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I.O. and Competition Theory

COMPETITIVE EFFECTS OF HORIZONTAL MERGERS IN THE EUROPEAN AIRLINE INDUSTRY: THE RYANAIR/AER LINGUS CASE

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1. Introduction

Every year the European Commission receives around 300 merger requests. Most of them are cleared without any problems however a few of them require special attention as they raise some competition concerns. In these cases, the Commission carries a careful assessment and, if necessary, decides whether or not the merger should be allowed. In the second case, the proposing parties can propose remedies aimed at clearing the competition concerns. This pattern seems to be very common in the airline industry after the deregulation of 1997 and the 2004 review of the Merger regulation by the Competition Authority.

I will review and re-evaluate how mergers affect competition in the airline industry with a particular focus on the attempted merger between Ryanair and Aer Lingus in 2007. I argue that the final decision taken by the commission of prohibiting the merger was necessary in order to impede an increase in prices in the overlapping routes. Such an increase would have harmed consumers.

To support my hypothesis, I will use three main instruments: (i) the European Commission's (2007) report, (ii) an empirical study made by Gaggero and Piga (2010) and a theoretical model on horizontal mergers in Cournot oligopolies developed by Farrell and Shapiro (1990).

The discussion will be articulated in six chapters. In chapter two I will briefly explain the general notions of horizontal mergers and remedies. In chapter three, I will move onto the airline industry and some facts about the mergers in the last decade. Chapter four will be the core chapter and will be divided into three subsections. The first will introduce the case, the second will describe the situation that would arise if the merger was approved and the third will describe and compare the empirical analysis and results by the European Commission (2007) and Gaggero & Piga (2010).

Chapter five presents the model created by Farrell & Shapiro (1990) and applies it to the case at hand. Chapter six presents the industry specific remedies, which issues could they solve and ultimately analizes the commitments proposed by Ryanair.

Finally, chapter seven presents the conclusions.

2. Brief theoretical introduction of horizontal mergers and remedies

2.1 Horizontal mergers

Horizontal mergers are defined as mergers between firms of the same industry. Their objective should be to increase economies of scale, thus reducing the average production cost and, ultimately, the price of the product (or so economic theory says). However, the new merged firm will most likely have more market power than the single firms. In a very competitive market with many small sized firms such thing would not be an issue. Nonetheless, in a more concentrated market where few firms own a considerable amount of market shares, a merger might be detrimental to the competition of that industry.

The role of anti-trust¹ authorities in horizontal mergers is to evaluate whether the positive effect brought by efficiency gains, if any, can outweighs the negative effect caused by a diminishing competition in the industry. In other words, a merger should be approved if and only if the total social surplus after the merger is larger or equal to the dead-weight loss caused by it. The first economist who introduced this concept was Williamson (Williamson, 1968).The "Williamson trade off", as it was later called, is represented in the picture below.



Figure 1 The Williamson trade-off

¹ Anti-trust authorities is the term used in the USA to indicate *competition authorities*, therefore I will use them as synonyms throughout this thesis.

In an ideally competitive industry where price equals to marginal cost, the economy would reach the equilibrium E. Suppose a merger between two participants occurs and efficiency gains are created; i.e. the marginal cost drops to c'. Also, suppose that thanks to the increase in market power of the merged firm, price rises to p'; the new equilibrium reached is F. Total surplus before the merger is the area ABE while total surplus after the merger is ACDF. The difference between pre-merger and post-merger is given by the difference of the two shaded regions, where the light one is the new gain while the dark one is the dead-weight loss caused by the merger. In this model, whether the merger should be allowed or not depends on which area is the biggest: only if the light area is bigger or equal to the other one the merger should be allowed.

This model is very simple and straightforward but there are a few underlying assumptions that rarely match the real world. First, the price is seldom equal to marginal cost. Second, the model does not take into account differences across firms and it assumes that all the firms have the same marginal cost before and after the merger. Third, the model considers price as the only factor that affects competition among firms in the same industry, ignoring other strategic decisions such as investment capacity and R&D.

Nonetheless, economically speaking, its main idea still hold true: whether or not a merger should be approved depends on the net welfare after the merger. Unfortunately, there are two main issues that hinder the application of this model: first, it is very hard to accurately calculate the efficiency gains and losses from a merger. Since there is a problem of asymmetric information, the merging firms have strong incentive to overstate the gains in order to convince the anti-trust authority. Therefore, said authority will tend to doubt the data provided by the merging firms as well as data provided by competing firms that oppose the merger.

Second, many competition authorities (including in U.S.A. and E.U.) focus on changes in consumer surplus, rather than on total welfare. That is, even if a merger would marginally diminish consumer surplus but greatly increase producer surplus, they would tend to reject it.

Therefore, the analysis generally shifts to how much the merger can damage the competition and thus the consumers.

There are mainly two cases in which a merger should be stopped. First, if the merged firms are likely to obtain *unilateral effects* that allow them to raise the price through their

newly acquired market power. Second, if the merger is likely to favour collusion in the post-merger industry.

As defined in the Report for the third ICN annual conference in Seoul,

"Unilateral effects arise when the merged group is able profitably to reduce value for money, choice or innovation through its own acts without the need for a co-operative response from competitors."

In other words, unilateral effects are likely to arise when the merged firm has high market power (market power depends on various factors, such as market concentration, market share, capacities, entry barriers and demand variables²). In such cases, the firm is able to raise the price of its product with no harm to its profits, resulting in a reduction of consumer welfare.

In the second case, a merger might favour pro-collusive (or coordinated) agreements (either explicit or tacit) in two ways: first, by reducing the number of firms in the industry, it is more likely that these firms will collude; second, a merger between two small firms might result in merged firm with similar assets to the other players. Thus, as competition theory suggests, when a market has a few firm with similar assets it is likely for these firms to collude and decrease consumer surplus.

Whichever is the case, competition authority will block a merger if they think it will harm consumers. However, in order to convince the anti-trust authorities merging parties can try to forfeit some of their assets in favour of competitors or take other arrangements that will decrease their market power and benefit competition. Such devices are commonly referred as "remedies".

2.2 Theory on remedies

Remedies are commitments that the merging firms take on in order for the merger to be cleared. In the last ten years, the importance of remedies in merger cases in the EU has risen. On average, in the last fifteen years, six percent of the cases were cleared subject to remedies.

² For an explanation of these factors and how they influence market power see Motta (2009), p. 115-135 & 235-238

Table 1 Merger cases notified to the EC. Source: European Commission, Statistics on merger cases

Years	1994	1999	2004	2009	2014
Cases notified	95	276	247	259	303
Remedies (phase I)	2	16	12	13	12
Remedies (phase II)	2	7	4	3	5

Moreover, there are some markets in which the percentage of cases compatible with commitments is much higher. For instance, in the Airline Industry about half of the cases proposed since 2004 have been approved subject to conditions.

Table 2 Merger decisions by EC in the Airline Industry from 2004

Merger approved	Merger subject to conditions	Merger prohibited
		Ryanair-Aer Lingus
KLM-Martinair (2008)	Air France-KLM (2004)	(2007)
		Olympic-Aegean
Lufthansa-bmi (2009)	Lufthansa-Swiss (2005)	(2011)
British Airways-Iberia		
(2010)	Lufthansa-Eurowings (2005)	
Olympic-Aegean (2013)	Lufthansa-SN Brussels (2008)	
	Iberia-Vueling-Clickair (2009)	
	Lufthansa-Austrian Airlines	
	(2009)	

Remedies can be divided in two categories: *structural* remedies and *non-structural* (*or behavioural*) remedies.

