

**Analysis of Global Airline Alliances as a
Strategy for International Network Development**

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Abstract

Since the late 1990s, network airlines worldwide have been enrolling in one of the three current Global Airline Alliances (GALs), oneworld, Star Alliance and SkyTeam. By 2011, airlines belonging to the three GALs transported over two-thirds of all international traffic. This thesis studies the reasons that cause an increasing number of airlines to join this collaborative scheme as a way to develop a wider network and to increase profitability by serving international connecting traffic.

The evolution of GALs is characterized here by the analysis of the size of these alliances, as well as by the volume of partnerships and code share agreements between alliance partners during the period 2006-2011. The results of this study illustrate the differences between each of the GALs and the degree of dependence of airlines on alliances to develop their international networks. By most indicators, the largest alliance, Star Alliance, is the GAL in which member airlines rely more on their alliance partners when developing code share agreements with foreign airlines. In all three GALs, code share agreements between alliance partners are much less likely to be broken than with non-partner airlines. Airlines operating in the transatlantic markets appear to be the most advanced firms in the marketing of code shared itineraries.

The empirical analysis is complemented with a review of the theoretical benefits of GALs to airlines, alternative network models for international growth, the impact of alliances on customers' welfare, their potential anti-competitive effects on independent carriers, and the current regulatory framework affecting alliances on both sides of the North Atlantic. Overall, this work provides a holistic view of the GALs as a model for network development, to describe their policy implications, and to suggest key drivers in the future of airlines' network development strategies.

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Chapter 1: Introduction

1.1 The Airline Industry

Air transport is a major industry in the world economy on its own, with air travel revenues usually accounting for about 1 percent of national GDP. Furthermore, since the 1980s global air traffic has experienced an average annual growth rate over 5%, outpacing economic growth, and according to the forecasts of the two largest aircraft manufacturers, Airbus and Boeing, this trend will continue in the next twenty years. In addition, air transport has a widely acknowledged impact on the development of world trade and tourism; and, from a wider perspective, the fast and safe airborne transport of people and goods to any place in the world facilitates economic, political, and social change. Looking towards the future, air transport is of high interest for policy-makers as *conditio sine qua non* for global economic development, and it plays, as well, a major role in the 21st century global challenge of curbing carbon emissions.

The main operators of passenger air transport, the commercial airlines, comprise a challenging industry characterized both in the US and the rest of the world by low profits and high volatility in returns. A distinctive element in the airline business is that most of the largest carriers in the world are enrolled in one of the three existing international strategic alliances—oneworld, Star Alliance, and SkyTeam—which are often recalled as the *global airline alliances*. These networks of airlines provide their members with a rich international route portfolio at a marginal cost that would be difficult to be reached through organic growth.

Still, the provision of cross-border air services is very constrained by international regulation. Since the Chicago Convention of 1944 established the rules of airspace, international air transport markets have been governed by bilateral air service agreements (ASAs) between national governments. This implies that the country of registration of an airline and the bilateral agreements of that country with other countries has determined the airline's possible routes of service and the conditions of capacity and frequency offered. Collaborative schemes between airlines, like the global airline alliances, are hence constructions of airlines to overcome these and other barriers encountered by airlines in their network expansion plans.

The two largest airline transport markets in the world, United States (US) and the European Union (EU), accounting for 60% of the world traffic, each have a liberalized domestic market. The United States was first in deregulating its domestic airline markets in 1978, which provided carriers

freedom to enter and exit routes and to price them as they pleased, subject only to the US competition law.¹ The success of this process led many other countries to liberalize their domestic markets, including the liberalization of cabotage services by European airlines in the EU in 1997, i.e. the authorization to any airline from an EU member country to transport domestic traffic within in any of the other EU countries. Since March 2008, these two economic regions have applied a new and evolving regulatory framework that removes most of the market access barriers between the EU and the US to create a single Open Aviation Area.

As air transport services have been liberalized new competitors have entered the market. In most cases, the incoming carriers have adopted the low-cost, low-frills business model, contrasting with the full-service of incumbent traditional carriers. Low-cost carriers are usually characterized by higher labor productivity and lower operating costs that translates into lower fares than traditional carriers. The latter, categorized here as network legacy carriers, have focused on providing wider network coverage through a hub-and-spoke network model that meets consumer demands of seamless connections with domestic and international destinations. As a tool for developing this business model, global airline alliances play a pivotal role.

1.2 Strategic Alliances

Strategic alliances are not a unique phenomenon of airlines, as they are evident in many other manufacturing and service industries. In fact, every year there are about 2,000 new strategic alliances in the world, and partnerships in the form of alliances have been increasing at 15 percent annually (Cools & Roos, 2005). Relevant examples can be found in the high-tech field, e.g. Sony and Ericsson joined efforts in their mobile phone divisions to take on more advanced competitors; in the pharmaceutical business, with the alliances between biotech research centers and manufacturing pharmaceutical companies; or in the energy business, with the example of Chevron and Texaco allying in the Middle East generating billions of revenues for both companies (Steinhilber, 2008). Also in the air transportation business there is a current trend of alliances between airport companies, as reported by Forsyth et al. (2011). In the air cargo business there are the global strategic alliances SkyTeam Cargo and WOW Alliance, whose constituents are the cargo

¹ Airline Deregulation Act of 1978: Pub. L. No. 95-504, 92 Stat. 1705.

divisions of some SkyTeam and Star Alliance members, respectively, despite holding an independent structure.

Amid that, the success of alliances in industry is not guaranteed. Indeed, according to a survey of the US-based Association of Strategic Alliance Professionals (ASAP), the success rate of alliances is perceived by insiders to be about 50 percent, and as a measure of excellence in alliances, only 9 percent of companies believe that they have success in 80 percent or more of their alliances (ASAP, 2007). This motivates us to study if alliances are successful in the airline industry as a strategy to develop airline's international network.

In the airline industry, carriers enter into cooperative arrangements to generate greater revenue, to reduce unit costs from economies of size, and to minimize or share risks by strengthening their position out of their domestic market. In a first approach, cooperation can be characterized as taking the form of either *tactical* or *strategic* alliances.

Tactical alliances, also called marketing or commercial alliances, have usually consisted of bilateral agreements between airlines, which by joining efforts in a limited number of routes gain access to the other airline's network. This type of alliances first began with airlines cooperating at the marketing level through interline/pro-rating agreements and code sharing, and then the more coordinated joint ventures (JVs), described here:

Interline consists of the transfer of passengers and cargo from one airline to another on the passenger's route, and while each airline maintains its own identity and there is a very limited coordination between airlines, the passenger is charged a single fare for the route and the airlines share the revenues by pro-rating.

Code sharing is the sharing of capacity between carriers on a given flight that has a code for each of the airlines involved in the agreement, earning consumer recognition that the flight corresponds to the carrier to whom the itinerary was purchased.² This is the most widely used form of alliance in the airline industry. There are two mechanisms for placing interline passengers on each other's flights: airline A can sell an itinerary involving airlines A and B and pay airline B for accepting the passenger on one or more of the flight legs; or airline A can have some seats reserved in airline B to sell at the price it sees fit, the so-called "blocked space arrangement".

² Airline designation codes are two letters assigned by the International Air Transport Association (IATA). They are listed for use in reservations, timetables, tickets, as well as in airline industry applications.

Joint ventures (JVs) are revenue-sharing or profit-sharing partnerships between carriers on international routes, so that a partner's revenue or profit generated from a passenger does not depend on which airline provided the service. In fact, JVs can be recalled as "metal neutral" alliances, as each airline gets its revenue portion regardless of who operates the actual aircraft in a route-to-route basis.³ The full implementation of this cooperative strategy on a given route requires the granting of **antitrust immunity** by the regulatory bodies to allow partner alliances to set schedules and prices together.⁴

Strategic alliances are bilateral or multilateral agreements in which the allied airlines share similar business objectives and they coordinate their services to achieve their common goals.⁵ Doganis (2006) focuses on the use of a common brand, a uniform service standard, and the asset comingling of aircraft, staff, traffic rights, terminal facilities or capital resources to identify the airlines that are in a strategic alliance. Tretheway (1990), Oum & Park (1997) and Fan et al. (2001) mentioned exclusive membership and joint marketing entity as the 'definitive characteristics of strategic alliances'. In addition, coordinated reservations, sales and inventory management, frequent flyer reciprocity, and a special emphasis in providing seamless connections are key elements of current strategic alliances.

As of today, there are three competing strategic international alliances in the industry: **Star Alliance**, **oneworld**, and **SkyTeam**, recalled as the *global airline alliances* (GALs), launched between 1997 and 2001 and, currently, each of them having a dozen or more airline members. In each multilateral alliance, participants decide with which airlines they establish code share agreements, and which routes they include in the agreement. Although alliance members cooperate on many aspects, they may nonetheless remain competitors. Nevertheless, within the alliances there are also subgroups of airlines granted with antitrust immunity.

³ As indicated by Bilotkatch & Hüsichelrath (2011) the term "joint venture" although is being comonly used in the literature and the business community as a revenue sharing and joint price setting arrangement, should be more generically referred to any kind of cooperation between airlines trying to overcome the limitations of unassociative interlining. In this work, however, this concept is used with the traditional narrower meaning defined above.

⁴ The term "antitrust immunity" refers to the US antitrust laws, although it is also commonly applied in the literature to the European context.

⁵ The term "strategic alliances" was initially preferred in the late 1990s and early 2000s, as a replication of the terminology used for sustainable alliances between organizations in other industries. Later, due to the geographic coverage of the airline alliances, the term *global alliance* was coined. Today the latter is more used in the airline industry, as it is more explanatory of the scope of the agreement between network legacy carriers.

Figure 1.2.1 shows the differences between the different forms of cooperation between airlines and how the cooperation level has increased with time, according to Iatrou & Oretti (2007). Within a global airline alliance, however, the reality is more complex, as there are different levels of cooperation. In fact, in each of the three alliances there is a subgroup of European and US airlines with granted antitrust immunity to coordinate pricing and scheduling in the transatlantic market and, within each of these three sub-groups, a core of two or three carriers has either a revenue or a profit sharing joint venture. Figure 1.2.2 illustrates the three layers of cooperation within a global airline alliance, from the baseline relationship that includes all global alliance partners, to the granting of antitrust immunity by the US Department of Transportation in the North Atlantic intercontinental flows for a subgroup of aligned airlines of the same GAL, and the integrated joint venture (JV) in the North Atlantic markets for a more reduced number of airlines.⁶

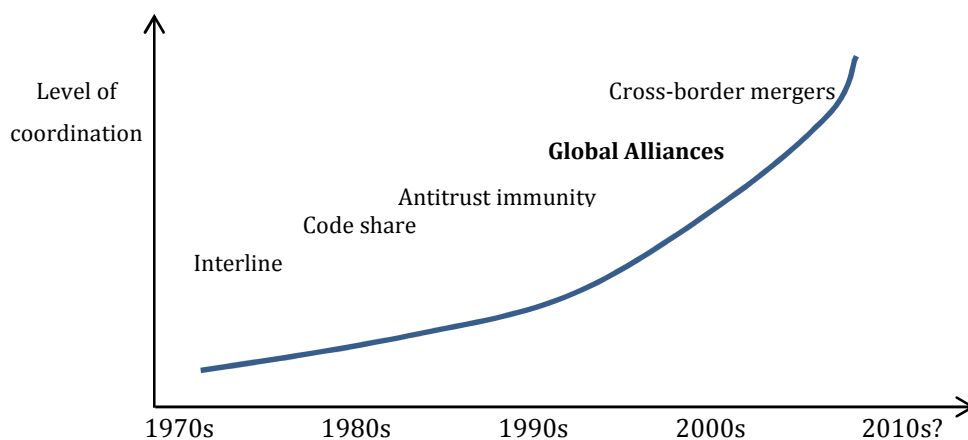


Figure 1.2.1. Expected development of partnerships (Iatrou & Oretti, 2007).

⁶ By 2010 each of the three GALs had a core of two or three members in the global airline alliance in a North Atlantic joint venture: Star Alliance members Air Canada, Lufthansa and United-Continental; oneworld members American Airlines and IAG (British Airways and Iberia); and SkyTeam members Air France-KLM, Alitalia, and Delta Airlines.

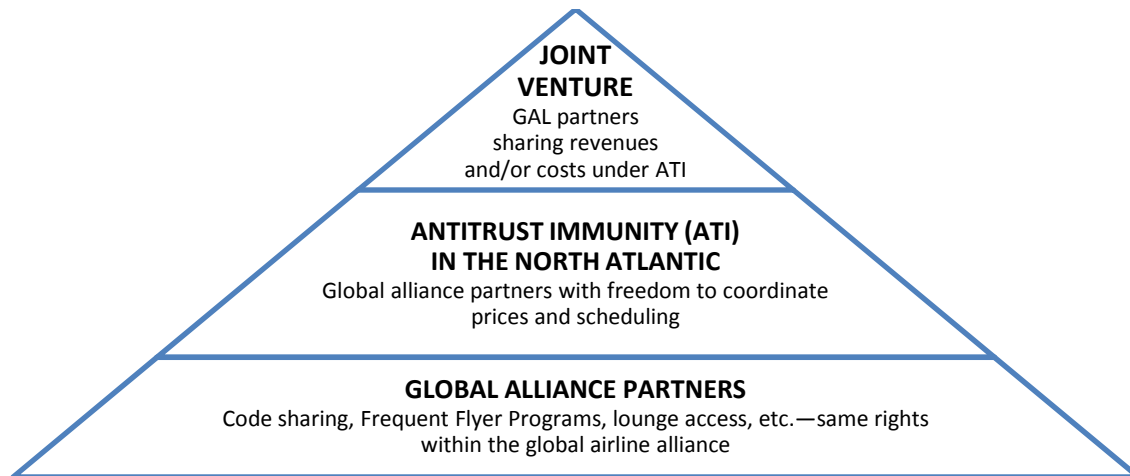


Figure 1.2.2. Different levels of cooperation within a Global Airline Alliance.

1.3 Motivation and Goals of this Thesis

The undertaking of this research is motivated by the importance of the three global airline alliances—oneworld, Star Alliance, and SkyTeam—for the network expansion of most of the largest firms in the highly competitive and beleaguered airline industry, making this strategic construction of the greatest significance for policy-makers. At the same time, the prevalence of this collaborative framework between airlines requires understanding that the driving forces of globalization, domestic competition, barriers to entry in foreign markets, and incentives for creation of shareholder value, among others, make global alliances a core tool of airlines in their expansion efforts.

This author identifies in the topic of global airline alliances a case study located at the interface between transport economics, public policy, and corporate strategy. Hence, it is the definitive motivation of this work to analyze the three Global Airline Alliances from this holistic perspective. Furthermore, given that strategic alliances are not unique to the airline industry but have proved to be successful in other manufacturing and service industries, this work should be of interest for scholars in other fields. In fact, network activities in communications, transportation, or utilities may only be conceivable through the hub-and-spoke network structure that member airlines have implemented. Similarities in economic and managerial fundamentals and the exposure of firms to similar driving forces might enlarge the potential audience and interest of this work.

As is shown next in Section 1.4, there is an extensive literature on strategic alliances from a myriad of perspectives. We have identified, however a lack of empirical data on the impact of Star Alliance, oneworld, and SkyTeam on the performance of their members. For the present work, the proxy for “performance” is the key issue of development of an international network, quantified here in terms of code sharing routes and number of code share agreements.

Overall, the goal of this thesis is to provide an explanatory framework that identifies the reasons for the continuous growth of the three Global Airline Alliances a decade after the last of them was launched. Some conclusions about these collaborative structures can be provided from the empirical study of the relationship between the global alliance of enrollment and the patterns of code share agreements of its members for marketing a wider international network.

1.4 Literature Review

Domestic and international airline alliances were one of the most critical advents in the airline industry in the 1990s. By then, a rich and evolving literature had developed to understand the implications of alliances on airline management and end consumers. Considerable research work was on the scope of alliances, strategy alternatives of airlines within this new framework, and the economic impacts of alliances. With the change of millennium, as the three Global Airline Alliances (GALs) became predominant, one can observe more focus on empirical analyses of GALs’ impact on prices and competition, revenue and marketing innovations, and airline operations. This section examines the most relevant works in several of the directions taken by the literature on airline alliances.

By the end of the 1990s, the work of Fernandez de la Torre (1999) provided a coherent overview of the different typologies of collaborative models between airlines, listed positive and negative impacts of alliances to airlines, and analyzed the effect of the level of network connectivity on capturing traffic and market share for the first North-Atlantic strategic alliance at that time, between Northwest Airlines and KLM.

Morrish & Hamilton (2002) contributed with a rich, though concentrated, review of the findings of major studies on global airline alliances during the period 1986-2000. The authors discussed both the conceptual and empirical evidence in the literature to conclude that although global airline alliances helped to increase airlines’ load factors and productivity, a positive impact on profitability

and members' competitive position could not be claimed, and they cited increased flight frequency and decreasing airfares as counter-balancing forces for this null effect.

To the extent of my knowledge, Iatrou and Oretti (2007) provide the most comprehensive text on the opportunities and challenges for airlines with regards to alliances and mergers. Their work includes a questionnaire submitted to carriers' executives in more than 30 airlines, becoming one of the very few insights available in the literature about the impact of alliances on member airlines. The survey reveals that code share is considered to be the most productive type of cooperation for increasing traffic, followed by frequent-flyer programs, and antitrust immunity, while strategic alliances without antitrust immunity were reported to have a more limited impact on traffic. Respondents also declared that the largest impact of alliances was on traffic increase, as reported previously by Youseff & Hansen (2004) and Oum et al. (2000), and the lowest impact was on fare increase and cost reduction. Similarly, a previous holistic study of the alliances' system, by Kleymann & Seristö (2004) also held interviews with airline managers, discussed the benefits that alliance partners can extract, and addressed the question of how strategic alliances affect performance.

It is in the work of Oum et al. (2000) where one of the most rigorous empirical analysis of the impact of alliances on airlines' performance can be found. Oum et al. worked with a cross panel data base of 22 international carriers during the period 1986-1995. They estimated that profitability increased by 1.5% for strategic alliances, while prices of flights in airline alliances were lowered and productivity rose. They also found that strategic alliances increased traffic volume between intercontinental gateways significantly over routes in non-alliance gateways. In fact, to the extent of my knowledge the work of Oum et al. (2000) is a unique case in the literature in the quantification of the impact of alliances on airlines' performance.

Among strategic analyses of alliances, a work to be highlighted is the early framework on the economic forces affecting the airline industry by Fan et al. (2001) which includes a correct prediction of the current scenario in the airline industry with a few global strategic alliances, as well as the persistence of driving forces towards intercontinental mega-carriers. Agusdinata & de Klein (2002) also explained the dynamic of airline alliances. Using a system dynamics' approach they described the endogenous and exogenous driving forces behind the formation of alliances and they addressed the concepts of optimum GAL size and the trade-off between collaborative learning and airline independence.

A unique perspective on airline alliances is the analysis of press, public relations, annual reports and interviews to airlines' directors and staff made by Vaara et al. (2004) for European carriers. The authors analyzed the strategic talks on airline alliances in the period 1995-2004 in order to understand the processes and practices in the discourse that contribute to create a strategy. They observed that some themes like "corporatization", "globalization", "financialization", "market power", "economies of scale", or "risk-sharing", legitimized the way for alliances as a "solution" to the "problems" associated with the previous "old-fashioned" thinking. Interestingly, the concept of "independence", which was linked with a nationalistic discourse, was found to be ambiguously used both by antagonist and protagonists of alliances. According to airlines' staff, dysfunctionalities within the alliance seemed to be solvable by establishing "control", "authority", or "decision-making power" at the alliance top-management level.

As a provider of reliable data on code share agreements formation, every year, and during more than two decades, the monthly magazine *Airline Business* has provided a list of the collaborative agreements in place between GAL members through an annual survey filled by the airlines' management teams. As part of the empirical analysis, *Airline Business'* 2006-2011 data base is used to analyze the trends on code share agreements among GALs' members.

Considering airline operations within an alliance, Tiernan et al. (2008) studied the differences in service quality in terms of reported flight cancellations and missing baggage by aggregating consumer reports' data in the US and Europe for the airlines in each of the three GALs finding no statistically significant differences between the three GALs. Höltrügge et al. (2006) analyzed human resource management in a GAL (Star Alliance) to conclude that pressures for differentiation were larger than driving forces towards a common strategy within Star Alliance, resulting in limited standardization in training and development, and always under the responsibility of the individual airlines. Gudmundsson et al. (2002) presented the challenges and opportunities in the merging of frequent-flyer-programs (FFP) between partners and how this related to GALs' stability.

An operative factor of great importance for airlines is alliance revenue management, i.e. how shared seat inventory on each airline's code share flights can be optimized to maximize revenue gains. Boyd (1988) compared the advantages of centralized and decentralized revenue management systems for alliances, pointing out that the former system requires extreme coordination and information exchange between partners, which is not possible due to operational, organization and regulatory constraints, while it allows reaching a global optimum. Fernandez de la Torre (1999) and Darot (2001) introduced various mechanisms of revenue sharing and they also considered how

code share impacts the redistribution of local and connecting traffic on an airline network. Vinod (2005) and Jain (2011) suggested dynamic approaches to further optimize revenue gains. Specifically, the work of Jain (2011) addresses the implementation of the dynamic valuation scheme for code share paths in real revenue management systems.

Considering alliance election, a few theoretical studies are highlighted. On the one hand, Flores-Fillol & Moner-Colonques (2007) took a game-theoretic approach to theorize the strategies involved in the formation of bilateral partnerships between airlines under the existence of complementary interline trips. Their framework considered product differentiation and economies of traffic density. The authors identified scenarios of unprofitable alliance formation and they concluded that alliances could not take place in conditions of close substitution. From a different approach, examples of decision-making models for the election of a convenient alliance considering different stakeholders, i.e. corporation departments, and their multiple criteria within an airline can be found in the works of Liou et al. (2011) and Liou (2012).

Moving to the public policy perspective, the effects of interlining, code share, international alliances and alliance antitrust immunity in airfares have been extensively investigated in the economic literature from the mid-1990s. There has been a special emphasis in the US domestic market and the international routes with origin or destination in the US, due to the availability of the Passenger Origin-Destination database of the US Department of Transportation including a 10 percent quarterly sample of all airline tickets sold by US carriers. The works of Jan Brueckner and Tom Whalen, and Tae Oum, Jong-Hun Park and Aming Zhang, and, more recently, Vladimir Bilotkach, have been the most salient in the modeling and empirical analysis of the price effects on markets operated by allied airlines. Looking at international alliances, Park and Zhang (2000), Brueckner and Whalen (2000), Brueckner (2003a), Whalen (2007), and Bilotkach (2007) have provided empirical evidence that, since the 1990s, alliance fares for connecting travel itineraries through alliances have been lower than interline fares. In Section 5.2 we extend this discussion to the latest findings, including the observation of the impacts of allied airlines operating under antitrust immunity.

With regard the perceptions of consumers an interesting work is the analysis by Goh & Uncles (2003) of the perceived benefits of global airline alliances by Australian business passengers. Their results showed limited differentiation of the benefits provided by different alliances. Additionally, the authors found that consumers did not discriminate airlines based on their alliance, and that the preferred local airline (Qantas) is what determined the preferred global alliance (oneworld).

From a public policy perspective, at the time of this thesis the most recent views of policy-makers in the US and the European Union (EU) with regard to airline alliances in the EU-US Transatlantic market were represented in a comprehensive joint report by its regulatory bodies in November 2010 (European Commission and U.S. Department of Transportation, 2010). Another relevant opinion in the process was reported by Kahn (2004), in which the “architect” of the 1978 airline deregulation in the US very briefly discussed the convenience of alliances for public benefit. Kahn’s conclusion was that alliances were beneficial to enhance the economies of scope of hub-and-spoke carriers, as these efficiencies were in the interest of the public. However, Kahn also raised the problems of suppressed competition. Other works by Gillespie & Richard (2011), Brueckner & Proost (2009), and Bilotkach & Hüsichelrath (2011) have discussed in detail the (in)convenience of granting antitrust immunity to allied airlines in the transatlantic market as well as the alternatives available to balance efficiency gains and the preservation of a competitive industry.

1.5 Thesis Overview

This first chapter has presented a brief overview of the current state of the industry, the basic concepts on alliances, motivation of the thesis and its goal, and a brief overview of the existing literature on airline alliances. The second chapter provides an explanatory framework of the particularities of the industry that bring airlines to join alliances for developing an international network. It also considers other internalization strategies in the industry. A special emphasis is given to the different potential benefits that strategic alliances in the airline industry can procure to its members.

The third chapter focuses in the empirical analysis of the Global Airline Alliances (GALs). It presents the evolution of GALs during the period 2006-2011 considering the use made of alliances by their members in their development of code share agreements. In addition, two regression models are shown providing evidence of the relation between geographic situation and GAL of enrollment with the number of code share agreements and code sharing routes of airlines in 2011.

Chapter 4 discusses the reported effects of collaborative agreements between airlines on consumers’ welfare and competition. The current competition regulation in the European Union and the United States for collaborative airlines is contrasted, and some of the potential implications of a more integrated market between both regions are discussed.

Finally, Chapter 5 summarizes the findings of this thesis, draws conclusions from them and proposes future research directions.

Chapter 2: International growth of airlines

2.1 Introduction

The appearance and progress of global alliances as a strategy for developing airline networks and increasing revenue sources can be explained by both exogenous and endogenous drivers to the airline industry. Together, they have shaped a business in which an increasing number of airline carriers all over the globe are joining one of the three Global Airline Alliances (GALs). This chapter provides an overview of the challenging constraints encountered by airlines in foreign countries, the motivations and strategies that the industry has followed to adapt to these challenges, and the potential business benefits that airlines pursue when joining strategic alliances.

On the one hand, airlines face barriers when intending to provide international services to their customers. The general perception is that the air transportation is a highly nationally regulated sector that constrains carriers when serving customers in markets outside of their national borders. Although this holds true, regulatory barriers are just one of the barriers encountered by airlines. The importance of trade costs as a barrier of entry is acknowledged in the economic literature as costs driven by policy, geographical, and environmental reasons can dominate production costs in some cases up to factors of even ten or more (Anderson & van Wincoop, 2004). Section 2.2 presents the particulars of these barriers in the airline sector and how this compares to other industries.

