Econometric and survey evidence in the competitive assessment of the Ryanair-Aer Lingus merger

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1. Introduction

Recently, the Commission prohibited the hostile takeover by Ryanair of Aer Lingus. The facts of this case differ from previous airline mergers assessed by the European Commission. This was the first time the Commission had to assess a proposed merger of the two main airlines in a single country, with both operating from the same “home” airport — Dublin. It was also the first time the Commission had to assess a merger of two “low-cost” airlines, operating on a “point-to-point” basis. Furthermore, the number of overlapping routes is unprecedented compared with previous airline cases. A comprehensive account of the Commission’s findings and assessment in this case is given in a complementary article in this issue (2). In contrast, this commentary focuses on the use of econometric and survey evidence to assess the non-coordinated effects of the merger (3).

From the Commission’s perspective an atypical and challenging feature of this case was that the merging parties both submitted separate econometric reports assessing the extent to which one merging firm imposes a competitive constrain on the other. At face value the results were contradictory:

- Ryanair’s results suggested that the presence of Aer Lingus in a route served by Ryanair has no statistically significant impact on Ryanair’s prices, whether a route is defined as an airport-pair (both airlines connect the same airports) or a city-pair (airlines fly to different destination airports close to the same city). In the view of Ryanair’s economists, this finding supports the claim by Ryanair that its business model is to target a passenger base that other (higher cost) airlines cannot profitably target. It follows that the strongest competitive constraint on Ryanair is not Aer Lingus but the price sensitivity of its customer base. Ryanair concludes that attempts by Ryanair to sustain higher fares would not be profitable — not because of switching to Aer Lingus but due to the fact that passengers, highly price focused, would rather choose not to take a flight on that particular occasion.

- In contrast, Aer Lingus econometric results indicate that on routes where both carriers are operating, Aer Lingus’ fares and load factor are systematically lower on average than on routes which are not served by Ryanair. Further evidence indicates that the reduction in Aer Lingus prices is greater when Ryanair is present on a route than when other carriers are present.

Confronted with such contradictory findings, and given the tight deadlines in merger control one may be tempted to dismiss these econometric reports as cancelling each other out. Quite generally this is a most inadequate response. Even more so in this specific case where in fact econometric evidence has provided a much deeper understanding regarding the competitive interaction between the merging parties.

Ryanair and Aer Lingus’ econometric results differ, largely for three reasons. First, they rely largely on internal data sources and therefore they use a different data set. Second, since each party only had access to its own prices they were in fact testing different hypotheses. Ryanair economists considered the impact of Aer Lingus presence on Ryanair’s prices whereas Aer Lingus economists assessed the converse. Finally, the merging parties relied on different econometric methodologies.

If the data set, the research hypothesis and the econometric methodology differ it is quite unsurprising that the results and conclusions also differ and may even appear contradictory. It was thus necessary for the Commission to conduct its own empirical analysis.

To assess the extent to which the merging parties impose a competitive constraint on each other pre-merger we chose to pursue two alternative but complementary research strategies:

(i) a price regression analysis based on a data set combining data submitted separately by the parties and the Dublin Airport Authority

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(2) “Ryanair / Air Lingus: even «low-cost» monopolies can harm consumers”, see page 65.
(3) Full details can be found in the annexes to the decision (upcoming in the Official Journal)
(ii) a passenger survey at Dublin airport designed specifically for this case (4)

In what follows we motivate the use of econometric and survey techniques in this case, we summarise the methodology and the main findings, with an emphasis on the rationale for placing more weight on certain results than others.