Structural remedies change the allocation of assets and property rights. They range from partial divestiture of a part of the business to full divestiture of an entire sector or brand. They are irreversible and therefore the anti-trust authority must carefully consider them. Suppose that the firm that ends up buying the divested part of the merging firm has strong incentives to collude with the latter or is not powerful enough to be a threat to it; then the remedy will hurt the consumer and being irreversible, the damage cannot be undone. On the other hand, structural remedies have the advantage that, once undertaken, they do not need to be monitored by the competition authority.

Behavioural remedies set constraint on the assets and property rights. They are long-term commitments that may be bound by contracts and need constant monitoring from the anti-trust authority and therefore entails higher costs. As such, they are usually less preferred by the authorities but they have the advantage to be reversible.

When deciding on a horizontal merger case, the anti-trust must consider which remedy is more fitted for that specific case. It is also possible to propose a mix of different remedies. In some industries, there exists a set of common remedies that are usually applied in the majority of the cases. In the next section, I will introduce remedies specific to mergers in the airline industry with a focus on the European market.

3. Mergers in the European airline industry

3.1 The industry

The European airline market has been transforming since two decades ago. Before the full deregulation of the market in 1993, international routes were monopolized by national flag carriers thanks to the restrictive bilateral Air Service Agreement. These carriers, owned for the most part by the state, had little to no competition and had little care of running efficiently as it is for many state owned companies. One good example would be Alitalia, which has incurred significant losses while under state ownership.

After the deregulation of 1993, entry was made easier and flag carriers' privileges were reduced. New entrants started to operate between small airports, mainly because bigger hubs were already full. Many so-called low cost carriers (LCC) were formed. While covering similar routes to the full service carriers, they adopted the "no-frills" business model. They reduced the number of services offered (such as free snack during travel, free checked baggage and less leg space) and at the same time they charged lower prices. The most known LCCs are the Irish Ryanair and the British EasyJet. Nowadays, some of them operate also from main airports (for example Ryanair from Rome Fiumicino and EasyJet from Amsterdam Schiphol); however their core business is still based on smaller airport that have lower cost and allows them to compete with full service carriers (FSC) without directly competing on the available slots. In fact, when assessing market share and market power the Competition authority has to take into account not only airport-

pairs (i.e. Rome Fiumicino/Milan Linate) but city pairs (i.e. all the airports close to Rome that connect to any of the airports close to Milan).

The airline industry provides a good testing ground for competition theory. Each route can be considered a separate market (Kim & Singal, 1993); moreover, it is possible to retrieve the necessary data with some ease on internet. The prices³ of the flights can be found on the web sites of the companies and data about the average number of passengers are released by the firms and the authorities. With all the data available, it is possible to carry out an analysis on the effect of a merger by comparing the pre-merger prices with the post-merger ones. Moreover, given that each route is a separate market, it is also quite interesting to compare routes affected by the merger with a control group made of routes not affected by the merger⁴.

Many economists have carried out such analysis to determine the benefits and losses brought by some mergers. Kim and Singal (1993) studied the deregulated American airline transportation market. They hypothesized that an increase in concentration after a merger can have two opposite effects: efficiency effect⁵ and market power effect. The former will cause a decrease in prices while the latter an increase. In order to understand which effect prevails, they investigated the correlation between price change and market concentration change in 14 airline mergers in the period 1985-1988, when the American Department of Transportation (DoT) "did not deny any of the mergers proposed for approval" (Kim & Singal, 1993, p. 552). The authors found that in mergers between "normal" firms, i.e. firms that are not in financial distress, the market power effect tends to prevail, even though it is partially offset by the efficiency gains.

Another similar study was conducted by Claudio Piga and Paul Dobson in 2008. They concentrated on the European airline industry and in particular low cost carriers; they studied the mergers between Ryanair and Buzz on the one hand, and EasyJet and Go Fly on the other. Their research tries to understand whether these mergers were beneficial for the consumers. They also put emphasis on business model assimilation. In this regard, they showed that both Ryanair and EasyJet quickly imposed their business model and in

³ In the USA the prices can also be retrieved in a dataset created by the DoT

⁴ The routes affected by the merger are those routes in which the merging parties were competitors. It also includes city-pairs.

⁵ In an airline merger, efficiencies such as synergies can be obtained only on those routes or airports shared by the merging parties. If the merging firms share none, it is very unlikely that efficiency gains will be observed.

particular their yield management model onto the acquired firms. The result was that both mergers benefitted the consumers. The authors attribute this finding largely on the ability of the acquiring LCC to transmit quickly their more efficient yield management and pricing systems to the acquired firms⁶.

3.2 The mergers

After the deregulation, the European market was full of small carriers. Some were new entrants and some were the national carriers of small countries. The market was rather



fragmented and because of the new and more efficient entrants some incumbents were obliged either to exit or to merge. Since 2004, 12 merger requests were filed to the European Commission⁷. Half of them have been approved

subject to remedies. If compared with the 6% average of all the mergers, it is clear that in the airline industry remedies are quite used.

When two airlines merge, there are a few benefit that can arise. For instance, the merged entity can reduce unit costs by centralizing some departments like marketing or by reducing the personnel stationed at each hub. Moreover, by acquiring more routes, the merged entity is able to offer more alternatives to the consumers by adapting the schedule in such a way that passengers can switch from one flight to the other more efficiently. For example, assume that passenger P need to travel from A to C, passing through airport B. Before the merger, the routes A-B and B-C are operated by different carriers (respectively by carrier 1 and 2) with different time schedules. P needs to book two separate flights, check in twice, and eventually pick up its baggage at airport B in order to embark it with carrier 2. This whole process requires both time and money. However, if 1 and 2 were to merge, then P would save on booking costs⁸ and save time at airport B.

⁶ This paper will be recalled in later chapters.

⁷ There are other mergers that have been filed to national anti-trust agencies such as the EasyJet/GoFly one.

⁸ Credit card costs and the likes.

Nevertheless, horizontal mergers always reduce the number of competitors (either actual or possible) in the industry thus increasing the market concentration and the market share. Whether this is detrimental or not to competition, it depends on the degree of market power of each of the merging firms and the situation of the market itself, i.e. the number and power of competitors.

Once the market is defined (for the airline industry corresponds to city-pairs⁹) it is possible to find the competitors and assess their respective powers. Following Fichert (2011), I present the possible cases that can arise given the pre-merger situation.

First, there is the case in which both merging parties are active competitors. If they have no other competitors i.e. they form a duopoly, as for example in the Paris Charles de Gaulle Airport/Amsterdam pair in the AirFrance/KLM merger, their union will create a monopoly in that market. A similar result will be obtained if they have a small competitor without enough market power to hinder them. However, if this competitor was powerful enough, then the merger might not cause any distortion caused by market dominance¹⁰. If the two airlines are competitors but do not possess high market power (which means that there are more powerful competitors in the market) then the merger is unlikely to cause harm.

