

Market power versus efficiency defense in the European Commission's merger policy: Evidence on European airline mergers

by

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Statutory Declaration

(on Authorship of a Dissertation)

I, Adél Németh hereby declare that I have written this PhD thesis independently, unless where clearly stated otherwise. I have used only the sources, the data and the support that I have clearly mentioned. This PhD thesis has not been submitted for conferral of degree elsewhere.

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Bremen, May 31, 2016

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IN MEMORY OF MY FATHER

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STATEMENT ON CONTRIBUTION TO ALL ARTICLES

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ABSTRACT

According to microeconomics, mergers result in a more concentrated industry. This fact is hardly questionable, but the discussion about whether concentration is good or bad for society leads us to a lively debate, called the efficiency defense: do mergers increase market power or efficiency? How does merger policy take market power and efficiency into consideration?

My work investigates the circumstances and consequences of merger appraisal in passenger airline markets in Europe between 1995 and 2015. The analysis tries to identify the role of consolidation driven by market power, efficiency and bankruptcy. The thesis introduces economic principles, models and policy choices behind the efficiency defense, and explains why the European Commission did not consider efficiency as a core criterion for their decision to allow or prevent takeovers.

In summary, efficiencies could be considered in the merger process under the total welfare approach, which also contains efficiency gains from producer surplus increase. The author believes that efficiency is the ordinary aim of companies, but the reason behind mergers is to increase market presence, market share or with other words: market power. Competition policy should therefore improve a transparent and smart framework to regulate market power.

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ABBREVIATIONS

AC	Average Costs		
ACCC	Australian Competition & Consumer Commission		
ACT	Australian Competition Tribunal		
ASK	Available Seat Kilometer		
ATRS	Air Transport Research Society		
CAT	Competition Appeal Tribunal (UK)		
CC	Competition Commission (UK)		
CEE	Central Eastern Europe		
CLA	Critical Loss Analysis		
CRESSE	European Summer School and Conference in Competition and Regulation		
CS	Consumer Surplus		
DEA	Data Envelopment Analysis		
DLR	German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt)		
DoJ	Department of Justice (US)		
DoT	Department of Transport (US)		
EBIT	Earnings before interest and taxes		
EBITDA	Earnings before taxes, interest, depreciation and amortization		
EC	European Commission		
ECMG	European Council Merger Guideline		
ECMR	European Council Merger Regulation		
EU	European Union		
FC	Fixed Costs		
FFP	Frequent Flyer Program		
FTC	Federal Trade Commission (US)		
HHI	Herfindahl-Hirschman Index		
IATA	International Air Transport Association		
ICN	International Competition Network		
ICAO	International Civil Aviation Organization		
IO	Industrial Organization		
LCC	Low-Cost Carrier		
LF, PLF	Passenger Load Factor		
M&A	Mergers and Acquisitions		
MC	Marginal Costs		
MRE	Minimum Required Efficiency		
O&D	Origin and Destination		
OFT	Office of Fair Trade (UK)		
OLS	Ordinary Least Squares		
PFO	Permanently Failing Organizations		
R&D	Research and Development		
RPK	Revenue Passenger Kilometer		
SCP	Structure- Conduct- Performance		
SIEC	Significant Impediment to Effective Competition (test)		
SLC	Substantive Lessening of Competition (test)		
SSNIP	Small but Significant Non-transitory Increase in Price (test)		
TFEU	Treaty on the Functioning of the European Union		
TFP	Total Factor Productivity		
TW	Total Welfare		
UPP	Upward Pricing Pressure		
VC	Variable Costs		

LIST OF AIRPORTS AND AIRLINES WITH IATA CODES

Airports

AOC Leipzig ARN Stockholm BUD Budapest BRU Brussels BSL **Basel** CDG Paris Charles de Gaulle CGN Cologne/ Bonn CPH Kopenhagen DRS Dresden DUS Düsseldorf FRA Frankfurt GVA Geneva HAJ Hanover HAM Hamburg LCY London City LGW London Gatwick LHR London Heathrow MUC Munich NUE Nuremberg ORY Paris Orly OTP **Bucharest** STN London Stansted STR Stuttgart SXF Berlin Schönefeld TXL Berlin Tegel VIE Vienna WAW Warsaw ZRH Zurich

Airlines

- 0D Darwin Airline
- 2L Helvetic Airways4U Germanwings
- 5P Sky Europe Airlines
- A3 Aegean Airlines
- AA American Airlines
- AB Air Berlin
- AF Air France
- AY Finnair
- AZ Alitalia
- BA British Airways
- BD BMI
- BE Flybe
- C3 Contact Air Germany
- C9 Cirrus Airlines
- CL Lufthansa CityLine
- CO Continental Airlines
- DE Condor Flugdienst
- DL Delta Airlines

- DM Maersk EI Aer Lingus EW Eurowings FR Ryanair Hapagfly HF Niki HG IB **Iberia** Airlines JK Spanair KF Blue1 KL KLM LG Luxair LH Lufthansa LO LOT Polish Airlines LT LTU International LX Swiss International Air Lines MA Malév Hungarian Airlines Thomas Cook Airlines MT NB **Sterling Airlines** North Central Airlines NC NE SkvEurope Lauda Air NG NW Northwest Airlines **Czech Airlines** OK
- OL OLT Express Germany
- OS Austrian Airlines
- OZ Ozark Airlines
- PS Ukraine International Airlines
- PT Piedmont Airlines
- QA Cimber
- QI Cimber Sterling
- RC Republic Airlines
- RO Tarom
- SK Scandinavian Airlines
- SN Brussels International Airlines
- SO Southern Airways
- SQ Singapore Airlines
- SU Aeroflot Russian Airlines
- TE FlyLal
- TV Virgin Express
- TW Trans World Airlines
- UA United Airlines
- U2 easyJet
- VO Tyrolean Airways
- VY Vueling
- W6 Wizz Air
- WA KLM Cityhopper
- WN Southwest Airlines
- WU Wizz Air Ukraine
- WW Bmibaby
- XG Clickair

INTRODUCTION

"We do not know whether the work of economists should be oriented toward the formulation of public policy or toward the analysis of market situations. The trend, however, is definitely towards the latter. The further economics goes in this direction, the greater becomes the difference between legal and economic conceptions" (Mason, 1937, p. 1).

Mason had already highlighted the parallel world of economics, namely the description and analysis and/or evaluation and prescription, in 1937. This gap in economics, especially in competition policy, became bigger every day after Professor Mason retired from Harvard University in 1969. My work attempts to bridge the gap by evaluating the (aviation) market situation and describing the public (competition) policy behind it. The PhD thesis contributes to the literature with an academic analysis of the circumstances and consequences of airline mergers on the passenger airline market.

Competition policy, a branch of microeconomics, was developed to ensure that competition works in favor of our welfare. The traditional approach has long been that concentration increases market power, the ability to set higher prices, and is thus bad for society. Therefore the policy, as the name 'antitrust' implies, has usually decided against takeovers. The revolution of merger policy started in the 1970s at the University of Chicago in the US. The new direction used efficiency reasons to explain concentration and asserted that big, concentrated companies are profitable because they are more efficient. Efficiency brings innovations, enables research and development, and continuously improves product quality, so it is good for everyone. The industry appreciated the new approach, which soon settled in the (first US) politics and completely changed previous antitrust thinking. By the 1980s, the efficiency defense (thus efficiency arguments of companies) had overcome the fear of concentration and high prices, and resulted in a deregulation and takeover wave.

The wave reached the European Union (EU) toward the turn of the millennium and challenged the European Commission's (EC's) merger policy. In today's globalized world, there is an increasing need for a convergence of EU-US competition policy, and companies also prefer to use the efficiency defense. However, in contrast to the relatively liberal antitrust policy in the US, EC competition policy has a multiple-goal system, based on a social rather than a liberal market economy. Due to its special characteristics, a social market economy also emphasizes macro- and microeconomic goals.

Simple adding the efficiency goal made the already complex system nontransparent and sometimes paradoxical. The outcome is confusion on both the company and policy sides. The motivation of the thesis is to fight confusion and clarify the role of efficiency versus market power in merger procedures.

The main topics of the PhD work are market power and efficiency. While there are new paragraphs (§76 to §88) on efficiency in the EC Merger Guidelines (ECMG, 2004), it is still unclear what efficiency means. The EC differentiates between costs- and revenue efficiencies, but only accepts efficiencies from variable cost savings. Further, merging companies need to present documentary proof that they could not achieve these efficiencies without the takeover (efficiencies are merger-specific) and that they will pass through all cost savings to consumers. The claim of companies, the efficiency defense, in a merger procedure fails to work at this point, at the latest.

Therefore, there is no such thing as an efficiency defense in EU-practice. The dissertation explains why the EC does not, and in the currently form cannot, apply the efficiency defense. Further, the analysis highlights the limitations of current EC merger policy, the failure to regulate market power and its consequences on welfare. The efficiency potential within the current EC merger framework is limited by the consumer surplus approach and excludes improvements in producer surplus. The European Commission follows the Harvard-view on concentration, but leaves a gray area for efficiency claims. Complex, sometimes controversial policy goals; nontransparent efficiency and consumer welfare definitions; and the fear of failing firms all promoted the European Commission's trend of allowing mergers, even if they were found to be anticompetitive. The EC needs to justify the merger approvals, including implementing efficiency defense, more consistently and more systematically.

The aim of the research is to explain the discrepancy in the EC merger policy and provide a framework in which an efficiency defense may be applicable, if desired by the policy. Therefore, the main research question are:

- I. How does merger policy take market power and efficiency into consideration?
- II. Do mergers increase market power or efficiency?

The first part of the thesis (Chapter 1 to 3) describes the theoretical background and criticizes the European competition policy for mixing different welfare standards with diverse (even controversial) policy aims. The EC only considers efficiencies if they are pre-merger verifiable and benefit consumers (i.e. stem from variable cost savings). Moreover, the merger framework in Europe is based on the Structure-Conduct-Performance model which contradicts efficiencies. Thus, in accordance with the Harvard School's concentration doctrine, the EC still emphasizes market power despite efficiencies.

The second part of the dissertation (Chapter 4 to 7) is an application of merger theory in European aviation. In order to decide whether the application of the efficiency defense might be useful, a descriptive case study on Lufthansa/ SWISS merger is used to investigate the potential of efficiency gains in airline merger cases. The study generally finds improved efficiency after the takeover, but merger-specific efficiencies are difficult to separate from general achievements to increase productivity.

The research methodology is based on applied microeconomics, relied on industrial organization. The main methodology of the work is quantitative (descriptive) case study analysis supported by qualitative partial productivity analysis. Case study analysis is the most appropriate method to investigate individual airline merger cases over time. The advantages of the methodology are that it enables to compare different cases by different approaches and does not require a big dataset. The dissertation also processed wide ranges of data, where it was available, on post-merger changes in quantity and price.

The structure of the work is the following. The doctoral thesis starts with a normative analysis and provides a framework for analysis by introducing different economic principles and policy choices on a meta-level. The first chapter discusses the theoretical background behind the efficiency defense, i.e. the general debate about market power versus efficiency trade-off. The rest of the PhD work is a positive analysis of the performance of the European aviation market.

The second chapter assesses potential merger-specific efficiency gains from airline consolidation and explains why the European Commission (EC) did not consider efficiency as a core criterion for their decision to allow or prevent mergers. The third chapter surveys economic models used to measure the price and efficiency effects of mergers and finds that most models predict a price increase and limited efficiency, especially in the sense of benefiting consumers. The fourth chapter describes the current merger framework within the European Commission and asserts that the EC did not comprehensibly apply its welfare standard; otherwise, it would have prohibited many of the airline mergers that I examine here. Chapter 5 then reviews the alternative scenario without merger permission: bankruptcy and its consequences. Two case studies about the failure of Malév Hungarian Airlines provide insight into the background of underperformance as well as into the short-term effects of airline exit on passengers' welfare, airport planning and LCC and network carrier competition.

Finally, at the operational level, the PhD thesis analyzes four Lufthansa takeovers in 2005 and 2009, and describes the consequences of failing to regulate market power. Chapter 6 controls for the EC's merger remedies, which proved only partially successful (e.g., they achieved only 15.3 new frequencies instead of the maximum possible 350 slot surrenders in all four cases), and it descriptively assesses capacity, frequency, yield and price changes on 21 overlapping routes. Although Lufthansa did not deviate from the EC rulings on frequency freeze, the airline increased capacity instead. Further, price freeze remedies in the current form are a 'gray area' and should be more precisely defined and controlled by the EC. The study also provides evidence that Lufthansa predated and foreclosed its rival Air Berlin on ZRH-FRA and VIE-CGN when it entered the market on these routes. Further, the investigation on the Lufthansa Group's price and capacity strategies on dominant routes finds significant price differences (about 15 to 32 percent) due to high concentration.

Chapter 7 identifies merger-specific cost efficiencies in the Lufthansa/SWISS case: economies of scale in marketing (reduced sales commission, insurance and security fees) and access to cheaper labor (outsourcing MRO and catering, and new contracts with cabin staff at SWISS). Assessed cost synergies were probably merger-specific, but also driven by a general cost-savings plan. Lufthansa itself did not realized any efficiency gains from takeovers other than SWISS.

In summary, I believe that efficiency, with other words productivity or profitability, is probable the main goal of all companies in order to survive. However, in case of a takeover, efficiency expectations has been usually too optimistic and merger-specific efficiency claims overestimated.

Most airline merger cases I investigate during the PhD thesis have been applied to rarely insolvent merger candidates. Taking over an almost bankrupt airline and hope for efficiency-gains in the short-run, where also passengers benefit from could not convince the European competition policy, which is understandable. The idea behind the EC's policy is to protect consumers from potentially price increase. However, the EC also seems to protect (less efficient) competitors from failure and thus, allows (previously prohibited) airline mergers (see Aegean/Olympic II, 2013). The limit of this approach, which is called Consumer Surplus (CS) standard, is however how to motivate competition?

The Chicago School provides one answer of that question, namely the so called Total Welfare (TW) standard. The aim of competition policy in this framework is exactly to enhance competition. The outcome of the merger procedure in the TW approach is similar to the CS approach, since at the end of the day, merger approval remains the dominant strategy. Though, while the EC allows mergers in order to protect less powerful market participants, the alternative merger standard would protect or rather support the most powerful, the most efficient members.

The discussion on who deserves more protection and / or more support by the government is endless in the history. In my view, the introduction of the more liberal TW approach into the European merger policy is challenging by numerous reasons I am going to describe in the following chapters. In sum, competition policy is not in the position (does not want/ does not believe/ does not capable) to assess merger-specific efficiencies.

My conclusion is therefore that merging companies need to be aware of the fact that the main goal of the EC merger policy is to protect consumers from price increase. As long as the industry keeps the rules, merging firms may enjoy the support of the government. The following work should provide a merger guidance for industry, for policy, and for interested audience of any kind of 'consumers'

1 EFFICIENCY DEFENSE AND BEYOND

"Efficiency defense is a legal provision allowing merging parties to present a justification to the adverse effects on competition found by the enforcement authority at the end of the competition analysis" (ICN, 2006, p. 63).

1.1 INTRODUCTION

Efficiency has become a buzzword in merger processes, but how effective is merger control in reality? Does efficiency still matter if the merger would otherwise increase market power? No, it does not, at least not in Europe. Competition law has traditionally had multiple goals in Europe, such as market integration, protection of freedom, efficiency and consumer welfare. Social and environmental issues are also included. The main purposes of competition policy in the new century seem to be efficiency and consumer welfare, but these are in conflict. Chapter **1** investigates these questions.

When merger control was influenced by the Harvard School approach during the 1950s, 1960s and early 1970s, efficiencies were not considered. However, with the rise of the Chicago School in the US at the end of the 1970s, efficiencies suddenly became an important part of the analysis. Competition policy in the European Union is a step behind: the EU started to adopt the efficiency criterion in the early 2000s, when industrial economics was already questioning the use of efficiencies. Section **1.2** provides insight into the theories behind the purpose of antitrust, while Section **1.3** derives the main competition-related syntheses from the different economic schools. These ideas are mainly based on the Chicago and Harvard Schools.

In his textbook on competition policy, the current Chief Economist of the European Commission (EC), Massimo Motta, defined competition policy as "the set of policies and laws which ensure that competition in the marketplace is not restricted in such a way to reduce economic welfare" (2004, p. 30). However, it is not always clear what economic welfare means. Is it consumer surplus, producer surplus, or both together? If the latter, whose interests are weighted more heavily? The goal of antitrust or competition policy depends on the welfare standard that is applied. The consumer surplus (CS) standard used in EC merger control differs from the total welfare (TW) focus in Canada or the hybrid approach in the US. Section **1.4** describes this issue. The EC aims to maximize consumer welfare based on consumer surplus and therefore applies the consumer surplus standard, which requires that consumers benefit from the merger. Section **1.5** focuses on the move since 1997 toward increasing the role of efficiencies (also called a *more economic approach*), in particular efficiency pass-over to consumers, and the relevance of the *efficiency defense*.

In the following sections, I will introduce the key issues of the thesis: the Williamson trade-off, the more economic approach and the efficiency defense.

1.1.1 THE WILLIAMSON TRADE-OFF

Williamson (1968) showed that the net effects of a merger are probably generally positive, so a relatively small cost reduction (from efficiencies) can offset a higher price increase¹. If the net allocative effects of the merger are positive, the merger should be cleared. Williamson defined the net allocative effect as the difference between *deadweight loss* and average cost savings (ΔAC).

Competition authorities should consider merger-specific efficiency gain (realized in ΔA), which might overcome deadweight loss (also called allocative inefficiency) and price increase (the transfer from consumer surplus to producer surplus; calculated as (P₂-P₁)*Q₂). As long as the cost savings are greater than the deadweight loss, the merger will increase total welfare, even if consumers pay a higher price.² In Williamson's approach, a price increase is only a welfare transfer from consumers to producers, so it leads to no relative change in total welfare and is unimportant.

In summary, if the cost savings are greater than the deadweight loss (see in Figure 1), the merger has positive net effects and should be cleared. The simple trade-off model from Williamson (1968) is:³

$$(AC_2 - AC_1) \times Q_2 > \frac{(P_2 - P_1) \times (Q_1 - Q_2)}{2}$$

Where AC_1 and AC_2 are the average costs before and after the merger; Q_1 and Q_2 are the provided quantity before and after the merger; and P_1 and P_2 are the prices accordingly. Williamson's model assumes the pre-merger price to be competitive, so the companies had no market power before the merger. It also assumes that both firms have identical average cost functions. With these assumptions, a small cost reduction could offset a relatively large price increase.⁴

¹ Leibenstein's study (1966) on X-efficiency gave a new explanation for way why firms do not produce the maximal level of output with given input factors. Leibenstein showed that the average costs of production depend less on allocative efficiency than on X-efficiency or lack of motivation, which are higher if there is less competition. Williamson was probably influenced by this research.

 $^{^{2}}$ For a detailed comparison of sufficient cost reduction to overcome price increase for different elasticity levels, see Hüschelrath (2009, p. 72).

³ Since the original model assumes non-linear demand function, the calculation of the deadweight loss is approximate.

⁴ In Williamson's calculation, supposing, for example, that own price elasticity is unit elastic, a 2 percent cost saving could offset a 20 percent price increase (1968, p. 23). The study also highlighted the fact that most mergers do not create any price or efficiency effects.

1. Williamson's "welfare trade-off" model



Source: Williamson (1968, p. 21)

The idea won Williamson the Nobel Prize and revolutionized antitrust thinking in North America (Shapiro, 2010). The European Union, following the increasingly liberal global trend, also adopted some ideas from the famous trade-off model into its merger regulation (ECMR) in 2004. It seems to be increasingly important to use economic models to claim efficiency, particularly for competition policy approval.

1.1.2 THE MORE ECONOMIC APPROACH

The more economic approach became the buzz phrase of European competition law at the end of the 1990s. It aimed to bring competition law enforcement more in line with current economic thinking. Although there is no unified definition of this approach, the following distinctive features can be identified (Németh & Remetei-Filep, 2010). The *more economic approach* is a "rule of reason" economic view instead of the previous legal "per se" approach. While a "per se" rule rejects certain mergers by labeling them as harmful; the new "rule of reason" approach needs a systematic market power evaluation with econometric data analysis. It is therefore more appropriate to talk about "a more effects based approach than simply a more economic approach" (Bishop & Walker, 2010, p. 10).

The first document⁵ that should be mentioned as a result of the more economic approach is the "*Commission notice on the definition of the relevant market*," published by the European Commission (EC, 1997). It describes methodologies to use when identifying the competitive constraints on market players, and introduces the SSNIP test⁶ and various quantitative methods (Németh & Remetei-Filep, 2010). Since then, the causes and consequences of mergers have received growing attention in Europe. Econometric approaches are increasingly used in competition policy enforcement: for example, a market analysis has to show that a merger will not lead to undue market power and abuse of market dominance.⁷

1.1.3 THE EFFICIENCY DEFENSE AND ITS PARADOX

Article 2(1)(b) of the first merger regulation (EC, 1989) was a contradiction on efficiency defense. Efficiencies (such as development of technical and economic progress) shall be taken into account if they benefit consumers <u>and</u> do not create an obstacle to competition. Since the efficiency defense is needed to counterbalance the potential harm, it is normally used if there is a conflict between competition and efficiency. The 1989 legislation, however, suggested that a defense could only be used if there is no conflict. Anyhow, in this case, efficiency does not need to be defended. Therefore, "the efficiency defense under the merger regulation (if any) is intended to be limited" (Röller et al., 2000, p. 68).

Three court defeats related to merger cases led to significant changes in 2002. The European Commission prohibited the mergers of Airtours/First Choice (M. 1524, 1999), GE/Honeywell (M. 2220, 2001), Schneider/Legrand (M. 2283, 2001) and Tetra Laval/Sidel (M. 2416, 2001). However, the Court of First Instance reversed the EC's prohibition decisions and delivered a hard critique of the lack of economics applied by the EC and how it treated those mergers (Németh & Remetei-Filep, 2010). It was time to conform and professionalize the economics used in merger decisions, so in 2003, the Commission created the position of Chief Economist. That person would be tasked with providing expert opinions and adopting a new regulation.

⁵ The reform of vertical agreements in 1999 was the next step toward a more economic approach (EC, 1999). The approach is more effect-based, emphasizing that the importance of market power in agreements cannot be exempted. The EC continued the reform with horizontal agreements. The most difficult task of introducing the new approach was in the legislation on the abuse of dominant position (Article 102, previous Article 82). Its reform began in 2005 (Németh & Remetei-Filep, 2010). ⁶ Developed by the US DoJ in 1982, SSNIP stands for the "small but significant non-transitory increase in price" test. The test, also called the hypothetical monopolist test, is based on own-price elasticity data. Section **4.2.1** describes SSNIP in detail.

⁷ Christiansen (2009) provides a good overview of the exact methodology of the more economic approach and many case examples about how far it has been implemented in EC merger policy in recent years (in German).

The new EC Merger Regulation (ECMR) 139/2004 came into force on May 1, 2004. According to its guidelines, concentration should be welcomed if it does not damage the competition, but increases the competitiveness of the entire European industry and raises living standards. Concentration has to maintain and develop effective competition. The resulting expansion of technical and economic progress should benefit consumers. The ECMR states in §29: "It is possible that the efficiencies brought about by the concentration counteract the effects on competition, and in particular the potential harm to consumers."

The ECMR 2004 replaced the dominance test (used from 1989-2004) with the SIEC test: "a concentration which would significantly impede effective competition (...) shall be declared incompatible with the common market" (Art. 2(3)). The new test also aimed to address the non-collusive oligopoly problems. The adopted merger guidelines dealt with the appraisal of mergers and with the assessment of non-coordinated (unilateral, non-cooperative game-theory-based oligopoly models) and coordinated (collusive) effects, and efficiency claims (Németh & Remetei-Filep, 2010). The new European-level guidelines moved away from protecting competitors and toward protecting competition and consumer welfare or consumer interest. In other words network, efficiencies and synergies should play an important role in the future (Németh & Niemeier, 2012). Thus, a convergence⁸ with US antitrust had begun. Economics is already central to antitrust in the US and competition policy in Europe, but *which economic concepts provide the most appropriate tools and the best suitable analytical framework for assessing market power and efficiency within merger control?* The first chapter aims to answer this question.

⁸ The aim is to bring US antitrust and European competition policy closer. According to my interview with the EC DG Comp (Pavlova, 2011), the main challenge is the different institutional frameworks. The US antitrust authority consists of the DoT (Department of Transport) and the DoJ (Department of Justice). The DoJ deals with antitrust and merger cases, while the DoT handles immunity cases. The role of the DoT is to meet the public interest, so it is important to note who benefits from the merger. If there is great public interest, the DoT allows the merger. It provides an explanation for the liberal forms of transport agreements.

1.2 ECONOMIC SCHOOLS OF ANTITRUST

"In general, if any branch of trade, or any division of labour, be advantageous to the public, the freer and more general the competition, it will always be more so" (Smith, 1776, p. 421).

The history of antitrust and competition policy has been extensively studied.⁹ The aim of the next section is to provide a brief overview of the main achievements of previous antitrust thinking in order to better understand the European competition policy framework. This section introduces the neoclassical approach, as well as the Harvard School, the Chicago School and the Modern Industrial Organization theories.

1.2.1 NEOCLASSICAL THEORY, THE CRADLE OF ANTITRUST

There have been many improvements¹⁰ since Smith described the concept of free competition with selfinterested behavior of market participants and laissez-faire. The *Classical School* was born with the publication of Smith's *The Wealth of Nations* in 1776 and was developed through the mid-nineteenth century by Ricardo, Malthus, Say and Mill. The Classical School was an attack on protectionism and feudalism at the time of England's industrialization. Its main topics were economic growth, the theory of value (Ricardo), the law of supply and demand (Say) and the problems of a growing population (Malthus). As the last great writer among nineteenth-century classical economists, Mill integrated the different classical views in his main work *Principles of Political Economy* in 1848. His more social approach to income distribution and government intervention was widely discussed.

Deeply impressed by Ricardo's ideas, Marshall wrote *Principles of Economics* in 1890, which ushered in a new century of economic analysis.¹¹ In his *Memorials* (pp.416), Marshall remembered: "My main position as to the theory of value and distribution was practically completed in the years 1867 to 1870, when I translated Mill's version of Ricardo's or Smith's doctrines into mathematics" (Shove, 1942, p. 302). With the help of mathematical tools developed by Cournot, Marshall developed the *Price Theory*. It forms the mainstream of microeconomic thinking and is the basis of the *Neoclassical School* and, later, the *Chicago School*.

Price theory is based on perfect competition in which there are many firms with homogeneous products, well-behaved production technology, no barriers to entry and perfect information. In this static model, market equilibrium is achieved and *economic efficiency* is reached when supply equals demand. Thus the equilibrium price of a given product equals the marginal cost of producing it.

⁹ See, for example, Drexl et al. (2011); Hildebrand (2009); Whish (2009); Pitofsky (2008); Posner (2007); Mercuro & Medema (2006); Shavell (2004); Gellhorn & Kovacic (1994); and Areeda (1981).

¹⁰ For an overview on economic thoughts before Smith, look at Robbins (2000).

¹¹ Nevertheless, Marshall's concept of competition was still dynamic, like the Classical approach. He defined moving equilibriums as part of the evolution. In contrast, Neoclassical economists have a static view on competition and equilibrium. For more about the differences between Classical and Neoclassical concepts of competition, price and value, see Stigler (1957).

Antitrust legislation was born in the same year as Marshall's book was published. In 1890, the *Sherman Anti-Trust Act (Act of July 2, 1890)* was enacted. It was the first legislation to address merger control, in the form of contracting against unlawful restraints of trade (Sec.1) and monopolizing (Sec.2). It was the first and probably the most debated regulation in the history of antitrust, and different parties have interpreted it very differently.¹²

The next milestone, the *Clayton Antitrust Act* of 1914, revisited previous regulations and prohibited acquisitions that could substantially reduce competition or create a monopoly.

1.2.2 THE HARVARD SCHOOL, LIMITING MONOPOLY AND MARKET POWER

Harvard economists in the early twentieth century found it naive to believe that the conditions of perfect competition could be met. The first criticism of the price theory model came from Chamberlin in the 1920s (at that time he was a PhD fellow at Harvard University, and he later became a professor there). He introduced the ideas of oligopoly, monopolistic competition and product differentiation. In this context, he was the first to draw attention to the cooperative and non-cooperative behaviors of oligopolies.

A decade later, the first female contributor the theory of competition, Robinson, further developed Marshall's partial equilibrium techniques (focusing on marginal revenue "MR" and marginal cost "MC" analysis). However, she dropped the assumption of perfect competition and added price discrimination instead. Chamberlin's book, *The Theory of Monopolistic Competition*, and Robinson's book, *The Economics of Imperfect Competition*, were both published in 1933 (Deane, 1993). Robinson's work became the early guide for today's relevant antitrust market analysis.

Mason (1939), a Harvard professor, was the first to mention the need for a more complex tool than pure price analysis. He drew attention to the chain of problems: different market structures, price response and their consequences for the economy. His new model became well-known as the Structure-Conduct-Performance (SCP) framework and, extended with entry barriers by Bain, is still the starting point for the research field of *Industrial Organization (IO)*. This field was the beginning of a new economic thought cluster that turned away from price theory, called the *Harvard School*.

¹² On one side, the Sherman Act is claimed to be the "best-known response to a combination of economic, social and political circumstances, which was influenced by resentment against increasing domination of big business, political fears of concentrated power and the perceived threat to the traditional right of individuals to determine their own destinies" (Hildebrand, 2009, p. 79). On the other side, Holmes stated in the early 1900s that it was "a humbug based on economic ignorance and incompetence" (Gellhorn & Kovacic, 1994, p. 19). The courts have also made varying interpretations of the Sherman Act; it is unclear whether monopolies are per se prohibited, or only the attempt to monopolize.

Scherer (1970) defines IO as a field of study which describes how production is balanced with demand through organizing mechanisms (e.g., free market) and "how variations and imperfections in the organizing mechanism affect the degree of success achieved by producers in satisfying society's wants" (p. 1). In Scherer's view, while Price Theory (microeconomics) keeps models simple and rigorous, IO is rich in independent variables, predictions and explanations for real-world issues.

Scherer (1970) also introduced the SCP model, which has become the central model for IO analysis. It assumes that the fundamental aim of production is good *performance*, which can be achieved by four factors: 1) efficiency, 2) innovative production, 3) full employment and 4) equal income distribution. All four factors should be satisfied. Performance depends on *conduct* (i.e., the behavior of sellers and buyers: pricing, marketing, R&D, etc.), while conduct depends on the *structure* of the relevant market (e.g., concentration, entry barriers, product homogeneity). One can derive market structure from *basic conditions* of supply and demand, but structure can also change basic conditions on the market. Conduct (e.g., successful research) might also influence basic conditions (e.g., technology) and/ or structure (e.g., production costs). These adverse effects are called the *feedback effects*.

Starting in the 1950s and reaching the height of its influence in the 1960s, the Harvard School of antitrust and industrial organization became the mainstream economic theories in the US. During the 1960s, the goal of US antitrust policy was the limitation of monopoly and market power.

1.2.3 THE CHICAGO SCHOOL AND THE HARDCORE ECONOMISTS, ENHANCING EFFICIENCY

The rise of the Chicago School in the early 1970s was complex. Due to strict antitrust politics expressed in regulation against concentration, US firms were losing market share nationally and internationally. The general dissatisfaction led to the election of Republican Richard Nixon to the presidency in 1969, the first time in almost¹³ 36 years that a Democrat did not hold that office. The new president appointed numerous Chicago School scholars¹⁴ to the US Court of Appeals, beginning the change in antitrust law (Kovacic & Shapiro, 2000).

The Chicago School's approach was based on four statements. First, neoclassical price theory (microeconomics) is the most qualified science to analyze antitrust.¹⁵ Second, the only goal of antitrust policy is consumer welfare with efficiency, not wealth distribution or other macroeconomic aims. Third, judges therefore need to make decisions consistent with the aim of antitrust policy (i.e., efficiency). Fourth, "simplicity and clarity" offer a secure and predictable legal framework, and promote capital investments within it (Hildebrand, 2009).

¹³ Since Roosevelt was first elected president in 1933, only Eisenhower's presidency (from 1953 to 1961) had interrupted the Democrats' hold on the presidency. These nearly four decades are also called the 'New Deal Coalition.'

¹⁴ E.g., Bork, Easterbrook, and Posner.

¹⁵ Milton Friedman argued that not the model of perfect competition itself, but its explanatory power is important (1953).

There are a number of other differences between the Harvard School and the Chicago School. Proponents of the Chicago School believe in a dynamic competitive market in which market imperfections and conspiracies are transitory; in the survival of the fittest in the market (which Stigler (1971) called Economic Darwinism); in the importance of economies of scale; and in the insignificance of entry barriers (other than governmental), which therefore require no remedies. Chicago School proponents also assume that all firms have perfect information on costs and profits; view market power with skepticism; and have an entrepreneur-friendly liberal-conservative attitude (Mercuro & Medema, 2006; and Hildebrand, 2009). The contrasting views on *predatory pricing* provide a helpful example. Whereas the Harvard School treated predatory pricing as an attempt to monopolize, Chicago School judge Frank Easterbrook said that predatory pricing is an "irrational activity and those claiming it should be summarily dismissed" (Hovenkamp, 2010b, p. 2).

Based on the policy statements above, the following table illustrates the main differences between the Harvard School's and Chicago School's approaches to contracting. While the Harvard School makes a strict assumption about firms' strategic, or even predatory, behavior in case of higher concentration, the Chicago School instead sees the benefits of agreements and concentration: cost reduction and efficiency improvements.

	Harvard	Chicago
Agreements among firms	Cartelization	Cost reducing, efficiency enhancing methods
Exclusive vertical	Anticompetitive restriction,	"Efficiency enhancing means of preventing
agreement	harmful market allocation,	dealer free-riding on the marketing investments
-	per se prohibited	of manufacturers" (Baker, 1999, p. 12)
Vertical restraints	Prohibited, rule of reason	Lawful, per se
Tying, exclusive dealing	Anticompetitive, unilateral	Efficiency enhancing
Predatory pricing	Monopolization	Normal process

2. Different views on firm agreements: Harvard and Chicago

Source: Baker (2002) and Hovenkamp (2010b).

1.2.4 THE HARVARD VS. CHICAGO BATTLE

By the early 1970s, the Harvard School was having increasing difficulties with their statistical methods. They often delivered similar studies by using approximate proxies, but provided contrasting results. Further, statistics could not tell anything about causality, whether the structure (concentration) defines performance (profitability) or whether the performance dictates the structure (i.e., attack on the concentration doctrine) (Hildebrand, 2009). Other scholars criticized the political influence on decisions, the Harvard School's economic structure-socio political approach. White (1992) even described it as "Modern Populist School."

The hardest critics came from the Chicago School, especially from Bork,¹⁶ Posner, Stigler, Demsetz, Easterbrook and Gellhorn. They argued that there were efficiency reasons behind performance and refused any part of price or entry regulations. By the end of the 1970s, even Harvard economists and lawyers like Areeda and Turner¹⁷ had moved away from the SCP approach. They oriented themselves toward anticompetitive conduct and refused aggressive legal intervention (Hovenkamp, 2010b).

The sunset of Harvard's SCP paradigm had already begun when Bork and Bowman (1965) published their article on the crisis in antitrust. They affirmed antitrust as protectionist, since "antitrust law protects competitors in name of protecting competition" (p. 375). They asserted that antitrust had labeled economies of scale and efficiency as anticompetitive, because it could create competitive advantage, injure competitors and impede new entry.

Bork and Bowman (1965) made an example of the *Brown Shoe Co. v. United States* case¹⁸ and presented the contrast in the court's argument: "Although mergers are not rendered unlawful by the mere fact that small independent stores may be adversely affected, we must recognize that mergers are unlawful when small independent stores may be adversely affected" (p. 373). They excoriated the court's decision, which declared the merger illegal since it generally held vertical integration to be illegal as a type of exclusionary practice (such as price discrimination or exclusive dealing contracts). The article also reviewed the social purpose of antitrust (calling it an "ugly demand for class privilege") and questioned the credibility of courts: "How could one know in a particular case whether the court would apply a rigorously pro-competitive rule or the social policy of preserving small business units from aggressive behavior?" (p. 370).

Stigler, a former PhD student of Knight (who was known as the 'father of the Chicago School'), heavily criticized earlier antitrust economics: "I am unwilling to believe that economists in general, or Clark in particular, had any appreciable influence on antitrust legislation. (...) no economist had any professional knowledge on which to base recommendations" (1982a, p. 6). He went even further: "The wonder, of course, is that any large number of economists ever survive in a law enforcement agency (...) but unless one believes in a labor theory of value, the magnitude of economists' influence remains uncertain" (p.

¹⁶ Bork (1993, first edition 1978) was very skeptical of oligopoly theory. He wrote: "it is little more than a guess" (p. 92) and ironically went further: "there appear to be about as many oligopoly theories as there are economists who have written on the subject" (p. 102). Finally, he even called it "speculation about how firms may or may not be able to behave" (p. 104).

¹⁷ Turner described the 1956 DuPont case in the *Harvard Law Review*. That case later became known as the 'cellophane fallacy' and was a milestone in the history of relevant market definition.

¹⁸ The *Celler-Kefauver Act* in 1950 strengthened antitrust by adding vertical mergers and asset acquisitions to the list of prohibitions (if they lessen competition). In the case *Brown Shoe Co. v. United States* in 1962 the court overruled a merger by means of a five percent market share. "This measure enabled the government to press aggressive attacks against categories of horizontal and vertical transactions" (Kovacic & Shapiro, 2000, p. 51).

7). In that same year, Stigler won the Nobel Prize for his work on markets and public regulation (Stigler, 1982b). It was time to change general thinking about economics and antitrust.¹⁹

1.2.5 New Industrial Organization: A marriage between the Harvard and Chicago Schools

By the time the courts had adopted Chicago School theories, economists had already improved new theories by combining ideas from both the Chicago and Harvard Schools. They did this while keeping in mind Keynes' idea: "The common sense of one generation is often the economic theory of a previous generation" (Baker, 2002, p. 18). Mathematics and empirical econometrics challenged the Chicago School. The main tool of new IO research²⁰ is the study of human behavior, (mainly non-cooperative) *Game Theory*²¹.

The first critics of the Chicago School appeared at the end of the 1980s. They asserted that it is only driven by ideology and is not fact-oriented. They also asserted that its static models are too simple: they should include market imperfections (e.g., asymmetric information or externalities) and strategic behavior with market power that can harm competition (e.g., raising rivals' costs²²).

The new thinkers not only considered allocative and productive efficiency, but also introduced *dynamic efficiency*, (e.g., future gains from innovation) (Hildebrand, 2009). The new research focused on conduct instead of structure, on dynamic strategic behavior (e.g., predatory behavior) and especially on predatory pricing. IO theory at the end of the 1980s had moved far away from the *contestable market theory* and had begun to consider sunk costs, *entry barriers* and government regulation. Modern IO in the 1990s combined the "theory of business strategy and the tools of industrial analysis" (Shapiro, 1989, p. 134).

¹⁹ The final attempt to rescue the ruins of antitrust based on the SCP approach was the Neal Report in 1968. Its contributors were, among others, Neal (the Dean of Chicago Law School), Baxter (Stanford Law School) and Bork (Yale Law). President Johnson commissioned the report just before Nixon won the 1968 presidential election. Nixon then appointed Stigler to write a new report in that same year. Bork published his minority report in 1968 (in *Antitrust Law and Economics 53*). Baxter, fully rejecting his previous recommendations in the Neal Report, became the first Assistant Attorney General in the Antitrust Division after Reagan won the presidential election in 1980 (Hovenkamp, 2009; and Mercuro & Medema, 2006).

²⁰ The research field is also called Modern Industrial Organization, post-Chicago and Industrial Economics.

²¹ In its early years, game theory focused on rationality (Neumann, Morgenstern), introduced the first mover advantage (Stackelberg), added signaling doctrine to asymmetric information theory (Spence) and described strategic interactions among humans. Famous representatives of game theory include Nash, Selten and Harsanyi, the latter of whom won the Nobel Prize in Economic Sciences in 1994.

²² Incumbent firms can act strategically to raise the costs of a potential entrant: put them at a competitive disadvantage and reduce the profitability of entry (Church & Ware, 2000, p. 123). Raising rivals' cost is a conduct, a strategy, which excludes competitors by increasing their costs, e.g., by exclusive arrangements to force suppliers to discriminate against rivals; by rent seeking in politics in order to battle out product standards, minimum wage contracts (if the rival is labor-intensive), or other government regulations; by advertising or R&D. These strategies have advantages over predatory pricing: it is more credible, less expensive and "it is better to compete against high-cost firms than low-cost ones" (Salop & Scheffman, 1983, p. 267). A good overview of case history provides (Scheffman & Higgins, 2003).

Schmalensee (1988) wrote a comprehensive study on the topics of what he called *industrial economics*, which is still relevant. While describing the improvements in different fields of research (e.g., credibility²³, principal-agent theory, entry deterrence), he also drew attention to the problems, which mainly arise from having too many different theories. As Schmalensee pointed out: "Recent research has cast doubt on many positive and normative relations that were once widely believed to be generally valid" (p. 677).

The relationship between concentration and competition is still questionable. Welfare analysis (due to very different oligopoly models, sophisticated game theory and imperfect data²⁴) is based on distorted equilibrium with second-best solutions.

Modern IO advanced from both the Chicago and Harvard Schools and focuses on the behavior of firms and individuals (i.e., the theory of the firm by institutional or transaction cost economics; game theory with strategic interactions). By developing IO, the Harvard School played a dominant role in forming mainstream ideas about antitrust worldwide.

US antitrust was also influenced by the Chicago School in the 1980s, while competition policy within Europe was instead inspired by the Freiburg School (for more details about the Freiburg School, see Section **1.4.3**). These diverse impacts make a convergence of US antitrust and EU competition policy more difficult.

1.2.6 THE EUROPEAN SCHOOL: A MORE ECONOMIC APPROACH

Competition law has traditionally had multiple goals in Europe. These include market integration, protection of freedom, efficiency and consumer welfare, but also social and environmental issues. The main goals in the new century, however, seem to be efficiency and consumer welfare (van den Bergh, 2007). In order to understand the roots of this multiplicity, we need to take a short look at the history of EC competition law.

During the 1940s, economists went back and forth about the appropriate model: perfect competition or oligopoly? This discussion is the background of Harvard economist John Maurice Clark's theory of the second best²⁵.

²³ The credibility of threats is a key issue in dynamic games. Only threats that are credible will influence the behavior of rational agents (Church & Ware, 2000, p. 299).

²⁴ "Since data collection is usually neither intellectually exciting nor highly valued by the economics profession" (p. 677), it will always depend on financial support. This raises another interesting question related to corporate financing: could the data provided be partial or biased by corporate interests?

²⁵ Lipsey and Lancaster define the theory of the second best as the following: "the maximization of total surplus in one market may not be efficient if surplus in other markets is not also maximized" (Church & Ware, 2000, p. 29).
Thus, if there are imperfect market conditions and perfect competition is not achievable, the industry needs remedial imperfection — "a theory that one kind of imperfection requires another to take part of the curse off it" — in order to help a workable or effective competition²⁶ (Clark, 1940, p. 249). Effective competition is still the basic concept of European competition policy, which necessitates rivalry. "To be effective, competition requires companies to act independently of each other, but subject to the competitive pressure exerted by the others" (EC, 2015).

Similarly, the German competition policy, Ordoliberalism²⁷, inspired the Treaty of Rome in 1957 and, particularly, the Articles on restrictive agreements and dominant position,²⁸ The Treaty of Rome established the European Economic Community (EEC), which was the precursor to the European Union. EEC competition law in the 1950s focused on protection against political and private economic power. Ordered regulated competition within the social market economy has traditionally been a "middle path between socialism and capitalism by using state intervention" (Hildebrand, 2009, p. 8).

The first EC merger regulation, the *European Council Merger Regulation (ECMR)* was introduced in 1989 and prohibited dominant position. Hawk (1990) compared it to the Harvard School's antimonopoly philosophy of 1960s. After the *Council Regulation 13/10/97* was adopted in 1997, EC competition policy started to adopt the previous SCP framework and become familiar with the new IO approach (Németh & Remetei-Filep, 2010).

From then on, their policy language became more similar to that used in the more liberal US antitrust policy (Pepall et al., 2011). This sort of language, called Post-Chicago or New Industrial Economics in the US, is called the *more economic approach* in the EU. This approach enhances economic efficiency, as long it will be passed on to consumers. In contrast, it often confuses producer efficiency with market power, or even with anticompetitive behavior.

The next table summarizes the main EC merger regulations. The next section will derive and discuss syntheses of these different economic schools on competition policy.

²⁶ Influenced by Joseph A. Schumpeter, who focused on innovation and dynamic competition, Clark improved the concept of effective competition. The literature often uses both concepts interchangeably (e.g., see Chapter 1.3 in Herdzina (1999).

²⁷ The Freiburg School of Ordoliberalism believes in protection of free competition with limited state intervention, the market order has been seen as constitutional order. Eucken, Böhm and Großmann-Doerth founded the Freiburg School of Ordoliberalism in the 1930s at the University of Freiburg in Germany. They supported procedural, rule-oriented liberalism with a market order, as a privilege-free, ethical order of competition.

²⁸ Articles 85 and 86 of the Treaty of Rome (1957); later, articles 81 and 82 of the Treaty of Amsterdam (1997); and currently articles 101 and 102 of the Treaty of Lisbon (2009).

Date	Regulation	Features
1957	EEC Treaty	Establishes the European Economic Community.
	Articles 85 and 86	
1989	Council Regulation 4064/89	First merger regulation, prohibits dominant
	European Council Merger Regulation (ECMR)	position.
	Official Journal L 395, 30/12/1989	
1997	Council Regulation 13/10/97	Defines the relevant market; introduces the
	Horizontal Merger Guidelines Articles 81 and 82	SSNIP test and various quantitative methods.
	Official Journal C 372, 09/12/97	
1999	Commission Regulation 2790/99	Block exemption only describes prohibited
	Vertical Agreements	actions.
	Official Journal L 336, 29/12/99	
2004	Council Regulation 139/2004 New ECMR	New SIEC test; reform of article 102 on the
	Official Journal L 24, 29/01/04	abuse of dominant position; deals with unilateral
	European Council Merger Guidelines (ECMG)	and coordinated effects and efficiency claims.
	Official Journal C 031, 05/02/04	
		<i>a a</i>

3. EC competition policy regulations related to mergers

Source: own figure

1.3 SYNTHESES ON COMPETITION POLICY

"Competition maximizes society's total wealth but does not necessary result in optimal income distribution. By emphasizing competition, current antitrust policy focuses mainly on maximizing the size of society's economic pie. How that pie is distributed is left mainly for other forces to decide" (Gellhorn & Kovacic, 1994, p. 42).

The Harvard School of economic research added real-world issues (like entry barriers, asymmetric information, and government intervention) to the perfect competition model. The Harvard-Chicago debates on concentration within a market, entry barriers and the need for regulation still inspire economists.

The following figure summarizes, and this section explains, the main economic syntheses related to the Harvard and Chicago Schools and Modern IO: whether concentration is evidence of market power or of efficiency (and which); whether entry barriers exist or markets are contestable, where only the fittest survive; and finally, whether society needs regulation or not.

	Harvard	Chicago	Modern IO
Framework	Oligopoly Theory	Neoclassical Price Theory	Game Theory;
		(Microeconomics)	Econometrics
Goal of antitrust	Limit monopoly and	Consumer welfare with	Consumer welfare
	market power	efficiency	
Main syntheses of the	Concentration doctrine	Efficiency doctrine (Bork)	Raising rival's cost (Salop
different economic	(Bain);	Survival of the fittest	and Scheffman);
schools	Effective or workable	(Stigler)	Principal-agent theory:
	competition (Clark);		moral hazard, adverse
	SCP model (Mason);		selection
	Entry barriers (Bain);		Entry deterrence (Salop)
Need for regulation	Yes	No	Yes
Critiques	Political influence	"Too simple" models	Difficult to conduct in
			practice

4. Comparing Harvard, Chicago and Modern IO

Source: own figure

1.3.1 IS CONCENTRATION THE EVIDENCE OF MARKET POWER OR OF EFFICIENCY?

After Rosenbluth's (1955) popular study on concentration indices, Harvard became the home of a new theory, called *Structuralism*, which proponents focused their research on market structure and defined that concentration as evidence of market power. One of Harvard's leading theorists (and a previous PhD student of Schumpeter), Bain (1954), developed the concentration doctrine (see Figure 6).

According to the *concentration doctrine*, concentration increases market power, which makes firms with high market share more profitable. However, the concentrated market structure leads to misallocation of scarce resources, since oligopolies or a monopoly produce less at higher prices than firms in competition do.

Thus, the government needs to intervene in order to allocate the resources more efficiently. Bain disagreed that cost efficiency, in the form of economies of scale, significantly stimulates oligopolies.

While Harvard's Structuralists saw concentration as clear evidence for market power (and therefore undesirable), Chicago School economists (like Demsetz) argued the other way around. The Chicago view is that competition leads to the success of cost-efficient firms, which might increase concentration (therefore in parentheses in Figure 6) and will surely improve profitability. Bork, a former student of Director,²⁹ worked out the efficiency doctrine.

According to the *efficiency doctrine*, improving cost efficiency benefits consumers and increases welfare. Competition induces an efficient environment where, parallel to Darwin's evolution theory, only the best companies or the *"fittest survive"* (Stigler, 1982a). Thus, concentration (and market power) is a natural consequence of competition and efficiency.³⁰ Therefore, no government intervention is needed (Bork, 1993). The debate is still ongoing.



5. The Chicago efficiency doctrine and the Harvard concentration doctrine

Source: own figure

²⁹ Director was Milton Friedman's brother-in-law, a former a student of Knight, a professor at Chicago's Law School from 1946 and the founder of *The Journal of Law and Economics* (in 1958). He first introduced the efficiency criterion with statistics and price theory to antitrust in order to serve consumers, not competing firms. Bork said: "He (Director) was the first one anywhere to question the economics of antitrust as the courts developed it." Later, Bork stated: "He gradually destroyed my dreams of socialism with price theory" (New York Times, 2004).

³⁰ Harberger (1954) was the first to measure welfare loss due to monopoly and he found it surprisingly low.

1.3.2 WHAT DOES EFFICIENCY MEAN?

Efficiency has become a buzzword in both academics and business since the Chicago School's efficiency doctrine. However, 'efficiency' takes various forms. This section explains the different approaches to efficiency. To give a résumé of several efficiency approaches, this section describes *allocative, productive, dynamic* and *transactional efficiencies*.

1.3.2.1 Productive efficiency

Productive efficiency, a term mostly used in business life, means producing with minimum average total costs (ATC). In Scherer's definition (ibid), in the long-run equilibrium, each firm sets prices, where $P=ATC_{min}$. Scherer declared that competition leads to productive efficiency, which hinders firms from earning a supra-profit and guarantees an equal income distribution between consumers and producers. In their Neoclassical economics textbook, Samuelson and Nordhaus described productive efficiency: when the economy is on its production-possibility frontier, it "cannot produce more of one good without producing less of another" (1989, p. 28).

Independent from market structure, and if both allocative and productive efficiency criteria are satisfied, Chicago School economists talk about wealth maximization. In Bork's definition, the nation's *wealth* is "consumer" (meaning total) welfare.

The Chicago School approach to productive efficiency is not transparent. Bork defined overall efficiency as *allocative* <u>and</u> *productive efficiency*. Though he wrote the following about the use of resources inside a firm — "Efficiency alone is used, productive efficiency is meant" (1993, p. 91) — it is more than simply a technical or plant-level efficiency. Economies of scale, management skills, minimum efficient size or specialization are only causes of efficiency. "It is any activity by a business firm that creates wealth (...) that consumers are willing to pay for" (p. 104ff).

1.3.2.2 Allocative efficiency

Most academics talk about *Pareto efficiency* (or Neoclassical Pareto efficiency³¹) and define efficiency as if nobody could be made better off without making someone else worse off. Perfect competition, through its price system, efficiently allocates the resources. The process is also called allocative efficiency (Nicholson & Snyder, 2010).

³¹ See Paul A. Samuelson's or Hal Varian's work. A modern application is in Nicholson and Snyder (2010). Neoclassical economists suggest maximizing the sum of consumer and producer surplus, maximizing satisfaction or utility, given efficient resource allocation, which can be the case only under perfect competition.

Posner (2007), a leading Chicago scholar, completed Pareto efficiency with the compensation principle³² and argued that Kaldor and Hicks made the most popular interpretation of efficiency. Hicks argued: "If a community were organized on the principle of making all alterations which were improvements [in the efficiency sense], then, (...) almost all of them would be better off after the lapse of a sufficient length of time" (Hicks, 1941, p. 111). Kaldor suggested that efficiency improvements should be preferred in general, even if some people lose and are not compensated by the winners (Scitovsky, 1951).

In Bork's definition, allocative efficiency asks whether the resources in an economy are placed (i.e., allocated) in the way in which consumers most appreciate their output. The best solution employs all input factors where the value of their marginal product is the highest. The problem of monopoly (and merger or cartel) is not the higher price or the output restriction, but the misallocation of resources (Bork, 1993).

Harvard professor Scherer (1970) also considered the costs and derived allocative efficiency from the long-run equilibrium, where "the cost of producing the last unit of output — the marginal cost — is equal to the price paid by consumers for that unit" (p. 13). Most microeconomic textbooks apply this P=MC assumption.

