 day does show measurable price increases on all days (on average about 12 percent), however, with the premiums on the two days of high demand being substantially larger (on average about 19 percent).

A final rather traditional way to study fares in a transport market is to analyze differences by haul. Generally, such differences – sometimes related to so-called economies of distance – occur as soon as either (trip-specific) fixed costs are shared over a longer trip or certain cost components increase at a lower rate with an increase in trip length. Furthermore, transport companies frequently use haul to implement price differentiation strategies (that might even include a cross-subsidization of long-haul routes by short-haul routes; see, e.g., Button (2010)). Figure 6 below allows studying these relationships between average/actual prices and haul in greater detail.
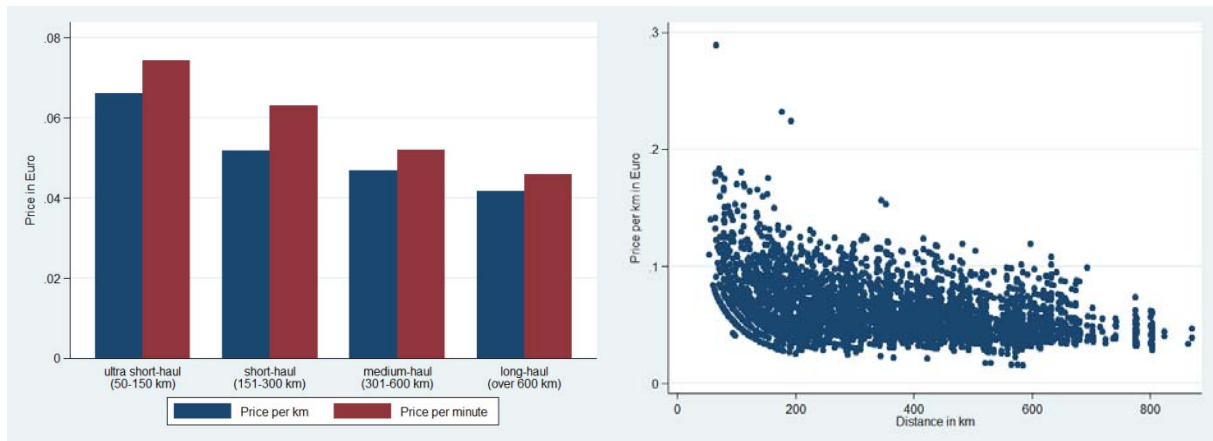
Figure 6: Average prices and actual prices differentiated by haul

As shown by the left-hand chart in Figure 6, a separation into ultra short-haul (50-150 km), short-haul (151-300 km), medium-haul (301-600 km) and long-haul (over 600 km)[9] leads to the expected stepwise reductions in average prices on both a per kilometer and per minute basis. While, e.g., the average ultra short-haul price is found to be 0.066 EUR/km (or 0.074 EUR/min), the corresponding value for long-haul connections is 0.041 EUR/km (or 0.046 EUR/min), i.e., a reduction of 0.025 EUR/km (or about 38 percent). In addition to the analysis of average values, the right-hand chart in Figure 6 gives a detailed overview by plotting all available (route-level) average price-distance combinations available in our data set. The revealed parabolic relationship is in accordance with comparable earlier studies for, e.g., the airline or trucking industries and likely reflects the initially discussed cost- and demand-related specificities of transport markets.

3.4. Service quality

In addition to pricing, service quality is another strategic decision variable in the competition between different interurban bus providers. Generally, measuring service quality certainly is a multidimensional problem with some (rather objective) service quality drivers being relatively easy to quantify (so-called quantitative indicators) and other (rather subjective) drivers with substantial problems in measuring them accurately (so-called qualitative indicators). Although it is not always easy to clearly separate between the two set of drivers, few would disagree that frequency of service is a quantitative indicator. Ceteris paribus, the more connections per day are offered on a particular route, the more likely that the desired travel day and time of the passenger is close to the actual scheduled travel times (thereby increasing consumer welfare). Furthermore, a higher daily frequency suggest more intensive competition on the respective