2. The Commission’s price regression analysis

Regression analysis is a statistical tool for understanding the relationship between two or more variables. Multiple regression analyses involves a variable to be explained — called the dependent variable — and additional explanatory variables that are thought to produce or be associated with changes in the dependent variable. The mathematical model of their relationship is the regression equation or regression specification, set by the researcher on the basis of his knowledge of the phenomenon to be explained. The dependent variable is modelled as a random variable because of uncertainty as to its value, given values of the independent variables. A regression equation contains estimates of one or more unknown regression coefficients which quantitatively link the dependent and independent variables. Once a regression equation is defined and an econometric methodology is chosen, the presence of a negative or positive relation between two or more variables and its magnitude (i.e. the sign and the value reported coefficient, respectively) completely rely on the data used for the estimation.

In interpreting the results of a multiple regression analysis, it is important to distinguish between correlation and causality. Two variables are correlated when the events associated with the variables occur more frequently together than one would expect by chance. A correlation between two variables does not imply that one event causes the second to occur. Therefore, in making causal inferences, it is important to avoid spurious correlation. Spurious correlation arises when two variables are closely related but bear no causal relationship because they are both caused by a third, unexamined variable.

Causality cannot be inferred by data analysis alone — rather, one must infer that a causal relationship exists on the basis of a theory that explains the relationship between the two variables. In this case, the theory of harm is that the merger between Ryanair and Aer Lingus may significantly impede effective competition in certain routes by removing important competitive constraints the merging parties exert on each other. The most direct effect of the merger will be the loss of competition between the merging firms, allowing the merged entity to exercise increased market power to the detriment of customers.

2.1. Hypotheses of interest

As is typical of no-frills carriers Ryanair’s pricing policy is geared to ensure that its planes carry passengers at least up to a certain percentage of total capacity (or target load-factor). Thus, if it were competitively constrained by the presence of Aer Lingus, it can be expected that Ryanair would offer lower fares on average when Aer Lingus is on the same airport or city pair. Conversely, if Ryanair imposes a competitive constraint on Aer Lingus we would expect that Aer Lingus fares are negatively affected by Ryanair’s continued presence. On the basis of this argument we derive two core hypotheses to be tested:

- The presence of Ryanair in the route is associated with a statistically and economically significant reduction in the fares of Aer Lingus;
- The presence of Aer Lingus in the route is associated with a statistically and economically significant reduction in the fares of Ryanair;

In addition a number of subsidiary hypotheses are of immediate interest:

- Aer Lingus and Ryanair exert on each other a stronger competitive constraint than any other existing competitor;
- The existence of an actual or potential competitor with a significant presence at the destination airport on a route originating in Dublin has an impact on (i) Aer Lingus’ prices and (ii) Ryanair’s prices;
- A stronger presence of one of the merging parties (in terms of number of frequencies) has a more pronounced effect on the other’s fares.

The next step is to select the most appropriate econometric methodology on the basis of the available data and to determine a regression equation which allows to validate or refute the identified hypotheses of interest. We recall that two types of error are possible in hypothesis testing. For example, we might accept the hypothesis that Aer Lingus and Ryanair competitively constrain each other even though it is false (leading to a “false conviction” — or type 1 error). The converse error is to reject this hypothesis even though it is true (leading to a “false acquittal” — or type 2 error).

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(4) Interviews were conducted by a specialised survey agency hired by the Commission but the processing and analysis of the responses was done by the Commission’s services.
Both types of error typically result from omitting important variables in the regression specification. For example, even if Aer Lingus’ fares appear to be lower on routes where Ryanair is present this relationship may be spurious. This may be the case if the presence of Ryanair is positively correlated with the presence of other competitors (for example because entry into these routes is easier). To some extent, this may be corrected by controlling in the regression analysis for the presence of other rivals — for example, by introducing a variable indicating the number of rivals in the route or even their identity.

In contrast, a regression analysis may fail to detect any impact of Ryanair’s presence on Aer Lingus’ fares when it exists. In cross-section regressions, in particular, this may occur because the threat of entry by one of the merging parties may be almost as strong as actual presence. Indeed, in such cases a cross-section comparison of Aer Lingus’ prices contingent on Ryanair’s presence leads to a negative result even though Ryanair constrains Aer Lingus by the mere threat of entry even if it is not actually active in the route.