1.3.2.3 Dynamic efficiency

Since the previously described approaches to efficiency have limitations in time, analysts may add dynamic efficiency. As Motta characterized it, dynamic efficiency is "the extent to which a firm introduces new products or processes of production ...(...) ...move the efficient frontier faster or further forward" (2004, p. 55). Motta measured dynamic efficiency by measuring the incentives of innovation and found that a firm in a competitive environment will innovate if the future profit is higher than the fixed costs of innovation. Kolasky and Dick (2003, p. 247) classified dynamic efficiency as learning by doing, research and development (R&D) and entrepreneurial creativity. However, there is a further question: do large firms and monopolies encourage R&D and innovation or better competition?³³

³² Chipman defines dynamic efficiency as follows: "when comparing two alternatives, one of the states constitutes an improvement over the other (in the weak sense including equivalence) if it is possible for the gainers to compensate the losers for their losses and still be at least as well off as in the original state " (Eatwell et al., 1987, p. 524).

³³ Arrow's defense (1972) of the role of competition won him a Nobel Prize for his contribution to general equilibrium theory in 1972 (when he was a Harvard professor). The idea of 'creative destruction' comes from the Austrian economist Joseph Schumpeter. Heertje describes creative destruction like: "an essential process in capitalism, which refers to the incessant mutation of the economic structure: destroying the old and creating a new. Schumpeter invented the phrase in 1942" (Eatwell et al., 1987, p. 714). Schumpeter theorized that in order to protect firms from 'too much' competition, the protection of ownership rights and provision of patents, copyrights, and licenses should be based on the view that innovation has to be defended. Demsetz (1982, p. 32) noted the paradox of this policy: "Whereas the existence of (appropriate) trademark protection is a barrier to greater production of known products, the absence (...) is a barrier to invention of new products." Twenty-first century economists still disagree about the role of market structure in enhancing innovation. Baker (2007a, p. 589) argued that

1.3.2.4 Transactional efficiency

New Industrial or Behavioral economists also consider a fourth kind of efficiency. Denying the Neoclassical model of pure price mechanism in his early work, Coase (1937, p. 390) asserted that the main matter of creating a firm is "the cost of using the price mechanism," such as the costs of information, marketing, negotiating and contracting. If the costs of these transactions are too high (especially because of uncertainty in the market), it seems to be better to integrate them via long-run contracts or even through vertical or horizontal integration. This concept is called *transactional efficiency*.

Williamson (1981) drew attention to human imperfections, like bounded rationality and opportunism, which make a transaction more risky and complicated. Thus, given uncertainty and the growing risk of opportunism, firms have a high incentive to internalize. Contracting is important when there are semi-special assets, while more specialization usually needs internalization. Common ownership should diminish the costs when contracting becomes too risky.

Hovenkamp (2010a) writes that transaction cost analysis brought the Harvard and the Chicago Schools closer together. By concerning itself with vertical restraints, tying, *double marginalization*, exclusive dealing, resale price maintenance, exclusionary practices, *predatory pricing*, raising rivals cost, foreclosure, price discrimination, joint ventures and mergers, transaction cost economics does not assume that those arrangements are suspicious (like the Harvard School does). In contrast, it shows the conditions under which they might be beneficial. On the other side, transaction cost economics also rejects the Neoclassical and Chicago School arguments about free entry, flexible resource allocation or human rationality. Hovenkamp summarized that: "The use of transaction cost economics in antitrust is an exercise in examining conduct by reference to Coasean markets, while power is assessed by reference to neoclassical markets" (ibid, p. 10).

Transactional efficiency is rarely applied in competition policy practice. One reason is that the line between efficient and harmful contracting and bargaining is not clear; it can differ in every situation. There is no general rule, like high concentration indices in the Harvard School or more or less the power of free competition in the Classical, Neoclassical or Chicago Schools. As Hovenkamp wrote (ibid, p. 35): "As a result, the transaction costs of operating the legal system are necessarily higher."

[&]quot;antitrust is not a general-purpose competition intensifier". Instead, it should merely focus on enforcing behavior and conduct, which improve innovation. On the other side, Motta (2004, p. 57) highlighted the importance of structure and concluded that "a monopoly (or a cartel) is worse than competitive market structures, because it fails to stimulate dynamic efficiency."

The figure below illustrates the growing circle of efficiency concepts: with wider rings the definition of efficiency gets broader. Productive efficiency is a condition to be fulfilled for allocative efficiency. Productive efficiency is often used as a measure of cost efficiency in real businesses, though Chicago School representatives have reached no consensus about how to use it. Most competition authorities try to investigate dynamic efficiency as well, with less success (see Section **1.4.2**.)

Transactional efficiency, however, remains a future research area, at least for competition policy purposes. The EC only uses some of the efficiencies described in this section, which only correspond to the middle of the efficiency circle. Though new economics provides complex tools, the effort needed to implement them might be too enormous.



6. The growing circle of wealth, welfare and efficiencies

1.3.3 DO ENTRY BARRIERS EXIST OR ARE THE MARKETS CONTESTABLE?

Bain also found that industry profitability depends on the seller concentration ratio and *entry barriers* (Scherer, 1986, p. 6). He stated that entry barriers exist if, in the long run, incumbent firms can set their prices above the *average costs* of production and distribution. As we can see from the discussion, in the literature has reached no consensus about what entry barriers are. Ferguson defined entry barriers as conditions that restrict entry while incumbent firms price above *marginal costs* (Demsetz, 1982). Barriers to entry played a central role at Harvard.

Chicago School economists, like Stigler, are rather skeptical of entry barriers, but describe them as additional costs related to entry, which are not held by established firms.

Demsetz (1982) identified several entry barriers: information costs, firm reputation and history (thus consumer loyalty), industry-specific investments and trademark protection. Figure 8 illustrates the Harvard versus Chicago Schools' debate on entry barriers. Whereas Bain saw barriers to entry in economies of scale, marketing, capital requirements and the existence of profit, Stigler refused all those factors and said that there are no barriers due to perfect information (same cost function, same input availability for every firm; Kolasky & Dick, 2003).

7. Different views on entry barriers

Source of barriers	Bain (Harvard)	Stigler (Chicago)
Economies of scale	Yes	No, if entrants have access to the same cost function
Advertising	Yes	No, if these inputs are available for all participants
Capital Requirements		
Profit	Yes	No
	r 1	

Source: based on Demsetz (1982) and Kolasky and Dick (2003, p. 26ff)

The deregulation wave during the Reagan presidency in the 1980s was based on the *contestable market theory*. Baumol, a Princeton University professor, wrote: "A contestable market is one into which entry is absolutely free, and exit is absolutely costless" (1982, p. 3). Entry is free in the sense that every firm has access to the same technology, incumbents have no cost advantage, there are no sunk costs of entry, and one can "*Hit and Run*" independently of the market structure, even in a monopoly. In this model, long-run profits are zero, there is no inefficiency of production in equilibrium and price is never less than marginal cost. Baumol described the airline market as the best example of contestability.

1.3.4 DO WE NEED GOVERNMENT INTERVENTION?

The Chicago School was correct that the goals of government intervention, and especially those of antitrust or competition policy, might be in conflict with each other. Who deserved more protection from the government: consumers, competitors or competition? If competitors, should less efficient companies also be protected against 'unfair competition' (efficiency offense³⁴) or, quite to the contrary, was it the 'national champion' who deserved a shelter?

At a meta-level, should the government interfere at all (Harvard approach) or only provide a framework, a defense against unfair conduct and market injury in general (Chicago approach)? What does 'unfair' mean in a world where consumer benefit seems to be the priority of competition authorities?

³⁴ Efficiency offense is when efficiency gains lead to a high market share of the merged entity. Efficiency offense can create a dominant position, 'form an obstacle to competition' and harm competition by making the rivals worse off (EC, 1989).

Is it fair for 'inferior' producers to be punished while cutting costs in order to win market share (Chicago's question)? Does a high market share equal market power, and is it automatically anticompetitive (Harvard's view)? These are the questions I will try to clarify in this section.

8. The goals of competition policy



1.3.4.1 The aims of competition policy and regulation

The aims *within* antitrust or competition policy are often in conflict. Bork (1993, p. 51) wrote that the only aim of antitrust should be the maximization of consumer welfare (which he defined as consumer <u>and</u> producer surplus): "Improve allocative efficiency without impairing productive efficiency so greatly as to produce either no gain or a net loss in consumer welfare" (1993, p. 91).

The problem, namely the *antitrust paradox*, is that courts often take into account other values (e.g., equality, income distribution³⁵), which are in conflict. The paradox arises from the fact that government intervention, while aiming at welfare improvements, often diminishes welfare.

In general, the goal of competition policy is to maintain or help to establish competitive market structures in which efficiency is exploited and thus *consumer* welfare is maximized. Whish defined the aim of UK competition policy as following: "Maintaining the process of competition in the market place, not as an end in itself, but as a way of maximizing consumer welfare" (2009, p. 806).

The German approach protects the economic freedom of *competition*, but some *competitors* still deserve more protection. In the American anti-monopoly approach, competition increases social benefits, which are lost through a monopoly. The European more economic approach enhances economic efficiency, as long it will be passed on to *consumers*. In contrast, producer efficiency (i.e., profitability) is often confused with market power, or even with anticompetitive behavior.

 $^{^{35}}$ *Income distribution* and *equality* are two more important issues to consider when assessing efficiency. Nicholson and Snyder (2010, p. 357) defined equality as a fair distribution of goods or utility, while noting that equality can be only achieved by sacrificing efficiency. Stiglitz (2009, p. 12) made light of the problem, writing that "the wealthy and powerful may 'exploit' others in an 'efficient' way (...) but such outcomes are socially unjust, and unacceptable." Scitovsky (1951, p. 304) addressed the topic sarcastically, writing that equality is "the equal ability of different people to enjoy themselves" and showing that there is no consensus about it.

This section takes a look behind the theory, searching for why the competition authorities are skeptical of efficiencies. The Classical School of free competition and the Neoclassical price theory focus on consumer satisfaction and efficiency, but are "silent about institutional arrangements, about adequate policy rules. If competition is not feasible, regulation has to develop those institutional arrangements" (Kahn, 1995, p. 17). If competition itself does not work, the government needs to make it work (i.e., with the help of market regulation).³⁶

The differences between competition policy and regulation are as follows. First, regulation defines the rules and imposes or controls prices, product choices and investments based on Principal-Agent models. In contrast, competition policy assesses conduct and checks the lawfulness within an oligopoly framework.

Second, regulation provides a continuous working framework (ex ante). Competition policy only comes into force if serious problems appear (ex post) (Geroski, 2004, in Hüschelrath, 2009, p. 4).

Third, the strength of regulation is its reliance on superior expertise, based on quantitative evidence. The advantage of competition policy is that it is more general, universal and independent, and qualitative evidence plays an important role (but benchmarking is limited).

Fourth, therefore, the weakness of regulation is its limited commitment power, incentive problems and the fact that regulation is sometimes captured by interest groups (Rey, 2003 and Motta, 2004). However, merger control in Europe is a "quasi-regulatory process" since the EC must be notified before large-mergers (Rey, 2003, p. 123).

1.3.4.2 Market failure and government failure

We talk about *market failure* when markets cannot allocate resources efficiently. In view of the lack of perfect allocation, diverse economic schools (notably the Harvard School and the new IO) suppose government intervention provides a better outcome.

With his pioneering work on the topic, Bator (1958) distinguished market failure from indivisibility, public goods³⁷ and nonappropriability.³⁸ Current research first emphasizes the presence of asymmetric information. Snyder and Nicholson (2008) differentiated between two classes of informational problems: adverse selection and moral hazard.

³⁶ Viscusi et al. (2005) and Baldwin and Cave (2008) both provide good introductions to regulatory issues.

³⁷ Public goods are defined by their two attributes: nonexclusivity (exclusion of individuals from benefiting is very costly or impossible) and nonrivalry (additional units have zero social marginal costs) (Snyder & Nicholson, 2008, p. 679).

³⁸ "The inability of a producer of a good or a service physically to exclude users, or to control the rationing of his produce among them" (Bator, 1958, p. 361).

While in the first case one party has limited information *before* signing the contract, in the second case informational inequality appears *during* the contract. According to Arrow (1974), uncertainty is the main problem behind modeling adverse selection and moral hazard.

Market failure becomes more complex if there are only a few companies in the market. Fritsch et al. (2005) defined four market failures which violate the theory of perfect competition: imperfect information, *externalities*, indivisibility and unstable market equilibrium. Indivisibility mainly refers to resource capacity in network industries with decreasing average costs and thus economies of scope.

Indivisibility can lead to public goods, oligopoly or, in extreme cases, a (natural) monopoly³⁹. Unstable market equilibrium (or a lack of equilibrium) exists if the market has an over-demand or oversupply⁴⁰ in the case of market inflexibility.⁴¹Williamson (1975) argued that market inefficiencies are based on human behavior, especially bounded rationality and opportunism. Bounded rationality damages the ability of people to analyze and handle difficult situations.

Bork questioned the need for regulation.⁴² "It is always possible to posit 'market imperfections' that may result in markets working contrary to the predictions of economics. Those 'imperfections' are typically ...both ingenious and imaginary. The result of reintroducing them into the law is lengthy trials on baseless claims and with unpredictable outcomes. Many antitrust issues must be tried to a jury, but economic impossibilities ought not be" (Bork, 1993, p. 438).

The Chicago School and Austrian School make many arguments against regulation.⁴³ I will briefly summarize the main reasons, based on government failures. First (1), regulation restricts competition. As Kahn (1995), the 'father of airline deregulation' wrote: "The decision to regulate it, typically, a decision also to restrict competition, not just to supplement it (...) but to supplant it" (p. 1). Second (2), regulation is selective and protectionist, creating a lot of room for lobbyists. In other words, regulation "chooses to serve the one by serving the other" (p. 13). Third (3), regulation rarely has incentives.

³⁹ "Natural monopoly is a firm that has diminishing average cost over a broad range of output levels and can therefore supply a good or service at a lower cost than could two or more firms" (Mankiw and Taylor, 2011, p. 311).

⁴⁰ In both cases, there is no intersection of the demand and supply curves (e.g., a simultaneously perfectly inelastic (agricultural market) or perfectly elastic demand and supply (Keynesian labor market)). See Fritsch et al. (2005, p. 327ff).

⁴¹ Such as overcapacity, strong price and quantity fluctuations or structural crises.

⁴² A middle path (limited state intervention) for the European airline industry provides an example. Fichert (2008) claims that public goods and natural monopolies are both "fundamental" limits to competition (p.131). If barriers to entry exist, a natural monopoly leads to inefficient allocation of resources, higher prices and reduced output. The paper criticized the current regulatory forms for natural monopolies and stated that there had been "rather disappointing experiences with traditional regulation schemes" (p.133). In addition, Fichert distinguished between "correctable" limits to competition and the described fundamental failures (i.e., externalities). The problem with externalities is that when the market price does not involve the costs or benefits provided to third parties, the allocation of resources is again inefficient.

⁴³ See Starkie (2008) for a comprehensive approach to regulation and deregulation of the aviation industry.

Regulated prices (above MC) generate firm responses with increasing costs, which regulators generally do not expect (Rose, 2012). Therefore (4), regulation is also costly. The authority has asymmetric information on pricing decisions within the firm.

In addition, regulatory systems involve transaction costs, subsidization of selected goods, tax distortion and efficiency loss through distortions of resource allocations (Fritsch et al., 2005, p. 81ff). Further (5), regulation is not only costly, but is also slow and fails to adapt to industry changes.⁴⁴ In extreme cases, regulation can lead to soft budget constraints (Kornai, 1980). Finally (6), regulated firms also suffer from a conflict of interests between shareholders and regulators, because the latter can limit wages and incentives (Laffont & Tirole, 1991).

Regulation should resolve market failures, but it leads to rent seeking by private economic interests, thus reducing production and consumer welfare. Government intervention can prevent competition legally and more effectively than the industry ever could (Gellhorn & Kovacic, 1994). The Chicago School professor Stigler (1971) argues that regulation can never be independent because interest groups capture it.

Market failures	Government failures		
Asymmetric information	Regulation is costly		
Adverse selection	Asymmetric information on pricing decisions within the firm		
Moral hazard	(involve transaction costs, subsidization of selected goods, tax		
	distortion, efficiency loss through distortions of resource		
	allocations)		
	Conflict of interests between shareholders and regulators		
	because the latter can limit wages and incentives		
Externalities	Regulation has no incentives		
The market price does not involve the costs	Regulated prices generate increasing costs		
or benefits provided to third parties			
Few companies and indivisibility	Regulation is selective and protectionist		
Public goods	A lot of space for lobbyists		
Natural monopolies			
Unstable market equilibrium	Regulation restricts competition and fails to adapt to		
Over-demand	industry changes		
Oversupply			
Market inflexibility			

9. Do we need regulation? Market and government failures

Source: own table based on the literature in this section

⁴⁴ Rose (2012) asserted that this leads to a "Whack a Mole" situation in which "firms try to circumvent costly regulations though behaviors that regulators fail to anticipate ... ()...vigilant regulators revise constraints, and firms start the search for evasive maneuvers anew" (2012, p.377). See also the *raising rivals costs* theory by Salop and Scheffman (1983) and Scheffman and Higgins (2003).

Figure 10 above compares pros and cons of regulation: market failures versus government failures. While followers of the Harvard School emphasize the role of market failures, Chicago School economists generally highlight the importance of government failures and support deregulation.

The 1968, 1982 and 1984 US Merger Guidelines were introduced alongside the background discussions on concentration versus (which) efficiency; entry barriers or contestable markets; and government intervention or free market.⁴⁵ The legislation used many Chicago School ideas, but still laid them on oligopoly models. Blumenthal (2010) described the 1982 US Merger Guideline as "the seed from which virtually all merger control around the globe has sprouted (...) moving steadily away from simplicity and administrability and towards greater flexibility" (p. 2). Annex **8.1** provides an overview of the most relevant merger regulations before 2000.

Since the US Merger Guidelines were introduced, efficiency-seeking mergers have become more conventional across the world and a wave of mergers has begun. The liberal Chicago School philosophy had arrived in Europe by the 1990s and challenged the institutions of competition policy, which had traditionally been driven by Harvard School ideas. The next section will describe the differences between the traditional and the Chicago School welfare standards and will explain why the EC cannot apply the efficiency defense.

⁴⁵ More recently, Fox (2012, p. 2159) highlighted the complexity of the different assumptions of competition policy and refused the goal of maximizing consumer welfare, saying that: "antitrust law is not designed to make consumers as well off as possible." The operational aim is to "let business be free of antitrust unless its acts will decrease aggregate consumer surplus."

1.4 WELFARE STANDARDS AND APPLICATIONS

"Competition agencies will be reduced to rubber stamping whatever deals and arrangements are deemed appropriate by the private sector" (Hazledine, 1998, p. 244).

This section describes the different welfare standards, which form the core of the efficiency defense. Antitrust practice is interested in questions such as which surplus, whose interest is more important and, not least, what is the role of efficiencies?

Welfare is a concept used "to measure how well an industry performs" (Motta, 2004, p. 18). According to basic microeconomic theory, welfare consists of consumer surplus and producer surplus. Consumer surplus is the savings from the fact that the price is below that which consumers are willing to pay, while producer surplus is the sum of all firms' profits. However, the welfare standard is not trivial and the lack of clear terminology often leads to misunderstandings and legal uncertainty for merging parties. In the following section, I will introduce the *total welfare (TW) standard*, the *consumer surplus (CS) standard* and some other views. The main conclusion of the chapter is that the efficiency defense is not applicable under the consumer surplus standard. The following table summarizes the findings of the following pages.

	US	EU	UK	Australia		Canada
Test	SLC	SIEC	SLC	-	SLC + public benefit	SLC
Welfare	CS or Hybrid ⁴⁶	CS	CS ⁴⁷	CS	TW (formal)	TW
standard				(informal)		
Efficiencies	Yes	Yes	Yes, if no harm	No	Yes	Yes
			to consumers			
Pass-on to	Not necessary needed,	Needed	Needed	-	No	No
consumers	but if there are some, it has a higher weight					

10. Welfare standards and tests applied in different countries

Source: own figure based on Renckens (2007)

1.4.1 TOTAL WELFARE STANDARD, FIRST ATTEMPTS IN CANADA AND IN AUSTRALIA

The theory behind a nation's wealth or welfare is the topic of many discussions among the various approaches, in particular about the definition or measure of welfare. The majority of economists, at least those who are close to the Neoclassical or Chicago approaches, probably prefer the *total surplus or total welfare* standard.

⁴⁶ Though the US used the CS standard until 1997, it now applies a *weighted surplus standard*, also called a *hybrid* standard (Kolasky & Dick, 2003).

⁴⁷ Only used in the UK since 2003. Before that, it used a TW "public interest standard" with political interest.

Williamson (1968) described the TW standard, which has revolutionized antitrust thinking. His intention was to balance the price effect with efficiencies from mergers or, in other words, to find the trade-off between deadweight loss and cost saving. Under this standard, "a merger should be allowed if it creates more wealth to producers than it destroys for consumers. Hence, distribution does not matter" (Röller et al., 2000, p. 81).

The TW standard is used in Australia and in Canada. The competition authorities in those countries consider consumer surplus (i.e., efficiencies from the merger versus producer surplus (profit increase of merging firms and of other firms)) with the anticompetitive effects of a merger. However Lyons (2003) doubts whether Australia, Canada or any major competitive authority can consistently apply the TW standard. Reasons for this are outlined in the following section by looking at its country-specific applications.

In **Australia** it is not mandatory to notify the competition authority about mergers, but a review is highly recommended since mergers are prohibited if they substantially lessen (or are likely to lessen) competition. The Australian Competition & Consumer Commission (ACCC) ⁴⁸ carries out the Substantive Lessening of Competition (SLC) test, but the Australian Competition Tribunal (ACT) can still grant a clearance despite a positive SLC if the merger benefits the public.

There is an interesting difference concerning formal and informal merger reviews in Australia. The most common informal review applies CS and requires that consumers benefit from the merger. The formal review, in contrast, applies TW and considers efficiencies (Renckens, 2007).

This paradox of welfare standards arises because if merging firms apply for authorization, it is their interest to provide evidence that the merger benefits the public. Thus they appeal to take TW into account. Since the formal process is public and companies dislike publishing internal data, the TW standard is rarely applied (Lyons, 2004).

Canada adopted the TW standard in its *Competition Act* in 1985, which is still valid. It aims to "maintain and encourage competition in Canada in order to promote the efficiency (...) ensure that small and medium-sized enterprises have an equitable opportunity (...) provide consumers with competitive prices and product choices" (MoJ, 1985, p. 1).

⁴⁸ The ACCC defines their role as "to protect, strengthen and supplement the way competition works in Australian markets and industries to improve the efficiency of the economy and to increase the welfare of Australians" (ACCC, 2010). I would like to thank Clare McGiness, Darrell Channing and Isabelle Arnaud for the interview at ACCC Melbourne on July 12, 2011.

The *Competition Act* states that after the Substantive Lessening of Competition (SLC) test, which is based solely on concentration or market share (Sec. 92.(2)), is found to be positive, the tribunal shall make an *efficiency exception* (Sec. 96.(1)) if the efficiency gains offset harms. Efficiency gains are measured in real value of export or domestic substitution in imported goods (Sec. 93(3)).

1.4.2 CONSUMER SURPLUS STANDARD: EVIDENCE FROM THE UK

The consumer surplus approach is equal to the total welfare approach with zero weight to firms' profits. Thus, the TW approach considers:

> $TW = \alpha_1 CS + \alpha_2 PS$ Where $\alpha_1 + \alpha_2 = 1$ CS standard = TW standard with $\alpha_2 = 0$

In the CS approach, in contrast to the TW standard, only efficiencies passed on to consumers matter. Here, the distribution from the firm to the consumers plays a relevant role.

Although Motta (2004) prefers the TW approach, he summarized the arguments for the CS standard. First, it can counterbalance the stronger lobby power of companies, or the regulatory capture, in advance of consumers; second, it can reduce the authority's asymmetric information on efficiency gains under uncertainty. Lyons (2004, p. 252) made a third argument: the selection advantage of firms. This means that firms "are likely to choose mergers that create negligible total welfare benefit – these would just pass the total welfare standard and maximize profits."

One could extend the reasoning of the CS approach with simple price theory and argue that because of the diminishing marginal utility of money or the diminishing marginal rate of substitution, the more we get from a good, the less we value an additional unit. Therefore, small 'poor' consumers value money more than 'rich' shareholders. This idea leads us to the question of equity and income (re)distribution, which are part of the SCP model.

Lyons (2003) further claimed that political interests also prefer the CS approach. Since there are more people (i.e., more 'voters') who imagine themselves to be consumers than there are profit-receiving stakeholders and politicians who want to maximize their votes, political interests behave to the advantage of the majority. Lyons denied that CS would only be "looking for lost keys under a lamppost because that is the only place where there is a light" (p. 4), but others have argued that the CS standard simplifies decisions to the point of merely assessing the price effects (Werden's point in Renckens, 2007).

The **United Kingdom** is a good example of the consumer surplus welfare standard. It has a long tradition of registering restrictive trade practices without punishing them. Since the introduction of the *Competition Act* in 1998, UK merger control has had more similarities with the ECMR. However, one difference is that there is no obligation to announce a merger in the UK. Nevertheless, most firms voluntarily notify the Office of Fair Trade (OFT)⁴⁹ and hold pre-merger discussions. If there are serious doubts concerning the merger, the OFT refers the case to the Competition Commission (CC) to apply the SLC test (similar to a Phase II investigation in the EU). The CC "may also take into account any relevant consumer benefits" (Whish, 2009, p. 889). The Competition Appeal Tribunal (CAT) then has to review the decisions of both the OFT and the CC. Part 3 of the *Enterprise Act 2002* defines the current legal framework for mergers. The UK uses the SLC test with a clause stating that "mergers are acceptable if they bring relevant consumer benefits" (Lyons, 2004, p. 261). Most countries (EU, UK and the informal review in Australia) apply the CS standard, which requires that consumers benefit from a merger.⁵⁰

Table 12 summarizes the main features of TW and CS standards. The first difference is the goal of competition policy. In the TW approach, competition policy should enhance economic efficiency, while the CS standard aims to maintain competition. Maximizing welfare seems to be a secondary aim in both approaches, and the term 'welfare' is treated differently. Misinterpreted and misleading terms and goals are a source of problems. In my opinion, the goal of maximizing consumer welfare is absurd, since there is no consensus about what *consumer welfare* is.⁵¹

The second difference is the attitude toward mergers. According to the TW standard, a merger should be allowed if it creates more wealth for producers than it destroys for consumers, thus resulting in a positive net benefit. To the contrary, in the CS approach, only mergers that increase consumer surplus (or at least do not decrease it) should be cleared. Therefore, income distribution only plays a role under the CS standard.

While market structure is still the basis of any antitrust analysis under the CS standard (see the SCP paradigm), economists who prefer the TW analysis do not attach value to structure, and particularly deny relevant market analysis (see Chapter **3**).

⁴⁹ The OFT has a high publicity obligation: the cases are published and need to describe consumer benefits. The Mergers Group (with around 35-40 officers) is responsible for merger cases (Whish, 2009).

⁵⁰ For airline-specific examples, see Morrison and Winston (1989), Brueckner and Pels (2005) and Barla and Constantatos (2006).

⁵¹ Consumer welfare is mostly interpreted as consumer surplus. Writing consumer welfare, Bork however means aggregate or total welfare, thus consumer surplus producer surplus. Werden (2011) compares the different meanings of the term "consumer welfare" in US, EU and UK competition policy.

	Total Welfare	Consumer Surplus	
Aim of competition policy	Enhance economic efficiency	Maintain competition, Maximize consumer 'welfare'	
A merger should be allowed	A merger should beIf it creates more wealth for producers than it destroys for consumersOnly if consum		
Role of distribution	No	Yes	
Market structure	Independent of structure, monopoly with perfect price discrimination also maximizes welfare	Competition	
Economists who prefer it	Williamson, Bork, Motta, Schmalensee	Röller, Lyons, Hazledine	

11. Comparing total welfare and consumer surplus standards

Source: Motta (2004) and Röller et al. (2000)

1.4.3 ALTERNATIVE WELFARE STANDARDS AND GERMANY

Renckens (2007) presented five countries and differentiated between five welfare standards. Efficiencies play an increasing role: no efficiencies in the *pure price standard*; balancing quality, service and innovation in the *consumer surplus standard*; giving less weight to producer surplus in the *Hillsdown standard* and the *weighted surplus standard* (also called the *hybrid standard*) and last but not least the *total surplus or Williamson standard*, in which efficiencies do not necessarily need to be passed on to consumers. Röller et al. (2000) added the *killer standard*, which prefers consumers and considers distributional effects.

The first three standards in the efficiency pyramid (see the figure below) — the killer standard, the pure price standard and the modified price standard or CS standard — only allow a merger if it <u>does not harm</u> consumers (i.e., it either benefits or does not affect them). The pure price standard does not take any efficiency into account, so long the price goes up (Venit in Renckens, 2007). The modified price standard (which includes innovation, quality and service improvements) or CS standard generally considers efficiency gains, but only for consumers.

The next two standards (i.e., the Hillsdown standard and the hybrid or weighted surplus standard) allow mergers if the efficiency gains overcome the losses to consumers. The Hillsdown standard, named after the *Canada v Hillsdown Holdings Canada*⁵² case, "gives a merger no credit for profit increases derived from transfers from consumers and 100 percent credit for increased profits derived from efficiency gains" (Bian & McFetridge, 2000, p. 315).

⁵² In the *Canada v Hillsdown Holdings Canada* case in 1992, after the Competition Bureau found the SLC test to be positive, the tribunal argued that it is not enough to equalize the lessening of competition with the deadweight loss (as was described due to the total surplus standard in the Merger Guidelines from 1991). Instead, the anticompetitive effect should also consider income transfers. In summary, the tribunal wanted a more consumer-oriented welfare standard (Hazledine, 1998). In contrast, Bian and McFetridge (2000, p. 301) argued that this case was rather exceptional, so it is not binding for the tribunal and "it has no basis in logic."

The weighted surplus approach ⁵³ leaves the choice of distributional weight to the competition authorities, which might be individual and therefore problematic. Since "transfers from domestic consumers to foreign stakeholders" are seen as complex issues, one suggestion is to take domestic ownership-based weights for all mergers (Roseman in Bian & McFetridge, 2000, p. 299). We can find examples for both Hillsdown and weighted surplus standards in the history of Canadian competition policy.

12. Efficiency pyramid: the role of efficiencies in different welfare standards



Source: own figure

Individuals or individual utilities play a small role. Instead, competition authorities consider interest groups, especially two: consumers and shareholders (firms). Although Röller et al. (2000) drew attention to other interest groups that are sometimes involved (e.g., workers⁵⁴ in the EU or small rivals in the US), Motta (2004, p. 11) argued that German competition policy "tends to protect smaller competitors" as well. Motta also questioned the boundary between consumers and shareholders, since consumers often own company shares in the form of investment funds or pensions.

⁵³ The *Canada v Superior Propane* case (1998-2003) was the first time a merger was allowed in spite of being anticompetitive. First, the Competition Bureau ruled against the merger. They applied the weighted surplus standard, where consumer gains had a 60 percent higher weight than producer gains, but the tribunal overruled the decision and allowed the merger (Renckens, 2007). Then the Court of Appeals, based on its anticompetitive effects, sent the decision back to the tribunal to reconsider, but the tribunal permitted the merger. This case shows the complexity of the TW approach, which is supposed to be the most "economically literate" in Canada (Neher et al., 2013).

⁵⁴ Unlike the EU, Sweden excludes hypothetical unemployment from the analysis.

Germany has an alternative welfare standard other than the European Commission's consumer surplus standard. "German competition law is known to focus on protecting the competitive process, and not primarily consumer interests" said Bernhard Heitzer, the former president of the German Bundeskartellamt (2008, p. 3). Competition policy has its roots in the Freiburg School of Ordoliberalism in Germany.⁵⁵ A fellow of the school, Alfred Müller-Armack developed the concept of social market economy, which was the basis for rebuilding the German economy after the Second World War (Vanberg, 2011).

The social market economy is based on protecting competition economic freedom. Freedom also means freedom of contracting (e.g., price agreements and cartels). Although the US did not allow these sorts of contracts, they were permitted in Germany until the first competition law came into force in 1958 (Motta, 2004). Kühn (1997) and Motta (2004, p.10) noted that by 1923 there were around 1,500 cartels in Germany, which served as 'national champions'. During the Second World War, it was usual to create compulsory cartels in order to control industry and outperform foreign companies.

The German competition law (*Gesetz gegen Wettbewerbsbeschränkungen*, GWB of 1957) was finally modified to conform to the EC law in 2005. While the EC increasingly focuses on low prices and consumer surplus, Germany assumes consumer benefits are an "unpredictable process of competition" (Heitzer, 2008, p. 4) and also addresses longer-term factors related to product choice, quality and invention.

Above a certain revenue rate,⁵⁶ firms that wish to merge need to apply at the Bundeskartellamt (the German competition authority) for authorization. However, § 42 of the GWB allows the possibility of direct ministerial admission, if the "social economic gains" overcome the competitive harms or if the merger serves the "public interest." This exceptional regulation highlights the lack of transparency in policy and the complexity of different macroeconomic aims at different levels of governmental interventions. It also raises the critique that "the Bundeskartellamt fails to continuously consider consumer and consumer welfare as the relevant standard" (Budzinski & Wacker, 2007, p. 303). Knieps (2008) and Kühn (1997) provide good overviews of German competition policy.

⁵⁵ In 1962, Hayek also joined the University of Freiburg, after spending 12 years at the University of Chicago. Thus, Hayek was a representative of the Austrian School, the Chicago School and the Freiburg School as well, although his work was largely neglected until he received the Nobel Prize in 1974. Kay wrote that Hayek was isolated and "in Hayek's mind his opponents are usually not just wrong, but mentally and morally defective" (Kay, 2004, p. 185).

⁵⁶€500m international together, €25m in Germany.

1.5 MORE, BUT WHICH ECONOMIC APPROACH? WILLIAMSON'S EFFECT ON EC MERGER POLICY

"The information needed by the optimizer is not provided by an existing market. It will be provided by a market which will exist in the future, but that is a bit too late to help in decisions made today" (Arrow, 1974, p. 6).

European competition policy is supposed to consider efficiencies, but the EC cannot yet apply the efficiency defense. This section describes the limitation of Williamson's model (see Figure 1) generally and in Europe specifically. The main barrier to implementing an efficiency defense is the consumer surplus standard. Under the CS standard, a merger will reduce 'consumer welfare' since higher prices will lessen the consumer surplus. Proponents of the CS standard would reject a merger even if the TW effect is positive, but the profit (producer surplus) gain is higher than the consumers' lost surplus. Thus, as long as the EC applies the CS standard, we cannot talk about an efficiency defense in Williamson's sense.

Williamson (1968) suggested using a TW standard, but also took other factors (i.e., income distribution) into account. In Bork's 'consumer welfare' model, everybody is a consumer in a certain manner; thus this TW model does not consider income distribution, since it is only a shift among two consumer classes. Bork expressed the opinion that income distribution "should be completely excluded" from antitrust (1993, p. 111). Compensation or income distribution should not be considered (that is the task of the tax system). Shavell (2004) argued that antitrust could consider morality, but its weighting is challenging.

Williamson's model (1968) has some basic limitations. First, the model presumes there are constant average cost (AC) functions, but economies of scale are only available at a diminishing AC. Second, while only illustrating AC, the paper differentiated between fixed and variable cost savings. Thus, according to the paper, it is not enough to have immediate cost reductions, which could have been realized anyway. Since immediate cost savings probably come from fixed cost savings (i.e., suspension), it would be more appropriate to use marginal costs (MC) instead of AC. Indeed, Farrell and Shapiro (1990) extended Williamson's model⁵⁷ and found that larger firms generally have more incentives and should be allowed to merge.

⁵⁷ The study by Farrell and Shapiro (1990) used a Cournot oligopoly with homogeneous goods. The paper developed the net externality effect on rival firms and consumers. If the non-participant firms are large, they could exploit their markup and expand capacity, thus increasing total output. In this case, a merger might raise welfare by output shifting. Therefore, an increase in concentration might result in better performance and is not necessarily bad, but the more concentrated an industry is, the more likely is a collusion with negative external effects. The authors argued that <u>both</u> anticompetitive effects and efficiency should always be proved, but "small firms should generally be allowed to merge" (Farrell & Shapiro, 1990, p. 124).

There are several more problems with the Chicagoan efficiency approach.⁵⁸ The new direction of antitrust economics research is difficult to conduct in practice for several reasons. First, Williamson already drew attention to the fact that "courts do not possess the expertise" (1968, p.34), so judges do not feel comfortable with the complexity of qualifications used. It is impossible to quickly understand, follow and apply Williamson's model in a courtroom. Second, there is a lack of reliable data and/or time to collect it (Gellhorn & Kovacic, 1994, p. 89). Therefore, simple methods are needed. This explains the popularity of using concentration data. In the words of Scherer, who criticized the courts: "…they adopt the 'do nothing' approach to their jobs" (2008, p. 37). However, Scherer agreed that the data and the empirical methodologies are often unsatisfactory.

The more complex IO research becomes, the more difficult it is to adjust the law and focus on the extended, sometimes paradoxical, welfare goal of antitrust policy. Thus, the higher the gap between law and economics, the more complicated the understanding and cooperation need to be between lawyers and economists. It seems to be a vicious cycle that the more economists work on antitrust models, the more complex they become and the more probable it becomes that they will be refused by the court.

As a consequence, a third source of dissatisfaction is accepting deals (Budzinski & Kuchinke, 2012). Legal uncertainty from misunderstood terminologies is a further problem. While the aim of competition policy seems to be maximizing consumer welfare, the different terminologies on welfare, the various policy perspectives and assumptions on competition and markets result in at least three different welfare standards.

Chicago economists and academics close to the Austrian School and Schumpeter's view on R&D and innovation generally argue for an efficiency defense. However, there have been very few cases⁵⁹ where the efficiency defense has been implemented worldwide. In looking for an efficiency defense, Klumpp (2005, p. 256) compared merger policies in the US, Germany and the EC. He found no evidence of an efficiency defense in the German or European policies, and concluded that also in the US, the call for an efficiency defense was a reaction to the strict merger-refusing policy of the 1960s.

⁵⁸ Kay (2004, p. 185) claimed that Chicago, as the center of conservative economic thought, was responsible for "various neoliberal experiments in South-America and New Zealand." He argued that Chicagoans were focused on the insistence on rationality and did not want to believe in market failures. Chicago economists 'economized' everything; in the Chicagoan *Journal of Political Economy* (which is the number two economic scientific journal, just after the *American Economic Review*) one can find articles about the economics of crime, language, family, suicide and even brushing your teeth (Kay, 2004).

⁵⁹ In Canada, the Competition Tribunal successfully applied the efficiency defense in the *Superior Propane* case, which was allowed despite its resulting in local monopolies and price increases. The Federal Court of Appeal claimed the wealth transfer from consumers to producers had no results (ICN, 2006).

The EC's more economic approach is supposed to fill the gap between US antitrust and EC competition policy and to strengthen the EC's position against the European courts. Without legal certainty on the basic welfare standard and accepted type of efficiencies, however, the new approach cannot help the EC Commission to "be the winner of the law-making game" (van den Bergh, 2007, p. 28). In summary, antitrust today represents more a "somewhat chastised Harvard School than of any traditional version of the Chicago School" (Hovenkamp, 2010b, p. 8). For European competition policy, Chicago beliefs on efficiency are even further away. The pluralist tradition of European competition policy makes the convergence even more difficult.

Because of the legal uncertainty around welfare and efficiencies, the EC's approach toward measuring efficiencies is very similar to the US debate from the 1960s. At that time, Bork said: "Economic analysis does away with the need to measure efficiencies directly. It is enough to know in what sorts of transactions efficiencies are likely to be present and in what sorts anticompetitive effects are likely to be present" (in Williamson, 1968, p. 5).

1.6 CONCLUSIONS

Chapter **1** investigated the question of which economic theories provide the most appropriate tools and the most suitable analytical framework for assessing market power and efficiency within merger control. Section **1.2** introduced the main economic schools behind antitrust policy and found that while the Chicago School challenged US antitrust policies in the 1970s, the influence of the Harvard School has remained dominant until today. The Harvard approach, while protecting consumers, emphasizes concentration as a sign of market power. The Chicago view sees concentration as evidence of efficiency and would therefore promote it.

Section **1.3** derived the main syntheses on competition policy from the Harvard vs. Chicago battle. It contrasted concentration with the efficiency doctrine and entry barriers with contestable markets, and discussed the need for governmental intervention. The main finding here is that because of the complexity of competition policy aims, consumers interest is often preferred to efficiency. Section **1.4** compared different welfare standards and efficiency concepts and found that the main obstacle to introducing an efficiency defense is the unclear definition of welfare with a weight on the consumer side. Williamson's efficiency trade-off model is only applicable under the TW standard, where welfare transfer from consumers to producers is allowed. Canada was the first nation to implement the efficiency defense.

Section **1.5** focused on the application of an efficiency defense in Europe. The EC has rejected the TW standard and instead focuses on protecting 'consumer welfare' in the frame of the CS standard. As long as the EC applies the CS standard, there is no application of efficiency defense in Williamson's sense.

The ECMR (2004) only allows efficiency considerations if they are not in conflict with harming consumers by a potential price increase. The merger guidance prescribes that efficiencies must be merger-specific, verifiable and beneficial to consumers.

The next chapters will show the efficiency trade-off in practice (Chapter 2) as well as which economic models the EC merger policy could (Chapter 3) and do apply (Chapter 4, introducing the current framework). The rest of the work focuses on airline mergers in Europe. Chapter 5 assesses the performance of aviation in general and answers the question of whether there is room for efficiency improvement, in particularly by takeovers. Chapters 6 and 7 analyze Lufthansa mergers from 2005 and 2009 and focus on entry to relevant markets, price- and output development and efficiency (synergy) effects.

2 EFFICIENCY TRADE-OFF IN PRACTICE: THE EUROPEAN COMMISSION

"Unfortunately, these 'positive' economic advantages of hub and spoke networks never get passed through to consumers. They have been immediately leveraged with anticompetitive actions to increase and exploit market power by incumbents dominating hubs" (Cooper, 2011, p. 2).

2.1 INTRODUCTION

The EC took the first steps toward a *more economic approach*, thus a more flexible *rule of reason* approach, which tries to take efficiency into account. The question is whether the move toward a more relaxed, laissez-faire Chicago approach has resulted in a softer merger control regime. This chapter discusses the rationale for the European competition authorities' new approach toward efficiency, particularly in airline merger decisions.

In Europe, following the US and the global trend, liberalization and the sudden appearance of low-cost carriers have inevitably led to airline takeovers and mergers. The global economic crisis is expected to create further consolidation. While some industry observers and managers welcome this development, competition authorities, and in particular the EC, are concerned that a change toward a more concentrated market structure might reduce competition and consumer welfare. At the same time, efficiency claims, particularly for competition policy approval, seem to achieve a growing importance.

As introduced in Chapter 1, the EC's merger policy is similar to the Harvard approach. Decisions about a merger are usually based on its *potential* anticompetitive effects, but they are used to refuse *potential* efficiency gains. The EC has been rather skeptical toward efficiency gains from mergers, because *real* efficiency gains are often too complex to measure (see Chapter 3), while there is a broad literature on the *real* anticompetitive effects of mergers.

This chapter shows that efficiencies from mergers probably exist, but these efficiencies, in the presence of market power, are not going to be passed through to consumers. Efficiencies do not result in cheaper ticket prices, but might improve quality and variety.

Section **2.2** will revisit the literature on efficiency gains in different stages of airline cooperation, while Section **2.3** will explain their limitations (i.e., why the EC did not consider efficiencies). Section **2.4** will describe my conclusions.

2.1.1 THE SCP MODEL – EXTENDED BY EFFICIENCIES

The EC has developed its own conceptual framework, which might be called the *extended SCP* model with a focus on behavior. The Harvard School, with its multiple goals and original Structure-Conduct-Performance paradigm, probably had the greatest influence on European policymaking, but we can find a Chicagoan touch on efficiencies, the Austrian idealism on free competition and, of course, the Freiburg roots on protecting economic freedom. Thus, one can say that EU competition policy around the beginning of the 21st century has picked out the best ideas from the last century's Harvard, Chicago, Freiburg and Austrian Schools. Whether those ideas are suitable to the European framework is, however, another question.

As Figure 14 illustrates, the EC extended the SCP model (after Scherer, see Figure 2) by adding a legal framework (basic conditions), exit barriers, transparency (market structure) and entry deterrence (conduct). The main differences from Scherer's SCP model are the factors affecting performance.

While Scherer only specified allocative efficiency, the new extended framework also considers technical (productive) and dynamic efficiency. Though full employment is no longer part of the performance aims, equity still plays an important role. The feedback effect is also stronger in this new model, since performance can now impact conduct and market structure (i.e., low profitability keeps new entrants away), while in Scherer's SCP paradigm, performance was a function of conduct.



13. The extended SCP framework of the European Commission

Source: original from Scherer and Ross (1990), adapted in Peeperkorn and Verouden (2007, p. 8).

The EC always starts its analysis with the market structure, but — in contrast to the Harvard practice in the 1950s and 1960s — it is not enough to assert the probability of anticompetitive behavior based only on the structure. As Peeperkorn and Verouden wrote: "The likely negative effects that may result from this conduct must be shown" (2007, p. 8).

While dynamic efficiency is part of the extended SCP model, the EC's performance analysis is static. Dynamic efficiencies might be considered, but the later they appear the less weight they should have. The higher the concentration after the merger, the more likely that the efficiencies will be passed on to consumers. It is also unclear how dynamic efficiencies should be measured and weighted.⁶⁰ Without considering cost reducing dynamic efficiencies (e.g., technological changes and innovation), concentration results in higher prices and less production. As long as equity (i.e., income distribution) is listed among the aims of competition policy, any merger will lead to a clear loss in consumer surplus.

2.1.2 THE TYPOLOGY OF EFFICIENCIES IN THE EC'S MERGER REGULATION

Former EC Commissioner Monti accepted that there should be an efficiency claim in order to lessen a finding of dominance, but he stated that "it is appropriate to maintain a touch of 'healthy skepticism' with regard to efficiency claims" (2002, p. 7). He referred his opinion to a study assigned by the EC, which prepared the latest ECMR in 2004. That particular study from Röller et al. (2000) investigated efficiency gains from mergers by reviewing both theoretical and empirical literature on the topic. The authors basically differentiated between five types of efficiencies related to *productivity measurement*: rationalization of production, economies of scale, technological progress, purchasing economies and reduction of slack (managerial and X-efficiency⁶¹).

The literature arranges these efficiencies in variable typologies and, due to the welfare standard, not all of them are relevant to the merger analysis. Merger-specific efficiencies, with substantial variance, have been occasionally found in the empirical literature. The authors suggested applying a sequential case-to-case analysis and consider efficiency claims. The study, however, concluded: "There seems to be no support for a general presumption that mergers create efficiency gains" (Röller et al., 2000, p. 35).

Efficiencies	Come from	Result in	
Cost savings	Variable or marginal cost savings	Incentive to charge lower prices	
in production and	Fixed cost savings	Less likely to reduce price	
distribution	Cost savings from output reduction	Anticompetitive behavior	
Now or improved	Passarah and davalonment	Incentive to reduce price and increase output	
new or improved	innovation	Lower risk of coordinated effects with other	
products or services		firms	

14. Efficiency considerations in the new ECMG 2004

Source: based on ECMG (2004), sec.76-88

⁶⁰ Hazledine (1998) discussed whether it is appropriate to measure efficiencies at all. The main challenges are defining the relevant market, assessing demand and cost functions, quantifying quality and service changes, including externalities and connected markets, considering feedback or adjustment effects and measuring long-run dynamic effects and cost savings.
⁶¹ Leibenstein defined X-efficiency as follows: "A significant social cost of market power is that a firm's cost would rise

because its employees perceived that effort maximization is not necessary. X-efficiency or managerial slack is larger the greater the market power or the firm" (Church & Ware, 2000, p. 145).

The table above shows that only cost savings from variable or marginal cost savings are accepted, since only these costs may motivate firms to lower prices. Mergers could improve competitiveness, increase growth and raise the living standard. The most important criterion is that consumers on the relevant market must not be worse off after the merger.

The European Council Merger Guidance (ECMG, 2004, p. 13) further describes the conditions of efficiency implementation: "efficiencies have to benefit consumers, be merger-specific and be verifiable." Merger-specific means that other, less anticompetitive forms of cooperation cannot achieve these efficiencies. The notifying parties need to inform the EC about the (possible quantified) efficiency gains and the clear impact on consumers. The EC may verify that the claims are based upon internal documents and external studies.

The ICN (2006, p. 61) also affirmed that authorities are generally skeptical of efficiency claims, which are the "most speculative single element of merger review." The study specified efficiencies from variable or marginal cost savings, better capacity utilization, economies of scale and scope, network effects, product quality and R&D complementarity. Producer efficiencies are usually not taken into account, since most countries apply the CS standard and "protect consumers against a loss of consumer welfare" (p. 63). Self-assessment is difficult, because firms have asymmetric information (which is sometimes too optimistic) on the possible efficiencies.

As a result of the discussion about efficiencies, the new *European Council Merger Regulation* (ECMR, 2004) takes efficiencies into account on a voluntary basis.⁶² "It is possible that the efficiencies brought about by concentration counteract the effects on competition, and in particular the potential harm to consumers, that it might otherwise have" (sec 29). It seems that even if a merger could harm consumers, it can be cleared based on large enough efficiency gains. Therefore, it seems that there is an efficiency defense in European merger control.

The ECMR (2004) is, however, limited on the efficiency defense. It only allows efficiency considerations if they are not in conflict with harm to consumers caused by a potential price increase. However, if there is no fear of harming consumers or competition, no policy intervention is needed. In contrast, the idea from Williamson and later the Chicago School was a counterbalance between price increases and cost savings from an efficiency increase. This is definitely not the case in Europe or the US.

⁶² "Failure to provide information on efficiencies will not be taken to imply that the proposed concentration does not create efficiencies or that the rationale for the concentration is to increase market power. Not providing the requested information on efficiencies at the notification stage does not preclude providing the information at a later stage. However, the earlier the information is provided, the better the Commission can verify the efficiency claim" (EC, 2009, p. 65).

2.2 EFFICIENCY GAINS IN AVIATION

"And in fact when an economist says (...) efficient, nine times out of ten he means Kaldor-Hicks efficient (...) The winners could compensate losers, whether or not they actually do" (Posner, 2007, p. 13).

According to the Chicago School's *efficiency doctrine*, efficiencies from network effects (e.g., economies and scale, scope and traffic density) allow airlines to reduce marginal costs and eliminate *double marginalization*,⁶³ which could lead to lower fares. According to the Harvard School's *concentration doctrine*, prices depend on the market structure⁶⁴ and are higher in a concentrated industry.

15. Balancing 'consumer' welfare



Source: own figure

The figure above illustrates the fears about balancing welfare from the authority's point of view. Competition policy has to intervene if there is a fear of anticompetitive effects due to increased market power after a merger. If the industry is concentrated and the airline has high market share, it might have market power on a given route. In this case, the merging airline could charge prices above its marginal costs, keep the efficiency gains and increase only producer surplus (thus profit). A profit increase, however, might come from cost savings related to reduced output and/or lower fixed costs (e.g., capacity cut, frequency cut, and employee release). These might be efficiencies in a total welfare sense, but not in the EC's consumer surplus approach.

⁶³ If two airlines with monopoly power operate independently on complementary neighboring routes, they impose externalities on each other. These reduce the common profit and lead to lost efficiency. Making pricing decisions together reduces costs and increases total output, thus benefitting everyone. In that way, mergers can lead to efficiency improvements and increased social welfare. Economides (1996, p. 682ff) argued that integrated monopolists provide better quality, a higher quantity and lower prices by using price differentiation and avoiding double marginalization. US antitrust policy has integrated the theory of double marginalization, though Horan (2010) sharply criticizes the DOT's "copy/paste" antitrust methodology, namely avoiding double marginalization to "automatically create 15-25 percent price reductions in connecting markets, in each and every case irrespective of market or competitive conditions" (p. 259).

⁶⁴ If the route is highly concentrated, as in a duopoly case, there is a higher potential to decrease fares. If there is fierce competition (also with high-speed railway or LCCs), price is probably already close to the market equilibrium. Nevertheless, there are most commonly two or three competitors operating direct services on intra-European routes.

2.2.1 COMPETITIVE ADVANTAGES: MERGERS VERSUS ALLIANCES⁶⁵

There is a broad literature about airline alliances and their ramifications, but it is rare to find a discussion that compares the advantages and disadvantages of mergers to strategic alliances, as a business strategy for internationalization. This issue is of particular interest as alliances are sometimes seen as second-best solutions to circumvent restrictive bilateral agreements, which generally do not allow cross-border mergers or acquisitions.

Airline agreements differ in the level of cooperation as follows. First is the commercial alliance: interlining, ground handling, frequent flyer programs (FFPs), code-sharing, blocking space, common sales, schedule and capacity coordination, joint engineering, joint flights and franchising. Second is the strategic alliance: common branding, joint cargo and passenger services. Third is the full merger (Doganis, 2006). Article 3 of the ECMR (2004) defines mergers as a "change in control as a lasting basis (...) which confer the possibility of exercising decisive influence on an undertaking" (p.7).

Economic and managerial theories explain the internationalization of firms to answer the following question: Why are mergers the preferred management strategy? It has been discussed broadly in the literature with respect to multinational corporations (e.g., Aharoni, 1966; Dunning, 1981; Forsgren, 2008; Glaum, 1996; and Morck & Yeung, 1992). Existing literature explains the competitive advantages that can be achieved within an alliance or a merger/acquisition (e.g., Hanlon, 2003; Iatrou & Oretti, 2007; Iatrou & Alamdari, 2005; Fritz, 2005; Gudmundson & Lechner, 2006; and Merkert & Morrell, 2012).