Second, only one of the merging parties is present in the market. If one firm has a monopoly or market dominance in a city pair market and the other is a potential competitor, then the merger will strengthen market dominance. Otherwise, if the other firm is not a potential competitor¹¹, the merger will not increase the market power and thus should not affect prices. Figure 3 summarizes these points.

⁹ Some economists consider trains and cars as close substitutes for airplanes. However, as the distance increases, the degree of substitutability decreases. Therefore, I will exclude intermodal competition from this paper.

¹⁰ As I already explained above, in this case there will be a more uniform distribution of assets in the market that will increase the incentives to collude.

¹¹ Some economists have observed that in the airline industry there is an increase in market prices given an increase in concentration that is not caused by the increase in market power in single markets, i.e. price increases even for those routes that are not affected by the merger. Kim and Singal (1993) suggest that this phenomenon might be explained by multimarket contact. In support of their view, they write: "Alfred E. Kahn (1950) and Corwin D. Edwards (1955) advance the notion that when firms face each other in a web of markets, they compete less vigorously by allowing each other more or less exclusive spheres of influence" (Kim & Singal, 1993).



In the airline industry, as it was said before, each city-pair is considered a market. This particular fact has its pros and cons when analysing a merger. On the one hand, the competition authority has to study each case separately which requires a lot of time and resources. For example, in the Ryanair/Aer Lingus case more than 20 city-pairs were analyzed singularly.

On the other hand, it is possible, in theory, to identify those markets in which a threat to competition would appear and to apply specific remedies without prohibiting mergers that could also benefit the consumers.

For instance, let us assume that a merger could bring forth efficiency gains but there are a couple of routed in which market dominance would be attained. The competition authority could identify these routes and approve the merger subject to remedies such that this threat to competition would disappear.

In the next section, I will briefly introduce some industry specific remedies and the cases in which they are needed.

4. The case: Ryanair/Aer Lingus mergers

4.1. An introduction

Ryanair and Aer Lingus are the largest carriers based in Dublin, Ireland. The former has had a huge growth and success thanks to its pioneering in Europe of the so-called "no-frills" business model. The latter is the Irish flag carrier. Ryanair tried to take over Aer Lingus three times in the past decade. Its first attempt was in 2007 but the European Commission decided to prohibit the hostile takeover. The second attempt was made in 2009 but the company itself decided to withdraw the request. The third and last attempt was made in 2013. After many revisions, the commission finally prohibited the merger. In the following sections, I will analyze the threat posed to competition and the proposed remedies. As specified by European Commission (2013), the two mergers, namely Ryanair/Aer Lingus I and Ryanair/Aer Lingus III¹², are very similar in terms of threats to competition and correlation between the merging parties' prices. I will be focusing on the first case (Ryanair/Aer Lingus I, 2007) because of the greater number of comparative studies conducted by other economists. The main paper that will be used as reference, apart from the European Commission (2007), is Gaggero & Piga (2010).

4.2 The initial phase of the merger evaluation

When the merger was proposed, Ryanair and Aer Lingus were the two largest airlines based in Ireland carrying about 80% of the total number of passengers passing through Dublin.

The first step in the analysis of this (and any) merger is to define the relevant market. Economic theory tackles this problem by asking a simple question:

"Would a hypothetical profit-maximizing monopolist impose at least a small but significant (around 5%) and non-transitory increase in the price of the product given the pre-merger prices of other products?" (Whinston, 2007)

In the airline industry, the relevant market is often identified with the "origin and destination" (O&D) approach. It defines the point of origin and the point of destination¹³

¹² I do not take into account the second case since it was withdrawn.

¹³ Both point of origin and point of destination could be made of a single airport as well as an entire area and may include also other means of transportation.

(basically a route) as a market on its own. The commission for this case found that "Following a small but significant and non-transitory price increase, these customers would not change their travel plans and choose another destination from Ireland" (European Commission, 2007). There still remain the issue of whether the O&D market should be limited to airport-pairs or should be extended to city-pair. In order to solve this problem, the commission analysed every route that was affected by the merger, taking into account among other factors distance between airports, other means of transportation and the consumer survey. As a result, city-pairs were preferred to airport-pairs consistently also with other studies¹⁴.

Out of all the markets analysed, the commission found that the merging parties had 35 overlapping routes¹⁵ of which 33 originated from Dublin. The market shares for each city pair were calculated on the basis of the capacity operated on the route (seats per week). Table 3 shows a complete list taken from European Commission (2007) with the airlines market shares and competitors.

Route	Ryanair ¹⁶ (%)	Aer Lingus (%)	COMBINED (%)	Existing competitors
Dublin - Alicante	50-60	40-50	Almost 100 ¹⁷	
Dublin - Barcelona	40-50	30-40	70-80	Iberia/Clickair
Dublin - Berlin	50-60	40-50	100	
Dublin - Bilbao/Vitoria	50-60	40-50	100	
Dublin - Birmingham	60-70	30-40	100	
Dublin - Bologna	50-60	40-50	100	
Dublin - Brussels	50-60	40-50	100	
Dublin - Edinburgh	70-80	20-30	100	
Dublin - Faro	40-50	50-60	Almost 100	
Dublin - Frankfurt	40-50	40-50	80-90	Lufthansa
Dublin - Glasgow	50-60	30-40	90-100	Loganair
Dublin - Hamburg/Lubeck	60-70	30-40	100	
Dublin - Krakow	30-40	40-50	70-80	SkyEurope
Dublin - London	40-50	30-40	70-80	BMI, British Airways, CityJet

Table 3 Routes with existing overlaps between Ryanair and Aer Lingus with market shares of existing competitors; Summer 2007. Source: European Commission (2007)

¹⁴ However, in the commission's econometric assessment both market definitions were used to cover for all possibilities.

¹⁵ From now on "route" will be used as a synonym of "city-pair" unless specified otherwise.

¹⁶ All the market shares are expressed in range form to avoid disclosure of sensible information.

¹⁷ When "almost 100" appears, it means that there is a miniscule part of the share that is taken by charter companies.

Dublin - Lyon	30-40	60-70	Almost 100	
Dublin - Madrid	20-30	30-40	60-70	Iberia
Dublin - Malaga	30-40	60-70	Almost 100	
Dublin - Manchester	70-80	20-30	90-100	Luxair
Dublin - Marseille	50-60	40-50	100	
Dublin - Milan	30-40	60-70	Almost 100	
Dublin - Newcastle	70-80	20-30	100	
Dublin - Paris	40-50	30-40	80-90	AF/CityJet
Dublin - Poznan	60-70	30-40	100	
Dublin - Riga	40-50	20-30	70-80	Air Baltic
Dublin - Rome	40-50	50-60	100	
Dublin - Salzburg	50-60	40-50	Almost 100	
Dublin - Seville	50-60	40-50	100	
Dublin - Tenerife	50-60	40-50	Almost 100	
Dublin - Toulouse/Carcassonne	60-70	30-40	100	
Dublin - Venice	40-50	50-60	100	
Dublin - Vienna/Bratislava	20-30	50-60	70-80	SkyEurope, Austrian Airlines
Dublin - Warsaw	30-40	30-40	60-70	LOT, Norwegian Airline Shuttle
Shannon - London	50-60	40-50	100	
Cork - London	50-60	40-50	100	
Cork - Manchester	40-50	10-20	60-10	bmibaby, Aer Arann

After the merger, the new entity would have had a monopoly in 22 routes and achieved a market share of more than 60% on the remaining 13 routes. While market power, the ability of a firm to raise its prices above marginal cost, is at its peak in a monopoly¹⁸, it is still uncertain whether a high market power is possessed by those firms with high market share. However, when the latter surpasses a certain threshold, market dominance can be presumed. The UK office of Fair Trading in the "Assessment of Market Power" guidelines put this threshold at 50% (Motta, 2009). Let alone a monopoly, market dominance derived from a merger should be avoided to preserve consumer welfare. Kim & Singal (1993) showed that in mergers between carriers, an increase in market power will eventually cause an increase in prices which is detrimental to consumers. By means of regression analysis, they found that

¹⁸ There are still other factors to take into account such as barriers to entry in the market. Contestable markets theory states that even a monopolist have to behave competitively when there are no entry barriers. However, the airline industry has considerable barriers, e.g. sunk cost and airport congestion.