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[9]   The, in sum, 1822 routes in our data set are allocated to the respective haul categories as follows: ultra-short haul: 366 routes, short-haul: 601 routes, medium-haul: 740 routes and long haul: 115 routes.

route – basically because high daily frequencies are only provided for markets with a sufficiently high demand (potential) and this high demand (potential) is likely to attract entry by other providers. Figure 7 below provides an overview of the average daily frequencies differentiated by both largest providers and number of competitors.
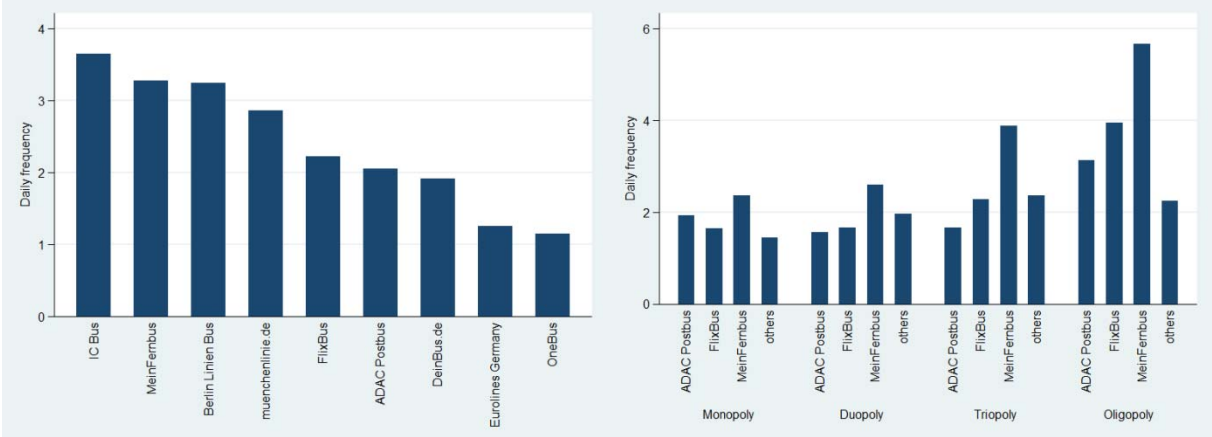

Figure 7: Daily frequency differentiated by largest providers and number of competitors

As revealed by the left-hand chart in Figure 7, IC Bus offers the highest daily frequencies on their routes – reaching an average value of 3.650 daily connections – followed by MeinFernbus with on average 3.275 daily connections. The other end of the spectrum – offering the lowest number of average daily connections – is occupied by Eurolines Germany and OneBus who both rarely operate (on average) more than once per day on a connection.

As daily frequencies are likely to change with market size (and market size in turn affects the probability of entry), the right-hand chart in Figure 7 provides the respective breakdown of daily frequencies by number of firms in the market and further differentiates between the three largest providers in terms of overall market share – MeinFernbus, FlixBus and ADAC Postbus – and the remaining providers. As shown in the chart, overall daily frequencies increase – as expected – with the number of competitors on the respective routes. Furthermore, it is revealed that MeinFernbus on average provides substantially higher daily frequencies – across all three different market structures – than its two toughest competitors FlixBus and ADAC Postbus.

Complementary to frequency of service as quantitative service level indicator, many other quantitative or qualitative factors influence overall service quality. Examples include the availability and quality of certain additional services (such as, e.g., free Wi-Fi on board, free luggage, snacks, bike transport or restrooms), the punctuality of the service or even mostly subjective drivers such as seat comfort, cleanliness of the restrooms etc. A usual way to