Based on the literature review in this section, the following table summarizes the advantages of mergers compared to alliances. The main advantages of airline mergers are the potential to: decrease and internalize costs (economies of scale in marketing, cheaper labor costs and avoiding transaction costs); increase revenue by exploiting market power, especially by price fixing; extend the network with new slots; and finally to pursue their own personal managerial aims (higher salary and empire building). Dempsey (2002) also added another motivation for alliances: predatory behavior in order to reduce competition and the "desire to skirt around the nationality rules (which prohibit multinational ownership) and cabotage (which prohibits foreign carriers from flying domestic traffic)" (Dempsey, 2010, p. 6). Both can be stronger in case of a merger.

⁶⁵ Based on our joint research paper Fröhlich et al. (2013), so this section is mostly identical to the original text.

		Competitive advantages of alliances versus mergers					
_	Aim				Tools	Alliance	Merger
_			1) Dec	crease costs			
			a) Inc	crease economies	Joint use of resources (maintenance	Yes	Yes
	es		of	scale and scope	facilities, sales offices, check-in		
	nci				desks, baggage handling, airport		
	cie	50			lounges or catering services);		
	effi	kin			pooling for aircraft; fuel purchasing		
ies	de .	eel			Economies of scale in marketing	No	Yes
eor	-Si	y-s			Access to cheaper labor	No	Yes
The	(qd	enc	b) Inc	crease economies	Optimize load factor, aircraft size	Partly	Yes
ic '	Sup	lici		traffic density	A	N T	X 7
OII	- 4	EU	c) Int	ternalize	Avoid uncertainty, rent seeking,	No	Yes
ion			tra	ansaction costs	opportunistic benavior, costs of		
- Ec			(U	oase theory)	Driving and sight many semant	Na	Vaa
			2) Incr	rease revenue by	Ontimine asheduling for such as	N0 Dertler	res Vez
	ide es		compe		Eliminate developmentionalization	Partly	res Vez
	d-s nci		2) E-+			Partiy	res Vez
	uan cie	ed ?	3) EXI	end the network	Assessing slots	NO Var	res Vez
	effi irko				Code-snaring, blocked space	res	res
	D a	, Ma: prie			EFD's		
					111.5		
	Principal- Agent		4) Purs	sue personal	Higher salary	No	Yes
rial es			aims		Empire building	Partly	Yes
gei							
hec	Behavioral		oral 5) Strategy is		Trends, fashions (merger waves)	Not applic	able
$^{\rm L}$			influer	nced by	Interests of the leaders		
F-1			coincie	dental events			

16. Competitive advantages: airline mergers versus alliances

Source: own classification

2.2.1.1 Economic theories

Within the economic theories, the competitive advantages of both alliances and mergers can be classified into two subcategories: efficiency-seeking and market-oriented advantages (Kleymann & Seristö, 2001). Efficiency-seeking advantages include joint use of resources (e.g., maintenance and ground handling facilities, staff) or pooling for aircraft and fuel purchasing. Market-oriented advantages include *code-sharing/blocked space agreements* to extend the network, seamless connection and the integration of *frequent flyer programs*.

Economic theories can help explain international mergers or acquisitions in the airline industry. This group of theories is based on the assumption that transnational firms are set up in order to exploit imperfections in markets involving inputs and outputs (Glaum, 1996). In the airline industry, such imperfections can be seen in 1) economies of scale, scope and density of airline networks, 2) the existence of market power and 3) the access to airport slots. These factors have been intensively studied in the literature on airline alliances.

1) One important result is that economies of scale vanish at a rather early stage, and therefore cannot be used to explain mergers in the air transport industry (Caves et al., 1984; and Laaser, 2001). More important are economies of scope and density. The DoT has emphasized that "carriers enter into transnational alliances to take advantage of economies of scope and density by increasing the size and reach of their networks" (Gellmann Research Associates, 1994, p. 7). Numerous researchers have shared this point (Oum et al., 2000). There is no doubt that these types of network effects have been one of the major driving forces behind alliances and mergers (for more about network effects, see Section 2.2.3).

The realization of economies of scale in marketing is limited within an alliance, as the alliance partners are likely to be focused on promoting their own brands instead of the alliance brand (Hanlon, 2003). However, it is still questionable whether the creation of a single global airline brand is desirable, as airline passengers seem to have a preference for their national carrier(s), which express their respective national identities.⁶⁶

Another tool for decreasing costs is the access to cheaper labor that comes with an international acquisition. With a foreign acquisition, it may be possible to offshore some of the acquiring airline's functions, such as data processing, weight & balance calculations or maintenance.

A famous branch of efficiency-oriented theories is the internalization theory. This approach follows Coase (1937), who extensively described the determinants of the boundaries of firms, using the transaction costs occurring for market transactions and internalization or hybrid forms of interaction.

Following this theory, a merger may lead to a greater reduction in transaction costs than an alliance. It is also reasonable to assume that a certain level of rent seeking over the alliance partners occurs within an alliance and that alliance partners have to bear transaction costs (in the form of costs for monitoring and control) to avoid the possible opportunistic behavior of their alliance partners.⁶⁷

⁶⁶ For instance, when British Airways introduced a multicultural branding strategy at the end of the 1990s, it provoked a strongly negative public opinion that finally resulted in the restoration of the 'British' image (Thurlow & Aiello, 2007). The national identity of a carrier therefore can be interpreted as part of a unique selling position, which is a valuable asset in the market. The creation of the pan-European brands Thomas Cook and — more recently — TUIfly have shown that it seems to be very difficult to exploit economies of scale in marketing due to the cultural diversity in Europe. In the former case, the experiment of renaming the traditional German brand Condor to Thomas Cook was reversed after less than two years. Although Thomas Cook is a brand with a tradition of more than 160 years in the UK, it was virtually unknown in Germany. A more positive example is the presence of the Virgin brand in different markets all over the globe, although the independent operation of Virgin-branded companies in totally different geographical markets (UK, Australia and USA) and with different business models (short-haul low cost services in Australia and the USA, long-haul low-cost operations from Australia and a full service long-haul operation based in the UK) seems to reduce the possibility of achieving economies of scale (Altman, 2009).

⁶⁷ Anecdotal evidence from recent events may illustrate such intra-alliance rivalries. While both Singapore Airlines (SQ) and Lufthansa (LH) are members of Star Alliance, SQ' early-morning departure from Frankfurt to New York does not bear the LH code and is therefore not sold by Lufthansa. Moreover, starting with the 2007 winter schedule, LH scheduled their own allbusiness-class service to New York, five minutes ahead of SQ' departure. LH's service was discontinued in 2008, but

These examples show that even within alliances, opportunistic behavior cannot be avoided and that the behavior of alliance partners is in many instances beyond the control of the other partners. In the presented instances, neither "deterrence-based trust" nor "familiarity" within the alliance seems to be working (Kleymann & Seristö, 2001). The study further sums up the problems and disadvantages associated with alliances: among them uncertainty, ambiguity and market dynamics that need to be adapted to and may destabilize alliances in the long run. In the case where alliance partners were to be integrated into one firm under a single management, it can be expected that transaction costs could be reduced as, for instance, when frequency or destination decisions can be made unilaterally and not through bi- or multilateral negotiations.

2) Part of every successful strategy is gaining competitive advantage, and alliances might be a very effective instrument. Youssef and Hansen (1994, p. 416) pointed out that "alliances may create virtual monopolies in markets between the hubs of alliance partners." Competition authorities treat alliances and mergers similarly, but in some cases do not allow price fixing among alliance partners. The advantage of a merger approved by the competition authorities is that it allows for practices that otherwise would not have been allowed by these authorities.

3) While network economies can be exploited within existing alliances, direct access to an alliance partners' resources (such as slots) would only be possible with a takeover. This argument is strengthened by the fact that even under a regime that allows slot trading, slot pairs are rarely traded between competing carriers or alliances due to strategic considerations. The possession of slots is seen as a key business asset and new entrants have had difficulties obtaining slots from incumbents, even at airports that are not used as hubs (e.g., New York-La Guardia) (Ball et al., 2007). Therefore, the acquisition of complete airlines (or major parts of their assets) for the sake of gaining control over slots has been observed in the past.⁶⁸ Slots might be the main reason behind mergers.

Lufthansa still does not cooperate with Singapore Airlines on this particular flight. Another example of intra-alliance competition was provided by Christian Hylander, the Germany-based Country Manager for Scandinavian Airlines (SK), who characterized the relationship with alliance partner Lufthansa as "friendly competition" (FVW, 2007). Elements of this include the unilateral introduction of one-way fares (which has the potential to erode yields for Lufthansa), the reintroduction of Scandinavian group sales and travel agent support in Germany, and the termination of both the joint call center use and the joint corporate volume discount program (ibid).

⁶⁸ One example is the divestiture of Pan Am after its bankruptcy in December 1991. Delta Airlines bought a major part of Pan Am's transatlantic and domestic network in the northeast for \$416 m and assumed its liabilities (New York Times, 1992) United acquired Pan Am's Latin American network for \$160 m (New York Times, 1991). The transactions included the transfer of route authorities, slots, staff and other assets.

2.2.1.2 Managerial theories

Based on the managerial theory of the firm, the principal-agent theory (number **4** in the table above) states that the primary objective of managers is not to increase shareholder value, but to pursue their own personal objectives, such as increasing their personal power or salary. An extensive analysis on this subject can be found in Glaum (1996). As mergers and acquisitions seem to be more promising than alliances as a way of achieving the managers' personal objectives, managers may underestimate the risks associated with integrating the acquired firms and may overestimate the chances of success (Roll, 1986).⁶⁹

The behavioral theory of internationalization (number **5** in the table above) describes the firm as a network of interacting stakeholder groups in which each influences the firm's decision-making processes with their own objectives (Aharoni, 1966). Coincidental events, trends and fashions ('M&A waves') or the interests and opinions of the leaders within the firm (typically higher management, board members or consultants) influence internationalization.

In the following section, the analysis focuses on efficiency-seeking and market-oriented explanations and classifies the efficiency gains from merger synergies claimed by economic theories and implemented by airline managers. Extensions from principal-agent and behavioral theories supplement the core economic model and will be handled as risk.

2.2.2 COST, REVENUE AND RISK SYNERGIES – FOCUS ON ECONOMIC THEORIES

Assuming that the aim of all managers is supposed to be creating additional value (in the form of efficiencies or synergies; see, e.g., Seth, 1990) by maximizing profit, I simply state that profit is a function of revenues minus costs. Therefore, the two ways to increase profitability are to increase revenue or decrease costs. Götsch and Albers (2005) added a third source of better performance: potential synergies from risk reduction. Since the revenue function depends on the demand and the cost function depends on supply, the literature also uses the terms 'demand and supply synergies.' I prefer 'differentiating cost, revenue and risk synergies.'

Cost synergies play an important role from the policy point of view, since a (marginal) cost reduction may shift the supply curve to the right and might reduce equilibrium prices, thus benefiting consumers and increasing consumer surplus. Revenue synergies, however, come from increased prices that are partially due to quality improvements and based on a higher demand, thus an upward shift of the demand curve.

⁶⁹ The failure of some transnational mergers in other industries (e.g., Daimler-Benz and Chrysler) may provide some anecdotal evidence for this theory, but the airline industry also provides some examples in which cross-border equity investments (not completed mergers) have failed (e.g., Swissair's investments in Sabena, Air Outre Mer, Air Europe and South African Airways).

While it does not necessary harm consumers (if their willingness to pay increases), the current consumer welfare standard does not accept any price increases after a merger. The only exception is when improved services come from innovation and there is an incentive to reduce price and increase production. Finally, competition authorities accept risk synergies (e.g., lower risk of coordinated effects with other firms) to some extent.

Airline managers claim (and mostly overestimate) positive synergies, but they usually forget to calculate the potential negative synergies. Götsch and Albers (2005) defined negative synergies as the loss of non-alliance passengers, the loss of autonomy and individual business relations, and high coordination, communication, dispute, friction and opportunity costs (e.g., the loss of flexibility, asymmetric information and the threat of antitrust jurisdiction).

The next table summarizes the most common cost, revenue and risk synergies and their acceptance by the competition authority in a merger process. As illustrated, revenue synergies have hardly been recognized, other than those coming from network effects. However, as described earlier in this chapter, these synergies might have already been exhausted at a lower level of coordination. Cost synergies were only accepted if a separation of fixed and variable costs were visible, which was rarely the case.

Туре	Claim	Acceptance
	Network and fleet planning:	Limited
	Route management, Integrated scheduling, Rationalization of frontline	
	operations, Fleet and product standardization, Higher aircraft utilization	
	Financial planning and bargaining power:	Limited
	Joint corporate contracts (code-share, BSA), Joint purchasing benefits (fuel,	
S	airport charges and fees, ground operation), Increased credit rating	
. <u>81</u> 6	Optimize labor costs:	No
neı	Reduced staff costs, Overhead reductions	
sy	Network effects:	Yes
ost	Infrastructure (catering, grand facilities, MRO, IT systems), Sales, marketing	
0	and distribution, Elimination of double marginalization, Hub & spoke	
	Yield management:	No
	Combined fares, Harmonized pricing	
	Network effects:	Limited
es	Code-sharing, Increased and/or better flight connections, More destinations,	
enu rgi	More frequent flights, Better timetables, Better check-in facilities,	
eve /ne	Combination of FFPs, Joint market analysis, Image transfer	
S S	Increased market power at hub airports	No
	Rationalization of the business model:	Yes
S	Innovative, Better management	
.gie	Network effects:	Limited
syner	Reduced risk of delay, Parallel code-sharing, Risk diversification	
	Limitation of competition:	No
isk	Less behavioral uncertainty, Entry deterrence, Expansion of market share at	
	hub airports, Joint lobbying	
Sc	urce: own classification based on the Ryanair/Aer Lingus decision (M. 4439, 20	007), <i>KLM/ Air France</i>

17. Cost, revenue and risk synergies – airline claims and EC acceptance

Source: own classification based on the Ryanair/ Aer Lingus decision (M. 4439, 2007), KLM/ Air France decision (M. 3280, 2004), Götsch and Albers (2005), Fritz (2005), and Park (1997)
2.2.3 NETWORK EFFECTS: DO THEY INCREASE EFFICIENCY OR MARKET POWER?

The next section⁷⁰ will describe why economists and competition authorities are skeptical of synergies from network effects. *Network effects* are special market externalities, whereby the number of consumers and/or producers using the same product or technology directly affects profitability (Shy, 2010).

The most known network effects in aviation are *economies of scale, scope and traffic density*. Network effects combine cost and revenue synergies since, for example, traffic density improvement attracts more passengers, which can result in a better load factor and in economies of scale.

First, if average costs decrease as output goes up, then we talk about *economies of scale*. Brueckner and Spiller (1991) drew the attention of competition policy to the network effects in air transport. Merged airlines operate with lower marginal costs due to *economies of scale*. The study pointed out that network effects are problematic for competition authorities, which focus on individual routes (i.e., *relevant markets*; see Chapter **4**) and fail to capture the wider effects of a merger. Therefore, it would be better to also take efficiency gains in 'outsider' markets into account, since benefits from the merger can spill over to other routes. However, there is a difference between parallel and complementary integration.⁷¹

A merger might reduce welfare on overlapping routes, but passengers (particularly connecting passengers) on related routes might benefit from cost complementarities. According to Brueckner's theory, if network effects are present, perfect competition would result in higher MC.

Generally in the airline industry, scale economies emerge by increasing network size (Caves et al., 1984). Smaller airlines can decline their average cost by increasing the number of served cities. This allows airlines to lower the 'unit cost' (i.e., the average cost of a passenger). Carlton, Landes, and Posner (1980) stated that in every case, passengers benefit from large networks.

On the other side, a merger might cause *diseconomies of scale* when an airport is already overloaded. In this case, not only the airport's operating costs increase, but so do the consumers' costs due to delays. The negative effects spill over within the whole network with the consequence that the airline's network (not only the route) becomes less attractive to consumers.⁷²

⁷⁰ This section is mainly based on our working paper Fröhlich et al. (2011), and a book chapter Fröhlich et al. (2013).

⁷¹ Parallel integration occurs if the partners' networks strongly overlap while complementary integration increases the size of the network (Brueckner & Spiller, 1991).

⁷² Spillover effects appear on neighboring routes and connecting airports, also in the case of price or capacity regulation on a given route. The regulated route loses attractiveness, prices increase, demand diminishes and passengers (mostly leisure passengers) will switch to alternative flights. Neighboring routes and connecting airports (mainly in foreign countries) benefit from restrictive air service agreements, but the introducing home country loses (Wolf, 2001).

Second, there are *economies of scope* in which the total cost of producing given quantities of two goods in the same airline is less than producing them in two single-product airlines. Bigger airlines aim to improve their network and tie in more consumers with bonus schemes like FFPs.

The third important network effect in the airline industry is the *traffic density* within a given network size.⁷³ When the level of traffic increases, the cost per passenger falls (Tretheway & Oum, 1992). Further, if the aircraft's load factor increases, the airline can achieve cost efficiencies. The airports also benefit from economies of traffic density, since the additional traffic lowers the average cost of operating the infrastructural facilities (Wolf, 2001).

On the other side, network effects may also increase *market power*. The question of market power at the hub airport (i.e., *hub dominance* or *hub premium*) and its influence on the market situation remains unclear. *Hub premium* occurs when one dominating airline charges a higher fare for flights from the hub airport.

Dodgson (1994) compared the first European mergers and described why mergers with hub dominance can be anticompetitive. Network effects might be responsible for higher ticket prices. The literature has often analyzed this problem with different outcomes. Borenstein (1989) estimated a 12 percent higher price if the airline had more than 50 percent market share at the hub airport compared to another airline with only 10 percent market share. Tretheway and Kincaid (2005) summarized previous research findings on hub premium and highlighted the results of the General Accounting Office (1990), which announced 27 percent more yields at hub airports, while the DoT (1990) only reported 18.7 percent at airports dominated by one airline. Abunassar and Koford (1994) stated that 10 percent higher fares due to hub dominance eliminated the hub premium effect because of higher demand for the hub cities. Lee and Luengo-Prado (2005) estimated 12.2 percent, while Morrison and Winston (1995) only expected a 5.2 percent premium, which completely stems from the higher quality service. Lijesen et al. (2001) calculated an around 15 percent hub premium concerning Lufthansa, KLM and Swissair's long-haul flights, and suggested taxing FFPs to reduce the principal-agent problem. Ledermann (2008) argued that FFPs are one of the main reasons behind hub premium, since FFP alone increases ticket prices by 3.5 to 5 percent. Bilotkach and Pai (2014) found that the higher prices paid by business passengers are only due to their higher willingness to pay, while dominant airlines abuse their market power on average passengers instead.

⁷³ For more on traffic density, see Caves, Christensen, and Tretheway (1984), who further explained the benefits of higher frequency and/or large aircraft. Other important contributors to the literature are Baumol and Willig (1981), Brueckner, Dyer and Spiller (1992), Zhang et al. (2004), and Lederman (2007).

Oum et al. (2000) found positive effects on productivity and profit for major alliances⁷⁴ (e.g., KLM/NWA) and insignificant effects for minor alliances. Major alliances increase total factor productivity by 4.9 percent, lower revenues (due to lower fares) per output by 1.5 percent and increase profitability by 1.5 percent. As airline competition became stronger, and low-cost carriers (LCCs) appeared at the beginning of the new century, discussions about hub premium lost their importance⁷⁵.

⁷⁴ The term 'major alliances' does not refer to size, but to the scope of cooperation (Oum et al., 2000).

⁷⁵ Now, a different way of looking at hub premium is to emphasize de-hubbing and analyze the consequences of a hub carrier disappearing due to bankruptcy or merger. See our case study on de-hubbing in Section **5.4**.

2.3 WHY DID THE EC NOT CONSIDER EFFICIENCY GAINS?

"Firms provide biased evidence; agency balances with focus on consumer welfare" (Lyons, 2012).

Independent of the airlines' relationship, the EC has not considered network effects. Even if efficiencies could be proven, measuring the rate to be passed through to consumers might be a further challenge. On one side, the EC has welcomed efficiency studies, but it has also pointed out the lack of the ratio between consumer welfare and social welfare which "would be necessary to examine to what extent such efficiencies would be passed on to consumers (…) however, they are very difficult to be quantified and the study's attempt to do so relies on rather strong assumptions" (M. 5141, 2008, p. 97). On the other side, the Commission has had serious concerns with respect to these takeovers, and has tried to benchmark the post-merger price evolution⁷⁶ of leisure fares (Németh & Niemeier, 2012).

Potential positive synergies were already welcomed during the Swissair/Sabena merger in 1995: these included "fleet planning, strategic network development, financial planning, and route management, yield management, sales and marketing" (M. 616, 1995, p. 3). However, the optimism at the beginning and the forecasted positive synergies seemed to have been overestimated. Six years after the takeover, both airlines went bankrupt⁷⁷ (Knorr & Arndt, 2004).

First attempts to use efficiency considerations in the decisions date from 2006, but the question of their usefulness was generally left open. In the Ryanair/Aer Lingus case (M. 4439, 2007), the EC rejected the efficiency gains⁷⁸ of €200-250m proposed by consultants on behalf of Ryanair because they were unlikely to outweigh the competitive harm.

The EC not only rejected the efficiencies, but also the Ryanair/Aer Lingus merger. The merger should have been prohibited with or without efficiency considerations. According to § 84 of the ECMG: "It is highly unlikely that a merger leading to a market position approaching that of a monopoly, or leading to a similar level of market power, can be declared compatible with the common market on the ground that efficiency gains would be sufficient to counteract its potential anti-competitive effects." Thus, if there is a fear of abusing market power, efficiencies do not matter.

⁷⁶ In the Ryanair/Aer Lingus case (2007), the commission also used a price-correlation analysis.

⁷⁷ In the following year, Sabena was successfully reestablished as SN Brussels Airlines. Swissair was restructured as Swiss in 2001 and was taken over by Lufthansa in 2005. Lufthansa merged with SN Brussels in 2009.

⁷⁸ Mainly from variable cost savings, like economies of scale and rationalization of the business model (more innovative, better management). According to Ryanair, those savings would have affected staff costs, aircraft ownership costs, maintenance costs, airport charges, ground operational costs, ancillary sales and distribution efficiencies (p. 311). However, the EC found most of these would affect rather short-run fixed costs instead (p. 313). Further, Aer Lingus claimed that efficiencies are overestimated, not merger-specific, not verifiable and probably not passed through to passengers (pp. 313-316).

In 2008, KLM submitted a study in which they claimed supply-⁷⁹ and demand-side efficiencies⁸⁰ of \in 16.4m when allowing the takeover of Martinair⁸¹ (M. 5141). The study also differentiated between fixed and variable costs savings (only the latter is relevant for benefiting passengers). Since demand-side efficiencies are concerned with quality improvements, they are hard to quantify and measure. However, since the merger, with or without efficiencies, "would not significantly impede effective competition," the case was cleared by the EC (ibid, pp. 96-98). Therefore, if there is no fear of abusing market power, efficiencies do not matter. So the EC was skeptical of efficiency claims provided by airlines (specifically by their economic consultancies), with or without market power.

In the 2010 British Airways (BA)/Iberia merger case, BA claimed significant synergies of \notin 400m, enhanced consumer benefits and developed their network (157 new destinations). Passengers should benefit from cost savings and higher quality service. The EC focused on price effects and conducted an econometric analysis with the data provided by BA, AA, Iberia and Virgin Atlantic. The assessment found a possible "increase of prices by 2.2 percent for business fully flexible tickets and 5.4 percent of economy restricted tickets" (M. 5747, p. 10) and rejected the claimants' argument that the merger would be beneficial for consumer welfare (Németh & Niemeier, 2012). Nevertheless, the merger was approved.

Efficiency is one of the main aims of the EU, but the *more economic approach*, at least in terms of accepting efficiency claims, has not yet been applied to airline merger decisions. However, mergers will probably still be cleared if there are other justifiable reasons (e.g., quality and variety⁸²) to believe that they will not significantly impede effective competition. Airline managers claim positive network effects, arising from significant cost and revenue synergies. The potential is higher if the merging airlines operate on complementary routes and if they do not previously belong to the same alliance. Nevertheless, convincing forecasts are difficult.

⁷⁹ Supply-side efficiencies were the joint purchasing benefits, overhead reductions, rationalization of frontline operations, systems integration and network efficiencies (M. 5141, p. 97).

⁸⁰ Demand-side efficiencies were the elimination of double-marginalization, increase in flight connections, reduced risk of delay, frequent flyer programs and better check-in facilities (M. 5141, p. 97).

⁸¹ KLM and Martinair already had a long history at the European Commission. After a contested process in December 1999, the EC imposed fines on KLM for supplying incorrect and misleading information about the destinations of its subsidiary, Transavia. KLM refused to answer in English and wanted to use Dutch as the official language of the proceedings. KLM held back the overlapping route information from the EC, hoping for an acceptance of the merger. In spite of this, the merger was rejected and a \notin 40,000 fine was levied.

⁸² E.g., increasing network quality and higher flexibility, lounge access and ground processes, more frequencies, more destinations, realigned timetables, better connections.

2.4 CONCLUSIONS

Previous literature differs about the magnitude of synergy effects, so the EC is skeptical of mergerspecific synergy gains, which could be passed on to consumers. The only certain network effect remains *quality improvement*, which is challenging to quantify. Cost savings could be measured, but it is difficult to relate them to exact network effects because they can spill over other routes as well. The role of competition authorities under the TW standard should be to prove whether the positive synergy effects overcome the anticompetitive effects from increased market power. Efficiency gains do not fit the CS standard applied in the EU unless they are passed on to passengers.

Chapter 2 tried to provide an answer to the contradiction of the merger policy: the EC does not directly measure efficiency, but takes it into account to some extent. The chapter addressed why the EC refused efficiency gains related to airline takeovers but still allowed the mergers.

First, the EC is generally skeptical of efficiency claims, which are of a speculative nature. Existing literature supports this view. Second, European competition policy applies the Harvard-developed SCP model. This model is based on oligopoly theory, where a concentration usually results in higher prices and less output. Hence, the model assumes that new oligopoly price is above the old price. As long as a merger leads to a marginal price increase, the price development causes a loss in consumer surplus, thus harming consumers. Therefore, any price increase would exclude efficiency considerations. In other words, even if the current merger regulation would allow efficiency defense, the applied oligopoly framework would exclude any trade-off when a potential price increase harms consumers. It is a contradiction of legislation. As a consequence and third, the EC had to switch to the TW standard to introduce the efficiency defense. Until then, one could conclude that airlines do not need to spend too much time assessing efficiency claims, since they will be rejected anyway.

Finally, there is a solution to the contradiction. According to the ECMG, efficiencies can be taken into account as long as they will be passed on to consumers (in our case, passengers). If there is a sign that efficiencies improve consumer welfare, mergers might be cleared. Although neither the ECMR nor the ECMG define *consumer welfare*, it could be defined as the well-being of consumers depending not only on price, but also on quality and variety. Efficiency gains might be passed on to consumers in these forms. This extended definition of consumer welfare meets the companies' needs. By implementing efficiency gains that lead to quality improvement for passengers, the welfare balance shifts back to the consumer's side and the goal of competition policy is successfully achieved. The conflict of the current merger policy is that there might be a better cost/price margin due to efficiencies, but does it also result in cheaper ticket prices (that benefit consumers)? The answer is probably not. Chapter **3** introduces different economic models to quantify the price and efficiency effects of mergers.

3 ECONOMIC MODELS OF PRICE EFFECTS VERSUS EFFICIENCY

"...the Commission's evidence (...) is at best non-robust (i.e., highly sensitive to small changes) and at worst meaningless (i.e., based on misspecified models" Ryanair, after the EC prohibited the takeover of Aer Lingus (M. 4439, 2007, p. 487).

3.1 INTRODUCTION

Davis and Garcés (2010), Bishop and Walker (2010), Lyons (2012) and Verboven (2012) have all provided comprehensive overviews of quantitative econometric techniques used in competition policy or antitrust analysis worldwide. This chapter summarizes the approaches and suggested methodologies for measuring price effects versus efficiency gains from mergers. The aim is to introduce models with future relevance to European airline mergers.

Bilotkach and Hüschelrath (2012) assessed the role of efficiencies in airline alliances with antitrust immunity (the US immunity ruling grants rights similar to a merger), collected the main sources of efficiency gains and methodologies to quantify them. Based on their study and our table in Section **2.2.1**, the following table provides an overview of merger-specific efficiencies, their importance and possible quantifications.

	Aim	Tools	Merger- specific ⁸³	Relevance	Quantification	
	A) Decrease costs					
efficiencies	Increase economies of scale and scope	Joint use of resources, Pooling for aircraft; Fuel purchasing	use of resources, A ng for aircraft; Fuel nasing		Not applicable	
		Economies of scale in marketing	Yes	Medium	Regression analysis	
ide		Access to cheaper labor	Yes	_		
Supply-si	Increase economies of traffic density	crease economies Optimize load factor, aircrat traffic density size				
	Internalize transaction costs (Coase theory)	Avoid: uncertainty, rent Yes seeking, opportunistic behavior, costs of monitoring		_		
	B) Increase revenue	Pricing and yield management	Yes	High	Descriptive or regression analysis	
emand-side fficiencies		Optimize scheduling, frequency	А	Low	Descriptive	
		Eliminate double marginalization	A	Low	Simulation	
D. D	C) Extend the	Assessing slots	Yes	High	Descriptive	
	network	Code-sharing, BSA, better connectivity, FFPs	А	Low		

18. How should merger-specific efficiencies be measured?

Source: own table

⁸³ "A" stands for alliances: if the efficiency can already be realized in a code-share alliance, it is thus not merger-specific.

Supply-side efficiencies might be realized by decreasing costs. The appropriate methodology is regression analysis based on internal cost data. Mergers might also increase revenue through common pricing and yield management. This analysis also requires cost data and detailed data about price discrimination. The third source of merger-specific efficiencies is the slot assessment, which could be investigated by a descriptive analysis.

To review the main literature, economic competition models (lacking cost data) mostly try to estimate the price effects of a merger⁸⁴. The first group (1) of models are based on the relevant market definition with the help of demand elasticity (SSNIP or CLA). They then calculate the potential increase in market power due to structural changes, thus changes in market share (Lerner index or HHI).⁸⁵ As I will illustrate in Chapter **4**, the EC applies this two-level framework to its merger analyses.

The models in the first group rely on the Harvard-based SCP paradigm and expect a direct correlation between prices and concentration, which can be measured by a regression analysis (2). The second group (2a) of econometric models focus on *cross-section or fixed-effects* analysis. In line with the more economic approach, the EC also investigates price-concentration analysis (e.g., in the Ryanair/Aer Lingus case). The remaining regression models (2b) assume a Cournot, Stackelberg or Bertrand oligopoly market without directly defining the relevant market. This group of models contains the *upward pricing pressure* (UPP) test to quantify potential efficiency gains from mergers. Section **3.2** describes these models.

The last group (3) of models tries to estimate parameters for demand, costs and equilibrium, and tries to set up an oligopoly model to simulate price and welfare effects of mergers by using different assumptions. *Minimum required efficiency* (MRE) tests are the most commonly used to measure efficiency gains. Section **3.3** introduces merger simulations.

Section **3.4** assesses the literature on the price and welfare effects of mergers and alliances in the airline industry and develops a model to measure the price-frequency trade-off. The EC does not yet use merger simulations for airline mergers.

⁸⁴ Annex **8.2** summarizes the main groups of economic models, including the latest research papers, applied in competition economics research and policy practice.

⁸⁵ For more about "small but significant increases in price" (SSNIP), critical loss analysis (CLA) and the Lerner and Herfindahl-Hirsch index (HHI), see Chapter **4.2.1**.

3.2 REGRESSION ANALYSIS

"The most expert economists in the world would not be able to put a usefully narrow confidence interval around their estimate of the net efficiency impact" (Hazledine, 1998, p. 250).

3.2.1 CROSS-SECTION AND FIXED-EFFECTS ANALYSES

Econometrics provides a useful framework for analyzing mergers. The victory of econometrics in the antitrust environment started when the FTC opposed the announced Staples/Office Depot merger in the US in 1997. Ashenfelter et al. (1998) explained that the FTC first based its decision on econometric regressions that estimated roughly 7 percent lower prices if Office Depot remained a competitor.

Generally, two types of regressions are used in competition policy to estimate the price effects of mergers. The first is called a *cross-section* analysis, and it compares price levels across different sections or regions (on affected routes). This methodology is useful if market structure differs across routes, but might be biased if it is not possible to control for unobserved variables that affect price (De la Mano et al., 2007). The second type, the *fixed-effects* approach, accounts for unobserved differences across regions (routes) and identifies the effect on prices from the presence of competitor(s) over time (Verboven, 2012).

The EC used a fixed-effects regression in the Lufthansa/SN Brussels (2009) and Ryanair/Aer Lingus (2011) cases. Most recently, the EC found that Ryanair's presence reduces Aer Lingus's fares by about 8 percent and, also for different reasons, prohibited the takeover. The following model was applied:

$$\ln p_{it} = \alpha_i + f(competition) + \sum y_t D_t + \delta_j X_{it} + \epsilon_{it}$$

Where P_{it} , the dependent variable, was the logarithm of the *average net monthly fare of* Aer Lingus. α_i is the *route fixed effect*, which accounts for unobserved differences within the route (dummy 1 if relevant route, or 0 otherwise). F(competition) is a function of the explanatory variables (e.g., the number of competitors), while D_t is a dummy for each month (to identify cost shocks). X_{it} is a vector of additional cost and demand control variables. The estimated parameters are y_t and δ_j , while ϵ_{it} is the error term.

Most recently, Hüschelrath and Müller (2013) tried to model the post-merger effects of, inter alia, the Delta Airlines/Northwest takeover in 2009. By using log-linear *fixed-effects regressions*, the authors found that the merger, which resulted in around a 20 percent common market share of the merging airlines, led to a 10 to 11 percent immediate price increase (later diminished to an average of 3 percent). Two factors affected the moderate reduction in ticket prices: new entries were responsible for a 5 percent price decrease, while efficiencies counted for only about a 2 percent price decrease.

3.2.2 UPWARD PRICING PRESSURE TEST

As described in Chapter 1, the concentration doctrine was challenged by the Chicago School's efficiency doctrine, which says that high market share might be based on efficiency or innovation. Following this line of thinking, the next model included efficiency arguments in the merger analysis, *independently of market share*. The *upward pricing pressure (UPP)* model⁸⁶ is a modern implication of the Williamson trade-off, since it balances the UPP from lost direct competition and the downward price pressure from marginal cost savings.

Farrell and Shapiro (2010b) suggested using the price-cost-margin-based UPP test instead of the traditional (concentration-based) relevant market definition.⁸⁷ The model assumes a Bertrand oligopoly with product differentiation instead of the traditional approach, which is based on a Cournot framework with homogeneous products. Therefore, coordinated effects (e.g., collusion) play a more important role here, while the traditional competition policy framework deals with unilateral effects instead.⁸⁸ With merging firms A and B, the UPP is the following:

$$UPP_A = D_{AB} \times (P_B - C_B) - E_A \times C_A$$

Where D_{AB} is the *diversion ratio* from A to B, thus the proportion of consumers who switch from A to B if P_A increases. Thereby we need to carry out consumer surveys to estimate demand function and *cross-elasticity*. P_B-C_B is the price-cost margin that B receives in each of these switches (retrieved from accounting data). E_AC_A is the post-merger efficiency gain from the merger, thus the marginal cost changes at firm A due to efficiency. If there is a positive UPP, the merger very probably has an upward pricing pressure.

Lyons (2012) provided a good example to illustrate the UPP test (while assuming, e.g., $P_B-C_B=20\%$ and $E_AC_A=5\%$). The following table shows the correlation between firms A, B, C and D after firm A increased prices by 5 percent. Since A and B are close substitutes (ΔQ shows that after A's price increase, 15 of the 20 lost consumers switched to B), while assuming a 5 percent efficiency gain, the merger of A and B would result in a 10 percent UPP. On the contrary, a merger between A and C or A and D might result in a negative, thus downward, pricing pressure.

⁸⁶ Originally, Werden (1996) developed the UPP model.

⁸⁷ Since the authors were that time working for FTC and DoJ, their model probably influenced the new US merger guidelines in 2010 (Lyons, 2012).

⁸⁸ For a more detailed discussion on coordinated and unilateral effects see Section 4.2.2.

Firm	Q ₀	Q1 if PA rise by 5%	ΔQ	DAI	UPP	Result (%)
А	100	80	-20	-		
В	100	115	15	15/20=0.75	0.75*0.20-0.05	+10
С	100	103	3	3/20=0.15	0.15*0.20-0.05	-2
D	100	102	2	2/20=0.1	0.10*0.20-0.05	-3

19. Illustrating the UPP test

Source: based on Lyons (2012)

The EC took some recommendations⁸⁹ from a further study conducted by Farrell and Shapiro (2010a) about the 2011 Olympic/Aegean merger case (M. 5830), at least their argument for why the traditional 'hypothetical monopolist' (SSNIP or CLA) tests are not appropriate in the airline industry. The EC found the UPP test inapplicable because of the complex yield management pricing in aviation.

While it has many limitations, UPP might be a better alternative to the SSNIP and CLA tests in cases of product differentiation, because it does not require defining the relevant market. Therefore, one could avoid the mistakes that stem from defining the wrong (too broad or too narrow) product market.

However, critics of UPP claim that the model does not calculate new equilibria, and leaves open the question of optimization with profit maximization. Schmalensee (2009) criticized the UPP approach since it rejects case-specific efficiencies and *uses a general value* for all cases. The author argued that marginal cost estimates are biased downward, as long the calculations use average variable costs as a proxy.

A further critique by Schmalensee (2009) is that the UPP model only assumes net changes in P_A and leaves P_B and other prices constant; thus it explains marginal changes in price levels and does not predict concrete prices. Merger simulations, on the other hand, go further and calculate new equilibria.

⁸⁹ The UK competition authority also uses a similar test, called the illustrative price rise (IPR).

3.3 MERGER SIMULATIONS

"The neoclassical theory is highly manipulable and flexible (...) our models are too simple; we ignore other arguments in the utility function, power, status, social approval, or whatnot that also motivate individuals, and we ignore some constraints, capacity for calculations and social controls" (Arrow, 1974, p. 3).

The research field, what Bork called "speculation," is the basis of *merger simulation* models. These demand-based models estimate the price and welfare effects of mergers due to increased market share in an oligopoly framework. Homogeneous product markets generally apply the Cournot framework (quantity competition), while heterogeneous markets (e.g., airline services) apply the Bertrand oligopoly (price competition) model. The Bertrand model does not necessarily require marginal cost data for describing the profit-maximizing conditions.

Budzinski and Ruhmer (2009) provided an overview of merger simulations, with their strengths and limitations, applied to antitrust. The authors summed up the process of building a merger simulation:⁹⁰

- 1. Choose a demand model up to the consumer behavior⁹¹
- 2. Estimate or deduce own- and cross-price elasticity from the data
- 3. Build a demand system including pre-merger prices, elasticity and market shares
- 4. Model the supply side with a Cournot or Bertrand oligopoly model
- 5. Calculate post-merger equilibrium with new market shares.

The simple static simulation model then might be extended by product differentiation (each product needs an own demand and cost function), efficiency gains (efficiencies are included in the cost function), entry or exit, and welfare considerations.

Ivaldi et al (2003) summarized the static merger simulations and explained demand models with elasticity, market power and welfare.⁹² To their knowledge, dynamic models have not been applied in antitrust. The European Commission first looked at a merger simulation model in 1999 in the Volvo/Scania case, which was presented by Ivaldi and Verboven (2005).

⁹⁰ For a detailed description of how to perform a simulation model (e.g., with Mathematica software), see Werden and Froeb (1994). Davis and Garcés (2010) also provide a good overview of building a merger simulation.

⁹¹ The authors described linear, log-linear, discrete choice (logit, nested logit and random coefficients), almost ideal (AIDS), proportionally calibrated (PC AIDS) and multi-level demand models. They concluded that log-linear models predict the highest price increase, while linear models predict the lowest price increase. Indeed, these two types of demand models are hardly used, since they would assume constant own- and cross-price elasticity, which is definitely not the case in airline tickets. Discrete choice models estimate consumer utility for differentiated products and give an option for 'outside good' if the consumer does not switch but refrains from purchasing the product after a price increase. AIDS and PCAIDS models use no demand function, but use real scanner data (which is rare and costly) and allow for a complex representation of elasticity. Multi-level estimations distinguish between top demand in the market (with a log-linear demand function) and brand bottom competition with the help of an AIDS model.

⁹² The study also introduced supply models used mainly in collusion cases.

3.3.1 MINIMUM REQUIRED EFFICIENCY

Merger simulation models can estimate a tailor-made *minimum required efficiency* (MRE) to compensate for price increases (see Werden, 1996; and Röller et al., 2000). Verboven (2012) provided a simple model for symmetric firms with similar pre-merger *marginal costs* MC and post-merger marginal costs MC_p . Then, the percentage efficiency can be written as:

$$\frac{MC - MCp}{MC} = \frac{D}{(1-D)} \times \frac{M}{(1-M)}$$

Where D is the *diversion ratio* (switching rate of consumers due to price increase), and M is the markup or margin calculated from the own-price elasticity of demand. Assuming constant demand elasticity and equal product prices, one could write up the following results:

Μ	D = 0.1	D = 0.2	D = 0.3
0.2	2.86	6.67	12.00
0.3	5.00	12.00	22.50
0.4	8.00	20.00	40.00
0.5	12.50	33.33	75.00

20. Calculating MRE: Post-merger price increase or minimum required efficiency (in percent)

Source: after Verboven (2012)

As illustrated in the table above, the higher the substitutability (D), the higher the potential price increase, thus the MRE to compensate for price increases after a merger. Also, the minimum required efficiencies are directly correlated with the pre-merger margins, which can be calculated as (P-C)/P or $1/\epsilon$, thus the own-price elasticity. Of course, this simple model has many limitations and should only provide a better understanding. The MRE model can be arbitrary extended within a merger simulation.

Spector (2003) argued that in the absence of technological synergies, a merger must always raise the price, even if entry appears. After describing different economic models to measure efficiency and the welfare effects of horizontal mergers, Motta (2004) summarized that the more concentrated an industry is, the more efficiencies are required to outweigh the price increases (and thus the negative market power effects of the merger). Further, even if there are high efficiencies, the question of *pass through* to consumers remains open.

3.3.2 THE PASS-THROUGH RATE

Ashenfelter et al. (1998) and Froeb, Tschantz and Werden (2005) tried to assess the extent to which synergies, concerning marginal costs, will be passed on to consumers. More recently, Farrell and Shapiro (2010b) calculated an artificial pass-through rate (PTR) for cost changes in price, which can be also used to improve the SSNIP test. For the oligopoly environment, the formula is as follows:

$$PTR = \frac{\varepsilon}{\left\{ \left(\varepsilon - 1 + \left\lfloor \frac{P}{\varepsilon} \right\rfloor \right) \times \left(\frac{d\varepsilon}{dP}\right) \right\}}$$

Their contribution is that this ratio depends not only on the own-price elasticity ε , but also on the demand function's curvature d ε /dP, thus on how the slope of the demand curve varies along different price levels. The authors argued that PTR is not directly related to market power (thus saying that the argument that firms with market power have low PTR is false), but is instead related to the shape of the demand function. The authors argued that even if there were efficiencies, they would not be passed through. Thus, the efficiency defense, in their view, has only a limited meaning.

Röller et al (2000) concluded that only efficiencies from variable cost savings can affect pricing decisions, while fixed cost savings have no impact on prices. In case of variable cost, the authority needs to know the magnitude, thus the share of these cost savings compared to all variable costs, such as the expected time when the firm expects to realize variable cost savings (e.g., from economies of scale). The study suggested considering synergies from quality improvements.

Weyl and Fabinger (2013) derived the pass-through ratio for different market structures and made a complex statement about the conditions under which it might be used. Baye and Hunter (2010) were more pessimistic and claimed that, unfortunately, it is merely conventional wisdom that efficiencies, in the form of marginal cost savings, will be passed through to consumers. The rate depends on the degree of competition and basically on the nature of the demand, but the authors conclude that such an analysis "goes beyond textbook models" (p. 7).

In summary, while the research field is improving, merger simulations have many limitations in my view. First, gathering data costs time and money, and the data is often still imperfect. Second, the more sophisticated a model becomes, the more expertise, time and data it requires; thus the costs of merger simulation might overcome the benefits. Still, even complex models might have less significance, due to the increasing number of conditions and assumptions, or excluded factors: for instance, non-price dimensions of competition (e.g., entry and exit barriers, buyer power, quality, and innovation).

3.4 PRICE AND WELFARE EFFECTS IN THE AIRLINE PRACTICE

"Anything is possible" (Schmalensee on industrial economics research, 1988, p. 676).

3.4.1 PRICE EFFECTS OF MERGERS

The following section⁹³ chronologically summarizes the main literature about price estimations due to airline mergers. Most of the studies forecasted price changes after a merger, but some authors also tried to assess efficiencies related to the takeover.

Borenstein (1989) and Werden, Joskow and Johnson (1991) compared the first US merger cases and found evidence of increased fares from 1985 to 1987. In the Northwest/Republic (NW-RC) case, fares increased by 5.6 percent in the overlapping market, but decreased by 0.8 percent in the former hub (Detroit). In the Trans World Airlines/Ozark (TW-OZ) case, fares in short-haul⁹⁴ overlapping markets increased by around 4.5 percent, while fares outside the overlapping markets decreased by 5.5 percent.

Kim and Singal (1993) analyzed 14 US airline merger cases in the period between 1985 and 1988. They found that merged airlines increased fares by 9.44 percent more on overlapping routes than on other routes. This price increase could even be 40 to 45 percent, if the merger involved a bankrupt airline takeover. On routes where airlines operated from the same hub, there was some evidence of efficiency gains. The authors pointed out that positive synergies do not arise until the end of the merger process, while the negative effects due to increased market power emerge at an early stage. The paper concluded that the negative effects are always greater than the positive synergies.

Evans and Kessides (1994) reviewed collusive multimarket contracts between 33 US airlines between 1984 and 1988. They noted the importance of external contracts on airfares: "fares are higher in citypair markets served by carriers with extensive inter route contracts" (p. 341). That proves the 'golden rule': airlines do not use aggressive pricing because if the competitor behaves in the same way, a price war will begin. The study further found that if the market structure moves from monopoly to duopoly, prices fall by 11 percent, but a move from a four-airline to a five-airline oligopoly only changes prices by minus 1.1 percent.

Singal (1996) considered the market shares and the relative size of the contracting/merging airlines and calculated a price increase of 10 to 14 percent on long-haul routes after the merger. He suggested that antitrust policy should examine not only the mergers, but also the collusive contracts. He concluded that consumers are always worse off.

⁹³ This chapter is mainly based on Németh and Remetei-Filep (2010) and, in particular, is identical to the text of our working paper.

⁹⁴ Short-haul means less than 1000 miles; while the effect on long-haul markets was not significant.

Carlsson (2002) examined the changes in market structure and their effects on prices. This was the first study to compare airline data from eight European countries. By differentiating between business and economy passengers, Carlsson argued that structure has no significant influence on economy ticket prices. Since leisure passengers are price sensitive, the intermodal or airline competition is stronger.

Peters (2003) from the DoJ compared six US merger cases from the 1980s and showed the post-merger price development. The study used two *simulation models* based on non-cooperative Bertrand duopoly and cross-price elasticity by measuring product substitutability. In every case, the actual prices were higher than those predicted by the models. The study also found increased marginal costs⁹⁵ after the merger, which questions the efficiency gains.

Kwoka and Shumilkina (2010) analyzed the USAir (now US Airways)/Piedmont Airlines (PT) case from 1987. They showed that air fares increased by 10 to 12 percent on overlapping routes. They assessed the anticompetitive incumbent pricing, which allows deterring entry and raising prices by 5 to 6 percent.

The following table summarizes the current state of the literature about the price effects of mergers. While ten research papers found evidence of higher prices, two studies found no price increasing impact. The opposing studies are representatives of the Chicago School's view of efficiency claims and positive network effects: Carlton et al. (1980) and Brueckner et al. (1992). Studies that found increased prices after a merger estimated these price effects as between 5 and 14 percent.⁹⁶

⁹⁵ Due to high financial investments in the bankrupt airlines and increased labor costs.

⁹⁶ A further extended approach is that firms might be generally worse-off after merger. Salant et al. (1983) described a special type of Cournot oligopoly in which firms that previously colluded are worse-off after the merger due to decreased joint profits related to less production. Perry and Porter (1985) argued that though a merger always increases prices, not every firm has an incentive to merge. However, if the merged entity is large enough, it can compensate for the lost production with the price increase in such a manner that a merger became profitable again. With the help of game theory, Kamien and Zang (1990) presented the limits of monopolization in a homogeneous product industry with linear cost function. Flores-Fillol and Moner-Colonques (2007) derived a model in which airline alliances are not profitable if there is other significant competition on the route and traffic density is low. Socorro (2007) went further and claimed that mergers with demand uncertainty and constant marginal costs are privately unprofitable but socially advantageous and should be publicly subsidized or granted a "limited liability debt financing" by the state. The paper presents examples from Asian countries, the USA and Spain. The model developed by Brander and Lewis (1986) provided the idea behind Socorro's proposition, which states that firms with high debt compete more aggressively and, thus, benefit consumers.

Author	Database,	Methodology,	Major findings	Price
Carlton et al. (1980)	33 city pairs 1977	Probability distribution on NC- SO merger	Passengers benefit from code- sharing; fares are 9 percent lower; time savings 12 percent; annual consumer benefit \$3.54m-\$4.79m	NO
Brueckner et al. (1992)	DB1A 1985	Describes US deregulation by concentration	Reduced price due to network expansion, evidence about traffic density, positive welfare effects, cost complementary	NO
Borenstein (1989)	DB1A 1985-1987	TW-OZ and NW-RC mergers	NW/RC – fares increased by 22.5 percent on average on routes where the airlines competed before, but prices increased overall	YES
Werden et al. (1991)	1985-1987	Regression on TW- OZ and NW-RC mergers	Increase in price and reduction in services in both merger cases	YES
Kim and Singal (1993)	1985-1988, 21,351 routes, 14 mergers	Regression analysis; price changes	Fare increased by 3.25 percent on average; 26.25 percent price increase if the takeover was related to a failing airline; limited/no efficiency effects	YES
Singal (1996)	DB1A 1985-1988	Pricing behavior after merger	10 to 14 percent price increase on long-distance routes; while mergers might have a limited efficiency effect, multimarket contacts are always anticompetitive	YES
Peters (2003)	DB1A 6 US mergers	Merger simulation compared to post- merger regressions	Frequency decreased; prices increase by 7.2 to 29.4 percent on overlapping routes; new entry has very limited effect on prices	YES
Armantier and Richard (2006)	DB1B 1999	CO-NW alliance	Prices rise by 13.6 percent with code-sharing	YES
Lederman (2007)	DB1A, 1996-2000	Regression, AA, CO, DL, NW, UA and US	Estimates a price function. FFP increases demand, thus new equilibrium with higher fares	YES
Kwoka and Shumilkina (2010)	DB1A 1987	US-PT, Pooled OLS, fixed- effects regression	Incumbent carriers raise prices by 5 to 6 percent on average; 10 to 12 percent on overlapping routes; evidence for entry deterrence	YES
Wan et al. (2009)	DB1A 1984-1988; 1,000 largest domestic routes	Random effect model	Fares are higher with inter-route contacts and network expansions; the 'golden rule' weakens price competition	YES
Hüschelrath and Müller (2013)	DOT-T100, DB1B 1995-2011	DL – NW takeover in 2009; with log-linear fixed-effects regression	10 to 11 percent immediate price increase, which was reduced to 3 percent in the long run due to new entries (-5 percent) and efficiencies (-2 percent)	YES

21. Price changes after US airline mergers and alliances: evidence of market power?

Source: based on Németh (2011a)

3.4.2 PASSENGERS' UTILITY AND TOTAL WELFARE

In order to compute welfare, Neoclassical welfare economics⁹⁷ basically maximizes consumers' utility (e.g., with *merger simulations*). The main determinants of travelers' utility are (1) the monetary cost of the flight, (2) the preferred departure time and (3) the opportunity cost of time. The difference between (2) and (3) is also called 'scheduled delay' and is inversely proportional to the flight frequency.

Applying a simple log-linear function, Peters (2003) developed the passengers' utility model. It includes ticket price, flight frequency, airport presence, distance and whether the flight is non-stop. His model also measures the fixed effects of mergers in different time periods.

In the extended model, passengers' utility is not only dependent on ticket prices, but also on schedule delay or 'generalized price.' Mergers may imply better connections and lower switching costs, thus less travel time. Therefore, even with a higher ticket price, the generalized price might be lower and consumers might be better off after a merger.⁹⁸ However, little evidence in the empirical research supports this result.

While airlines usually benefit from a merger (increased producer surplus), consumers might be worse off. Airline alliances and mergers cause complex welfare effects. The purpose of European competition policy is to maintain competition <u>and</u> avoid harm to consumers. Applying a CS standard and focusing only on price effects means that European competition policy should always rule against mergers. However, case studies in Section. **3.2** illustrate the opposite behavior.⁹⁹ Not even economic research applying a TW approach with the Williamson trade-off could prove that airline mergers enhance welfare.¹⁰⁰ The latest European research into airlines with a TW approach concluded that the Air France/KLM merger was anticompetitive (Brueckner & Pels, 2005).