In performing econometric analysis, the probability of incurring in type 1 or 2 errors could be high even if the model is correctly specified. Sometimes, indeed, the lack of important information or the unavailability of a sufficient number of observations may induce errors in establishing (or failing to detect) a relation between different events. The risk of making type 1 and type 2 errors is an important reason why regression analysis should be used only as complementary to the overall qualitative and descriptive assessment of the facts of the case.

2.2. Econometric methodologies

The Commission’s econometric specification and choice of methodology builds on the submissions of both Ryanair and Aer Lingus. All parties followed essentially the same strategy: to determine whether the presence of one of the merging parties on a route would have an impact on the prices of the other. Hence, the variable to be explained is the net average fare in a certain month on a given route; and the explanatory variable of interest is one that indicates that a rival firm was present (i.e. offered one or more flight services) in that same month and route. Other variables are added to “control” for other possible systematic influences on fares. These control variables refer to route characteristics that may affect demand or supply on that route.

The Commission considered two econometric methodologies.

(i) Cross-section regression analysis, which examines differences in prices across a number of affected routes at a point in time.

(ii) Fixed-effects regression analysis with panel data, which exploits the variation in market structure at individual routes over time.

Cross section regressions

Cross-section regressions use information on different market structures across routes, directly controlling for observed route specific factors that affect fares. The primary advantage of this methodology arises where market structure varies substantially across routes and where there are a large number of routes in the data. Ryanair’s expert economists focused essentially on this approach, using as samples the routes operated by Ryanair in different moments in time.

The disadvantage of using a cross-section approach is that it may not be possible to control for important but unobserved or unmeasured influences on price that vary from route to route. When important variables affecting price in different routes cannot be observed and are correlated with the explanatory variables included in the regression, the estimated coefficients can be subject to bias. This problem is often referred to as omitted variable bias.

We derived no definite conclusions from our cross-section regressions and thus the results from these regressions are not reported here (for details see annex 4 in the Commission’s decision). Essentially the reason we place no weight in our cross-section regression is that it is not possible to control for a number of unobserved factors that are likely to affect prices and differ across routes. Any coefficient estimates are thus likely to be biased in unpredictable directions. Further results are insufficiently robust to be relied upon given the small number of observations, (i.e total number of routes operated by Ryanair or Aer Lingus). Furthermore, the sensitivity of the results to the month considered and the fact that the inclusion of additional explanatory variables, even if statistically insignificant, sometimes affects dramatically the results of the overall regression cast additional doubts about the suitability of this method in this case.

Fixed-effects regressions

An alternative to making inferences about price effects from cross-sectional comparisons is to exploit the variation in market structure at individual routes over time. For example, the entry of Ryanair on a route dominated by Aer Lingus may affect the latter’s price (after controlling for
observable changes in other variables such as entry by other rivals). Effectively the method compares the level of Aer Lingus prices on a route after Ryanair entered, with the level before Ryanair entered. This before-and-after comparison is done systematically for all routes where Aer Lingus operates and thereby generates the average effect of Ryanair’s presence on Aer Lingus fares. Aer Lingus’ expert economists focused essentially on this approach.

The fixed-effects procedure compares the incumbent’s prices before-and-after entry of a rival within the same route. Such comparison can mitigate the omitted variable bias that affects cross-section regressions because many unobservable or non-measurable cost or demand factors affecting fares and varying across routes are not likely to vary over time within a given route (such as the type of destination, the popularity of the route according to purpose of travel, customer awareness, destination airport characteristics, number of alternative airports at destination, safety considerations, total duration of travel, air traffic regulations at country of destination etc). Thus, the primary advantage of fixed-effects regressions comes where most unobservable or non-measurable factors affecting price remain relatively stable during the sample period.