handle the issue of a multitude of different service quality factors is the construction of a service quality rating that combines at least some key indicators into one final rating value per provider. Although necessarily imperfect, in this article, we use the results of a (general, not route-specific) quality rating provided by http://www.fernbusse.de. The overall rating is derived by calculating the mean of the following three rating categories: bus comfort, service level, and punctuality. For all three categories, users of http://www.fernbusse.de were asked to rate a provider on a one-to-five star basis (with 5 stars being the best outcome). The respective average values – obtained from the webpage on 19 December 2014 – are shown in the left-hand chart in Figure 8 below.
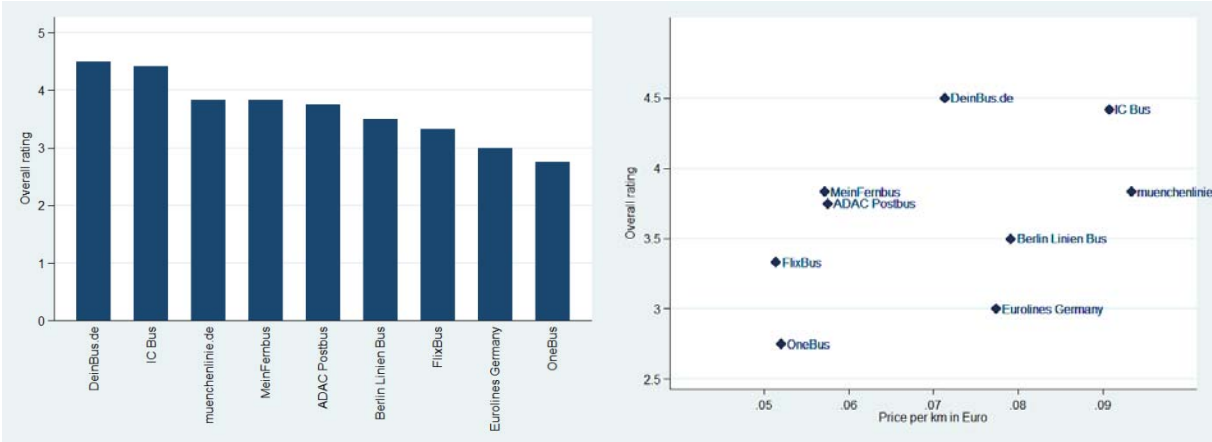

Figure 8: Average service quality differentiated by largest providers and price-service quality matrix

As shown in Figure 8, DeinBus.de provides the highest service quality (4.50 stars) – along the dimensions included into the rating – followed by IC Bus (4.42 stars) and muenchenlinie.de (3.83 stars). At the other end of the spectrum, we find OneBus (2.75 stars) and Eurolines Germany (3.00 stars) with the lowest rating values. Last but not least, the availability of price and service level data suggests a final categorization of the major players along these two key dimensions of competitive interaction. The respective results – using the data plotted in Figure 4 and Figure 8 (left-hand charts) – are shown in the price-service quality matrix in the right-hand chart in Figure 8 above. The matrix generally reveals substantial differences between most of the nine largest providers in the German interurban bus market. While several providers such as OneBus or FlixBus rather follow a low price-low quality strategy, other providers such as IC Bus or muenchenlinie.de offer rather expensive premium services. Eurolines Germany appears to have a rather difficult position with relatively high prices but a relatively low level of service quality. However, the rather international focus of the company might explain part of the disadvantageous position when concentrating on routes within

Germany only. Last but not least, the almost identical positions of MeinFernbus and ADAC Postbus in the price-service quality matrix suggest rather intensive competitive interaction between both companies. The same conclusion – however to a lesser extent – is true for the relationship of both companies to FlixBus.

4. Recent policy issues

Guided by the detailed analysis of selected market characteristics in the preceding section, we now turn to a discussion of recent policy issues. In particular, we use our data set to shed light on the potential effects of recent industry consolidations and potential abuses of market power by incumbents.

4.1. Industry consolidation

Following substantial market entry activity by either new or incumbent firms at the early stages of a liberalized industry, it can subsequently be expected that both shrinking growth potentials over time as well as business concepts that turn out to be less successful than others will cause a consolidation phase in which less efficient firms will have to leave the industry either through liquidation or merger.