On the other hand, airlines have found enough economic incentives to pursue international operations. Section 2.3 overviews some of the theoretical motivations of this expansion. As a continuation, Section 2.3.1 to Section 2.3.3 present the different strategies that low-cost carriers, legacy network carriers, and a particular group of firms in the Persian Gulf, have been following in their international network development. Finally, a review of the potential benefits of multilateral strategic alliances is presented in Section 2.4.

2.2 Particularities of the international air transport services

Airlines, when providing international services to their customers, are exposed to some of the peculiarities of service sectors that make of the airline business one with notable barriers to entry. In a first macroeconomic overview, it is remarkable that while services contribute in more than two thirds to the overall production in most of the developed countries, the international trade in services is just one quarter of the contribution of good exports to the GDP (World Bank, 2011). This manifests that international trade in services has, in general, a modest weight in the national production of countries in comparison with the high, and increasing, importance of the service sector in the overall economy. In fact, it is documented that barriers to international service in both high-income and developing countries are higher than those for trade in goods (Borchert et al., 2010).

The imbalance between economic production and trade can be largely explained by the evidences that the trade costs in international services double or triple the cost of trading with goods.⁷ Even in the well-known close trade relationship between the USA and Canada, trade costs in goods are 30% in ad valorem equivalent terms, while around 100% in services. On a world aggregate basis, the tendency is that while trade costs in goods decreased in 15% during the 1995-2007 period, the trade costs in services have been flat. The only exception is China, where trade costs have decreased significantly in both goods and services, which can be explained by their initial higher service costs. It is also worth mentioning that as some European countries shown a constant decline in trade costs for goods after their accession to the EU, trade costs in services remain stagnant after an initial fall of less than 20% (Mirodout et al., 2010).

Among all these internationally traded services, the airline industry stands out as an exceptional case due to its high entry barriers to foreign investors. These barriers are not only limited to regulatory measures, but other service trade costs in culture, geography and institutions might also play a major role, even in more integrated economies like the European Union. Somewhat related to trade costs, new entrants would operate under the absence of economies of density and scope that airlines usually exploit in their domestic networks, and they might experience limited access to airport's slots in foreign countries due to the grandfather rights of incumbent airlines. In fact, these

⁷ Here we define trade costs as all the costs incurred in getting a good or service to a final user other than the marginal cost of producing the good itself, in accordance with Anderson & van Wincoop (2004).

elements become primary natural barriers for airlines pursuing to enter a new geographical market due to the inability to replicate their domestic business model.

Looking forward, Mirodout et al. stated that some industries are comparatively less exposed to future falls in trade costs because of the need of dealing directly with the consumer. This is the case of air transport services as airlines require of physical infrastructures like airports to deliver their services. This limits to some degree the new possibilities of working overseas that the information and communication technologies are enhancing.

As a matter of fact, however, one of the most differentiating features of air transport when compared to other industries is the constraints that national regulations impose on foreign airline carriers. Although there has been a continuous process of bilateral and multilateral agreements on open skies⁸, the airline sector continues to be a paradigm of restrictiveness to international entering airlines. The existing limitations to foreign investment in airlines are especially remarkable. A measurable evidence of the regulatory restrictions is the limit to foreign ownership and control, shown in Table 2.2.1.

Table 2.2.1. Limits on foreign ownership of airlines for selected countries.

Country	Limits on foreign ownership
Australia	49% for airlines engaged in international operations; 100% for solely domestic airlines
Canada	32%
China	35%
Chile	100% as long as airline's principal place of business is in Chile
European Union	49%, applies to non-EU citizens
India	49%, but foreign airlines cannot hold shares in Indian airlines
Japan	33.33%
Korea	49%
Malaysia	45%
New Zealand	49% for airlines engaged in international operations; 100% for solely domestic airlines
Singapore	27.51%
Taiwan	33.33%
Thailand	30%
United States	25%; one-third of the board of directors; chairman/woman must be US national

Printed from Odoni (2009).

⁸ Gunther (1999) estimated that nearly 70% of the 400 air service agreements initiated since the GATS were either open skies agreements or allowed other similar liberalizing measures.

As argued by Odoni (2009), this special attitude towards airlines can be caused by the government concerns on the use of air infrastructure in cases of national emergency or military needs, as well as the national pride of “flag carriers”, or even the fear of losing well-remunerated jobs. In a broad framework, however, the welfare gains from the liberalization of services are widely acknowledged and many countries show an interest in liberalizing trade in services. This helped to launch negotiations on trade in services in the Uruguay Round⁹, as well as the creation of the World Trade Organization (WTO) General Agreement on Trade in Services (GATS) in 1994 (Francois & Hoekman, 2010).

The reality for air transport service, however, is that it was excluded from the Uruguay Round, as members preferred to continue with the regime of bilateral reciprocity incepted at the Chicago Convention (1944), instead of the GATS. The early beginnings of the Doha Round¹⁰, initiated in 2001, were no exception, and the only application of the GATS to the airline industry was in the following ancillary services: catering services, aircraft repair and maintenance, sales and marketing, and computer reservation services.

The system of international traffic rights known as Freedoms of the Air, established by the Chicago Convention, provides an alternative framework to the GATS. By all means, the former substitutes the latter in international trade of air transportation services. Here we provide an analogy between the modes of supply covered by the GATS, and their equivalent Freedoms of Air, which define the extent of bilateral and multilateral air service agreements (ASAs) between countries.¹¹ Table 2.2.2 indicates the different modes covered by the GATS.

⁹ The Uruguay Round of Multilateral Trade Negotiations involved 122 countries from 1986 to 1994 trying to reduce restrictions in the trade of services and goods. The Final Act covers all the negotiating areas cited in the first declaration, held in Uruguay, and brought “the biggest reform of the world’s trading system since GATT was created at the end of the Second World War” (see www.wto.org), although the major agreements were concentrated in agriculture and goods.

¹⁰ By early 2012, the Doha Development Round, initiated in 2001 was still continuing.

¹¹ The ASAs consider four main aspects in their definition: (i) potential city pairs between the States involved; (ii) number of airlines from each of the States with right to provide service; (iii) capacity (frequency of flights and number of seats for each pair); and (iv) passenger and/or cargo rates.

Table 2.2.2. Modes of supply covered by the General Agreement on Trade in Services.

-Mode 1 *Cross-border supply*: it is defined to cover services flows from the territory of one Member into the territory of another Member.

-Mode 2 *Consumption abroad*: it refers to situations where a service consumer moves into another Member’s territory to obtain a service.

-Mode 3 *Commercial presence*: it implies that a service supplier of one Member establishes a territorial presence, by ownership or lease, in another Member’s territory to provide a service.

-Mode 4 *Presence of natural persons*: it consists of persons of one Member entering the territory of another Member to supply a service.

The focus here is on Mode 3, as all other modes of supply are already granted. In Table 2.2.3 three possibilities of *commercial presence* and how they related to the Freedoms of Air are indicated. All current ASAs banish Mode 3(c)¹², which corresponds to the 8th and 9th freedoms of air, with few exceptions like the traffic between EU countries and between Australia and New Zealand. In fact, even with the most developed ASA typology, the *open skies*, access to city pairs between countries tends to be limited (Odoni, 2009). Only under the newly denominated *open areas*, like the US-EU Open Skies Agreement—see Section 4.2—there could be an inclusion of the 7th, 8th and the 9th freedom rights together. As of today, the market access is still today clearly restricted. Even if the ASAs allow airlines from a particular country pair to operate in a foreign market, and usually with trade limitations, these agreements are a discrimination against airline carriers from third countries because the service is restricted to national flag carriers of the signing countries.

Table 2.2.3. Modes of supply services according to airline nationality, customer nationality, and territory of service consumption.

Nationality of the carrier with respect to the customer	Operations from a <u>foreign base</u> to the customer	Operations from a <u>local base</u> adjacent to the consumer
Foreign	MODE 1. E.g. An EU carrier operating out of the EU transports US passengers to/from the US MODE 2. E.g. An EU carrier transports US citizens between two points out of the US	MODE 3(b). E.g. A EU carrier establishes a business in the US to serve routes to or from the US. (this includes 3 rd , 5 th , 6 th , 7 th , and 8 th freedoms) MODE 3(c): A non-US carrier establishes in the US to serve US domestic routes (cabotage).

¹² The sub-classification 3(a), 3(b), and 3(c), does not correspond to the WTO, and it is specific of this text for explanatory purposes.

Domestic (same nationality)	MODE 3(a). E.g. A US airline transports US passengers from a point out of the US (this includes 4 th , 5 th , 6 th , 7 th , 8 th and 9 th freedoms)	DOMESTIC. A US-based airline operates on routes to and from the US. MODE 1. E.g. A US carrier transports US citizens to international destinations
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A valuable resource for this discussion is the Foreign Direct Investment Restrictiveness index (FDI index), developed by the OECD since 2003, which compares the *restrictiveness*¹³ of FDI policies in each country for a representative range of economic sectors. For the majority of more than 40 countries included in the comparison, air transport turns to be the sector with more restrictions to FDI among 22 sectors considered in the primary, secondary and tertiary economies. The scoring of air transport and other representative sectors is shown for a selected group of countries in Table 2.2.4. Overall, we find that in the air transportation sector there is a substantially higher discrimination against foreign investors than in other industries, irrespectively of the particulars of the domestic regulation in each of the countries considered in the comparison.

Table 2.2.4. OECD's FDI Index by country and sector in 2010

Service sector	OECD	Non-OECD	USA	China	Germany	India
Air Transport	0.376	0.497	0.650	0.730	0.325	0.788
Maritime transport	0.272	0.252	1.000	0.850	0.275	0.000
Surface transport	0.048	0.159	0.000	0.415	0.000	0.000
Business services	0.073	0.198	0.000	0.138	0.000	0.625
Communications	0.119	0.166	0.010	0.800	0.000	0.425
Construction	0.027	0.150	0.000	0.265	0.000	0.350
Distribution	0.028	0.119	0.000	0.238	0.000	0.431
Manufacturing	0.029	0.065	0.000	0.252	0.000	0.020
Real estate investment	0.092	0.357	0.000	0.275	0.000	1.000
Fishing	0.305	0.350	0.550	1.000	0.275	0.700

Source: Kalinova et al. (2010). Indexes range from 0=open to 1=closed. Highlighted the highest value for each country or group of countries considered.

Another variable of interest is the concentration of the air transportation sector. Figure 2.2.1 compares the consolidation of various industries with a global reach, showing that the airline industry is much more fragmented than a similar service industry like maritime transport or manufacturing sectors like motor vehicles or cellphone devices. This higher level of fragmentation of the airline industry is even more significant considering the low number of big-player carriers existing in each country. As a matter of fact, despite the perception that a lower level of aggregation

¹³ There are four main types of restrictions considered in the FDI index:

(i) Foreign equity limitations, (ii) screening or approval mechanisms, (iii) restrictions on the employment of foreigners as key personnel, and (iv) operational restrictions.

The methodology for the 2010 update of the FDI Index is described in Kalinova et al. (2010).

is symptomatic of a competitive industry and this is usually associated with low barriers of entry, in the global scale the story is different: this fragmentation can be associated with the preponderance of national champions that capture the rents from existing barriers to foreign carriers in their domestic markets.

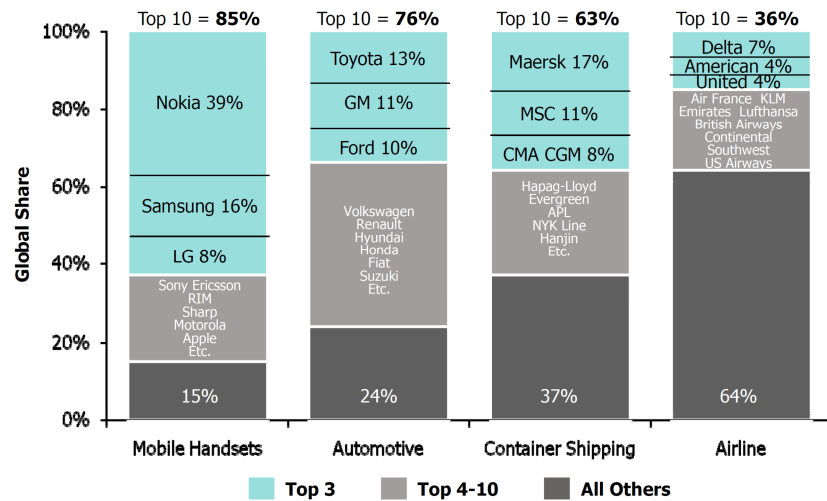


Figure 2.2.1. Global share of the largest airlines in the airline industry and other selected industries. Source: Boston Consulting Group- Retrieved from Swelbar (2011).

From Michael Porter’s competitive strategy analysis it can be inferred that when industry fragmentation is caused by “underlying industry economics that cannot be overcome”, which in this particular case can be associated with the entry barriers confronted by airline carriers in international markets, firms may look for marginal profitability by strategic positioning (Porter, 1980). From a wide range of strategic alternatives when firms have to contend with a fragmented industry, we observe that a very significant driver in the industry is that, still today, most carriers have a clear *focus geographic area*. Other factors that can also be observed in the industry are a *specialization by customer type*, which explains the business model distinction between low-cost carriers and network legacy carriers; *specialization by type of order*, which translates to the differentiation between point-to-point and hub-and-spoke networks, as well as the different marketing strategies for capturing business and leisure travelers; and *increase value added of the service*, arguable ascribable to services like seamless itineraries and higher frequencies offered by airlines with code share and strategic alliances. All of these factors together, among others, help to provide a framework to explain the different internationalization strategies of carriers.

2.3 Internationalization of airlines

Airlines around the world pursue different and evolving business plans. Despite the existence of similar exposure barriers to entry, this translates into diverse internationalization strategies. Historically, the main distinction among carriers has been between “traditional” incumbent legacy carriers and incoming low-cost carriers. On a network basis, a similar discrimination can be made between carriers operating a hub-to-spoke network and point-to-point carriers. Towards the future, it could be argued that the main divergences among large carriers might be between aligned carriers in multi-lateral airline alliances, i.e. the Global Airline Alliances, and those other carriers that remain unaligned. By any criteria, all the largest carriers in each side have a common denominator: the pursuit of international network expansion.

Ramón-Rodríguez et al. (2010) developed a theoretical analysis of the reasons of airlines for going international. The authors transferred what they referred as the “traditional internationalization” to explain the process of international expansion taking place in the air transportation sector. Table 2.3 provides their own summary of their findings. In next sections, the internalization models of three groups of carriers—low-cost carriers in Section 2.3.1, Persian Gulf’s global connectors in Section 2.3.2 and network legacy carriers in Section 2.3.3—provide a current overview of the possibilities of international expansion observed within the industry.

Table 2.3.1. Internationalization theories applied to the airline industry.

Industrial organization theories

- Traditional companies gain competitive advantages from their reputation and brand, company prestige, their size and know-how, as well as from government protection and barriers to entry. They also benefit from economies of scale and density thanks to the formation of alliances.
- Low cost airlines expand internationally due to the higher competitiveness of their product, achieved through technological innovation and a better know-how giving rise to the development of a re-engineering of processes on all levels, including the distribution of the product and the use of the Internet. Furthermore, they are based in secondary or regional airports (which have lower barriers to entry), the ideal channel from within which to develop their internationalization strategy.

Oligopolistic behavior theory

- Airlines imitate each other with respect to price strategies and technological innovations that represent competitive advantages for international expansion.
 - Oligopolistic behavior theory explains not only why airlines internationalize but also how they achieve it and the different modes of entry into international markets.
-

Life cycle theory

- The airline market is in a mature phase of its life cycle, and is an example of how aggressive competition through pricing together with technological advances is capable of rejuvenating a sector.

Risk diversification

- The creation of diverse routes by airlines between disparate points constitutes a strategy to manage possible adverse circumstances in a specific location.
- Internationalization, through FDI or any other mechanism facilitates this diversification as it means that a company is not dependent on a sole market for its survival.

Internationalization as a sequential process

- Newly-created airlines usually begin by offering their transport service on international routes through code sharing or slot leasing where it believes that there is considerable potential demand. The consolidation of these pioneer routes may lead companies to extend their operations to new projects and routes in order to reap greater returns. They may acquire foreign carriers or establish a hub on foreign soil.
- It is common to see airlines using the different internationalization strategies simultaneously, giving rise to a combination of entry modes.
- As the competitiveness of the market intensifies, airlines opt for international expansion strategies that require greater commitments. The liberalization of the European airline industry stimulated the formation of alliances and the entrance of LCCs expanding with FDI strategies.

Localization theory

- The search for new markets, avoiding, where possible, rivalry with other companies is a determinant of the expansion strategies of carriers.
- The liberalized air transport market and the role of governments as regulating agencies also influence the internationalization process.
- The formation of alliances avoids the interference of governments and the association of airlines shows an expansion strategy based on the most important routes across the world.

Transaction cost theory

- Quality control, autonomy or adaptability of the carrier to changes in demand and in general the ability of the airline to reduce uncertainty among customers, avoiding opportunism and protecting the carrier's reputation, together constitute the key advantages of internationalization.

Institutional theory

- The role of the institutional environment not only affects where an airline positions itself but also how it carries out its expansion process. Sometimes, the positioning of an airline depends more on where it is allowed to establish a base rather than where it would like to operate from.

2.3.1 Low Cost Carriers

Low-cost carriers (LCCs) are carriers with different practices and resources to the traditional full-service network legacy carriers which enables them to operate at a lower cost. The LCC business model has been usually characterized by several characteristics associated with productivity efficiencies over the traditional carriers: single aircraft type (usually Airbus 320 or Boeing 737 family), “point-to-point” network instead of a hub-and-spoke network with connecting traffic, lower wage rates, single class cabin, direct sale of tickets instead of using the traditional global distribution channels (GDS), only one-way fare per flight at each point in time, and no seat assignments. The reality is that today most LCCs have diverted their strategies and they only meet some of the archetypical criteria of the low-cost business model. In fact, among the LCCs in Europe and North America only the successful Irish carrier Ryanair meets all the characteristics above (Belobaba, 2009, Klophaus et al., 2012).

Some of the low-cost carriers are opting for expanding their successful business models to international operations. Their aim is to extend their network to whichever routes they can continue operating with similar returns on investment. In this process, LCCs are making use of tactical alliances, i.e. interline and code share, to a significant lesser extent than network legacy carriers. Indeed, at the time of this thesis, no LCC have planned to join a Global Airline Alliance without previous significant changes in their business model. Additionally, there are few examples of successful strategic alliances between LCCs.

Internationalization for an LCC arises as a natural evolution when operating in mature markets with relative scarcity of further attractive routes to operate, significant exposure to down-market moves of legacy carriers, and/or the entry of younger LCCs with lowest cost structures that challenge the incumbent LCC. This need, however, has not been as urgent as for network legacy carriers due to LCCs’ lower fares resulting from a lower cost structure. Indeed, this has allowed LCCs to operate a more extensive set of domestic scheduled routes where they are able generate a critical demand. Another natural limitation to international expansion is their single business model with a limited range of aircraft typology, which limits flight range.

Ryanair, a leading LCC holding 45% of the market share of LCCs in Europe, might be close to reach this market depletion point. The Irish firm has a market share of over 75% at nearly half of its bases (de Wit and Zuidberg, 2012), indicating fewer opportunities for growth within its current network of secondary airports. Future opportunities might arise by serving from primary airports (in 2012

Ryanair already operated in Barcelona and Madrid) or by continuing the expansion of its network of secondary airports to other countries. Ryanair, together with easyJet (the second largest LCC in Europe) are point-to-point non-connecting carriers and, so far, they have not developed tactical alliances with other carriers and all their network expansion has been through organic growth. At the same time, both LCCs are the only unaligned airlines in the world that have established main bases outside of their borders, although these are still in their same economic and regulatory market, the European Union.¹⁴ Ryanair's top management, however, has shown an interest in initiating a low-cost transatlantic service in the near future.¹⁵

Southwest and JetBlue, which account for a 65% and 18%, respectively of the market share of LCCs in the US (de Wit and Zuidberg, 2012), also might find incentives to expand their services abroad.¹⁶ A key factor is how the ongoing process of unit costs' convergence of US legacy carriers with the traditionally more cost-effective Southwest and JetBlue (see Tsoukalas et al., 2008) triggers both airlines' resilience to challenging competitors in the US market. As a matter of fact, the business models of Southwest and JetBlue and the network legacy carriers have more limited differences than in a similar comparison in Europe, as both US LCCs cannot be described anymore under the paradigm of non-associative point-to-point airlines.

Regarding network architecture, in 2010 Southwest had roughly half of its flights through one of their six hubs, increasing this ratio from 40% in 2000; while JetBlue still had more than 80% of its flights through one its four hubs, even considering that it had moved beyond its only hub in 2000, in JFK-New York City (Swelbar, 2011). Although the hub dependence of Southwest is the lowest among the large US carriers, a significant and increasing weight of its operations corresponds to connecting passengers by a hub-to-spoke model.¹⁷ Regarding collaborative agreements, JetBlue has interline agreements with American Airlines and the foreign legacy carriers Aer Lingus, Icelandair, South African Airways, and Lufthansa (code share); Southwest only has a limited code share agreement with Mexican carrier Volaris, initiated in 2009. So far, both airlines have limited their international operations to the Caribbean.

¹⁴ Ryanair (Ireland) has bases in Ireland, UK, Germany, Italy and Spain; and easyJet (UK) has bases in UK, Italy, Spain and Germany. By early 2012, Air Berlin, also unaligned although with a scheduled entrance in oneworld at the end of 2012, practiced a hub and spoke strategy from Germany (Berlin, Dusseldorf, and Nuremberg) and Spain (Palma).

¹⁵ E.g. <http://www.irishexaminer.com/business/kfgbauidqlau/rss2/>

¹⁶ Including AirTran in Southwest Airlines.

¹⁷ The purchase of AirTran, with a strong hub presence in Atlanta, in 2011, might reinforce this trend.

Among the largest LCCs in the rest of the world, Air Asia, a leading low-cost carrier from Malaysia, represents a particular case of international growth through affiliate airlines.¹⁸ Thai AirAsia and Indonesia AirAsia are expanding AirAsia's network to neighbor countries. AirAsia's latest venture is a long-haul LCC, AirAsia X, based in Kuala Lumpur, which is trying to succeed where other long-haul services like Newark's People Express, Hong Kong's Oasis and Ottawa's Zoom failed. Qantas' subsidiary Jetstar and the most recent Singapore Airlines' Scoot are two other low-cost carriers introducing long-haul services with twin-aisle aircrafts.^{19,20}

A limitation for international long-haul services is that some of the competitive advantages that LCCs have over network legacy carriers in short-haul flights are undermined in long-haul sectors. Francis et al. (2007) concluded with 2003 data that a low-cost long-haul operation could only achieve a 20% cost advantage over network carriers, while the advantage in short-haul legs was around 50%. First, long-haul routes cannot be operated by the A320 or B737, which are the most popular aircraft, due to range limitations, which would end up with the cost-savings of fleet commonality. Second, as pointed out by Morrell (2008), the hub connection with passengers from feeding markets would become crucial, as the longer the flight distance, the bigger the catchment areas need to be to maintain the route density. Third, Morrell also indicates that although some cost efficiencies from a higher seat density and lower crew salaries could be achieved, the complications of the service (in-flight catering, schedule constraints from night curfew), and the higher effects of fuel costs, would give a more limited room for exploiting the strengths of the LCC's business model.

Overall, low-cost carriers in the domestic markets at both sides of the North Atlantic show symptoms of stagnation in network growth. Carriers like Southwest, Ryanair or easyJet have a long record of successful decisions, and they might find new ways to capture new demand. Moving to primary airports, growth by acquisition, and connection of passengers (or hub feeding intensification) are three of the business strategies in their portfolio. The provision of intercontinental services through code share agreements is a natural evolution for connecting airlines, as already practiced by a leading LCC like JetBlue. Going further, Wensveen and Leick (2009) have even proposed an interlining alliance of LCCs around the world for achieving profitable long-haul operations. In the shorter term, results of AirAsia X, Scoot and JetStar in Asia and Oceania,

¹⁸ AirAsia, is the largest Asian low-cost carrier, and receiver of the World's best low-cost airline award in 2009, 2010, and 2011, given by Skytrax, a market-research firm specializing in aviation.

¹⁹ Long-haul is a flight leg that cannot be operated by single-aisle aircrafts due to range limitations. It corresponds de facto to flights requiring 6 hours or more of flight.

²⁰ For more details about Scoot launch plans see <http://www.bloomberg.com/news/2011-11-01/singapore-air-unveils-budget-airline-scoot.html>.

and, tentatively, Ryanair in the transatlantic, might be leading the strategic movements on international services for the rest of LCC carriers in the industry.

2.3.2 The alternative strategy of the Persian Gulf's global connectors

A rising group of airlines based in the Persian Gulf —Emirates, Qatar Airways, Etihad Airways, Saudi Arabian—have found their own way to grow in international services with a strategy with echoes to the classical network carriers. The so-called Gulf carriers are exploiting hub-and-spoke operations in the intercontinental flow between Europe on one end, and Asia and Australia on the other, with a single hub in a region with a great geographic advantage, the Persian Gulf. Other carriers in the region, though at a smaller scale, are Saudi Arabian, Gulf Air, and Kuwait Airlines. Additionally, Turkish Airlines, a Star Alliance member, has a network model with similarities to the Gulf carriers.

For the Gulf carriers internationalization can be understood as a need to overcome the lack of an extensive domestic market, as well as an opportunity to take benefit of the competitive advantage of being in the geographic center between regions with a continuously increasing flow, which includes some of markets with the greatest growth potential. Arguably, these airlines are revolutionizing the reach of the hub and spoke mechanism and its role in the global market. An azimuthal projection of the routes of the three largest Gulf carriers—Emirates, Etihad Airways, and Qatar Airways—in Figure 2.3.1, exhibits the geographical convenience of the Gulf's hubs for connecting intercontinental routes.



Figure 2.3.1. Route maps over 1500 miles for three largest Gulf carriers: Emirates (red), Etihad Airways (yellow), and Qatar Airways (pink).

A main competitive advantage of Gulf carriers arises on their routes between secondary airports. Traditional network legacy carriers would serve these OD markets by providing a succession of three flight legs: a short-haul flight connecting the origin spoke with a hub, an intercontinental long-haul between two hubs, and a short-haul flight to the destination spoke. However, Gulf carriers connect the two nodes via their Gulf’s global connector hub. Hence, with two long-haul flights, instead of three flight legs, they provide a higher path quality for passengers. This adds to reduced costs in airport charges in their hubs (Brützel, 2006). As pointed out by O’Connell (2011) in his analysis of Emirates’ business model, the development of these extensive networks are underpinned by the 6th freedom of air with the countries where the firms operate.²¹

The development of large airlines with hub in the Gulf is supported by the construction and expansion of enormous airports in the region. In Dubai, a new large airport, Al Maktoum International²², is under construction, which will be added to the Emirates’ hub of Dubai International airport —already the third airport in the world in volume of international passengers

²¹ The sixth freedom is the right to carry passengers or cargo from a second country to a third country by stopping in the airline’s country.