Fixed-effects regressions are suitable if there are sufficiently long time series for all the variables of interest and the variation in the data is enough to permit precise estimates of the relationship between price and presence of a rival. It turns out that there were many instances of Ryanair entering or exiting a route already served by Aer Lingus within the period of analysis (five years). In contrast, Aer Lingus had entered or exited routes where Ryanair was present in very few instances. A likely explanation is that Aer Lingus was taking the lead in the opening of routes out of Dublin with Ryanair following. In any event this pattern in the data meant that the fixed effects methodology was primarily suitable to assess the effect of Ryanair’s presence or capacity expansion on Aer Lingus’ prices.

The fixed-effects procedure is subject to two caveats. Firstly, it is based on the assumption that entry and exit decisions are exogenous, i.e. not decided on the basis of the competitors’ fares observed in the route right before the entry. This assumption may only be approximately correct. It is possible that a high Aer Lingus price on a route makes it profitable and so encourages entry and expansion by both Ryanair and its rivals. If so entry or expansion would be endogenous. If this was the case, there would be an inverse causal relation between the dependent variable, i.e. Aer Lingus fares, and the main explanatory variable, the presence of a competitor on a given route. In practical terms, this means that the estimates may be subject to some selection bias since they are conditional on the carrier being present on a given route.

A second problem is that the frequency variables, an alternative variable used as a proxy of the strength of the presence of a competitor, may also be possibly endogenous. It seems sensible, though, to assume that airlines set these frequencies at least a few weeks in advance and then optimize their pricing and load factors conditional on the pre-set frequencies.

In theory, these problems can be addressed by instrumenting the explanatory variables (7). The Commission has tested a number of candidate instruments included in the data set, such as intra-route frequency rank, own costs or own total frequencies at destination airport. However all these instruments turned out to have very poor properties.

2.3. Fixed-effects specifications

The baseline fixed-effects regression is as follows:

$$\ln p_{it} = \alpha_i + f(competition) + \sum p_j \cdot D_j + \delta_j X_{it} + e_{it}$$

Where:

- The dependent variable is the average net monthly fares of first Aer Lingus and then Ryanair.
- $\alpha_i$ is the route fixed effect (time invariant dummy variables = 1 for the route and 0 otherwise). The $\alpha_i$ dummy accounts for systematic but unobserved or non-measurable differences in costs or demand within that route.
- $f(.)$ is a function of competitor variables. These are the explanatory variables of interest.
- $D_i$ is a dummy for each time period (a month). The month dummies allows for an identification of cost shocks that affected all routes during the same time period.
- $X_{it}$ is a vector of cost and demand controls added in certain specifications

We run a number of alternative specifications that essentially differ in the competitor variables included. We first test a set of specifications where a dummy variable for the other merging firm and for other rivals present in the route is included.

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(7) For example, Evans, Froeb & Werden (1993) run a fixed effects IV model on the data of Evans & Kessides (1992). They regress price on route HHIs. As instruments they use a one-year lag of the route HHI. The coefficient more than doubles relative to the fixed-effects results obtained without instrumenting.
It is common in applied work for the dependent variable to appear in logarithmic form, with one or more dummy variables appearing as independent variables. When the coefficient on a dummy variable suggests a small proportionate change in the level of the dependent variable, the coefficient can then be interpreted as the percentage difference in the dependent variable. For example if the coefficient on Ryanair’s presence were to be -0.05, this would imply that the presence of Ryanair is associated with Aer Lingus charging on average 5% less than in routes where Ryanair is not operating.

Then we test an alternative set of specifications where the frequencies of the other merging firm and those of other rivals is included in logarithmic form (in addition to absence dummies(9)). This specification allows measuring the sensitivity of each firm’s fares to the strength of its various rivals in the route. In the “frequency” specification, the coefficient of interest is that of the (log) of frequencies of the other merging party. This coefficient can be interpreted as the elasticity of fares with respect to the number of monthly frequencies that a rival offers in the route. For example, if the coefficient is -0.2, this means that a 1% increase in a rival’s monthly frequencies leads to a 0.2% decrease in fares. It should be noted, however, this can not be compared to the estimated price effect given by the coefficient in the “presence” specifications. To estimate a comparable price effect from the “frequency” specification it is necessary to make assumptions regarding the competitive situation after the merger and make additional calculations. We applied for this purpose the same approach that was also followed by the US Federal Trade Commission in the Staples/Office Depot case where both the cross-section and fixed-effects approach were also used. In this case the regression specification was very similar to the Commission’s proposed frequency specification (7).