⁹⁷ Welfare economics is "the framework to measure market performance and the effects of firm behavior" (Church & Ware, 2000, p. 20).

⁹⁸ I would like to thank Pilar Socorro for her useful comments and advice on extending the welfare approach and including the advantages of airline mergers.

⁹⁹ A recent incident from Australia shows the inconsistency around welfare. South African Airways had a joint venture with Qantas on the Johannesburg to Pert and Johannesburg to Sydney routes until 2010, based on "the maintenance or promotion of exports, and in respect of a change in productive capacity to stop decline in an industry" (ACCC, 2010, sec. 10(3)(b)(i) and (iii)). The code sharing was first challenged (because it resulted in high airfares and entry barriers), but was then extended for two more years.

¹⁰⁰ E.g., Werden and Froeb (1994) simulated seven hypothetical mergers of long-distance carriers with and without cost efficiencies. Two mergers had significant price effects and all negatively affected the consumer surplus, even within the cost savings scenario. Total welfare decreased in every case without cost savings, but hardly increased with possible cost efficiencies.

Morrison and Winston (1989) found that airline mergers might harm competition and consumers. They analyzed six US merger cases involving 115 routes and found that passengers choose the airline that offers the highest utility: by fare, service time, safety record, reputation and promotional offerings. They also found that fare and service time are the most significant factors. They estimated the passengers' value of hourly travel time at \$35 and valued the transfer time even higher, allowing that if mergers reduce transfer time, some passengers may benefit despite higher fares. They estimated that welfare effects ranged from -\$75m to +\$71m annually. However, without an extended FFP, they stated that all six mergers would harm passengers, by around an annual \$335m.¹⁰¹ The price increasing effect spilled over to overlapping routes.

By using *merger simulation*, Brueckner and Pels (2005) used the example of the KLM/Air France merger to show that all the merger's effects were harmful due to the loss of competition between the two carriers inside the big alliance. In that case, the efficiencies were already exhausted because the airlines were members of the same alliance. The authors found that the decrease in consumer surplus was higher than the increase in profit. This result is surprising, since Brueckner and Spiller (1991) earlier drew attention around competition policy to the (positive) network effects on air transport. Brueckner and Pels (2005) explained that TW depends on the nature of integration (parallel versus complementary cooperation), the strength of network effects and the gains from avoiding double marginalization. The authors state that among the costs, two other factors influence airline fares: the level of competition (positive) and the economies of traffic density (negative).

In contrast, Daughety (1990) described the conditions under a Cournot model, in which mergers, even without cost efficiencies, always enhance welfare. In Daughety's model, a merger changes the symmetric equilibrium on the market and the behavior of the firms, which now become Stackelberg leaders. The paper claims that symmetry (thus equal firm size) is rather welfare decreasing. Along this line, Levin (1990) stated that mergers with less than 50 percent market share are welfare improving, even if they reduce common output. Welfare in these models is defined as consumer <u>and</u> producer surplus and corresponds to the TW standard.

¹⁰¹ This research leads back to an often-discussed question: do FFPs have positive or negative network effects? While merging airlines usually claim that taking part in each other's frequent flyer programs will have a positive network effect, some authors argue that FFP is anticompetitive (Tretheway, 1989). I would also suggest being more skeptical about FFPs and not automatically accepting them as a positive synergy.

3.4.3 AN EXAMPLE: OUR PRICE-FREQUENCY TRADE-OFF MODEL

In the following section, I will summarize the *lower-price-lower-frequency trade-off model* presented in our research paper (Bilotkach et al., 2014).¹⁰² Lower frequency of service increases schedule delay, but the entry of LCCs might result in lower airfares. Therefore, the net effect on the full price of travel (i.e., the sum of airfare and the schedule delay) can be expressed as

 $p + \frac{\gamma}{f}$. The passengers' utility is then:

$$U = y - p - \frac{\gamma}{f}$$

Where y is passengers' disposable income; f is frequency; and γ is a parameter representing the degree to which an extra flight increases customers' utility. Then, as in (Bilotkach et al., 2010), we can assume that passengers' income y is uniformly distributed on [0,1] interval and only those passengers for whom utility is positive will travel ($y \ge p + \frac{\gamma}{f}$). Then, demand for travel is given by:

$$Q = \int_{p+\frac{\gamma}{f}}^{1} dy = 1 - p - \frac{\gamma}{f}$$

Denoting $\alpha^* = p + \frac{\gamma}{f}$ we define consumer surplus as:

$$CS = \int_0^{\alpha^*} y dy + \int_{\alpha^*}^1 \left(y - p - \frac{\gamma}{f} \right) dy$$

The first component of the above expression is the utility obtained by the customers taking the outside option (not flying), while the second is the total utility obtained by the traveling public. After solving the equation (see in Annex **8.3**), we found that:

$$dp < \frac{\gamma}{f^2} df$$

The left-hand side of the above inequality is the change in price; the right-hand side is the marginal effect of change in frequency on consumers' utility. For instance, if df = 0, then any decrease in price increases consumer welfare, whereas any increase in price lowers it.

¹⁰² This section is based on our joint paper and is therefore mainly identical to the original text.

Now we will try to evaluate the minimum decrease in price required for the passengers to be better off in the end for a given decrease in frequency of service. Changes in frequency of service can be obtained directly from the data. Combining these with the estimates of the marginal effects of change in frequency on consumer utility, we can get approximate declines in prices, which would compensate the travelers for the lower frequency of service.

Lijesen (2006) provided an overview of studies that estimate ¹⁰³ parameter γ . We averaged the corresponding marginal effects, and adjusted the resulting numbers for inflation.¹⁰⁴ We then proceeded to estimate the following relationship with a simple OLS regression:

$$\frac{\partial U}{\partial f} = -16.22 + \frac{139.43}{f} + \varepsilon$$

Both coefficients are highly statistically significant, and the adjusted R-squared for this fit is 0.928. The estimate suggests that we should not be concerned with any destinations that have a mean daily service frequency of more than eight-and-a-half flights, since the fitted values will be negative.



22. Fitted marginal effect: lower-price-lower frequency trade-off

Source: own figure based on (Bilotkach et al., 2014)

As an example, suppose that, before the merger, five daily flights were available to a certain destination. Further suppose that this frequency decreased to two. The fitted marginal effect for five flights is \notin 11.70, implying the price decline of \notin 35.10 will be required to compensate the passengers for lower frequency of service. We will apply this model in Section **5.4** to discuss welfare loss due to the bankruptcy of a national carrier (Malév Hungarian Airlines).

¹⁰³ We took the data points behind the marginal-effect-frequency relationships as reported in Lijesen (2006). We are very grateful to Mark Lijesen for supplying us with the underlying numbers.

¹⁰⁴ Lijesen's study was performed in 2005; according to Eurostat, cumulative inflation in the Eurozone between 2005 and 2012 equalled 18 percent.

3.5 CONCLUSIONS

Chapter **3** collected economic models to measure the price and efficiency effects of airline takeovers. Merger-specific efficiencies can be measured in a descriptive way, by regression analysis or by merger simulation models. If there is a lack of internal (marginal) cost data, supply-side efficiencies (changes in costs, particularly due to network effects) are difficult to calculate.

Regression analysis therefore mostly focuses on the demand side, especially on airline pricing. Some regression models also include demand-side efficiencies. Section **3.2.1** introduced different price effect estimation methodologies with the help of regression analysis; Section **3.2.2** extended the investigations to include cost efficiencies.

Section **3.3** described (limited) merger simulation models, which first estimate consumers' utility, calculate price elasticity (i.e., set up a demand model) and then choose an oligopoly framework (the supply model) to calculate new equilibria after the takeover. Some models also calculate the minimum required efficiency to compensate price increases; or even the pass-through rate, in which extend efficiencies would be passed through to consumers. Most studies conclude that efficiencies would not be passed through at all.

As Section **3.4** summarized, most models predict a significant price increase but no direct efficiency gain. Prices on overlapping routes tend to increase after a takeover. I used a model we developed in Section **3.4.3** to try to estimate the frequency improvements required to compensate for higher prices.

The CS standard dictates that consumers must not be worse off after a merger. Microeconomics measures the change in consumer surplus in money, thus in price. As long as the price increases, given the same demand function, consumers lose money. Yet, the EC's trend is to clear¹⁰⁵ airline mergers. The next chapter will investigate the EC's merger framework in aviation to try to find the reason behind their soft merger policy. Chapter **4** will evaluate the EC's current merger framework with a focus on relevant markets.

¹⁰⁵The only exception was the Ryanair/Aer Lingus case.

4 THE EUROPEAN COMMISSION'S MERGER FRAMEWORK IN AVIATION

"A lawyer who has not studied economics and sociology is very apt to become a public enemy" (Louis D. Brandeis, Supreme Court, 1934, in Gellhorn and Kovacic, 1994, p. 44).

4.1 INTRODUCTION

Németh and Niemeier (2012) assessed the development of the definition of the relevant market after liberalizing the European airline industry and found that the EC had broadened the market definition by airport, mode of transport and flight substitution concerning leisure passengers ¹⁰⁶. In sum, concentration is lower in a broader market, so mergers might be less harmful. This more *laissez-faire* approach might explain the central question of merger approvals in the 2000s, even without efficiency claims. We can observe the first signs of applying the *more relaxed economic approach* since 2008.

Section **4.2** will describe the theoretical framework used to analyze airline mergers and its economic background. Section **4.3** will focus on structure and investigate the development of the relevant market definition in practice since 1995. It will also show the advantages and disadvantages of improving the origin and destination (O&D) route approach. Section **4.4** will assess the competitive environment of the mergers. It concludes that more competition from rail carriers or LCCs has benefited the leisure passenger market, but business passengers have rather limited choices on a consolidated market. Finally, Section **4.5** will introduce the topic of EC remedies, which will be analyzed in detail in Chapter **6**.

As introduced in Chapter 1, in most parts of the world (including Europe), only efficiencies passed on to consumers matter. Competition authorities can block mergers that would raise ticket prices on overlapping routes and harm consumers. In order to avoid the loss of competition and protect consumers, the EC analyzes overlapping routes and, if necessary, applies remedies (e.g., slot releases). Decisions over the past 20 years show that the majority of airline mergers have been subjected to one or more remedies.

When European airlines (with an EU-wide turnover of over €250m) decide to merge, they need to notify the EC. The current merger control process has two phases. In Phase I, the EC has 25 working days to take a quick look at the merger. In Phase II, the EC has 90 working days to investigate and carry out a multi-step analysis.

In the EC merger framework, the following four factors have to be taken into account on a case-to-case basis: substitutes (number of firms offering similar products); degree of competition between these

¹⁰⁶ The chapter is based on Németh and Niemeier (2012) and is, in part, identical to the text of the research paper.

substitutes (product differentiation); the potential responses of competitors (oligopolistic interaction between firms); and barriers to entry and expansion (Bishop & Walker, 2010, p. 110). This chapter will assess the above factors.

First, the EC assesses the relevant routes¹⁰⁷ (where both merging airlines operate services). After defining the relevant market, the authority uses the market shares of each airline to measure the concentration on relevant routes and assess entry barriers. At the end of the investigation, the EC might conclude that the merger could have a negative effect on performance. Thus, by decreasing competition, mergers might lead an airline to take a dominant position in the relevant market; to avoid this, the EC applies remedies. Figure 25 summarizes the current analytical framework for airline mergers.

1) Structure	RELEVANT MARKET	 A) Product & geographic market: origin and destination (O&D) route approach (using SSNIP and Critical Loss Analysis) B) Demand & supply sides of the market: Demand-based: passengers are: Point-to-point or connecting Time-sensitive or non-time-sensitive (business/leisure, later premium/non-premium) Supply-based: substitutability of:				
2) Conduct	COMPETITIVE ASSESSMENT Changes in market share and entry	 <u>Change in concentration</u> is the loss of direct competition <u>Concentration measures</u> (with HHI) Low: no further analysis High: fear of anticompetitive effects Unilateral (non-coordinated) effects: reduce output, increase price Coordinated effects: act as a cartel; increase price Entry barriers 				
3.) Performance	PRICE AND WELFARE EFFECTS	 <u>Use of remedies</u> to motivate new entry and reduce concentration Slot surrender Agreements: interlining, code-sharing, blocked space, FFPs, etc. Freeze or reduce frequencies and/or price 				

23. Competition analysis: framework for airline mergers

Source: Németh and Niemeier (2012) after Stragier (2002), and Bishop and Walker (2010)

¹⁰⁷ As discussed in Chapter **3**, there is no consensus on whether the definition of the relevant market is necessary. Further, the supporters of the relevant market definition also disagree on the correct approach. For example, Larouche (2000) examined the relevant market definition under EC competition law and left open the question of whether it is better to take the route or the airline network as the starting point for the regulatory framework. ECA (2004) also analyzed the problem of defining the relevant market and setting appropriate remedies.

4.2 THE THEORETICAL FRAMEWORK FOR AIRLINE MERGERS

"European school is a self-contained school of thought which should not be confused with the schools in the US, e.g., the Harvard school, the Chicago school" (Hildebrand, 2009, p. 5).

4.2.1 THE RELEVANT MARKET

In every case, the EC first defines the relevant market. According to Relevant Market Notice (EC, 1997) the market has to be defined using the O&D route approach. "Every combination of a point of origin and a point of destination should be considered to be a separate market" (M. 3280, 2004, p. 3). The relevant market is not Europe or a specific city, but the city pair impacted by the proposed merger. If the merger leads to unduly high market shares (i.e., market power on the given route (relevant market)), the EC needs to assess any potential harm on competition.

4.2.1.1 The SSNIP test

Since 1997, EC merger policy has used the SSNIP test (EC, 1997). This small but significant nontransitory increase in price test, also called the hypothetical monopolist test, analyzes the extent to which sales decrease after a *hypothetical*¹⁰⁸ price increase of 5 to 10 percent. If the price increase is profitable, it means that there are no close substitutes, so it is supposed to be a separate market. Thus, we have found the relevant market. If the price increase is not profitable, there are many close substitutes and the market definition needs to be narrowed by taking away some products.

The question is whether passengers of merging airlines would switch from one product (flight) to another (flight or rail) if the price of the original flight were to increase by 5 to 10 percent for one year. If passengers are likely to switch, the two modes of transport belong to the same market.

The SSNIP test is usually based on passenger surveys and private company data. It requires data about prices and sales to calculate demand substitution (i.e., own-price elasticity (E)) and data about cost savings due to reduced sales and less production (Verboven, 2012, and Bishop and Walker, 2010). As usual, a firm's gross revenue is calculated as price (P) times the sold quantity (Q). Net revenue or profit equals revenue minus costs. Own-price elasticity (E) is defined at the margin and measures the percentage changes in demand due to the percentage price increase ($\Delta Q/\Delta P$). It depends on whether the flight is long- or short-haul, international or domestic, and dominated by business or leisure passengers.¹⁰⁹ For example, a short-haul business passenger has an average price elasticity of E =-0.7 (Conrady et al., 2009, p. 353).

¹⁰⁸ The next step is to see whether the firms have so much market power that they could actually raise prices profitably. ¹⁰⁹ E.g., Peters (2003) compared elasticity estimations in aviation derived from different econometric models.

The following table, which assumes a -0.7 own-price elasticity, illustrates the SSNIP test. After running the test with a 5 percent price increase, the following calculation is possible.

$E = \Delta Q / \Delta P = -0.7$	Before price increase	After $\Delta P = 0.05$	Δ (in %)
Price P	200	210	5
Sales Q (P)	120	115.8	-3.5
Revenue R (Q)	24,000	24,318	1.33
Average Costs AC (Q)	150	150	-
Total Costs TC (Q)	18,000	17,370	-3.5
Profit π (Q)	6,000	6,948	15.8

24. Implementation of the SSNIP test

Source: own calculation

Assuming constant average costs (as usual), the SSNIP test estimates a 3.5 percentage decline in sales $(\Delta Q = E^* \Delta P)$ and a 3.5 percent decrease in total costs along with it. In this example, a 5 percent price increase would increase profits by 15.8 percent, up to 6,948. Thus, the airline has no close substitutes and we can define the relevant market. To sum up, the defining difference of the SSNIP test is whether the change in profit is positive or negative.

However, this simple model has some limitations. First, demand elasticity is not necessarily constant, but it might change along the demand curve depending on the price charged. Second, since the price is not a constant average price (due to price discrimination), consumers in the same plane would act completely differently up to their price-sensitivity. Thus, the mixture and variance of different passenger groups also plays an important role. Further, the calculation depends greatly on the margin, which might be too complex to derive on a route basis (Church & Ware, 2000).

One further critique refers to the cellophane fallacy¹¹⁰. If the airline already has market power, it might behave like a theoretical (*'hypothetical'*) monopolist. Hence it already produces at the elastic part of the demand function and charges the profit-maximizing price. In this case, the firm cannot significantly raise the price without generating any losses in profit. The SSNIP test would be negative and would not have detected the market power. On the other side, the test is *only* useful for defining the relevant market and not for detecting monopolies. Consumer surveys, in addition to the SSNIP test, might help authorities detect monopolies.

¹¹⁰ The cellophane fallacy is the "failure to recognize that a monopolist always prices where demand is elastic and finding competitive substitutes that restrict a further price rise, and thereby broadening the market" (Church & Ware, 2000, p. 617).

4.2.1.2 Critical loss analysis

The *critical loss analysis*¹¹¹ (CLA) is very similar. It asks "how many sales a hypothetical monopolist could afford to lose because of a price increase before the price rise becomes unprofitable" (Bishop & Walker, 2010, p. 552). Again, the margin determines whether the price rise is profitable. The CLA shows the break-even (i.e., how many passengers (sales) are required after the price increase to achieve the same profit).

The first comprehensive evaluation with CLA was carried out in 2008 in the KLM/Martinair case. The LEGC consultancy's study (on behalf of the merging airlines) focused exclusively on the Amsterdam-Havana route. However, the results were not taken into account in the final decision. The EC rejected the study with the following arguments: (1) there was a contradiction between the results' high gross margin and high demand elasticity (high margins signal inelasticity); (2) it was assessed on a flight focusing only on short-term effects; and (3) it contains inconsistencies in the cost calculations (e.g., too low marginal costs).

One year later, in 2009, the EC controlled a CLA to assess the substitutability of Brussels Airport and Antwerp in the Lufthansa/SN Brussels case (M. 5335).¹¹² However, the question about how to use it was left open: "The Commission does not consider the use of critical loss analysis to be appropriate in an industry in which price discrimination is a major feature and where the calculation of avoidable costs can be very complex" (ibid, p. 31).

Since the CLA test assumes a single price and calculates with a 5 to 10 percent change of this average price, it provides biased results in every case. Price-sensitive passengers would immediately switch and already-high-yield passengers would not. This result highlights the importance of the two different markets: business and leisure.¹¹³

In summary, based on the shortcomings described in the introduction to this chapter, the EC declared that the use of a CLA is inappropriate in aviation due to the lack of transparency in costs and price structure. However, the EC still applies the SSNIP test, which has similar features.

¹¹¹ For more about the CLA, see Werden (1996), Baker (2007b) and Farrell and Shapiro (2010a).

¹¹² The EC concluded, "it is not likely that the merger would benefit consumers on the affected routes to such an extent that they could counter-balance the competitive harm" (ibid, p. 112). Despite this potential harm, the EC allowed the merger. ¹¹³ Leisure passengers who hold accommy class tickets are price constitue but not time sensitive.

¹¹³ Leisure passengers who hold economy-class tickets are price-sensitive but not time-sensitive.

4.2.2 (ANTI)COMPETITIVE ASSESSMENT: CONCENTRATION AND DOMINANCE

The change in concentration caused by a merger indicates the loss of direct competition.¹¹⁴ If the modification is high, there is a potential competitive harm. The data used for the analysis is based on reliable sources:¹¹⁵ the 'future competitive significance indicators.' If the relevant market is highly concentrated, there might be a fear of anticompetitive behavior. This section briefly summarizes the most important types of anticompetitive behavior.

Chicago School economists like Demsetz or Posner would argue for efficiency behind the concentration and probably clear the mergers. Farrell and Shapiro (1990), following this approach, showed that a high concentration leads to larger, more efficient firms with lower unit costs. In the Cournot model, the firms with the lowest marginal cost produce the most product. The Austrian School, especially Schumpeter, would prefer large firms (monopolies in particular) to encourage innovation and dynamic efficiency. However, these economic schools have had little influence on European merger policy. Europe has followed the Harvard School's view that high market share equals market power. Most commonly, EC policy uses the *Herfindahl-Hirschman Index* (HHI) to measure industry concentration.

HHI is the sum of squaring the market shares (w) of each firm within an industry. The number ranges from 0 to 10,000; the higher the number, the higher the concentration. While the US Horizontal Merger Guidelines contain stricter thresholds based on HHI, the EC might intervene if the HHI value after merger increases 2,500 or if the change in the index due to takeover exceeds 150 to 250 (Bishop & Walker, 2010). The index is calculated as follows:

$$HHI = 10,000 \sum w_i^2$$

Carlsson (2002) defined market share as the airline's share of the aggregate number of seats, while Peters (2003) based it on airline revenues instead of passenger shares. After measuring market shares and the competitive environment,¹¹⁶ authorities can suggest whether a merger is likely to have anticompetitive consequences or not.

There are two types of anticompetitive behavior: unilateral and coordinated effects. They depend on market share, product similarities, price elasticities, capacity constraints, switching costs and entry barriers (Buccirossi et al., 2008).

¹¹⁴ E.g., Campos and Romero (2008) presented a complex approach for weighting the market power of airlines.

¹¹⁵ E.g., trade associations, market sources, market research studies, companies' estimates or consultancy agents, comparative statistics, sales, production and capacity data.

¹¹⁶ Supply-side substitutes, which could receive more weight in the future, are the competition by feeder carrier and LCCs; airport substitution; and alternative transport modes.

Coordinated effects occur "if the airlines coordinate their behavior in an anticompetitive manner" (Bishop & Walker, 2010, p. 355). This means the firms act as if they were a cartel. This behavior is also known as 'tacit collusion' or collective dominance. Collusion is more probable if there are only a few firms on the market with transparent prices, similar cost structures and homogeneous goods. After a merger, the market structure is more conducive to collusion and therefore the price will go up.¹¹⁷ Ivaldi et al. (2003) concluded that in the absence of entry barriers, collusion is unlikely.¹¹⁸

We talk about *unilateral* (US) or *non-coordinated* (EU) *effects* when firms price independently and the nature of competition does not change after the merger. In this case, the merged entity probably also increases the price. Lyons (2012) argued that there must be an efficiency reason behind the merger since without efficiencies, companies would have to merge up to an 80 percent market share to be profitable.

Peters (2003) highlighted another form of anticompetitive behavior: post-merger *entry deterrence*. He stated that entry has very small effects on prices and concluded that the policy "should not be expected to yield large gains" from expected new entries (p. 45). Entry deterrence, like foreclosure, might be a strategic option for maintaining market position. Airlines with market power can use limit pricing possessing valuable slots to behave anticompetitive and deter entry. Economies of scale can also create entry barriers and help airlines keep smaller competitors out of the market. On the other side, Shy (2010, p. 18) argued that cooperation by allowing access to the own standard (like common FFP) is a better long-run strategic behavior than deterrence.

The EC considers potential market entry to be a constraint of anticompetitive behavior. In their view, the threats of market entry after the merger or of rivals seeming to expand capacity to maintain their market positions lessen the feasibility of harm (Németh, 2011b). This approach arises from the contestability theory discussed in Section **1.3.3**. Liberalization in European aviation started in 1993 and was based on contestability. However, recent research has questioned the contestability of the aviation market (e.g., Arndt, 2004), especially because of high *sunk costs* and the *slot system* in Europe.¹¹⁹

¹¹⁷ The EC did not look at coordinated effects until the Nestlé/Perrier case (merging from 3 to 2) in 1991. The second remarkable case involved Airtours in 1998 (merging from 4 to 3); the merger was prohibited based on coordinated effects, but Airtours appeared before the EU Court, questioned the quality of the analysis and won against the EC. In the US, we can find many examples involving airlines (mostly merging from 6 to 5), but in every case there was a 'maverick': the weakest LCC airline with a small market share had a strong incentive to deviate and detect collusion (Lyons, 2012).

¹¹⁸ In cases of collusion, the result is worse than in a monopoly (Brueckner & Pels, 2005, p. 37). If airlines collude, they split passengers, thus limiting economies of density. This leads to higher costs, lower traffic and more expensive ticket prices. From a consumer surplus approach, this might be the worst outcome. Adler and Hanany (2010) argued that capacity agreements are also worse than mergers. When airlines set capacity jointly but do not have any pooling agreements (meaning they do not provide access to each other's capacity), this leads to lower capacity, higher prices and a reduction in consumer surplus.

¹¹⁹ Werden et al. (1991), Reiss and Spiller (1989), Berry (1992), Joskow et al. (1994), Sinclair (1995), Dunn (2008), Lin et al. (2002), Oliveira (2008), and Goolsbee and Syverson (2008) have assessed entry in the airline industry. Most of these studies deal with the US market, and some pay specific attention to LCCs. Ciliberto and Williams (2010) analyzed the access to airport facilities as a determinant of market power in the airline industry (Bilotkach et al., 2014). Balfour (2004) introduced the EC practice according to the remedies in airline alliance cases.

4.3 REMEDIES: SLOTS RELEASES TO PROMOTE COMPETITION

"Slot allocation will not go away even with airport expansion; there will always be a need to have some basis of allocation. Issues of equity, efficiency and competition are all intertwined in such methods of allocation" (Gillen, 2008, p. 52).

The current slot system might impede contestability. The landing or takeoff right to use airport infrastructure (thus scarce airport capacities) during a given period of time (EC, 2004) can be a serious barrier to entry for new entrants at slot-coordinated airports. The *grandfather rights*¹²⁰ of incumbent carriers, the IATA slot allocation system and the high capacity utilization at some airports can make it almost impossible to get new slots.

Knieps (2004) warned that slots could be stockpiled for anticompetitive purposes and suggested that airport operators conduct ex ante auctions, which could finance airport (capacity) developments from scarcity rents. Knieps and Neuscheler (2009) made a detailed proposal about slot auction and its potential pricing scheme.

Czerny et al. (2008) provided a comprehensive overview of several issues related to slot allocation and its possible reform, pricing and regulation at slot-coordinated airports and their efficiencies based on international evidence. Starkie (2008) defended the high slot concentrations at hub airports, which generally increases efficiency due to network effects, but also benefits secondary airports with LCCs.

Since the current slot allocation system does not facilitate new entries and the secondary trading of slots is not allowed in Europe (but happens in the UK, according to Gillen, 2008, p. 45), an airline can obtain access to new markets by taking over a small regional airline with valuable slots at a hub airport.¹²¹ This can also motivate airline mergers.

However, if a takeover leads the merged entity to take a dominant position on a given route (usually above 50 percent common market share), the European Commission can introduce remedies¹²² (i.e., undertakings) that define the conditions under which a merger would be approved. In most cases, the release or surrender of slots is one of those conditions, to allow for new entry to mitigate the dominant position. Merging airlines have to announce that they are making some of their slots available for new entrants for free. This is important at slot-coordinated airports,¹²³ where scarce slots would deter entry and impede competition.

¹²⁰ Airlines that previously received a slot (i.e., grandfathers) can keep it, but they are obligated to use it at least 80 percent of the time. If they do not, they can lose it in the next period following the '*use-it-or-lose-it*' rule.

 $^{^{121}}$ Which was the case, for example, in the Lufthansa/bmi merger.

¹²² Or even prohibit the merger. The only prohibition in the last 20 years was in the Ryanair/Aer Lingus case (M. 4439, 2007). ¹²³ For example, the slot-coordinated airports in Germany are Munich, Stuttgart, Frankfurt, Dusseldorf and Berlin. According to current data (IATA, 2010), there are 155 slot-coordinated airports worldwide, 98 of which are in Europe. Greece has the highest share (23) of slot-coordinated airports, but the busiest cities in Europe are coordinated as well.

Thus, entry barriers determine whether passengers find alternative airlines. One of the EC's tasks is to lower the structural entry barriers by imposing remedies. A further remedy might be an agreement to enter into *interlining* or *code-share agreements* with new entrants. In other cases, the incumbent must guarantee that it will enter into a *blocked space agreement (BSA)* with a new airline to sell a reserved and fixed seat capacity. Merging airlines might also be asked to offer new entrants participation in their *frequent flyer programs (FFP)*.

The EC can also ask airlines to *freeze or reduce frequencies and/or prices* on certain routes, which benefits new competition. Another option is to *cooperate with railways* or other transport companies on short-haul routes. The train option is considered especially acceptable with respect to less-time-sensitive leisure travelers. The EC's merger decisions highlighted in the next table show that the majority of airline mergers have been subjected to one or more remedies.

	Surrender of slots	Interlining, code-sharing	BSAs	Open up FFP	Freeze or Reduce frequencies	Freeze or reduce price	Intermodal agreements
Council Regulation No 4064/89							
Swissair/Sabena	Х	X		X	X		X
BA/TAT	Х						
BA/Air Liberté							
KLM/Air UK							
SAS/Spanair		Х					
Air France/KLM	Х	Х	X	Х	Х	Х	X
EC Merger Regulation 2004							
LH/Swiss	Х	Х	X	Х		Х	X
LH/Eurowings	Х	Х	X	Х	Х		X
KLM/Martinair							
LH/BMI							
Iberia/Vueling/Clickair	Х	Х		Х			
LH/Austrian	Х	X		X			X
LH/SN Brussels	Х	Х		Х	Х		X
			n		0 1	1 50	7

25. Airline merger remedies from 1995 to 2009

Source: own figure based on EC decisions

In sum, most studies imply that the European aviation market is not contestable because there are entry barriers. The EC must solve the following question on a case-by-case basis: *how relevant are entry barriers to the relevant market, which remedies could facilitate competition and to what extent can new entrants diminish the market power of incumbents*? The evidence shows that newcomers have had a limited competitive impact; there has been hardly any entry. Chapter **6** will assess the success of EC policy regarding four Lufthansa mergers. The next section will introduce EC practice in airline mergers.

4.4 THE PRACTICE: DEVELOPMENT OF THE EC-RELEVANT MARKET DEFINITION

"More effective competition policy means less need for regulation" (Vickers, 2003, p. 3).

The OECD (2000) already called attention to the importance of the relevant market definition and the fear of definitions that are too broad or too narrow. This section will introduce the similarities and differences in the airline merger processes approved by the European Commission.

Németh and Niemeier (2012) assessed the development of the definition of the relevant market after the European airline industry was liberalized. Figure 28 summarizes the results. Since the paper was published in 2012, I will briefly summarize the main airline takeovers since that time. First, Lufthansa sold bmi to IAG (the holding company of British Airways) in March 2012 (M. 6447).

Second, the EC blocked the Aegean Airlines/Olympic Air takeover in January 2011, saying that "it is the duty of the Commission to prevent the creation of monopolies" (EC, 2011, p. 1). However, it was approved in October 2013, when the same Commissioner, Joaquín Almuna, said: "Olympic would be forced to leave the market soon in any event" (EC, 2013, p. 1). This was the third case in the last two decades in which the EC accepted the *failing firm doctrine* (for more about this approach, see Chapter 5). Olympic, creating operating losses of \notin 15m in 2012, had never made a profit (Financial Times, 2013). The former flag carrier of Greece had many troubles with the EC. After several investigations about state aid, the EC required the airline to pay back more than \notin 850m to Greece. Unsurprisingly, it never happened (Németh, 2011b).

Third, Ryanair had not given up on taking over Aer Lingus in the time between the three negative EC decisions (M. 4439, 2007; M. 5434, 2009; and M. 6663, 2013). The merger was rejected for three reasons: both airlines operated from the same country and the same hub (Dublin airport); both were LCCs; and finally the number of overlapping routes was very high (22 would have become monopolies). The first and last claims were also mentioned in the Aegean/Olympic case, but after the first denial in 2011, the airlines reduced the common routes without competitors from nine to five. After three unsuccessful bids from Ryanair (most recently in July 2015), the EC allowed IAG to take over Aer Lingus (M. 7541). As a main remedy, the merged entity would provide up to five daily slot pairs at London Gatwick to Dublin and Belfast.

Year	Merger	Demand side	Supply side	Specialty	Economics used
1995	Swissair/ Sabena	O&D approach + frequency	+ Airport subst.		no
1996	BA/ TAT		+Railway subst.	Eurostar: London- Paris	no
1997	BA/ Air Liberté		No airport subst. by Gatwick, CDG and Orly	+ Together against KLM	no
1997	KLM/Air UK	Differentiate "business" and "leisure" passengers, but substitutability left open	Schiphol subst left open		Passenger Survey
2002	SAS/ Spanair	Diff. "direct" and "indirect" flights; but subst. left open			no
2004	Air France/ KLM	 + Diff. time-sensitive and time-insensitive passengers +Airport subst. (people live in the catchment area) 	+Airport subst. (airline) +Network competition: hub dominance	Thalys: Paris- Amsterdam	no
		EC Mer	ger Regulation 2004		
2005	LH/ Swiss			Price and frequency freeze remedies	no
2005	LH/ Eurowings	+Diff. time-sensitive and time-insensitive passengers		Price and frequency freeze remedies	no
2008	KLM/ Martinair	+ Diff. leisure and business passengers	+ "sunny beach" destination subst.	Merger rejected in 1999	SSNIP test, CLA, Welfare study – left open
2009	Iberia/ Vueling/ Clickair			Only in Spanish language	no
2009	Ryanair/ Aer Lingus		+ Airport subst.: 100km/ 1 hour rule – left open		Regression analysis
2009	LH/ BMI	+Diff. leisure and business passengers	+ Railway subst. + Airport subst.: 100km/ 1 hour rule apply	Eurostar: London- Brussels, even for business passengers	no
2009	LH/ Austrian	+Diff. leisure and business passengers	No airport competitiveness (LH flies merely from hub)	Austrian state aid not taken into account	Austrian Study
2009	LH/ SN Brussels Airlines	+ Diff. leisure and business by passenger survey	Railway is not a substitute	10% price increase for business passengers would be profitable	Passenger Survey, CLA

26. The development of the relevant market definition and the economics used

Source: Németh and Niemeier (2012)

In the earlier airline merger decisions, before the ECMR was introduced in 2004, the relevant market was defined by the O&D approach, the airports' catchment areas and the frequencies on each route. With an increasing number of mergers, the EC took more and more determinants into account. However, these factors were realized mainly among leisure passengers, where LCCs already have a higher market share. Since 2004, two trends in defining the relevant market can be observed.

First, the EC differentiated and thereby narrowed the relevant market on the demand side based on ownprice elasticity of demand calculated using passenger surveys. By separating the demand side first into leisure or business passengers and later into direct or connecting passengers, the relevant market is narrowed. Hence, the market share of the merged airline on the new, narrower market is higher and competition is weaker. However, the EC found that competition was still strong enough to allow all the described mergers. I assume that the main reason behind this soft policy is the structure of these passenger groups on the plane. While leisure (and indirect) passengers may find an alternative, business passengers have less choice after a takeover. However, business passengers have a higher willingness to pay and are less price sensitive. Business passengers are also more time sensitive and might be compensated by better scheduling.

The second trend might provide further explanation. The EC has also simultaneously broadened the market definition with supply-side substitutes (i.e., airport, flight and railway substitution). However, this latest trend is particularly observable for leisure (i.e., non-premium¹²⁴) passengers, who are willing to switch to an LCC or rail travel, or even travel one to two hours to a secondary airport to avoid a price increase. Therefore, passengers are not necessarily worse off. From the policy point of view, concentration is lower in a broader market, so mergers might be less harmful. Certainly the extended relevant market definition meets the interests of the merging airlines. The next figure illustrates the trends.



27. Relevant market definition, 1997-2002

Source: ATRS 2011 presentation, Németh and Niemeier (2012)

¹²⁴ Passengers holding restricted, economy-class tickets.

4.4.1 **O&D** APPROACH IN THE EARLIER AIRLINE MERGER DECISIONS: 1995-1997

The approach taken by the EC in the Swissair/Sabena case (M. 616) in 1995 is the starting point for any airline merger analysis. Swissair purchased 49.5 percent of the shares in Sabena, but the majority remained held by the Belgian State. In the absence of airport substitution, the EC considered that Zurich (ZRH), Brussels (BRU) and Geneva (GVA) airports were likely to negatively affect new entry. Therefore, as a remedy, new slots were made available. Swissair had to give up 12+12 daily slots at ZRH and GVA, while Sabena surrendered 18 slots at BRU between 1996 and 2001.

The next airline merger announcement was British Airways/TAT in 1996 (M. 806). There were no special circumstances relative to this merger, since BA already owned 49.5 percent of the French domestic airline, TAT. BA agreed to make slots at Gatwick (LGW) available for new entrants over a one-year period if required. In February 1997, BA bought 70 percent of another French domestic airline, Air Liberté (M. 857). In contrast to TAT, Air Liberté was in serious financial strife. The relevant market was narrowed to Gatwick in the UK and Charles de Gaulle (CDG) and Orly (ORY) in France. No remedies¹²⁵ were imposed.

4.4.2 DEFINING 'BUSINESS' AND 'LEISURE' PASSENGERS: 1997 KLM/AIR UK

The broad O&D approach slowly developed into a distinction between substitutability on the demand side (different types of passengers) and on the supply side (airport or flight substitutability). In the following section, I will show the new aspects of the relevant market, and how the EC has handled different types of passengers and flights.

The last airline merger at the end of the 1990s was the KLM/Air UK takeover, in which KLM acquired 55 percent of Air UK's share capital (M. 967, 1997). The EC decision stated that due to different price elasticity of demand for air travel, "a distinction could be made between 'business'¹²⁶ and 'leisure' passengers" (p. 7).

This separation might have been the first sign of the more economic approach later applied by using price elasticity and the SNNIP test since the announcement of *Relevant Market Notice* (EC, 1997).

¹²⁵ The only common route was the Paris-Toulouse route; however, Air France had a 74 percent market share on this route. At the time, BA held a 21 percent market share of slots at LGW, while Air Liberté held only 3 percent. The merger also had no impact on slot allocation at ORY, since both airlines combined only owned 19.2 percent of total slots, while the Air France Group held 45 percent.

¹²⁶ Passengers with full-fare flexible tickets.

The KLM/ Air UK case was the first time that two passenger groups had been explicitly mentioned. Since there was no fear of dominant position on any routes, the precise market definition¹²⁷ was left open and no further investigation was needed (M. 967, 1997). The main reason was that the takeover had little effect on the market structure, since an almost 20-year-long relationship between the two airlines had led to "Air UK being fully dependent on KLM" (ibid, p.2).

4.4.3 DEFINING 'DIRECT' AND 'INDIRECT' FLIGHTS: 2002 SAS/SPANAIR

In March 2002, SAS was allowed to increase its shares in Spanair from 49 to almost 74 percent (M. 2672). This was the first merger decision in which the EC mentioned the difference between point-topoint (direct) and connecting (indirect) flights. Connecting flights might be considered alternatives on medium-haul (3- to 6-hour) flights, because passengers' flight decisions are not only influenced by flight duration, but also by departure/arrival times, frequency, FFPs and ticket prices. Since there was no fear of dominant position on any routes, the question of the substitutability of direct and indirect flights was left open.¹²⁸ SAS and Spanair operated complementary networks on a code-share basis, so the EC did not find it necessary to further investigate airport competition or slot allocation. The EC imposed only one remedy: they dictated that because Spanair¹²⁹ was the second biggest regional airline in Spain, they had to offer interlining services to other airlines. The following table summarizes the EC airline merger decisions before the new ECMR was introduced in 2004.

Merging airlines	Case no.	Date	Relevant route(s)	Remedy	Share increase (%)	Passengers (m)
Swissair/Sabena	M.616	Jun 1995	BRU-GVA, BRU-BSL, BRU-ZRH	Slot 1996-2001	0 to 49.5	-
BA/TAT	M.806	Aug 1996	LGW-CDG LGW-LYS	Slot 1997	49.5 to 100	36+
BA/Air Liberté	M.857	Feb 1997	-	-	70	36+
KLM/Air UK	M.967	Sep 1997	-	-	55	ca. 17
SAS/Spanair	M.2672	Mar 2002	-	interlining	49 to 74	22.1+9.8
Air France/KLM	M.3280	Feb 2004	AMS routes, many remedies, see Section 4 6 1		0 to 100	43.5+19

28. Earlier airline merger decisions

Source: Németh and Niemeier (2012)

¹²⁷ The only overlapping market in Europe was in the Amsterdam–London area (Heathrow, Gatwick, Luton, Stansted and London City) route. Although the KLM group (KLM, Transavia and Air UK) increased its market share on this route up to double BA's market share, the merger was declared compatible with the common market without defining any relevant market. ¹²⁸ After analyzing all the overlapping routes, the EC limited the market to four city-pairs starting from Copenhagen and going to Madrid, Malaga, Alicante and Palma de Mallorca, "since the operation does not raise serious doubts in regard to this route even where indirect routes are excluded from the market definition" (M. 2672, 2002, p. 5).

¹²⁹ Seven years later, on 31 January 2009, SAS Group sold 80.1 percent of the (still) loss-making Spanair. The price was €1 (Aviation Week, 2009).
4.4.4 DEFINING TIME-SENSITIVE AND TIME-INSENSITIVE PASSENGERS: 2004 AIR FRANCE/KLM

The new EC merger regulation (ECMR, 2004) took a "more economic approach": it considered efficiency gains, particularly from network effects, which clearly influenced the next airline merger decision in 2004. In the Air France/KLM merger, the EC differentiated between time-sensitive passengers (those with unrestricted tickets) and time-insensitive passengers (M. 3280, 2004). The EC further extended the relevant market: in 2002, only medium-haul direct and connecting flights were 'hypothetically' considered as substitutes, but in 2004, even short-haul (less than 3 hours) flights with a maximum connection time of 150 minutes were seen as competitors. This applied to the Bordeaux-Amsterdam and Marseille-Amsterdam routes. The other important European overlapping routes traveled from Amsterdam to Paris, Lyon, Rome and Milan.

This merger was also the first time in which "some network competitors" (M. 3280, 2004, p. 4) suggested that the EC consider network competition and network effects. In contrast, LCCs and regional carriers argued in favor of the traditional O&D view. The EC rejected the network competition approach, since it "follows the business model of network carriers rather than the customer needs" (ibid), and the network effects would only affect corporate customers. However, generally, the EC declared the network effects to be positive, since the lower marginal cost would give the airlines an incentive to reduce prices (Németh & Niemeier, 2012).

In the BA/Iberia case in 2010 the EC separated business and leisure passengers by introducing new terms: "premium" (including first and business class) and "non-premium" passengers (M. 5747, p. 6). They only applied this distinction to long-haul (more than 6 hours) routes. One-stop flights could be substituted for non-stop flights depending on the passenger group, but the margin between the groups was not defined precisely. The next table summarizes the airline merger cases that occurred after the new ECMR was introduced in 2004.

ers (m)	Number of Passengers (n	Date	Case number	Airlines
43	51.255 +9.188 = 60.443	04 Jul 2005	M.3770	LH/Swiss
948	51.255 + 7.693 = 58.948	22 Dec 2005	M.3940	LH/Eurowings
	20 + 2.5 = 22.5	17 Dec 2008	M.5141	KLM/Martinair
	25.5 + 9 + 1 = 35.5	09 Jan 2009	M.5364	Iberia/Vueling/Clickair
)	55.5 + 3.829 = 59.329	14 May 2009	M.5403	LH/bmi
	55.5 + 3.42 = 58.92	22 Jun 2009	M.5335	LH/SN Brussels
	55.5 + 10 = 65.5	28 Aug 2009	M 5440	LH/Austrian
	33.2 + 25.5 = 58.7	14 July 2010	M.5747	BA/Iberia
•	55.5 + 3.829 = 59.329 55.5 + 3.42 = 58.92 55.5 + 10 = 65.5 33.2 + 25.5 = 58.7	14 May 2009 22 Jun 2009 28 Aug 2009 14 July 2010	M.5403 M.5335 M 5440 M.5747	LH/bmi LH/SN Brussels LH/Austrian BA/Iberia

29.	Airline	merger	cases	after	the	ECMR	2004
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Source: Németh and Niemeier (2012)

4.5 COMPETITIVE ASSESSMENT

"There is no guarantee that making markets more competitive will generally enhance welfare" (Schmalensee, 1988, p. 677).

4.5.1 GROWING HIGH-SPEED RAILWAY COMPETITION

Supply-side substitution¹³⁰ takes into account any other available (primary and secondary) airports in the overlapping catchment area, other airlines, other modes of transport and even the likely substitution of "sun and beach" destinations¹³¹ in the most recent merger cases.

Competition by railways became a significant supply-side factor in the last two decades. The Eurostar line between London and Paris was already defined as a competitor for airlines in early 1996 during the BA/TAT merger. After its introduction in 1995, Eurostar carried 2.5 million passengers in its first year. The new railway service led to a decline in air passenger transport of more than 19 percent in 1996 (M. 806, 1996).

The Thalys high-speed rail line between Paris and Amsterdam was considered to be a competitor for time-insensitive passengers during the KLM/Air France case in 2004. The Thalys offered six daily trains, while Air France and KLM each operated seven flights a day. The flight took 3 hours; the train took 4 hours and 9 minutes. Therefore, "Thalys does not allow for a typical business return trip within the same day" (M. 3280, 2004, p. 16).

During the Lufthansa/bmi case in 2009, Eurostar was considered to be a substitute between London and Brussels, also for business passengers. The market power of the airlines was therefore decreased by the Eurostar train service on this route. In 2009, the travel time was 2 hours by train compared to 1 hour 15 minutes by direct flight (M. 5403, 2009). Therefore, the train attracted business travelers as well.

Given the EU policy of improving the high-speed train network, one can expect that intermodal competition will play a more important role¹³² in the future. From the competition policy's point of view, this means that the more substitutes enter the market, the less market power airlines will have and the more probable the clearance of airline mergers will become. The following figure illustrates the increasing role of railways in airline merger decisions.

¹³⁰ Supply-side substitution is defined in §20 as follows: "suppliers are able to switch production to the relevant products and market them in the short term without incurring significant additional costs or risks in response to small and permanent changes in relative prices" (EC, 1997, p. 4).

¹³¹ In 2008, the EC considered a "certain degree of substitutability between various holiday destinations" mainly in the Caribbean, which they called "sun and beach" destinations (M. 5141, p. 36).

¹³² See, for example, Givoni (2008) on the railway as a substitute for airlines.



30. The increasing role of railway competition

4.5.2 AIRPORT SUBSTITUTION: DO SCHIPHOL AND HEATHROW HAVE MARKET POWER?

In order to broaden the market definition and decrease its market power, KLM suggested in 1997 (concerning the Air UK takeover) that the relevant market of Schiphol Amsterdam (KLM's base) should include "airports of Rotterdam, Eindhoven and Maastricht in the Netherlands, Antwerp and Brussels airports in Belgium and Düsseldorf in Germany" (M. 967, 1997, p. 6). At that time, in conjunction with the responses from competitors and consumers, the EC did not accept these airports as substitutes for Schiphol.

However, when KLM was taken over by the French flag carrier Air France seven years later in February 2004, the EC changed its previous view. It was the first time the EC had analyzed airport substitutability to define the relevant market. From the passengers' (and the EC's) demand-side view, Paris CDG and Orly, as well as Milan-Malpensa and Milan-Linate, were considered to be close substitutes. Thus both hubs (Paris and Amsterdam airports), however slot-coordinated, were not seen as an entry barrier. The merger was not constrained. From the airline's supply-side view, these airport are, of course, not good substitutes because airlines strive for economies of scale, scope and density, and hence prefer to focus their activities on one hub airport.

In 2008, Martinair carried out a representative passenger survey¹³³ to prepare for its takeover by KLM. According to the survey, "64% of the whole sample replied that they would switch to either Brussels airport or Düsseldorf airport, or both, while only 36% of the whole sample replied that they would not switch" (M. 5141, p. 35).

Source: EC decisions, own figure

¹³³ Only passengers with unbundled flights were asked.

As a result, Brussels, Dusseldorf and Amsterdam were regarded as substitutable and belonging to the same long-haul market. This furthermore implies that Schiphol airport has no market power¹³⁴ and hence no remedies were imposed.

The KLM/Martinair merger is of special interest as airport substitution was newly interpreted by the EC. Martinair exclusively served intercontinental destinations; hence no overlapping European routes existed at the end of 2008. The EC applied airport substitutability and even the "sun and beach" destination substitutability from a new perspective: "tour operators and travel agents indicated that a proportion of between 5% and 25% of Dutch leisure passengers would switch their point of departure to Brussels or Düsseldorf if prices for flights to long-haul holiday destinations from Amsterdam were to increase by 5-10%" (ibid). This result shows a strong substitutability between these airports for holiday destinations.

In 2009, Lufthansa purchased a further 50 percent share in bmi, which was added to its existing 29 percent share (M. 5403). Lufthansa had acquired sole control over the UK Company, British Midlands (bmi), which held 56 slots at the coveted London Heathrow Airport.

Referring back to the Ryanair/Aer Lingus merger, this case (M.5403) was the first time the EC applied the airport substitutability "100 km/1 hour"¹³⁵ rule by defining the relevant market.

In summary, by broadening the definition of the relevant market with airport substitution, the market power of the affected airline will decline and the EC will tend to allow a merger to take place. To the contrary, when assessing the relevant market in the BA/Iberia case in 2010, the EC changed its view and argued that since London Heathrow plays a leading role in transatlantic routes, no other London airport can be a competitor.

¹³⁴ In contrast to this finding, the GAP's (2010) study found that Schiphol airport definitely has market power concerning O&D passengers for the provision of infrastructure to airlines. However, the market power concerning transfer passengers is limited. The study also carried out a passenger survey with SSNIP analysis and concluded that Schiphol is a dominant airport with economic market power.

¹³⁵ A secondary airport is in the catchment area of a city if it lies within 100 km or one-hour driving distance from the city center.

4.6 Assessing the Remedies

"What is worse than monopoly? A chain of monopolies" (Tirole, 1988, p. 175).

Sections **6.2** and **6.3** will analyze the remedies related to the Lufthansa cases in detail, so the next section focuses only on the other merger cases.

4.6.1 AIR FRANCE

As described in Németh and Niemeier (2012), the EC imposed more remedies in the Air France/KLM case (2004) than in any other airline merger. The following table summarizes the remedies.

Surrender of slots: number of slots	Amsterdam and/or Paris and/or Lyon
with no time limit	and/or Milan and/or Malpensa
within 120 minutes of the requested time for long-haul and	and/or Rome
within 45 minutes for intra-European city pairs	
Reduction of frequencies: 6 frequencies a day	Paris-Amsterdam
Freeze of frequency: thus no increase of flights	Paris-Amsterdam, Lyon-Amsterdam
Price reduction mechanism:	Paris-Amsterdam, Lyon-Amsterdam
If the merged airline reduces a published fare on the Paris-Amsterdam	
route, it has to lower the fare on Lyon-Amsterdam accordingly	
Enter into interlining agreements:	Between France and/or Italy and the
special pro-rate agreements;	Netherlands
blocked space agreements and	
intermodal services	
at request of new entrant or the railway	
Frequent flyer program	All
Allow new entrants to be hosted in the newly formed "FlyingBlue"	

31. Remedies in the 2004 Air France/KLM merger

Source: EC merger decision on Air France/KLM (M. 3280, 2004, p. 32)

The Air France/KLM merger happened in the same year as the EC's introduction of the new merger guidelines with efficiency considerations. However, efficiency gains from mergers (also called synergies) played a limited role at that time.

The merger seemed to result from an attempt to secure a valuable alliance member against a takeover by a rival alliance, rather than from a realization of synergies. Furthermore, those synergies could also have been realized through an alliance since AF and KLM did not combine their business structures. Instead, they kept them separate despite the full merger, so the realization of cost synergies was limited. Turning to unit costs, AF could not generate significant cost savings after the merger with KLM compared to other major carriers (Fröhlich et al., 2013). This case has been analyzed in the literature.¹³⁶

¹³⁶ See, for example, Brueckner and Pels (2005) and Veldhuis (2005).

4.6.2 BRITISH AIRWAYS

There was only one slot remedy imposed in the British Airways/TAT decision, since the high-speed railway between London and Paris was supposed to be a strong competitor in the coming years. In the Iberia/Vueling/Clickair case¹³⁷ the slot transfer obligations were "unlimited in duration" (M. 5364, 2009, p. 9). This is interesting, given that prior to this ruling the longest remedy period was defined to be five years.¹³⁸

British Airways (BA) — which aimed to "create a leading European airline group" (British Airways, 2009, p. 1) — took over a 55 percent market share in its Oneworld alliance partner, Iberia, at the end of 2010. The British flag carrier promised a strong global strategic position, while "slots and destinations [are] to be protected for the benefit of the group" (ibid, p. 15). Unluckily for the airline, the EC had a different view regarding slot protection.

In its worst case scenario, BA would have to give up 49 slots¹³⁹ at London Heathrow airport without any compensation. The 60-minute slot window was the most rigorous in European airline merger history; until 2010, a 90-minute window was applied for intercontinental slots.

The merger between Iberia and BA differs from the other mergers in that there was an attempt to build a new branded corporation that mentioned neither of the two brands. Furthermore, the two networks seem to be more complementary than the networks of KLM and Air France or Lufthansa and Swiss, because Iberia focuses on South America and BA on North America. A further difference is that the airlines were integrated before the merger within the Oneworld alliance in 1999, while Lufthansa/Swiss and AF/KLM had not been alliance partners before their mergers (Fröhlich et al., 2013).

Since the relevant routes and slots are all related to long-haul intercontinental routes, it is beyond the framework of European airline mergers. This case alone is worth investigating in a separate study.