²² Formerly known as “Dubai World Central” airport, it is projected to have five parallel runways and the capacity for having four aircrafts landing at a time.

(ACI, 2011)- and also under current expansion. With both airports Dubai will have a capacity of 160 million passengers in 2020.²³ These developments go in hand with the expansion of Etihad Airways' and Qatar Airways' hub airports in Abu Dhabi and Doha, respectively, among other developments in other airlines' bases in the Gulf region, as O'Connell (2011) reported. It is worth mentioning that by 2015 or 2016 the three current airports in Dubai, Abu Dhabi and Qatar will have more capacity than Heathrow, Paris Charles de Gaulle and Frankfurt together (The Economist, 2010).

The international growth of the Persian Gulf carriers is a reason of concern for the largest European network carriers, all of them members of global alliances, who see their services between Europe and Asia, Australia, and South Africa threatened by the rise of these high-flier competitors. In fact, Emirates, which is the largest and most profitable Gulf carrier, became in 2009 the world's largest international airline in revenue passenger-km terms. Additionally, the actual orders of wide-body seats of Emirates, Etihad and Qatar Airways combined overpassed those of the entire US carriers' fleet (Schulte-Strathaus, 2011).²⁴ By 2010, Emirates had more than 140 airplanes in order, including 50 A380s, and without plans of delaying or cancelling orders (The Economist, 2010).

The development of the Gulf carriers responds to clear national policies of the United Arab Emirates (UAE) and Qatar: to invest in new economic sectors that prepare the country to maintain its economic status in a post-oil era. From a public perspective, the role of the airlines is not to maximize their profitability in the short-term, although they have proven to develop a profitable business model, neither to connect these micro-states to the rest of the world, but to create a transport network that help their countries to be world class hubs in the flow between the East and the West. Shortly, UAE and Qatar pursue to be global trade centers as well as attractive touristic destinations. This goal of economic expansion explains the alignment of the governments with their airlines to increase the number of destinations and the fleet size, which makes of the development of public infrastructures that can accommodate this growth a priority.

The active role of the public sector is being criticized by European carriers, mainly Lufthansa —the largest European carrier—which accuses the Gulf carriers of distorting competition and allege that they get hidden subsidies. These criticisms have been responded by airlines like Emirates proclaiming the absence of subsidies, while attacking the European allied airlines and the

²³ Expected date of full operations for Al Maktoum International is around 2020. An expansion at Dubai International will already increase its capacity to 75 million by the end of 2012 and 90 million passengers by 2018. (Dron, 2011).

²⁴ By 2011, Mr. Ulrich Schulte-Strathaus was the secretary General of the Association of European Airlines (AEA).

grandfather rights in the slot allocation process in European airports (see Emirates, 2011). However, pressure from domestic carriers could be conditioning European national regulators' willingness to allow Gulf carriers to increase their number of airports under service. In particular, German officials do not plan to modify the air transport agreement (ATA) with United Arab Emirates—who by their part have adopted an open-skies policy—limiting to four the number of cities that Emirates can serve in Germany, arguing that the current agreement is based “on the size of the mutual home markets” (Kingsley-Jones, 2011).

This author has not found any evidence of subsidies to Gulf carriers in the literature, but the acknowledgment that in the Persian Gulf countries there are no income taxes and that non-skilled workers are recruited from lower income countries in Asia and its wages are significantly low. A legitimate source of cost-saving is the lower fuel costs in the Gulf, due to lower supply chain costs associated with the proximity to oil infrastructures (O'Connell, 2011), although a contrary argument here is by *The Economist* (2010), claiming that Gulf carriers pay more for fuel at their hubs than in other airports abroad due to a lack of oil refineries infrastructure in the area. True or not, the rest of advantages pointed here would arise even before considering possible efficiencies in the rest of structural operating costs that depend on technical and managerial talent.

In the paradigmatic case of Germany, after more of a decade of Emirates operating from two secondary airports (Düsseldorf and Hamburg)—in addition to serving from Lufthansa's hub-airports of Frankfurt and Munich—Emirates has become the leading airline in the Düsseldorf-Asia markets, surpassing Lufthansa and other network carriers by providing two daily services with Dubai and, from there, the rest of Emirates' network (Grimme, 2011). This reality that Grimme studied for the case of Emirates in Düsseldorf corroborates the competitive advantage that the Gulf carriers have in some intercontinental markets from/to Europe, especially at secondary nodes.

However, there are some disadvantages in these hub operations that may make Gulf's carriers less attractive for customers in the catchment area of European network legacy carriers' hub airports. For the case of two secondary German cities, Hamburg and Düsseldorf, Grimme proves that Emirates is in a critical competitive disadvantage in larger travel distances to the most demanded Asian itineraries because of the connection via Dubai, which brings to longer total travel times for the customer than with Lufthansa's alternative. Grimme also argues that the transfer for most of the flights in Dubai is at unpleasant early morning hours. Additionally, potential consumers may have

more schedule displacement²⁵ than with Lufthansa, given the higher daily frequency flights of the German carrier.

Overall, Emirates is not a leader in the business passengers' sector in neither Hamburg nor Düsseldorf. However, Grimme finds that Emirates does not offer the lowest fares—which are offered by Turkish Airlines, Finnair, Air France-KLM, Air China and Swiss. This suggests that there might be retained preferences, whether the reason be the ease of connections by the two long-haul legs connection via Dubai, or Emirates' stronger brand recognition than the rest of airlines other than Lufthansa. The latter argument could be well based if we considered the reported marketing efforts of Emirates—4% of its annual revenues (O'Connell, 2011)—which has had especial visibility via their sponsorship of many large sport events with global exposure.

Finally, the bold expansion of the Gulf carriers might not give enough room in the market for all of them to be global carriers. As a matter of fact, Saudi Arabian Airlines planned to join Sky Team as a full member by 2012, and similar movements from other Gulf carriers to oneworld and Star Alliance should not be dismissed. Different movements have been those of Qatar Airways and Etihad Airways, who by 2011 had been executing stock purchases in European carriers in financial distress. Ultimately, the Gulf carriers are not only expanding their network at a fast pace, but also developing their business model in a global industry that they aspire to reshape.

2.3.3 Network Legacy Carriers

In all regions worldwide where start-up passenger carriers have entered following the low-cost business model, incumbent network legacy carriers (NLCs) have been exposed to their lower fares. This has posed a competitive pressure on NLCs during the last decades. Among all the challenges posed, Tretheway (2004) and Kahn (2004) argued that the greatest effect of low-cost carriers on NLCs had been to undermine their price discrimination ability.

The responses of NLCs to this challenge have been varied. Some carriers attempted to emulate low-cost carriers' business model, such as Aer Lingus and US Airways; others launched low-cost subsidiary carriers to compete directly with low-cost carriers on the domestic routes, like Delta

²⁵ *Schedule displacement* is the difference between the time that the passenger would like to depart and the closest departing time available. This displacement or “wait time” can be modeled as a contributor to the total trip time of a given passenger (Simpson & Belobaba, 1992).

Airlines (Song), Continental (Continental Lite), United Airlines (Ted) Air Canada (Tango, Zip), or bmi (bmibaby). Most of these “airlines within an airline” failed. However, as of 2012, two of the largest network legacy carriers, Singapore Airlines and Iberia, were launching their low-cost carriers, Scoot and Iberia Express, respectively. Instead, for the majority of surviving legacy carriers the strategy has been to exploit the differences with low-cost carriers, and to turn them into a competitive advantage.

Some of the most valuable features supplied by NLCs are connecting flights, wide network coverage of domestic and international destinations, frequent-flier programs, and business class cabins. On the demand side, these services are valuable for travelers requiring a more extensive network, and, as a general rule, also a higher service quality. As part of this package of superior services, network carriers are expected to offer their customers seamless connections with domestic and international destinations. For the former, NLCs have been transferring capacity to regional partners (see Dennis, 2007), while the provision of a wider international network has been made possible by partnering with foreign airlines.

As shown previously in Chapter 1, there are diverse collaborative frameworks for building an international network. An extended and basic scheme for NLCs, but also common to low-cost carriers and Gulf global connectors, is the bilateral code share agreement with foreign airlines. In open-skies markets, like the European Union, trans-border mergers and acquisitions provide the full-integration option, and examples are Air France-KLM, IAG, or the Lufthansa Group. With no exclusion to these two frameworks of collaboration, multilateral alliances are an intermediate and complementary option of collaboration, and they are found in the form of the three Global Airline Alliances (GALs).

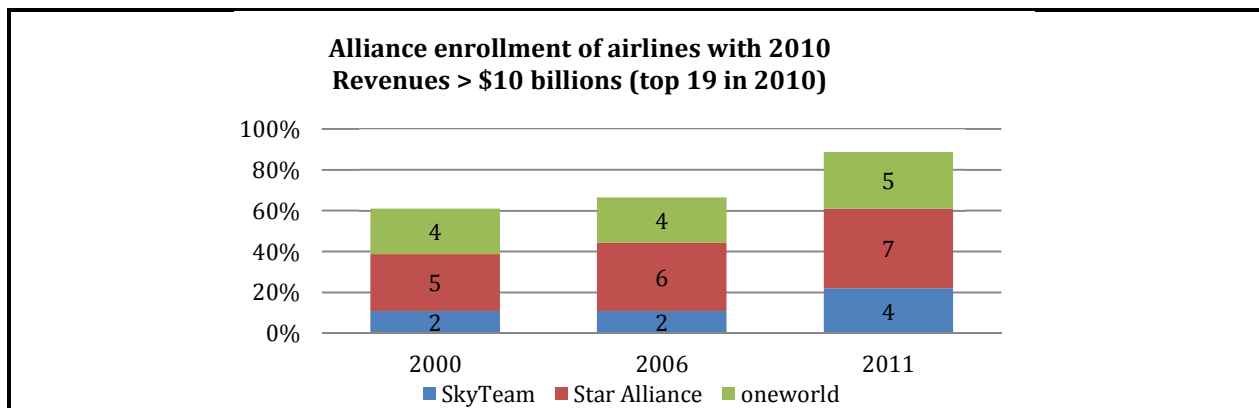
On a worldwide scale, the reality is that, as of today, most of the largest carriers have joined one of the GALs. By 2011, 21 of the 23 largest passenger airline groups in the world—when ranked by revenue—were enrolled in a GAL.²⁶ Only Emirates (9th) and Southwest Airlines (13th) remained unaligned. More interestingly, when considering the airlines with more than \$3B in revenues (top-41), although just two-thirds (26) were in a GAL (see Figure2.3.2), from the remaining 13 carriers, four had a scheduled entry (Air Berlin, China Airlines, Saudi Arabian Airlines, Malaysia Airlines), and two had plans to join a GAL (Eva Air, Hainan Airlines), while eight of the remaining airlines

²⁶ The mention to “airline group” is required as large carriers like American Airlines, Lufthansa, or Japan Airlines have consolidated revenues with subsidiary firms; similar cases are the multi-brand merged airlines like Air France-KLM Group, United-Continental Holdings or International Airlines Group.

could be labeled as low-cost carriers (Southwest, Ryanair, easyJet, GOL, JetBlue) or Gulf global connectors (Emirates, Qatar Airways).²⁷ Overall, it can be observed that almost all the largest airlines in the world that have not opted for the cost-minimization business model of the low-cost carriers, or the expansion plan of the Gulf carriers, have decided—or plan to—join a Global Airline Alliance.

When considering middle-sized airlines, i.e. between \$3B and \$0.3B, (105 airlines) the proportion of aligned airlines decreases dramatically to less than 20%, despite having doubled the number of enrolled airlines during the last five years. This author proposes four complementary interpretations of this lower proportion of aligned airlines:

- (i) 30% of the unaligned airlines are not among the three largest airlines in their country, which is a relevant factor because with the exception of the two largest economies in the world, the US and China, each GAL has no more than one member per country to avoid a significant network overlapping between existent and incoming members;
- (ii) An additional 10% of the unaligned airlines in this category can be characterized as low-cost or regional carriers;
- (iii) Some of the carriers might not have been admitted due to lower service quality standards; and
- (iv) GALs are still in a growth phase. As a matter of fact, by early 2012 nearly an 8% of these unaligned middle-size carriers were in process of joining a GAL in the next two years.



²⁷ In this list of 41 airlines, this author found that Alaska Airlines could not be classified under any of the categories presented without controversy.

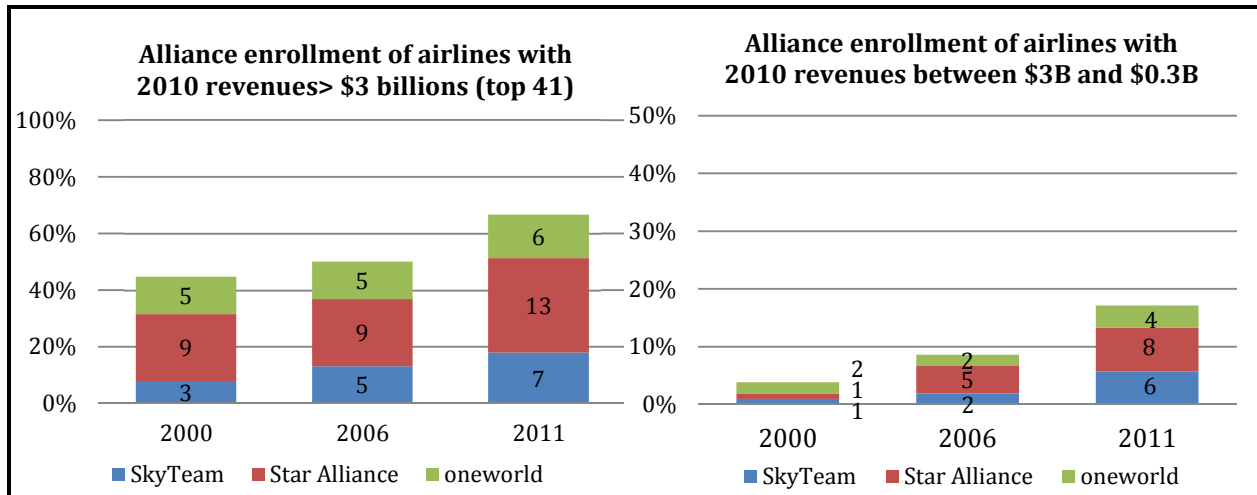


Figure 2.3.2. Distribution of airline groups according to their alliance of enrollment in 2011, 2006 and 2000. Note: The difference from the top of the bar to 100% corresponds to unaligned airlines.

2.4 Potential benefits of strategic alliances

The growth of airlines' international networks, and the use of collaborative strategies for this purpose, has to be interpreted as a strategy of airlines to improve their profitability by exploiting new revenue sources while reducing marginal costs. In this direction, multilateral strategic alliances have the potential of achieving diverse benefits from a close collaboration between airlines. These gains may vary from those achievable with code share routes to the potential benefits associated with close partnerships that resemble an international multi-brand airline.

Although this Section focuses on the advantages of alliances for exploiting efficiencies and generating new revenue sources, some of the implicit trade-offs associated cannot be disregarded. In fact, although alliances can contribute to develop code share routes in an airline's network—an analysis in Chapter 3—joining an alliance might be a restraint for pursuing growth strategies, a view subscribed by many low-cost carriers and the Gulf's global connectors. Aside, an aligned airline can market its GAL enrollment as an added value feature for its customers, potentially generating extra demand and, as well, the GAL's global marketing platform can be leveraged by local airline brands to reach a much larger market. At the same time, this dual brand dimension of GAL-airline might also have the undesired effect of the airline brand losing weight in the international or domestic market, as pointed out by Iatrou & Oretti (2007).

Despite an extensive literature on the benefits of alliances from the perspective of manufacturing businesses, the particularities of the air transport business brings us to the need of addressing the

economic incentives of global airline alliances from a particular basis. Most of the benefits of multilateral airline alliances are linked with the reinforcement of the competitive advantages of other key features of the airline industry like the hub-spoke network, code share routing, and antitrust immunity for airlines coordinating joint operations. In addition, global alliances also contribute per se with initiatives like joint marketing and exclusive membership. Following, we can decompose the most relevant potential gains to allied members that global alliances can amalgamate.

2.4.1 Economies of scale

Economies of scale are the decrease in unit costs with respect to the increase in network size and the provision of services. They can also derive from learning, specialization and the distribution of fixed costs over a larger output (Iatrou & Oretti, 2007). There can be potential economies of scale with aircraft size, as the unit costs in fuel and crew, among other items, increase to a lesser degree than the available seats-km if laboring under the *ceteris paribus* assumption when considering aircraft technology and pilots' seniority. Stage length also provides economies of scale as fixed costs in airport-based costs are the same for a longer covered distance. Fuel costs also reduce with longer stage lengths as there is lower fuel consumption at cruise altitude and the higher consumption in takeoff and descent are distributed over a longer period. Alliances with foreign airlines bring to more international flights, enhancing economies of scale from a larger average stage length and, tentatively, the operation of a larger number of flights.

As an example of the motivation to create alliances, Romero-Hernandez & Salgado (2005) report that after the liberalization of the intra-European airline market, incumbent airlines opted for three strategies to exploit economies of scale through expansion: (i) mergers and acquisitions, (ii) setting up low cost carriers, and (iii) airline alliances; and from the three, the most sustainable strategy in time has been the airline alliances. Airlines wanted to become larger to bring their costs down and create a competitive advantage over entering airlines. Nevertheless, the reality is that most empirical studies have reported constant returns to scale in network expansions, as concluded by Caves et al. (1984), Gillen et al. (1990), Oum & Zhang (1991), and Ng & Seabright (2001), among others.

From a different perspective, Fan et al. (2001) mentions the diseconomies of scale for airlines serving spoke cities with a low frequency. In those airports with limited operations, airlines may want to rely on an airline with a larger structure in that base to provide ground operations—i.e. handling passengers and cargo, ticket sales, and facilities. Similarly, Kilpi and Vepsäläinen (2004) showed the potential economies of scale with inventory pooling spare components for aircrafts between airlines, with a decrease in inventory levels of up to 30%. The alternatives are sustaining an own inventory of components which has a holding cost, or depending on subcontractors which implies to lose sovereignty in a relevant cost source, as well as potential longer lead times. Agreements of this kind are far from being uniquely attributable to global alliances—e.g. cooperative pooling of aircraft parts initiated in Europe as soon as in the 1960s—although the higher degree of cooperation of global alliances obviously enhances the provision of these services.

Toward the future, global alliances can take benefit from economies of scale by committing in pooling spare components and distributing the provision of the inventory, being its titular either the alliance or the airlines under a cooperative framework (Kilpi and Vepsäläinen, 2004). Further efficiencies can be gained with a standardized fleet. In a similar direction, Iatrou & Oretti (2007) pointed out that a joint action of alliance partners in network and fleet planning is needed to take full benefit of economies of scale and maximize profits by managing maintenance and ground handling; the same authors, however, assume that this ultimate level of cooperation may require for the allied airlines a single management team, which is arguably only possible under airline mergers.

2.4.2 Economies of density

Economies of density refer to the decrease in unit costs when the transportation services within a network increases, not by an expanded network size but a higher traffic density.²⁸ By this, airlines might use larger aircraft, i.e. more cost effective, at a higher load factors. Higher network densities allow a more intensive use of ground facilities, human capital, and aircraft. This effect led to the emergence of hub-and-spoke networks.

²⁸ Oum & Waters (1996) described the economies of density as the lower increase in cost when expanding traffic in a network of constant size, whereas they referred to economies of scale as the diminishing average cost of increasing network size with constant traffic density.

Caves et al. (1984) already argued that the smaller unit costs of US national-coverage airlines compared with local airlines during the 1970-1981 period could not be explained by the scale of airlines but primarily by the higher density of traffic in larger airlines' network.²⁹ Later, in a similar analysis, Brueckner & Spiller (1994) found that a 10% traffic increase led to a 3.75% reduction in marginal costs. The implication of these findings is that airlines opt to grow by expanding the frequencies on the routes where they are already established, increasing their market share.

Airlines can increase the flow density by merging or partnering with competing airlines. In the particular case of global alliances, aligned airlines can benefit from economies of traffic density in two different manners. One is by consolidating operations with airlines with overlapping networks, which reduces the number of contenders in the market, and increases the traffic density on their routes, diminishing marginal costs. The existence of economies of density can help to explain the phenomena of airlines partnering or merging to increase revenues even when they serve the same nodes and significant increase in network size is not expected. The reduction in the number of competitors may also help the airline to increase market power. The second manner is by funneling connecting passengers in code share from partner airlines, resulting in a higher volume of passengers per route and a lower passenger-mile cost. Compared to a non-collaborative scenario, aligned airlines can serve connecting passengers that before would have been handled by the partner airline with a low route density or by another competing airline.

2.4.3 Economies of scope

This term was first coined by Panzar and Willing (1981) to refer to the cost savings achieved by having a multiproduct enterprise in which the joint cost of producing two or more outputs is less than the sum of the costs of producing each output by itself. In the field of air transportation this term is intrinsically associated with spatial scope. Economies of scope appear when as an airline adds new nodes, i.e. destinations, to their network, the production costs for all the new routes that the new nodes generated is lower for an incumbent carrier than if the new routes were served by a new company created ad hoc. This source of efficiency is especially remarkable when airlines operate with a network close to a theoretically pure hub-and-spoke network with n airports, for

²⁹ Other studies reporting economies of density in airlines are Oum & Zhang (1991); Gillen, Oum, & Tretheway (1990); Romero-Hernandez & Salgado (2005); Ng & Seabright (2001), and Kumbahar (1990).

which the addition of m new destinations increases the number of route combinations between destinations in the network from $n \cdot (n-1)$ to $(n+m) \cdot (n+m-1)$.

A majority of cross panel studies on airline's costs during the last 30 years have reported economies of density and null economies of scale. If economies of scope were not considered it should be interpreted that expanding networks is inconvenient, and to increase density would be profitable. Nevertheless, this would hold as an inconsistent conclusion considering the effort of airlines to increase their network size through natural growth, and the development of alliances, mergers, and acquisitions between airlines with complementary networks. As presented by Basso & Jara-Díaz (2005), with a large network size there is an increase in the number of products, and this comes at a cost advantage.³⁰

According to Oum et al. (2000), economies of scope are one of the reasons for the formation of alliances. In fact, as an airline code shares with a hub of a partner airline, a myriad of new routes are added to its destinations' portfolio at a minor cost. In the study of Basso & Jara-Díaz (2005), the authors analyzed the cost function of three Canadian carriers and they found that all three carriers had increasing returns to spatial scope. Interestingly, the economies had a diminishing return when the number of nodes served increased, i.e. smaller airlines had more to gain from increasing their network than larger airlines. Given that, it might be hypothesized that smaller global alliance members could achieve larger cost efficiencies from a larger network than larger members, although, to the extent of our knowledge, there are no studies supporting this argument.

2.4.4 Larger profits from pricing on code sharing routes

Airlines partnering in a code share agreement not only adjust schedules to provide a seamless trip to clients, but they also might adapt fares in multi-airlines code share tickets. Research conducted by Jan Brueckner with data from the Passenger Origin-Destination Survey of the US Department of

³⁰ The distinction between the concepts of economies of scale and scope is shown in the following equation, where C is for cost, and Q is output. Economies of scope (SC) are then:

$$SC = [C(Q_1) + C(Q_2) - C(Q_1 + Q_2)] / C(Q_1 + Q_2)$$

where: $C(Q_i)$ is the cost of producing Q_i units of output alone, and $C(Q_1 + Q_2)$ is the cost of producing both Q_1 and Q_2 . Economies of scope arise if $SC > 0$, and there are economies of scale when C/Q falls as Q expands.

Transportation show that interline alliances lead to lower fares, both in the case of codeshare agreements, and under granted antitrust immunity to coordinate prices between airlines (Brueckner & Whalen, 2000; Brueckner (2003a).

Under antitrust immunity, airlines can collaborate in setting prices. In code share agreements between unimmunized partners, airlines opt for a fare that is split between the operating carriers according to a distance-based prorate formula. In both cases, airlines stimulate demand with lower interline fares that can translate into higher profits than without collaboration. This pricing behavior contrasts with a non-cooperative case in which the airlines on a multi-leg route sets a separate fare for each leg. From that, the multi-stop route is marketed at a higher total fare, by summing local fares. In Chapter 4 we review the impacts of pricing on consumers' welfare.

A different case is for nonstop travels operated by a single carrier under an agreement between carriers on gateway-to-gateway routes. This situation, in which the two or more carriers combined have a large market share, may lead to collusive behavior between them. In this case, coordination of pricing for the airlines could translate into a higher fare (see Barney, 2002) and, again, higher profits.

2.4.5 Marketing and branding benefits

The change in cost structure is not enough to explain the behavior of airlines. The marketing strategies and the demand response are crucial in the bottom line of the firm. Above we have seen that, by being part of global alliances, airlines can offer consumers a larger and denser global network with smoother connections; while from the efficiency gains from economies of scope, scale and density, they can also be more competitive in price, boosting demand. Together, the ability of airlines to retain and generate passengers in an airline's international and domestic hub-feeding network increases as the firm offers a better product to customers.

An aligned airline has the potential to sell tickets from its own distribution channels to any location that the alliance covers, increasing the utility of the airline to the eyes of the consumer as a competent provider of air transportation services for a wide range of destinations, thereby potentially increasing the brand loyalty. Another additional marketing benefit is that the consumer appraisal can potentially increase by offering a more attractive frequent-flyer program (FFP) because passengers can earn mileage on routes all over the world whenever they fly with partners

of the FFP's issuer airline. Vice versa, there are also marketing benefits as FFP holders from aligned airlines give value to a partner airline for counting FFP mileage on their routes. In fact, benefits from more attractive FFPs from combined networks were reported as soon as in the 1980s (e.g. Levine, 1987).