Whether focusing on presence of competitors or the strength of presence (i.e frequencies) we start with the simplest possible specification (or baseline) and gradually include relevant controls, paying particular attention to the statistical robustness and economic significance of the explanatory variables of interest.

In all cases, we employ a “robust regression” technique that controls for the influence of extreme observations, i.e. outliers. In substance, this technique assigns less weight to observations that are farther apart from the mean respect to the others in the computation of the output. We consistently used panel fixed effect estimation for all the regressions presented. In the present case, the introduction of fixed effect can capture differences across routes affecting price that are not explicitly considered as regressors. An alternative approach known as “random-effects” imposes the assumption that the route effect is uncorrelated with each explanatory variable. This assumption is often not valid in practice. As mentioned above, fixed-effects models offer the advantage that the route effect also captures all time-invariant factors affecting price and likely to be correlated with the exogenous variables. Comparing the “fixed effects” and the “random effects” techniques can be a test of whether there is correlation between the α and the explanatory variables assuming that the explanatory variables and the error term are uncorrelated across time periods. Hausman first suggested this test (9).

In order to test for the suitability of fixed-effects over random-effects in the present case, we use a Hausman test for all the regressions (9). A large value of the Hausman test statistic leads to the rejection of the null hypothesis that the route fixed-effects are uncorrelated with included explanatory variables and to the conclusion that fixed-effects


(9) Given a model and data in which fixed effects estimation would be appropriate, a Hausman test tests whether random effects estimation (i.e. with the α, uncorrelated with the explanatory variables) would be almost as good. The Hausman test is a test of the null hypothesis that random effects would be consistent and efficient against the alternative hypothesis that random effects would be inconsistent. It is important to point out that if we believe that α is uncorrelated with the explanatory variables then the coefficients of interest can be consistently estimated by using a cross-section. Hence, implicitly, the Hausman test also provides an indication of the suitability of the fixed effects model over the cross-sectional approach.

(9) The only drawback of the use a fixed effect model after a rejection of the null hypothesis in the Hausman test relies on the larger variance of our coefficient. Given that consistency is not at stake, and rejection concern very few cases, we have not taken into account a random effects model.
are present (that is routes differ significantly and these differences are correlated with the explanatory variables of interest — for example route distance might be correlated with the presence of Aer Lingus across routes). The replications of the test have confirmed the correctness of the fixed effect model in all relevant regressions (10).

2.4. Results from the Commission’s fixed-effects regressions

Our data set covers the period January 2002 to December 2006. The results from fixed-effects regressions on Aer Lingus price indicate consistently that Ryanair exerts a competitive constraint on Aer Lingus’ prices. In particular following hypothesis set out ex-ante are validated:

First, depending on the specification, the Ryanair’s presence is associated with Aer Lingus charging around 7-8% lower prices when considering city-pairs reflecting the Commission’s retained market definition and around 5% lower prices when considering airport-pairs. This effect is economically and statistically significant in all tested regressions. This result is also robust, correcting for the presence of outliers, heteroskedasticity and serial correlation. It is also highly robust to the use of alternative specifications including alternative demand and supply controls. Notably, in practically all cases the control variables in the different regressions have the expected signs and are statistically significant. The explanatory power of the regression is also high with R2 consistently above 80%.

Second, comparing the coefficients of Ryanair with that of flag-carriers and non-flag carriers, as well carriers with relative presence at Dublin such as Aer Arann and CityJet, Ryanair’s presence or number of frequencies have a much stronger economic impact (at least double) than that of any other type of carrier. In fact, in most cases the regressions indicate that the presence of other carriers has no economic or statistically significant effect on Aer Lingus fares.