Despite the fact that the German interurban bus industry was deregulated quite recently, several consolidation events have already been observed. For example, in October 2014, the rather small (but financially powerful) provider City2City – a subsidiary of UK's National Express – went out of business and in November 2014, DeinBus.de entered the state of bankruptcy protection, however, continues to operate for the time being. Very recently and most importantly, in January 2015, the two biggest players in the market – MeinFernbus and FlixBus – announced their plans to merge. Although the small absolute size of the German interurban bus market makes it unlikely that the German Federal Cartel Office will investigate the proposed transaction (basically because the respective worldwide/domestic turnover thresholds set out in merger control are not reached), the announced merger still raises the question after its competitive effects in general and its price effects in particular. This is especially the case as such a merger between the two by far largest providers – in an industry still in its infancy – can certainly have a substantial impact on its future development.

Generally, in order to assess the competitive effects of the announced merger, it is important to analyze not only the number of routes operated by both carriers but especially the degree of overlap between both merging firms prior to the merger and the corresponding (potential) differences in average prices charged and daily frequencies offered (assuming that price and

daily frequency are key competition variables). Furthermore, a merger between two leading firms in a network industry is likely to affect the respective business strategies in general and the respective pricing strategies in particular suggesting a more detailed pre-merger assessment.

Again using our route-level data set of one week in November 2014, the initial descriptive analysis of route presence above revealed that MeinFernbus operated on 1288 routes compared to FlixBus with 960 routes. Interestingly, both players competed directly on 691 routes from which they are the only two providers on 348 routes (i.e., a monopoly market will result post-merger). Figure 9 below offers several further insights on the average daily frequencies and average prices of the merging parties compared to the remaining providers on the respective routes.
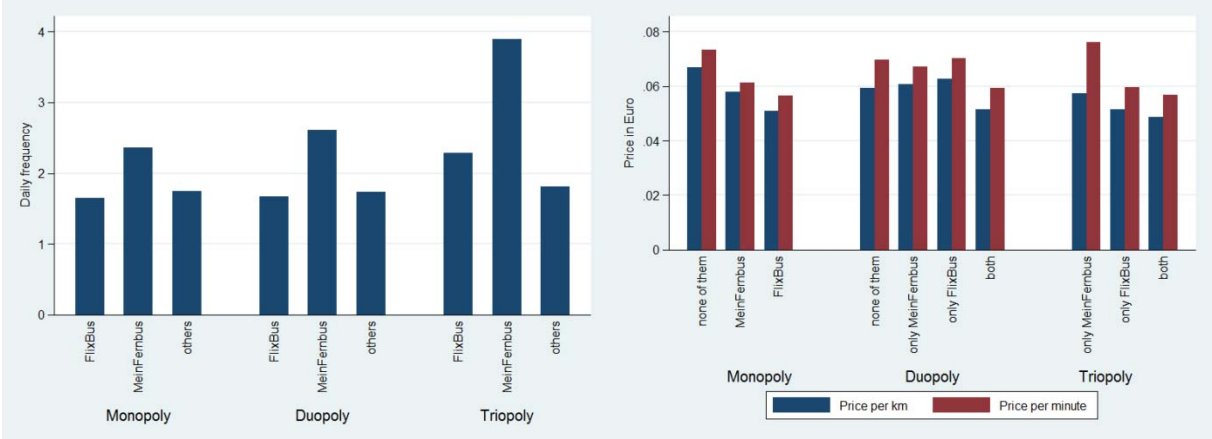

Figure 9: Daily frequencies and average prices of merging parties compared to other large providers[10]

The left-hand chart in Figure 9 presents the daily frequencies by number of competitors and differentiates between MeinFernbus, FlixBus and other providers. As expected, the average number of daily frequencies increases substantially with the number of competitors. More importantly, the chart reveals that MeinFernbus offers on average much higher daily frequencies than both FlixBus and the other providers. This not only leads to an increase in service quality (as more departures reduce the time span between the desired departure time and the actual departure time for the customers) but also promotes the company goal of MeinFernbus to become (or stay, respectively) the leading interurban bus brand in Germany.