Advertisement of each airline can increase in hand with its alliance expansion if there is a quid pro quo promotion at the marketing channels of the alliance partner members. Airlines can enjoy what Iatrou & Oretti (2007) refer as indirect free advertising system, or the global advertising of the name and image of the airline with that of the alliance. Additionally, member airlines can undertake cross promotion by revealing and marketing the airline that operates in each connection of their global network as well as by promoting the variety and excellence of its partners as an added value of the airline. Especially in the case of small airlines, the association with larger and better-known firms can help signaling to the customer a superior service standard as well as the approval from the airline business. This plays an important role in the long term, as the marketing literature acknowledges that the levels of customer loyalty increase for companies that are perceived to provide a higher quality service.

Another contribution of alliances is the promotion of service quality among customers, who after building an idea of the quality of an airline they apply this perception of airline's service to the rest of markets the airline offers (Iatrou & Oretti, 2007). Hence, there is a potential for alliances to position all its members under the alliance brand as a similar market product, by making most of the attributes of the alliance brand extensive to all the alliance members. Hence, they can create a competitive advantage that is resilient to pricing competition. However, Iatrou & Oretti mention the difficulties for developing alliance brands in an industry that has historically being associated with the country of origin of the carrier, and they assert that alliances need to emphasize to the customer that the merits of the alliance prevails over the nationality of the carrier. On the other hand, at the managerial level of many airlines there is the belief that a strong airline brand, i.e. a familiar name, should not be phased out in benefit of the alliance brand. Recent mergers of Air France-KLM in 2004, and Iberia-British Airways in 2010 offer more insights about the difficulties to integrate reputed airlines from different countries in a strong brand, as in both cases the two original brands were preserved. Again, there is a strong national association and global recognition of the four carriers, and the airline managers perceived that the loss of any of the two brands might have brought more risk than the potential benefits of a stronger single brand.

On the other hand, this author shares the idea of Kleymann & Seristo (2004) that alliance membership can bring a better reputation to the airline. In fact, alliance branding may be even more relevant for smaller alliance members, who may want to signal service quality and reliability to the customers by pairing their brand with the alliance. The importance of brand reputation and its association with higher quality standards is important for capturing top-end customers, who are less impressed by airfares and give value to other aspects of the service. In fact, the empirical research (e.g. Gillen et al. (2008)) shows that although leisure travelers have high price elasticity and their choices are mainly driven by treating air transport as a commodity, business passengers have a significantly more inelastic demand and, hence, the weight of non-pricing factors like service quality or FFPs is higher. Similarly, leisure passengers also tend to be more price inelastic in the long-haul than in the short-haul. If smaller airlines are associated to the same quality than their alliance partners, quality-sensitive customers may use their (positive) information on the alliance to choose the allied airline expecting a higher value from the service.

Finally, in an industry bipolarized between network carriers in alliances and low-cost carriers, especially in the European Union, airlines that are neither the national flag carrier nor a low-cost carrier, can differentiate from the latter by strengthening their status as an alliance member. This scenario is especially valid for European carriers, as historically there was just one flag carrier in each country and some charter or entering airlines have evolved towards network carriers. The cases of Air Berlin in Germany (oneworld member in 2012), and Spanair³¹ (Star Alliance) and Air Europa (Sky Team) in Spain, provide an example of non-flag carriers that provide a network coverage for whom being an alliance members may have helped to distinguish themselves from low-cost carriers—which were competitors in markets in the 3-hour range—in terms of perceived service quality. On the other hand, the process of product differentiation needs to be accompanied by the fulfillment of safety, quality, IT, and customer service standards that GALs require for incoming members to avoid lavishing the alliance's brand with lower standards.

2.4.6 Financial economies

Some of the potential benefits of diversification have already been outlined from the perspective of economies of scope, as this brings to more sources of revenues at a lower marginal cost. In addition,

³¹ Defunct in January 2012.

here we also consider the theory that diversification allows a superior risk return on assets (Markowitz, 1952), as well as limited cash flow fluctuations in the firm. Global Airline Alliances (GALs), due to its reach, provide its members the best platform available to build a diversified portfolio within the same sector. By including destinations in new markets, airlines limit their exposure to a limited number of revenue sources. Although globalization makes economies increasingly more interconnected, if airlines can generate demand in other countries with lower correlation with its domestic economy, this can reduce their exposure to economic downturn in a particular country or economic region, which brings to a reduced risk of financial distress for their overall business. This feature increases the value of the firm, as reported by Mansi & Reeb (2002) for multinational corporations.

Due to the geographic diversification provided by GALs, airlines could potentially reduce the negative effects of economic downturns in their domestic market on average yield and/or load factor as other markets might be still sustaining demand. In addition, the dispersion in revenues between economic periods is reduced, limiting the tensions on treasury, and reducing the amount of working capital required. From another perspective, given a fixed amount of working capital, the risk of financial distress would be reduced. These gains, however, would be even higher in case of airline mergers with consolidated finances.

Geographical diversification in the airline industry brings together other great opportunities — amid other notable limitations. On the one hand, airlines have a potential high mobility of resources, as aircrafts and crews can be swapped from one route to another, providing an opportunity to allocate resources where the returns are higher whenever the supplies are scarce. Here, GALs have widened the range of opportunities to reallocate resources among routes and regions; however, this requires a high level of integration between airlines. Also, the national regulations applying on international workers limit human resource mobility. In addition, although GALs certainly might help to overcome the constraints from trade costs and barriers to entry described in Section 2.1, these should not be disregarded as potential limitations to the reallocation of services. Finally, the figure of an alliance manager with powers to reassign assets among regions and airlines would require of a well-defined internal policy to which the members committed. In fact, this higher level of integration would resemble that of merging airlines.

A particular case of financial economies can be inferred from Rigas Doganis' description of a crucial period in the development of global alliances:

The most active period of alliance-making was triggered by the deteriorating financial performance of international airlines as they were hit first by the crisis in the tiger economies of East Asia from late 1997, then by the economic slow-down in some European states in 1998, followed by the rapid escalation of fuel prices in 1999. Airline Business in June 1998 recorded 502 separate inter-airline alliances, 32 per cent more than a year earlier. As the global economic downturn began to bite in 2000 and the airline crisis deepened, especially after the attacks in New York in September 2001, the alliance frenzy intensified. Many airline managers saw alliance building as a key pillar of their survival strategy.

Doganis (2006).

2.4.7 Joint purchasing

Global alliances can have a negotiating power in benefit of its members, achieving better deals when dealing with suppliers. Iatrou & Oretti (2007) mention fuel, spare-parts, maintenance, catering, airport charges, or cabin crew training as potential sources of cost reduction. These authors state that already in 2000 Star Alliance pursued to save US\$150 million each year through joint procurement, which only stated for a 0.1% of the total expenses of the alliance members, although some analysts thought that there was room for cuts of up to 3.6% of total expenses if the management of external services—handling, maintenance, catering and fees, among others—was pooled. According to Star Alliance, however, the annual savings from joint fuel purchase is just in the range of \$27 million (Star Alliance, 2011a). Oneworld claimed to have saved \$37.5 million per year over the period 2000-2008, although the alliance acknowledged that there was room for larger savings.³²

In fact, it is not in the joint fuel purchase where significant room to negotiation can be found. There is an extensive record of joint procurement on the main airlines' asset, its aircrafts. A recent example of joint procurement is Star Alliance's project of building a common economy-class seat specification for all its member airlines (Air Transport Intelligence, 2011), with a stronger emphasis in lowering costs in a commodity resource than in homogenizing the fleet.

³² From oneworld Managing Partner John McCulloch.

Source: http://www.aviationweek.com/aw/generic/story_channel.jsp?channel=comm&id=news/ALLlex.xml

2.4.8 Control on barriers to entry

As noted in Young et al. (1989), the motives of firms in any industry for establishing international joint ventures can be distinguished between the establishment of corporate linkages that benefit both firms, like economies of scale, sharing investment risks, learning and exchange, etc.; and the role of international cooperation in corporate entry strategies, mainly the entry to new geographical markets. In fact, one of the main resources that an airline can offer to alliances is its airport slots and hub location, as well as its traffic rights with other countries.

Access to slots, i.e. a time interval available for scheduling an arrival or departure, is a highly relevant barrier to entry at capacity-constrained airports, given the existence of non-tradable rights like that of “grandfather rights”, i.e. the preservation of slot times for occupant airlines instead of incoming airlines. The degree of control of airports by hub-dominant carriers is such that among the 20 largest airports in the world in 2010, on average, over 40% of the flights corresponded to the dominant carrier and its affiliated regional carriers.

The importance of hub control remains in the fact that the dominant airline can exploit economies of hub density, lowering costs and attracting passengers with higher frequencies through the hub-and-spoke network. In addition, airlines in minority and potential entrants can only compete with the hub-dominant carrier in a limited number of markets. While this is not necessarily a limiting factor for non-connecting airlines, network carriers depend on a critical volume of slots to feed their hub-and-spoke network with a suitable range of destinations and/or frequencies. The airlines allied with a carrier dominant at a specific airport—e.g. SkyTeam partners of Air France in Paris-CDG, which holds 50% of the frequencies—can have access to a large European network that, otherwise, would be very difficult to serve in their own, given the diseconomies of low hub density that the non-dominant carriers face. At the same time, if the alliance partners operate from new slots, the hub-dominant carrier is able to reinforce its protection against non-partners competitors who will see their potential expansion undercut by the access of foreign network alliances to new slots.

The natural evolution of this trend under a low regulatory pressure is the increasing dominance of a hub by a hub-dominant carrier and its alliance partners. Regulators pay also attention to two other main potential barriers of entry that alliance members can raise to potential competitors in each city-pair market: frequency advantage of allied carriers, and strengthening of the alliance

members' position in the hub, from loyalty effects of FFPs, corporate contracts, and the provision of a more extensive network (European Commission & US DOT, 2010).

2.4.9 Learning

A substantial area of benefit comes from the standardization of practices and the sharing of regional preferences among the airline members. The learning process can improve airlines' efficiency and the service quality provided, bringing to a potential increase in profits. As a difference to less integrative models of collaboration, Global Airline Alliances can be a forum for sharing practices and technologies that have proved to be more successful in the managerial and operational sphere, for the generation and discussion of new improvements, and the understanding of the preferences of customers from different backgrounds.

By joining a global alliance, incoming partners are firstly exposed to an integration process that may require a period of several months or years. During this time, new airlines might have to adapt its operations, IT systems, dress-code, office layouts, chain of command, hierarchy structure, customer service, fidelity program, safety standards, etc. (Iatrou & Oretti, 2007). If we consider a wider range of collaborative scenarios for an given unallied airline—joint venture, bilateral alliance, multilateral alliance and merger and acquisition—joining a global alliances implies much more assimilation and less mutual adaptation or bidirectional learning, because the incumbent airline needs to adapt to a large number of firms with existent standards and procedures. Hence, any significant change in the alliance forced by the new partner may affect the rest of the members, implying a larger cost of integration for the group. The integration process may help the airline to be more competitive if the changes improve the efficiency and service quality. However, this is not assured, as the airline may be reluctant to integrate if their competitive advantages are challenged during the homogenization. In the other extreme, integration through merger or acquisition between equal-sized firms is arguably the best scenario for having mutual learning and it can enhance the choice of the best practices of both firms.

Another primary goal of alliances could be that they are a vehicle for internalizing new skills, in particular those that are “tacit, collective and embedded” and, hence, not easily obtained by one's own means (Doz & Hamel, 1998). The insights from the bilateral or multilateral exchange can be expanded to the entire firm structure, making of the alliance the spurn for general improvements in

the airline. To sum up, two steps of the learning process of an airline joining an alliance can be identified: learning through the adaptation process, and by creating value in the day-to-day collaboration.

2.5 Chapter Summary

The largest airlines in the world have been pursuing international expansion as a way to leverage their competitive advantages, diversify risks, seek for larger returns than in their domestic markets, and benefit from economies of size and density. This process has been conditioned by the peculiarities of the airline industry, which were described in Section 2.1. As a service industry, the provision of air transport services is affected by higher trade costs and barriers than manufacturing industries. Also, in most countries the airline industry is under regulations limiting foreign ownership of airlines and making of the air transport probably the most restrictive service sector for foreign direct investment in the world. A global liberalization of the air transportation is not expected in the next decade, as it has been excluded from the multilateral trade negotiations of the WTO. An open question here is to which extent the regulatory barriers prevent airlines from organic growth, and which is the impact of other barriers to entry.

The incentives for internationalization still propel the great majority of airlines to pursue international operations. As of 2011, 18 of the 20 largest airline groups in the world had joined one of the three Global Airline Alliances (GALs), and during the last decade the enrollment of airlines in alliances has shown a clear increasing trend. At this point in time there is a very clear coupling between network legacy carriers and GALs. Among middle-sized airlines—considered here as airlines with annual revenues between \$3B and \$0.3B—the proportion of allied airlines is less than 20%. One reason for this is that actual network carriers are usually of a larger size; also, GALs have tended to avoid significant geographic overlapping between members, which limits the chances of enrollment of a 30% of middle-sized airlines based in countries with already three GAL members or more.

Regarding the rest of the airline industry, low-cost carriers (LCCs), and a group of quickly expanding carriers in the Persian Gulf have opted for other internalization strategies rather than multilateral alliances. The latter group, represented by the archetypical example of Dubai-based Emirates Airlines, is developing a hub-and-spoke network at the global scale around a Gulf's hub, already challenging the GALs in the flyways between North America, Europe, Africa and Asia. LCCs

have not yet shown significant internationalization plans. Indeed, most of the competitive advantages of their successful business model would be triggered in long-haul operations and, so far, most LCCs have found enough opportunities of expansion in their domestic markets. Despite that, LCCs have exploited a few options of international growth, like multi-base short-haul expansions within the EU, short-haul subsidiaries in foreign countries, or low-cost long-haul spin offs. As of today, no LCC has ever joined a GAL, and there are no prospects of a group of them creating a multilateral international alliance.

The benefits of alliances for enrolled network legacy airlines are majorly based on the economies resulting from code share agreements and, tentatively, from the collaboration in pricing and scheduling in antitrust immunized partnerships. Coordinated pricing, economies of density, and economies of scope have been, so far, the major benefits from collaboration reported in the literature. Further gains associated with GALs, like efficiency improvements from learning, cost savings from joint purchasing, a more convenient exchange and reallocation of resources, as well as marketing benefits from brand recognition and association with the GAL brand, depend on a close collaboration between members. This, however, is amid a trade-off between the gains from consolidation and the dilution of the competitive advantages of firms, like the consideration of “national brand” in the domestic market. Finally, possible constraints imposed by national governments to this consolidation process should not be disregarded, and we will treat this in detail in Chapter 4.

Chapter 3: The three Global Airline Alliances

Today there are three Global Airline Alliances (GALs) in the world: Star Alliance, SkyTeam and oneworld. Formed during the period 1997-2000, more than a decade later half of the seating capacity in the world and around 80% of the intercontinental traffic between Asia, Europe, and America are served by airlines enrolled in the Global Airline Alliances.³³ Since their creation, the number of GAL members has been increasing from year to year. The number of destinations covered by the three alliances has followed a similar pattern. In this chapter we address the growth of the three GALs and their impact on the partnership strategies of their members. Section 3.1 summarizes the first attempts of international alliances; Section 3.2 introduces the current state of the three GALs; and Section 3.3 analyzes in detail the evolution of GALs during the period 2006-2011 and their impacts on the code share strategies of aligned airlines; finally, Section 3.4 summarizes the findings of this chapter.

3.1 Historical background

The birth of airline alliances is historically linked to the development of the hub-and-spoke scheme and the need of airlines to build domestic and international networks. After the US Airline Deregulation Act of 1978, US airlines shifted their network structures from a point-to-point scheme to a hub-and-spoke scheme as a way to increase their efficiency through hub economies, as described previously in Section 2.5.2. Large US carriers established code shares with more cost-effective regional carriers to feed their larger and more profitable medium-haul and long-haul networks, initiating the regional alliances. At a different scale, independent US international carriers without strong domestic networks, like Pan American and Trans World Airlines (TWA), found themselves at a competitive disadvantage against other competing carriers with both domestic and international businesses, as they did not have a domestic network to feed their international routes. In fact, both carriers ended up disappearing in 1991 and 2001, respectively.

International alliances began less a few years later after deregulation, as US airlines realized of the benefits of expanding the national hub-and-spoke network structures to a multi-hub international

³³ Data from UBM aviation (Emirates, 2011) and Airline Business (2011). "Traffic" refers to revenue passenger-distance terms (RPK or RPM in kilometers and nautical miles, respectively).

network in which foreign carriers and large US carriers could feed each other's traffic through code sharing connections. Airlines were aware that controlling and operating a hub in a foreign country was politically infeasible, because of regulatory limitations to cabotage and foreign ownership of airlines. Then, through international alliances, foreign airlines with strong domestic networks could feed international routes of their alliance partners, and vice versa, exploiting economies of hub density in a multi-hub network.

According to Iatrou & Oretti (2007), the first international alliance was formed in 1986, when Air Florida began feeding British Island with passengers from its US network for the code shared British Island's London-Amsterdam route. Fernandez de la Torre (1999) mentions American Airlines and Qantas point-specific alliance in 1985 as the first international code share agreement.

During following decades, large carriers found themselves in scenarios with high incentives to develop intercontinental partnerships. In the US, pressure from low-cost carriers (LCCs) forced US legacy carriers to focus more on transatlantic services due to their higher profitability. In the international scale, competition with smaller-scale, less efficient European carriers put US carriers in a better competitive position against its EU competitors; despite that, the impossibility for foreign-based airlines to establish hub-and-spoke networks in the EU by themselves forced US carriers to partner with European carriers through strategic alliances. In Europe, the smaller domestic markets had made foreign services crucial for major carriers, and some European airlines had already more than 30% of their profits from transatlantic services (Egan, 2001). The creation of the European Union single market, combined with the persistence of barriers to entry, and the existence of very few US carriers to form an alliance with, also drove European carriers to consolidate through international alliances and mergers.

Many of the first bilateral and multilateral alliances were in the transatlantic market. KLM and Northwest Airlines formed in 1988 the oldest strategic alliance, and the most important bilateral alliance of the 1980s. Swissair and Delta Airlines partnered in 1989. In the early 1990s, other bilateral strategic alliances in the North Atlantic were British Airways-US Airways, and United-Lufthansa. From that time, until the consolidation of the three Global Airline Alliances (GALs), there were other attempts of multilateral airline alliances. Figure 3.1.1 shows the evolution of the international alliances built during the 1990s that did not succeed.

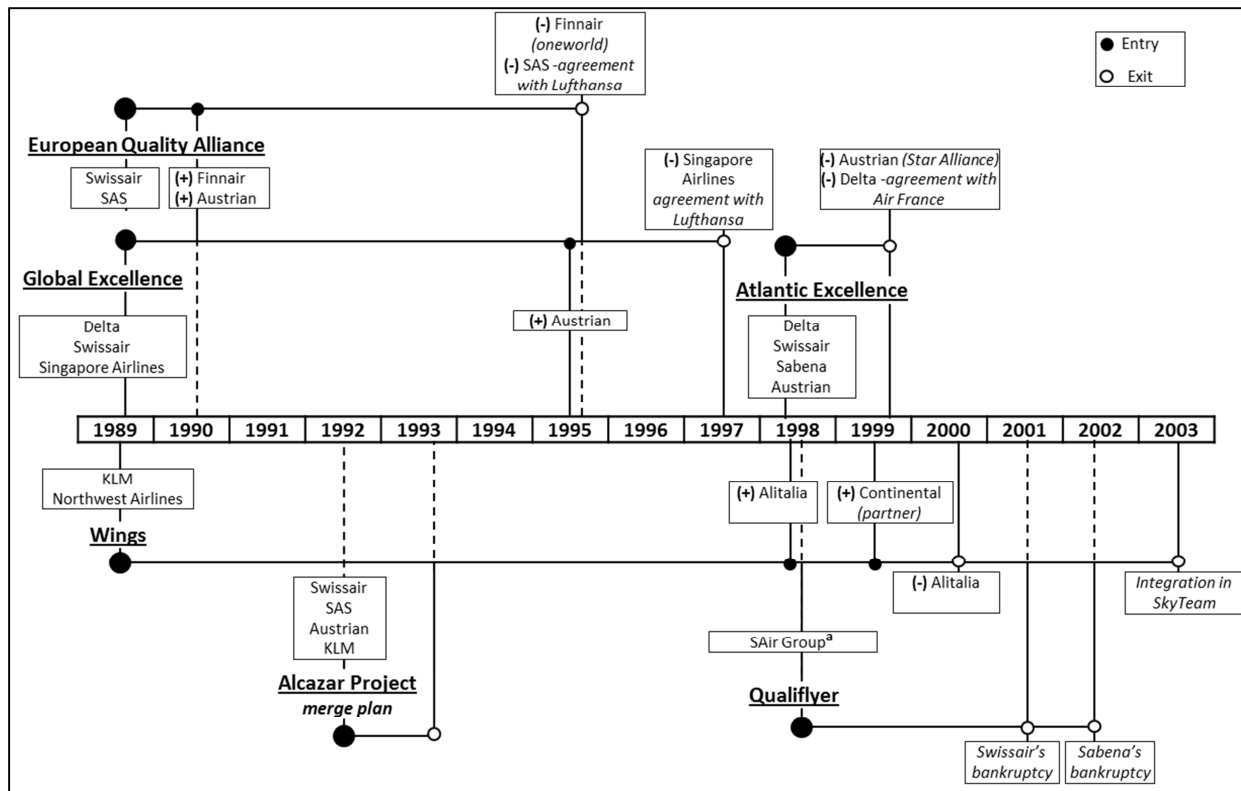


Figure 3.1.1. Evolution of multi-airline alliances other than the three current Global Airline Alliances during the period 1989-2003.

Sources: Iatrou & Oretti (2007), Suen (2002), and Knorr & Arndt (2003).

^aBy 2000, SAir Group, Swissair's holding company, had equity stakes (in parenthesis) in Air Europe (49%), Air Littoral (49%), AOM France (49.5%), Crossair (37.6%), LOT Polish (37.6%), Sabena (49.5%), TAP Portugal, Volare (34%), Austrian (10%), LTU Group (49.9%), and South African Airways (20%), among other airlines. Air Europe and LOT Polish did not join Swissair until 1999; while Air Littoral, Portugalia, and Volare Air joined 2000.

Two main characteristics can be pointed out from these alliance projects. First, with the exception of the three Global Airline Alliances and Wings (KLM-Northwest Airlines' alliance), all other multi-airline alliances were led by Swissair. Second, the majority of the partnering carriers were small- and medium- sized European airlines, which were seeking for either a transatlantic link with a US-based carrier, a strong European alliance, or both. They were pursuing a competitive edge against the "Big Three" European carriers (Air France, British Airways, and Lufthansa), in a recently liberalized European market (Knorr & Arndt, 2003).

Failing alliances were characterized by the lack of common, long term goals between partners (Iatrou & Oretti, 2007), which is crucial for the success of strategic alliances. Knorr and Arndt (2003) also highlighted Swiss' management hubris as major cause for failure in the European alliances. Although Switzerland was excluded from the EU aviation market and Swissair's Zurich hub had a limited growth potential, Swissair demanded the role of the alliances' undisputed leader.

Often, a cause of divergence was in the choice of the US partner. An example is the Alcazar Project, for which Swissair refused to accept KLM's proposed US partner (Northwest) in detriment of its more preferred option (Delta Airlines) (Iatrou & Oretti, 2007). Another difference between an alliance like Qualiflyer and the current GALs is that in Qualiflyer all the members gravitated around Swissair, and, with very few exceptions, all bilateral agreements in the alliance involved Swissair (Suen, 2002). As a matter of fact, the absence of a large airline backing Swissair's multi-airline alliances could have been behind these failures, as Swissair's partners preferred to join the Big Three European carriers in the Global Airline Alliances that were been launched. These latter options provided small- and medium-size European airlines with a more extensive international network, while continuing in the Alcazar Project or European Quality Alliance required looking for intercontinental partners –mainly with US carriers. At some point, all Swissair's alliances disintegrated due to defections of its alliance partners to competing groupings. In fact, between 1996 and 2000, Singapore Airlines, SAS, and the Austrian Airline Group (Austrian Airlines, Lauda Air, and Tyrolean Airlines) opted for the Star Alliance; Finnair joined oneworld; and Delta joined efforts with Air France to build their own alliance, SkyTeam.

By 2001, there were still five strategic alliances in the North Atlantic market—Star Alliance, oneworld, SkyTeam, Wings, and Qualiflyer—and a frequent flyer program with 10 members in Central and South America, the so-called Latinpass. However, based on the frequency of flights within each alliance to all the inhabited continents in the world, Fan et al. (2001) considered that, by then, only Star Alliance and oneworld could be considered to be alliances with a global reach. Soon thereafter, the multi-airline alliance picture stabilized around the three current Global Airline Alliances. Each GAL was founded with a major US carrier, one of the “Big Three” European carriers, and a major Asian carrier. This intercontinental reach with leading carriers made these alliances different from all other attempts represented in Figure 3.1.1. Their first years are briefly summarized below, and the main indicators of their current state are reported in next Section 3.2.

Star Alliance was launched by United Airlines, Air Canada, Lufthansa, SAS, and Thai Airways International in May 1997. Before the end of the year, the Brazilian carrier Varig Airlines (defunct in 2007) joined Star Alliance. With the entrance of Air New Zealand and Ansett Australia in March 1999, the alliance had members in all continents except for Africa. It was not until 2006 when South African Airways, the 18th member, became the first African airline at Star Alliance, which made of Star a truly global alliance. In 2009, Air Canada, Lufthansa, and United and Continental—merged in 2010, received approval to form an immunized joint venture within Star in the North Atlantic markets. This high level

of cooperation added on top of the antitrust immunity granted during the previous years to these airlines and six more members of the alliance.

Oneworld is a global airline network formed in September 1998 by five airlines from four continents: American Airlines, Canadian Airlines (defunct in 2001), British Airways, Cathay Pacific and Qantas. Oneworld became operative in February 1999. The first member from South America was LAN in May 1999. As well as Star Alliance and SkyTeam, most of the members had subsidiary airlines that soon became member affiliates, like Iberia Regional Air Nostrum in September 1999, and LAN Express and LAN Peru in May 1999. It was not until 2010, when a significant group of oneworld members – American, British, Iberia, Finnair, and Royal Jordanian- were granted with antitrust immunity within the alliance. By then, American, British and Iberia formed an immunized three-way joint venture within oneworld in the North Atlantic markets.