"routes affected by mergers show significant increases in airfares relative to the control group. These price increases are positively correlated with changes in concentration and do not appear to be the result of an improvement in quality or of an industry-wide contraction of air services to rectify a supply-demand imbalance" (Kim & Singal, 1993).

Following the estimates of the European Commission, a dominant position or a monopoly (its ultimate form) would be created in all the city-pairs analyzed. Therefore, based on this preliminary findings, the merger should not be allowed.

Nonetheless, Ryanair argues that it "behaves independently of Aer Lingus (and any other competitor) when setting prices and deciding on frequencies for its routes and does not consider the prices of its competitors" (European Commission, 2007, p. 107). This seems to be caused by some differences that Ryanair claims to exist differences between Aer Lingus' business model and its own. Namely, it affirms that:

- Ryanair is based on "no-frills" while Aer Lingus is based on "mid-frills"
- Ryanair offers less services at a lower price
- Ryanair uses mainly secondary airports while Aer Lingus serves primary airports (this statement implies that city-pairs are not substitutes and only airport-pairs should be considered; this point, if correct, would change the whole picture)

This differences, according to the airline, would make Ryanair a stand-alone carrier with no competitors on the market. Thus, it would assume that Ryanair prices are not affected by Aer Lingus and therefore no changes would be seen in the prices after the merger. The validity of this statement is very dubious. The European Commission tried to confute it first rhetorically and the empirically.

In order to show that Ryanair prices are affected by Aer Lingus and vice-versa, the commission proposes three arguments: (i) Ryanair and Aer Lingus respond to each other's promotion; (ii) both airlines use a price comparison software tool ("QL2") which allows them to track and compare air fares for every flight of all competing scheduled carriers that is distributed over the Internet; (iii) both parties use similar yield management systems and revenues management system that allow them to *daily* check

and change the prices depending on factors such as the actual load factor or historical data (European Commission, 2007, p. 108-111).

The first argument is based on multiple evidence; the commission has observed that Ryanair often compares its prices with other airlines in its commercials. Moreover, the authority has found some Ryanair's internal documents¹⁹ which confirm that Ryanair has been reacting to promotion campaign of Aer Lingus.

The second argument is self-explanatory. The third and last argument is less convincing. The commission assumes that using similar yield and revenues management software will cause the prices to be similar. However, an important point was disregarded. Although the software may be similar, the carriers dispose of multiple "templates" that can be applied in different situations. Gaggero & Piga (2010) propose that Ryanair and Aer Lingus have different yield management systems. The difference, overlooked by the commission, appears in the inter-temporal pricing profile of the two airlines. In fact, the authors argue that Ryanair has a steeper temporal fare pattern than Aer Lingus. This hypothesis is supported by the data. In their paper, they observe for each flight the fares from 63 to 1 day before the departure date²⁰. Plotting the data obtained against time, they obtain on average a flat curve for Aer Lingus and for Ryanair a similar curve with lower fares up to ten days before departure when the slope increases dramatically as the departure day nears.

While in theory their assumption may support Ryanair's arguments, when it boils down to the empirical analysis, the overall results obtained by the commission are confirmed.

Moreover, Gaggero & Piga (2010) propose another reason for which the merger should be prohibited. They argue that the merger, independently from possible increases in price due to the increase in market power and concentration, will damage late bookers. In fact. They observed that when Ryanair took over Buzz in 2003, its yield management system was forced upon the acquired party (Piga & Dobson, 2008). They suggest that the same thing is likely to happen with Aer Lingus. This event, following the assumption that Ryanair's prices tend to dramatically increase in the last week before the departure, would reduce the choice and eliminate a valid (and cheaper) alternative for those customers

 ¹⁹ The European Commission does not specify which documents because it is confidential information.
 ²⁰ To be more precise, the observations are made 1, 4, 7, 10, 14, 21, 28, 35, 42, 49, 56 and 63 days before the departure for Ryanair, while for Aer Lingus the series reduces to 7 up to 56.

whose need to travel arises with a short notice and unexpectedly. These customers who are generally travelling for business reasons will have to pay more after the merger. Also, they tend to value time over money and have very low (or null) sustainability between routes which makes them price inelastic²¹. As standard economic theory dictates, given an increase in price of 1 unit, a price inelastic consumer will have a higher dead-weight loss (or a larger decrease in consumer surplus) than a price elastic consumer (Motta, 2009). In short, to use Gaggero & Piga's (2010) words, "net of the possible effects due to market concentration and dominance, the application of Ryanair's yield management approach on the target routes could have entailed sharp price increases for late booking customers".

4.3 The empirical analysis

To help determine the effects that an increase in concentration after the merger might cause on prices, the competition authority and the merging party often run econometric tests. These studies typically follow the "structure-conduct-performance" paradigm that in this case consists in regressing the ticket price on measures of market concentration and other control variables (Whinston, 2007).

I will discuss two regression analysis, one made by the European Commission and one by Gaggero & Piga (2010). They have two main differences: (i) the commission assumes there are no differences in the inter-temporal pricing profile of the merging parties and therefore does not control for it; (ii) while the commission takes into account the presence of other competitors, it does nothing to control for their prices.

Nonetheless, let me proceed in order. First, I will present the data used and how they were collected for both models. Second, I will discuss in detail the two models used and their differences. Third, I will present their results.

4.3.1 Data collection

²¹ Business travellers cannot change their destination based on price as for leisure travellers. Time is valued more than money. For example, if a customer needs to go from Dublin to Milan for business purposes, she or he will not land in Rome because the cost is cheaper for doing so will waste a lot of time.

The European commission constructed a panel dataset consisting of the merging parties' monthly average prices collected for 5 years on different routes, number of frequencies, number of passengers, costs (mainly airport taxes and fuel), load factors and flight distances²². The data were collected directly from the merging parties' databases as well as the Dublin Airport Authority (DAA). The airport-pair based final dataset has data from January 2002 to December 2006.