Turning from daily frequencies to a second key competition variable in interurban bus markets, namely price, the right-hand chart in Figure 9 on the one hand generally shows the

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[10]   The figure largely follows Dürr et al. (2015).

decreasing average price trend associated with an increase in the number of competitors. [11] In line with the results reported in Figure 4 above, average prices are found to be highest (with an average of 0.059 EUR/km or 0.064 EUR/min) if only one provider is operating on the respective route and decrease significantly if a second (0.055 EUR/km or 0.063 EUR/min) and third operator (0.049 EUR/km or 0.058 EUR/min) is present. However, as revealed by the right-hand chart in Figure 9, the respective averages are hiding substantial between-firm variation as the breakdown between the merging parties and other providers found FlixBus (0.051 EUR/km or 0.056 EUR/min) to charge lower monopoly fares than MeinFernbus (0.058 EUR/km or 0.061 EUR/min). However, the average prices of both firms are clearly below the average prices of the remaining providers operating in the industry (0.067 EUR/km, 0.073 EUR/min).

Turning from monopoly to duopoly markets, it is shown that duopolies in which only other providers are operating (0.059 EUR/km, 0.070 EUR/min) charge similar prices than FlixBus (0.063 EUR/km or 0.070 EUR/min) or MeinFernbus duopolies (0.061 EUR/km or 0.067 EUR/min). Most importantly, however, routes on which the two merging parties directly compete against each other show the lowest average prices of about 0.051 EUR/km (0.059 EUR/min)[12] thereby suggesting noticeable (at least short-term) prices increases post-merger.

Interestingly, the picture partly changes if triopoly markets are analyzed. Now, FlixBus routes (0.051 EUR/km or 0.059 EUR/min) show lower average prices than MeinFernbus triopoly routes (0.057 EUR/km or 0.076 EUR/min) while routes in which both merging parties operate still show an average price below the two former (0.049 EUR/km or 0.056 EUR/min). Although these descriptive findings already point towards substantial differences in the pricing strategy of the merging parties, it is obvious that these descriptive results must be handled with great care – especially because they do not control for other potential drivers of price differences (see Dürr et al. (2015) for an investigation in a more sophisticated econometric framework).

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[11] The absolute numbers of routes in the respective categories are as follows: Monopoly MFB 451 routes, Monopoly FB 159 routes, Monopoly others 242 routes; Duopoly MFB 140 routes, Duopoly FB 98 routes, Duopoly MFB-FB 348 routes, Duopoly others 23 routes; Triopoly MFB 6 routes, Triopoly FB 12 routes, and Triopoly MFB-FB 223 routes.

[12] Although these differences, on the surface, appear to be negligible, they are in fact quite substantial. Assuming an average interurban bus trip length of 296.87 kilometers, the customer would face an average price of about 296.87 km * 0.061 EUR/km = 18.10 EUR in markets with presence of FlixBus only, compared to an average price of only 296.87 km * 0.051 EUR/km = 15.14 EUR in markets in which both merging parties are operating (i.e., an about 16.4 percent cheaper price).

In sum, although our descriptive results suggest (at least short-term) post-merger price increases for at least several groups of customers, for a number of reasons (beyond the general necessity of an econometric analysis) these findings do not allow the immediate conclusion that the merger should be classified as anticompetitive. First, from an antitrust perspective, it remains unclear whether the German interurban bus market constitutes an own relevant market or must be considered as a (rather small) fraction of a much larger transportation market (possibly including car sharing agencies, railway services etc.). Second, although our empirical results suggest short-term price increases, realized merger efficiencies might (partly) be passed-on to consumers through price reductions in the medium and long run. Furthermore, other providers of bus services might specifically enter markets in which market power has increased post-merger (and positive profits can be earned). Last but not least, it has been argued by industry experts (see, e.g., German Office for Goods Transport (2014), pp. 26ff.) that the current price levels in the industry do not allow making permanent positive profits. It is therefore partly believed that industry consolidation and a corresponding reduction of competitive pressures, e.g., through the proposed merger, is necessary to reach a sustainable long-term industry equilibrium. Due to the absence of detailed (firm-level) cost (and profit) data, we are unable to investigate the correctness (and relevance) of this argument any further.