SkyTeam was the last of the multi-airline alliances to be formed. It was founded by Delta Air Lines, Aeroméxico, Air France, and Korean Air in June 2000. In 2002, SkyTeam members Delta, Air France, Korean Air, Alitalia, and Czech Airlines obtained a common grant of antitrust immunity within the alliance. When Continental Airlines, KLM, and Northwest Airlines, joined SkyTeam in 2004, SkyTeam surpassed oneworld as the second largest alliance in the world, behind Star Alliance. In 2008, after the Air France-KLM and the Delta-Northwest mergers, Northwest and KLM joined the immunized SkyTeam joint venture. In 2009, Air France-KLM and the merged Delta launched an integrated joint venture in the North Atlantic markets.

Although, the period 1988-2000 was the stage of formation of strategic alliances, of which only the three global airline alliances continue today, the agreements between airlines would continue to take place during the next decade. Figure 3.1.2 below indicates the code share agreements in force for the largest passenger airlines according to the start date, including both GAL and non-GAL members. It is worth mentioning that the median age of code shares in 2011 was 5.5 years, while for 2005 the median age was 3.5 years. This shows that there has been a remarkable stabilization in the formation of new agreements in a short time period. In Section 3.3 we analyze the degree of consolidation of code share agreements among GAL members during the period 2006-2011.

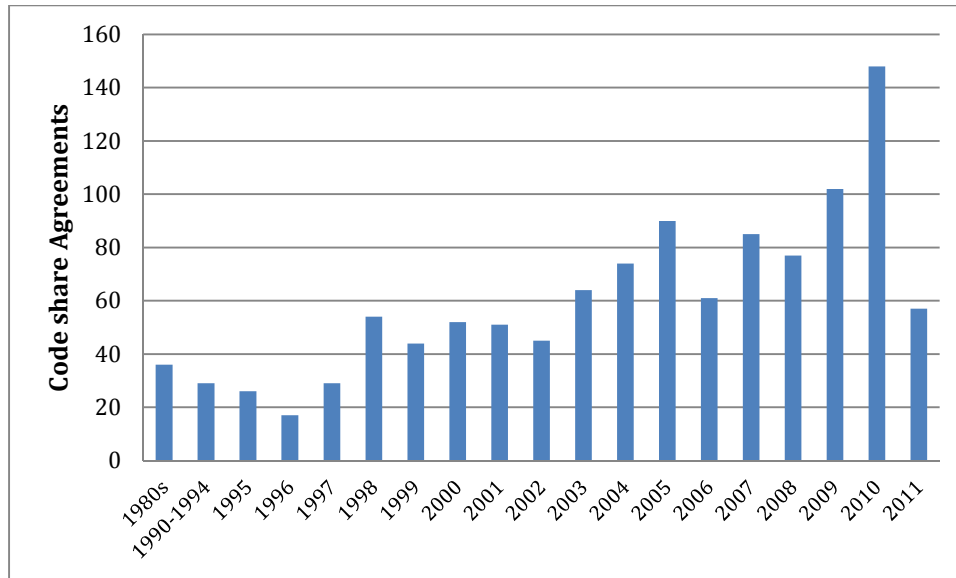


Figure 3.1.2. Distribution of valid code share agreements in September 2011 by its start date. ^{34,35}

3.2 The three Global Airline Alliances today

During the last decade, the scenario of an airline industry with three Global Airline Alliances (GALs) has been continuously reinforced by the gradual growth of Star Alliance, oneworld and SkyTeam, and the absence of further consolidation between GALs or the rise of new strategic multi-airline alliances. As previously shown in Section 2.3.2, by 2011 the majority of large network legacy carriers were aligned in one of the GALs. In 2010, they carried 68% of international scheduled RPKs, and provided 54.6% of world capacity share. In fact, by 2011 Star Alliance had presence in 181 countries, oneworld in 145, and SkyTeam in 169 (see Table 3.2.1).




Despite the entrance of dozens of new members (see Figure 3.2.1), still today all three alliances are centered on the founding European and US members, which are the largest carriers in all their alliances. As a matter of fact, at the time of this thesis in all GALs the largest member was still the founding US carrier and the second largest was a founding EU carrier. Even more, in oneworld and SkyTeam, the two largest airline groups—American Airlines, and British Airways-Iberia (IAG) for

³⁴ The figure is constructed from the combination of results from two surveys: Airline Business (2011b) and Iatrou & Oretti (2007). We consider all the agreements of both GAL members and a selection of the largest unaligned carriers with the largest 200 airlines in the world. The number of agreements in 2011 is significantly smaller due to the survey method, consisting on questionnaires returned by the airlines during just the first half of 2011.

³⁵ All the agreements for each of the airlines considered are counted and, hence, double counting issues arise.

oneworld; and Delta Airlines, and Air France-KLM for SkyTeam—contributed with more than 50% of the total RPKs of the GAL. In Star Alliance, the merged United-Continental and the Lufthansa Group, which includes Swiss and Austrian Airlines, among others, cope around 40% of the total RPKs of the alliance (see Figures 3.2.2 to 3.2.4).

Table 3.2.1. Summary table of the main indicators of the Global Airline Alliances.

	 STAR ALLIANCE	 oneworld	 SKYTEAM
Launch date	May 1997	February 1999	June 2000
Slogan	<i>The way the earth connects</i>	<i>Oneworld revolves around you</i>	<i>Caring more about you</i>
Headquarters	Frankfurt, Germany	New York City, USA	Schiphol Airport, The Netherlands
Full Members (March 2012)	27	12	15
Countries served ^a	181	145	169
Destinations ^a	1135	712	832
Annual global ASKs (Bn) ^b	33.5	18.2	20.9
World capacity share ^a	25.2%	13.7%	15.7%
World international scheduled RPKs share ^c	30%	19%	19%
Annual revenues (\$ Bn) ^b	174	92	112

^a September 2011, ^b 2010 from Airline Business (2011b); ^c 2010, IATA, World Air Transport Statistics 55th edition.

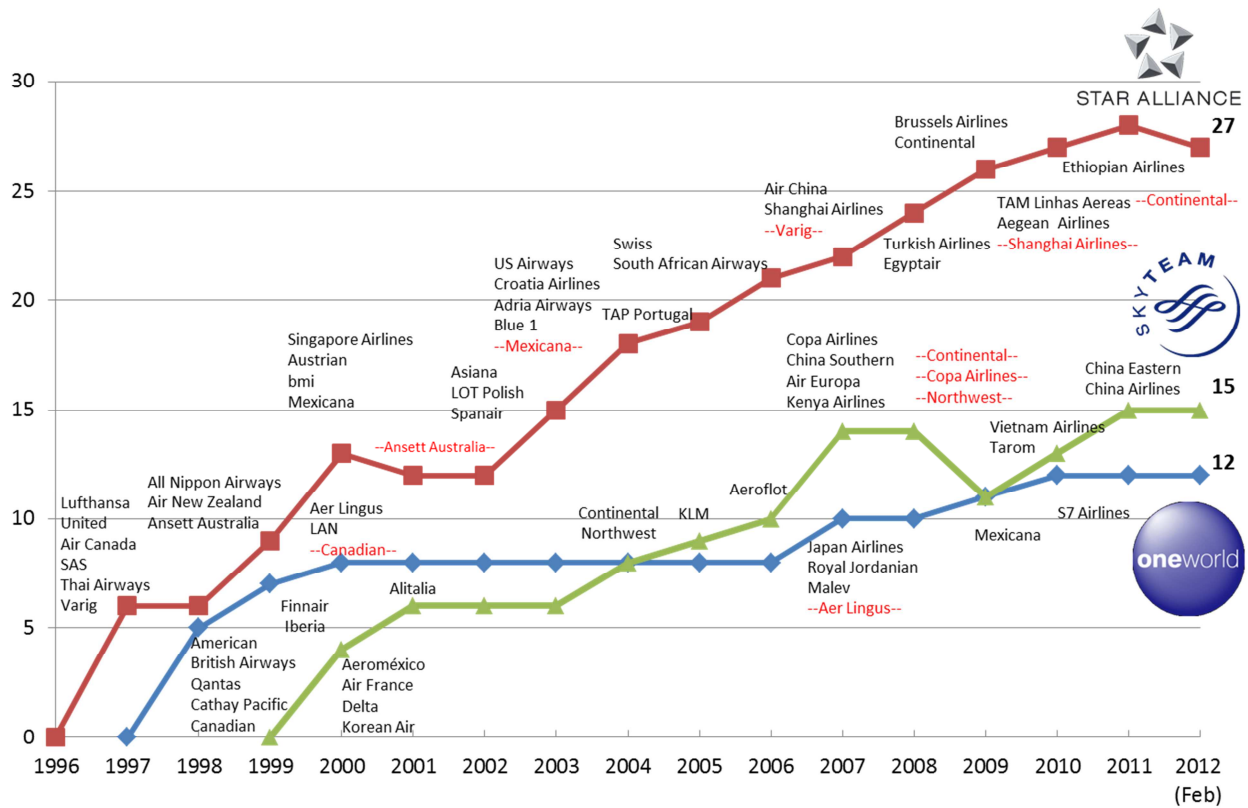


Figure 3.2.1. Evolution in the number of members of the Global Airline Alliances until February 2012.

Amid many similarities, Star Alliance can be differentiated from oneworld and SkyTeam by its larger size. In fact, Star Alliance nearly pairs oneworld and SkyTeam together in terms of enrolled airlines, ASKs, and annual revenues. Figure 3.2.1 shows how the actual difference in enrolled airlines has been gradual since the three GALs were formed in the late 1990s. Next Section 3.3 analyzes in more detail the implications of this size difference in the partnership strategy of aligned airlines.

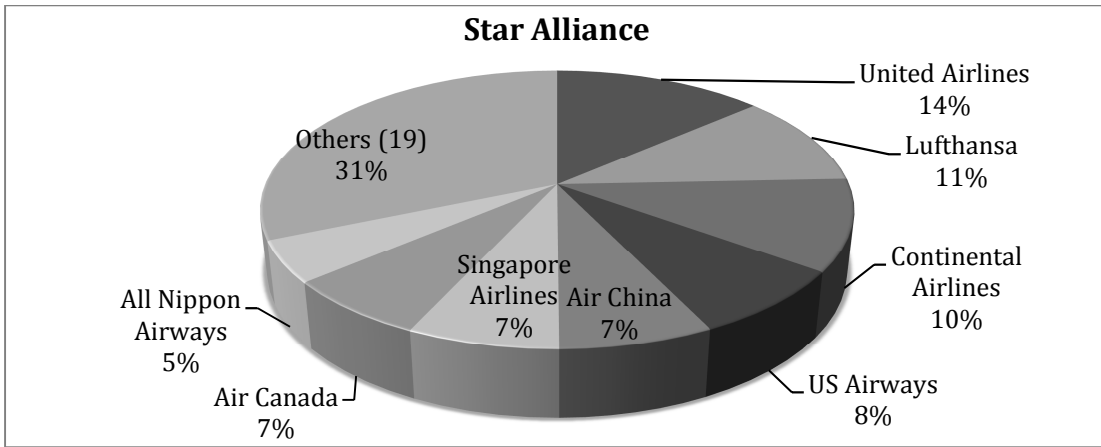


Figure 3.2.2. Star Alliance passenger traffic (RPK) in 2010.

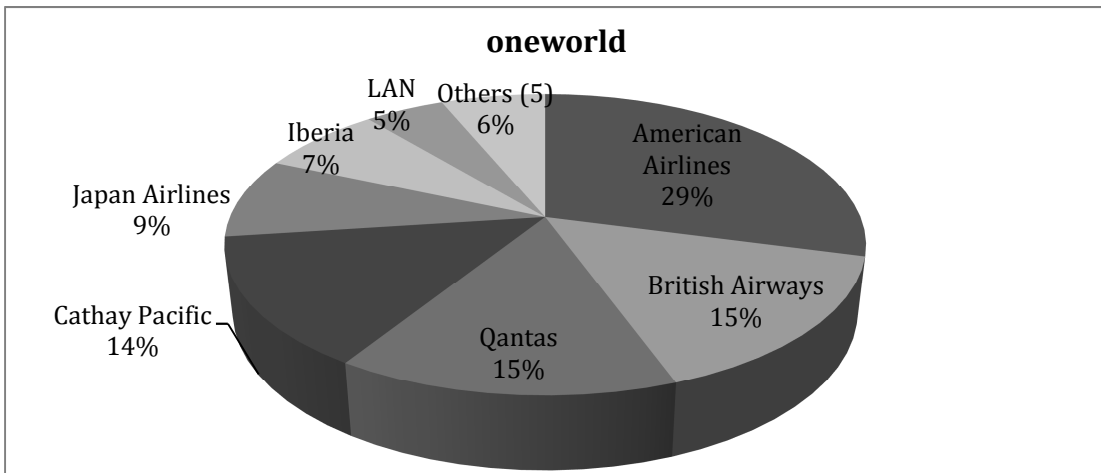


Figure 3.2.3. Oneworld passenger traffic (RPK) in 2010.

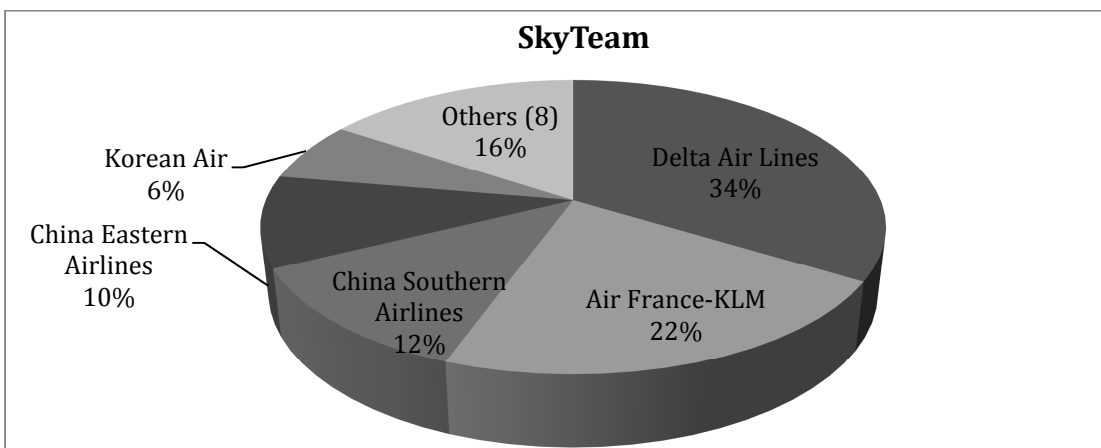


Figure 3.2.4. SkyTeam passenger traffic (RPK) in 2010.

The larger size of Star Alliance is not translated into an evenly distributed larger market share in the different regional and transcontinental flows represented in Figure 3.2.5. SkyTeam is the largest alliance in the Asia-Americas, and the Africa-Europe flows; oneworld surpasses Star Alliance in the world's largest transcontinental market, the Americas-Europa; while Star Alliance is the largest group within Europe, Asia, and Australasia, and in the Asia-Europe transcontinental flow. In the latter, an unaligned carrier, Emirates, carries 13% of the passengers on its own, challenging directly the three GALs from its connecting hub in Dubai.

A common key factor in the three GALs is their emphasis in the Americas-Europe flow, where they have the largest combined share of all the transcontinental flows represented here, an 87%. More specifically, in the North Atlantic flow the three alliances have achieved their largest combined market share, with a 90% of all the passenger traffic between North America and Europe, according to Emirates (2011). In fact, it is in this intercontinental market where the core members of the three GALs have achieved their largest degree of integration. As of 2011, nine members from Star Alliance, five from oneworld and five SkyTeam each have been granted with antitrust immunity from US regulators. And, since July 2011 three carriers at Star Alliance —Air Canada, Lufthansa and United-Continental, SkyTeam —Air France-KLM, Alitalia, and Delta, and oneworld —American, British, and Iberia³⁶, have each a North Atlantic joint venture, which resembles in many respects to a virtual merger across the North Atlantic Ocean. The regulatory framework and policy implications of this higher level of cooperation are discussed in Chapter 4.

³⁶ British and Iberia form from January 2011 a single multi-brand airline holding group, the International Consolidated Airlines Group (IAG).

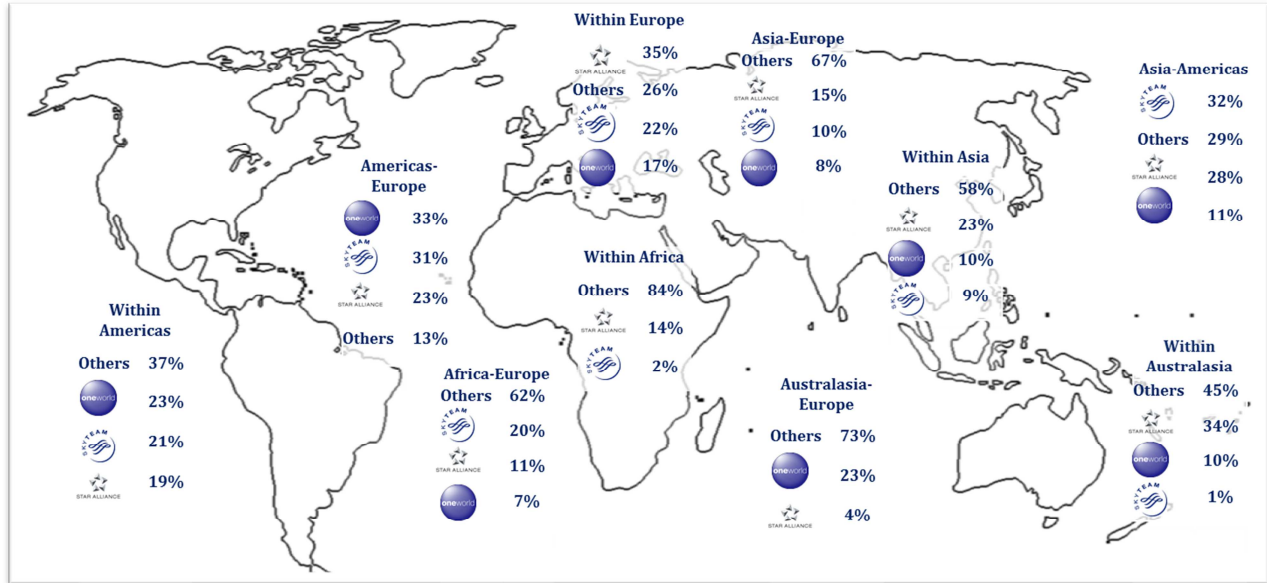


Figure 3.2.5. Global passenger traffic flows in 2010.
Source: UBM Aviation.³⁷

3.3 Analysis of the evolution of the Global Airline Alliances

Our goal here is to understand the differences in the use of Global Airline Alliances (GALs) by aligned carriers in their partnership strategy. Section 3.3.1 introduces the details of the two databases used in this analysis. Section 3.3.2 presents our findings, which have a special emphasis on the evolution of each of the GALs during the 2006-2011 period and the weight of GALs on the total volume of code share agreements (also referred here as *partnerships*) of enrolled carriers.

3.3.1 Methodology

Every year the monthly magazine Airline Business (AB) publishes a list of the code share agreements of the largest airlines in the world.^{38,39} For each of the airlines enrolled in one of the GALs there is a list of the carriers in the world top-150 with which the airline has code sharing

³⁷ Edited from Emirates (2011).

³⁸ The data has been traditionally published in Airline Business' September volume.

³⁹ In Airline Business' terminology, the term "alliance" refers to any code share agreement between airlines. In this work, however, the terms "partnership" and "code share agreement" are preferred to avoid confusion with the concept of Global Airline Alliances.

routes. Usually, the year when the bilateral agreement was initiated is indicated. The survey also includes the code share agreements of non-aligned carriers in the top-100 largest airline groups in the world by revenue. According to AB, the data is “largely sourced from airline questionnaire returns over the first half [of each year]”, which is the criteria adopted in each of the years considered here.

The Airline Business database does not consider the number of routes under code share involved in each code share agreement between airlines, despite including a binomial distinction between agreements involving either 10 routes or more, or fewer than 10 routes. This limitation is overcome here by including *airlineroute*'s database, which consists of an August 2011 snapshot of all the routes under code share agreement—and the code sharing airline—for each of the 200 largest airlines in the world, as loaded in the global distribution systems (GDS). This database reports more than 1600 pairs of partnerships, and helps to comprehend the extent of code sharing routes in each of the aligned airlines.⁴⁰

In this section, data from the five Airline Business' annual surveys on *Alliances* in the period 2006-2011 is compiled and analyzed. This time-cross database allows studying the most relevant changes in the GALs, as well as the evolution in the use that aligned airlines do of GALs, and how this relates to their partnership strategy. Additionally, the number of code sharing routes for each aligned airline is studied with the database of *airlineroute*.

3.3.2 Results

As shown in the previous section, the three GALs have experienced a nearly steady growth in the number of members since their creation (see Figure 3.2.1). Since their creation, Star Alliance has always been the largest GAL in terms of members, while SkyTeam and oneworld have grown following similar trends. The period 2006-2011 has not been an exception, and the difference in size between Star Alliance with respect to SkyTeam and oneworld has been reinforced as the

⁴⁰ Report available at <http://airlineroute.net/2011/08/08/cs-aug2011>.

number of entering members in each GAL during the five-years period has been 7, 5, and 4, respectively.⁴¹

This emphasis on GALs’ size is related to their mission as frameworks for the development of bilateral code share agreements between GAL partners. Figure 3.3.1 shows the average number of partnerships of member airlines during the period 2006-2011. This indicator is built by adding the number of partnerships of the aligned airlines in a given year, and dividing it by the number of members that same year. It can be observed that members of oneworld and SkyTeam have had a constant number of partnerships, while members of Star Alliance have steadily increased them.

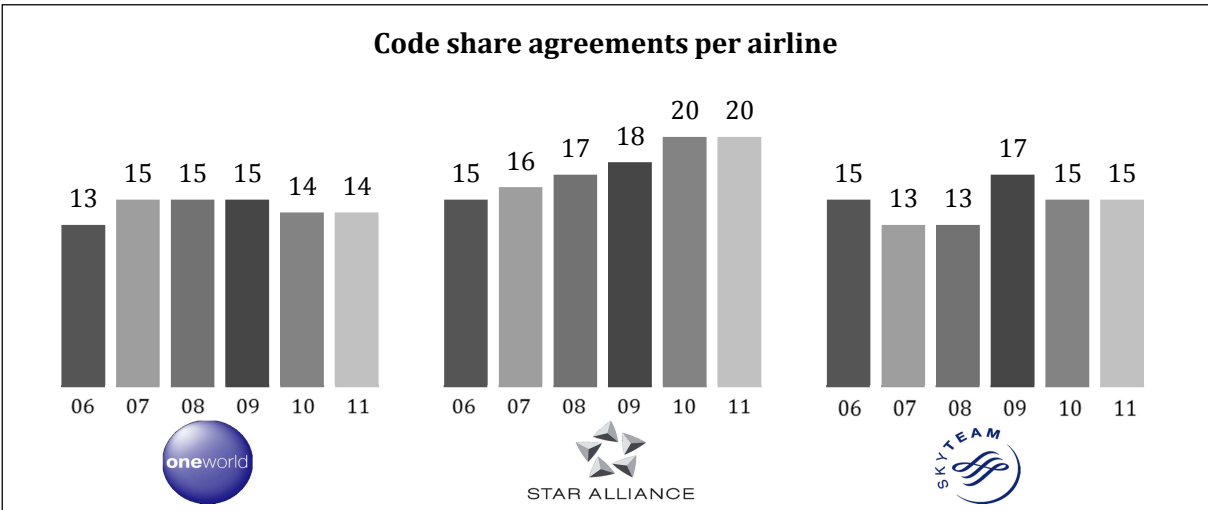


Figure 3.3.1. Average number of code share agreements for aligned airlines (with any other airline in the top-150 of airlines) according to their GAL of enrollment.

A fair comparison between GALs should also consider if entering airlines have the same number of partnerships as incumbent members, or if there are significant differences. Indeed, Table 3.3.1 exhibits that by 2011 those airlines that had joined their GALs during the 2006-2011 period had partnerships with fewer airlines than the average for long-term members. The difference is particularly remarkable for SkyTeam, which shows significant differences in the number of code share agreements depending on the period of enrollment. Star Alliance and oneworld have more limited differences between incumbent and incoming airlines, but if we compare the second column in Table 3.3.1 with Figure 3.3.1 above, it can be noted that Star Alliance is the only GAL whose

⁴¹ By September 2011, Mexicana (oneworld) was still considered as a formal member, although it ceased operations in August 2010. From here on, when considering 2011 data, Mexicana is not included in the comparisons referring to oneworld members.

incoming airlines had by 2011 more code share agreements than the original GAL members in 2006. Said that, by the end of this section a more complete study including other explanatory variables for the number of code share agreements of aligned airlines will shed light on the impact of time of enrollment on the network development through partnerships. As an example, Figure 3.3.2 shows that (i) airline size, and (ii) GAL of enrollment might also have an impact on the number of code share agreements of an airline.

Table 3.3.1. Number of partnerships in 2011 for incoming (2006-2011) and incumbent GAL members (2005 or before).

	New members in 2006-2011	Average partnerships per incoming member	Average partnerships per incumbent member
SkyTeam	6	11	18
Star Alliance	7	18	21
oneworld	4	12	15

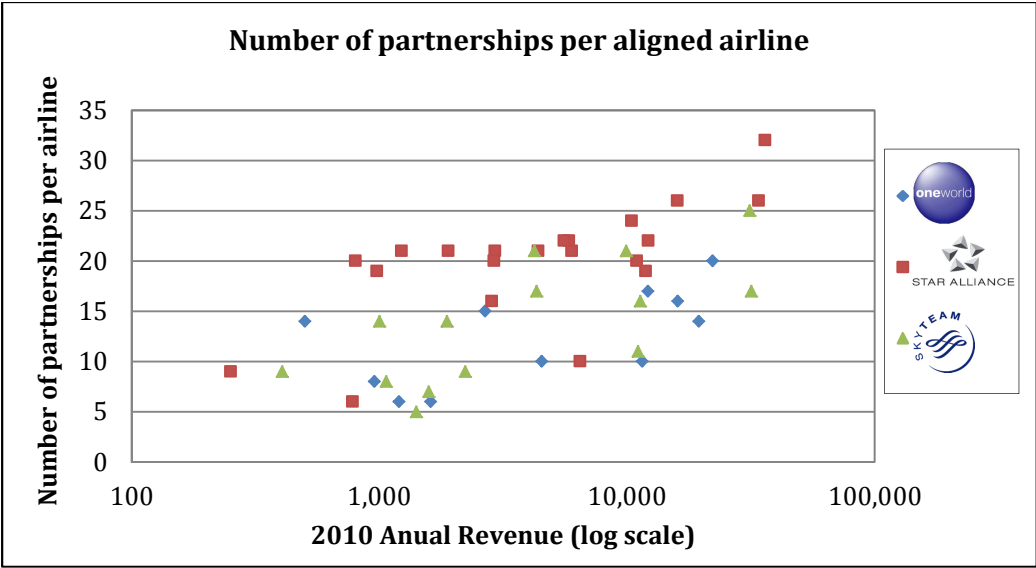


Figure 3.3.2. Number of partnerships (code share agreements) compared to revenue for each member airline in 2011.