¹³⁷ In early 2009, Iberia bought the Spanish LCCs Vueling and Clickair. The EC defined six Spanish domestic routes and seven European city-pairs as relevant: "The Parties undertake to make slot(s) available in Barcelona and/or Venice and/or Rome and/or Nice and/or Athens and/or Madrid and/or Naples and/or Ibiza and/or Paris... at Barcelona and/or Malaga and/or Santiago de Compostela and/or Seville and/or Granada and/or Oviedo and/or Bilbao and/or Ibiza and/or Valencia and/or Alicante" (M. 5364, 2009, p. 5).

¹³⁸ However, this case is difficult to evaluate. Apart from the Spanish language used in the decision, there is no clear rule about whether the slots should be provided at all the listed airports or just at one of them.

¹³⁹ Concerning four routes starting from London, BA might give up 49 slots at Heathrow or Gatwick airports, but only if the competitors has already exhausted their own slot portfolio (ibid, p. 18). The EC (not the airlines) decides which airlines will obtain these slots. The first criterion is the competitive constraint, followed by the price offered for a slot. Overlapping (thus anticompetitive) effects were realized on seven transatlantic routes.

4.7 CONCLUSIONS

Chapter 4 analyzed the European merger framework in aviation and found a further reason for the softer merger policy since 2004. The EC has widened its notion of the relevant market, which explains the merger approvals in the 2000s, even without considering efficiency claims.

Mergers, most of them with remedies, were cleared due to quality and variety reasons. Variety also includes variety of substitutes (e.g., railway, indirect flights, LCCs and secondary airports within 100 km or a one-hour driving distance) and a broader relevant market, where the merger merely increases concentration. This is particularly true on the leisure (non-premium) market, where passengers are price sensitive, but not time sensitive.

Quality increase (e.g., improved schedule and extended FFP) might benefit business (premium) passengers, who are time sensitive but less sensitive to price changes. The EC first considered a quality increase from network effects in 2004, during the KLM/Air France takeover concerning corporate (business) passengers. However, the exact network effects have remained theoretical and unquantified since then.

When looking at the development of the relevant market definition, we can conclude that the convergence of EC merger policy with US antitrust policy was successful in particular ways. There have been numerous attempts to improve merger policy: gathering efficiency (at least theoretically) into the main goals of the EC; introducing the effect-based more economic approach; implementing remedies to motivate competition; testing econometric methodologies (SSNIP, CLA and fixed-effects price correlation); and precisely separating different markets (consumer groups).

Government intervention, particularly competition policy in the EU, aims to ensure free competition in order to maintain or improve economic welfare. When takeovers are not allowed, inefficient airlines might fail and leave the market. *Are airline mergers a second-best solution to survive a potential bankruptcy? Should merger policy defend failing firms by approving takeovers?* Chapter **5** will review airline performance, the reasons behind inefficiency and the welfare consequences of failures of European airlines.

5 AIRLINE PERFORMANCE: INEFFICIENCY, BANKRUPTCY AND WELFARE

"Deregulation of the airline industry has been a 'nearly unqualified success, despite the industry's unusual vulnerability to recessions, acts of terrorism and war." The benefits to consumers have been estimated at in excess of \$20 billion a year... () Consumers do complain that standards of service have fallen. So they have – because passengers are unwilling to pay for them." – Alfred Kahn, the 'father of airline deregulation' in The Economist (2003, p. 90).

5.1 INTRODUCTION

As introduced in Chapter 2, next to cost efficiency and new market assessment, the main driving force behind mergers and acquisitions (M&As) is probably the advantage due to common revenue management. Economic models, described in Chapter 3, support the idea that consolidation generally leads to increased prices, and therefore to a competitive advantage for the merging companies. Performance could improve, but growing in size also brings risks.

Chapter **4** showed that almost every European airline M&A in the last 20 years was related to nearly insolvent airlines. Taking over a smaller carrier with financial difficulties may challenge merging airlines and even result in a common bankruptcy (e.g., Swissair/Sabena). On one side there is a trend to merge airlines, but on the other side we also observe a wave of smaller airline bankruptcies (see Chapter **6**). It seems that less efficient carriers are either taken over or become insolvent and disappear.

This observation raises the questions Chapter **5** will attempt to answer. *Which factors lead to the bankruptcy of a formerly more or less successful carrier and what can we learn from it? What are the consequences of airline bankruptcies from the consumer's point of view?* Section **5.2** will introduce the different approaches used to measure airline efficiency. Case studies will address the reasons for worsening performance of a failing *flag carrier* (**5.3**) and the consequences of airline failure on welfare and market structure (**5.4**).

Network airlines such as flag carriers face fierce competition from LCCs. The situation of former national monopoly airlines in Central Eastern Europe (CEE) is a special one, and this chapter will focus on them. After the EU accession of ten CEE countries in 2004 and 2007, small national flag carriers had to give up their international air service agreements and implement new rules (Németh, 2011b).

The challenge in the transition countries to adapt the European liberalized market was enormous and often ended in privatization then re-privatization, state aid investigation or even bankruptcy (Németh, 2011b). Some of the carriers could not keep up with increasing competition and failed. The Hungarian flag carrier perfectly represents the challenges of the European airline industry and the answers of the EC competition policy. This chapter investigates the failure of Malév Hungarian Airlines.

In this relationship, we assume that market *stability* might be a further reason behind soft merger policy. Without new investors, airline failures in the short-run shift up the supply curve, quantity decreases and prices increase. This may create a loss in consumer surplus, until new airlines enter the market. This argument is known as the *failing firm doctrine* (§89-90 of the ECMG, 2004), which the EC officially accepted in airline cases as late as 2013. The European Commission (EC) considered that "Olympic is a failing firm which absent the Transaction would most likely exit the market, it is not necessary for the Commission to assess in every detail the Notifying Party's efficiency claims" (M. 6796, p. 132).

Efficiency arguments became important to counterbalance the competitive harm. Though, if a firm were failing anyway, there would be no competitive harm and thus no need for an efficiency defense. It is in the interest of not only the EC, but also the airline owners (states, investors, banks) and the airlines themselves that takeovers occur before airlines go bankrupt. Managerial theories describe reasons (e.g., better bargaining power and reputation). One major point is that airline owners (notably states) can in that way leverage slot allocation by preventing slots from being reallocated by the slot pool (e.g., see the LH/SWISS case). Airplanes and other fixed assets (e.g., computer reservation systems) can be sold even after insolvency, but slots play a significant role from the takeover airline's point of view. Landing rights and networks (markets) are the most important properties an airline has. When the expected value of a takeover is less than slot value minus price, the takeover airline should wait until bankruptcy.¹⁴⁰ Aegean paid €72m for the assets of Olympic, which consisted of the brand name, bilateral traffic rights and its 14 leased Q100 and Q400 aircraft. Olympic's loss had been €130m in the three years before merger (CAPA, 2013a).

The *failing firm* doctrine is based on the assumption that bankruptcy and exit are unavoidable in the absence of a takeover. However, this theory does not consider new entries, who could fill the gap after the failing carrier leaves the routes. Therefore, the failing firm argument could protect takeover firms from new competition by definition and, in extreme cases, support monopoly-building. The observation leads us back to the theoretical debate on market failure versus government failure in Chapter 1.

In sum, without government intervention, pure market conditions should promote new entry and competition. The question remains: *can new entry fill the gap created by airline exit?* Our study in Section **5.4** offers an empirical exercise related to airline network replacement after bankruptcy and finds various evidence. This chapter offers insight into why carriers fail and what happens if an airline leaves a market, since this could be the default option if a merger is not permitted.

¹⁴⁰ One can calculate the expected value and compare it to the airlines' debts and the share prices of the takeovers. With the help of probability density functions and case scenarios, one could define the probability of winning the slot lottery. The higher the probability to win and the less the expected slot remedies, the more probable it is that the airline would choose the 'buy' strategy. Likewise, in the four LH takeovers, Lufthansa 'won' 306 destinations and 'lost' 20 relevant routes with 350 slot remedies. I appreciate the helpful comments from Kevin Wainwright, who provided the idea of a slot lottery.

5.2 BENCHMARKING: AIRLINE EFFICIENCY IN PRACTICE

"Productivity is efficiency in production" (Syverson, 2011, p. 329).

This section introduces the general airline benchmarking methodologies. We could measure performance from an efficiency approach or from a productivity approach. The efficiency approach considers the maximum potential output that can be produced with the available inputs, while the productivity approach considers actual outputs and compares them with other competitors (Lai et al., 2012). I will use the productivity approach and compare airlines using the available performance indicators.

Dresner (2002) described performance measures used in the airline industry. He differentiated between two main categories. On one side there are productivity and cost efficiency indicators, and on the other side the industry uses costumer service measures (e.g., on-time performance, ticket over-sales, and mishandled baggage and customer complaints). However Dresner concluded that "neither the partial nor the gross measures are good metrics to capture airline productivity, after controlling for airline-specific effects" (2002, p. 47).

Francis et al. (2005) conducted a survey among the largest 200 airlines about their performance measurement methodologies. Forty-three airlines completed the questionnaire, with the highest response rate in Europe (52 percent). The majority of the airlines (88 percent) used benchmarking as a performance improvement technique. The following figure shows the *partial productivity* indices used by the airlines.

Partial Performance Measure	Used (%)
Punctuality	100
Load Factor (PLF)	100
Block hours or Aircraft Utilization	98
RPK	95
ASK	93
Cost per Seat Km	90
Labor Cost as a Percentage of total Operating Cost	87

32. Partial productivity measures used by the airlines

Source: after Francis et al. (2005, p. 212)

Financial indicators (e.g., operating costs, cash flow, operating revenue or profit) also provide a reliable overview of the development of an airline. Comparing different airlines, however, makes the analysis difficult due to differences in size and business model (economies of scale and scope), airline network (e.g., economies of density, long-haul flights) and cost structure (e.g., outsourcing, taxes, and bookkeeping). A slightly better alternative is to compare financial data per passenger (Dresner, 2002).

The following table presents the most common productivity metrics and lists their advantages and disadvantages. General gross airline productivity measures in Europe¹⁴¹ will be introduced in the following pages, while partial indicators will be used to illustrate the findings of the first case study in Section **5.3.4**.

			Indicator	Advantage	Disadvantage
			Revenue passenger		No trade-off between labor and other inputs;
		ity	kilometers (RPK ¹⁴²) per	e	labor are treated equally (pilot=baggage
		tiv	employee	llat	handler?); output measures are incomplete;
		que	Available seat kilometers	alcı	distinct outputs may be added together (tons
		ro	(ASK ¹⁴³) per employee	с: С	of passengers=tons of freight?); Not adjusted
		r p		y tc	to stage lengths; Misleading: high labor
		poq		gas	productivity through very low wage rates;
	ial	La		щ	Autocorrelation: capital intensity as a driver
	art				of labor productivity (adjusted $R^2=0.8$)
	L L	<u>.</u>	Load factor (PLF ¹⁴⁴)		Do not account for any other inputs (no trade-
	~	d ghi	Flying hours per plane	late	off); do not differentiate between plane types;
		fli ivit	Kilometers flown by	cn	cannot measure outsourcing: capital or
		or pm	plane	cal	labor?; various weight allowances for
ncy		ital Juij Odu	Block hours per day ¹⁴⁵	5	passengers; quality changes are not reflected
cie		api ec	Turnaround time per	asy	(need to separate premium and non-premium
Ĩ		0	flight	Щ	passengers); need to be adjusted for stage
st e			Total output produced	Most	Quite complex computations: difficult to
00		ty 1	por unit of input	widely	ostimate, because labor and capital are hard to
pui		or tivi	Output/sum of labor +	accented:	measure (see partial indicators): individual
y a		P: 1 luc	capital inputs	Weighing	characteristics of carriers are not considered
ivit		E i fo	Formulate a production	weighnig	
uct	Ś	, g	function for airlines		
ipo.	ros		Finds maximum levels of	Allows for	Individual characteristics of carriers are not
$\mathbf{P}_{\mathbf{I}}$	5	a nt	output for given levels of	trade-offs;	considered
		dat me sis	input	Easily	
		aly op		handles	
		Vel vel		multiple	
		E E		inputs and	
-				outputs	
			Collects gross scores	Best	More complex, because it requires a huge
	ą	_	(TFP and DEA) and	allows for	dataset; sophisticated statistical knowledge
	OSE	cal	regresses them for firm	compariso	needed, which makes everyday use difficult
	du	isti	characteristics	ns between	in practice
	<u>[0]</u>	tat	Control variables:	very	
	De	\mathbf{N}	aircraft size, traffic	different	
			density, routes, average	carriers	
			stage length		

33. Airline productivity performance metrics (related to passenger traffic)

Source: own summary based on Dresner (2002), Morrell (2002) and Forsyth et al. (1986)

¹⁴³ Available seat kilometers = Available seats x km flown

¹⁴¹ There is a comprehensive database of US carriers, so there is a lot of literature comparing US airlines. In contrast, research with European airline data is rare and, in the sense of data accessibility, more relevant as a starting point for our analysis. ¹⁴² Revenue passenger kilometers = Paying passenger x km flown

¹⁴⁴ Passenger load factor = RPK / ASK

¹⁴⁵ Also called *aircraft utilization*, aircraft operation in hours per day

Since the thesis concerns merely European airlines, the following literature review is confined to *gross productivity* studies with a focus on European carriers. Fethi et al. (2000) investigated the effects of liberalization in aviation for 17 European airlines in the early 1990s. The paper also summarized earlier benchmarking research in the airline industry. Bigger airlines in the sample were more efficient, but it did not find a strong effect of liberalization (ownership structure) on technical efficiency.

Scheraga (2004) compared 38 international airlines and found that load factor and non-flight assets were statistically significant to the operational efficiency of an airline. The more internationally an airline operates (i.e., the percentage of international operations is high), the higher the DEA efficiency scores it can achieve. However, Scheraga also drew attention to the financial vulnerability of efficient airlines, which may hinder their flexibility in a changing environment. This is especially true for economic or financial shocks, such as the event of September 11.

Barbot et al. (2008) used gross productivity metrics (e.g., input-oriented DEA and TFP) to compare 49 airlines based on data from 2005. They found weak evidence for economies of scale, so larger airlines are generally more efficient. Only the input factor "labor" was relevant in determining productivity.

Barros and Peypoch (2009) used output orientation (assuming profit maximization) to measure whether an airline would produce the same output with less input. By explaining efficiencies with the help of a regression, the authors found the demographic dimension of the airline's home country and the alliance membership significant. Interestingly, if an airline is part of Oneworld, the average mean of the regression models was 0.10; for Star Alliance it was hardly more than 0.05, and for Sky Team it was only 0.03. The next table summarizes the main features of the recent airline *gross productivity* literature.

Authors	Methodology	Input Factors	Output Factors	Time- frame	Sample
Barros and	1 st stage: output-oriented DEA	Employees,	RPKs	2000-	27
Peypoch	2 nd stage: regression to evaluate	Op. Costs, Planes	EBIT ¹⁴⁶	2005	European
(2009)	the drivers of efficiency	-			airlines
Barbot et	Input-oriented DEA, TFP	Labor, Fleet, Fuel	ASKs, RPKs,	2005	49
al. (2008)	-		RTKs		airlines
Scheraga	1 st stage: DEA	ATK, Op. Costs,	RPKs, Non-	1995-	38
(2004)	2 nd stage: Tobit regression	Non-flight assets	passenger	2000	airlines
		-	RTKs		
Fethi et al.	1 st stage: DEA	ATK, Op. Costs,	RPKs, Non-	1991-	17
(2000)	2 nd stage: Tobit regression	Non-flight assets	passenger	1995	European
	_		revenue		airlines
				ã	

34.	Benchmarking	airlines:	a literature	review
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Source: own figure

¹⁴⁶ EBIT: Earnings before interest and taxes

5.3 CASE STUDY: INEFFICIENT AIRLINES

"Successful joint stock companies which haven't been granted a State-conferred monopoly have been conspicuously successful—some of them being conspicuously unsuccessful—at subsequent times in history." On Adam Smith's work (Robbins, 2000, p. 155).

This section targets the following question: *how do inefficient airlines survive despite growing competition?* The research¹⁴⁷ applies ideas about permanently failing organizations (PFOs) to the aviation sector, and focuses on the three largest airlines in central and Eastern Europe. The research question is whether the PFO phenomenon could explain the poor performance of Malév, CSA and LOT airlines. Elite management interviews provided a rich explanation of events at these airlines and successfully confirmed the robustness of the permanent failure concept.

The poor performance of the airline industry raises a number of questions about our understanding of the relationship between organizational behavior, firm strategy and financial performance in market contexts. Industrial organization and economic theory generally posits that persistently inefficient firms would be forced to exit the market – especially when the industry is experiencing unprecedented deregulation.¹⁴⁸

Business strategy theories would also suggest that firms that consistently produce below-average industry returns would be forced to change strategies if they wish to change the trajectory of firm performance. Yet, in the aviation sector, we see a persistent repetition of seemingly unsuccessful strategies across airlines and over time.

Thus why is it frequently the case that, in the aviation sector, companies perform poorly over several years and yet continue to survive despite deregulation and growing competition? On a broader, conceptual note, our study provides further evidence of the need for organizational, micro-level research to inform broader strategy and industry-level understanding of firm performance.

5.3.1 EXPLAINING POOR PERFORMANCE

Numerous quantitative studies of performance outcomes have examined why the industry struggles to generate consistent returns on invested capital (Borenstein, 2011; Button, 2003; Holloway, 2002; IATA, 2011; Pilarski, 2007; and Wojahn, 2012). Five arguments have been identified as the main explanatory factors concerning the aviation sector.

¹⁴⁷ This section is mainly identical to the original text of Akbar, Niemeier and Németh (2014).

¹⁴⁸ It is possible for inefficient firms to remain in the market for limited periods if, for example, the efficient firms with market power keep prices high, giving the inefficient firms a buffer.

First, in the last two decades, the industry has experienced severe impacts from progressive phases of deregulation. Sheltered national markets were exposed to competition, producing significant losses for incumbents (Creel and Farrell, 2001; Dempsey, 2008; and Dennis, 2007).

Second, there is an economic logic driven by the minimum efficient scale that questions the economic feasibility of smaller airlines (Caves et al., 1984; Romero-Hernandez and Cabrera, 2005; and Barbot et al., 2008): if an airline is too small and offers too narrow a range of services, it cannot serve enough customers to cover its fixed and sunk costs. The network effects of being a larger airline (more connections to more destinations) also undermines the economic feasibility of smaller airlines since customers prefer to fly with a larger network airline.

Third, poor industry performance is inextricably related to ownership structures and soft budget constraints imposed by owners of the airlines, notably the state (Beria et al., 2011; and Doganis, 2002). Since airline managers know that underperformance will not be punished through liquidation of assets and exit, they are not forced to operate under market-based efficiency criteria.

Fourth, airlines have invested substantial resources in protecting themselves from competition through rent-seeking behavior – especially at the national level. The success of this activity has been one of the main reasons for owners imposing soft budget constraints (Bergamini et al., 2010; and Ciliberto and Schenone, 2012).

Fifth, deregulated air transport markets might have no stable long-run equilibrium. Airline markets might be inherently unstable and the lack of profitability is an empty core phenomenon¹⁴⁹. Airlines might collude to avoid empty cores, where prices do not cover costs (Button, 2003).

All five arguments are relevant. Clearly changing market structures and evolving technologies and basic cost features of the industry would explain performance. However, none of these studies have explored how internal practices, processes and discourses contribute to the performance of firms at the *organizational level*, and nor have they examined the firms' persistent existence despite poor performance.

¹⁴⁹ After Edgeworth (1881), in presence of an empty core (prices do not cover the costs), competition might be unstable and inefficient, and there is no Pareto equilibrium. In order to avoid an empty core, airlines collude if costs and demand are strongly variable (Button, 2003).

5.3.2 PERMANENTLY FAILING ORGANIZATIONS

Our study identified a sixth complementary explanation for airline performance: airlines are a category of organizations that have been characterized as 'permanently failing.' This concept, first developed by Meyer and Zucker (1989), asserts that the continued survival of these firms is contingent on serving the interests of certain dependent actors and replaces the purely economic interests of shareholders and owners. The PFO framework has been applied in several industries,¹⁵⁰ but this is the first time it has been applied to the aviation sector. The following sections present some evidence from the elite interviews.¹⁵¹ The main question is *why CEE airlines have been unable to improve productivity*.

The first practice of permanent failure is the stubborn belief in deeply and historically embedded perspectives about the rights and obligation of the firm and its stakeholders. For example, stakeholders believe that it is unthinkable that the organization should fail or believe that external stakeholders will not shut the organization down because they have avoided doing so during previous performance crises.

The interviewees also addressed updating the brand. For example, Malév had not changed its staff's uniforms since the 1980s and its logo had remained unchanged since the 1990s. The reasons why Malév was unable to do so were identified as related to the 'culture' at the airline, which was somewhat conservative and backward looking. One manager reflected on the fact that Malév, LOT Polish Airlines and CSA Czech Airlines had seat technology from the 1980s on their long-haul aircraft. None of them had in-seat video, and none of them offered fully flat seats in business class.

PFOs display a recurring discrepancy between strategy articulation and implementation. For example, they break promises made by owners and top management about change and resource allocation or they significantly delay their implementation. Since this repeats numerous times during the course of an organization's history, it increases the lack of trust between external stakeholders and employees, the media and the wider community. Decision-making time horizons were another theme that emerged from the interviews. In particular, top managers emphasized that their airlines tended to focus on short-term decision making across many functions within the company in contradiction to the long-term strategies articulated by top management. This included limiting budgets for new marketing campaigns, website development and investing in industry benchmarking data.¹⁵²

¹⁵⁰ Eitel (2004) examined national agencies dependent on governmental support and Seibel (1996) the not-for-profit sector.

¹⁵¹ The interviews, carried out by Akbar, were based on open questions (e.g., what role did the manager have and why; how does the manager explain and justify their behavior; how does the person rationalize the nature of events and process; how does the manager explain failure). The managers selected for the interviews were either members of the airlines' and airports' Boards of Directors or held positions at a director level within their respective companies. Each interview lasted between one and two hours. Due to requests for confidentiality, the names and roles of interviewees were kept anonymous.

¹⁵² In the case of one airline, the web development team was severely understaffed so only incremental changes to the website were possible, making it lag behind its competitors. In another instance, the airline would not invest in industry benchmarking data.

When it came to investment in capital goods, the airlines were unable to generate enough cash from operations to finance new aircraft leasing or acquisitions. Instead, they relied on injections of funds from owners, especially governments, which in all three cases led the airlines to be formally investigated for receiving illegal state aid under EU competition policy rules.¹⁵³

Permanent failure is characterized by an apparent perpetual lack of agreement on how to reverse failure at the top management level and the arrival of contradictory trade-offs. A final case would be pressure to save the firm in the 'societal or public interest' despite the lack of an economic rationale.¹⁵⁴ According to the managers interviewed, both Malév and CSA Czech Airlines sold their slots at potentially lucrative destinations, partially in an attempt to raise cash.¹⁵⁵ They also stopped their intercontinental routes and mothballed their long-haul aircraft. The Malév decision to end long-haul routes was based less on strategy than on short-term cash considerations. In the case of Malév, the penultimate CEO, Martin Gauss, resigned because his salary was cut to be in line with the highest paid public civil servant.¹⁵⁶ Frequent changes in leadership at the airlines also contributed to instability at the CEE carriers. This led to business policy reversals and further communicated a lack of coherent long-term thinking to the organization.¹⁵⁷

35. Driving forces of worsening performance

	Malév	CSA	LOT
Organizational and strategic inertia			
a. Has proven successful in the past, must work in the future	Х		
b. Risk averse management culture	Х	Х	Х
c. Bureaucratic decision-making structure	Х	Х	Х
Lack of long-term strategy, only short-term stop-gap measures	Х		Х
Market exit neither feasible nor instinctive	X	X	Х

Source: own table

5.3.3 THE ROLE OF COMPETITION AND NETWORK EFFECTS

Every manager interviewed expressed the view that increased competition brought about by deregulation and, in particular, the emergence of LCCs had severely and negatively impacted the CEE carriers.

¹⁵³ The state aid case against Malév effectively led to its failure. One interviewee expressed doubt that the CSA case would lead to a similar outcome given that CSA's complex ownership structure would make it hard for investigators to show that state aid was directly aimed at the airline (rather than the holding group, including Prague Airport).

¹⁵⁴ External stakeholders often articulate this latter trade-off, the outcome being the emergence of soft budget constraints.

¹⁵⁵ In the case of Malév, it sold its London Heathrow slot to British Airways and its Amsterdam slot to Air France-KLM. CSA Czech Airlines surrendered its London Heathrow slot.

¹⁵⁶ One industry executive suggested that this kind of government intervention demotivated managers at the CEE carriers and made it hard to attract the best talent to the company.

¹⁵⁷ One senior manager at a regional airport who also had experience working at airlines highlighted how mid-level management and front-line staff grew skeptical and weary of new CEO mandates proclaiming the "last chance to save the airline" mantra. Ultimately, staff knew that they would be saved by the government through changing ownership or capital injections, thereby undermining the urgency of the CEO's rallying cry.

Since they operated in a price-sensitive leisure market, the CEE carriers rapidly lost demand in the economy-class segments, forcing them to lower prices and thereby worsen their financial positions. There were few destinations where LCCs were providing flights that the CEE carriers could operate profitably.

Most executives interviewed cited the importance of joining one of the global airline alliances. In principle, joining a global alliance had several benefits. First, it allowed the CEE carriers to co-market, co-brand and co-sell flights on airlines within the alliance, drastically increasing the number of destinations available to their passengers.

Second, being a member of a global alliance would allow them to have more of their seats sold on their flights within the network. In an observation that ran against conventional wisdom in the industry, one manager observed that membership in an airline alliance was overrated because small CEE carriers could only participate in short segments toward hub intercontinental airports. Thus the revenue generated from the sale of a ticket involving intercontinental travel was limited.

Third, the attractiveness of the CEE carriers' FFPs would be significantly enhanced, as both mileage earning and redemption possibilities for passengers increased. Fourth, it could allow the CEE carriers to learn best practices from other airlines in the alliance. One manager observed that Malév's membership in Oneworld was less beneficial than LOT Polish Airlines' membership in Star Alliance because the latter alliance had much tighter coordination and governing rules between member airlines.

Industry executives interviewed agreed that the impact of competition had affected all airlines. Yet the CEE carriers were more greatly impacted, one executive observed, partly because they failed to be large enough to weather the increased price competition. Due to deteriorating cash flows, they were forced to become smaller, thereby worsening their cash positions.

5.3.4 BENCHMARKING CEE CARRIERS' PERFORMANCE

Central Eastern European carriers had lower levels of productivity than other European carriers. Their efficiency scores were in the range of 0.42 to 0.55, while the mean efficiency score was 0.7605 (Barbot et al., 2008). Facing competition from LCCs, CEE carriers produced the same output with roughly double the input (Akbar et al., 2014).



36. DEA airline efficiency scores in Europe

Source: Akbar et al., 2014; own figure based on Barbot et al., 2008

A further question is whether the market values quality, the product side of the industry. Airlines offer passenger flights, so they should always be at the service of their consumers, the passengers.

Customers' perceptions of flight quality were mixed. According to SkyTrax, who collects data from passenger reviews all over the world, the three CEE carriers had only a middling (3 out of 5 stars) service quality. Yet there are some properties where the general ranking is below 3, thus barely satisfactory. These refer to employees' problem-solving capabilities. Their interaction with both economy- and business-class passengers was rated as poor. Many passengers criticized the in-flight entertainment, the available newspapers and the food quality (Akbar et al., 2014). In comparison, most of the CEE carriers' competitors had 4 out of 5 stars (e.g., Lufthansa Group, Air France/KLM, British Airways, Turkish Airlines). Only Ryanair had a worse evaluation (2 stars).

The following figures present the performance of the three biggest CEE carriers. While the number of passengers the airlines carried is different (in 2010, Malév carried around 3 million, CSA 5 million and LOT 4.5 million), the airlines had very similar profit performance. None of them were able to sustain profits for more than two years; during most of the period between 2000 and 2010, all the airlines made losses.





Source: own figure, based on Annual Reports

The next figure shows the profit and loss per passenger in the period from 2000 to 2010. None of the airlines were able to sustain profits for more than two years, and during the majority of the period, all the airlines made losses.



38. Profits and losses per passenger (in €) from 2000 to 2010: Malév, LOT and CSA

The available partial measures confirm the low efficiency scores of the total measures. The average load factor in 2010 was 78 to 79 percent in Europe. By comparison, Malév increased its load factor from 62 percent in 2000 up to around 70 percent by 2010, while CSA had an almost constant load factor of 70 percent in the same time period. LOT had better values: up to 75 percent. However, it was still considerably lower than the load factor of Lufthansa (79.4 percent) or LCC competitors Ryanair and Wizzair (both 82 percent).





Source: Akbar et al (2014); own analysis based on AEA, IATA and annual reports

By comparing the aircraft utilization of Malév and LOT in the period between 2002 and 2007, we can conclude that the values (8 to 9 hours flown a day) were in accordance with the industry average. Ryanair and Lufthansa planes operated up to 10 hours a day.

Source: own figure, based on Annual Reports

5.4 CASE STUDY: ESTIMATING THE WELFARE EFFECTS OF DE-HUBBING

"I remember seeing an elaborate and complicated automatic washing machine for automobiles that did a beautiful job of washing them. But it could do only that, and everything else that got into its clutches was treated as if it were an automobile to be washed. I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail" (Maslow, 1966, pp. 15-16).

5.4.1 THE BANKRUPTCY OF MALÉV AND ITS IMPACTS

This section evaluates the reaction of LCCs to the bankruptcy of a European network carrier in early 2012, and develops a methodological approach to analyzing the trade-off on consumer welfare between lower frequency and likely lower airfares. Bankruptcy can also be a chance for many market players. The study¹⁵⁸ is a first application of real-world data to such an analysis, and thus makes a contribution to the literature. The case study provides lessons for airports planning for the *de-hubbing* (when losing a hub carrier) contingency based on an airline bankruptcy or merger.

The study first describes the bankruptcy event itself, the research questions and the relevance of the topic. Then, we will classify 51 former Malév routes according to what happened after the exit and identify new entries. A regression analysis will determine changes in frequency and seat capacity. Finally, by applying our *frequency-price welfare trade-off model* described in Section **3.4.3** (see Annex **8.3**), we will estimate the probable price decrease due to LCC entry.

On February 3, 2012, Malév Hungarian Airlines grounded all its aircraft after the Hungarian government stopped funding the loss-making carrier following the EC's finding that such support was illegal. Malév held a clearly dominant position at its only hub, Budapest Liszt Ferenc¹⁵⁹ International airport (IATA code BUD). In particular, in the summer of 2011, Malév performed nearly half of all scheduled departures, offering non-stop services to 51 destinations. Budapest airport thus lost its position in the list of the world's hub airports, and is unlikely to regain this status in the near future.

This event offers us an interesting opportunity to address the issue of importance and *value of hub operations*. Two of Europe's leading low-cost carriers, Ryanair and Wizzair, acted immediately. Rapid growth of low-cost carriers at Budapest airport raises questions related to both the *determinants of European LCC entry and the value of European low-cost airlines' point-to-point services* as opposed to the network provided by Malév. The third research question is *whether passengers are adequately compensated for the lower frequency of service by the supposedly lower fares offered by the LCCs*.

¹⁵⁸ This section is mainly identical to the original text of Bilotkach, Müller and Németh (2014).

¹⁵⁹ After March 2011, the new name of the airport is Budapest Liszt Ferenc International, previously known as Ferihegy International airport. Since there is no secondary airport in Budapest, we will use the prevalent name of Budapest airport in the rest of the paper.

Several other CEE flag carriers are currently finding themselves in a rather precarious financial situation, indicating that further bankruptcies may be possible.¹⁶⁰ The European airline market appears to be developing toward a unique model in which network carriers co-exist with LCCs. It is therefore interesting to understand the extent to which LCCs can pose a threat to the network carriers' networks.¹⁶¹ As further consolidation in the global airline industry appears certain, based on bankruptcy or merger, de-hubbing may became an important topic.

Malév's former partner airlines might be forced to curtail their services to Budapest, since they would no longer be able to fill up their flights with transfer passengers to feed Malév's network. This consideration is especially important in light of Bel and Fageda's (2008) finding that corporations prefer locations that are well-connected to the rest of the world with non-stop air services.

Passengers who used to rely on Malév to connect to services of the carrier's larger Oneworld alliance partners had now lost that option. Also, the airport might find itself in a situation of having to deal with excess capacity, which effectively represents specific assets, requiring a hub operator to be used. Our research thus informs European hub airports about what they can expect when their hub operator leaves.

The most closely related study to ours is Redondi et al. (2012), which documented the instances of dehubbing worldwide, demonstrating that former hub airports never fully recover in terms of traffic volumes they had prior to losing their hub status. However, the literature on hub premium would overall suggest lower fares when a carrier loses brand loyalty and local market power at its hub airport.

Tan (2012) estimated a 2.9 to 6.9 percent increase in airfare after the de-hubbing of legacy carriers at four US airports. The event study illustrates that in the absence of sufficient substitutes, less frequency softens competition and increases prices despite diminished concentration. Bilotkach et al. (2012) also demonstrated that de-hubbing leads airports to charge lower aeronautical fees.

5.4.2 ROUTE CLASSIFICATIONS – PRE- AND POST-BANKRUPTCY

The impact of Malév's bankruptcy on consumer welfare depends on the reaction of other carriers. We offer the following classification of Malév routes based on what could happen after the bankruptcy event.

¹⁶⁰ Aerosvit Ukrainian Airlines' bankruptcy in January 2013 represents another recent case of a disappearing hub operator.

¹⁶¹ For example, Morrison (2001), based on internal airline research by Southwest Airlines, found that if LCC Southwest serves a route, fares are 46 percent lower.

- Malév monopoly, no replacement. 14 routes lost all service as of summer 2012. Alternatives (in particular, connected flights) imply a substantial increase in travel time, and potentially in the total cost of travel. Those destinations include Beirut and Damascus¹⁶²; Tirana, Skopje, Belgrade and Pristina in the Balkans; and St. Petersburg and Odessa in Russia. Additionally, American Airlines (Malév's partner in the Oneworld alliance) chose to discontinue its flights to New York, and Hainan Airlines stopped flying to Beijing, marking a loss of all long-haul services out of BUD.¹⁶³ Thus, these former passengers are definitely worse off.
- Malév monopoly with legacy carrier entry. We only have two such cases: Lufthansa started flying to BUD from Hamburg (flights operated by Eurowings, a Lufthansa-owned subsidiary) and Berlin. Remaining a monopoly, passengers are definitely not better off.
- 3. Malév duopoly with a legacy carrier; the legacy carrier expands its service. Aeroflot, Air France, Austrian Airlines and Finnair are the carriers who expanded their services to Budapest from their hubs following Malév's bankruptcy. Their frequency, however, tends to be lower than the total frequency of service by Malév and the corresponding legacy carrier before the bankruptcy. Competition decreased, along with total frequency of service, so passengers are likely paying higher fares on the respective routes. At the same time, passengers have gained better access to the networks of the corresponding network carriers.
- 4. Malév monopoly with LCC entry. After the bankruptcy, Wizzair entered eight such markets, Ryanair started its services in three and Air Berlin entered one route.
- 5. Malév duopoly with a legacy carrier; an LCC enters this route. Some cases of this kind are observed as well, including Dublin and Warsaw.
- 6. Malév duopoly with an LCC that expands its service. Wizzair did this in seven separate markets (Ryanair was not present at BUD in the summer of 2011).

¹⁶² We could argue that services to Damascus would have been discontinued regardless of Malév's fate, due to the civil war that broke out in Syria around the same time. The only medium-haul flight out of Budapest airport in summer 2012 was Qatar Airlines' service to Doha.

¹⁶³ Interestingly, Aerosvit's bankruptcy also led to the disappearance of all long-haul services out of Kyiv Boryspil airport.

Wizzair is a Hungarian low-cost carrier which has established itself as the leading LCC in Eastern Europe. Based in Ireland and operating a fleet of over 300 aircraft, Ryanair is the largest LCC in Europe. Both Ryanair and Wizzair have similar business models.¹⁶⁴

We will use the data on frequency and seat capacity for scheduled airline services from Budapest airport¹⁶⁵ included in the 2011 and 2012 summer schedules. Both schedules cover the period from April through October of the respective year.

The data were aggregated to different levels: airline-destination level data in the first stage, and airportmarket and city-pair market data in the second stage.¹⁶⁶ The data was supplemented with the information on distances between the airports, the population and the income per capita at the destination. For the distance (in km), we used Malév Horizon Magazine (2010) and the website www.aircalculator.com. We retrieved the latest larger urban zone population data from Eurostat (2012) and OECD. Similarly, the income per capita data came from OECD.¹⁶⁷

5.4.3 REGRESSION ANALYSIS AND CONSUMER WELFARE ESTIMATION

In 2011, the schedule included 60,737 flights to 92 airports (79 city-markets). The 2012 summer schedule included 46,721 flights to 94 airports (72 cities). Therefore, BUD lost about a quarter of its scheduled flights. The offered seat capacity decreased from 7.5 million to about 6.9 million, about an 8 percent decline. Sixty-two cities maintained scheduled non-stop services out of Budapest airport, but only 26 were served with a higher frequency.

Yet, over half of cities (35) gained offered seat capacity. One-third of added capacity came from Ryanair and Wizzair. Lufthansa had become Budapest airport's third largest airline in terms of flight frequency (with a 13 percent market share).¹⁶⁸

¹⁶⁴ Including strictly point-to-point operations (Any passenger wishing to connect from one flight to the next must purchase two separate tickets. The airlines will not be responsible for any missed connections, irrespective of the reason.), strictly non-refundable fares, fees for checked luggage and substantial restrictions on carry-on luggage, an absence of frequent flier programs, an absence of assigned seating (and fees for the right to select a specific seat), extensive use of smaller remote airports and a single aircraft-type fleet.

¹⁶⁵ We would like to thank Patrick Bohl, Head of Airline Development and Strategy at BUD airport, for kindly providing us the latest schedule data.

¹⁶⁶ Point-to-point carriers often use smaller secondary airports.

¹⁶⁷ OECD data are at the country level. For destinations outside the EU/OECD countries, we used various data sources (mostly national statistical agencies) to obtain the latest available figures for population and income per capita.

¹⁶⁸ In 2011, Malév was the largest carrier at the airport, followed by Lufthansa and Wizzair (who had approximately an equal number of flights). In 2012, if we add all the carriers owned by Lufthansa to the picture (Swiss, Austrian, Brussels and German Wings), the Lufthansa Group became the largest carrier at BUD, with over 23 percent market share (based on number of flights). Apart from Lufthansa, Wizzair, and Ryanair, no other carrier achieved more than a 5 percent market share in terms of flight frequency.

Using the techniques of generalized least square (GLS) and binary probit maximum likelihood (ML) estimations,¹⁶⁹ we subjected our data to a *regression analysis*¹⁷⁰ and found the following facts. There was a significant frequency and seat capacity reduction. An average destination lost about 18 percent of its flights.¹⁷¹ We found that distance and endpoints' demographic characteristics were not robust predictors of changes.¹⁷²

At the same time, replacing Malév with either Ryanair or Wizzair would lead to an overall decline in the frequency of service. Ryanair appears to add half the frequency withdrawn by Malév; the corresponding figure for Wizzair is one-third.

There are several determinants of new and discontinued services. The level of per capita income emerged as a strong predictor of discontinued services. Destinations that had more flights to BUD in 2011 were less likely to be lost. Both LCC carriers were attracted to flights to high-income destinations, but Wizzair was also attracted to the lower-population destinations.¹⁷³ While Ryanair appeared to be seeking shorter-haul routes to higher-income destinations that have generally been underserved, Wizzair's strategy appeared to be geared toward replacing Malév's services.

Brueckner et al. (2013) demonstrated that the entry of an LCC reduces average airfares by about 33 percent, or 20 percent if the LCC serves a secondary airport (we suppose the latter case). Additionally, we obtained access to fare quotes collected on a number of European routes in 2005.¹⁷⁴ The average one-way LCC-network price differential corresponded to about €43 in 2012. We considered a further shrink in the price differential by about a quarter¹⁷⁵ to €32.25. The following table summarizes the results on city pairs with lower frequency.

¹⁶⁹ The dependent variables were flight frequency and the number of seats. Our control variables were distance, population and per capita income. We also differentiated between such as indicator variables as island destination (when lacking other transport modes, and particularly higher tourism, demand on islands might be higher) and destinations served by Malév, Ryanair and Wizzair. Total and Malév flights were differentiated as well. We used natural logarithms to mitigate the heteroscedasticity problem (thus, if the variance of the dependent variable is different with different values of the independent variables; var (ui) $\neq \sigma$ square).

¹⁷⁰ Please find the detailed data analysis and the corresponding tables in our research paper.

¹⁷¹ The number drops to 11 percent if we exclude discontinued destinations (those included less populous metropolitan areas with lower per capita income than average in the sample).

¹⁷² With the exception that island destinations appeared to be attracting more services, other things were equal. The latter result may be related to the strong presence of Ryanair in the British market, coupled with a substantial Hungarian diaspora living there.

¹⁷³ The latter result could be explained by the fact that Wizzair, which had an established presence at BUD prior to Malév's bankruptcy, could have entered the higher-population destinations before the event.

¹⁷⁴ The data were provided by Claudio Piga, who collected airfares net of taxes and fees 14, 21, and 28 days before the flight departure date. Each number is the average for hundreds to several thousand observations. We are very grateful to Claudio for giving us this information.

 $^{1^{75}}$ First, in contrast to LCCs, network carriers are known to discriminate between one-way and roundtrip passenger fares, so that network carriers' lowest one-way fares require purchasing a return ticket. LCCs are more likely to charge a booking fee and add different fees for add-on services (e.g., checked luggage, seat reservations, in-flight drinks/meals) to the ticket price.

Destination (City level)	Daily frequency,	Decline in daily frequency, Summer 2012 versus 2011	One-way price decrease producing zero n	
(city level)	Junner 2011	Juliller 2012 Versus 2011	$\frac{1}{MU_{\epsilon}^{(1)}}$	$MU_{\epsilon}^{(2)}$
	Ma	arkets with LCC entry post-bankru		J
Varna	1.52	1.39	105.72	108.21
Larnaca	1.37	1.05	89.57	89.15
Sofia	1.78	1.28	79.92	77.16
Venice	1.28	0.77	71.48	
Thessaloniki	1.93	1.25	70.10	66.80
Goteborg	2.05	1.03	53.38	52.83
Milan	2.84	1.71	56.09	49.11
Stockholm	3.34	1.13	28.78	27.17
Stuttgart	2.91	0.63	19.98	
Madrid	2.55	0.41	15.56	
Helsinki	3.61	0.25	5.71	
Bucharest	4.71	1.25	16.82	15.10
Warsaw	4.70	0.48	6.50	
Frankfurt	8.48	2.13	0.46	2.75
Paris	7.60	1.74	3.71	4.11
Dusseldorf	6.49	0.56	2.94	
Amsterdam	7.39	0.39	1.02	
London	11.66	0.15	0.00	
	Mar	kets without LCC entry post-bank	ruptcy	
Basel	0.50	0.37	98.15	
Burgas	0.52	0.28	72.51	
Targu Mures	1.49	0.98	75.89	
Athens	2.23	1.55	71.81	66.80
Zagreb	2.61	1.67	62.03	55.56
Geneva	2.16	1.14	55.12	52.83
Copenhagen	2.84	1.92	63.28	56.59
Tel Aviv	3.13	1.96	55.45	47.96
Kiev	2.55	0.68	26.20	
Moscow	3.24	0.87	23.23	
Istanbul	2.69	0.39	13.83	
Zurich	4.65	1.09	14.98	14.35
Prague	5.54	1.89	16.97	13.80

40. Estimated price declines required to compensate for lower frequency

Source: Bilotkach et al., 2014, p. 63

The price differentials correspond to the smallest change in one-way fare, which would compensate the customers for lower frequency of service on the route. Where the estimated marginal effect turned out to be negative, we used the value of zero in the table. $MU_f^{(2)}$ was not calculated where the change in daily frequency was less than one. In sum, destinations in bold correspond to routes with LCC entry, where passengers are likely to be worse off following the event (7 routes). Destinations in *italics* are those where LCC entry likely increased consumer welfare (11 routes).

Of the 31 cities included into the table above, 18 experienced the entry of an LCC. On these 18 routes, the price drop required to fully compensate the passengers for lower frequency of service ranged from $zero^{176}$ (London) to over €100 (Varna).

¹⁷⁶ The value is set to zero where the estimated corresponding marginal effect is negative.

Passengers flying to London are probably better off after Malév's bankruptcy, given the overall small decrease in frequency of service. At the other extreme, passengers traveling to Varna would probably not be compensated adequately for the decreased frequency of service and can be expected to be worse off.

Passengers traveling to seven destinations (Milan, Varna, Sofia, Thessaloniki, Larnaca, Goteborg and Venice) could potentially be worse off after the bankruptcy event, despite the entry of low-cost carriers on those routes to replace services that had been provided by Malév. Stockholm is a borderline case. Passengers traveling to the remaining 10 destinations where total frequency of service decreased and Malév was replaced by an LCC are likely to be better off.¹⁷⁷

In sum, of 51 Malév destinations in 2011, 14 lost all operations in 2012. Passengers traveling on six routes were better off, at least in terms of higher frequency. Thirty-one destinations lost frequency, but due to LCC entry on 18 routes, passengers traveling between 11 city pairs might be compensated by lower prices.

We can thus conclude that the short-time negative effects of a failure have likely been limited.

¹⁷⁷ Some shortcomings should be mentioned. We used estimates of marginal effects of frequency reduction on consumer utility, which are not based on the data that comes from the markets in question. Further, our estimates of likely network-LCC price differentials are very rough. Also, the marginal effects are likely to vary with passengers' income and trip purpose, as well as with the travel time. Last but not least, we only gave brief credit to the fact that LCCs are likely to enter a metropolitan area with service to smaller airports, without looking deeper into the increase in travel time.

5.5 CONCLUSIONS

Chapter **5** introduced different benchmarking approaches to measure performance (efficiency) and explained general underperformance in aviation. Section **5.2** addressed the fears and (missed) opportunities of a failing airline and found that management forms the main obstacle to developing performance. We can learn from the study about hidden barriers when taking over an airline with poor performance. We showed that Central Eastern European carriers are inefficient relative to competitors, created losses and were perceived by customers to offer poorer quality services. This suggests that they were able to survive despite their poor performance, thus the permanent failing organization prevents exit. Support is embodied in positive coverage of the organization and its activities by the media, uncritical endorsement by known figures in society or the repeated granting of contracts, particularly government contracts. This support carries a clear message to stakeholders that the organization and its activities are legitimate and in need of further financial, moral and political support. However, continued support deteriorates performance and leads to permanent failure.

The study found qualitative evidence for the persistence of short-term decision making, ongoing contradictions between articulated strategy and its poor implementation, and frequently assiduous intervention by governments that, instead of fostering decisive decision making, served to do the opposite. These factors contributed to reinforcing deeply held beliefs among top and middle management that they would survive despite the obvious problems they had faced and continue to confront.

Malév finally failed. The explanation for Malév's exit can be found in the changing constellation of interests among external stakeholders in this case – in particular the EC's refusal to permit state aid. Evidence from this chapter suggests that the EC's decision to rule against the subsidy was due to the Hungarian government's failure to credibly make the case for continued support for Malév (in contrast to both CSA Czech and LOT Polish Airlines).

Section **5.4** measured the value of airline networks and the welfare effects of Malév's bankruptcy. The evidence showed assorted results: leisure passengers probably benefited from immediate LCC entry, while business or connecting passengers suffered short-term losses. We estimated the minimum price reductions to compensate passengers for the, on average, 18 percent lower frequency on 51 former Malév routes. We found that passengers on 11 routes might be compensated, so they were at least not worse off after the event. In sum, both the passenger mix and the airport's reaction affected new entry. Latter may be constrained by the regulatory framework and has clear policy implications. Our study provides some lessons for airports to use in planning for the de-hubbing contingency, and the methodology for addressing the price-frequency trade-off.

6 CONCENTRATION AND PRICE EFFECTS OF LUFTHANSA MERGERS: A DYNAMIC COMPETITIVE ASSESSMENT

"Ronald [Coase] said he had gotten tired of antitrust because when the prices went up the judges said it was monopoly, when the prices went down they said it was predatory pricing, and when they stayed the same they said it was tacit collusion" (Landes, 1983).

6.1 INTRODUCTION

Chapter **6** analyzes four Lufthansa (LH) mergers that occurred between 2005 and 2009. The storyboard of the takeovers could be summarized as follows (see the table below). LH and its partner airlines' goal (1) was to keep and profitably improve their market position by increasing their network and decreasing costs. The investigation found that Lufthansa could increase its network and keep its position as a market leader on the relevant routes. The following table shows the key parties, their conflicting aims and the results from this chapter of the Lufthansa merger wave.

Parties	Conflict	Results
1) Lufthansa and its partners	1a) Increase network	good
	1b) Decrease costs	
2) Lufthansa's competitors	2a) Enter the market failed/satisfact	
	2b) Operate with profit	
3) Consumers	3a) Preserve (or lower) prices assorted	
	3b) Preserve (or increase) service	
4) European Commission	4a) Maintain competition	failed/satisfactory
	4b) Protect consumers	

41. The storyboard of the airline mergers

Source: own figure

LH's competitors (2) also aimed at profitability, but on a different level since, in the presence of a more dominant rival, they worried that they could no longer operate profitably and would have to leave the market. The analysis provides evidence that several market exits were directly caused by LH's improving market share. Evidence about entering a LH-dominated market is rather limited. Consumers (3) were in conflict with the airlines' aim of increasing profits, since consumers prefer that airfares remain the same (or decrease) and airlines maintain (or improve) services, thus quality.

The study found evidence that there was a disproportionally high increase in net airline ticket prices on LH-dominated routes. Service quality might have increased, but it is difficult to trade-off with higher prices. The EC (4) tried to maintain competition but, in line with the *consumer surplus* approach, it also wanted to protect consumers from price increases. The EC imposed remedies to reduce entry barriers and stimulate competition on the routes where the merged entity would otherwise have market power.

Four LH takeovers affected 21 overlapping city pairs (see the figure below) where the merger could have led to a monopoly situation. Lufthansa especially gained market power on those routes, which are defined as relevant markets and central to the analysis.

SWISS (LX) 2006-2009	Eurowings (EW) 2006-indefinite		Brussels (SN) 2010- ¹⁷⁸	Austrian (OS) 2010- ¹⁷⁹
from	from	from	from	from
Zurich ZRH	Vienna VIE	Stuttgart STR	Brussels BRU	Vienna VIE
Frankfurt FRA (5)	Cologne CGN (3)	Dresden DRE (2)	Munich MUC (3)	Frankfurt FRA (5)
Munich MUC (5)	Stuttgart STR (2)		Hamburg HAM (3)	Munich MUC (4)
Dusseldorf DUS (4)			Frankfurt FRA (2)	Brussels (4)
Hamburg HAM (4)			Zurich ZRH (2)	Stuttgart STR (3)
Vienna VIE (4)				Cologne CGN (3)
Berlin TXL (3)				
Copenhagen CPH (3)				
Hanover HAJ (2)				
Stockholm ARN (2)				
Warsaw WAW (2)				
Bucharest OTP (1)				

42. Relevant markets: city pairs in the recent Lufthansa takeovers

Source: airline merger decisions; daily slot surrenders are in parentheses

The structure of Chapter **6** is as follows. Section **6.2** will introduce two trends in LH's competitive environment: takeover and bankruptcy. This section provides an overview of Lufthansa's enlargements and related remedies: slot surrenders, frequency and price freezes.

The relevant routes will be classified into four groups: (1) Lufthansa monopoly, (2) Germanwings dominance, (3) LCC competition, and (4) Flag cooperation. A fifth group, called (5) 'No regulation' contains the 36 routes that were investigated without remedies by the EC during the LH merger decisions.

Section **6.3** will compare the post-merger route concentration in the form of market share development of the Lufthansa Group, new entries. After controlling for slot remedies, frequency and price freeze remedies, the study found only a few examples on relevant routes where the EC's remedies have worked. This section shows that remedies had no significant effect on market structure.

¹⁷⁸ During eight IATA seasons (4 years) for FRA, four seasons for MUC and ZRH, and two seasons for HAM.

¹⁷⁹ The utilization periods are eight IATA seasons for Frankfurt, and two seasons for the other routes.

The descriptive analysis¹⁸⁰ in Section **6.4** will detect strategic behavior by incumbent airlines in order to ensure market share, while Section **6.5** will investigate monopoly pricing. This part of the thesis will concentrate on capacity and frequency changes, and analyze ticket price and yield developments. I will introduce Air Berlin's pricing strategy when entering a route, Lufthansa's (predatory) reaction to entry, the effect of AB's competition on prices and the effect of AB's exit. In sum, the aim of Chapter 6 is to analyze remedies and market power.