The dataset made by Gaggero & Piga (2010) is different in some aspects. First, the time period is shorter. Data were collected from 1 June 2003 to 31 December 2004. However, the collection frequency is much larger; fare for Ryanair and Aer Lingus, as well as for their main competitors (Bmibaby, Mytravellite and British Airways), were collected daily for each flight code in order to check for the inter-temporal pricing profile. Measures of market structure, flight distance and load factors were derived from data obtained by the UK Civil Aviation Authority. The prices were obtained from the carriers' web sites by using a web spider. One big difference between the datasets is the number of routes included. This one in fact focuses on the routes connecting the Republic of Ireland with the U.K. which are only a subset of the routes observed by the commission. However, given the high similarity of these airport-pairs to the rest of the routes in terms of market composition and concentration (i.e. they have more or less one or two small competitors while the merging parties detain a market share higher than 60%), it is possible to expand these results to the rest of the relevant markets.

4.3.2 Regression analysis

In order to cover every possibility, the commission run two different types of regression analysis; the first one is a cross-sectional regression analysis that analyses different routes at a single point in time. It was done mainly because it was used and proposed by Ryanair's economists. However, it "may not be possible to control for important but unobserved or unmeasured influences on price that vary from route to route" (European Commission, 2007) which cause an omitted variable bias thus jeopardizing the obtained results²³.

²² For a full list, see European Commission (2007), p. 423-425.

²³ For this reason, I will not stress this topic any further.

The second type of regression is called "fixed-effect" analysis that making use of a panel dataset allows to control for unobservable route specific time-invariant factors. This analysis has been acknowledged by the commission as the one most fitting the case and was later used also in Ryanair/Aer Lingus III.

The commission's regression equation is:

$$\ln(p_{it}) = \alpha_i + f(competition) + \sum_t \gamma_t \cdot D_t + \delta_j X_{it} + \varepsilon_{it}^{24}$$

Where:

- ln(p_{it}) is the fare first for Ryanair and then for Aer Lingus expressed in natural logarithm.
- f(competition) is a function of market structure variables such as dummy presence indicators variables.
- D is a set of dummies that stand for the month of the year, i.e. one for January, another for February and so on.
- X is a vector of cost and demand variables such as flight distance, load, number of passengers, changes in demand due to events or holidays, etc.

Multiple regressions were run with different combinations of specifications.

The equation used by Gaggero and Piga (2010) has a similar form:

$$\begin{split} \ln(p_{it}) &= \alpha_{i} + \mu_{1}MS_{it} + \mu_{2}HHI_{it} + \mu_{3}onlyEI_{it} + \mu_{4}onlyFR_{it} + \theta_{1}Departime_{it} \\ &+ \theta_{2}Arr/Dep_{i} + \theta_{3}Ryanair_{i} * Booking \ day_{it} + \rho_{1}\ln(Distance)_{i} \\ &+ \pi_{1}Xmas_{it} + \pi_{2}Easter_{it} + \pi_{3}St. \ Patrick_{it} + \delta_{1}Aer \ Lingus_{i} \\ &+ \delta_{2}Ryanair_{i} + \delta_{3}Month_{t} + \varepsilon_{it} \end{split}$$

 $ln(p_{it})$ denotes the natural logarithm of the weekly mean price for each route *i*, *t* booking days before the departure date. This is the first point of difference between the two regression equations. In fact, this price, contrary to the commission approach, reflects the fares of all the competitors and not just of either one of the merging parties. This allows the authors to compare prices not only between the merging parties but also with the other competitors.

The regressors can be divided into five groups: (i) the μ variables are market structure indicators (MS in the market share while HHI is the Herfindahl Index); these variables can be compared to the f(competition) in the commission's equation although the actual measures differ; (ii) the θ coefficients indicate flight characteristics; they have been

²⁴ See European Commission (2007), p. 467.

inserted with the aim of checking for the temporal pricing hypothesis and as such, have no correspondents in the commission's approach; (iii) the δ coefficients corresponds to additional dummies; δ_3 indicates seasonal effect in a similar fashion to variable *D*; (*iv*) ρ indicates the cost factor and together with (v) π coefficients that correspond to demand factors, they are comparable to vector *X*.

As showed, both analysis use the same kind of dataset (panel data) and have similar equations. However, they are estimated in two different ways: the commission uses a fixed effect approach while Gaggero and Piga (2010) use a random effect estimator and control for possible correlation among the regressors by running a Variance Inflation Factor test. Moreover, they use instrumental variables²⁵ to account for potential correlation between the error term and the market structure variables (the ones denoted by μ).

4.3.3 The results

Gaggero and Piga (2010) and the commission run regressions under the assumption of both airport-pairs markets and city-pairs markets. However, I argue that the latter is more relevant than the former since the relevant market has been already identified as the citypair market.

The commission found that Ryanair's presence in the market as a statistically significant negative effect on Aer Lingus' fares. This effect which has a magnitude of approximately minus 7.6%²⁶ is also economically significant. The competition also controlled for other competitors' presence and found that other than Ryanair, Aer Lingus' other competitors do not affect its prices.

In addition, the commission found that Ryanair equally constricts Aer Lingus also when departing from different airports in the same city-pair. This result is an important piece of evidence in favour of the relevant city-pair market and against Ryanair's claim of non-substitutability of primary airports versus secondary airports.

Similar results were obtained when analysing the effect of Aer Lingus presence on Ryanair's fares. Aer Lingus' presence has a negative and statistically significant (at 1%)

²⁵ See Gaggero & Piga, (2010), p. 275.

²⁶ See European Commission (2007) p. 470.

effect of -10% on the rival's prices. Moreover, Aer Lingus is the only carrier that has a significant effect on Ryanair. Therefore, if Aer Lingus merged with Ryanair, the only competitive restraint on the latter would have been removed leaving the merged entity with market dominance.

Other evidence in support of the prohibition of the merger can be found in Gaggero and Piga's (2010) results with market defined at city-pair level. Using the instrumented variables for market share and concentration they conclude that an increase by 10% in market share and market concentration leads to prices that are respectively 1.3% and 2.9% higher. This result shows that the merger would be detrimental to consumers in all the 35 routes analyses by the commission.

Further confirmation is given by the coefficient of *onlyFR* which shows that when Ryanair does not compete with Aer Lingus, its prices are approximately 21% higher. Gaggero and Piga (2010) own hypothesis that Ryanair has a different inter-temporal pricing profile than Aer Lingus is also confirmed. Looking at the coefficients of the interaction *Ryanair*booking day*, it is evident that Ryanair offers lower fares than its competitor at a constant level. However, as the day of departure nears its prices start to increase and one day before the departure the relative coefficients for the price are 0.03 for Aer Lingus and 1.29 for Ryanair. This finding suggests that the merger would have negative consequences for the late booking consumers, thus it provides another argument for which the merger should not be allowed.

5. A theoretical approach

5.1. The model

In 1990 two economists, Joseph Farrell and Carl Shapiro, developed a model to understand mergers' effects in a Cournot oligopoly with homogeneous goods and different marginal costs. They posed two main questions: (i) what is the effect of a merger on price and (ii) what is the effect of the merger on welfare.