The weight of each GAL on the partnership strategy of its members can be seen more closely by analyzing the reliance of aligned airlines in their global alliance for the development of code share agreements. If airlines rely extensively on their GAL partners it may indicate either an exclusivity agreement within the GAL, a higher advantage in partnering with GAL partners, or that the

international network of the alliance members is in consonance with the network reach of their GAL.

In Figure 3.3.3 it can be observed that an average Star Alliance member had between 65% and 78% of their code share agreements—among top-150 world airlines—with other Star Alliance members between 2006 and 2011. In that same period, oneworld fell between 21 and 29 points behind, while by 2011 SkyTeam had closed the gap with Star Alliance to 18 points. Oneworld had a fairly stable trend in the period 2007-2011. In fact, the proportion of agreements within oneworld could not be increased as the alliance had always between 10 and 11 operative alliance members in the 2007-2011 period, and oneworld members might have had to continue relying on airlines out of the alliance for developing an international network. Between 2006 and 2009, SkyTeam showed similar values to oneworld. In fact, it was not only until 2010 and 2011 when SkyTeam members could leverage the larger size of their alliance (14 members by September 2011) to increase the proportion of intra-alliance partnership. The tentative relationship between the number of airline members and the proportion of code share agreements within an airline’s own GAL is challenged in Figure 3.3.4. The series 2006-2011 for the three GALs deliver a positive lineal relationship with $R^2=0.78$.

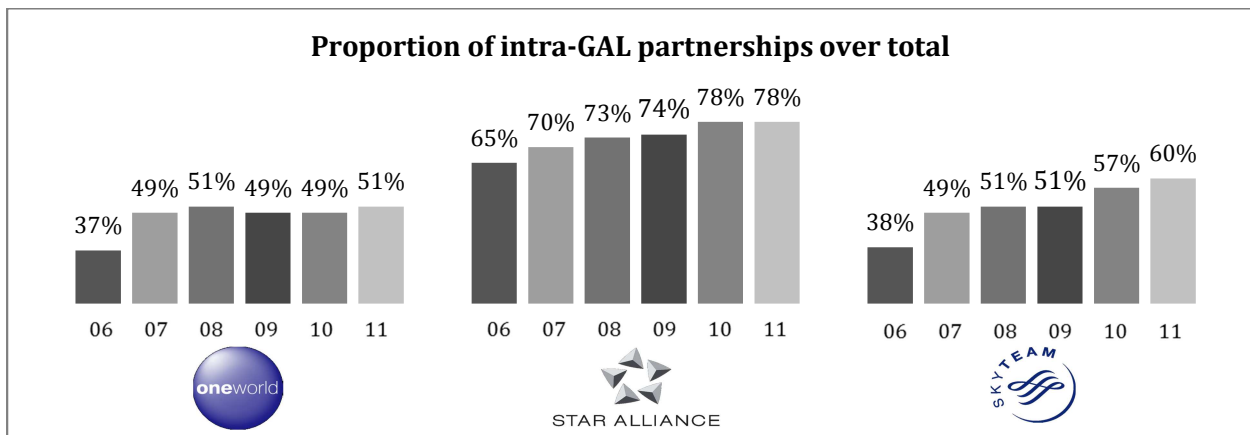


Figure 3.3.3. Proportion of code share agreements with airlines of the same GAL by the unweight average of the proportion of the GAL members in a given year.

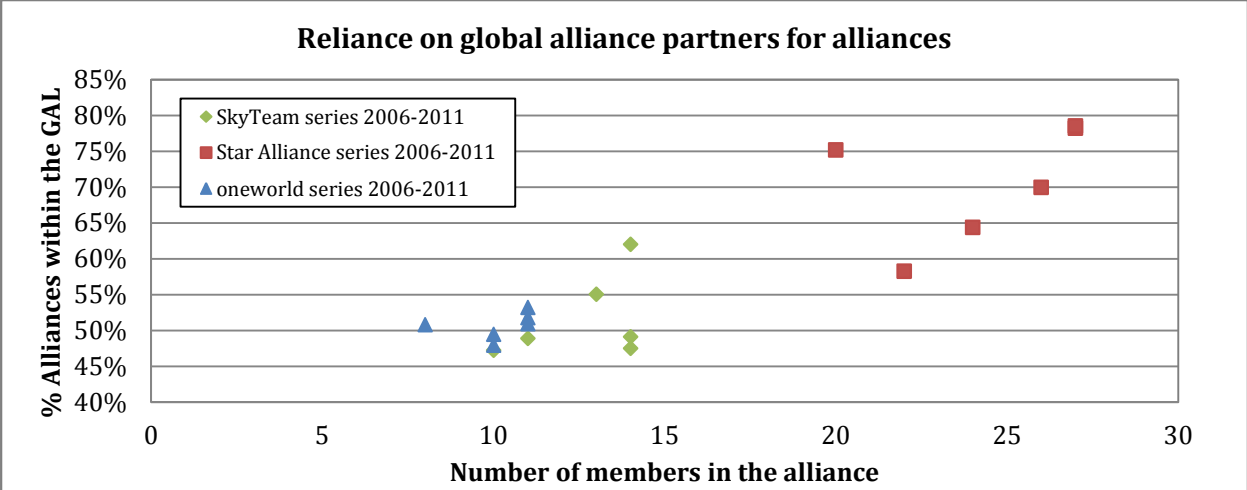


Figure 3.3.4. Reliance on global alliance partners for code share agreements.

The use of GALs by its members can be also analyzed from an opposite perspective, i.e. by the degree of use of all the code sharing relationships available within the GAL. Figure 3.3.5 exhibits the average percentage of members to which GAL members were connected in the 2006-2011 period. Not surprisingly, oneworld, with fewer members, had realized the highest proportion of all possible intra-GAL partnerships; however, this ratio decreased from 77% in 2008 to 69% in 2011, due to the arrival of Mexicana in 2009 amid financial problems and few code share agreements with oneworld members. Star Alliance shows an upward trend despite its significant size increase, which could have driven the alliance members to have code share agreements with a fewer percentage of total members. Then, this growth may be an implicit proof of a solid integration of incoming members. SkyTeam shows ups and downs during the period of analysis but, although by 2011 an average SkyTeam member has code sharing relationships with two thirds of its partners, there has been no improvement in this indicator during the period 2006-2011 despite maintaining a constant number of GAL members.⁴²

⁴² Our mention to “constant number of GAL members” considers that by the beginning of September 2011, when annual data was available, SkyTeam only had 14 official members, the same as by 2008. By the end of September 2011, China Airlines would join as the 15th member.

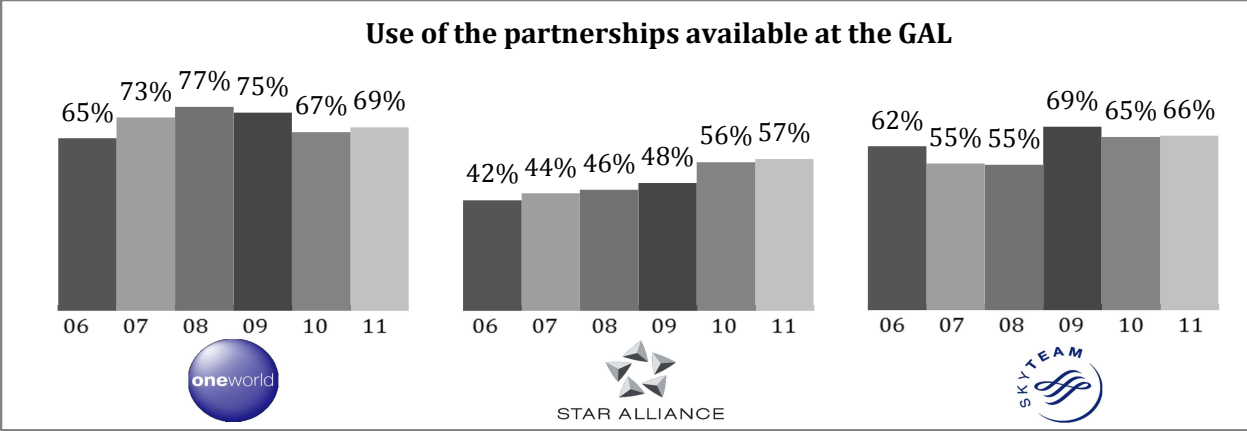


Figure 3.3.5. Average proportion of GAL partners to whom aligned airlines in each of the GALs in a given year are partnered with (i.e. they have code share agreements).

Our emphasis on the code share partnerships between GAL partners, differentiating them from the rest of code share agreements, is justified by some indicators associating partnerships between airline of the same GAL with a more intense and more durable partnership. As it is discussed below, agreements with GAL partners involve more code sharing routes, and during 2006-2011 the number of broken agreements between alliance partners has been very limited.

Using Airline Business' terminology, code share agreements reported in AB's annual reports on alliances are classified as either "limited" when agreements involve code sharing on fewer than 10 routes, or "comprehensive" when there are 10 or more routes involved in the partnership. Table 3.3.2 shows that for all three GALs, the percentage of "comprehensive" agreements is significantly larger for intra-GAL agreements than for the rest of code share agreements. However, the difference between these two groups of partnerships has been reduced during 2006-2011.

The converging trend in Table 3.3.2 can be explained by two reasons. First, new entrants in GALs have a shorter network reach than previous GAL members, and, hence, they are bringing more limited agreements. Second, aligned airlines have eliminated more agreements with non-partner airlines when the extent of the agreement was limited, and, hence, this could be replaced by GAL partners, hence raising the proportion of comprehensive code share agreements over the total number of agreements with non-GAL partners. In a comparison of the three GALs, SkyTeam and oneworld show a much smaller difference than Star Alliance, whose intra-alliance partnerships are still of a "comprehensive" reach for 46% of the total of intra-alliance partnerships.

Table 3.3.2. Percentage of comprehensive agreements for GAL members.

Proportion of Comprehensive code share agreements out of total agreements with GAL partners (%). ⁴³						
<i>Proportion of Comprehensive code share agreements out of total agreements with non-GAL airlines (%).</i>						
Year	2006	2007	2008	2009	2010	2011
SkyTeam	55%	34%	32%	39%	29%	30%
	<i>9%</i>	<i>13%</i>	<i>10%</i>	<i>11%</i>	<i>15%</i>	<i>19%</i>
Difference	46%	21%	22%	28%	14%	11%
Star Alliance	56%	54%	52%	49%	47%	46%
	<i>6%</i>	<i>10%</i>	<i>11%</i>	<i>13%</i>	<i>24%</i>	<i>27%</i>
Difference	50%	44%	39%	36%	23%	19%
oneworld	52%	32%	31%	28%	35%	31%
	<i>14%</i>	<i>17%</i>	<i>19%</i>	<i>21%</i>	<i>20%</i>	<i>24%</i>
Difference	38%	15%	12%	7%	15%	8%

An analysis of broken code share agreements shows that agreements between GAL partners are significantly less prone to be broken than when they involve non-GAL partners. During the period 2006-2011, and considering AB's data base of the largest airlines in the world, 579 new code share agreements and 242 broken code shares could be counted.⁴⁴ From these 242 broken code shares, only 24% of them corresponded to intra-GAL agreements, although the majority of agreements for aligned airlines are with their GAL partners (47% for oneworld members, 51% for SkyTeam members, and 73% at Star Alliance members), as shown before in Figure 3.3.3. The results are shown in Table 3.3.3, which considers the average airline at each GAL. Star Alliance members show the most remarkable differentiation between the alignment of the partner and the breaking likelihood of the partnership, as intra-GAL agreements are significantly more unlikely to be broken.

Table 3.3.3. Proportion of broken code share agreements in intra-GAL partnerships.

Global Airline Alliance	A Percentage of partnerships between members of the same GAL (averaged during the 2006-2011 period)	B Percentage of broken alliances during 2006-2011 period corresponding to intra-GAL partnerships	Ratio A/B Meaning: 0 = no broken code shares in intra-GAL agreements; 1 =equal number of broken code shares among the two types of partnerships
SkyTeam	51%	32%	0.63
Star Alliance	73%	24%	0.33
oneworld	47%	28%	0.60

⁴³ Comprehensive agreements, as defined by Airline Business, take place when they involve 10 or more code sharing routes between the two partner alliances

⁴⁴ These values are duplicated. E.g. an alliance between Air France and Delta Airlines is counted for both Air France and for Delta Airlines records.

Next, a closer view of the reasons for broken bilateral code share agreements between airlines of the same GAL reveals that from the 40 broken bilateral partnerships in Star Alliance, SkyTeam, and oneworld together, only in 25% of them (10) the breakage could not be justified by having a partner in one of the following exceptional cases: i) ceasing commercial operations, ii) exiting the original global airline alliance, or iii) merging with another airline and disappearing as an airline brand. Figure 3.3.6 breaks the weights of all the different sources down, and Table 3.3.4 summarizes the specific reasons of the 30 justifiable broken partnerships.

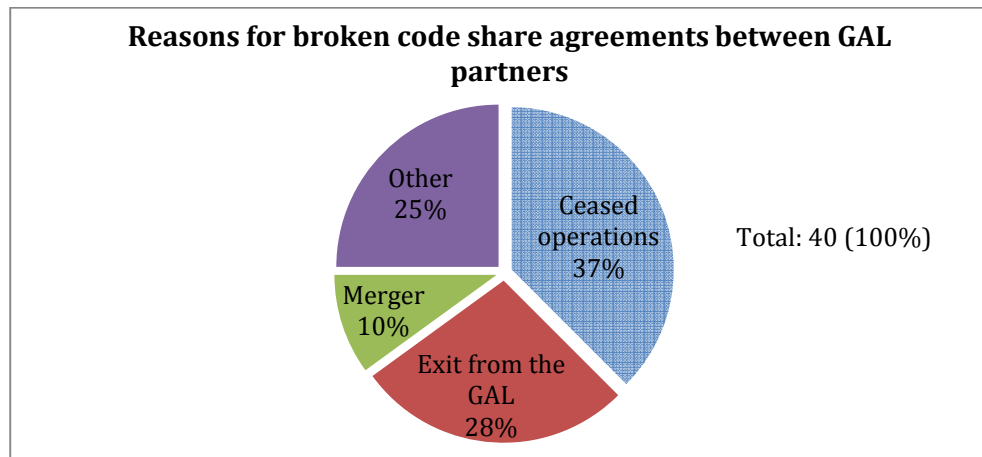


Figure 3.3.6. Broken code share agreement in the three GALs during the 2006-2011 period.

Table 3.3.4. Exceptional reasons for broken code share agreements between GAL partners during the period 2006-2011.

Reason	Number of broken partnerships
Varig (oneworld) ceased operations	10
Continental Airlines leaves SkyTeam due to a merger with United Airlines from Star Alliance	7
Northwest Airlines merges with Delta Airlines (SkyTeam)	4
Mexicana ceased operations (oneworld)	5
Shanghai Airlines leaves Star Alliance breaking partnerships with Star Alliance members	4
Total	30

So far, in this analysis we have always considered an *average member* when comparing GALs. The differences between members of the same GAL, however, are significant; for example, the size of two partner airlines, when compared by annual revenues, may differ by a factor of over 100. Although this limits the implications of our analysis to generalize from one GAL to all its members, the distribution of airlines by size is fairly similar among the three GALs, validating the comparison

between alliances. Figure 3.3.7 summarizes these two characteristics—similarity between GALs, and the differences between alliance members—with a distribution of aligned airlines by the number of code share agreements recorded in Airline Business’ database by September 2011. Only a few of the largest airlines —British Airways in oneworld, Lufthansa in Star Alliance, and Air France and KLM in SkyTeam- had partnerships with over 90% of its alliance partners. This contrasts with the lower percentage of possible intra-GAL partnerships realized by Adria Airways (Star Alliance) with 23% (6) of them, S7 Airlines (oneworld) with 30% (4), or Taron (SkyTeam) with 38% (5). The median value in each GAL varies significantly between a 70% for oneworld, 65% for SkyTeam, and 54% for Star Alliance. The difference here is that Star Alliance’s small and middle size carriers connect with a smaller portion of the rest of their GAL partners, despite having more partnerships in absolute terms. Only Lufthansa, Swiss, and bmi, have partnerships with more than 80% of the rest of Star Alliance members, compared to 4 airlines at SkyTeam and 5 airlines at oneworld over this 80% threshold.

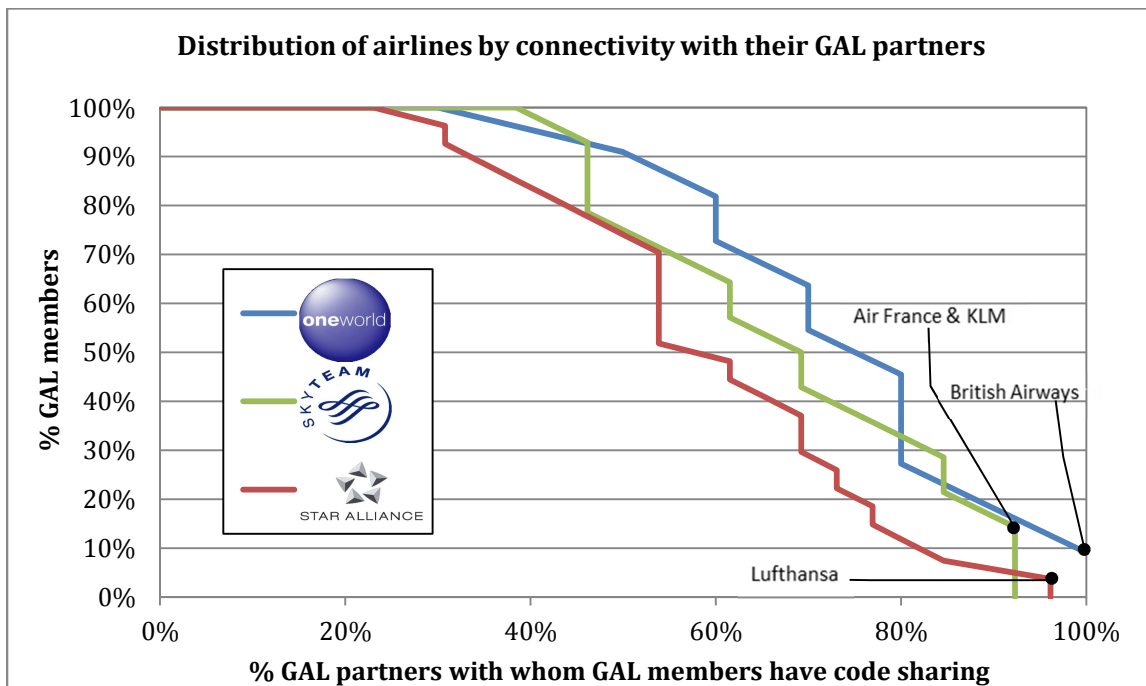


Figure 3.3.7. Distribution of airlines for each of the three GALs according to the proportion of members of the same GAL to whom they were partnered (code share agreement) in 2011.

Code sharing routes

Up to this point in this section, we have focused on the code share agreements between airlines as the unit of measure when considering aligned airlines' network development. A more detailed view, however, should refer to the amount of code share routes in vigor. Here we construct a linear regression model to understand the explanatory variables for the volume of code share routes of each airline. For that purpose, we use the list of code share routes compiled by *airlineroute* in 2011. This document reports 16,000 routes and 1,600 bilateral partnerships in vigor for 202 of the largest airlines in the world, including duplication from double-counting. This data base was loaded in the GDS by August 8, 2011, and given the nature of this distribution channel, many of the largest low-cost carriers are self-excluded. Our focus here is on the volume of code share routes of the aligned carriers, as well as other network carriers in negotiations for enrollment. The idea is to aggregate the total number of code share routes of a given airline with any of the top-150 largest airlines in the world, and then, to find the variables that can explain this volume of code shares. The values of this consolidated indicator vary from the over 800 code shares routes of United Airlines to the 12 code share routes of Garuda Indonesia.

A limitation of the *airlineroute* data base is that it does not consider some of the codeshare agreements reported in the Airline Business data base. Our criterion has been to consider only the airlines for which 85% or more of their code shares agreements reported by Airline Business are also counted by the *airlineroute* data base. The list of considered airlines (34) is shown in Table 3.3.5 including their 2010 revenue, which as a proxy variable for airline size proved to be the best single indicator for the number of code share routes of each airline, as it can be already inferred from Figure 3.3.6. A posterior analysis considering all the aligned airlines initially evaluated (57) brings to similar conclusions than with this subgroup.

Table 3.3.5. Sample of network airlines considered in the regression model.

Airline	Alliance	Revenue 2010 (\$m)	Code share routes	Airline	Alliance	Revenue 2010 (\$m)	Code share routes
American	oneworld	22,170	428	TAM	Star Alliance	6,475	129
British Airways	"	13,168	443	TAP Portugal	"	2,932	309
Cathay Pacific	"	11,523	119	Thai	"	5,822	153
Iberia	"	6,361	405	United	"	31,547	810
Qantas	"	12,145	116	US Airways	"	11,908	503
Air Berlin	oneworld (2012)	4,915	147	Air India	unaligned ⁴⁵	3,000	42
Aegean	Star Alliance	780	51	Aeromexico	SkyTeam	2,220	112
Air Canada	"	10,428	570	Air Europa	"	1,583	57
Air China	"	12,203	286	Air France	"	19,454	496
ANA	"	15,963	343	Alitalia	"	4,224	395
Asiana Airlines	"	4,377	127	China Eastern	"	11,089	90
Brussels Airlines	"	1,228	219	Delta	"	31,755	454
Continental	"	14,880	590	Kenya Airlines	"	1,066	64
Lufthansa	"	19,800	675	Korean Air	"	9,923	197
SAS	"	5,978	326	Vietnam Airlines	"	1,876	44
Singapore Airlines	"	10,957	120	Garuda Indonesia	SkyTeam (2012)	2,027	12
South African Airways	"	2,900	163				
Spanair	"	800	131				

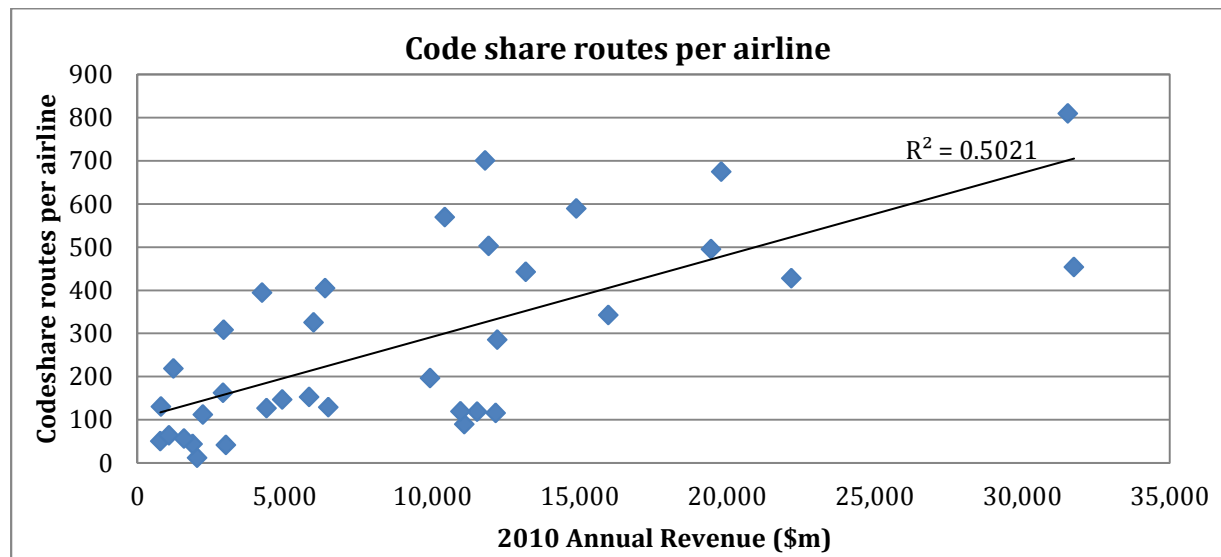


Figure 3.3.8. Relation between the number of code share routes for a given airline with world top-150 carriers, as reported by *airlineroute* in August 2010, and the 2010 annual revenue of the airline, as reported by *Airline Business*.

⁴⁵ Air India was in process to join Star Alliance until July 2011, when its application was suspended (Star Alliance, 2011b).

The Regression Model

In order to comprehend the factors determining the use of code share, several tentative explanatory variables have been tested in a linear regression model. The candidate variables have been included to account for some of the potential characteristics of an airline that make it more (less) prone to have code share routes in its network. Following, the tested variables are defined in Table 3.3.6.

Table 3.3.6. List of independent variables considered as tentative regressors (x_i) in the linear regression model for the number of code share routes (Y) of a network carrier.

REVENUE	The airline annual revenue in USD millions for 2010 is used as a proxy for airline size. By late 2011, the 2010 data was the last year of full data available, as compiled by Airline Business (Airline Business, 2011). When the revenue data was consolidated for a multi-brand airline group (IAG, United-Continental, Lufthansa AG, Air France-KLM), the revenue for each one of the brands was estimated by prorating the revenues of the airline brand through its portion of RPKs out of the total RPKs of the airline group.
RPK	The airline annual revenue passenger-kilometers in 2010 of each airline in millions, also used as a proxy for airline size. The high correlation with REVENUE (>0.90) brings to include either RPK or REVENUE as an explanatory variable and to exclude the other one.
EUROPEAN	Dummy variable [0,1]. Its value is 1 when the airline is based in a European country, including Turkish and Russian carriers. It is 0 otherwise.
EU.LEGACY	Same variable as EUROPEAN, but restricted for the historical flag carriers of each European country.
EU.REGIONAL	Save variable as EUROPEAN, but restricted to the European carriers without a significant number of routes to North America or Asia. Considering the airlines shown in Table 3.3.5, this category would correspond to Aegean Airlines, Air Europa, Brussels Airlines, Spanair, and TAP Portugal.
US&CANADA	Dummy variable [0,1]. Its value is 1 when the airline is either one of the allied US carriers or Air Canada.
N.ATLANTIC	Same variable as US&CANADA, but including also all European carriers, i.e. airlines with EUROPEAN=1.
STAR, ONEWORLD, SKY, SKY+ONEWORLD	Dummy variables [0,1]. Their value is 1 for airlines enrolled in the GALs described by each particular variable.
EARLY	Dummy variable [0,1]. Its value is 1 for those airlines that aligned during the 1997-2001 period, and 0 otherwise.