For the analysis, I used time series panel data kindly provided by our project partner, the German Aerospace Center (DLR).¹⁸¹ The dataset contains monthly schedule and segment passenger data from 2002 to 2014 for all 21 plus 36 city pairs assessed by the EC. The table below summarizes the data used in this chapter. In addition to the given dataset, the analysis calculated market share of the merged entity (based on seat capacity) and the weighted net average segment fare.¹⁸²

43. Dataset: airline schedule and price data

Schedule Data (all relevant routes from January 2002 –June 2014)
a) Origin and Destination
b) Operating and Marketing Airline
c) Fleet, Equipment Capacity; Total Capacity per Month
d) Load Factor
e) Departure and Arriving Time; Flight Duration, Year and Month
f) Starting and Discontinued Date; Days of operation during the week
g) Distance (km)
h) Departure Count (frequency per month)
i) Number of Passengers (segment and all)
j) Passenger Revenue in \$ (segment and all)
k) Average Fare in \$ (segment and all)
 Yield in ¢ /mile (segment)
m) Cabin Class (hub-to-hub connections, 3 years data)

Source: own table

¹⁸⁰ Future research could compare the application and significance of statistical methods, such as fixed-effects and differencein-difference analysis. These methods lie beyond the framework of this PhD thesis.

¹⁸¹ I would like to thank DLR for enabling me to do the data analysis.

¹⁸² The net average segment fare is an estimated one-way average ticket price without airport and other additional fees. The estimation calculates an average price based on the number of airline tickets sold in six cabin class categories on a given flight. The segment fare includes only the part (the 'segment') of the full net ticket price that was applied in the relevant markets. Thus, if somebody were to fly from Zurich to New York via Frankfurt, the segment ticket price would only include the price paid for the ZUR-FRA connection. I disregarded all data if fewer than 10 passengers a month were on a flight.

6.2 LUFTHANSA'S COMPETITIVE ENVIRONMENT: FROM RIVALS AND PARTNERS TO MEMBERS OF THE LUFTHANSA GROUP

"There is no better way to fly" – Lufthansa's slogan (2000-2012)

Lufthansa took over five airlines in five years. All those airlines had financial problems except Eurowings (Air Transport World, 2005); LH already held a 49 percent share in Eurowings (EW) before the merger in December 2005. LH also owned a 30 percent minus 1 share in bmi British Midlands (BD), when the full takeover occurred in May 2009. Their alliance partner, Austrian Airlines (OS), also suffered from financial difficulties and announced its privatization. Lufthansa already had a long-running partnership with both EW and BD (e.g., one could only book EW flights through Lufthansa).

The SWISS (LX) and the Brussels Airlines (SN) cases are similar to each other because both were independent of Lufthansa (no existing partnership) and both were descendants of former flag carriers: Switzerland (SWISS after Swissair) and Belgium (Brussels Airlines after Sabena), respectively. Swissair and Sabena merged in 1995, went bankrupt in 2001 and were reorganized in 2002. After a few years, however, both airlines entered into a second insolvency. The following table summarizes the main features of the takeovers. The data shows the latest available company information before the takeover.

Mergers	Date	LH's shares (%)	EBITDA (€ m)	Aircraft	Passengers (million)
LX	July 4, 2005	0 to 49 (100 by July 2007)	93	84	9.2
EW	Dec. 22, 2005	49 to 50 (+ 1 share)	14.8	23	7.7
BD	May 14, 2009	30 to 80 (100 by 2010: sold in 2011)	-78	53	3.8
SN	June 22, 2009	0 to 45 (option to 100 by 2011)	-40	51	3.4
OS	Aug. 28, 2009	ca. 43.44 to 85	-294	102	10

44. Facts about the Lufthansa takeovers

Source: EC decisions and Financial Times Deutschland (2011)

The next section briefly summarizes the five Lufthansa takeovers, describes the imposed remedies caseby-case and provides background information about merger processes.

6.2.1 LUFTHANSA TAKEOVERS WITH REMEDIES

The LH/SWISS merger had a specific reason for its creation: **SWISS** (LX) entered its second bankruptcy after restructuring efforts failed. Lufthansa took advantage of the opportunity to expand traffic flows and hub structure. The full integration of LX (by July 2007) into the Lufthansa Group affected 563 weekly services between Germany and Switzerland. Before Lufthansa bought 100 percent of LX (M. 3770, 2005), the Swiss airline had aimed to join the Oneworld alliance. Its hub airport in Zurich is a slot-coordinated airport with high barriers to entry for new airlines.

After analyzing the 64 common city-pair markets, the EC had serious concerns. The merger would lead to a monopoly on 11 routes: from Zurich airport to Frankfurt, Munich, Berlin, Dusseldorf, Hamburg, Hannover, Stockholm, Copenhagen, Vienna, Warsaw and Bucharest. Therefore, slots had to be given up for newcomers at Zurich airport between 2006 and 2009. Further, the merged entity could not increase prices between August 2005 and April 2006 (price freezing) on any of those routes. On the Stockholm and Warsaw routes, the published fare also had to be reduced (price reduction remedy) every time the airline decreased fares on comparable routes (determined by the EC) up until the time when a new airline began serving the route.

Lufthansa increased its shares in **Eurowings** (EW, the 100 percent owner of Germanwings). It had previously owned 49 percent of EW¹⁸³ (M. 3940, 2005). LH and EW already had many common routes, so the EC found that only three city pairs were threatened by potential market power.¹⁸⁴ The only 'rival' was the alliance partner, Austrian Airlines. The EC introduced slot remedies from 2006 that would run indefinitely, and also imposed price freezing remedies from January to November 2006 on all those routes.

The **bmi** (BD) merger in 2009¹⁸⁵ was a "must-takeover" (M. 5403). LH also acquired the remaining 20 percent from SAS Scandinavian Airlines and became the sole owner of BD (Financial Times, 2009). No slot remedies were imposed in the LH/bmi case, but the process and the results of the takeover are interesting.¹⁸⁶

¹⁸³ Lufthansa received 24.9 percent of the Eurowings shares in January 2001, and acquired another 24.1 percent of shares in September 2001 (Bundeskartellamt, 2001). Interestingly, the EC differentiated between the point-to-point and connecting markets; however, the German Competition and Regulation authority "Bundeskartellamt" did not in 2001.

 ¹⁸⁴ From Vienna to Cologne and to Stuttgart; as well as from Stuttgart to Dresden; only for time-sensitive business passengers.
 ¹⁸⁵ This section is based on our book chapter Fröhlich et al. (2013) and is therefore mainly identical to the original text.

¹⁸⁶ After bmi chairman Sir Michael Bishop exercised his option to sell his shares to Lufthansa in October 2008, Lufthansa bought 50 percent plus one share in the loss-making British airline. Lufthansa did not want to pay the high price (£298m) agreed to in a contract in 1999, but Bishop resorted to the High Court. In an out-of-court settlement, Lufthansa agreed to pay Bishop £175m to give up his option and to pay £48m for the bmi shares. In comparison, Lufthansa paid £91.4m for a 20 percent share package in bmi in 1999. Stephan Gemkow, Lufthansa's chief financial officer, commented on the purchase: "There are options that put us in the position to acquire the majority of BMI over a foreseeable timeframe. We are determined to exercise these options. Beyond that there is no need to hold talks" (The Telegraph, 2008). The quote shows that the airline did not expect substantial synergies.

Lufthansa took full ownership of bmi and obtained 11 percent of all of the slots at London Heathrow, becoming the second largest airline at the airport and improving its position in the capacity constrained market. The takeover strengthened bmi's position in the Middle East as well (Lufthansa, 2010).

The EC had no objections concerning the possible anticompetitive effects of the merger (M. 5403). Lufthansa's former CEO, Wolfgang Mayrhuber, argued that due to the multiple hub strategy, passengers would have higher network quality, more choices and increased flexibility (2009). However, bmi's operating profits (EBIT) have been negative¹⁸⁷ since 2007 and LH sold the airline in April 2012 (Lufthansa, 2012).

Only a few weeks after the bmi deal, the EC permitted Lufthansa to take over **Brussels Airlines** (SN) (M. 5335, 2009). The evaluation of the affected routes found that the merger would lead to significantly less competition in four city-pair markets. The merging airlines should have made ten daily slots available for new entrants at Brussels airport: three to Munich, three to Hamburg, two to Frankfurt and two to Zurich.

KLM/Air France announced its intention to take over **Austrian Airlines** (OS) in 2008, but surprisingly withdrew from the deal. Only Lufthansa made a bid (with a negative price).¹⁸⁸ Previously, in July 2002, the EC had allowed an alliance agreement¹⁸⁹ between OS and LH to run until the end of 2005 (COMP/37.730, 2002). The alliance agreement created a quasi-merger (including revenues and cost sharing derived from joint services) in the Austria/Germany market (Németh & Remetei-Filep, 2010).

In summary, the financial problems of otherwise-failing airlines initiated the Lufthansa takeovers. LH had successfully applied the first mover advantage and became the strongest competitor on the 21 investigated relevant markets. Driven by the fear that LH would become too strong and abuse its market power, the EC launched undertakings (see the table below).

¹⁸⁷ Bmi experienced a slow recovery after selling Heathrow slots for £100m and reducing the total number of slots from 87 to 66.Loss-making routes were immediately cancelled after the merger, so the capacity was cut by 20 percent in 2009. All in all, the annual synergy potentials would have been €20m. Nevertheless, the airline reported net losses of €78m in 2009 and €268m in 2010 and the first half of 2011 combined. Bmi's operating margin dropped to minus 26 percent in the first half of 2011 (Morgan Stanley Research, 2010).

¹⁸⁸ The EC doubted whether the price paid for Austrian Airlines (€366,269) and a €500m grant received as state aid from Austria reflected the market price. They also doubted whether the sale was truly open, transparent and unconditional. Nonetheless, the merger was approved (M. 5440, 2009).

¹⁸⁹ In its authorization (after refusing it a year before), the European Commission imposed conditions and obligations to maintain competition (e.g., slot surrender at congested airports; frequencies freeze; mandatory price cuts; blocked space and interlining agreements with new entrants or intermodal agreements with railways). The EC concentrated its efforts only on those markets where the parties' activities were of a parallel nature and the remedies aimed to remove barriers to entry (Németh & Remetei-Filep, 2010).

	Remedy Table		200)4	200)5	200	6	20	07	20	08	20	09	20	10	20	11	20	12	20	13
Nr.	Frequency free	eze (ff)																				
	Price freeze (p	f)																				
	Price reduction	ר (pr)	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W
1	ZRH-FRA	ff at 11			pf	pf	5	5	5	5	5	5										
2	ZRH-MUC	ff at 10			pf	pf	5	5	5	5	5	5										
3	ZRH-DUS				pf	pf	4	4	4	4	4	4										
4	ZRH-HAM				pf	pf	4	4	4	4	4	4										
5	ZRH-VIE				pf	pf	4	4	4	4	4	4										
6	ZRH-TXL				pf	pf	3	З	3	З	З	3										
7	ZRH-CPH				pf	pf	3	З	3	З	З	3										
8	ZRH-HAJ				pf	pf	2	2	2	2	2	2										
9	ZRH-ARN	pr			pf	pf	2	2	2	2	2	2										
10	ZRH-WAW	pr			pf	pf	2	2	2	2	2	2										
11	ZRH-OTP				pf	pf	1	1	1	1	1	1										
12	VIE-CGN	ff at 3				pf	pf	З	3	З	З	3	З	З	3							
13	VIE-STR	ff at 5				pf	pf	2	2	2	2	2	2	3	3							
14	STR-DRS	ff at 5				pf	pf	2	2	2	2	2	2									
15	BRU-MUC													3	3	3	3					
16	BRU-HAM													3	3							
17	BRU-FRA													2	2	2	2	2	2	2	2	
18	BRU-ZRH													2	2	2	2					
19	VIE-FRA													5	5	5	5	5	5	5	5	
20	VIE-BRU													4	4							
21	VIE-MUC													4	4							

45. Lufthansa's merger remedies from 2006 to 2013

Source: own figure, based on EC decisions

The aim of these remedies was to limit market power by facilitating entry (e.g., *slot remedies on 21 routes*), to prevent possible anticompetitive behavior by prescribing behavior after new entry (e.g., *"ff" frequency freezing on five routes*) and to ensure that synergies from the merger would be passed on to consumers and would not result in price increases (e.g., "*pf" price freezing on 14 routes and "pr" price reduction on two routes*). The table above illustrates the merger remedies imposed in the Lufthansa takeovers. The slot remedy periods are highlighted in gray and refer to daily slots. S stands for summer, while W stands for winter.

These remedies are the crucial points of my analysis in this chapter. Section **6.3** will show that the EC's remedies were not successful. Since there were very few new entries on the relevant routes, concentration increased and opened up opportunities to abuse market power.

6.2.2 MARKET STRUCTURE ON THE RELEVANT ROUTES

The figure below illustrates the groupings of the relevant markets based on the type of competition. The first row includes the relevant overlapping routes from the 2005 decisions, while the second row completes the city-pair markets from the 2009 takeovers. According to this classification, the mergers led to LH's monopoly on seven routes (first group), almost all of them hub-to-hub connections. The second group consists of three dominant (over 70 percent market share) routes of LH's own LCC, Germanwings. The third group contains seven routes on which Lufthansa only faced competition from an LCC: Air Berlin (AB) in 2005 and NIKI (also part of AB) in 2009. This group also has three hub-to-hub connections. The fourth group combines four rather small routes where Lufthansa cooperated with flag carriers: two in northern Europe and two in Central Eastern Europe.



46. Groupings of the Lufthansa cases by type of competition

Source: own table

Finally, the fifth group compares yield developments on routes investigated by the EC, which were, in the absence of high concentration, not regulated with remedies. The aim of the classification is to highlight the differences in yield depending on the level of concentration, and to distinguish the effects of remedy regulation. The following table provides an overview of the 21 relevant routes (groups 1 through 4) compared to the 36 less concentrated ones (group 5).

Origin (O)	Destination (D) Relevant route destination (21)	Destination (D) investigated by the EC without regulation (36)						
Zurich ZRH	Frankfurt FRA	Nuremberg NUE						
	Munich MUC	Berlin Schönefeld SXF						
	Dusseldorf DUS							
	Hamburg HAM							
	Vienna VIE							
	Berlin Tegel TXL							
	Copenhagen CPH							
	Stockholm ARN							
	Warsaw WAW							
	Bucharest OTP							
	Hanover HAJ							
Basel BSL	-	Berlin airports ¹⁹⁰						
		Hamburg HAM						
		Dusseldorf DUS						
		Munich MUC						
Geneva GVA	-	Dusseldorf DUS						
		Munich MUC						
		Frankfurt FRA						
Vienna VIE	Frankfurt FRA	Berlin airports						
	Brussels BRU	Dusseldorf DUS						
	Munich MUC	Hamburg HAM						
	Stuttgart STR	Hannover HAJ						
	Cologne CGN	Nuremberg NUE						
		Zurich ZRH						
Brussels BRU	Munich MUC	London airports ¹⁹¹						
	Hamburg HAM	Berlin airports						
	Frankfurt FRA	Basel BSL						
	Zurich ZRH	Geneva GVA						
		Milan airports ¹⁹²						
		Florence FLR						
		Naples NAP						
		Porto OPO						
		Krakow KRK						
Cologne/Bonn CGN	<u>-</u>	Berlin airports						
0		Leipzig AOC						
		Munich MUC						
		Paris CDG and ORY						
		London airports						
Stuttgart STR	Dresden DRS	Berlin airports						
~		Dusseldorf DUS						
		Hamburg HAM						
		London airports						
Berlin airports	-	Munich MUC						
*		Dusseldorf DUS						
Hamburg HAM	-	London airports						
~								

47. Origin and Destination routes in the data sample

Source: own table

¹⁹⁰ Berlin airports include Tegel TXL and Schönefeld SXF.
¹⁹¹ London airports include London City LCY, London Gatwick LGW, London Heathrow LHR and London Stansted STN.
The data sample excludes London Luton, since there were no Lufthansa services to that airport.
¹⁹² Milan airports are MXP, LIN and BGY.
The revenue passenger emplacements differ from route to route. The first and the third groups had significantly more passengers; those two groups contain all the hub-to-hub connections, so many transfer passengers.¹⁹³ The second group consists of middle-strong routes concerning revenue passengers, while the fourth group contains rather thin routes. The figure below illustrates the differences in route specialties.



48. Revenue passengers on the relevant routes by groupings, 2004, annual

Before looking at the schedule data over 10 years of operation on the relevant markets, a few important observations must be made. First, we need to define the Lufthansa Group (LHG). Lufthansa's own webpage ¹⁹⁴ lists six airlines as members of the LHG: Austrian Airlines, Brussels Airlines, Germanwings, JetBlue,¹⁹⁵ Lufthansa Regional and SWISS. However, there are considerably more airlines that fly on behalf of Lufthansa. For example, if the LHG only sells (thus 'markets') a flight, it is called the marketing carrier and the (code-share) partner airline that actually operates the flight is called the operating carrier.

Therefore, on the relevant routes, the following carriers should be included in the LHG: Eurowings, Lufthansa CityLine (CL), Tyrolean Airways (VO), Lauda Air (NG), Edelweiss (WK), Flybe (BE), bmi (2009 through 2011), Helvetic Airways (2L; from 2011), Augsburg Airways (IQ; until 2012), Contact Air (C3; until 2012) and Cirrus Airline (C9; until 2012).

¹⁹⁴ www.lufthansa.com [Accessed on October 28, 2014].

Source: own figure, based on DLR data

¹⁹³ The differentiation between Origin and Destination (O&D) and transfer passengers is important for two reasons. First, network effects of mergers are more significant on routes where the share of transfer passengers is high. Second, segment ticket prices differ on routes with higher transfer passengers share.

¹⁹⁵ JetBlue does not operate services in Europe, so it is not relevant to our analysis.

IQ on beha	lf of LH	ł		IQ: pur	chase	d by CS)					Jan: IQ	and C	9 are insolvent, exit			
BE on beha	lf of SI	N						WK: purchased by L	Х		2L op	erates 3	3 aircra	fts on behalf of LX			
C3 on beha	lf of LH	ł			July: L	H/LX n	nerger	: LH's shares up to 1	L00%								
C9 on beha	lf of LH	ł			Dec: L	H/EW	merge	r: LH's shares in EW	abov	/e 50%	'n						
CL on behal	lf of LH	ł							May:	LH/bn	ni take	eover:	LH's sh	ares in bmi up to 100%, no reme	dies		
VO on beha	lf of O	S		Apr: LH	√s sha	res in l	EW up	to 49%	June LH/SN merger: LH's shares in SN up to 45% with sole control								
			4	4U was	s found	ded as	100% s	subsidiary of EW	Aug:	LH/OS	taked	over: LH	l's shar	res in OS up to 85%			
			C3 bec	ame p	art of I	LH Reg	ional		Jan: 4	U: 100	% pur	chased	by LH				
			NG fou	inded a	as a su	ıbsidiaı	ry of O	S				Apr: Ll	H sold I	bmi 100% to BA			
before 200	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2	014		
			Nov: H	G was	found	ed						CY: sta	ite aid i	investigation by the EC			
			J	Jan: Al	B's sha	res up	to 249	% in HG	Aug:	NE is i	nsolve	ent, exi	t				
						Aug: D) purc	hased by AB				Sept: C	3: purc	hased by OL			
							Apr: D	I brand became AB					Jan: C3	and OL are insolvent, exit			
							Aug: L	T: 24 aircrafts purcl	hased	by AB	, no r	emedie	s				
								LT brand became AB	3								
								Nov: DI's exit									
									Nov:	X3: 14	aircra	afts on	behalf	of AB			
										AB's s	hares	up to 4	49.9% i	n HG, no remedies			
					DM m	erged v	with NE	3			Nov:	AB's sh	ares u	o to 100% in HG, no remedies			
								Oct: DM and NB ar	e inso	lvent		Nov: H	G bran	d became AB			
			2L was	found	led as	a LCC		Dec: DM and NB are	e taker	n over	by QI	under t	he nam	e Cimber Sterling			
						2L has	financ	ial problems, new C	EO			May: 0	QL is in	solvent, exit			
								. ,				,					
							X3 was	s founded as a follow	ver of	Нарая	-Llovd	and H	F				
										1.00	, /-						

49. Takeovers, partnerships and insolvencies in the relevant markets from 2000 to 2014

Source: own figure

The figure above illustrates Lufthansa's partner airlines (above the timeline) and competitors (below the timeline). Air Berlin had been the most significant rival; it was quietly (without EC investigations) but continuously increasing parallel to the LH mergers. Air Berlin increased its shares in NIKI (HG) in 2004 (up to 24 percent), in 2010 (up to 49.9 percent) and finally in 2011 (up to 100 percent). Air Berlin also took over dba (DI) and LTU (LT). A common feature of these cases is that shortly after the mergers, Air Berlin painted all the aircraft with its own brand. While dba and LTU were broken up, NIKI was still operating in 2014.

Many of the smaller competitors announced insolvency during the last ten years; most of them went insolvent after unsuccessful takeover attempts. For example, Maersk Air merged with Sterling in 2005 and was taken over by Cimber Air after insolvency in 2008. Cimber Sterling later declared bankruptcy and left the ZRH-CPH market in May 2012. SkyEurope was broken up and exited the VIE-BRU route in August 2009.¹⁹⁶

¹⁹⁶ The bankruptcy of SkyEurope (NE) in August 2009 led the LHG to develop a monopoly on the VIE-BRU route (compared to an 80 percent market share at the beginning of 2008). The offered seat capacity decreased by 18 percent from 2008 to 2009, whereby the exit of NE was only responsible for minus 4 percent. The capacity has not recovered in the following years. The exit of the LCC (due to bankruptcy) on the VIE-BRU route had no effect on the LHG's prices. Lufthansa had no interest in expanding and gaining the previous SkyEurope passengers, probably because of the LCC airline's price sensitivity.

The previously independent but not financially prosperous Helvetic Airways has been operating over 40 percent of its capacity on behalf of SWISS since 2011. Shortly after the new contract with Helvetic, Augsburg Airways and Cirrus Airline (merged in 2004) both went bankrupt in January 2012. After Contact Air lost the contract with LH Regional, it was taken over by OLT Express (OL) in September 2012 and again announced insolvency¹⁹⁷ in January 2013.

In sum, it seems that Lufthansa provides an invisible shelter for smaller carriers. A partnership with LH gives them the possibility to survive. Losing the contract, on the other hand, might lead to a bankruptcy.

In relation to Lufthansa, none of the remaining flag carriers were successful between 2004 and 2014 (see Sections **6.3.1** and **6.5.3**). The Romanian flag carrier, SkyTeam member Tarom (RO), first entered the Zürich-Bucharest route in 2009 and promptly left in 2011.

LOT (LO) has been losing market shares on the Zürich-Warsaw route since the LH/SWISS takeover in 2005. LO disappeared from the schedule in winter 2013 and winter 2014. The Polish flag carrier has also had financial problems and was investigated for state aid by the EC. The Star Alliance partner is not a competitor to Lufthansa.

SAS (SA), the likewise alliance member Scandinavian Airways, has been suffering from losses and saving programs during the last years and was considered to be taken over by LH (airliners.de, 2013). SA and LH already have a code-share agreement.

¹⁹⁷ The exit of OLT Express was rather adventurous, since its mother company (OLT Express Poland) was arrested in a \in 80m deception process. The owner of the airline, Marcin Plichta, was also the owner of Amber Gold, a famous gold dealer in Poland that was indicted for money laundering in summer 2012 (WirtschaftsBlatt, 2012). Even managers from Contact Air were ordered to a three-day pre-trial detention (private talk with an ex-manager).

6.3 THE EFFECT OF REMEDIES ON MARKET STRUCTURE

"What mattered was getting a fair shot as an entrepreneur, and having choice and receiving a fair deal as a consumer" Fox and Sullivan (1987, p. 944) on the Harvard School's impact on antitrust.

Slot surrenders did not achieved their aim, since the LHG's market share remained high and there were no sufficient new entries. The following table shows the structure of the analysis of airline merger remedies in the Lufthansa cases, their classification and the evidence found during the data investigation in the period from 2004 to 2013. Since there were no remedies in the fifth group, this section only describes the findings for groups 1, 2, 3 and 4.

Type of remedies	Evidence that the remedy did not work	Section	Res	ılts in	grou	ps
			1	2	3	4
Slot remedies	a) LH's market share remains high	6.3.1		Va		
	b) Insufficient entries			168	\$	
Frequency freeze	c) LH increased seat capacity instead	6.3.2	Y	es	-	
Price freeze	d) Average prices have partially risen despite the		Yes	Yes	No	-
	remedy – no robust result					

50. The structure of the dynamic competitive analysis on merger remedies

Source: own table

Section **6.3.1** will focus on slot remedies. A summarizing table in each group will illustrates the maximum number of possible entries (counted in daily frequencies) and the real entries (or frequency expansions by the rival airline) and exits. The first group (mainly hub-to-hub routes where the LHG had a dominant position) provided only three new daily frequency entries instead of the 110 expected by the EC. In the second group (dominated by Germanwings), 5.28 new daily frequencies were launched during the EC remedy investigation period instead of the maximum possible 54. There have been no new entries in the third and fourth groups.

Section **6.3.2** will then describe behavioral remedies imposed in the SWISS and Eurowings cases.¹⁹⁸ In order to prevent strategic behavior, the EC also introduced frequency and price freezes. Lufthansa did not deviate from frequency freeze remedies, but increased seat capacity instead, which had a similar effect: to foreclose competitors by building up overcapacity and better quality of supply, which might reduce the demand for newcomers' products (Fichert, 2013). In part, average prices rose despite price freezes. The Lufthansa Group might have deviated from the EC's prize freeze remedy rules on four routes: ZRH-MUC, VIE-CGN, VIE-STR and STR-DRS. The remedies only worked conditionally.

¹⁹⁸ Behavioral remedies are supposed to work as a safeguard against predatory behavior. Since these rulings were not constructive enough, the EC has not introduced them in merger cases after 2005.

6.3.1 DID THE SLOT REMEDIES WORK? ENTRY AND MARKET SHARE INVESTIGATION

6.3.1.1 Group 1) Lufthansa monopoly

I will start the analysis with the routes where Lufthansa Group operated a quasi-monopoly after the takeovers. These are ZRH-FRA and ZRH-MUC (after the SWISS merger), and BRU-MUC, BRU-HAM, BRU-FRA, BRU-ZRH and VIE-BRU (after the Brussels and Austrian Airlines mergers). With the exception of BRU-HAM, all these relevant routes are hub-to-hub connections, so particularly important for the merging airlines. The next table shows the new entries within and outside the remedy periods.

2006		2007		2008		2009		20	10	20	11	20	12	20	13
S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W
5	5	5	5	5	5										
3.07	0.12	Exit													
5	5	5	5	5	5										
							3	3	3	3					
							3	3							
							2	2	2	2	2	2	2	2	
							2	2	2	2					
							4	4							
		1.02	1.69	0.92	0.99	0.71	Exit								
	2006 S 5 3.07 5	2006 S W 5 5 3.07 0.12 5 5	2006 2007 S W S 5 5 5 3.07 0.12 Exit 5 5 5 .007 0.12 Exit 5 5 5 .012 Exit 100 .011 .012 Exit .011 .012 .012 .011 .012 .012 .011 .012 .012	$\begin{array}{c c c c c c c c } 2006 & & 2007 \\ \hline S & W & S & W \\ \hline S & 5 & 5 & 5 \\ \hline 3.07 & 0.12 & Exit & \\ \hline 5 & 5 & 5 & 5 \\ \hline & & & & \\ \hline 5 & 5 & 5 & 5 \\ \hline & & & & \\ \hline & & & & \\ \hline & & & & \\ \hline & & & &$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

51. The result of the slot remedies on the LH monopoly routes - new entries

Source: own table

LH and LX had a monopoly on the ZRH-FRA route until April 2006. Air Berlin entered in summer 2006; that was the only significant entry, but it was for only one IATA period. There was no entry on the ZRH-MUC route during the remedy periods.¹⁹⁹ SN and LH (including CL, IQ and VO) operated a monopoly on the BRU-MUC and BRU-HAM routes in the investigated time period (2002 to 2014).²⁰⁰ The BRU-FRA route remained a monopoly.²⁰¹ There have been no other competitors on the BRU-ZRH route since 2004.²⁰² The VIE-BRU route had LCC competition until the bankruptcy of SkyEurope (NE) in summer 2009.²⁰³

¹⁹⁹ On a code-share basis, Air Mauritius (MK) carried out a few flights in winter 2008 on the ZRH-FRA route. On the ZRH-MUC route, Cyprus Airways (CY) first reached the 0.1 daily frequency border in 2012.

²⁰⁰ Though Flybe (BE) entered the BRU-HAM route in 2012 and achieved a 27 percent market share by the end of 2013, it was only an operating airline (on behalf of SN Brussels as marketing carrier).

²⁰¹ However, it was partially (0.14 to 0.44 daily frequencies) weakened by Ethiopian Airways (ET) between winter 2007 and summer 2010. This must have been a code-share agreement, but it was not signed as a code-share in the database. Another interesting fact on this route is that 90 busses were operating in winter 2010/2011.

²⁰² Though WK Edelweiss and 2L Helvetic airlines appeared in 2012 and in 2013 with a combined 15 percent market share, both airlines fly for LX.

²⁰³ Ukraine International (PS) entered the route the following summer, but only for three months (without the sign of codeshare, again). With 0.25 daily frequency (accumulated for one IATA period), it was the only entry during the remedy periods related to the 2009 Lufthansa mergers.

The next figure focuses on the core years of the mergers. As we can see, AB's entry into ZRH-FRA had only a one-year short-run effect. Also, since both Eurowings (EW) and Augsburg Airways (IQ) belong to the LHG, there was no competition here.



52. Market share development on the ZRH-FRA and the ZRH-MUC routes

6.3.1.2 Group 2) Germanwings dominance

The next groups of interest are the routes where Lufthansa has a monopoly due to its LCC, Germanwings (4U). Both the EC²⁰⁴ and the German competition authority (Bundeskartellamt, 2001) have investigated the common routes served by LH/Eurowings. The EC found that the VIE-CGN, VIE-STR and STR-DRS routes were in danger of being dominated by LH/Eurowings and imposed remedies (from W 2006 until the end of S 2009).

One could say that, at first sight, the remedies did not work, since four years later (in the LH/Austrian Airlines takeover in 2009, M. 5440) the EC still found that the VIE-CGN and VIE-STR routes were still not competitive enough. The EC once again imposed slot and frequency freeze remedies (from W 2009 until S 2010).

New entries / exits	200	6	2007		2008		2009		2010	
Utilization Period	S	W	S	W	S	W	S	W	S	W
VIE-CGN		3	3	3	3	3	3	3	3	
AB							0.53	1.7	Exit	
VIE-STR		2	2	2	2	2	2	3	3	
AB			1.16	1.57	0.32	Exit				
STR-DRS		2	2	2	2	2	2			

53	The result of the sl	ot remedies on the	HICC mon	noly routes _	_ new entries
55.	The result of the si	ot remeates on the	е сп ссс шон	opoly routes -	- new entries

Source: own table

Source: own figures

²⁰⁴ The EC decision is only available in German.

TUIfly (X3) entered the VIE-CGN route for two months in summer 2009 with 1.6 daily frequencies (equals 0.53 daily frequencies for one IATA period), while Air Berlin took over the TUIfly City Carrier with 13 airplanes. Air Berlin launched a new service with an average of 1.7 daily frequencies in winter 2009/2010, but it suddenly left the route in July 2010. AB also entered the VIE-STR route in May 2007. However, it left after 13 months of operation.

Since 2006, 4U has had a monopoly on STR-DRS, while it shares the market with Tyrolean Airways (VO) on the other two Vienna routes. Since VO belongs to Austrian Airlines, which was also taken over by LH in 2009, there has been no competition on any of these routes.

6.3.1.3 Group 3) LCC competition

The third group contains the routes on which the merged entity, Lufthansa Group, merely competed with Air Berlin or NIKI (an LCC airline in AB's interest). The appraisal consists of two parts: five Zurich routes related to the SWISS takeover in 2005, and two Vienna routes related to the Austrian Airlines merger in 2009.

New entries/ exits	2006		2007		2008		20	09	20	10	20	11	20	12	20	13
Utilization Period	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W
ZRH-DUS	4	4	4	4	4	4										
ZRH-HAM	4	4	4	4	4	4										
AB	0.28	0.44	1.02	0.63	1.18	0.69								Exit		
ZRH-VIE	4	4	4	4	4	4										
ZRH-TXL	3	3	3	3	3	3										
AB	0.31	0.52	0.68	0.9	1.34	1.12										
ZRH-HAJ	2	2	2	2	2	2										
AB												Exit				
VIE-FRA								5	5	5	5	5	5	5	5	
JP												Exit				
VIE-MUC								4	4							

54. The result of the slot remedies on the AB competition routes - new entries

Source: own table

During the remedy period from summer 2006 until winter 2008, Air Berlin slightly expanded its frequency on the ZRH-HAM and ZRH-TXL routes.²⁰⁵ There were no significant new entries²⁰⁶ on the routes in this group.

²⁰⁵ There were no services to the other Berlin airport, Schönefeld (SXF), in the investigated period (2004 to 2014). Only Avion Express (X9), a Lithuanian airline, carried around 700 passengers in summer 2012.

²⁰⁶ Cyprus Airways (CY) briefly entered the ZRH-VIE route with a total of 23 frequencies when NIKI stopped operations for four months in October 2007. Korean Air (KE) also appeared in the 2008 winter schedule with an average of 0.37 daily frequencies as the operating and marketing carrier; this must have been a code-share instead. On the VIE-FRA route, Iranian Air (IR), without indicating code-share, appeared in the schedule for nine months (with 0.14 to 0.27 daily frequencies) starting in winter 2012; as did an unknown airline (AQ) in spring 2011 with 9,394 passengers. AQ airline appeared in the VIE-MUC route in the same two months like VIE-FRA, thus April and May 2010 with 4,300 passengers. Delta Airlines (DL) appeared as well for three months in winter 2010; however, these must have been code-share flights. According to the schedule data, Saudi Arabian Airlines (SV), which served a quarter daily frequency before, exited the VIE-MUC route in January 2010.

On the contrary, the only competitor (AB) discontinued services to HAJ in November 2011 and to HAM a year later. Adria Airways (JP), which served the VIE-FRA route with more than two daily frequencies, left in winter 2011. The slot remedies did not work.

After the merger in 2006, AB lost market share in seat capacity on the ZRH-HAM (14 percent), ZRH-HAJ (8 percent) and ZRH-TXL (7 percent) routes compared to the offered seat capacity in 2005. However, it gained market share in seat capacity on the ZRH-VIE (10 percent) and ZRH-DUS (6 percent) routes. By the end of 2014, Air Berlin had left two out of five relevant routes, but slightly improved its market share on the other three routes from Zurich (from 45 to 47 in TXL, from 34 to 42 in DUS and from 20 to 28 percent in VIE).





Source: own figure

Air Berlin was represented by NIKI on two relevant VIE routes in 2009. Though NIKI improved its market share in seat capacity on VIE-FRA from 16 percent in 2009 to almost 22 percent in 2010, this number was continuously decreasing, down to 10.6 percent by the end of 2014.

On the other side, NIKI was able to keep its market share from 2008 to 2014 at around 20 percent on the MUC route. In summary, since all the other smaller competitors left in 2011 and 2012 and no new airline entered, the LHG increased its already dominant position after the takeover.

6.3.1.4 Group 4) Flag cooperation

The fourth group for analysis contains four routes from Zurich airport to European capitals, where the merged entity of Lufthansa and Swiss cooperated with flag carriers. The LHG was represented by LX on all these routes. The merger affected connections to Copenhagen (CPH) and Stockholm (ARN) in northern Europe, and Warsaw (WAW) and Bucharest (OTP) in Eastern Europe. The next table shows that slot remedies, again, did not work; there was no entry within the remedy period.

New entries / exits	2005		20	06	200	07	200	08	2009		2010		2011	
Utilization Period	S	W	S	W	S	W	S	W	S	W	S	W	S	W
ZRH-CPH			3	3	3	3	3	3						
DM	1.3	Exit												
QI												1.08	0.58	Exit
ZRH-ARN			2	2	2	2	2	2						
ZRH-WAW			2	2	2	2	2	2						
ZRH-OTP			1	1	1	1	1	1						
RO									0.19	0.71	0.87	0.68	Exit	

56. The result of the slot remedies on the flag competition routes – new entries

Source: own table

By the time of the merger decision in summer 2005, three airlines were operating on the ZRH-CPH routes: SK, LX and Maersk Air (DM). However, DM left the route immediately after its takeover by LCC Sterling Airlines in September 2005. Three years later, Sterling Airlines announced insolvency and was bought by Cimber in December 2008. Cimber Sterling (QI) relaunched services in winter 2010 for 10 months, but it went bankrupt in May 2012.

LX used to have a monopoly from Zurich to Bucharest (OTP), the capital of Romania, until the Romanian flag carrier entered the route in August 2009, surprisingly first after the remedy period expired. Thus, there were no new entries during the remedy period.²⁰⁷

While there were no entries despite the slot remedies, SK lost market share on both CPH and ARN connections. Scandinavian Airways suffered dramatic losses on the ZRH-CPH route.

²⁰⁷ While it seemed to be a new entry in winter 2007, there were for three months (with an average of 0.88 daily frequencies – adjusted for one IATA period) in which Spanair (JK) operated services on behalf of Scandinavian Airways (SK) as a marketing carrier on ZRH-CPH. Blue1 (KF), a network carrier purchased by the SAS Group in 1998, also operated 0.15-0.27 daily flights on behalf of Scandinavian Airways on the ZRH-CPH and ZRH-ARN routes at the end of 2012 and 2013. Neither JK nor KF were competitors for SK. The ZRH-WAW route had a short entry-exit in the remedy period, when Helvetic Airways (2L) launched new services in winter 2006 for three months and in winter 2007 for five months (first 0.16, then 1.73 daily frequencies). Yet, 2L was not independent of SWISS, thus of the LHG. In summer 2008, when 2L re-entered the market with two daily frequencies, LX dropped its frequency from 3 to 1. Also during the few months in 2007, when 2L provided some connections, it was always part of the three daily LX contingents. Since 2006, Helvetic Airways has also flown on behalf of LX (and plans exclusivity by 2017). Although Cirrus Airlines (C9) appeared on the schedule for one month in 2007, at that time it was already part of Lufthansa. Contact Air (C3) was also listed between 2008 to its insolvency in 2012, but since the airline was part of Lufthansa Regional, it did not compete with LH.

While SK had more than a 75 percent market share in total seat capacity on the ZRH-CPH route in 2004, the year before the Lufthansa/SWISS merger, it dropped down to 50 percent by 2006, the year after the LHG takeover. The trend continued: since 2012, SK has only held a 30 percent market share. On the other side on the ZRH-ARN route, SK was able to keep its market share of about 35 percent until 2011, but it has shrunk by 5 percent since 2012.

LOT Polish Airlines (LO) also lost market share after the SWISS takeover on the ZRH-WAW route. LO suddenly lost 15 percent and its market share in seat capacity dropped down to 25 percent by summer 2006 and could not recover until 2014. The Romanian state-owned carrier had less success on ZRH-OTP. During its two-year operation (2009 to 2011), Tarom (RO) achieved an average market share of 43.5 percent. After the flag carrier left, LX outsourced the connection to Helvetic Airways (2L) in summer 2012 for three IATA periods. It began operating as a monopoly again.

6.3.2 DID THE FREQUENCY AND PRICE FREEZE REMEDIES WORK?

The EC introduced frequency freeze remedies in five cases: ZRH-FRA, ZRH-MUC, VIE-CGN, VIE-STR and STR-DRS. Thus, the merged entity was not allowed to add any more frequencies when a new competitor entered the route (up to three years).

Since there were only three entries apart from Air Berlin and its subsidiary NIKI, I looked at the Lufthansa Group's frequency development on three relevant markets: in 2006 on the ZRH-FRA route, in 2007 on the VIE-STR route and in 2009 on the VIE-CGN route. Frequency freeze remedies aim to prevent building up overcapacity at the incumbent airline. There was no deviation from the frequency freeze remedy on any of these connections, but Lufthansa's sudden strategic capacity increases (instead of forbidden frequency increases) were probably predatory in nature (see Section **6.4.2** on ZRH-FRA and Section **6.4.3** on VIE-CGN).

After the merger with Eurowings, LH closed its two daily frequencies on the STR-DRS route. Germanwings remained a monopoly with the remaining two frequencies, which were continuously reduced during the current investigation period until the end of 2012. Therefore, imposing a frequency freeze remedy on the LHG's five daily connections if there were a new entry seems to be very unrealistic.

The SWISS and the Eurowings takeovers in 2005 included a price freeze remedy on 14 relevant markets, which forbade the *merged entity*²⁰⁸ from increasing *published fares*²⁰⁹ on any relevant markets until the next IATA period when newcomers could enter (summer 2006 on the Zurich routes and winter 2006 on the Vienna routes). With the sole exemption of the ZRH-MUC route, SWISS reduced prices by 8 percent from winter 2004 to winter 2005. Lufthansa itself operated services on 3 out of the 14 relevant routes with price freeze remedies, but a few months after the merger they completely outsourced STR-DRS to the LCC Germanwings. Despite the remedy, *net average segment fares*²¹⁰ at Germanwings rose by 8 to 12 percent before a new airline could have entered the dominant routes. The following table shows the price changes.

		20	04	20	05	Change in average fare
Route Nr.	Route	S	W	S	W	from 2004W to 2005W
1	ZRH-FRA (LH)	71	87	70	85	-1%
	ZRH-FRA (LX)	108	117	114	116	-1%
2	ZRH-MUC (LH)	69	83	64	88	6%
	ZRH-MUC (LX)	73	82	80	105	27%
3	ZRH-DUS (LX)	147	153	136	149	-3%
4	ZRH-HAM (LX)	127	122	120	114	-7%
5	ZRH-VIE (LX)	126	131	115	114	-13%
6	ZRH-TXL (LX)	117	106	113	103	-3%
7	ZRH-CPH (LX)	157	156	113	120	-23%
8	ZRH-HAJ (LX)	135	133	130	114	-14%
9	ZRH-ARN (LX)	181	205	204	181	-12%
10	ZRH-WAW (LX)	149	159	158	133	-16%
11	ZRH-OTP (LX)	172	187	176	152	-19%
12	VIE-CGN (4U)	87	92	89	100	8%
13	VIE-STR (4U)	71	71	73	80	12%
14	STR-DRS (4U)	-	70	72	78	12%
	STR-DRS (LH)	155	148	117	106	-28%

57. Deviating from the price freeze remedy? Average segment prices from 2004 to 2005

Source: own table

The price data has limitations that could significantly influence the robustness of the results. Although the airline ticket price data are the most comprehensive and the most reliable for the European market, the shortcomings are as follows. First, since airlines use price discrimination, there is no 'single' announced average price for a flight. The weighted price data corresponds to a calculation based on number of bookings in six different cabin classes. Therefore, if the airlines' yield management decides to close a cheaper cabin class for bookings, average prices will automatically increase.

²⁰⁸ The merged entity is defined as "Lufthansa and Swiss and companies and/or affiliated businesses controlled by the entities after the consummation of the concentration" (M. 3770, 2005, p. 47).

²⁰⁹ Published fares refer to "applicable IATA fares, carrier fares that are distributed to CRS via the public tariff data base of ATPCO (Airline Tariff's Publishing Corporation), and fares marketed on the Internet where such fares are available to the general public, excluding network-wide fuel, passenger or service surcharges" (M. 3770, 2005, p. 47). ²¹⁰ In order to diminish seasonality and other short-run effects on prices, I calculated the average one-way net segment airline

²¹⁰ In order to diminish seasonality and other short-run effects on prices, I calculated the average one-way net segment airline fare for every IATA season (six months each) over two years. I disregarded the price data if the airline carried fewer than 200 passengers per month.

Second, in accordance with the above observation, the price increase might not have been a direct deviation by Lufthansa, but it rather may have resulted automatically through the specialties of the price mechanism. Lufthansa decreased the supply of LH tickets and assigned the capacity to LX instead. Therefore, the load factor of LX increased, which must have led to higher ticket prices, since tickets in the highest price class were now also sold.

It could be difficult to prove in court whether the price increase was deliberately made by Lufthansa or automatically generated by schedule optimization between LH and LX. The potential plaintiff needs to derive 'published' price changes per booking class, but there is only one average price in the publicly available (but expensive) OAG airline database. Further, the OAG data is based on estimations and does not represent published fares. Therefore, the EC needs to reconsider the price freeze remedy and impose a clear framework to control it.

The following figure shows that while keeping the same frequency, LX increased passenger numbers on ZRH-MUC. Thus, the price increase might have been (at least partially) a result of the higher load factor of LX. In 2004, Lufthansa started to operate with CityLine (CL) and Eurowings. CL entered the ZRH-MUC market in April 2004 and had an average price of \$94 in the first three years of operation. Thus, CL's prices were higher than both LH's and LX's prices. Eurowings (EW) entered in November 2004 with average ticket fares above \$100, but reduced prices down to \$80 to \$90 during 2005.





Source: own figure

The figure below shows the revenue increase at the Lufthansa Group due to dominant pricing on the ZRH-MUC route.²¹¹ LX and CL prevailed there. However, segment passenger revenues on that route only account for 5 to 15 percent of all revenues. The other 85 to 95 percent of the revenue stems from transfer passengers.²¹²



59. Revenue increase at ZRH-MUC (in \$m)

Within the investigated period of 2005 to 2007, LX's segment and transfer revenues on the ZRH-MUC route were constantly increasing. SWISS's revenues rose by \$16.6m, while CL increased revenues by almost \$30m.

In summary, in the absence of competition, the LHG expanded its route-specific revenues by two-anda-half times within four years.

Source: own figure

²¹¹ Monthly route-based aggregated revenues from one-way net ticket prices per airline; the data stems from the DLR database.

²¹² Segment revenues in the figure are labeled as 'seg,' while transfer revenues are labeled 'other.'

6.3.3 SUMMARY OF THE RESULTS ON REMEDIES

Section **6.3** described how the remedies imposed on market structure, conduct and performance had limited effects. Remedies aimed to improve competition on the routes negatively affected by the merger, but the analysis showed that the remedies did not work. New entries (or frequency expansions by rivals) were rather short run and considerably rarer than expected by the EC. The deficiency of new entries is not anticompetitive apart from the Lufthansa Group, but needs further explanation. In the later merger cases (from 2008 forward), the EC explicitly asked Lufthansa's competitors whether they were interested in entering particular relevant markets. Thus, potential newcomers were already listed in the merger decisions, even those who only had two aircraft and 25 employees (Fichert, 2013). This could have led to a general overestimation of new entries.

Table 60 summarizes the results of Section **6.3**. The first column shows the groupings, while the second column indicates the relevant route. I compared data from the year before the merger with data from the last year of the remedy period. The third column counts the slot remedies (in the form of daily frequencies) times the IATA periods (6 months) for which they were in force. The fourth column, called entry/exit, illustrates the new entries (bold), extensions and exits (in brackets) for the slot remedy periods. Altogether, there was one entry for three periods (VIE-STR); three entries for one period (ZRH-FRA and VIE-CGN twice); two frequency extensions for five to six periods (ZRH-HAM and ZRH-TXL); two exits (VIE-BRU and VIE-FRA) and one periodic route leaving (ZRH-VIE). There were 15.3 new frequencies instead of the maximum possible 350 during the slot remedy periods. The utilization rate of the slot remedies is 15.3 to 350, thus 4.37 percent.

Compared to the year before the merger (fifth column), LHG increased its presence (weighted by market share in passenger volume after the slot remedy period expired; sixth column). Lufthansa Group won market share (seventh column) on most of the connections and it still has nearly a 100 percent market share on all relevant routes from Brussels.²¹³ In sum, while the LHG's average market share was 69.9 percent before the merger, it increased to 76.1 percent afterward. Twelve of 21 routes remained highly concentrated, with LH and its partners holding more than a 70 percent market share.

Ticket price increase became obvious despite regulation, which questions the use and the control of merger remedies. I found evidence that the LHG probably deviated from the EC's price freeze remedies on four relevant routes (ZRH-MUC, VIE-CGN, VIE-STR and STR-DRS), though, because of the limited price data, the results are not robust.

²¹³ The data on BRU-FRA listed very high passenger numbers for Ethiopian Airways (ET) for five months, which resulted in a 12.6 percent market share. Since ET is an African carrier, it must have been a code-share agreement with one of the Star Alliance partners (LH or SN). Therefore, I added their market share to that of the LHG.

	Relevant route	Slot remedy	Entry/Expansion/(Exit)	LHG's marl	ket share (%)	M. Sh.
G1	ZRH-FRA 2004-2008	5*6	AB 3.07*1	99.8	99.9	7
	ZRH-MUC 2004-2008	5*6	-	99.9	99.2	Ľ
	BRU-MUC 2008-2010	3*4	-	99.1	99.6	7
	BRU-HAM 2008-2010	3*2	-	97.9	99.4	7
	BRU-FRA 2008-2010	2*8	-	98.6	100	7
	BRU-ZRH 2008-2010	2*4	-	89.4	97	1
	VIE-BRU 2008-2010	4*2	(NE -0.7)	68.3	97.7	1
G2	VIE-CGN 2004-2010	3*8	X3 0.53*1, AB 1.7*1	82	75.9	¥
	VIE-STR 2004-2010	2*6+ 3*2	AB 1*3	75.5	96.9	1
	STR-DRS 2004-2008	2*6	-	99.7	100	7
G3	ZRH-DUS 2004-2008	4*6	-	54.4	51.9	Ľ
	ZRH-HAM 2004-2008	4*6	AB 0.8*5	45	43.6	Ľ
	ZRH-VIE 2004-2008	4*6	(HG)	30	56	↑
	ZRH-TXL 2004-2008	3*6	AB 0.5*6	36.6	45	1
	ZRH-HAJ 2004-2008	2*6	-	77	59	▶214
	VIE-FRA 2008-2012	5*8	(JP -2.3)	57	72.4	1
	VIE-MUC 2008-2010	4*2	-	57	62.1	1
G4	ZRH-CPH 2004-2008	3*6	-	29.3	47.2	1
	ZRH-ARN 2004-2008	2*6	-	45.5	54.2	1
	ZRH-WAW 2004-2008	2*6	-	43.2	62.6	1
	ZRH-OTP 2004-2008	1*6	-	81.7	79	Ľ
Av		16.7	0.59	69.9	76.1	^
All		350	15.3			

60. Post-merger results on the LHG's market share, capacity, frequency and airfares

Source: own calculations, OAG and DLR data

²¹⁴ Though the LHG's average market share in 2004 was 77 percent, one should note that Lufthansa had a monopoly on the route until AB entered in May 2004. By December 2004, Air Berlin already had a market share of 49 percent, reducing the LHG's to only 51 percent. Compared to the 51 percent at the end of the year 2004, the LHG's market share did not decrease by the end of 2008, but increased by 8 percent up to 59 percent.

6.4 ENTRY AND EXIT: HIT-AND-RUN OR PREDATION?

"It is fortunate for all of us that there was no Federal Biological Commission around when the first small furry mammals appeared and began eating dinosaur eggs. The commission would undoubtedly have perceived a 'competitive advantage,' labeled it an 'unfair method of evolution,' and stopped the whole process right there" (Bork & Bowman, 1965, p. 375).

The previous section showed that in the absence of sufficient new entry, the Lufthansa Group increased its market share following all the takeovers. The market power of the biggest German airline had been significant before the mergers and further increased afterwards. This raises the question of whether Lufthansa abused its market power. The **hypothesis** of Section **6.4** is that the abuse of market power, in forms of strategic capacity increase and predatory pricing, was present. The following table shows the structure of the analysis and the results in each group.

Conduct	Evidence	Section	Resu	lts in g	grou	ps
			1	2	3	4
Strategic behavior to force	a) Strategic equipment capacity increases	6.4.2	Yes	Yes	-	-
out competitors	and predatory prices	6.4.3				
	b) Price competition with consequence	6.4.4	-	Yes	-	-
	(exit of a flag carrier) – yet no predation					
Contestability	c) AB's hit-and-run strategy	6.4.5	No	No	-	-
			So	urce: o	wn t	table

61. The structure of the entry-exit analysis

Market power is the ability to set prices above the competitive level (Motta, 2004), although both prices above and below the competitive level are suspicious and could be signs of abusing market power. Low prices could be *predatory* (Section **6.4**) with the aim of foreclosing competitors and prices set high could be *monopoly* prices afterwards (Section **6.5**). The optimum would be if prices were equal to the competitive level (P = marginal costs, thus MC), but this definition is challenging because of the high proportion of fixed costs and price discrimination. Since MC is difficult to calculate and firms do not list it in their annual reports, competition authorities usually compare prices to the *average variable cost* (AVC) (Motta, 2004). The Areeda-Turner test is a known tool for detecting predatory prices.²¹⁵

In order to avoid the complexity of comparing prices and costs, the US DoT proposed using the Capacity Lock-in Rule (CLR) to avoid predatory behavior in the airline industry.

 $^{^{215}}$ Their rule says that prices below short-run MC (or AVC) are predatory and "attempt to destroy its rivals or deter new entry" (Areeda & Turner, 1975, p. 697). Some scholars find the test, which is based merely on a cost/price analysis, too strict and require an additional proof of recoupment of losses (i.e., *U.S. v American Airlines* in 2003, *Matsushita v Zenith Radio* in 1986 or *Brooke Group Ltd v Brown Williamson Tobacco* in 1993). Others suppose the test is not strict enough and argue that even prices above AVC (but below average total costs) are predatory if there is evidence of a 'smoking gun' (i.e., *AKZO v Commission* in 1991 and 1993, or *Belge v Commission* in 2000). The only shortcoming is that written demonstration, like emails, are difficult for the authority to detect (Whish, 2009). For a detailed overview of different approaches to the theory of predatory pricing, see, e.g., Joskow and Klevorick (1979), or Motta (2004). For airline-specific investigations, see Morrison (2005) and Ewald (2005).

The CLR is based on the DoT's assumption that incumbent airlines will flood the market with low-fare overcapacity as soon a new airline tries to enter the market. It therefore prescribes a capacity freeze (locks overcapacity) for the incumbent for a given period after new entrants have exited (Starkie, 2005). The aim of the competition authority is to make predation unprofitable.