5.1.1. Effect on price

In a Cournot oligopoly, firms compete on quantity and face a demand p(X), where the price (p) is a function of industry total output (X), that slopes downward (p'(X) < 0). There are *n* firms in the industry, each with a different cost function $c(x^i)$ and marginal cost $c_x(x^i)$ where x_i is firm *i*'s output. In a Cournot oligopoly, firms choose their output in response to other firms to maximize their profits. In equilibrium, profits equal $\pi^i(x_i, y_i) = p(x_i + y_i)x_i - c^i(x_i)$ where y_i is the industry output except for firm *i* (*X*- x_i). To maximize profits, it is necessary to derivate the first order condition, that is $\frac{\theta \pi^i}{\theta x_i} = 0$, which is equal to

$$p(X) + x_i p'(X) - c_x^i(x_i) = 0.$$
⁽¹⁾

A Cournot equilibrium is a vector that satisfies (1) for all the firms in the industry. Moreover, the market share of firm *i* can be expressed in terms of output such that $s_i = \frac{x_i}{x}$. From (1), we can derive that the lower is the marginal cost for a firm, the higher will its output be and the higher its market share. Starting from this model, Farrell & Shapiro (1990) make two assumptions: first, each firm's reaction curve must slope downward; in other words,

$$p'(X) + x_i p''(X) < 0, \ i = 1, 2, 3, \dots, n$$
(2)

Second, each firm's residual demand curve intersects its marginal cost curve from above:

$$c_{xx}^{i}(x_{i}) > p'(X), \quad i = 1, 2, 3, ..., n$$
 (3)

The authors then note some properties of the Cournot oligopoly equilibrium that will be necessary to develop their model. Given equation (1), effect of a change in rivals' aggregate output, y_i , on firm *i*'s output is given by

$$\frac{dx_i}{dy_i} = -\frac{p' + x_i p''}{2p' + x_i p'' - c_{xx}^i} = R_i$$
(4)

which corresponds to the slope of the reaction schedule. From this equation and conditions (2) and (3), the authors derived that $-1 < R_1 < 0$, which means that given a change in rival's output, firm *i*'s output will behave in the opposite way but with a smaller magnitude. Moreover, to simplify the calculations, Farrell and Shapiro rewrote (4) such that

$$dx_i = -\lambda_i dX \qquad (5)$$

with $\lambda_i = -\frac{R_i}{1+R_i} = -\frac{p'+x_ip''}{c_{xx}^i-p'}$.

A further simplification is given by using the elasticity of demand $\varepsilon^{27}(X) = \frac{p(X)}{Xp'(X)}$, the elasticity of the slope of the inverse demand curve $E = -\frac{Xp''(X)}{p'(X)}$ and the elasticity of firm *i*'s marginal cost with respect to its output $\mu_i = \frac{x_i c_{xx}^i}{c_x^i}$. The result is

$$\lambda_i = \frac{s_i - s_i^2 E}{s_i + \mu_i (\varepsilon - s_i)} \tag{6}$$

Given that assumptions above hold, it derives that after an exogenous change in production by one firm (firm "a") and assuming that the other firms will adjust their output coherently to the Cournot equilibrium model, total output X will move in the same direction of firm "a" but with a smaller magnitude.

After defining this general conditions, the authors move to the first question. They propose that (Proposition 1):

"A merger of a group of firms in Cournot oligopoly raises price if and only if M's markup would be less than the sum of the pre-merger mark-ups at its constituent firms, were M produce just as much as its constituent firms together did before the merger." (Farrell & Shapiro, 1990, p. 112)

The proof is straightforward. In a Cournot model, firm M (the merged firm) will raise its price as a consequence of lowering its output. Its output will be lowered if and only if the marginal cost of firm M is higher than the marginal revenue at pre-merger output which can be expressed as $c_x^M(X_M) > p(X) + X_M p'(X)$. If we rearrange it, we have $-X_M p'(X) > p(X) - c_x^M(X_M)$. From (1) we know that $p(X) - c_x^i(x_i) = -x_i p'(X)$. By assumption, X_M is equal to $x_A + x_B$ (where A and B are the two merging parties), therefore $X_M p'(X) = x_A p'(X) + x_B p'(X)$. Finally, we obtain $p(X) - c_x^A(x_A) + p(X) - c_x^B(x_B) > p(X) - c_x^M(X_M)$ where the left hand side of the inequality is the sum of the pre-merger mark-ups and the right hand side is the mark-up of firm M.

Basically, this first proposition says that whether the merger will rise the price or not depends on the pre-merger and the post-merger marginal costs. Moreover, we now know that not only the marginal cost of the merged firm (M) must be lower than those of its parties prior to the merger, but their difference must be quite substantial. This result is derived by the condition of Proposition 1. By simplifying it, the result is:

$$c_{x}^{B}(x_{B}) - c_{x}^{M}(X_{M}) > p(X) - c_{x}^{A}(x_{A})$$
(7)

 $^{^{\}rm 27}$ I will refer to ϵ as the absolute value of the elasticity

The authors identify three categories of mergers based on the types of efficiency generated: (i) merger without synergies; (ii) merger with economies of scale and (iii) merger with learning.

First, when a merger does not generate synergies, it means that it cannot combine its assets to improve their production capabilities. In other words, the new firm can only rearrange production from one facility to another without changing the pre-merger marginal costs. Proposition 2 states that:

"If a merger generates no synergies, then it causes price to rise" (Farrell & Shapiro, 1990, p. 7).²⁸

I can also be seen from equation (7). When there are no synergies, assuming there are no capacity constraints, output will be produced with the facility with the lower marginal cost. Formally, $c_M(x) = \min\{\sum c^i(x'_i) | \sum x'_i = x\}$. However, marginal cost will never be lower than the lowest of the pre-merger costs. Therefore, price will rise.

Second, a merger can cause efficiencies if its capital (e.g. machinery) is moved across facilities to increase economies of scale. This economy of scale may be able to increase output at one condition: the marginal cost reached after combining capital and output of the two firms must be smaller or equal to the pre-merger marginal cost minus the mark-up (derived from Proposition 1).

$$c_x(2x, 2k) \le c_x(x, k) - [p - c_x(x, k)]$$

By knowing from (1) that the mark-up is equal to $s/(\epsilon-s)$ times pre-merger marginal cost $c_x(x, k)$, the authors derived:

$$c_{x}(2x,2k) \leq \left[1 - \frac{s}{\varepsilon - s}\right] c_{x}(x,k) \tag{8}$$

From this condition, we understand that the market share of the firm plays an important role. If it is very large, then it is unlikely that the condition will hold. Of course it depends also on the elasticity; if the demand is very inelastic and the share is quite large, than it is possible for this condition to hold.

²⁸ For the proof, see the appendix of Farrell & Shapiro (1990)

Third, efficiencies might be born through learning, that is, sharing techniques, patents and expertise. To show how much learning is needed for price to fall, Farrell and Shapiro assumed that firm *i* has a cost function $c^i(x_i) = \theta_i \varphi(x_i, k_i)$ where θ inversely measures "knowledge". They found that in order for (7) to hold true, a fall in price must be preceded by a reduction of θ_1 of a factor of at least $s_2/(\varepsilon - s_1)$ or equivalently by a reduction of θ_2 of a factor of at least $s_1/(\varepsilon - s_2)$. Here, as in the previous case, the market share is very important.

These results provide the answer for the first question posed by Farrell & Shapiro (1990). These model provides some general guidelines that could be followed when analysing a horizontal merger in a Cournot model.