4.2. Possible abuses of market power by incumbents

Complementary to the recent concentration activities among successful new entrants in the industry discussed in the previous section, the issue of potential abuses of market power by incumbents has been raised by new entrants on a regular basis. In particular, it has been argued that the incumbent railway company Deutsche Bahn AG is likely to misuse its market power in the railway market to distort competition in the interurban bus industry through their subsidiary company IC Bus. Although the allegations are multifaceted, a key concern of some new entrants are possible attempts by IC Bus to gain market share and eventually monopolize at least parts of the interurban bus market through low price 'predation' strategies.

In order to investigate whether our data supports such low price strategies by particularly IC Bus, we have to differentiate between two analytical steps. First, we have to compare the average prices on IC Bus routes with the average prices on other routes. Second, we have to investigate whether the prices set by IC Bus itself are noticeably lower than the prices set by the other providers operating on these routes. Figure 10 below presents the descriptive results for both sets of questions.
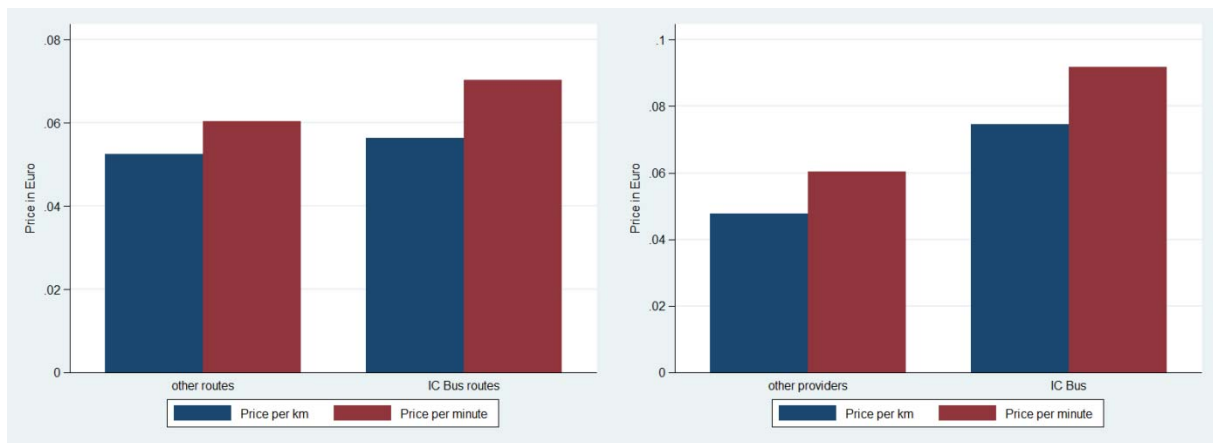
Figure 10: Average prices and price-setting strategies on IC Bus routes

As shown in the left-hand chart in Figure 10, routes with a presence of IC Bus have on average higher prices on both a per kilometer and a per minute basis than other (non-monopoly) routes (without the presence of IC Bus). Although descriptive in nature, these results speak against a particular low price 'predation' strategy of IC Bus. This basic conclusion is strengthened further if a differentiation between the average price set by IC Bus and the average price set by the other providers on the respective IC Bus routes is introduced. As revealed by the right-hand chart in Figure 10, the direct competitors of IC Bus set (on average) substantially lower prices than IC Bus itself. Although IC Bus is providing a higher quality product, it appears unlikely that the respective prices can be used as evidence for an anticompetitive behavior by IC Bus in the form of setting unusually low 'below cost' prices. In fact, it is the competitors of IC Bus that decided to price (on average) substantially lower on routes where IC Bus is present than on other routes. Without having any specific information on the motivations behind these pricing strategies, one possible explanation is that especially the new (but already powerful) recent entrants to the industry see IC Bus as a key danger to their future developments thereby deciding to (preemptively) set very low prices on routes where they directly compete against IC Bus.