From the consumers' point of view, the difference between price competition and predatory pricing is that while they would benefit from lower prices in the short run, if predation was successful and forced out the competitor(s), consumers would face monopoly prices and lose welfare (Morrison, 2005). An incumbent airline has short-term losses if it prices below costs, but this strategic behavior might be successful if their rival, who cannot keep up with fierce competition, leaves as a result. Then the incumbent airline could set 'too high' monopoly prices and reimburse its short-term losses this would attract new entrants.

Case evidence on decisions related to predation in aviation is rare.²¹⁶ Lufthansa, however, was sanctioned "for its attempt to rule out a competitor" in 2002 (Hüschelrath, 2005, p. 173). The German cartel authority (Bundeskartellamt, 2002), following the Harvard School approach to predation, punished LH for fighting Germania on the Frankfurt-Berlin Tegel route in November 2001. LH reacted with predatory pricing to Germania's low-fare entry and suddenly reduced its own prices by 58 percent. Germania then undercut the new LH prices by almost 50 percent. The Bundeskartellamt decided that Lufthansa abused its dominant position and ordered LH to keep at least a €35 difference between its prices and Germania's for two years in order to ensure brand name and market share for the new airline.

Section **6.4** will describe entry and exit events from NIKI (HG) and Air Berlin, investigate contestability using a hit-and-run strategy and present evidence on predation following the Bundeskartellamt definition (without case decisions). Airline markets have been deregulated in the US and liberalized in Europe based on their contestability. Low (or even no) entry and exit barriers, no sunk costs and hit-and-run competition are supposed to be the features of contestability. Case studies look for evidence of contestability and find predation instead. Slot remedies remove administrative entry barriers. AB's exit from a route could be associated with no relevant sunk costs, since the aircraft could be utilized somewhere else. However, *hit-and-run* competition is a strategy that assumes excess profit and ensures that prices remain at least as high as MC. This was very probably not the case among the investigated events. Sudden capacity increases and price reductions on ZRH-FRA and VIE-CGN might have been predatory with the aim of forcing out competitors, and may have later harmed passengers by setting higher prices. Section **6.5** will focus on the Lufthansa Group's monopoly pricing.

²¹⁶ Chicago School economists questioned the rationality of predation at all. For a comprehensive overview of North American airlines' and competition authorities' predatory practices, pro and con, see Lall (2005).

6.4.1 INTRODUCING AIR BERLIN AS A COMPETITOR TO LUFTHANSA

The following analysis investigates the remedy periods and describes new airline entries into the relevant routes. However, as the figure below illustrates, all new entries ended in exit. It immediately raises a question about the reasons behind exit: is it the natural process of contestable competition (a hit-and-run strategy) or rather strategic behavior to force out competitors (predation)?

Since Air Berlin's share in the passenger transport market is significantly higher than those of smaller competitors in the table, the following analysis will focus on the competition between Air Berlin (including NIKI) and the Lufthansa Group (LHG).²¹⁷

~					
Competition	Route	Entry	Expansion	Exit	Airline
Air Berlin	G1: ZRH-FRA	2006 S	-	2008 W	AB
	G2: VIE-CGN	2009 W	-	2010 S	AB
	G2: VIE-STR	2007 S		2008 W	AB
	G3: ZRH-HAM		2006 S – 2012 S	2012 W	AB
	G3: ZRH-TXL		2006 S – 2014 S		AB
	G3: ZRH-HAJ			2011 W	AB
LCC and	G1: VIE-BRU	2007 S	-	2009 S	NE
regional					
	G4: ZRH-WAW	2006 W, 2007 W	-	2007 S, 2008 S	2L
	G4: ZRH-CPH	2004 W	-	2005 S	DM
		2010 W	-	2011 S	QI
Flag	G4: ZRH-OTP	2009 S	-	2010 W	RO
	G3: VIE-FRA			2011 W	JP
				Sourc	a. own table

62. The (end of) low-cost, regional, flag and Air Berlin competition with Lufthansa

Source: own table

Air Berlin (AB) started as a low-yield carrier in 2004. Berlin Tegel (TXL) is the base of Air Berlin, the second biggest German airline. As the figure below illustrates,²¹⁸ AB then improved its average yields per mile from \$0.22 to \$0.38 until summer 2008. AB suffered high losses during the financial crises, and operated below \$0.20 per mile average yields²¹⁹ in 2012.

²¹⁷ Cases other than AB will be briefly summarized in footnotes to provide a clearer picture.

²¹⁸ The data shows monthly average nominal yields on 17 routes where AB competed with the LHG (within the sample of a combined 57 relevant regulated and non-regulated routes).

²¹⁹ In comparison, Lufthansa's average yield per mile was double that in 2012. For the detailed yield development of the LHG, see Section **6.5.4**.



63. Air Berlin's average yield per mile (in \$), 2004 to 2012

AB and the LHG have different strategies for average equipment capacity increase. AB and NIKI mainly operated Airbus A320 and A321 aircraft with 156 (later up to 174) or 187 (later up to 210) seats, and in 2007 they added a few A319 aircraft with 124 (later down to 80) seats. Thus, AB served all the relevant routes with a constant average of 160 +/-10 seats, independent of the demand. On the other side, Lufthansa, thanks to its growing fleet and related to different partnership agreements (and particularly due to the takeovers), could optimize and fit the aircraft sizes to the actual demand²²⁰ (see Lufthansa's annual reports). In spite of decreasing frequencies, Lufthansa provided 90.6 percent more seats in December 2014 than in January 2004.²²¹

By the time Lufthansa took over SWISS, four relevant routes out of Zurich already competed with Air Berlin: Dusseldorf, Hamburg, Hannover and Berlin Tegel. One year after the first merger wave, the LHG lost market share against AB. In 2006, the LHG had 20 to 24 percent less market share on the ZRH-DUS, ZRH-HAM, ZRH-HAJ and ZRH-TXL connections than in 2005, which resulted in a 17 to 29 percent ticket price reduction.²²² Thus, AB's growing presence benefited passengers. AB also accounts for stronger competition in capacity. Their entry reduced average airfares, but after the new competitor left, the LHG increased prices above the original level. The table below illustrates the result.

Source: own figure

²²⁰ According to the OAG schedule data, starting from 60 to 100 seats in 2004, Lufthansa raised seat capacity up to 120 (HAJ), 140 (DUS) and 160 (VIE, HAM, TXL) seats by the end of 2014.

²²¹ The LHG and AB increased seat capacity on the ZRH-TXL, ZRH-VIE and ZRH-DUS routes during the previous ten years with a yearly average of 5 percent. AB is represented by NIKI on the ZRH-VIE route with 1/3 market share, while the Lufthansa Group switched Austrian Airlines (OS) for Tyrolean Airways (VO) in summer 2012. The remaining 1/3 is provided by SWISS (LX). AB has been competing with LX half-to-half on the TXL route, while it shares the Zurich market with LX and LH to DUS since 2009 (previously with LX and EW).

²²² For example, while the LHG had 78 percent market share on ZRH-DUS in 2005 and the average passenger weighted ticket price on that route was \$188, by the end of 2010 the LHG had lost their dominance (less than 50 percent) against Air Berlin and prices declined to \$108. Further, on average, AB offered cheaper tickets on relevant routes with LHG competition than on other routes. On the ZRH-HAM and ZRH-TXL routes, AB's yields have been \$0.05 to \$0.10 below its average \$0.20 per mile since 2010. By the end of 2012, after yields had fallen down to \$0.12, the airline closed the ZRH-HAM connection.

Route	AB's	AB's	AB's	average	e segme	ent fare	in %,	LHG's average fare in %,							
	share	sum seat	du	during its whole operation,						offer AB left the route					
	(%)	capacity		con	inparcu	10				an icit					
			LH	LX	CL	4U	VO	LH	LX	CL	4U	VO			
ZRH-FRA	4	23,571	-3	-27			26	19							
VIE-CGN	26	66,492				-51	-31				-53	14			
VIE-STR	23	79,302			-56	-10	-52			19	10	-2			
ZRH-HAM	34.2	1.18 m	-27	-19				15	32						
ZRH-TXL	46	2.52 m	-23	-21	-40										
ZRH-HAJ	39	665,838	-40	-22					21						
average			-23.3	-22	-31	-42	20.5	24	19	-21.5	6				
										C.	unaar or	w tabl			

64. Air Berlin's effect on the Lufthansa Group's prices

Source: own table

6.4.2 PREDATION ON THE HUB-TO-HUB ROUTE ZRH-FRA? CAPACITY AND PRICE INCREASE

This section describes how the merged Lufthansa Group reacted to Air Berlin's new entries with shortrun strategic capacity increases and probable predatory prices after forcing out the competitor on ZRH-FRA.

At first sight, the **ZRH-FRA** connection benefited from AB competition²²³ in 2006, when ticket prices decreased by 19 percent.²²⁴ The following figure shows the passenger numbers there from 2004 to 2010. We can observe a peak in 2006, which is mostly explained by the short-lived entry of Air Berlin.²²⁵





Source: own figure

²²³ Air Berlin operated an Airbus A319 with 126 seats on ZRH-FRA. Since the departure times were out of the business periods (09:05, 13:05, 16:05, 21:05), these flights attracted few business travelers (the data shows that 99 percent of the passengers paid for a discount coach service). 91 percent of AB's costumers were not transfer passengers. ²²⁴ After AB entered the route in summer 2006, LH and LX lost 35 percent market share and the ticket price decreased from

an average of \$197 to \$159. After AB left the route, the LHG monopoly increased ticket prices to \$216.

²²⁵ Interestingly, AB's entry did not affect the LHG's passenger numbers, but the new airline attracted additional costumers (there were 87 percent more passengers in 2006 than in 2004). The different business model of AB might explain this fact, which is close to an LCC focusing on price-sensitive leisure passengers. AB offered a one-way place for an average of \$73, which was around \$100 less than LH's average price for the same route.

According to the merger remedy, LH and LX should have 'frozen' their frequency at 11 per day starting from the day AB entered the route. Air Berlin entered ZRH-FRA on April 24, 2006 (right side of the graph below). While keeping the frequency constant as a response to AB's entry, LH and LX immediately increased their seat capacity. LH's average load factor on ZRH-FRA, since it was less than 57 percent, would not have required any capacity increases. The seat capacity offered by LH and LX promptly rose (left side of the graph) only until Air Berlin had left the route by the end of the year 2006.²²⁶ AB's exit was very probably the consequence of predation.





Source: own figure

During its 14 months of operation (with a 4 percent market share in seat capacity), AB applied competitive pressure to average segment fares on ZRH-FRA (see the figure below). Still, AB's yields per mile (\$0.42) on this route were high above Air Berlin's average. Compared to the year before AB's entry, both LH and LX charged 10 to 12 percent lower average fares during the competition.



67. ZRH-FRA: Average segment ticket prices during the competition with AB (in \$)

Source: own figure

²²⁶ In the first five months of competition, LH and LX expanded their seat capacity by an average of 55 percent, compared to the same months in 2005 (e.g., in April 2006, LX even enlarged capacity by 99 percent).

The question is whether the 10 to 12 percent sudden price reduction that coincided with AB's entry was the result of price competition or predatory pricing. In the Germania case in 2002, the German Bundeskartellamt decided that on the TXL-FRA route, Lufthansa "does not cover the average costs per passenger with the low fare tariff of \notin 105" (Hüschelrath, 2005, p. 177). LH's prices for ZRH-FRA fell in part to \$62 (ca. \notin 49 in 2006) during the competition with AB.

Predation is probable in this case from two reasons. First, this price was the *average* (one-way) ticket price, while in the Germania case it was the *lowest* ticket price that was stamped as predatory. In other words, there had been even lower prices than Lufthansa's \$62 on the ZRH-FRA route. Second, the distance between TXL-FRA is about 270 miles, while the distance between ZRH-FRA is 177 miles. Thus, while Zurich-Frankfurt is around two-thirds of the Frankfurt-Berlin flight distance, Lufthansa's prices on ZRH-FRA were less than half.

6.4.3 PREDATION ON THE HUB-TO-SPOKE ROUTE VIE-CGN?

Air Berlin introduced new services on the **VIE-CGN** route in 2009, with fares at half the prices of both Tyrolean Airways (VO) and Germanwings (4U) (see the figure below). While VO adjusted²²⁷ to the lower prices after four months, 4U further increased the significant price difference. On behalf of Lufthansa, VO replaced its aircraft with bigger airplanes and reduced its frequency from 2.5 down to 1.7 a day. Austrian Airlines (OS) used VO's remaining 0.8 slots to launch new services in the next summer period. Net average one-way fares were \in 81 during OS's presence from 2010 to 2012.²²⁸ The reason behind the price reductions, and probably behind the exit of AB, was OS's entry in April 2010 with prices even below AB's airfares. Three months after OS entered the market, AB left.



68. VIE-CGN: LH's and LX's prices during and after AB competition (in percent)

Source: own figure

 ²²⁷ During the eight months of AB's presence, VO decreased prices by an average of 36 percent, compared to the year before.
 ²²⁸ After OS closed operation on all routes, the average ticket price on VIE-CGN went up to €130 by 2014.

Air Berlin, which is not an LCC, entered the VIE-CGN route by undercutting the LCC Germanwings by 50 percent. Austrian Airlines' entry was no hit-and-run, since the flag carrier even undercut AB's prices. Comparing AB's and OS's average yields (OS's average yield per mile was about \$0.28 according to Figure 83 in Section 6.5.4, while AB's average yield per mile was \$0.25 in the month of entry, April 2010), we can definitely state that Austrian Airlines could not cover its marginal costs with the pricing strategy on VIE-CGN. OS's average one-way ticket price was \$55 (at 4,257 offered seats, half of AB's seat capacity) in June 2010, when AB decided to leave the market.

When comparing this price to the predatory pricing decision of the German Bundeskartellamt in the Germania case (Hüschelrath, 2005), one can state that the price of \$55 (ca. \notin 41.5) probably did not cover the average costs of a passenger (even if we consider that average costs had decreased since 2002). Further, the flying distance from VIE-CGN (463 miles) is about 1.7 times longer than the case decision on TXL-FRA, where Lufthansa's minimum price should have been \notin 105 (according to the German competition authority).

Therefore, OS's entry was rather predatory and done to force out Air Berlin. The evidence is as follows.

First, *seat capacity*, which had been constant around 17,000 since 2004, suddenly increased by 76 percent (up to 30,000 provided seats) after AB's entry (first as X3 TUIfly). Therefore, the supply of seats had already almost doubled by the time OS entered.

Second, OS left the route after one year, but neither VO nor 4U expanded capacity later, which might be a sign of insufficient demand.

Third, when Austrian Airlines entered, the *load factor* of both 4U and VO stood at an all-time low (63 and 53 percent, respectively; 10 percent lower than the average of both airlines in the previous two years). While Germanwings recovered in terms of load factor, both VO and OS fluctuated between 40 and 70 percent until OS finally left the route. Last, AB's load factor (78 percent during the last three months) contradicts the idea that there was no place for more airlines.²²⁹ Since Lufthansa took over OS in 2009, it seems that the incumbent airline (LH) reacted to AB's entry through its subsidiary OS instead of directly lowering prices. The following figure illustrates the results.

²²⁹ On the STR-DRE route, LH outsourced the whole operation for its LCC, Germanwings, closed two out of four daily frequencies, and increased seat capacity by replacing aircraft with significantly bigger ones. The winners are (leisure) passengers at first sight, since all three routes provide increased seat capacity. However, there is no place for AB on this connection, which is mainly dominated by leisure passengers. AB could not successfully enter the markets with Germanwings dominance.



69. Forcing out AB from VIE-CGN? Post-merger seat capacity development

Source: own figure

6.4.4 PRICE COMPETITION WITH CONSEQUENCES ON THE HUB-TO-HUB ROUTE VIE-FRA

The LHG's seat capacity expanded, a flag competitor left and NIKI significantly lost market share on **VIE-FRA**. Since 2010, NIKI and the LHG have been in a fierce price competition (yet without predation). The difference between this situation and predation, described in the previous section, is that Air Berlin (NIKI) still competes with the Lufthansa Group, though the price competition has already resulted in the exit of another competitor, Adria Airways.

There were two relevant routes with rivalry from AB in the LH/OS merger that was part of the 2009 merger wave: VIE-FRA and VIE-MUC. Nothing has significantly changed²³⁰ on the VIE-MUC route post-merger: AB kept its two daily flights, while LH kept its eight. In contrast, Lufthansa expanded seat capacity on VIE-FRA, so the connection provided about 85,000 seats in 2014 compared to 50,000 in 2008.

NIKI (HG) slowly lost market share and offered less capacity over time. As the figure below illustrates, Lufthansa continuously increased daily frequencies from VIE to FRA. This explains the seat capacity increase. The Slovenian flag carrier, Adria Airways (JP), competed on the route with about a 6 percent market share in seat capacity until October 2011. A year later JP, which had two daily flights, left the market. LHG significantly increased frequency, and AB suddenly started to cut capacity²³¹ in 2013. AB provided 26.5 percent fewer seats in 2014 than in 2013. AB might leave the VIE-FRA market soon.

²³⁰ Changes stay inside of the capacity frame of the 2008 level (ca. 35,000 seats). LH took over the flights from CL when NIKI started to expand in 2009, but the LHG's capacity was later split back for the smaller partners CL and VO.

²³¹ NIKI's load factor cannot explain the reduced capacity to FRA, since it usually has been above 80 percent, even 90 to 95 percent in 2013. The LHG's load factor had been fluctuating around 60 percent, but it slowly started to improve in 2012 when they completely switched OS to VO.



70. Airline exit after LH increased daily frequencies on the VIE-FRA route

The next figure illustrates price competition on the VIE-FRA route. In spite of the crisis, all the airlines (but especially JP) started 2008 with earnings above \$0.60 per mile (at a greater than 60 percent load factor). Profitability quickly dropped down to \$0.20 by summer 2010, when NIKI (HG, part of AB) launched one-way tickets for \$50 (one-third of its own 2008 price) and almost doubled capacity compared to 2008.

While LH, OS and VO also reduced prices, JP left the market. The exit of the flag carrier had no significant effects on airfares; the fierce price competition continued. After OS left in 2012, VO took over all its previous operations and, in cooperation with LH, further decreased prices. NIKI has not given up, but after yields diminished below \$0.10, the LCC cut capacity back to its 2008 level.



71. Yields per mile on VIE-FRA (in \$): fierce price competition

The LHG's capacity increases on VIE-FRA were significant, but did not led to the exit of NIKI as part of AB (yet). Air Berlin answered with fierce price competition directed at the LHG's strategic capacity increase and provided tickets in 2010 at a third of the price they charged in 2008. AB's \$0.10 per mile-level is not sustainable without making high losses in the long run.

Source: own figure

Source: own figure

6.4.5 CONTESTABILITY ON THE HUB-TO-SPOKE ROUTE VIE-STR?

The next section investigates whether ticket prices on VIE-STR overcame MC, thus whether AB's entry was a *hit-and-run* strategy. Air Berlin attempted to enter the **VIE-STR** route in summer 2007. In this case, the LHG had already expanded their seat capacity by 27 percent in 2006, one year earlier. During AB's operation, offered seat capacity achieved a peak of 25,000, while the common seat capacity of 4U, CL, VO, EW and C3 had previously been constant around 19,000 before (see figure below).



72. Seat capacity increases on VIE-STR, 2005 to 2010

Looking at the demand side, Germanwings (4U) had an average load factor of 76 percent between 2005 and 2012. Tyrolean Airways (VO) remained the second airline with 58 percent. Lufthansa City Line (CL) could also achieve 50 to 60 percent until it left the route at the beginning of 2010. While Eurowings (EW) was never prosperous with its 37 percent, it launched new services from time to time until March 2010. During AB's 14 months of operation in 2007 and 2008, the airline could reach a 66 percent load factor as the fourth 'competitor' on the route. AB's load factor was higher than most of the incumbent airlines' load factors.

The explanation for AB's exit <u>could not</u> be founded in its hit-and-run pricing strategy. Air Berlin undercut both VO and CL by over 50 percent when it entered the VIE-STR route. The price difference between AB and 4U was only minus 10 percent. With this strategy AB achieved a 23 percent market share in seat capacity. Air Berlin continued pricing down to \notin 25 one-way (at 7,200 offered seats), which resulted in a \$0.08 per mile average yield and finally AB's exit from the route. This price was probably lower than AB's marginal costs (average yields per mile were about \$0.32 in summer 2007 according to Figure 62 in Section 6.4.1), so there was no hit-and-run strategy. Since the fares of 4U, VO and CL were all higher than AB's average fare in August 2007 (by 3x, 4x and 5x, respectively), we also cannot blame it on predation.

Source: own figure

6.4.6 SUMMARY OF THE RESULTS ON ENTRY AND EXIT

The following table compares the LHG with AB on the relevant routes. Lufthansa significantly won market share on five relevant routes in competition with Air Berlin, while AB could slightly expand on only two routes in spite of its large frequency and seat capacity developments. The main difference is the LHG's flexibility, which enables a quick switch of aircraft depending on demand. Thus, while they operated fewer flights, aircraft size increased at the LHG. Further, AB's average load factor was 80 percent, while the LHG's was about 60 percent.

	Lufthansa Group	Air Berlin
Market share	Increased (5 to 10 percent)	Increased (less than 5 percent)
	on five routes \bigstar	on two routes 🛪
Seat capacity	Increased by 18 percent 个	Increased by 74 percent ↑↑↑
Frequency	Decreased by 9 percent Ψ	Increased by 52 percent ↑↑↑
Equipment capacity	Increased by 31 percent ↑↑	Increased by 14 percent ↑
Aircraft types	Various, flexible	Fixed: Airbus 319, 320, 321
	Depending on demand	Independent of demand
Load factor	Average 60 percent	Average 80 percent
Exit	LH outsourced routes for 4U and 2L,	HAJ in 2011, HAM in 2012
	switched OS for VO	

73. 0	Comparing the	LHG and	AB on the	relevant	routes.	2004 to) 2014
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Source: own table

Section **6.4** investigated entry and exit events from Air Berlin and found two cases in particular where the Lufthansa Group could have used predatory pricing and a predatory capacity increase: on the ZRH-FRA and VIE-CGN routes. There was no evidence of contestability on the relevant markets around the Lufthansa takeovers, since the newcomers' hit-and-run strategy (which is part of contestability theory) failed due to 'too low' prices.

The exit of Air Berlin, which led to the LHG's monopoly, had significant effects on ticket prices on the **ZRH-FRA** route. The LHG suddenly increased airfares by 26 percent, while LX increased by 19 percent compared to the year with competition. While both LH and LX generally reduced the size of aircraft on other (non-monopoly) routes in 2006 by 10 to 12 percent, respectively, compared to 2005, as soon as AB started to operate in April 2006, LH quickly spread its equipment (aircraft) capacity on ZRH-FRA by up to 20 percent compared to the same month in the year before. After three months, LH returned to using smaller airplanes: probable predation to force out AB. During the fierce competition on the **VIE-CGN** route, AB undercut the incumbent regional (VO) and even low-cost (CL and 4U) carriers by an average of 40 percent. Only VO reacted with a significant price reduction. OS entered in the following IATA period and undercut Air Berlin's already low ticket prices. AB left after three months. Without competition, average ticket prices on VIE-CGN doubled by 2014.

6.5 MONOPOLY PRICING AND CAPACITY CUT: (AB)USING MARKET POWER

"No economic model could ever hope to accurately predict effects on individual city pairs": Werden et al. (1991, p. 348) when criticizing the US DoJ's²³² decisions not to predict anticompetitive effects.

While Lufthansa and Swiss generally increased prices due to the takeover, a price cut in the following years was rather a mixture of the answer to AB's entry attempts, and the reduced demand due to the financial crises. Lufthansa's own LCC, Germanwings, still dominates the low-yield markets. Further, flag carriers that were faced with high costs and financial difficulties could not successfully compete against the merged entity. Therefore, the Lufthansa Group had market power in the forms of higher prices and reduced frequency. The following table shows the structure of the analysis and the results.

Performance	Evidence	Section	Results in groups				
			1	2	3	4	5
Less competition results in lost capacity and higher prices	a) Frequency and capacity cuts	6.5.2	Yes	-	Yes	-	-
	b) Higher yields on dominant	6.5.1					
	routes	6.5.3	Yes	-	Yes	Yes	Yes
		6.5.4					

74. Structure of the market power analysis

Source: own table

This section describes an analysis of the Lufthansa Group's performance after merger that found significant price increases and capacity cuts due to a lack of competition and rivals leaving the market. High concentration resulted in more yields, expensive prices and less frequency.

Lufthansa and its subsidies remained dominant and could set monopoly prices from a different background: after the competitor airline AB exited a relevant market, ticket prices increased by 15 to 32 percent (Section **6.5.1**); after taking over SN Brussels, the LHG increased prices by up to 31 percent and cut capacity by more than 7 percent (Section **6.5.2**); and after starting cooperation with flag carrier SK, LX and SK both increased prices (Section **6.5.3**).

When relevant markets were compared to markets that were non-relevant but investigated by the EC (Section **6.5.4**), the analysis found a 20 to 25 percent price difference when the LHG held a dominant position. The *yield* figures in this section all illustrate nominal values in \$ from the DLR database. This enables a transparent and comprehensive comparison of carriers for the purpose of the analysis.²³³

²³² TWA-Ozark (1986) and Northwest-Republic (1986) cases; the authors indicated that consumers were harmed seven times as much as was published by the Air Transport Association of America, used by the DoJ (Werden et al., 1991, p. 346).

²³³ Further research could consider different exchange rates and normalize the numbers using different inflation rates (SWISS is based in Switzerland and partially calculated in CHF, while Austrian Airlines and Brussels Airlines, based in Austria and Belgium, count in \in).

6.5.1 MONOPOLY AFTER AIR BERLIN'S EXIT FROM ZRH-HAM AND ZRH-HAJ

Air Berlin started with a fierce price competition in 2004 and undercut Lufthansa's and SWISS's airfares by about 30 percent. The difference fell to a moderate 15 to 20 percent during 2005 and 2006, and almost disappeared in the following four years. AB suddenly decreased prices in 2010, so the difference between its prices and the LHG's even reached 40 percent when AB decided not to operate on **ZRH-HAJ** in November 2011. One year later, a price cut strategy²³⁴ also failed on the **ZRH-HAM** route, in spite of constant capacity and a 92 percent load factor.

Lufthansa definitely lost some passengers due to its decreasing load factor, but the 'wait' strategy was successful: after AB left, LH and LX increased prices by 15 to 32 percent on ZRH-HAM. The ZRH-HAJ connection became 21 percent more expensive and remained with the monopoly of LX. The next figure illustrates average prices during the competition with AB.





Source: own figure

While AB's exit in the next year had a positive impact on both Lufthansa's and SWISS's load factors, LH outsourced its operation to 4U in winter 2013. LH did not take over AB's lost capacity on the routes where AB discontinued services. Therefore, former AB passengers on the ZRH-HAJ and ZRH-HAM routes might be worse off after AB's exit. LH and LX provided fewer seats than they did during the competition with Air Berlin, but they outsourced capacity for their own LCCs: Germanwings (4U) and Helvetic Airways (2L).

However, since AB left both ZRH-HAJ and ZRH-HAM routes six to seven years after the related SWISS merger, the merger itself can only partly explain AB's decision to leave.

²³⁴ While Lufthansa's prices remained unchanged, AB launched one-way tickets below \$50, thus more than 50 percent cheaper than LH's tickets. In this year, 15 percent of SWISS's passengers switched to AB, which resulted in LX's route-based productivity factor of 60 percent.

6.5.2 FREQUENCY AND CAPACITY CUTS ON THE BRU MONOPOLY ROUTES

This section investigates whether the decline in passenger numbers was demand-based due to decreases in load factor or supply-based due to the merged entity's capacity and frequency cut. All relevant monopoly routes out of Brussels lost passengers in 2009 and 2010 compared to 2008, the year before the merger (see the figure below). Both hub-to-hub connections, BRU-FRA and BRU-ZRH, lost 10 percent of their passengers in the year of the merger; BRU-MUC and BRU-HAM lost 5 percent. BRU-MUC lost another 15 percent in 2010.



76. Passenger development pre- and post-merger on the Brussels routes

The data investigation found the following results. First (1), the average delta seat capacity decreased by 7.44 percent in 2010, the first year post-merger (compared to 2008, the year before the merger). Second (2), the daily frequencies provided by the LHG fluctuated between 7.8 and 9.9 percent to FRA and MUC, and around 5 percent to ZRH, but dropped down from 4.6 to 2.2 percent to HAM. At the same time, the seat capacity to HAM doubled. Third (3), the load factor (LF) of 52 to 59 percent was below the average of 78 to 79 percent indicated in Lufthansa's annual reports. The bottom average LF of 52 and 53 percent was measured in 2009 and in 2010 respectively, in spite of the significant capacity cut. Passengers on these routes were worse off due to price increases of up to 31 percent. Demand decline due to financial crises partially explains the reduction, but capacity and frequency cuts are also responsible for the decreased passenger numbers.

Source: own figure

6.5.3 FLAG CARRIERS: COOPERATION (ZRH-CPH, ZRH-WAW) OR EXIT (ZRH-OTP)

This section investigates yield developments of flag carriers compared to the LHG. The study differentiates between routes from Zurich into Copenhagen in cooperation with the alliance partner SAS; into Warsaw in cooperation with alliance partner LOT; and into Bucharest in competition with the SkyTeam member Tarom.

In northern Europe, Scandinavian Airways (SK) has lost about 63 seats each month since 2005 on the **ZRH-CPH** connection. LX always operated three daily frequencies between 2004 and 2014. The average LX equipment capacity developed from 50 in 2004 to 200 in 2014, so the capacity was one-fourth as high as in the year before the merger. Right after the takeover, SK reduced its frequency²³⁵ from 3.5 to 4 daily connections down to 2.5 to 3 and never recovered. Both LX and SK had very similar load factors (an average of 72 percent) during the last ten years.



77. Yields per mile on ZRH-CPH (in \$): price correlation after rivals left

Source: own figure

The figure above illustrates the price development on ZRH-CPH. Maersk Air (DM) entered the route shortly before the LH-LX merger in November 2004 and, until it ceased operations in October 2005, provided 25 to 30 percent cheaper tickets than LX or SK. However, DM failed to keep the very low margins²³⁶ and left the market (restructured as Sterling Airlines in 2005). After DM left, SK was able to quickly recover and succeeded in increasing prices by 18 percent in one year. LX adjusted slowly, and a significant price difference remained between LX and SK until 2010. When Cimber Sterling²³⁷ (QI) entered in winter 2010, SK reduced prices by 30 percent, while LX further decreased its already lower prices by 9 percent.

 $^{^{235}}$ Despite the reduced frequency, SK's equipment capacity has averaged around 120 (+/- 30 seats) in the last 10 years, inversely proportional to LX's seasonal equipment capacity. For example, when LX suddenly increased its equipment capacity from 150 to 180 in 2009, SK's dropped from 120 to 85.

²³⁶ Both airlines decreased airfares compared to the year before entry: LX by 18 percent, SK by 12 percent.

²³⁷ Cimber Sterling is the successor of the meanwhile insolvent Sterling Airlines.

The exit of QI seven months later from ZRH-CPH resulted in a 35 percent price increase at LX, and a 44 percent increase at SK. Since then, both airlines' ticket prices have correlated and together they have been able to develop their yields per mile.

LOT, the Polish flag carrier, also lost market share on **ZRH-WAW** after the LH/LX merger. LX, while always keeping its 3 daily frequencies, immediately doubled its equipment capacity from 49 to 85 (later 100) seats starting from February 2006.²³⁸ Passengers benefited from the improved offer of about 11,000 monthly seats instead of the previous 7,500 seats. LO slowly adapted, but the difference between its and the LHG's offer remained about 30 seats. From summer 2008 until October 2012, LX almost completely outsourced the route for Contact Air (C3). This was the peak time for offered seat capacity: around 12,000 to 13,000 every month. Parallel to this event, however, LO reduced its daily frequency from 2 to 1.5. Even in doing so, LO could not fill its aircraft better; its load factor remained below 50 percent.²³⁹ LOT did not appear in the schedule for winter 2013 or winter 2014. It seems that the LHG are going to become a monopoly on this route.





Source: own figure

The figure above shows that while LOT maintained constant seat capacity and frequency over the last 10 years, they used to have higher yields than any other airline on the ZRH-WAW route. The difference became more obvious when LX doubled its aircraft capacity and dropped prices in spring 2006. Probably because of the low profitability, SWISS outsourced²⁴⁰ the route, first to Helvetic Airways (2L) then to Contact Air in 2008. Since winter 2013, 2L seems to have taken over the entire capacity from both LX and LO, at a moderately high LOT price level. 2L succeeded in surviving thanks to SWISS. As the figure illustrates, C3 was failing to hit the \$0.20-per-mile threshold and left the market.

 $^{^{238}}$ LX first returned back to its pre-merger seat offer when Helvetic Airways (2L) entered the route for one period in winter 2007, which is another sign that 2L was not independent from LX.

²³⁹ The ten-year review of LO-LX relations shows an 8 percent advantage for LX concerning the load factor (68 to 60 percent).
²⁴⁰ The difference between LO and C3 yields, however, remained almost 50 percent in the meantime and started to converge only shortly before OLT took over C3 in 2012. During its brief operation due to bankruptcy, OL charged prices similar to those of LOT Polish Airlines. Parallel to OL's entry, LX relaunched services 22 percent cheaper than OL.

The Romanian flag carrier, Tarom (RO), entered the **ZRH-OTP** route right after the remedy period expired, and after LX had already reduced fares as a consequence of the 2008-2009 crisis (see the figure below). The route had not been prosperous before (LX fluctuated around \$0.20), but RO's entry further decreased LX's fares by 21 percent in the first year. Yet, RO's airfares have still been 5 percent cheaper.



79. Yield development on ZRH-OTP (in \$)

Source: own figure

RO averaged a yield of \$0.12 per mile on that route, which was probably why the flag carrier decided to close services in March 2011.²⁴¹ In the monopoly position, LX increased airfares by 84 percent in 2011. Even without the peak in September 2011 (above \$0.50 per mile at about 3,000 passengers), LX had a positive balance of 68 percent higher ticket prices compared to the year before. However, the success seemed to be temporary, since LX (and 2L) has dropped back to (and below) the \$0.20-level.

6.5.4 LUFTHANSA'S YIELD DEVELOPMENT: MORE EXPENSIVE DOMINANT ROUTES

This section compares the LHG's average yield per mile developments in relevant (regulated) and non-relevant (non-regulated) markets in order to separate the regulatory effects from the market trends (for an overview of non-regulated routes (group 5) see Table 47). Over the last ten years, **Lufthansa** was generally forced to decrease its airfares. While the leading German airline achieved an average of about \$0.50 per mile from 2004 to 2008, the financial crisis in 2009 and 2010 negatively influenced airfares.

²⁴¹ In sum, ZRH-OTP was a weak route of around 3,800 monthly seats (1 daily frequency) until the Romanian flag carrier entered in summer 2009. Tarom offered about an additional 2,600 seats but not everyday frequency during its 20 months of operation. In general, there were very few RO flights on Tuesdays and Thursdays. While the LX airplane started every day at 09:50, the RO aircraft left Zurich one hour later at 10:50 and arrived at 14:05. Additionally, around half of the Romanian flag carrier's services started in the afternoon between 16:15 and 16:40. This inconvenience for business passengers, as well as the uncertainties with the changing schedule, probably led to the fact that the Tarom airplanes were half empty (54.8 percent) most of the time, while LX succeeded with a 75.2 percent load factor. One year after RO left the route, 2L had taken over all services. Helvetic Airways, on behalf of SWISS, operated smaller aircraft (100 instead of 120 seats), but provided 2 daily frequencies with around 6000 seats a month. LX took back the operation from 2L in winter 2013, reduced the daily frequency back to 1, changed the aircraft size to 160 seats and offers about 4,500 places per month.

LH had to cut prices down to \$0.35 per mile during the crisis. The airline started to recover in 2011, but its airfares in 2014 (ca. \$0.45 per mile) are still below the 2004 level. The next figure presents the development of LH's average yield per mile within the last ten years.²⁴²



80. Lufthansa's decreasing average yield per mile (in \$)

Source: own figure

The ten-year-average seasonal effects were negative only in those months when tourism (i.e., visiting friends and relatives) is higher (i.e., July-August, April and December-January). August therefore has the lowest fares: \$0.05 less than the all-route average. Thus, in the peak season of leisure traffic, airfares were up to 10 percent cheaper than the average. On the contrary, March was the most expensive month (with \$0.03 higher fares), followed by September (close to \$0.03) and November (\$0.02). The difference between regulated routes (12 in the sample) and non-regulated but investigated routes (19 in the sample) is significant (see the figure below).

The first signs of divergence appeared in the winter of 2005, where airfares rose about \$0.15 on relevant routes. However, these differences disappeared during the first remedy period (from 2006 to 2009), when Lufthansa not only faced a general financial crisis, but also more competition. Though the second merger wave (in 2009) resulted in significant higher prices on relevant routes, this tendency was still observable in 2014.

In particular, Lufthansa charges net prices that are \$0.10 to \$0.20 higher on routes where the airline has a more dominant position. In summary, between November 2009 and July 2014, the average yield per mile on relevant routes was 24 percent higher than on non-relevant routes. It seems that LH compensates for the loss in general yield development on the routes where it faces limited competition. The figure below compares the yield development on relevant routes to yield development on non-relevant routes.

²⁴² Centered moving means (black line; based on 6 months average) were calculated to diminish seasonal effects, whereby the gray line indicates the seasonally adjusted values.



81. Regulated versus non-regulated routes – LH's average yield per mile (in \$)

Source: own figure

SWISS used to have lower yields than Lufthansa, and they further decreased at the beginning of the remedy period (in winter 2005). LX could increase yields from 2006 to 2008, and after the crises from 2011 until 2013.

82. SWISS's average yield per mile (in \$)



Source: own figure

The average seasonal effects at SWISS, similar to Lufthansa, were negative in January-December, April and July-August. Also here, August had the lowest airfare, which had been \$0.04 (ca. 8 percent) lower than the centered moving mean. The most expensive month used to be November (\$0.03 higher fares), followed by September (\$0.02 higher fares). While there are only two non-relevant routes in the sample (ZRH-NUE and VIE-ZRH), it is nevertheless interesting to compare the development of the average yields on the 12 relevant routes. Similar to LH's strategy, LX has also increased the average yield per mile by about \$0.10 since 2009 on routes with less competition.





Source: own figure

Brussels Airlines was already affected by the crisis when it came to the merger with Lufthansa in 2009. Their average yield per mile hardly achieved \$0.40 between 2004 and 2008, but it worsened to about \$0.30 during 2009 and 2010 and could not recover until 2014. However, the low yields can mostly be explained by the fact that SN switched to leisure destinations. While Brussels Airlines had four relevant routes in 2008, it closed two main connections (BRU-FRA and BRU-MUC) by 2010. On the other side, the airline started new services to TXL in winter 2009. Thus, there are now eight routes in the non-relevant sample.

The seasonal effects were again like we saw with Lufthansa and SWISS. August was the cheapest month (\$0.06 less), while November was the most expensive month (\$0.03 more average yield per mile than the centered mean). The difference between regulated relevant routes and non-regulated routes was \$0.10 per mile during the entire period from 2004 to 2014. Interestingly, the difference went up to \$0.20 in 2009.²⁴³





Source: own figure

²⁴³ Though the fierce competition with TUIfly was responsible for the increase in the gap, because the new competitor airline charged less than \$0.10 per mile on the BRU-NAP connection.
Austrian Airlines had low yields like Brussels Airlines did, but while SN's yield fluctuated between \$0.35 and \$0.40, OS slowly increased its net yield until summer 2008. OS's yields per mile suddenly dropped down by half (from \$0.48 to \$0.24) by summer 2010. Since Austrian Airlines could not recover above the (still loss-making) \$0.28, the airline ceased operations in summer 2012.



85. Austrian Airline's average yield per mile (in \$)

Source: own figure

The seasonal effects were again as in the previous cases. August was the cheapest month (\$0.04 less yields per mile), while November was the most expensive month (\$0.02 higher revenues per mile). Lufthansa's 2009 takeover of the Austrian flag carrier had no influence on the difference in fares between relevant (six routes) and non-relevant markets (also six routes in the sample). The average yield per mile on the relevant routes had always been about \$0.10 to \$0.15 higher than the yields from non-relevant routes. Nevertheless, the gap decreased since summer 2008.

6.5.5 SUMMARY OF THE RESULTS ON MARKET POWER ANALYSIS

Section **6.5** concentrated on probable monopoly pricing and capacity cuts on routes where Lufthansa remained in the dominant position. The analyzed events are not necessarily merger-specific, but illustrate a situation that becomes more probable as the market becomes more concentrated.

Air Berlin's exit from ZRH-HAM (in 2011) and ZRH-HAJ (in 2012) resulted in a monopoly by the Lufthansa Group, a capacity cut and an immediate price increase with it (Section **6.5.1**). The merger of SN and LH also resulted in less capacity and higher prices on the newly monopolized routes between Brussels and Germany. The former flag carrier, SN Brussels, disappeared from the schedule of the hub-to-hub connections BRU-ZRH and BRU-MUC. Thus, Lufthansa had taken over the strategic most important routes. SN became a monopoly on BRU-HAM, dropped the frequency by half and, in the absence of competition, increased prices by 31 percent (Section **6.5.2**).

Section **6.5.3** presented evidence that smaller airlines (e.g., regional, flag or low-cost carriers) on the relevant routes used to have two alternatives: partnership or bankruptcy. Being an operating carrier on behalf of the LHG offers a certain security against insolvency, but losing the cooperation can quickly lead to failure (e.g., Contact Air). If competition becomes stronger, there is an increased risk that flag carriers, such as LOT or Tarom, will have to cease operation.

Summarizing the results of Section **6.5.4**, LH and LX successfully recovered after the 2009 and 2010 crises; SN stabilized its fares at a slightly lower level, and OS could not recover and closed operation in 2012. LH was the most expensive airline with a ten-year average of \$0.44 per mile, followed by LX at \$0.39, SN at \$0.35 and OS at \$0.34. Airfares were particularly negatively affected by leisure competition in August, which was most significant at LX. November seems to be the most prosperous month for all the airlines.

The indirect impact of regulation can be distinguished by comparing routes in groups 1, 2, 3, 4 to routes in group 5. Lufthansa and SWISS, in the absence of additional competition on the relevant routes, were charging about \$0.10 higher yields per mile. Given the relatively low yields in the industry, that means around **20 to 25 percent more expensive airline tickets** on the routes where the merged entity significantly increased concentration, the 'relevant routes.'

The results from section **6.5** may also serve as first evidence that merger-specific efficiencies (if any) are not passed through to consumers in the form of cheaper ticket prices.

6.6 CONCLUSIONS

Chapter 6 concentrated on the failure of regulating market power by evaluating the changes in Lufthansa's competitive environment affected by the mergers between 2004 and 2014. The study focused on four takeovers: SWISS, Eurowings, Brussels and Austrian Airlines. It analyzed the merged airline's market share, frequency, capacity and pricing on 21 relevant routes defined by the European Commission.

The chapter introduced the idea that the EC's priority aim (i.e., to maintain competition) was in conflict with Lufthansa's goal to reduce competition and become the market leader. Section **6.2** showed that the tendency in Lufthansa's competitive environment was either to enter into a cooperation agreement (and become part of the LHG) or to exit the market.

Section **6.3** showed that remedies, which should have reduced the LHG's high concentration due to its mergers, had limited success in stimulating new entry. The study found that although Lufthansa did not deviate from the EC rulings on frequency freeze, the airline increased capacity instead. Further, price freeze remedies in the current form are a 'gray area' and should be more precisely defined and controlled by the EC.

Section **6.4** provided evidence that Lufthansa predated and foreclosed the rival on ZRH-FRA and VIE-CGN after Air Berlin entered. Capacity increases (despite the frequency freeze remedy) might have been predatory and probably induced the exit of Air Berlin. Thus, the LHG (ab)used market power to prevent entries and forced rivals' exit through strategic capacity increases and/or predatory pricing. The contestability argument failed on the routes with new entry because of net ticket prices have been probable below marginal costs (e.g., on the VIE-STR route, Air Berlin operated with only \$0.08 per mile, while AB's average yield on other routes was more than \$0.30 per mile in the same period of summer 2007). There was no evidence of a hit-and-run strategy.

Section **6.5** investigated the LHG's price and capacity strategies on dominant routes and found significant price differences (about 15 to 32 percent) due to high concentration. Sudden frequency or capacity cuts accrued after rivals left the routes (e.g., ZRH-FRA, VIE-CGN, ZRH-HAM, ZRH-HAJ), which might prove the DoT's argument that LHG flooded the market with low-fare overcapacity until the competitor exits.

The next table shows the average changes of post-merger variables compared to the sum of the premerger variables in seat capacity (SC), frequency (F), equipment capacity (EC) and net ticket price (P). It also illustrates the evidence for probable predatory behavior in each group. The analysis found reduced seat capacity on the monopoly routes, while routes with flag cooperation provided above 10 percent more seats than before. Frequency decreased in all groups, but especially (up to 10 percent) in the second group, where the LCC subsidiary Germanwings took over almost all operations. The LHG generally decreased its frequency on the relevant routes by 8 percent as part of 'schedule optimizing.' A gross reduction in daily frequencies was, in every case, a loss in consumer surplus (see our regression results in Section **5.4.3**). Average ticket prices are more expensive on routes where LH cooperates with a flag carrier and in monopoly cases.

	Group	SC	F	EC	Р	Strategic or predatory behavior
G1	LH monopoly	¥	¥	^	^	LH increased capacity and introduced predatory prices on ZRH-FRA; LH cut prices on VIE-FRA to force out AB
G2	4U dominance	↑	$\mathbf{A}\mathbf{A}$	ተተተ	$\mathbf{h}\mathbf{h}$	4U predated AB on VIE-CGN
G3	AB competition	^	¥	ተተ	¥	AB left two out of five common routes; LH did not take over lost capacity
G4	Flag cooperation	ተተተ	¥	ተተተ	ተተ	LX doubled capacity and penalized flag carriers SAS and LOT (ZRH-CPH, ZRH-WAW)
	Meaning of the d	arrows:	l or ↑	= 0 to 5	%; ^	or $\checkmark \checkmark$ = 5 to 10%; $\land \land \land \land$ = more than 10%. Source: own table

86. The summary of the frequency, capacity and price analysis

The merged Lufthansa increased average seat capacity by 23 percent²⁴⁴ due to equipment capacity increases: they built additional seats in the aircraft and switched to bigger planes. Increased seat capacity might result in cost synergies (better economies of scale) when correlated with higher load factors; however, that was not the case on the analyzed routes.

The next and final chapter analyzes sources of potential merger-specific cost synergies.

²⁴⁴ Especially interesting are the ZRH-CPH and ZRH-WAW routes, where LH and LX doubled seat capacity while keeping the frequency constant. The detailed analysis shows that as a consequence, Scandinavian Airways lost its market share (from 70 to below 30 percent on CPH), while the other competitor, LOT Polish Airlines (to WAW with a 60 percent presence premerger), slowly disappeared from the schedule.

7 EFFICIENCY GAINS FROM LUFTHANSA MERGERS

"If economists could manage to get themselves thought of as humble, competent people, on a level with dentists, that would be splendid" (Keynes, 1930, p. 332).

7.1 INTRODUCTION

Keynes's words are eternal, and economists are still not as efficient as dentists. When it comes to efficiency, the role of economics in the competition policy environment is inferior, despite many attempts to include efficiency considerations.²⁴⁵ The motives for airline takeovers are to increase efficiency and market presence. The European Commission has traditionally placed weight on the latter (i.e., market share), which is associated with concentration and market power. Chapter **6** showed that there is evidence for increased market power and strategic behavior after the takeovers. Economists, as introduced in Chapter **1**, also call attention to efficiency and argue that concentration is not necessarily bad. Mergers might enhance efficiency, so they might be beneficial for everyone.

Chapter 2 highlighted the fact that the current European merger regulation (ECMR, 2004) started to assess efficiency claims. Airlines appreciate this approach and commission detailed efficiency studies on the synergy effects of mergers. However, these studies have all been rejected by the EC. The result is often confusion on both sides. Merging companies invest in complex studies to assess efficiency gains just to learn that these studies will be refused. The authority has to check the claims, but since this is always controversial with the applied welfare standard, it has to reject it. That is the current state on the changing procedure in the EC.

Chapter 7 will present a partial performance analysis of the Lufthansa Group. This analysis will try to identify merger-specific efficiencies and ask whether considering efficiency in merger procedures would significantly affect the outcome of the EC's merger decisions.

Section **7.2** will first explain the overall performance of the growing Lufthansa Group with the help of partial performance indicators (described in Section **5.2**), such as labor and capital (aircraft) productivity from 2004 to 2013. Section **7.3** will compare Lufthansa's forecasted and realized efficiency claims from the merger decisions and from the LH annual reports. This section will attempt to assess merger-specific synergies with own expertise, which could be used for future consideration by the EC. Section **7.4** will conclude with the findings.

²⁴⁵ As introduced in Chapter 1, efficiency can be divided into allocative (efficient resource allocation), productive (resource allocation within the firm), and dynamic (e.g., R&D and innovation) efficiencies.

7.2 PARTIAL PRODUCTIVITY ANALYSIS

"We are writing the next chapter in our success story" (LHG 2007, p. 1).

Before deriving potential synergy effects, I will briefly introduce the general cost structure of the Lufthansa Group (LHG). All data in Chapter **7** stem from the LHG's annual reports from 2005 to 2014. The analysis investigated developments within the LHG and, in order to remain transparent and comprehensible, excluded comparison with other main carriers.

In the airline industry, it is difficult to distinguish between fixed and variable costs. Assuming fixed networks, only few input factors could be defined as variable (e.g., variable sales and distribution costs, passenger-related airport, handling and security fees, variable catering and fuel costs). Assessing only those costs would result in a distorted picture.²⁴⁶ In the following text, if not indicated otherwise, the analysis uses total costs in nominal ²⁴⁷ terms. The first figure illustrates the LHG's total cost development between 2004 and 2013.²⁴⁸



87. Cost development at the Lufthansa Group (in €m), 2004-2013

Source: own figure

While all cost elements were relatively constant before 2004, we can observe a slight increase in staff costs, doubling fees and charges and rising fuel costs since 2005. The next section will explain the development of each of the expenses. For an overview of productivity measures, such as the advantages and disadvantages of partial productivity indices, see Section **5.2** about airline benchmarking.

²⁴⁷ Nominal values are deflated and exchange rate fluctuations are assessed in the detailed analysis later if the difference significantly changes the results. In general, bookkeeping values from the official annual report provide a more comprehensive picture, since it would be difficult to reconstruct where exactly costs arose from, in which country and at which inflation rate, and in which currency and on which exact date. Therefore, normalizing the data would result in more distortion.

²⁴⁶ I would like to thank Sven Martens for the background idea and the useful comments on airline efficiency analysis.

²⁴⁸ 2009 seems to be an outlier due to the financial crisis. First, revenues per employee decreased by 14 percent in 2009 compared to 2008. Second, because the number of employees increased faster than the number of supplied and demanded seats, the ASK and RPK per employee figures also showed a short backflow. Third, aircraft utilization dropped in 2009 down to 7.4 hours. Finally, kilometers flown per aircraft also dropped to a historical low of 4,500 by the end of 2009.

7.2.1 LABOR PRODUCTIVITY AND STAFF COSTS

The Lufthansa Group had almost 120,000 employees in 2013, 33 percent more than in 2004. The LHG had fewer employees in 2005 than in 2004, and also cut jobs in 2012 and 2013 (see the figure below).

*Average labor costs*²⁴⁹ have not increased significantly in the last ten years: the LHG spent barely 10 percent more on staff salaries in 2012 than in 2004, but unit staff costs increased in 2013 by an additional 10 percent. Unit staff costs increased, parallel to the German labor costs index²⁵⁰, by 20 percent within ten years, while *unit revenues*²⁵¹ improved twice as much (by 40 percent from 2004 to 2013).



88. The Lufthansa Group's employees and average unit staff costs (in €), 2004 to 2013

The main indices of labor productivity – *average seat km* (ASK²⁵²) per employee and *revenue passenger km* (RPK²⁵³) per employee – significantly increased between 2004 and 2013 (see the figure below). While a Lufthansa employee on average produced 1.1m revenue passenger kilometers in 2004, the same employee on average handled close to 1.8m revenue passenger kilometers in 2013, which is a 59 percentage rise in labor productivity.





²⁴⁹ Average labor costs, also called unit staff costs, are calculated by dividing total costs by the total number of employees.
²⁵⁰ Normalizing the unit staff costs according to the German labor cost index would not significantly influence the results, since total staff costs increased between 2004 and 2013 by an annual 1.67 percent (Statistisches Bundesamt, 2016).

Source: own figure

²⁵¹ Revenue per employee, also called unit revenue, is calculated by dividing gross sales by the total number of employees.

²⁵² ASK is the measure of available seat kilometers (Available seats x km flown).

²⁵³ RPK is the measure of revenue passenger kilometers (Paying passenger x km flown).

Labor costs used to have the highest share in the Lufthansa Group's cost structure with 21 to 27 percent (see Figure 89). Unit staff costs at Lufthansa have not increased more than the overall German labor cost index, while employees have become more productive and produced close to 60 percent more revenue passenger kilometers in 2013 than in 2004. Employees at the LHG became more productive and comparatively 'cheaper.' While the total cost of an RPK first increased during 2005 and 2006, *labor costs per RPK* remained constant and, together with the total costs of an RPK, started to decrease in 2007. As the following figure illustrates, *unit cost* at the LHG,²⁵⁴ in the form of total costs per RPK and total costs per ASK, significantly decreased during 2007, 2008 and 2009, but hardly changed between 2010 and 2013 (in nominal terms).