Results of the Model

All the variables presented in Table 3.3.6 were calculated for every observation of the analysis. Standard Least Squares (SLS) estimation was applied to the model in order to estimate its coefficients. Table 3.3.7 shows the result of the best-fit model with the largest number of tentative

explanatory variables while avoiding correlation issues between them. A refined version of this model, including only the statistically significant variables is shown thereafter in Table 3.3.8.

Table 3.3.7. Results from the SLS regression considering the maximum amount of uncorrelated variables.

Basic linear regression model			
Term	Coefficient	t ratio	Prob> t
Intercept	-7.8879	-0.29	0.7771
REVENUE	0.01074	4.81	<.0001**
EU.LEGACY	68.132	1.88	0.071
N.ATLANTIC	212.234	6.32	<.0001**
EARLY	33.870	0.92	0.367
STAR	121.089	4.16	0.0003**
ONEWORLD	-18.729	-0.44	0.6661
EU.REGIONAL	-161.973	-3.32	0.0026**
Adjusted R ²	0.888		
F-ratio	33.8		
Observations	34		

**Indicates that the estimated coefficient is statistically significant with a 99% confidence.

Table 3.3.8. Results from the SLS regression considering only the statistically significant variables.

Refined linear regression model			
Term	Coefficient	t ratio	Prob> t
Intercept	6.5846	0.25	0.8048
REVENUE	0.010666	5.18	<.0001**
N.ATLANTIC	248.302	7.93	<.0001**
STAR	125.543	4.53	<.0001**
EU.REGIONAL	-167.882	-3.54	0.0014**
Adjusted R ²	0.861		
F-ratio	52.1		
Observations	34		

**Indicates that the estimated coefficient is statistically significant with a 99% confidence.

Similar interpretations can be excerpted from the basic and the refined linear regression models. Being in the North Atlantic market is the dummy variable with the highest weight, size (i.e. annual revenue) aside. This can be explained by the tight commercial relation between the US and the European Union, and also between EU countries, which is translated into a higher volume of code share routes between airlines from these countries than in any other intercontinental flow.⁴⁶ In absence of the N.ATLANTIC variable, the EUROPEAN variable would also have a positive coefficient. This positive impact of being a carrier in the North America-European market is balanced, for some

⁴⁶ Historically, the EU and the US have had the largest transcontinental trade flow in the world; for a brief review of this relation, see Cooper (2011).

airlines, by the EU.REGIONAL variable. This dummy variable indicates that for those airlines without enough size to extend their network farther of their regional area in Europe, they are predicted to have fewer code shares of what corresponds to their size. Additionally, Star Alliance members (STAR) will have, on average, and all else equal, more code share routes than aligned airlines in oneworld and SkyTeam. A limitation of this analysis is that there are not enough unaligned carriers in the study group for analyzing the impact of being member of oneworld or SkyTeam on the number of code share routes.

An analysis including the 57 carriers initially considered, i.e. obviating the need for validation of *airlineroute* with Airline Business data, would bring to similar conclusions. All the variables considered above would conserve their sign, although two more variables would be statistically significant while avoiding high variable correlations, EU.LEGACY (+) and US&CANADA(+). With six variables, the model would have adjusted $R^2=0.828$, and F-ratio=45.9. Overall, this new model would have EU.LEGACY as the dummy variable with the highest weight (212.5). A limitation here is that a significant portion of the non-European legacy carriers have significantly fewer code share agreements acknowledged by *airlineroute* than by Airline Business, weighting their code share routes down in this comparison, and limiting the implications of this result.

Code share partnerships

A similar analysis can be conducted evaluating the code share agreements of aligned airlines.⁴⁷ As shown previously in Figure 3.3.2, the number of agreements of an aligned airline tends to increase with airline's size. Beginning with the same explanatory variables used before (see Table 3.3.6 above), a linear regression model is conducted. Table 3.3.9 shows the best-fit model justifiable by statistically significant variables with at least a 90% confidence.

⁴⁷ Aer Lingus is also considered as a former aligned carrier (oneworld).

Table 3.3.9. Results from the SLS regression for code share agreements.

Linear regression model			
Term	Coefficient	t ratio	Prob> t
Intercept	-12.034	-2.45	0.0182*
STAR	5.093	3.23	0.0023**
EUROPEAN.STAR	3.638	1.72	0.0930
LOG.REVENUE	7.205	5.42	<.0001**
Adjusted R ²	0.483		
F-ratio	16.4		
Observations	50		

*(**) Indicates that the estimated coefficient is statistically significant with a 95% (99%) confidence.

Note: EUROPEAN.STAR corresponds to airlines that have a weight of 1 both under the EUROPEAN category and under STAR category. LOG.REVENUE is a continuous variable corresponding to the logarithmic transformation of the values of REVENUE for all observations considered.

This regression models provides a much lower goodness of fit than the model on code share routes. One straightforward interpretation is that there are many other factors affecting the outcome that have not been captured by the proposed variables. Also, the weight of the REVENUE variable is more limited as the number of code sharing partners is not as conditioned by size as when considering code share routes, highly limited by network size. Additionally, the limited range of values of code share agreements—minimum of 6 agreements for Aer Lingus, maximum of 33 for Lufthansa—makes of the outcome variable coarser in its observation and, hence, more uncertain in its characterization. Notwithstanding this limitation, this regression model corroborates that being a Star Alliance member can explain a higher number of code share agreements, arguably even more in case of European members of Star Alliance.

3.4 Chapter Summary

In the 1980s airlines began to form international code share agreements as a way to develop a multi-hub international network in which international carriers could feed traffic to each other from their domestic networks. Between 1989 and 2002, there were four attempts to develop multi-lateral alliances spearheaded by Swissair that failed due to the absence of a large European carrier and a single, and committed, US partner. A fifth strategic alliance, between Northwest Airlines and KLM, would end up integrating into SkyTeam. Only when large carriers from the US, Europe, and Asia joined together—as in Star Alliance (1997), oneworld (1999), and SkyTeam (2000)—did the project of a global strategic alliance in the airline industry succeed.

Today, the three Global Airline Alliances (GALs) are multi-airline strategic alliances with presence in most countries. Together, they have attained half of the world capacity share and two-thirds of the international RPKs. Since their formation, the three GALs have continuously enrolled new members from all over the world. However, the North Atlantic continues to be the world region with their largest market share, both in intercontinental and intracontinental routes. They have their lowest presence in the Asia-Europe flow and within Africa.

This chapter has analyzed the evolution of the GALs during the period 2006-2011 considering them as enhancers of code share agreements. We have observed that as the GALs increase in size, the proportion of agreements between GAL members increase. More relevantly, code share agreements between GAL partners are, on average, more than 60% less prone to be broken than code share agreements without a GAL partner. Additionally, up to 75% of the 40 broken partnerships between GAL members observed between 2006 and 2011 could be explained by exceptional situations, i.e. one of the carriers experiencing cease of operations, leaving the GAL, or disappearing as a brand due to a merger.

The implications outlined above need to be tempered by the fact that large differences between members exist, and this also translates into their use of the GALs. In all three strategic alliances there are two or three airline groups that make up half of the RPKs of the GAL, and these airlines are the only ones code sharing with all GAL members. The enormous differences in size between members, in some cases well over 100 times, are not deterministically translated into large differences in the number of code share agreements of each airline. In fact, other variables explaining the differences in the number of code share agreements have been successfully tested here.

The regression models developed have shown that airlines that are in the North Atlantic market, and, independently, Star Alliance members, have significantly more code share routes than the rest of aligned carriers, all else being equal. As part of the Star Alliance, members hold more code share agreements than in the case of carriers aligned with SkyTeam and oneworld. Overall, Star Alliance's larger size serves its members as a more robust framework for adding code share agreements to expand their network of destinations. From observation of the 2006-2011 period, a similar implication can be extended to SkyTeam: we can observe a positive relationship between the enrollment of new airlines into the GAL and both the increase of the average number of code share agreements and the proportion of code share agreements with GAL partners. The smallest GAL,

oneworld, is characterized by the highest density of code share agreements between its members: by September 2011, its members had, on average, code sharing with 69% of their GAL partners.

This chapter has focused on understanding the use of GALs as a framework for the development of code share agreements, which contribute to expanding the network of destinations of enrolled carriers. However, we have not considered the impact of GAL enrollment and code share agreements on the annual revenue or net income of a given carrier. Further research could evaluate the effect of GALs on the long-term profitability of carriers in order to assess the economic value-added of strategic alliances in the airline industry.

Chapter 4: Policy Implications

4.1 Introduction

The air transport industry is highly regulated compared to other industries. In fact, the birth and growth of global alliances is closely tied to the regulatory frameworks and competitive issues in the countries where allied carriers are based. National governments have mostly prevented airlines from deeper forms of collaboration than global airline alliances by limiting the ownership and control of national carriers by foreigners and, sometimes, by restricting the international air transport. Although the regulatory environment is in constant evolution, the understanding of the current drivers in the competitive assessment of airline alliances helps to explain the trends in global airline alliances and to predict its evolution. This chapter reviews the effects of collaborative schemes between airlines on consumers and competing unaligned airlines, as well as the current regulatory framework in the air transport industry from the perspective of global airline alliances.

From a regulatory standpoint, there is an asymmetric environment in which while the industry develops as a global business common global rules for airline services fall short. However, during the last decades there has been a convergence between jurisdictions, initiated with the bilateral and multilateral agreements between countries. This process will be intensified as globalization develops, international commerce grows and global alliances expand.

As a case of the greatest interest, our focus of study here will be in the United States and the European Union, which by large hold the most advanced international collaboration between countries. In addition, their markets are very representative of the airline industry, as together they account for a 60% of the world traffic in RPK terms. Also, the transatlantic market, i.e. the Europe-North America flow, represents a 9% of the total traffic in the world, being the most intensive intercontinental commercial flow in the world, and the third total largest, after the EU-intra and US domestic markets.⁴⁸ The transatlantic routes are also where global alliances initiated, and, as well, they have been the main focus of attention of researchers in the analysis of the effects of alliances on consumers' welfare.

In the recent history, the provisional application in March 2008 of the *EU-U.S. Air Transport Agreement* was a milestone in the increasingly closer collaboration between the regulation

⁴⁸ From Boeing (2011).

frameworks of both jurisdictions. This agreement was followed by its second-stage in 2010. At the time of this thesis all efforts were concentrated on a final agreement that would even include lifting some ownership and control restrictions (see previous Section 2.2), although this had a very uncertain final deadline. A main driver in the process is the convergence between the competition laws at both sides of the Atlantic as regulators face similar challenges with respect to global alliances.

This chapter provides an overview the similarities and differences between both systems (Section 4.4), as well as the trends that can shape the global alliances in the future in this region in the world (Section 4.5). Before that, we introduce the benefits and drawbacks of alliances for consumers as well as some potential anti-competitive measures on competing airlines, with the intention of improving the understanding of the motivations of policy-makers at both sides of the Atlantic in their declared commitment of protecting the *customers* (European Union) and the *public interest* (United States). In Section 4.2 we review the economic theory on the potential benefits of alliances as well as the empirical evidence, when available, of its impact on prices, traffic flows, service quality, and competition. In Section 4.3 we provide a brief overview of possible anticompetitive effects of airline alliances on other carriers. This review may improve the understanding on the actions taken by regulators in the EU (European Commission) and the US (Department of Transportation—DOT) in their declared commitment of protecting “customers” and “public interest”, respectively.

4.2 Impact on consumers

The formation of international airline alliances implies the expansion of the hub-and-spoke networks, frequent flier programs and computerized reservation systems to a competitive scenario of collaboration between airlines. From a customer perspective, alliances have a positive impact on connecting passengers by coordinating flight schedules within an alliance, improving the convenience of connections at airports decreasing connecting times between gates and lowering transfer times for checked luggage, and unifying frequent flyer programs.

Similarly, airlines can reduce their unit costs exploiting economies of traffic density, scale, and scope. These cost reductions can either be transmitted to final consumers on a given route or, alternatively, airlines could benefit from cooperative pricing on (part of) the routes of their shared network. The collaboration in price-setting is only allowed when regulators concede antitrust

immunity (ATI) to airlines in the provision of their joint transport services, although airlines may also find subtle ways to coordinate fares.

The classic economic theories distinguish between two types of alliances when a pair of airlines alliance in a particular city-pair market. A *parallel alliance* is when both airlines are operating in that market prior to the alliance, and *complementary alliances*, when the two airlines are combining their network to jointly provide a service for connecting passengers. Figure 4.2.1 illustrates a model of a complimentary alliance in which two airlines serve a new market AB when they combine their routes; Figure 4.2.2 shows the international route that is operated in parallel by two allied airlines. In reality, a partnering between two airlines—and their networks—implies a combination of both types of alliances, as captured in Figure 4.2.2. In any case, each market can be reduced to either one type on other, and this translates to different effects on consumers' welfare. In fact, according to the theoretical framework developed by Park (1997), Brueckner (1997), and Oum et al. (2000) parallel and complementary alliances can imply different competitive outcomes, as follows.

In *complementary alliances* the cooperation between airlines increases the frequency of flights connecting city pairs AC, AD, BC, and BD (see Figure 4.2.2); hence, potential passengers decrease their schedule delay cost which translates in increasing demand, i.e. traffic of passengers. A higher demand brings to higher loader factors on both legs AH and BH or, alternatively, the provision of more flights on AH and/or BH to cope with the increased demand, which also results in higher frequencies between international city pairs. In both cases, the partner airlines have increasing returns to traffic density from larger demand, which translates in reduced operating costs per passenger.

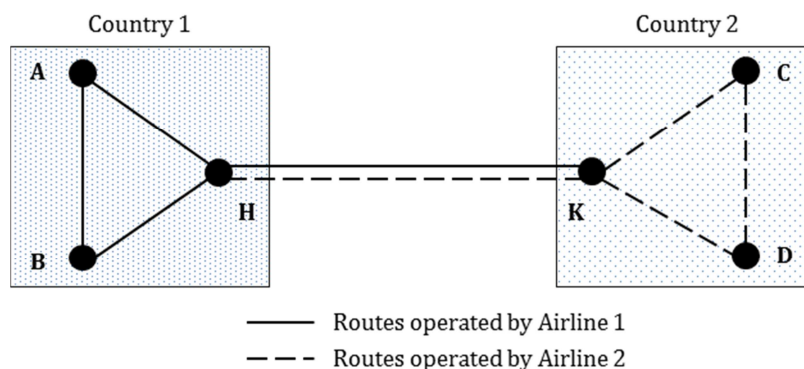


Figure 4.2.1. Hub-and-spoke networks for Airlines 1 and 2, Country 1 and Country 2 (Brueckner and Whalen, 2000).

Furthermore, in complementary alliances in which cooperative pricing is allowed, the economic theory developed by Park and Brueckner predicts that the fare on connecting itineraries, e.g. AC, decreases compared to a previous non-cooperative scenario. In the latter case, airlines would set a “sub-fare” for their portion of the interline itinerary, bringing to a local optima price for the flight leg they operate; the overall fare for the AC itinerary would be the sum of the sub-fares. When carriers are allied and can cooperate in pricing, which usually requires being under antitrust immunity, they cooperatively set the entire fare, instead of individual fares. Now, each airline takes account of the fact that an increase on its own subfare impacts negatively on the traffic of the other carrier.⁴⁹ In fact, for maximizing joint profits on the route, airlines bring fares down.⁵⁰

In *parallel alliances* two allied carriers continue to provide service on a route before and after the alliance. This phenomenon is seen in the flow between hub-to-hub airports⁵¹, where airlines were already overlapping prior to the alliance. As airlines cooperate in the hub-to-hub market, they reduce the number of competitors on the non-stop service. According to the first studies of Park and Brueckner and a classic industrial organization perspective, higher fares are expected from a collusive behavior of airlines, as they maximize their combined profits. Oum et al. (2000) argued that the degree of overlap between the respective networks is usually a key determinant because the higher the overlap, the more severe are the competition concerns and the more likely are price increases as a consequence of cooperation.

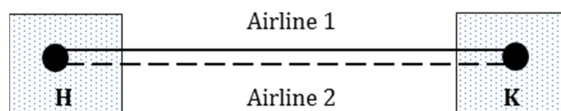


Figure 4.2.2. Hub-to-hub route.

In fact, alliances in hub-to-hub markets have centered the concerns of regulators about potential anticompetitive effects. A potential remedy for particular hub-to-hub routes are “carve outs”, which consists on granting antitrust immunity in all markets excepting for the hub-to-hub market(s) of

⁴⁹ This concept is referred as double marginalization; Brueckner (2001) provides a mathematical demonstration.

⁵⁰ See proof in Oum et al. (2000) and Brueckner & Whalen (2000).

⁵¹ Also referred as international gateway city-pair markets.

concern, where carriers are prohibited from commonly pricing their products and services (Brueckner & Proost, 2009).⁵²

The empirical evidence, as reported in the literature, has supported the prediction of lower fares in complementary alliances, while no evidence has been found of significant increase in fares on hub-to-hub routes after airlines ally. Brueckner (2003a, 2003b) reported up to a 27% reduction in interline fares from the combined effect of alliance membership, code sharing (8-17%), and antitrust immunity (13-21%) on international itineraries with three or more segments. Park & Zhang (2000) also found that complementary alliances led to lower fares in North Atlantic markets.

On the other hand, findings on parallel alliances have found no statistically significant impact of alliance cooperation on fares in hub-to-hub markets (Brueckner and Whalen, 2000; Willig et al., 2009, Zou et al., 2009). A different conclusion was found by Youssef & Hansen (1994), who reported increasing airfares in non-stop markets after the alliance between Swissair and SAS. On the other side, Wan et al. (2009), concluded that oneworld had lowered prices on its transpacific hub-to-hub routes, arguably because of the inability of American Airlines and British Airways to follow a price-setting strategy on their aligned routes⁵³, and Oum et al. (2000) also found that the first parallel alliances of KLM-Northwest and Delta-Sabena-Swissair had decreased fares after the alliances although their market power had increased due to their efficiency gains.

More recently, a divergent finding was brought by Gillespie & Richard (2011), who in a study of fares on non-stop trans-Atlantic flights during the period 2005-2010 showed that, all else equal, average one-way fares on routes with non-stop operators increased by about 7% for each reduction by one in the number of independent carriers serving the route.

Other recent studies have challenged the conventional wisdom on the price effects of complementary alliances. As argued by Czerny (2009), airlines may use code share agreements to apply price discrimination between interline passengers and non-interline passengers, raising prices to interline passengers for the service provided. Brueckner et al. (2011) stated that the effect of antitrust immunity on economy-class tickets at trans-Atlantic connecting routes in the period 1998-2009 was just between 0% and 1% reduction in fare. Similarly, Zou et al. (2011) found that

⁵² In 1996 United and Lufthansa were imposed carve-outs by the US DOT on the Chicago-Frankfurt and Washington-Frankfurt routes, which connect United and Lufthansa hubs. DOT also carved-out two non-stop overlaps in the Delta-Air France-Alitalia agreement in 2002 (Atlanta-Paris, Cincinnati-Paris) and four non-stop overlaps when Continental joined the Star alliance in late 2009 (New York City to Stockholm, Lisbon, Geneva, and Copenhagen).

⁵³ By then, American Airlines and British Airways had not yet received antitrust immunity (ATI) from the US DOT.

the fare-reducing effects from optimal joint price-setting can be outweighed by the upward price pressure from airlines to capture passengers' increasing willingness to pay for the code sharing service. Because of a better provided service, passengers are willing to pay higher airfares for allied airlines than for interline service.

Overall, these results are not contradictory, but as Wan et al. (2009) proposes, they show that, after alliances are created, there are upward pressures on fares from the price-setting and the reduction in the number of competitors, but also downward pressures from efficiency gains in carriers' operations. The effect on airfares depends on the balance between the upward and downward forces which can even upset each other (Zou et al., 2011). The final effect is conditioned by the pressure from airlines operating non-stop and pure-online flights in a particular market, as well as by the competition between alliances.^{54,55}

4.3 Potential anticompetitive effects

A greater integration of airlines may potentially defer the competition with existing and potential competitors. Given that, the analysis of anticompetitive effects also plays a main role in the analysis of the public impact of global alliances. The current focus of regulatory bodies on both sides of the Atlantic is on the approval or denial of clearance of antitrust immunity for alliance partners. Bilotkach & Hüschelrath (2011) consider three potential anticompetitive effects of airline coordination in their study of effects of antitrust immunity for airline alliances: potential for market foreclosure, potential for collusion, and the hindering of non-stop services. Considering the use of distribution channels made by GALs, Fernandez de la Torre (1999) pointed out the problematic of displaying the same itinerary in the computer reservation system (CRS) repeated times, once for each of the code sharing airlines, pushing down on the screen the O-D itinerary options of other competitors.

Next, we identify four potential anticompetitive effects of airline alliances on independent carriers. Section 4.3.1 describes the problem of market foreclose, Section 4.3.2 brings the classical case of the

⁵⁴ Pure online is when single carrier operates all the flights (two or more) on a given itinerary.

⁵⁵ Zou et al. (2011) conducted their study on itineraries between Northeast Asia and the United States in October 2007, finding that Star Alliance and SkyTeam tended to charge significantly higher fares for connecting itineraries than the sum of subfares, while oneworld members, with a smaller market share in the North trans-Pacific market had no significant higher airfares for their interline services.

potential problem of collusion between allies that is treated by antitrust regulation, Section 4.3.3 briefly explains the barriers to entry for airlines operating non-stop services from/to connecting hubs, and Section 4.3.4 mentions a negative externality created by code sharing airlines to the rest of marketed carriers on distribution channels.

4.3.1 Potential for market foreclosure

Market foreclosure consists in the denial of access to competitors of inputs or consumers needed to compete in the market from the dominance position of the airlines enjoying antitrust immunity. This phenomenon can be represented through the model illustrated in Figure 4.3.1. The allied Airline 1 has an interline agreement with both a partner alliance, Airline 2, and a partner alliance, Airline 3 on the same leg. In theory, Airline 2 can lose market share without any increase in the interlining fee from Airline 1. In fact, the two allied firms Airline 1 and Airline 2, are allowed to coordinate price under antitrust immunity, and they can set a lower interlining fee that removes double marginalization. Consequently, this results in higher traffic between partner airlines with antitrust immunity and lower traffic by non-allied airlines on routes to/from hubs of partner alliances. The more resilient the connecting traffic carried by Airline 3 is, i.e. AC market, the higher the negative impact from foreclosure. In a more manifest way, foreclosure can also arise if Airline 1 refuses to deal or rises interlining fees.

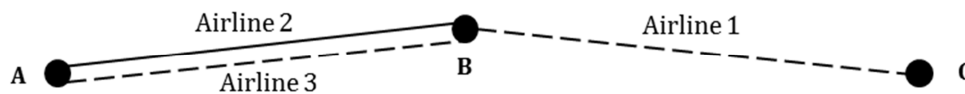


Figure 4.3.1. Airline network with choice of alliance partner (Bilotkach & Hüscherlath, 2010).

Alfred Kahn, “architect” of the Airline Deregulation Act, pointed out in one of his latest works that alliances might exacerbate the competitive disadvantages of incumbent unaligned carriers by increasing dominance in their hubs and opposing to interline with outsiders (Kahn, 2004). Market foreclosure is also characterized by Bilotkach & Hüscherlath (2011) in a scenario of competing global alliances with antitrust immunity: assuming each global alliance has control over one hub at each side of the Atlantic, the routes between hubs dominated by carriers from different alliances will have declining traffic, as each carrier has a limited market power in behind-gateway feeding

routes and both carriers have more problems to be profitable on the hub-to-hub segment. This phenomenon not only has an anticompetitive effect on the service between hubs from different alliances but, to a lesser degree, it also affects the spoke-to-spoke markets by limiting the routing options.⁵⁶ In Figure 4.3.2 a simple network illustrates this: both the H2-H3 route served by the Alliance 1 and the H1-H4 served by Alliance 2 are affected by foreclosure, and the S1-H1-H4-S2 and S1-H2-H3-S2 routes may not be available anymore. However, overall the competition between alliances may increase in the spoke-to-spoke markets but in the affected markets there may also be decreasing competition, as non-alliance carriers may decrease flight frequency and switch to smaller aircraft on their services to immunized hubs.

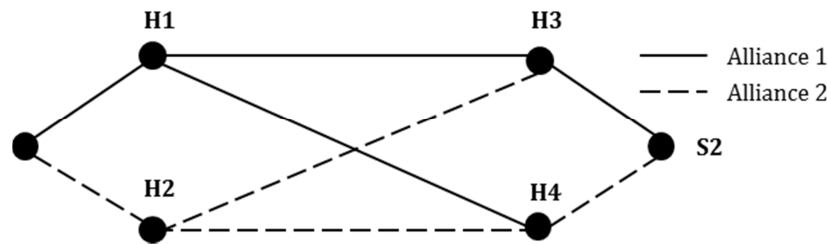


Figure 4.3.2. Simple airline network with two alliances (Bilotkach & Hüsichelrath, 2010).

4.3.2 Potential for collusion

There is evidence in the literature that airlines refrain from initiating aggressive pricing actions on a given route fearing the reaction of competitors in other jointly contested routes. For instance, Evans & Kessides (1994) found that fares were higher in city-pair markets served by carriers with extensive network overlapping. Under antitrust immunity between allied airlines, collusion is allowed de facto within the alliance but, additionally, the extent of market contact between firms, which in this case refers to global alliances, increases with their growth in scope. As noted by Bilotkach & Hüsichelrath (2011) there has not been emphasis on this phenomenon of collusion within global alliances, but in the future more attention may be paid to the potential negative effects of a potential triopoly of oneworld, SkyTeam, and Star Alliance.

⁵⁶ At the time of this thesis airlines each of the three global alliances were granted antitrust immunity in the North Atlantic market after the last of the alliances, oneworld, had its application for antitrust immunity approved by the US Department of Transportation (DOT) on February 13, 2010.