They reached the conclusion that

"the larger are the market shares of the participating firms, or the smaller is the industry elasticity of demand, the greater must be the learning effects or scale economies in order for price to fall" (Farrell & Shapiro, 1990).

5.1.2. Effect on total welfare

Of very much interest is the answer to question (ii). It provides a general model that is able to predict if a merger can increase total welfare even though it raises prices. Moreover, it does so without taking into account any claims of efficiency from the merging firms. The only extra assumption with respect to the previous findings is that the merger is profitable. With this assumption, they clear the hurdle created by the information asymmetry between firms and commission and consider only the net effect caused by the merger on the welfare of non-participating firms and consumers, formally $\Delta W - \Delta \pi_I$ (also called external effect of the merger) where W is total welfare and π_I is the profit of the insiders (the merging firms as opposed to the outsiders, the non-participating firms). They show that this effect is given by the integral of the net effect generated by an "infinitesimal merger" that is a merger in which the insiders' output (X_I) decreases only marginally.

Using the previously found condition (1) and (5), the authors show that an infinitesimal change in total welfare is given by the equation

$$dW = (pdX_{I} + X_{I}dp - dc_{I}) - X_{I}p'(X)dX + \sum_{i \in O} p'(X)\lambda_{i}x_{i}dx \qquad (9)$$

The first three terms in the brackets represent the infinitesimal change in insiders' joint profits, the fourth term represents the (infinitesimal) change in consumers' surplus and the fifth term represents the aggregate change in outsiders' surplus. The term that is the most troublesome to calculate, as I have already said many times, is the change in the insiders' joint costs dc_I . Fortunately, this term disappear when we consider the infinitesimal external effect $dW - d\pi_I$. To obtain it, it is sufficient to move the terms in brackets in (9) to the left hand side of the equation.

From this, they obtain that if the sum of the market shares of the outsiders multiplied by their respective λ (remember that λ is a proxy for the firm response to changes in output) is greater or equal to the joint market share of the insiders, then a small reduction in insiders' output has a net positive welfare effect on outsiders and consumers. When Farrell & Shapiro extend this result to the full change in output (ΔX_I), they obtain Proposition 5 that states:

"Consider a proposed merger among firms $i \in I$, and suppose that their initial (joint) market share s, does not exceed $\sum_{i \in O} \lambda_i s_i$. Suppose further that p", p ", and c^i_{xx} are all nonnegative and c^i_{xxx} is non-positive in the relevant ranges and for all nonparticipant firms i. Then, if the merger is profitable and would raise the market price, it would also raise welfare" (Farrell & Shapiro, 1990, p. 116).

5.2 Application to the case at hand

The model described seems to fit well with the merger analysed. In fact, while in the short run airline competition is probably described better by a Bertrand model, in the long run as Zhang & Brander (1990) showed, the model that best fits the ailine industry is the Cournot model. Moreover, the product sold can be considered as mostly homogeneous, as it was also reported by the European Commission in both 2007 and 2013 cases. Therefore, I will use Farrell & Shapiro's (1990) model to evaluate the merger.

Ryanair argued multiple times that the merger would have produced efficiencies. However, this efficiencies, as Ryanair itself stated, can only reduce Aer Lingus' cost to its own and affects mainly fixed costs. As Farrell and Shapiro demonstrated, in order to decrease prices on the overlapping routes, efficiencies must greately reduce *marginal* cost, not fixed. Moreover, even if we were to account these efficiencies as increasing economy of scale or learning, the huge market share that the merged firm would possess on those 35 routes would be too big to reduce price (from equation (8)).

In conclusion, following Farrell and Shapiro's (2010) analysis on the effect of horizontal mergers on prices, it is possible to conclude that Ryanair acquisition of Aer Lingus would have caused prices to rise and thus would have reduced consumer welfare.

However, as showed by Farrell and Shapiro (2010), the Ryanair/Aer Lingus merger could still have a positive effect on the total externality $\Delta W - \Delta \pi_I$. The calculations needed are behond the data in my possession; however, given that the primary condition necessary for a merger that raises price (reduce output), $\sum_{i \in O} \lambda_i s_i > s_I$, involves once again the market shares, and given the actual joint market shares reported in Table 3, I can presume that, without applying remedies, the merger would not be able to increase total externality. Even ignoring the 22 routes on which the merged entity would obtain monopoly, in the remaining 13 the joint market share is on average 70-80% and never smaller than 60%. This means that the remaining firms should have amazing reaction functions which I believe not to be feasible in an industry like the airline one in which incrementing quantity by a small margin (for example 1 flight) takes considerable planning and expenses.

6. Remedies

Until now I have presented various evidence that the proposed merger between Ryanair and Aer Lingus raises serious competition issues. In fact, the merged entity would enjoy a monopolistic position in 22 routes and a high level (>60%) of market share in other 13 routes. Moreover, econometric evidence shows that such high market share and level of concentration will likely increase the new firm's market power and allow it to charge higher prices. Thus, independently of whether efficiencies are achieved after the merger, if the prices increase the consumers' welfare will decrease. The competition authority has the duty to protect consumers from damages deriving from mergers. Nonetheless, every merger always has a chance to be cleared. Article 5 of the Notice of remedies states that: *"Where a concentration raises competition concerns in that it could significantly impede effective competition, in particular as a result of the creation or strengthening of a dominant position, the parties may seek to modify the concentration in order to resolve* *the competition concerns and thereby gain clearance of their merger*" (European Commission, 2008).

The means to resolve the competition concerns are the remedies or commitments that I have already introduced in the first part of this thesis.

Each industry has some specific remedies. The air transport is no exception. Therefore, I will briefly discuss these commitments and their shortcomings before analysing the commitments proposed by Ryanair.

6.1. Remedies specific to the airline industry

The best way to resolve the competition concerns is to reduce concentration. In order to do so, entry barriers must be eliminated from the relevant market such that new entrants will find entry profitable. In the airline industry, following Fichert (2011) we can identify five types of entry barriers: (i) capacity constraint at airports, (ii) high frequency if service by incumbent, (iii) incumbent's frequent flyer program, (iv) danger of predatory behaviour and (v) restrictive regulations.

The first barrier is more likely to happen in primary airports than secondary airports. Moreover, slots are more expensive in congested airports as there is a high demand but only a low supply. The remedy consists in transferring a sufficient number of slots such that an existing competitor or a new entrant is able to competitively constrain the incumbent. This commitment would fall under the category of structural remedies since it is similar to a partial divestment.

The second barrier is harder to abate. Fichert (2011) proposes an obligation to interline and/or code share. However, there are two problems: (a) both actions require a continuous contact between competitors which may favour collusion; (b) the new entrant has cannot efficiently compete in any way with the incumbent because the one in control of food quality, services offered, and other options is the latter. The only choice left to the former is the price that has little scope of change given that everything else is equal. Moreover, this kind of remedy is similar to behavioural commitments that are hard and costly to monitor.

The third barrier can be destroyed by obliging the incumbent to open its FFP to the entrants. This barrier is one of the weakest since it has an effect majorly on business customers which are only a part of the consumer base.