90. Total costs per RPK and per ASK at the Lufthansa Group (in €), 2004 to 2013

Source: own figure

Fuel costs, and airport fees and charges have been the next relevant cost sources, so the analysis in the following section will focus on their development, such as on flight equipment productivity.

7.2.2 AIRCRAFT PRODUCTIVITY, FUEL COSTS AND AIRPORT CHARGES

The Lufthansa Group almost doubled their number of aircraft from 2004 to 2009, though the number started to decrease afterwards (see the figure below). The significant increase in 2009 was due to the Austrian Airlines (102 aircraft) and bmi (67 aircraft) takeovers, while the drop in 2012 was mainly caused by selling bmi. LH itself owned 317 aircraft in 2009.²⁵⁵

²⁵⁴ The LHG, with its $\notin 0.1269$ unit costs (costs/ASK) in 2004, has been relatively good compared to other European network airlines (the average for Lufthansa, Air France and British Airways has been $\notin 0.1285$). However, easyJet's unit costs have been 60 percent, while Ryanair's have only been 36 percent of the network carriers' unit costs (IATA, 2016, p. 24).

²⁵⁵ In 2014, the Lufthansa Group consisted of only 615 transport planes: 423 aircraft belonged to LH (including Germanwings and regional airlines), 92 to Swiss, 80 to Austrian Airlines, and 20 planes operated for Lufthansa Cargo. The fleet is heterogeneous, though with a high share of the following aircraft types: Airbus A319 (73 planes), Airbus A320 (72), Airbus A321 (62), Embraer (43), and Airbus A340 (42) (LHG, 2014). 55 aircraft are leased and the rest belongs to LH Company.



91. Number of passenger aircraft, 2004 to 2013

The *kilometers flown per aircraft* on an average day fluctuated in the meantime. Lufthansa aircraft flew about 5,800 km per day in 2004, and an average of 5,900 km per day in 2013. Though LHG aircraft flew fewer kilometers per day after 2004 and spent less hours in operation (with the exemption of 2008), the *distance flown within one operating hour* improved from 590 km in 2004 to 605 km in 2008. With the takeover of the mainly regional short-haul networks of Austrian Airlines and bmi in 2009, the average kilometers flown per block hour decreased (see below).





Source: own figure

Parallel to the growing fleet, *fuel costs* became the second main sources of total costs. While fuel costs accounted for 10 percent of total expenses, this proportion more than doubled in 2013 to 22 percent. The main drivers of the cost increase were oil and kerosene prices.

The Lufthansa Group's *load factor*²⁵⁶ fluctuated between 74 and nearly 80 percent within the investigated period, which is close behind the averages of LCC competitors Ryanair and easyJet, but similar to network carriers KLM/Air France or British Airways (see in Section **5.3.4**). Next to the load factor, *block hours*²⁵⁷ per plane and block hours per day indicate the utilization of aircraft. Block hours per day (all aircraft together) improved by 67 percent compared to 2004 parallel to the increased number of aircraft (65 percent more in 2013 than in 2004). The LHG's airplanes already spent 9.8 hours in operation per day in 2004, while the average was 9.9 hours in 2013.

²⁵⁶ The load factor is the difference between ASK's and RPK's and shows the rate of the sold seats on the plane.

²⁵⁷ Block hours are hours spent in operation from closing the airplane doors until opening them at the destination airport.

The following figure illustrates the average price increase of crude oil and jet fuel kerosene. While the average kerosene price per barrel (42 gallons or 159 liters) was around \$48 in 2004, the price almost doubled by 2007 and even tripled by 2008. Oil prices fell sharply in 2009, but became expensive again by 2011 and 2012.





The third biggest (variable) cost source are *airport fees and charges*. Total expenses on fees and charges more than doubled between 2004 and 2013. The sharp 12.4 percent increase in 2007, for example, was "due to initial consolidation of SWISS. Without this effect they (fees and charges – the author) would have been 3.3 percent higher" (LHG, 2007, p. 48). However, the increase in fees and charges per flown km in EUR, from 2004 to 2013, was only 21 percent.

The nominal development of *unit costs per mile*²⁵⁸ at the Lufthansa Group between 2004 and 2013 can be calculated as shown in the following figure, which also assesses the exchange rate development. In general, average costs in EUR increased after both merger waves in 2005 and 2009, but there were limited cost efficiencies in 2007 and 2008 due to better labor productivity. Despite growing average costs after both merger waves at first sight, the next section identifies merger-specific cost synergies.





Source: own calculations based on eia (2016).

Source: own figure

²⁵⁸ Unit costs per mile were calculated by dividing total costs by all flying miles for every year. The data stem from the Lufthansa Group's annual reports and have been converted into miles and \$ (according to the OECD yearly average exchange rate) to make them comparable to the yield per mile results in Chapter 6.

7.3 MERGER-SPECIFIC EFFICIENCY GAINS AT SWISS

"The efficiencies are not verifiable and, to a large extent, are not merger specific, and it is not likely that they would benefit consumers on the affected routes to the extent that the efficiencies would counter-balance the competitive harm" (§409, p. 112); "LH's efficiency claims appear to be largely based on documents that were produced for the purposes of this investigation rather than on business documents" (§410); "LH's statements about lower aircraft financing and purchasing costs are based on questionable estimates" (§411); "contains extremely simplified calculations to evaluate the cost savings (...) not discounted, and the lack of reasonable estimates of the flow of annual cost savings over time and of sensitivity analyses regarding the strong underlying assumptions is problematic" (footnote 313, p. 113) - the EC on Lufthansa's efficiency claims at the SN Brussels case (M. 5335).

Partial productivity indicators showed significant development in both labor and flight productivity between 2004 and 2013 at the Lufthansa Group. Despite exploding fuel costs and more expensive airport charges, the average costs of an RPK continuously decreased. The key element of this improvement is labor productivity, as unit labor costs per RPK decreased by 24 percent. *Is the access to cheaper labor, thus lower wages, the main driving force of merger-specific efficiencies?* This section describes how reasonable merger-specific efficiencies have been at the SWISS takeover.

7.3.1 AN OVERVIEW OF POTENTIALLY MERGER-SPECIFIC EFFICIENCY GAINS

As discussed in Chapters **2** and **3** (see Tables 17, 18 and 19), merger-specific efficiency gains may arise from 1) cost decrease, 2) revenue increase and 3) extending the network. The EC could only accept (variable) cost savings (see Chapter **2**), since revenue synergies are interpreted as profit increase from dominant (or monopoly) pricing and the relevant market definition does not consider network spillovers.

However, the EC did not consider any efficiencies in the LH takeover cases,²⁵⁹ though Lufthansa forecasted merger-specific benefits from cost and revenue synergies. Our joint research paper (Fröhlich et al., 2013) gives an overview of potential and realized synergies and describes whether the decisions to merge with smaller alliance partners and competitors were profitable.

In general, there could be several sources of synergies: restructuring, integration in cargo and sales; a multiple hub strategy with increasing network quality and higher flexibility; lounge access and ground process; more frequencies; realigned timetables; better connections; new markets and destinations including slots; and bilateral cooperation (i.e., code-share). The following table provides an overview of Lufthansa's efficiency claims.

²⁵⁹ The first time Lufthansa claimed efficiency was when LH increased its shares in Brussels Airlines up to 45 percent (M. 5335, 2009). Brussels Airlines did not belong to any major alliance. The deal expanded the LHG's network by 18 new destinations in Africa (Mayrhuber, 2009). Morgan Stanley estimated potential yearly synergies of €60m, compared to a €12.2m loss by the Belgian flag carrier in 2008. The EC heavily criticized Lufthansa's analysis, questioned LH's positive comparison with SWISS and clearly refused all efficiency claims (M. 5335). Despite the critique, the EC finally approved the takeover, affirming Davignon, Chairman of the Board, who proposed that "a joint future with Lufthansa provides us with the best chance of operating successfully against the competition" (Brussels Airlines, 2008).

Lower fixed and variable costs due to LH's purchasing power and financial strength				
a. Lower aircraft purchasing and financial costs				
b. Lower fuel costs				
c. Lower costs of MRO services (maintenance, repair, overhaul)				
d. Outstation staff and ground handling				
Route-specific scheduling benefits and cost reductions on overlapping routes				
a. Optimizing capacity utilization				
b. Optimizing scheduling				
Integration into LH's loyalty program Miles & More				
Network benefits				
a. Maintaining and				
b. Opening new routes				

95. Lufthansa's synergy claim concerning the Brussels Airlines takeover in 2009

Source: M. 5335 (2009), p. 111ff

The following investigation, like the European competition policy approach, focuses on the costs side and tries to simulate cost efficiency gains from the, in Lufthansa's own interpretation, SWISS takeover 'success story.' Both the EC and LHG management questioned the existence of synergies at all. In Lufthansa CEO Franz's interpretation: "synergies had not yet been realised and, to some extent, the original deal logic had been overruled by adverse market conditions" (CAPA, 2013b).

This section will identify merger-specific efficiency gains from the SWISS takeover, but I need to point out that it is very difficult to isolate the merger-effects from the overall post-liberalization trend to improve productivity.

In its annual reports, Lufthansa (in sum of totals from 2005, 2006, and 2007) forecasted high synergy gains (\notin 326m) and realized even more (\notin 467m) by the end of the full integration process²⁶⁰ in 2007 (see the table below). Lufthansa itself did not reported merger-specific synergies in 2010 and later; efficiencies rather resulted from the general cost saving plans SCORE²⁶¹ and Climb 2011.²⁶²

After subtracting integration costs, net synergy gains became \notin 225m (forecasted) and \notin 421m (realized) respectively. According to the annual reports, efficiency gains from cost savings at the end of a given year amounted to \notin 213m, while revenue synergies amounted to \notin 254m.

 $^{^{260}}$ The EC allowed the 100 percentage takeover of SWISS by Lufthansa, though the full integration process took more than two years after the contract was signed in March 2005. By the end of 2006, 62 out of 67 traffic rights had been secured, mainly in the USA and Canada (LHG, 2006). Thanks to the SWISS merger, Lufthansa Group expanded its network by at least 62 slots in 2006, which were valued at €118m five years later (LHG, 2011).

²⁶¹ SCORE, a complex efficiency and profitability improving program of the LHG to increase operating results up to \in 1.5bn, partially due to cost savings, started in 2012 (originally until the end of 2014). SCORE stands for Synergies, Costs, Organization, Revenue, and Execution (LHG, 2005, p. 13).

²⁶² Climb 2011 was an LHG cost efficiency plan with the aim of improving company results by up to ϵ 1bn by the end of 2011. It contained, for example, a general 10 percent staff cost reduction (ϵ 190m); cutting staff by 20 percent (ϵ 55m); savings at suppliers (ϵ 230m); reviewing fleet structure (ϵ 130m); and revenue synergies (ϵ 170m) (LHG, 2009, p. 23).

"Lufthansa and SWISS both benefit equally from these synergies – around 43 percent accrued to Lufthansa in 2007, and 57 percent to SWISS" (LHG, 2007, p. 74). There was, however, a general \in 1.2bn cost saving program called "Action Plan" in the background between 2004 and 2006, which raises doubts about the merger-specificity of the overall cost savings.

		Forecas	sted by LH	I	Realized by	LH ²⁶³
Year	Revenue	Costs	Costs of SWISS's	Revenue	Costs	Costs of SWISS's
			Integration			Integration
2005	15	15	-62	14	18	-17
2006	32	40	-39	111	91	-29
2007	120	104	-	129	104	-

96. Synergies generated by the LH/SWISS merger (in $\ensuremath{\in} m)$

Source: LHG (2005), pp. 13-17; LHG (2006), p. 39; and LHG (2007), p. 74.

SWISS had been successfully restructured by the end of 2007. LH announced further synergy gains of €165m for 2008 and €230m from 2010 on (LHG, 2009, p. 19). The annual reports for the challenging year of 2009 and later did not realize synergies from the SWISS merger.

7.3.2 COST EFFICIENCIES – REDUCED SALES COMMISSIONS, INSURANCE, FEES AND CHARGES, AND MRO

The question of this section is the source of the cost synergy gains from the SWISS merger. Cost synergies are complex to relate to the takeover, but the following analysis will try to find merger-specific cost efficiencies by studying Lufthansa's annual reports. The following figure illustrates the *unit costs* (total costs per RPK)²⁶⁴ from 2004 to 2013 and shows a slightly diminishing cost tendency since 2006.



97. Costs per RPK at the Lufthansa Group (in €), 2004 to 2013

Source: own figure

²⁶³ According to Lufthansa Group's Annual Reports at the end of the given year.

²⁶⁴ These total cost values might be underestimated, since the annual report refers to all flights and intercontinental operation generally have lower unit costs. However, since all routes in the sample are intra-European short-haul (less than three hours) services, the distortion grade is similar and therefore suitable for using as a cost dummy.

In 2005, the Lufthansa Group realized \notin 18m in cost synergies from the SWISS takeover, while the LHG's total revenue exceeded \notin 18bn that year (LHG, 2005, p. 77). Thus, realized cost savings amounted to less than 0.1 percent of the total turnover, but (since LHG had a positive operating result) even less than a percent of the total costs.

The main savings at the LHG in **2005** were due to 1) \in 128m less in sales commissions paid to agencies (\in 662m instead of \in 790m in 2004) and 2) \in 23m less in flight operations insurance-related expenses (\in 60m instead of \in 83m in 2004) (LHG, 2005, p.91). Additional cost saving actions were implemented at SWISS: they decreased their fleet by 11 airplanes; they switched to larger aircraft within Europe; they built lighter seats into the A320 fleet in order to reduce weight and kerosene consumption; and they reduced ground times within Europe from 40 to 30 minutes. The result is slightly shadowed by the fact that the realized \in 18m cost synergies were achieved by investing \in 17m in integration costs (see Table 97). In that year, only \in 6m in additional staff costs were related to the enlargement (ibid, p. 90), mainly because the new employee contracts, which were negotiated at SWISS with ground staff, cabin crew and pilots, entered into force in April 2006 (ibid, p. 17).

In 2006, the LHG announced €91m cost synergies (minus integration costs of €29m) from the SWISS merger. Although unit costs at the LHG generally increased in every term that year, sales commission paid to agencies further decreased by €29m (down to €633m in total). According to the LHG (2006, p. 39), cost savings stemmed from 1) distribution (i.e., merging Lufthansa's and SWISS's check-ins and lounges at airports) and 2) process optimization (especially with Lufthansa Cargo).²⁶⁵ Wages and salaries hardly increased (from €3,912m to €4,007m), despite the takeover of 2,075 Eurowings employees (ibid, p. 128).

However, a general cost saving program called "Action Plan" was running in the background at the LHG from 2004 to 2006. In 2006 alone, the program accounted for \notin 420m in cost reductions. The main sources of these savings were new contracts with external providers (e.g., ground handling) and reduced airport fees and check-in charges at Frankfurt and London airports, which enabled decreased commissions. New negotiations with internal providers resulted in outsourcing of MRO, IT and catering services: this saved over \notin 300m in costs within three years. It is hard to distinguish whether the cost synergies in 2005 and 2006 stemmed from the SWISS merger or from the general cost savings program.

²⁶⁵ It is worth mentioning that in 2006, Lufthansa agreed to pay \$90.3m in a cartel process in connection with air cargo price fixing, but finally received full immunity from fines under the EC's leniency program. The EC imposed the third highest cartel fine in its history (€799.5m) on November 9, 2010; it was imposed on 11 air cargo airlines who fixed prices related to fuel and security between 1999 and 2006. (Probably as a consequence, the LHG's security fee went up by 19 percent in 2007 compared to 2006.) Thanks to the leniency program, Lufthansa and SWISS received full immunity from fines because they detected the cartel. In comparison, Air France had to pay €183m, KLM €127m and British Airways €104m (EC, 2010). The decision of COMP/39258 (2010) was provisionally published on May 8, 2015.

In 2007, LH reported €104m in cost synergies from the full integration of SWISS (LHG, 2007). Cost savings came from reduced unit staff costs and other operating expenses that were relatively cheaper. The declining exchange rate of Swiss francs benefited the LHG as well, since costs in francs at SWISS were labeled lower (ibid, p. 41). In general, "operating expenses went up by 10.8 percent, which is well below the increase in operating income" (ibid, p. 48). In comparison, traffic revenue increased by 16.8 percent in 2007 (ibid, p. 73).

2007 was the first year when SWISS's numbers appeared in the consolidated LH report, which therefore provides a good comparison to 2006. A rough estimate of the reduced *unit operational expenses per passenger* (thus cost savings of ca. \in 54.2m at SWISS) might be calculated as follows. The LHG (2007) listed \in 16bn in operating expenses from passenger transport in 2007, compared to close to \in 14bn in 2006 (ibid, p. 73). Dividing the total operating expenses by the number of carried passengers, we obtain the unit cost of a passenger at about \in 255, which is \in 4.44 less than in 2006. Thus, if we project the unit savings of 12.2m passengers carried by SWISS, we attain a roughly \in 54.2m cost savings at SWISS.

Efficiency gains from the \notin 4.44 per passenger net cost savings came from relatively cheaper external MRO services (ca. \notin 2 saving per passenger), relatively reduced fees and charges (by \notin 1.16), less average sales commission paid to agencies (by \notin 1.05), diminished rental and maintenance expenses (by \notin 0.64) and reduced staff costs (by \notin 0.34). However, lease payments, external staff expenses and fuel costs per passenger increased in 2007. When the per-passenger savings are multiplied by the number of carrier passengers at SWISS in 2007 (thus by 12.2 million), we achieve the accumulated cost savings presented in the figure below. Based on my calculations, which were based on the annual reports, the figure illustrates total savings of \notin 69.4m, but also cost increases of \notin 15.2m in operating expenses at "Lufthansa Passenger Transportation," which together equals a net \notin 54.2m cost savings in 2007 compared to 2006.



98. Efficiency gains from unit cost savings at LH Passenger Transportation in 2007

Source: own figure

These cost saving are hypothetical and assume that SWISS had the same cost structure (and the same per passenger unit costs) in 2006 as the Lufthansa Group. The higher costs SWISS had before, the higher the hypothetical cost synergy effect would be. Therefore, if SWISS's costs overcame the LHG's costs before, the estimate of \notin 54.2m is the minimum merger-specific cost efficiency in 2007 due to the Lufthansa merger.

7.3.3 COST EFFICIENCIES - LOWER WAGES IN THREE LUFTHANSA DEPARTMENTS

As the analysis in Section **7.2.1** showed, general cost savings were mainly related to labor productivity. Additionally, *unit staff costs*²⁶⁶ decreased by €345 from 2005 to 2007 in spite of the very expensive year 2006, during which the LHG took over 2,075 Germanwings staff, and pension costs and other employee benefits increased the unit employee costs at the LHG by €706 per person. The LHG recruited 10,751 new personal (including 7,160 SWISS employees) with at an average cost of €43,642 (LHG, 2007, p. 73 and 133) in 2007. The following figure shows the development of unit staff costs at the LHG.



99. Unit staff costs development at the Lufthansa Group (in €), 2005 to 2007

Source: own figure

When separating the employee cost structure development into different working segments, the following statements can be made. First, staff cost savings in the biggest²⁶⁷ Lufthansa department (Passenger Transportation) played the most significant role, since 8,820 new employees decreased the average costs in this area by 5 percent between 2006 and 2007.²⁶⁸

²⁶⁶ Staff costs divided by number of employees.

²⁶⁷ 45 percent of all staff costs at the LHG were related to "Passenger Transportation" in 2007.

²⁶⁸ Assuming existing staff received the same salaries in 2007 as in 2006, the delta staff number 2006/2007 divided by delta staff costs 2006/2007 yields a new unit staff cost of €48,413 for the year 2007. In other words, while existing staff received a gross €65,920 average salary in 2006, newly recruited (or overtaken) staff in 2007, given other equal circumstances, started with a gross average of €48,413.

If the LHG would have paid the same salaries for new staff in "Passenger Transportation," the airline group would have had more than €154m higher staff costs alone in this segment.

Second, changes in catering staff in 2007 resulted in a \notin 76.4m cost savings. While the second biggest²⁶⁹ department (Lufthansa Catering) employed 1,546 more staff, they had fewer total costs in 2007 than in 2006. Following the previous thought, every new staff member in catering had a negative price, thus would have had to pay \notin 17,464 to work for the company. Because this is, of course, nonsense, we need to find another explanation.

The LHG asserts the following: "In addition to significant efficiency gains in all countries, the weakness of the dollar against the euro also played a role, as did the fact that the one-off payment as part of the new wage settlement in the USA no longer had an impact and the agreed measures began to take effect (...) new recruitment took place in growth markets especially" (LHG, 2007, p. 97). That statement proves the assumption from the beginning of the section that access to cheaper labor markets ("growth markets especially") is a merger-specific cost efficiency gain.

The third biggest source of cost savings (\notin 20.3 m staff cost savings in 2007) was the smallest Lufthansa department (Service and Financial Companies). While the department hired 131 more employees, they had \notin 10m less in total staff costs (\notin 84m instead of \notin 94m) in 2007 than in 2006. That means the hypothetical marginal cost of one new employee ²⁷⁰ was \notin -76,336. In other words, keeping the incumbent staff's wages constant, every new employee would have had to pay Lufthansa over \notin 76,000 to work for the company in 2007. However, if new employees in 2007 would have received the same gross average salaries (\notin 78,464) as existing staff in 2006, Lufthansa would have had \notin 20.3m more staff expenses that year.

These cost saving calculations are hypothetical and based on opportunity costs savings, given the average salaries of existing staff stay ceteris paribus. New negotiated job contracts, especially part-time instead of full-time, could explain the drastic reductions in average wages in 2007. We only know that the average age of Lufthansa employees was 40.3 years, they were 58 percent male and 26.8 percent of all staff worked part-time (LHG, 2007, p. 62).

²⁶⁹ 29 percent of all staff costs at the LHG were related to "Lufthansa Catering" in 2007.

²⁷⁰ When dividing delta staff costs €-10m by delta employee numbers -131.

7.4 CONCLUSIONS

Chapter 7 investigated efficiency gains within the Lufthansa Group and tried to identify merger-specific efficiencies from the SWISS merger.

Section **7.2** analyzed partial productivity indices in general at Lufthansa and found that *labor productivity* was the driving force behind the development. Revenue passenger kilometer per employee expanded by 59 percent by 2013 compared to the pre-merger situation in 2004. Employees at Lufthansa not only became more productive, but even became relatively cheaper. This contributed to the result that, despite tripling fuel costs and doubling airport charges, *unit costs* in terms of total costs per RPK decreased by 15 percent, while they decreased in terms of total costs per ASK by 6 percent between 2004 and 2013. Improving load factor at the LHG explains the difference. At the same time, flight equipment productivity fluctuated.

Section 7.3 introduced the forecasted and realized merger-specific synergies in the Lufthansa mergers and controlled them with our own expertise. When concentrating on the SWISS case, the analysis found about a \in 157m cost savings in agency commission fees (in 2005 and 2006), \in 23m in savings related to insurance and security fees (in 2005) and at least a hypothetical \notin 54.2m unit passenger cost savings thanks to additional SWISS passengers (in 2007). In sum, at least \notin 234.2m could have been identified as probable merger-specific cost savings. In comparison, Lufthansa reported \notin 213m *in cost synergies* from the SWISS takeover in the first three years post-merger. There were no reported synergies later on.

Alternatively, following the 'access to cheaper labor approach,' a hypothetical opportunity cost investigation found a possible €250.7m in cost synergies alone in 2007 due to lower wages in three Lufthansa departments, in particular due to outsourcing and new employee contracts.

In summary, cost synergies were located in 1) economies of scale in marketing (reduced sales commission, insurance and security fees) and in 2) access to cheaper labor (outsourcing MRO and catering, and new contracts with cabin staff at SWISS). Assessed cost synergies were probably merger-specific and mostly driven by the merger (but also by a general cost savings plan in the background), though one should consider the circumstances and the long-run effects of short-run savings.

SUMMARY

Chapter 1 introduced the theoretical background of the efficiency defense and explained that the Chicago School has challenged US antitrust policy since the 1970s. Chicago School economists view concentration as evidence for efficiency and would therefore promote it. The deregulation wave during the Reagan presidency in the 1980s was dominated by the Chicagoan influence. In contrast, the Harvard School has had a dominant influence in the European Commission, which continues today. The Harvard School approach, while protecting consumers, also emphasizes concentration as a sign of market power. Chapter 1 compared Harvard and Chicago Schools, derived syntheses on competition policy and asked: *Which economic concepts provide the most appropriate tools and the best suitable analytical framework for assessing market power and efficiency within merger control?*

The main purposes of European competition policy in the new century are efficiency and consumer welfare, but these goals are in conflict. Consumer welfare is preferred to firms' efficiency. The recent merger regulation (ECMR, 2004) only allows efficiency considerations if consumers are not harmed by a potential price increase. It therefore prescribes that efficiencies must be merger-specific, verifiable and beneficial to consumers. These criteria are challenging to prove.

Williamson's efficiency defense, the efficiency trade-off model is only applicable under the Total Welfare standard, allows welfare transfer from consumers to producers. In contrast, the EC focuses on protecting 'consumer welfare' in the framework of the Consumer Surplus standard. The main obstacle to introducing an efficiency defense is the definition of welfare with a weight on the consumer side.

The EC is generally skeptical of efficiency claims, which the ICN (the International Competition Network) called "speculative" elements (2006, p. 61). Existing literature supports this view. **Chapter 2** revisited the literature on efficiency gains at different stages of airline cooperation and explained the limitations to considering efficiencies. The research question of Chapter 2 was: *Why did the EC refuse the efficiency gains of airline takeovers but still allow the mergers?*

Merger decisions within the EC are based on the merger's potential anticompetitive effects, but they are used to reject potential efficiency gains. The EC applies the Structure Conduct Performance (SCP) model developed by Harvard School economists, in which a concentration usually results in higher prices and less output. Hence, the economic model presumes that new oligopoly price is above the old price. Thus, as long as a merger leads to a marginal price increase (a loss in consumer surplus), it harms consumers. Harming consumers excludes any efficiency considerations.

In other words, even if the current merger regulation would allow higher-price-but-higher-efficiency counteraction, the applied oligopoly framework excludes any trade-off because a potential price increase harms consumers. It is a paradox of legislation.

Existing literature shows that efficiencies from mergers probably exist, but in the presence of market power, these efficiencies are not going to be directly passed through to consumers. Efficiencies do not result in cheaper ticket prices, but might improve quality and variety. The EC does not directly measure these efficiencies, but takes them into account.

The aim of **Chapter 3** was to introduce models with future relevance for European airline mergers that would measure price and efficiency effects. The research question was: *How should the price effects of airline consolidation and merger-specific efficiencies be measured?*

Most efficiencies can already be exhausted on the strategic-alliance level. Merger-specific efficiencies arise from a) decreasing costs, b) increasing revenue and c) extending the network. These efficiencies can be measured descriptively by regression analysis or merger simulation models. In the absence of internal (marginal) cost data, supply-side efficiencies (changes in costs, particularly due to network effects) are difficult to calculate. Both qualitative and quantitative analysis therefore focus on the demand side, especially on airline pricing. There are models to calculate the minimum required efficiency (MRE) to compensate price increases or even the pass-through rate (PTR), in which extended efficiencies would be passed through to consumers.

Most models predict a significant (7 to 26 percent) price increase on overlapping routes, but no direct efficiency gain. The conclusion is that even if there were efficiencies, they would not be passed through to consumers. Frequency arguments, as part of the quality improvements, are often used as an example of an efficiency gain by merging airlines. We developed a model to try to estimate the minimum decrease in price required for the passengers to compensate for a given decrease in frequency. The model is also applicable to calculate the value of a new frequency depending on the existing number of frequencies (e.g., if there are already five daily connections, an additional frequency on a route has a value of $\in 11.70$. With other words, passengers would pay up to $\in 11.70$ for the quality improvements in frequency, but if the price increase is more than $\in 11.70$, passengers are worse-off.).

Chapter 4 evaluated the EC's theoretical merger framework with a focus on relevant market. Quality and variety arguments influenced the EC's merger approval. The main question of the chapter was: *How much did the more laissez-faire Chicago School approach influence EC merger control in the last 20 years?*

The EC has broadened its market definition by airport, mode of transport and flight substitution concerning leisure passengers since 1995. By definition, concentration is lower in a broader market, and mergers are therefore less harmful. The more laissez-faire approach might explain the merger approvals in the 2000s, even without quantitative efficiency claims. Mergers, most of them with remedies, have been cleared due to quality and variety reasons.

Quality and variety has also appeared in the EC's relevant market definition. Variety includes a variety of substitutes (e.g., railway, indirect flights, LCCs and secondary airports within 100 km or a one-hour driving distance). The result is a broader relevant market, where the merger hardly increases concentration and thus does not raises concerns about market dominance. This is particularly true on the leisure (non-premium) market, where passengers are price sensitive but not time sensitive. Increased quality (e.g., improved schedule and extended FFP) might benefit business (premium) passengers, who are time-sensitive but less sensitive to price changes. The EC first considered quality increases from network effects in 2004 during the KLM/Air France takeover concerning corporate (business) passengers. However, the exact network effects remained indefinite. In sum, more variety benefits leisure passengers, while quality improvements benefit business passengers.

The convergence of EC merger policy with US antitrust has been successful, in part. Attempts to improve merger policy include gathering efficiency (at least theoretical) into the main goals of the EC; introducing the effect-based more economic approach; implementing remedies to motivate competition; testing econometric methodologies (e.g., SSNIP, CLA and fixed-effects price correlation); and precisely separating different markets (consumer groups).

Competition policy aims to ensure intense competition in order to maintain or improve economic welfare. If a takeover is not allowed, inefficient airlines might fail and leave the market. Therefore, at this point, the thesis investigated the fail option.

Chapter 5 introduced the benchmarking approach to measuring and explaining airline performance (i.e., efficiency) and inefficiency. The research questions of the case studies in this chapter were: *Which factors lead to a bankruptcy of a carrier and what can we learn from it? What are the consequences of airline exits from the consumer point of view?* The chapter provided insight into why carriers fail and what happens if an airline leaves the market without government intervention.

The first case study focused on Malév Hungarian Airlines, an inefficient Central Eastern European flag carrier. The case study addressed the features of a permanently failing organization and found that management is the main obstacle to developing performance. The continued support of stakeholders, based on misbeliefs, worsened performance and led to permanent failure.

On February 3, 2012, Malév grounded all its aircraft after the Hungarian government stopped funding the loss-making carrier following the EC's finding that such support is illegal. The EC's decision to rule against state aid was due to the government's failure to credibly make the case for continued support.

The tendency in Europe is that less efficient carriers will either be taken over or become insolvent. Therefore, I assume that market stability might be another reason behind the EC's soft merger policy, which accepted the failing firm doctrine in airline cases as recently as 2013 in the Aegean/Olympic takeover. The failing firm doctrine states that exit is unavoidable in the absence of a takeover (given no less anticompetitive purchase alternative). However, this argument could also protect takeover firms from new competition since, in case of an exit, market conditions should promote new entry and competition.

The second case study on Malév's failure examined the conditions of airline network replacement after bankruptcy. The question is therefore: *can new entry in the short run fill the gap caused by airline exits?* It found assorted evidence: leisure passengers probably benefited from immediate LCC entry, while business or connecting passengers suffered losses. The study estimated the minimum price reductions required to compensate passengers for lower frequency and found that passengers on 11 routes might have been compensated. Passengers on the other 40 affected routes were probably worse off in the first year after the bankruptcy event (e.g., the route Budapest-Goteborg reduced daily frequency from 2 to 1, which might have required a \in 53 price reduction as compensation for passengers to be better-off). We concluded that both the passenger mix and the airport's reaction affect new entry. The results are of special interest since the exit scenario could be the default option without the EC's merger permission. The policy relevance of the results is that the application of the failing firm doctrine is questionable if immediate new entry in a short period can be expected.

Chapter 6 gave insight into the failure of regulatory approaches that are applied as remedies and the problems of regulating market power. The main questions were: *Did the EC's remedies prevent market power? Is the abuse of market power in the forms of predation and monopoly pricing present?*

The parallel trend in Lufthansa's competitive environment (thus on the relevant markets from the merger decisions) is takeover or bankruptcy. The descriptive analysis on entry, market share, capacity, frequency and yield investigated 21 overlapping city pairs related to four Lufthansa mergers between 2005 (SWISS and Eurowings) and 2009 (Brussels Airlines and Austrian Airlines) which could have led to a monopoly. The EC accepted the mergers and acquisitions with remedies, which partly worked. In order to keep the calculations transparent, the study defined the Lufthansa Group.

The first hypothesis was that remedies have limited effects. The main results are as follows:

- 1) Slot surrenders did not work, since the LHG's market share further increased (up to 76 percent on average).
- 2) There were no sufficient new entries to counterbalance the LHG's increasing market share (15.3 new daily airline frequencies instead of the maximum possible 350).
- **3**) Frequency freezes (not to add any more frequencies when a new competitor entered the route) were not directly violated, but there was evidence of increasing seat capacity instead in two out of the five cases (see point 6).
- 4) Frequency decreased overall by an average of 8 percent due to the takeovers. A gross reduction in frequencies was, in every case, a loss in consumer surplus.
- 5) Average prices partially increased despite price freezes (in four cases, so not a robust result). The result is limited by the fact that price data is based on estimations.

The second hypothesis was that the abuse of market power was present in forms of strategic behavior. Prices substantially above and below the competitive level are both suspicious. Low prices could be predatory, while high prices could signal a monopoly, both signs of abusing market power. With the limitation that it is challenging to define the 'ideal' competitive price in an industry with price discrimination and a high proportion of fixed costs, the study found evidence of both substantially low and high prices. Competition reduces prices, but how much cheaper means hit-and-run competition and when are prices predatory? The border is the marginal cost. Short-run entries could theoretically be hit-and-run, but the data investigation found prices below MC. The results are as follows:

- 6) Short-run capacity increases might be predatory if they aim to force out competitors, as occurred against Air Berlin (AB) on ZRH-FRA and VIE-CGN. The LHG increased seat capacity as a reaction to AB's entries. This behavior induced AB's exit. In contrast, the LHG reduced seat capacity on seven monopoly routes.
- 7) After the LHG lowered price substantially, the new entrant AB left a relevant route. The LHG then increased prices above the original level. The contestability argument failed (e.g., on the VIE-STR route) because of the low prices (Air Berlin only had \$0.08 per mile, while on other routes it was more than \$0.30). Overall, the LHG lost 20 to 24 percent of its market share on all the routes where it competed with AB. This competition resulted in 17 to 29 percent cheaper ticket prices.
- 8) Average ticket prices are 20 to 25 percent more expensive on routes where the LHG has increased concentration (i.e., the relevant routes) than on other routes investigated by the EC. It may also serve as first evidence that merger-specific efficiencies (if any) are not passed through to consumers in the form of cheaper ticket prices. The mergers accounted for four monopoly routes out of Brussels, which resulted in an up to 31 percent price increase in the first year.

Lufthansa kept its position as a market leader and reacted strategically to Air Berlin's entry. AB's strategy failed in most cases because price cuts resulted in Lufthansa's short-run strategic capacity increases and AB could not quickly fit capacity.

Chapter 7 investigated merger-specific efficiency gains from the Lufthansa takeovers, especially from the LH/SWISS case, between 2004 and 2013. In general, the LHG partially improved its productivity, especially in labor productivity. Savings in labor costs compensated for tripling fuel costs and doubling airport charges. Unit costs decreased in the form of total costs per RPK, even by 15 percent in nominal prices.

Merger-specific cost efficiency gains arose from the SWISS takeover, while synergies from other Lufthansa acquisitions, according to Lufthansa, not yet realized. The descriptive analysis of SWISS found higher cost efficiencies than those reported by Lufthansa, though my calculations also included opportunity costs. The main driver of cost savings are: 1) economies of scale in marketing (e.g., reduced sales commission, insurance and security fees) and 2) access to cheaper labor (e.g., outsourcing MRO and catering, and negotiating new contracts with SWISS cabin staff). These synergies are merger-specific and could not have been achieved by an alliance.

Back to the question at the beginning of the work: How is it possible that the European Commission approved mergers that were found to be anticompetitive? Complex, sometimes controversial policy goals; nontransparent efficiency and consumer welfare definitions; and the fear of failing firms all promoted the European Commission's trend of allowing mergers.

When efficiency is implemented in quality and quality becomes cheaper due to efficiencies, demand should increase and more passengers should benefit from it. At least according to the economic theory. According to the data, in the absence of new entry, merging airlines immediately cut frequency (optimize schedules and rationalize costs) on the relevant dominant routes. Therefore, fewer passengers probably benefit from the promised quality improvements. Passengers on the other side, who will not and/or cannot afford quality, like leisure passengers, can switch to LCC competitors as long as they are in the market. Historical data shows that LCCs (e.g., Air Berlin) enter a market but, due to predation by the incumbent carrier, leave again in one or two years.

In summary, merger-specific efficiencies are difficult to separate from general achievements to increase productivity. Further, the EC only considers efficiencies if they are pre-merger verifiable and benefit consumers (stem from variable cost savings). Moreover, the merger framework in Europe is based on the Structure-Conduct-Performance model which contradicts efficiencies. Therefore, similar to the Harvard School, the EC merger policy still emphasizes market power despite efficiencies.

FUTURE RESEARCH, IMPLICATIONS AND LIMITATIONS

The EC had to adapt to the new situation on airline liberalization and started to work on an international convergence of its merger policy. Though the path is still long, the EC needs to reevaluate its current competition approach, its view of the relevant market and its use of merger remedies, and ask itself whether the road toward an efficiency defense is suitable for the European framework.

Efficiency defense remains a hypothetical concept as long efficiencies are not clear and not measurable. Future research should focus on the measurement of merger-specific efficiencies, particularly on dynamic and transactional efficiencies. In the current EC framework, a merger that leads to lower prices due to efficiency gains, which outweigh price increases, would be rejected.

The overall profitability of aviation, and with it the relevance of market power issues, is decreasing. However, we need to differentiate between leisure and business markets, and also between hub-to-hub and other markets. Low-cost carriers enter markets by undercutting the incumbent, and network carriers particularly try to protect their dominant hub-to-hub business routes to retain monopoly pricing. Future research on relevant market and on market power should therefore particularly focus on business routes from the hub airport.

We know that remedies in airline merger cases did not work well and, at least in standard oligopoly theory, the probability of a price increase is higher in a more concentrated market. Competition ensures the ability to set competitive prices by passing efficiency gains from mergers onto passengers. The question for science, practice and policy implication remains: *how can competition be motivated in airline markets, what remedies can be imposed and how can remedies (especially price-related remedies) be controlled?*

Current research could be extended by merger consequences on intra-European routes; by discussing the spill-over effect of mergers on non-overlapping routes; by examining the relevance of synergies from other European airline mergers (e.g., British Airways/Iberia) or by comparing the features of the withdrawn merger cases (e.g., Ryanair/Aer Lingus).

The research approach and the methodology could be implemented in other network industries, while the findings from the passenger airline market could be compared to explain current developments in other oligopoly markets. The limitation of the thesis is based on its descriptive methodology and data availability. Price data on the European passenger airline market does not make it possible to control predatory prices, or to carry out complex regression analyses or merger simulations with distinct results.

Future research, supposing better data availabiliy, could improve methodology (e.g., by building a merger simulation model), measure minimum required efficiencies and the efficiency pass through rate to consumers.

Although the approach of an economist remains dominant during the work, managers and policymakers can also learn from the reasons behind airline market inefficiencies and derive future consequences of airline consolidation, entry, failure and exit. To my knowledge, no such comprehensive analysis of airline merger cases in Europe has been published thus far. Hence the work could serve as a basis for critical evaluation of mergers, and of the EC merger policy.

The results of the thesis provide guidance for airlines, airports, shareholders and policymakers. Airlines can learn from the case evidence how to improve performance and how to profit from efficiencies; but also from the predatory strategies and their policy consequences. Airports can benefit from the lessons on how to successful reorganize airport planning after de-hubbing, thus losing the hub carrier; but also from getting an insight into airline practices concerning market power and efficiencies (frequency decrease, capacity increase, bargaining power in order to reduce airport charges and fees). Policymakers can learn about the importance of merger-specific efficiencies compared to market power issues. Finally, we, passengers can learn how to appreciate the value of having the choice and the final word.

8 ANNEX

8.1 MERGER REGULATIONS IN THE US, AUSTRALIA, CANADA, UK, AND GERMANY

Date	U.S. Antitrust	Features
	Regulation	
1890	Sherman Act	Prohibits trade restrictions (price fixing and market sharing); conspiracy and monopolization.
1914	Clayton Act; FTC Act	Prohibits mergers eligible to reduce competition and price discriminations; limits market power. Establishes the Federal Trade Commission (2 nd antitrust agency)
1950	Celler-Kefauver Act	Prohibits vertical mergers, if they impede competition
1968	1 st DoJ Merger Guidelines (D. Turner)	Based on harmfulness of high and increasing concentration not only against consumers, but also against smaller firms. Focuses on market share, concentration, and entry barriers. Introduces C4: four firm concentration ratio
1976	Antitrust Improvements Act	Introduced merger notifications 30 days before proposition (for firms with assets above US\$ 100m)
1982	Merger Guidelines (Baxter), DoJ	Focuses on competitive effects and efficiency. Relevant market: product and geographical side. Introduces HHI (instead of C4) and the SSNIP test. Entry barriers are less important
1992	Merger Guidelines, DoJ and FTC	Effects analysis: Distinguishes Unilateral and Coordinated effects. Movement toward Total Welfare. The authority might weight producer surplus against consumer losses: "Some mergers that the Agency otherwise might challenge may be reasonably necessary to achieve significant net efficiencies" (sec. 4)
1997	Revised Merger Guidelines DoJ and FTC	Revised efficiencies: Considers "delayed" dynamic efficiencies with less weight Movement to Consumer Surplus standard: "The Agency considers whether cognizable efficiencies likely would be sufficient to reverse the merger's potential to harm consumers in the relevant market" (revised sec.4).

Source: own figure

Date	Australia, Canada, UK and Germany				
Before	UK:		Germany:		
1950	1919. Profiteering A	ct prohibited excessiv	1923. Cartel Law registered without		
	1948. Monopolies an	nd Restrictive Practice	es Act	prohibition; created "national	
	examined whether th	e monopoly is in publ	champions"		
1950s	Australia:	UK:		Germany:	
1960s	1974.	1964. Resale Prices	Act	1958. Gesetz gegen	
1970s	Federal Trade	eliminated resale price		Wettbewerbsbeschränkungen (GWB)	
	Practices Act	maintenance		prohibited price-fixing agreements and	
		1965. Monopolies a	and Mergers	anti-competitive strategies	
		Act reduced collusiv	ve practices,	1973. <i>GWB</i> completed merger control;	
		and led to a merger	wave	resale price maintenance per se illegal	
		1973. Fair Trading	Act created		
		the Office of Fair T	rading		
		(1956, 1968, 1976.	Restrictive		
		Trade Practices Act	t registered		
		without prohibition))		
1980s	Australia:	Canada:	UK:		
1990s	1995. Competition	1985. Canadian	1980. Compe	etition Act replaced previous legislation	
	Policy reform Act	Competition Act	and consider	ed efficiency	
	introduced welfare,	introduced	1989. Compa	anies Act improved merger investigation	
	established ACCC	efficiency	1998. Compe	etition Act converges to EU approach	
2000s	Australia:	Canada:	UK:	Germany:	
	2010. Competition	2011. Merger	2002.	2005. <i>GWB</i>	
	and Consumer Act	Enforcement	Enterprise	harmonization to EC law	
		Guidelines	Act		

Source: own table based on Lipczynski & Wilson (2001); Motta (2004); and Whish (2009)

8.2 QUANTITATIVE ECONOMETRIC MODELS FOR COMPETITION POLICY USE (EU)



Source: own figure after Lyons (2012) and Verboven (2012)

8.3 CONSUMER WELFARE: THE PRICE – FREQUENCY TRADE-OFF²⁷¹

We can compute consumer surplus (or consumers' total utility across the entire income distribution) given that the price is *p* and frequency is *f*. Denoting $\alpha^* = p + \frac{\gamma}{f}$ we can write this consumer surplus as:

$$CS = \int_0^{\alpha^*} y dy + \int_{\alpha^*}^1 \left(y - p - \frac{\gamma}{f} \right) dy$$

The first component of the above expression is the utility obtained by the customers taking outside option (not flying), while the second is the total utility obtained by the traveling public. This expression can be more conveniently written as:

$$CS = \int_0^1 y dy - \int_{\alpha^*}^1 \left(p + \frac{\gamma}{f} \right) dy$$

Then the first of the two integrals is equal to 0.5 (note that this is just expectation of the normally distributed random variable on [0,1] interval). The second integral is equal to:

$$\left(p + \frac{\gamma}{f}\right) \left(1 - p - \frac{\gamma}{f}\right)$$

Taking the appropriate differential as we vary price and frequency of service can assess the change in consumer surplus:

$$dCS = \frac{\partial CS}{\partial p}dp + \frac{\partial CS}{\partial f}df$$

The two partial derivatives are:

$$\frac{\partial CS}{\partial p} = -1 + 2p + 2\frac{\gamma}{f}$$
$$\frac{\partial CS}{\partial f} = -\frac{\gamma}{f^2} \left(-1 + 2p + 2\frac{\gamma}{f} \right)$$

Then, the differential we are looking for is equal to:

$$dCS = \left(1 - 2\left(p + \frac{\gamma}{f}\right)\right) \left(\frac{\gamma}{f^2}df - dp\right)$$

Then, as long as $1 - 2\left(p + \frac{\gamma}{f}\right)$ is positive²⁷², the sign of *dCS* will be determined by the sign of $\frac{\gamma}{f^2}df - dp$. Note also that $\frac{\gamma}{f^2}$ is nothing but $\frac{\partial U}{\partial f}$ or the marginal effect of change in frequency on traveler's utility. Also observe that the above expression for the change in CS clearly reflects the lower-price-lower-frequency trade-off we were talking about above: a decrease in frequency (df < 0) decreases CS, while a decrease in price (dp < 0) increases it

²⁷¹ The deduction equates to the explanation in our research paper Bilotkach et al. (2014), p. 59.

²⁷² This condition will indeed hold for any reasonable market structure – see Bilotkach et al. (2010).

TERMS AND DEFINITIONS

Allocative efficiency	"The industry or market is allocative efficient when the social marginal benefit of the last unit produced equals its social marginal cost" (Church & Ware 2000, p. 750)
Blocked space	"Fixed number of aircraft seats (hard block basis) shall be reserved for new entrants at
agreement	request. The new entrant carries the full commercial risk" (M 3280, 2004, p. 47)
Code-sharing	"The representation of the flight of an affiliated feeder carrier as being the flight on a
Coue-snaring	dominant carrier" (Tretheway & Oum, 1992, p. xvi).
Concentration	After Bain: concentration increases market power, which makes firms with high
doctrine	market share more profitable. Though, the concentrated market structure leads to
	misallocation of scarce resources, since oligopolies or a monopoly produce less at
	higher price than firms in competition do.
Contestable market	Willig: "Markets, where competitive pressures from potential entrants exercise strong
	constraints on the behavior of incumbent suppliers: no significant entry barriers; no
	significant excess profit; efficient in pricing and in its allocation of production among
	incumbent suppliers" (Eatwell et al., 1987, p. 618).
Cost synergies	Farrell & Shapiro: "when assets can be reorganized so that costs of the merged entity are below the costs of any of the premerging firms" (Church & Ware, 2000, p. 721)
Deadweight loss	"The difference between the total surplus under monopoly and maximum total surplus.
0	Deadweight loss represents the opportunity cost to society. By not producing output,
	where willingness to pay exceeds marginal cost, the society forgoes surplus" (Church
	& Ware, 2000, p. 33).
Economies and	Silvestre: "Consider the unit costs of producing an output under a given technology.
diseconomies of	There are economies (diseconomies) of scale of output if the average cost of
scale	producing is decreasing (increasing)" (Eatwell et al., 1987, p. 80).
Double	"Double marginalization reduces joint profit, leads to prices above the profit-
marginalization	maximizing level, and creates an incentive for vertical integration in case of monopoly
	or oligopoly" (Church & Ware, 2000, p. 707).
Economies of scope	"If it is cheaper to produce the two output levels together in one plant than to produce
	similar amounts of each good in single-product plants" (Church & Ware, 2000, p. 58).
Effective or	After Clark: The basic concept of European competition policy, which necessitates
workable	rivalry: it "requires companies to act independently of each other, but subject to the
competition	competitive pressure exerted by the others" (EC, 2015, p.1).
Efficiency defense	Williamson: "only a small cost saving arising from the merger may be required to
	offset a given price increase due to the merger" (Church & ware, 2000, p. /18).
Efficiency aoctrine	After Bork: improving cost efficiency benefits consumers and increases welfare.
	Competition induces an efficient environment, where only the best firms survive.
Futm, bannian	"A structural market abaracteristic that protects the market power of incumbants by
Entry burner	making entry unprofitable" (Church & Ware 2000 p. 11)
Entry datarrance	"Preservation of market power and monopoly profit" (Church & Ware 2000, p. 11)
Entry delettence	"If activities of one accompanie actor affect the activities of another in ways that are not
Externatives	raflacted in market transactions" (Snyder & Nicholson, 2008, p. 670)
Failing firm	"A failing fire must fulfill three criteria First the firm would in the near future be
doctrine	forced out of the market. Second, there is no less anticompatitive nurchase alternative
uocirine	Third, the assets of the firm would inevitably exit the market" (ECMG, 2004) §89-90.
Fixed-effects	Accounts for unobserved differences across regions (routes) and identifies the effect
analysis	on prices from the presence of competitor(s) over time (Verboven, 2012).
Flag carrier	Flag carriers are national carriers in mainly state-ownership.
Frequency freeze	"The merged entity shall not add frequencies for a period starting when new air
	service provider begins operations on the relevant city pair" (M. 3280, 2004, p. 45).
Grandfather rights	Airlines that previously received a slot (so called grandfathers) can keep it, but they
	are obligated to use it at least in 80 percent of the time, otherwise they lose it.
Hit-and-run entry	"Forces the incumbent to limit price in a perfectly contestable market. The threat of
	entry ensures that market power is constrained" (Church & Ware, 2000, p. 507).

Hub dominance	When one dominating airline charges a higher fare for flights from the hub airport.
Interlining agreements	"The merger entity shall carry a passenger holding a coupon issued by a new air service provider" (M. 3280, 2004, p. 46).
Internalization theory	After Coase: transaction costs occur for market transactions, and internalization; a merger may lead to a reduction in transaction costs when compared to an alliance.
Market failure	"Market failure is when the market outcome is inefficient: do not exhaust all of the gains from trade and total surplus is not maximized. Pareto improvements are possible: the winners from regulatory intervention could compensate the losers and still be winners" (Church & Ware, 2000, p. 750).
Market power	"Market power is the ability to profitably raise price above marginal cost" (Church & Ware, 2000, p. 10).
Merger remedies	"Undertakings submitted by the merging parties in order to remove the serious doubts raised by the proposed transaction" (M. 3280, 2004, p. 40).
Merger simulation	Oligopoly models to estimate parameters on demand, costs and equilibrium in order to simulate price and welfare effects of mergers.
More economic approach	No unified definition, rather a rule of reason economic view.
Network effect or externalities	"Network effect or network externality is the positive relationship between adopters and the size of a network" (Church & Ware, 2000, p. 637).
Own-price elasticity	"It is a percentage change in quantity demanded from a percentage change in price" (Church & Ware, 2000, p. 36).
Predatory pricing	"A form of exclusionary strategy: aggressive pricing by a dominant firm or firms designed to induce the exit of a rival firm" (Church & Ware, 2000, p. 644).
Price freeze	"The merged entity shall not increase published fares until the beginning of the next IATA season for which slots have not yet been allocated" (M. 3280, 2004, p. 59).
Principal-agent problem	"When there are asymmetric information due to either hidden information or hidden actions and the preferences of the agent and the preferences of the principal are different" (Church & Ware, 2000, p. 95).
Product differentiation	"When products produced by different firms are not viewed as perfect substitutes by consumers: products are heterogeneous" (Church & Ware, 2000, p. 8).
Productive efficiency	"Productive efficient is the firm, which operates on the cost-minimizing effort level" (Church & Ware, 2000, p. 832).
Rent seeking	"Rent seeking is the behavior by employees that gives rise to influence costs and redistribution of income within the firm" (Church & Ware, 2000, p. 102).
Rule of reason	"Rule of reason is the attempt of the courts to determine the effect on competition of the agreement: whether there are benefits or legitimate business reasons that justify the agreement and offset any effect on competition" (Church & Ware, 2000, p. 355).
Slot	"Slot shall mean the entitlement of an air carrier to use the full range of airport infrastructure necessary to operate an air service at a coordinated airport on a specific date and time for the purpose of a landing and takeoff" (M. 3280, 2004).
Slot surrender or slot remedy	"The merged entity undertakes to make slot(s) available at a given slot-coordinated airport to allow a prospective new entrant to operate new or additional daily frequency on given city pairs" (M. 3280, 2004, p. 48).
Slot-coordinated airports	"Airports, where demand exceeds capacity: the allocation of slots is based on historic precedence and supervised by a slot coordinator" (Gillen, 2008, p. 43).
(Economies of) traffic density	"The more traffic which can be carried in a given market, the lower per passenger costs tend to be" (Tretheway & Oum, 1992, p. xv).

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