From a more general perspective, it would also be premature to conclude from the fact that we did not find evidence for a predatory behavior of IC Bus that anticompetitive moves by the incumbent(s) have never appeared (and will never appear in the future). In addition to the important limitations of our study – being able to analyze prices of one leading online search engine for one week in November 2014 only – incumbents typically have more than one possibility to 'raise rivals' costs' and therefore to make the life of new entrants less pleasant. Examples include incumbency advantages in online booking – especially by being able to include IC Bus connections into the online railway booking tool of Deutsche Bahn AG – or

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preferred access to infrastructure facilities such as bus stations at (or near) the respective main railway stations. In that respect, it is therefore an important task of the German Federal Cartel Office not only to keep eyes and ears open for complaints by new entrants on possible forms of anticompetitive behavior by incumbent firms but also to be prepared to intervene in cases of sufficiently clear violations of competition law.

5. Conclusion

In this article, we have studied competition in the German interurban bus industry two years after its liberalization in January 2013. In addition to a brief characterization of the liberalization process and several general market developments, we have provided a detailed analysis of selected market characteristics such as concentration and competitive interaction, fares as well as service quality. We further used the gained insights to study and discuss two recent policy issues – industry consolidation and possible abuses of market power by incumbents.

Having in mind the limitations of our route-level data set – that only comprises detailed price and frequency information of one leading online search engine for one week in November 2014 – our results do support the hypothesis that competition in the German interurban bus industry is workable (and working). After liberalization, frequent firm and route entries have been observed leading to a quick extension of the respective route networks with the new entrants gaining the by far largest share of the market. Route-level concentration is – as suggested by standard Cournot-type oligopoly models – a key driver of the realized fare level (with lower average fares being realized on more competitive routes). Daily frequencies and service quality are identified as two other key competition variables that show substantial between-firm variation (reflecting different business strategies of the nine largest providers included into our analysis).

Furthermore, although our purely descriptive analysis suggest (short-term) price increases in the aftermath of recent industry consolidation events, it appears rather unlikely that (merger- or liquidation-induced) increases in market concentration will allow non-transitory increases in price. This has especially to do with the currently rather low level of entry barriers in combination with the largely price-elastic demand (that it likely to face several forms of intermodal competition by, e.g., car sharing agencies or railway services). With respect to the second policy issue discussed in this article – a possible misuse of market power by the incumbent Deutsche Bahn AG through its subsidiary company IC Bus – we did not find any supporting evidence for such a form of anticompetitive 'predatory' behavior. In fact, the

competitors of IC Bus appear to set substantially lower prices on routes with IC Bus presence compared to other routes. However, the absence of any evidence for predatory behavior of IC Bus does not allow the conclusion that incumbents will generally abstain from an implementation of so-called raising rival's cost strategies. As a consequence, the German Federal Cartel Office is well advised to keep eyes and ears open for complaints by new entrants about possible forms of anticompetitive behavior by incumbent firms.

From a more general perspective, it appears particularly important for the future development of the industry to assure that potential barriers to market entry in general and route entry in particular remain low. Taking experiences from other network industries into account, especially the access to existing infrastructure components – first and foremost the bus stations in the respective cities but also, e.g., feeder roads from the city centers to the highways (and vice versa) – must be granted on a transparent and non-discriminatory basis. Complementary, the extension of such infrastructure components must be considered as well – as soon as capacity limits become binding for a sufficient large fraction of the day, the week, the month or the year – in order to be able to realize further growth potentials and to keep interurban bus markets open for market entry and competition. Such competition is not only likely to discipline pricing behavior in the interurban bus industry itself but will also create important knock-on effects on the pricing behavior in adjacent industries – such as railways or car sharing agencies – which are likely to directly compete for the same group of (price-sensitive) customers.

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