The danger of predatory behaviour may include predatory pricing and capacity increases. In the former the incumbent makes entry unprofitable for competitors or new firms by charging very low prices. The proposed remedy is the obligation to reduce fares in all affected markets. Capacity increases instead aims at filling the whole market so that competitors do not find the necessary slots to enter. One way of solving it is by imposing a frequency freeze upon the incumbent. Nonetheless, both commitments are behavioural type remedies which are not loved by the competition authority.

The last barrier is an institutional barrier. However, since the deregulation of 1997, the EU has made several agreement to reduce these barriers which are already non-existent inside the European Union.

6.2. Remedies in Ryanair/Aer Lingus

In a hypothetical post-merger industry, it is unlikely that any competitor, existing or potential, would have enough power to counterbalance the market power acquired by the merged party. The high market share and concentration alone create strong barriers to entry. First, there are not enough slots left in Dublin to allow anyone to stand up to the two carriers. Second, even if a third party was able to acquire an adequate²⁹ amount of slots, it would still lack the knowledge of the relevant markets needed to properly compete with the two merged incumbents. Third, a new player entering the markets would still lack brand recognition, which is in contrast a strong point of both Aer Lingus and Ryanair. All these elements make entry very hard for everybody. Nonetheless Ryanair proposed a set of remedies to the commission. To be precise, the official sets of remedies sent to the authority were three: one in phase I, another one in phase 2 and the third one has a final try. The commission refused them all.

²⁹ There are many ongoing discussions related to what "adequate" means in term of number of slots. The commission reached an estimate based on a survey.

I will only discuss the last set of remedies since it is the evolution of the previous two. The commitments proposed can be divide in two categories: slot-related and slotunrelated. Unfortunately, a precise distinction between structural and behavioural remedies cannot be made. The next part closely follows European Commission (2007). Slot related remedies:

- Ryanair committed to lease for an indefinite amount of time 24 to 40 daily slots for the Dublin/London Heathrow to be split among BA and Air France.
- 2. Ryanair also committed to give up on determined slots for those routes that connect Dublin with the rest of Europe (do not forget that out of 35 city-pairs analysed, 32 had Dublin as base).
- 3. Slots for routes from/to Shannon/Cork: Ryanair also committed in its Final Commitments to make available slots for overlap routes starting at Cork and Shannon if necessary (European Commission, 2007).
- 4. Ryanair committed not to conclude the merger until an "up-front buyer" approved by the commission would buy Dublin's slots.

Non slot related remedies:

- 5. Fare/brand-related commitments: Ryanair repeats its offer to reduce Aer Lingus' short-haul fares by at least 10% immediately, to eliminate the fuel surcharges Aer Lingus applies on its long-haul flights immediately, to retain Aer Lingus' brand and to continue to operate Ryanair and Aer Lingus separately
- 6. Ryanair committed to frequency freeze, i.e. to neither increase nor decrease, all the affected routes for six IATA seasons after the merger.

The slot related commitments are quite vague. Aside from that, giving away slots is not sufficient to restore competition. "The notice on remedies points out specifically that, in air transport mergers, a mere reduction of barriers to entry by a commitment of the parties to offer slots on specific airports may not always be sufficient to ensure the entry of new competitors on those routes where competition problems arise and to render the remedy equivalent in its effects to a divestiture" (European Commission, 2013). For such a thing to happen, a divestiture would be needed. The merged entity should give away, together with the slots, trained personnel that is familiar with the relevant markets, an adequate number of airplanes enough to cover the daily routes (plus a spare one to ensure the time schedule if anything were to happen), and all that is necessary for a new entrant to immediately compete at the same level as the incumbent.

Even if, by chance, the entrant was able to compete with only the slots, the numbers proposed by Ryanair are not sufficient. By pooling together estimates made by Aer Lingus and third parties, the commission estimates that to cover for the necessary frequencies in routes from/to Dublin (including London Heathrow), an average of 17 airplanes is needed while Ryanair offers a maximum of 10.

Moreover, the slots offered are not comprehensive of all the airports covered by the 35 overlapping routes. As noted by the commission, the majority of the slots are for secondary airport that are not congested, thus the new entrant could buy the slot independently of Ryanair.

Therefore the proposed remedies are likely to restore competition only in minimal proportions which are far from the pre-merger situation.

The remaining commitments do not seem to be effective either. First of all, their wording is too general and describes possible behaviours that Ryanair might follow to an unclear extent. Second, being all behavioural remedies, they need to be controlled over time. Ryanair did not propose any guarantor nor did it specify whether the commitments need to be approved by Aer Lingus shareholders. In short, these remedies are too vague to be taken into account.

To estimate an appropriate degree of market share and concentration that would be sufficient to restore competition, it could be possible to use Gaggero and Piga's (2010) regression analysis. The level could be identified by inserting various measures for market share and concentration (MS and HHI) until their estimated coefficient nears 0. Alternatively, an easy solution would be to divest the entire Aer Lingus business relative to those 35 overlapping routes.

7. Conclusion

In this thesis I tried to review and re-evaluate how mergers affect competition in the airline industry with a particular focus on the attempted merger between Ryanair and Aer Lingus in 2007. I argue that the decision of the European Commission to prohibit the merger was right, even though some efficiencies might have been realised (in particular

reduction of airport costs on overlapping airports and routes). The reason is that the positive effect of such efficiencies is not enough to outweigh the negative effect on competition that the drastic increase in market power that would have happened in 35 overlapping routes (most of which departing from Dublin), would have had on consumer welfare. This result was confirmed using three different studies: (i) first the regression analysis carried out by the European Commission (2007) showing that Ryanair and Aer Lingus are each other biggest competitors and the only ones able to influence the other party's price decision in the short run. (ii) Second, the study with annexed regression analysis by Gaggero & Piga (2010) that starting from different assumptions and using different data and quantitative method, confirmed the results obtained by the commission. In addition, they showed that the merger would have particularly harmed late bookers with an inelastic demand through the elimination of Aer Lingus' yield management system. This result originating from their novel approach adds to the reason why the decision to prohibit the merger seems to be the right one. (iii) Third, the theoretical model by Farrell & Shapiro (1990) shows that in a Cournot oligopoly with homogeneous products, horizontal mergers between two or more participants will most likely increase price, especially if the pre-merger market shares of the merging parties are quite large, as in this case. Moreso if after the merger the Cournot behaviour degenerates in a less competitive one (i.e. monopoly).

However, if I were to consider total welfare, i.e. the sum of consumer and producer surplus, the same result may not be confirmed. In fact, Farrell & Shapiro (1990) show how a privately profitable merger that raises prices can increase total welfare. However, that does not seem to be the case for Ryanair/Aer Lingus that, even considering the proposed remedies, would still possess a joint market share too high for the condition proposed by the two economists to hold true.

In the last section I also present the remedies proposed by Ryanir in order to solve the numerous competitive concerns. As a result, these remedies were either too general to be taken into consideration or too small to effectively improve the competitive position of rivals.

In summary, the merger between Ryanair and Aer Lingus seems to be welfare detrimental both if we consider only consumer welfare and if we considere total externality. Therfore, the evidence shown is in favour of the prohibition of the merger. Overall, this thesis has two main limitations: first, it uses second-hand data and analysis on which I did not contribute; second, it does not show with certainty that the conditions depicted by Farrell & Shapiro are not met, therefore reducing the worth of the conclusion drawn. Further research may be carried out also on the more recent merger attempt of 2013.

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