Third, destination-based flag carriers exert only a very limited constraint on Aer Lingus. Destination-based non-flag carriers exert a higher constraint than flag based carriers. However, their constraint is around half or less than the constraint exerted by Ryanair on Aer Lingus retaining the Commission’s market definition. Moreover flag carriers, for instance are only present on 8 of the 37 overlap routes upon which Aer Lingus and Ryanair competed in May 2007, and tend to be much smaller than either Ryanair or Aer Lingus where they are present (especially for point-to-point passengers). Thus, contrary to Ryanair’s claim, it cannot be expected that the merged entity would be effectively constrained by flag or other non-flag carriers post-merger.

Fourth, measuring the strength of Ryanair’s presence using number of frequencies in the route as a proxy provides further confirmation that Ryanair constrains Aer Lingus. It is possible to examine the price change in overlap market only or across all markets under various assumptions. For example one can focus on the price effect on the last month for which data is available or the price effect on average over the full sample period. Depending on the specification the price effect of the merger implied by the Commission’s frequency regressions is around 5-6% (on average over all routes) or 10-12% (if only overlap routes are considered). This adds to the robustness of the results derived from the presence specifications. It is also worth noting that, as expected, Ryanair appears to impose a more significant constraint on Aer Lingus when it serves the same airport.

Next, we turn to describing our efforts in applying the fixed-effects procedure to test the influence of Aer Lingus on Ryanair prices, which has lead to very limited results. The Commission’s analysis indicates, as claimed by Ryanair’s economists that there is not sufficient variation, within a reasonable time period, in the presence of Aer Lingus in routes operated by Ryanair. The fixed-effects regressions with Ryanair’s prices as the dependent variable do not allow reaching conclusions with respect to the impact of Aer Lingus on Ryanair prices. This is because there are insufficient instances of Aer Lingus exiting or entering into a route where Ryanair was already present. In other words there is little variation in the presence of Aer Lingus on Ryanair routes. It should be emphasised, however, that this neither validates nor refutes the hypothesis that Aer Lingus exerts a competitive constraint on Ryanair’s prices (11). As a result the fixed-effects regression does not provide reliable estimates of the possible impact of Aer Lingus’ presence on Ryanair prices. In contrast, there are many instances of Ryanair entering/exiting routes in which Aer Lingus was present.

(10) For a relevant part of the frequency specifications, the standard Hausman test was not able to compute the matrix of the difference of the disturbance variances. In order to get around this problem, we have run the test as an f-test as presented in Wooldridge (2002), pp.290-291.

(11) In order to capture more events of Aer Lingus entering, the extensive data set has enabled the Commission to consider a longer time period, starting from April 1997. While in fact Aer Lingus’ presence has a significant negative effect on Ryanair’s prices in that regression, for a number of reasons — as set out in Annex 4 — the Commission does not give weight to this result.
already present. Hence the fixed-effects procedure is very well-suited to assess whether Ryanair’s presence is negatively associated with Aer Lingus prices.

Finally, it should be noted that the effect of Ryanair on Aer Lingus prices is likely to be underestimated. The presence of Ryanair in Dublin exerts a potential competitive constraint on Aer Lingus. On routes out of Dublin where it is the only carrier, it can be expected that Aer Lingus sets prices which are lower than what it would charge if Ryanair had no Dublin base. Since the regression analysis considers only fares’ overtime variations within each route and only captures price reductions subsequent to Ryanair’s entry, this potential competition constraint does not show up in the empirical results.

3. The Customer Survey

The Commission’s investigation indicated that Ryanair and Aer Lingus compete largely for the same pool of customers and competition takes place via a differentiated product offering in which a lower price reflects a lower quality product and a higher price reflects additional features. This implies that price is only one of various parameters of interest in the competitive assessment. For example, in the presence of Aer Lingus, Ryanair may not lower its fares but may be forced to increase the quality of its service or reduce the price of ancillary services. A regression analysis on fares is thus unlikely to capture the full extent to which the merging parties may exert a competitive constraint on each other. Moreover, on the basis of the available data the fixed-effects methodology lead to conclusive results only with respect to the impact of Ryanair on Aer Lingus prices.

In part to address these concerns the Commission took the initiative to conduct a passenger survey. The goal of the survey was to test (i.e. validate or refute) Ryanair’s claim that the Merging Parties do not constrain each other because Ryanair serves customers that in the event of a price increase would choose not to fly rather than fly with Aer Lingus. A further advantage of the passenger survey is that it would not be appropriate to consider mainly the views of so-called time-sensitive passengers as was the case in for example the Air France/KLM and Lufthansa/Swiss transactions. It was important for the Commission to try to ascertain, to the extent possible within the constraints of the Commission’s investigation, the views of individual customers directly.

The questionnaire was designed by the Commission, after consulting the parties on a draft, and implemented by a specialised external contractor over a 10 day period. The Commission processed the responses and analysed the results.

The Commission proposed the contractor a sample of routes of short haul flights from Dublin to EU destinations divided into different categories. Category A included the routes where both carriers operated into the same airport. Category B included routes in which Aer Lingus and Ryanair operated into different airports. Finally, category C involved routes in which also other carriers operated. From that list of different routes the contractor chose four of each category in a way so as to ensure that it would be possible to minimise the number of days required to conduct the interviews in view of the scheduled departure dates and time of the relevant flight.

Given the tight deadlines and the need to collect a sufficiently large and representative sample of responses the questionnaire was intentionally short and all questions were multiple choice (that is, the questionnaire includes no open-ended questions). It takes between 5 and 15 minutes to fully answer the questionnaire. Importantly, no questions were asked that would allow the Commission or any party with access to the responses to trace the identity of the respondent. The fieldwork was done between the 1st and the 10th February and the data was sent to the European Commission the 13th February. In total 2674 questionnaires were collected.

Though initially supportive, Ryanair, afterwards raised several criticisms regarding how the customer survey was designed and conducted. In particular Ryanair argued that it was deficient since it was undertaken on a self-completion basis and questions were ambiguous so as to require knowledge on the part of the respondent that could not be assumed existed. This and related concerns are unfounded. First self-completion questionnaires are a standard technique to gather information from consumers in all sectors, including air travel. Second, all questions used simple and clear language and refer to the respondents own actions, perceptions and beliefs. The results we obtained and briefly summarise below are clear-cut and reliable given the absence of any significant source of systematic bias.

3.1. Results

Overall the customer survey indicates that customers consider Aer Lingus and Ryanair as the closest competitors in terms of product offering on routes to/from Ireland. In particular, when customers were asked which other airlines they have considered when planning their journey, the survey shows that overall the main alternative considered by both Ryanair and Aer Lingus
customers are the other party. For instance, table below summarises the (weighted \(^{(12)}\)) responses by carrier to question 8: Which other airlines, if any, did you consider using for this route?

<table>
<thead>
<tr>
<th>Did you consider?</th>
<th>Flying with Carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ryanair</td>
</tr>
<tr>
<td></td>
<td>Count</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>No</td>
<td>1167</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td>Aer Lingus</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>695</td>
</tr>
<tr>
<td>Yes</td>
<td>472</td>
</tr>
<tr>
<td>Other Carriers</td>
<td></td>
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<tr>
<td>No</td>
<td>1015</td>
</tr>
<tr>
<td>Yes</td>
<td>152</td>
</tr>
<tr>
<td>None</td>
<td></td>
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<td>699</td>
</tr>
<tr>
<td>Yes</td>
<td>467</td>
</tr>
</tbody>
</table>

The table shows that the percentage of Aer Lingus passengers that considered Ryanair as an alternative is 34.5%, that is, slightly more than 1/3. It is significantly above the 8.8% of Aer Lingus passengers that considered any other carrier. Furthermore, when considering only Aer Lingus passengers that stated that they do not always travel with Aer Lingus the percentage that considered Ryanair increases to 62.3% (not reported).

The percentage of Ryanair passengers that considered Aer Lingus is even higher at 40.4%. In contrast only 13% of Ryanair passengers considered any carrier other than Aer Lingus.

Interestingly there is also certain symmetry in the responses by passengers of Ryanair and Aer Lingus. This further suggests that the competitive constraint that both carriers impose on each other is symmetric \(^{(13)}\). This is relevant because, in contrast to for example the Commission’s regression analysis that focuses on the impact of presence of one firm on the prices of the other, respondents to the survey were not asked whether they considered the other carrier on the basis of a particular dimension (e.g. price).

The results hold also when distinguishing between different customer groups (as business or leisure travellers) or between different reasons why passengers bought a ticket. A further indication is the number of Ryanair passengers that have selected Best price, Best time, Close Airport and Punctuality (the four most popular reasons) and whether they had considered Aer Lingus and other airlines (all aggregated). Of the 860 passengers that indicated they had chosen Ryanair because it offered the best price 44.4% considered Aer Lingus as an alternative, as opposed to 14.7% who considered carriers other than Aer Lingus. The same pattern is apparent whether the respondent’s preference for Ryanair is due to the fact that it offered a good departure time, the destination airport was conveniently located or punctuality.

The results are similar when one looks at Aer Lingus customers. Aer Lingus passengers also seem to have a strong preference for Ryanair as an alternative again irrespective of the reason why they have selected Aer Lingus in the first place.

\(^{(12)}\) To weight the sample we used as an estimate for the population size at route level the weekly average number of passengers on that route (from Dublin Airport Authority data on yearly number of passengers). The table therefore reproduces the raw results correcting for the over-sampling or under-sampling in each route.

\(^{(13)}\) Note also that passengers travelling with airlines other than the merging parties considered more often Aer Lingus than Ryanair. This is consistent with the hypothesis that Ryanair is less constrained by airlines other than Aer Lingus.

\(^{(14)}\) Results based on raw (i.e. unweighted) data.
4. Conclusion

The Commission’s price regression analysis based on a fixed-effects technique confirms and complements findings relying on qualitative evidence that Ryanair and Aer Lingus are close competitors.

The results clearly indicate that Aer Lingus prices are currently constrained by competition from Ryanair. This finding alone implies that post-merger as predicted by standard “non-coordinated effects” analysis \(^{(15)}\), both carriers would internalise the effects of setting higher fares on each other. In particular, the merged entity would have the incentive to set higher fares for Aer Lingus as most of the customers lost would be captured by Ryanair. The loss of post-merger competition on Aer Lingus is in itself a major cause for concern from the transaction.

Moreover both economic theory and qualitative evidence suggest that Ryanair might also be constrained on parameters of competition other than price. A number of factors can affect the reciprocal influence of one firm on the other. For example, Ryanair may have a particularly strong effect on Aer Lingus’ prices, due to its low-price strategy and its recent and aggressive entry into Aer Lingus routes out of Dublin. Conversely, Aer Lingus may have little impact on Ryanair’s prices but a significant effect on its frequencies or load factors. Furthermore, Aer Lingus may also affect Ryanair’s decisions regarding the expansion of its network out of Dublin. It may force Ryanair to increase advertising, and reduce prices of its ancillary services, which in certain routes may contribute to a very significant proportion of total profits on that route. Thus, it is possible that the constraints imposed on each other are asymmetric in nature but not in strength. Price regressions provide little insight into such effects. In contrast, the results of the passenger survey partially confirm this argument: overall, more than 1/3 of the customers of either merging party considered the other as an alternative.

\(^{(15)}\) See for example paragraph 24 in the Horizontal Merger Guidelines.