A reduction from four or more competitors to just three competitors could still have an impact on prices, yet limited. Gillespie & Richard (2011) estimated the difference in fares in international non-stop routes and they found that, else equal, the positive difference between average one-way fares on routes with three independent competitors with respect to routes with three competitors was \$28.⁵⁷ Similarly, the work of Borenstein (1992) in the US domestic market provided evidence that with three competitors in a market most of the downward pressures on airfares from competition were already completed, without significant impact on cases with additional competitors. Arguably, these findings might be transferred to a case with just three de facto international competitors, i.e. the three global airline alliances. If that extrapolation proved to be true, a scene with three non-collusive actors in each O-D market could still provide competitive markets.

4.3.3 Network development

The impact of global alliances in network development is an expansion of the effects of the hub-and-spoke network structure, in which more markets are served by connecting flights, expanding the network coverage compared to a point-to-point network, but also dissuading future non-stop services between those markets. Partner alliances join their hub-and-spoke networks and, under the same reasoning, this hinders entry of the member airlines with new non-stop services between the markets in the network, limiting future competence through non-stop services, as shown by Dunn (2007) and Bilotkach (2009).

4.3.4 Multiple listing on distribution channels

An additional disadvantage for competitors of global airline alliances is that the same code sharing route appears in the online travel agencies and computer reservation systems (CRS) on multiple occasions under the name of all the code sharing airlines for just a single flight or combination of flights being operated. In CRS the effect is to push down potential competitors from the first screen, from where most of the travel agency reservations are made (Oster & Pickrell, 1988). A similar

⁵⁷ The model accounted for differences in mileage distance of the route, and route's population potential.

advantage of multiple listing by code sharing airlines can be experienced in the websites of online travel agencies like Expedia, Orbitz, Travelocity, and others.

4.4 Regulatory framework

In a world in which airlines remain highly attached to their nationality, they are considered as a strategic industry by national governments, and firm ownership by foreigners is still limited, at the international level global alliances are similar to exceptional stateless entities. In fact, the vagueness in international law causes that any international alliance depends on two or more national jurisdictions. As a result, in the absence of proper coordination, conflicts or incoherencies can arise with the foreign jurisdiction decision which allows companies operating on the world scene to circumvent rules of competition and antitrust.

In the North Atlantic market, the airline industry has assisted to a deeper coordination between the regulatory bodies in the EU (European Commission), and the United States (Department of Transportation (DOT) and Department of Justice (DOJ)). The US began to negotiate “open skies” agreements with other countries in 1992, and in 1995 the first agreements with European countries were initiated. The aim of DOT was to provide open entry, unrestricted capacity and frequency on all routes, air service between any point in the United States and any point in the partner country, no government restrictions of fares, and code-share and charter rights. It was not until 2003 that the EU established a common legal framework for the air transport relationship between all the Member States and the rest of the world, establishing equality between all EU carriers. In May 2004 the Commission obtained jurisdiction to investigate air transport services between EU and third countries.⁵⁸ Following that, in March 2008 all bilateral agreements between EU countries and the US were replaced by the EU-US Air Transport Agreement. The implementation of the Agreement implied a single framework for regulatory cooperation, while it formalized the cooperation between the EU and the US on competition matters aiming to avoid conflicts in their resolutions in the transatlantic air transport service. Overall, the goal of the Agreement, to be

⁵⁸ By Regulation 847/2004, Member State courts and national competition authorities retained control of the international commitments they assumed with third countries, although a system of notification by the Member States and Commission approval and the enforcement of the EU competition rules was established, as the necessary safeguard against discrimination between Community carriers (European Commission & US DOT, 2010; Lykotrafiti, 2011).

achieved in a multi-step process, is the restructuring of the industry to allow for efficient cross-border cooperation (European Commission & US DOT, 2010; Lykotrafiti, 2011).

The main obstacle to a deeper integration in the regulatory framework of the EU and US is the perpetuation of the regulatory barriers on ownership and control, which prohibits EU and U.S. carriers from merging, as well as the prevalence of domestic cabotage as a national privilege. The European solution is the concept of “Open Aviation Area” (OAA), the next phase in the Agreement. The OAA is intended to deliver market access in the form of full freedoms of the air to both parties. Both European and American airlines would be able to operate freely within an open aviation area, subject only to a body of common rules on operational safety, security, competition and environmental protection (Booz Allen Hamilton, 2007). At the time of the official adoption of a Protocol to Amend the 2007 EU-US Air Transport Agreement on 24 June 2010, there had not yet been relevant changes to bring to an OAA, with the notable exception of the US granting EU airlines to offer services between the US and non-EU countries.⁵⁹

Giving the existing restrictions limiting the freedom of carriers from the EU and US to merge, global alliances and immunized joint ventures (JVs) continue playing a leading role in transatlantic markets. Indeed, at the level of competition in the airline industry, the main area of discussion at both sides of the Atlantic is the granting or denial of antitrust immunity (ATI) to airlines that are either participating in an alliance or intending to forge an alliance. The increasing number of cases of alliance reviews has brought to several recent analyses and discussions of the approaches of the competition authorities in the EU and US (e.g. Lykotrafiti, 2011; European Commission & US DOT, 2010; Gillespie & Richard, 2011; Bilotkach & Hüscherlath, 2011) on which we base this analysis of the general approach of regulators in the United States and the European Union on antitrust immunity for international airline alliances. Moreover, the current policy approaches of the authorities can be of value for predicting the assessments of potential future mergers, given that as argued by Bilotkach & Hüscherlath (2011), JVs with granted ATI and mergers affect consumer markets very similarly and they are considered virtually identical by regulators.

In the United States, the antitrust immunity (ATI) requests from airlines are decided by the DOT, to which the U.S. Congress transferred jurisdictions from the DOJ in 1988.^{60,61} The DOT bases its

⁵⁹ See Lykotrafiti, (2011) for an extended discussion of the impacts of OAA as well as the needs and legal implications of regulatory convergence and harmonization of US antitrust and EU competition law.

⁶⁰ The DOJ is only allowed to make recommendations.

⁶¹ There is no corresponding authority for DOT or DOJ with regard to domestic alliances between U.S. carriers, and domestic alliances do not have antitrust immunity.

decision on a two-step analysis. First, the DOT approves the alliance agreement if they are “not adverse to the public interest”⁶², and it “shall disapprove... an agreement... that substantially reduces or eliminates competition”⁶³ unless “the agreement [...] is necessary to meet a serious transportation need or to achieve important public benefits”, and if those benefits cannot be met by reasonably available alternatives that are materially less anticompetitive. Second, if the alliances agreements are approved, it is not DOT’s policy to confer ATI simply on the grounds that an agreement has been approved as pro-competitive. In fact, exemption from the antitrust laws is authorized only if the parties would not otherwise go forward without it, and DOT “decides it is required by the public interest”.⁶⁴ According to the DOT, the “public interest” standard is applied on a case-by-case basis, trying to balance between the promotion of a competitive aviation system that facilitates commerce and the consumer benefit from enhanced service options and competition. Generally, the DOT has used the antitrust immunity as an incentive to persuade foreign countries to sign Open Skies agreements with the US.

In the European Union, from May 2004 the Commission has jurisdiction to investigate air transport services between the EU and third countries. The decisions are taken at the College of Commissioners of the Commission, with groups the Commissioners in charge of EU policies, including competition, transport, energy, and environment. The Commission argues that although it only applies EU competition rules, i.e. Articles 101 and 102 of the Treaty on the Functioning of the European Union (TFEU), “each policy area is given due consideration” and decisions are consistent “across all areas of its competence” (European Commission & US DOT, 2010). According to Article 101, all alliances agreements between airlines prevent, restrict or distort competition within the European market, excepting for those agreements that meet all the following criteria:⁶⁵ (a) they help to improve the production or distribution of goods or promote technical or economic progress, (b) consumers must receive a fair share of the resulting benefits, (c) the restrictions must be indispensable to the attainment of these objectives, and (d) the agreements must not afford the parties the possibility of eliminating competition in a substantial part of the products and services offered. From Article 102, the agreements that bring to abuse of dominant position that either excludes competitors from the market, or that allows the company to exploit on consumers its market power (e.g. excessive fares) are prohibited with no exception.

⁶² See 49 USC §§41308-09.

⁶³ See 49 USC § 41309(b)(1).

⁶⁴ See 49 USC § 41308(b).

⁶⁵ As considered in Article 101 (3) TFEU.

The DOT has generally favored the formation of international alliances, arguing that the public benefit from network efficiencies and the new competitive framework would offset the cooperation in price-setting and capacity. For example, by the end of the 1990s the DOT even justified the granting of ATI by the benefits of creating alliances that could compete between them, rather than against unaligned carriers. The expected negative anticompetitive effects of alliances with granted ATI in the more critical gateway-to-gateway markets has been counterweighted by the imposition of carve-outs on the routes of concern.

Differently, the Commission has been characterized by a low number of decisions in its evaluation of alliances with only two final resolutions between 1994 and 2008. The approval conditions in the single transatlantic alliance subject to conditions (Lufthansa-SAS-United in 2002) and in the resolutions of intra-European alliances, differ from the US; instead of using carve-outs, the surrender and/or release of airport slots and ground facilities is enforced. Table 4.4.1 characterizes some of the main differences between the regulatory approaches in the US and EU, and Table 4.4.2 summarizes the enforcement actions of the European Commission and the US DOT during the last two decades.

Table 4.4.1. Investigation of international airline alliances

Jurisdiction	Period	Total Applications	Accepted (In the North Atlantic market)	Disapproved	% Approval over Applications	Dismissed by airlines or obsolete during evaluation process	Pending*
US	1992-2009	35	28 (16)	3	84%	2	2
EU	1994-2008	11	2 (2)	0**	18%	3	4

Source: Bilotkach & Hüscherlath (2011).

*By May 2010

**Two applications became inactive due to DOT's previous suspension

Table 4.4.2. Differences in regulatory approaches in the transatlantic market.

Concept	Jurisdiction	
	United States	European Union
Consideration of airline alliances in the competition regime	Exceptional Although DOJ is responsible for enforcing antitrust law in all industries, DOT can grant ATI to airline alliances	Alignment with EU competition law, although considered to have the same competitive effects as mergers
Mandates of the competition authority	DOT is limited to transport industry, but also holds mandate on regulation and policy making	It is the same authority across all industries
Goal in the assessment	Do the best for the "public interest"	Ensure consumers are not harmed
Methodology in the assessment of alliances	Review of ATI applications before the alliance is implemented	Commission reviews are ex post facto Airlines must assess the legality of their cooperation in accord with EU competition rules
Transparency of assessment process	Evidence and application materials are made available by DOT to the public	Procedures are not public. The Commission publishes non-confidential versions of its decisions and press-releases on its proceedings
Considered market scope	At three levels: network, country-pair, city-pair Focus on the network level	At three levels: network, country-pair, city-pair Focus on the city-pair level
Evaluation of consumer benefits	DOT analyses them to justify the convenience of alliances and making a grant of ATI	Commission focus only on negative competitive effects. The airlines have to argue the potential consumer benefits if ATI was granted
Conditions and remedies to accept alliances and/or antitrust	(i) Carve-outs on specific fares & routes (ii) Origin & destination survey data reporting requirement (iii) Yearly reporting requirements from the alliance members	(i) Restrictions on frequencies /capacity/slots on specific routes/airports (ii) Requirements on blocked space agreements with new entrants and land transport companies (multimodal enforcement)

Sources: European Commission & US DOT (2010), Bilotkach & Hüschele (2011).

The differences between the approaches of the Commission and the European Union are representative of their view of global alliances. The Commission does not give a preferential

treatment to alliances and imposes more strict conditions to ensure that competition is not distorted; while the DOT, on the other hand, tends to be more relaxed concerning the conditions to be fulfilled, it is more reluctant to interfere with the business rationale through the imposition of conditions, and also considers the potential efficiencies in case alliances are allowed and/or airlines are granted with antitrust immunity.

4.5 Prospects and challenges

The current efforts in reaching a final EU-US Air Transport Agreement (ATA) seem directed toward the future development of an Open Aviation Area (OAA) that could reshape the industry. The creation of a single market in the EU and the US without ownership and control limitations would indeed allow transatlantic mergers. Further consolidation would be an opportunity for exploiting additional theoretical efficiencies and cost saving synergies over those delivered by alliances by maximizing cooperation between merging airlines. Assuming the implementation of a purely homogenous OAA, two questions arise regarding the future of global airline alliances: i) *Would airlines opt for transatlantic mergers to the detriment of global airline alliances?*, ii) *Will the continued evolution of global airline alliances be aligned with the public interest?*

(i) *Would airlines opt for transatlantic mergers to the detriment of global airline alliances?*

A reinterpretation of the industry changes after the 1978 Airline Deregulation in the US and the multi-step EU liberalization in the period 1987-1997 might provide reasonable answers to the question of how likely is that airlines choose to merge if there were an OAA and, in that case, if this closer collaboration scheme would replace the GALs. The more recent case of the EU shows a competitive scenario in which, 15 years later, the full implementation of a single market has brought the consolidation of carriers into three big network legacy firms that concentrate most of the market share within the “full-service” niche. However, along this path there have also occurred less expected events. One is that the emerging carriers have taken the shape of multi-brand airline groups with notable hub dualities, which acknowledges the difficulties in consolidating “flag carriers” considered as strong national brands. The second one is that, as of today, low-cost carriers capture more than one-third of the intra-Europe traffic.

Currently, we observe that the competitive pressure from LCCs could indirectly reinforce concentration among full service carriers, as some of the European “full service” network carriers with insufficient economies of size struggle to remain competitive. In fact, amid the economic downturn in the region, two GAL members ceased operations in 2012: Spanair (Star Alliance; Spain) and Malev (oneworld; Hungary). If more regional alliance members were to exit the market, the concentration of power within each GAL into a single multi-brand group would be reinforced.

The record of European consolidation, represented in Table 4.5.1, and supported on the other side of the Atlantic by the prevalence of three large network legacy carriers in the US (United-Continental, Delta Airlines, and American Airlines) with a 72% revenue market share in the US (Swelbar, 2011), could be examples of the future trends in a single OAA. Still, there are relevant characteristics of the transatlantic market that could preclude a similar consolidation. Overall, considering the record of mergers and acquisitions within the European Union, it seems plausible that even if there were to be transatlantic consolidation within a future OAA, the resulting company would be more likely to emerge in the form of a multi-brand airline, as this would prevent the disappearance of either US or European well-established brands.

Table 4.5.1. Top-10 largest airline groups in Europe

Ranking 2010	Group/Airline	Revenues (\$m)[†]	Revenue-size compared to Lufthansa Group (100)	Global Airline Alliance
1	Lufthansa Group	36,067	100	Star Alliance
2	Air France-KLM	31,755	88	SkyTeam
3	IAG	19,533	54	oneworld
4	SAS Group	5,978	17	Star Alliance
5	Air Berlin	4,915	14	oneworld
6	Ryanair	4,807	13	-
7	easyJet	4,632	13	-
8	Alitalia	4,224	12	SkyTeam
9	Virgin Group	4,000	11	-
10	TAP Portugal	2,932	8	Star Alliance

†Source: Airline Business (2011a).

The strategic interest of transatlantic mergers might be limited if we consider the limited growth opportunities in the North America- Europe traffic flow. Indeed, there are symptoms of maturity as the transatlantic market shows the lowest estimated traffic growth among the largest international flows in the world: according to ICAO, the transatlantic flow would have 2.6% annual growth in the

period 2010-2030 compared to the world average estimated between 3.7% and 5.2%.⁶⁶ In addition, of all large traffic flows in the world, GALs already hold their largest market share of the North Atlantic flow, with around a 90% of all traffic. Still, according to ICAO forecasts, by 2030 5.7% of world traffic (in RPK terms) will be the in North America-Europe flow, compared to a 15% share for the domestic North America market, and a 7.4% share for the intra-Europe market. Overall, and considering also the high degree of collaboration already achievable when antitrust immunity is granted, the opportunities of revenue growth for aligned carriers through a transatlantic merger might not be attractive enough to initiate the usually challenging and disrupting merging process.

On the side of cost efficiencies, however, the financial economies from further collaboration between carriers could provide merging firms with a competitive edge to support their profits in periods of economic downturn. Indeed, this is a reason strong enough for not disregarding cross-border capital investments. On the other hand, political barriers and service costs of a geographical and cultural nature between EU and US firms could raise more impediments to a unified management structure than in the previous merging experiences within Europe, which already proved to be complex.

At a larger scale, the liberalized framework allowed in the EU-US Air Transport Agreement is an exception within the global airline industry. According to ICAO forecasts until 2030, these other international and intercontinental flows will be characterized by a much larger expected traffic growth, e.g. 9% in Europe-Africa, 7.8% in Europe-China, 5% in North America-Latin America. This higher growth is projected despite the general persistence of barriers to foreign investment in most of these countries. Overall, the combination of high growth in international flows and the persistence of regulatory barriers to foreign carriers seem ideal to both global airline alliances and the Gulf carriers' complementary model of a global connecting hub.

(ii) Will global airline alliances be aligned in the future with the public interest?

More than a decade after the GALs were formed, most of the literature published on the impact of global airline alliances has focused on airfares in the US domestic and transatlantic markets. Recently, the attention has been on the most cooperative agreements existing in the North Atlantic:

⁶⁶ Estimates by Boeing "Current market Outlook 2011-2030" consider instead that annual traffic growth in the North Atlantic flow (3.6%) will be significantly larger than within North America (2.3%) and closely below the intra-Europe market (4.0%). These are the markets with lower expected growth in the world among the 14 large regions considered in Boeing's analysis.

joint ventures with granted antitrust immunity (ATI), which fairly represent the case of merger-like associations. As of today, the literature on price effects of alliances on consumer's benefit—with and without ATI on transatlantic routes—is, as shown in Section 4.2, still inconclusive. The remedies proposed by the EU Commission (slot divestment) and the US Department of Transportation (carve-outs) in case of potential anticompetitive practices attempt to avoid the dominance of GAL members at their hubs. These measures find the obvious resistance of allied airlines, who claim that the divestment implies the loss of a very valuable long-term asset, and the carve-out brings inefficiencies and extra-costs in their operations.

A comprehensive assessment of the impact of global airline alliances requires that, in addition to airlines and consumers, more stakeholders with relevant weight in the decision-making process are considered. At the regional level, city authorities have serious interests in having one (or more) local airport(s) from which the city is served with an extensive network of destinations, high flight frequencies, low airfares, and that this contributes to generate business and jobs. Depending on the power distribution of the airport ownership and management bodies and the status of the airport as (non-) hub for one or more airlines, the objectives of the airport authority might be more or less well aligned with the interests of allied airlines. Labor unions, aircraft manufacturers, other suppliers, and large local corporations are also important stakeholders that can fall under the category of *public interest*. Political forces have a central role, not only through the granting of antitrust immunity, the development of international agreements or the enforcement of transportation and infrastructure policies but, given the importance of the airline industry as an economic and social enabler, some political actors might have their own agenda regarding alliances with implications that go beyond the scope of transport economics.

From the perspective of consumers of air transport services, demand is mainly stimulated by low airfares and short total trip times.⁶⁷ A third element in the election of airline is the quality of service provided by the each carrier. As introduced in Section 2.3.3, alliance members have focused on serving consumers with high frequency—through a multi-hub-to-spoke network—and on providing a superior quality of service than LCCs in connecting flights. By facilitating these purposes, global airline alliances are a crucial tool for network legacy carriers. Especially for price-inelastic, business-class travelers, for whom low displacement time and high quality of service have more importance than for tourist-class passengers, the “seamless” network provided by GALs could

⁶⁷ “Total trip time” is the sum of (i) flying times of flight legs, i.e. *block times*; (ii) wait time between connecting flights; and (iii) *schedule displacement*, or the wait time between the desired departure time of an individual and the closest departing time available.

well bring a remarkable added value. For price-insensitive travelers, further cooperation between airlines that would decrease total trip time by coordinating schedules, as well as other initiatives that could improve the quality of service—especially in flight connections—would be positively welcomed.

The other element of weight for consumers, i.e. low airfares prices, can be also delivered by GALs by exploiting the cost efficiencies described in Section 2.4 and by transferring these savings to their customers. However, as pointed before in this chapter, allied airlines may also exploit some market forces which could drive airfares up. A feasible option here for regulators for exerting a competitive pressure on GALs' members is to facilitate the access of further competing carriers—i.e. low cost carriers and Gulf carriers—to intercontinental markets. Although the theory of contestable markets of Baumol (1982) might not be fully applicable to the EU and US liberalized airline markets, a current snapshot at both regions yields evidences that non-traditional unaligned carrier—like Southwest Airlines, Ryanair, JetBlue, easyJet or Emirates—still have a competitive edge to continue exerting pressure on aligned carriers in their current markets.

Indeed, low-cost carriers have exhibited a leading role in driving airfares down. For example, the study of Brueckner et al. (2011) on airfares in the US, found that legacy carrier competition in an airport-pair market has weak effects on average fares, but the presence of low-cost carriers in the same or adjacent airports, or even as a potential competitor has a dramatic effect on driving airfares down.⁶⁸ However, the implications of these findings cannot be fully transferred to international scenarios in which GALs compete with independent carriers; as indicated in Section 2.3.1, it is estimated that a significant share of the cost advantages of LCCs over network legacy carriers in domestic markets would be lost when operating intercontinental routes.

Still, an equitable right of access, especially at hub airports, could level the opportunities for new players to enter GALs' markets and to exercise a downward pressure on intercontinental airfares. If one believes that the goal is to pursue efficient markets with a competitive pressure on prices, a possible strategy could be the modification of the so-called grandfather rights on slots at congested airports, and the establishment of a market-driven bargain of slots. By that, independent carriers could have one very relevant barrier to entry for developing international services removed. Nowadays, the process of slot allocation gives preference to long-standing carriers in conserving their rights to operate AT airports. Sometimes, this advantage to incumbent carriers provides network legacy carriers with a market foreclosure power, and precludes incoming carriers from

⁶⁸ These findings endorse results from previous works of Morrison (2001) and Goolsbee & Syverson (2008).

operating whenever demand for air transport overcomes airport capacity. Still, other barriers would persist, like the economies of size and density that GALs have legitimately attained by developing their network strategy.

The viability of implementing a market-driven distribution of slots at airports is open to question. While the changes in a market-driven slot allocation process should ideally be dynamic, the design and gate configuration of airport passenger buildings is associated with significant inertias, multiple interests, and infrastructure constraints. In fact, among the 50 largest airports in the world which are a hub airport for a leading airline, by 2011 nearly a 40% of them had airlines distributed so that each leading airline and its GAL members could connect passengers under one roof (same terminal and/or concourse); an additional 30% of the airports had opted for separated passenger buildings by domestic-international airlines or routes. Also, gate distribution and building design might be configured according to other factors like fitting of aircraft in gates or minimization of walking distances for connecting passengers, limiting the incentives for a redistribution of slots.

Moreover, from the airport operations perspective there might be benefits associated with a static slot allocation mechanism. Indeed, while there are many proponents of a more dynamic distribution based on a market-based slot bargaining system, some of the issues raised above suggest that the new system could also limit the passenger output of the airport. In addition, airport shareholders' goals do not need to be necessarily aligned with the creation of an equal opportunities playground to airlines. **Local governments and corporations** might promote the growth of airlines operating the airport as a hub in order to ensure a service with higher frequency and lower travel time; profit-oriented **airport authorities** might opt for a system that favors airlines capable of generating higher fees instead of a market-based mechanism, even after considering the trade-off between operational feasibility and profit generation. In some cases, the leading airline might be a shareholder of the airport and it can veto or delay the entrance of other carriers. An additional layer of complexity is that a nationwide coherent framework for airport's slot access might be difficult to implement given the heterogeneity in airport authorities regarding ownership structure and management goals, especially considering the coexistence of private, public and hybrid public-private partnership structures of power.

Following the thread of possible incentives for a downward pressures on airfares, in the scenario that independent incoming carriers could not be as price competitive as GALs, or in case that the reliance on market-based mechanisms for a fair slot-access policy was unfeasible, regulators might focus on enhancing inter-alliance competition. This approach seems to have been already adopted

by the US Department of Transportation (DOT). In the proceedings for granting antitrust immunity to the transatlantic joint venture by oneworld members American Airlines, British Airways, and Iberia⁶⁹, the DOT stated in 2010 that this action “*would provide a third global network that can better discipline the fares and services offered by the Star and SkyTeam alliances*”.⁷⁰ As a support of this argument, the work of Borenstein (1992) found that by adding a second or a third competitor in a given market reduced fares by about 8% in both cases and, interestingly, there was not much effect of new entrances on fares beyond the third competitor.

The **governmental branches** and their dependent bodies play a crucial role in directing the future of global airline alliances. In this case, the importance of the airline industry in the overall society expands the framework of analysis out of the most basic “*consumer-industry*” scheme of regulation. In the case of the transatlantic market, in Section 4.4 we showed that the US Congress focuses, through the DOT, on the broad concept of *public interest*; similarly, in the EU, despite having set the *consumer* as the key element of their assessment on competition, we observed that other policy areas are actively considered in the decision-making process. As of today, we cannot find in the literature a policy discussion about the possible inconvenience of global airline alliances, but the widespread acknowledgement of (some of) the benefits for airlines mentioned in Section 2.4, with a focus in the importance of GALs to overcome barriers of entry to foreign airlines and the social benefits provided by GALs’ dense and integrated networks. Instead, the debate is centered on the trade-off between enhanced efficiencies from increased coordination between partner airlines on the one hand, and the thread of a reduced number of real competitors in O-D markets when coordination between airlines reduces the number of real competitors on the other.

National political actors try to fulfill not only some of the primary goals of the other stakeholders considered in this section, but they might also try to shape the future of global airline alliances to implement their own political agendas. Here we recall some ways in which GALs can be associated with the development of non-transportation policies both in US and EU.

- ***Economic integration:*** The different stages of the EU-US Air Transport Agreement are a bridge of coordination and understanding between the two largest economic forces in the world. The success of the consolidation process into a single Open Aviation Area could be interpreted as part of a wider process of economic and regulatory alignment.

⁶⁹ Finnair and Royal Jordanian were also applicants, and they were also granted with antitrust immunity, although they did not initially integrate in the joint venture in transatlantic markets.

⁷⁰ DOT Order 2010-2-8 in Docket OST-2008-0252 at 32.

- **Geostrategic power:** the first years of the XXI century are showing a global power shift from the more industrialized countries to emerging nations, especially China and the rest of BRICs—i.e. Brazil, Russia, and India. Within this context, the condition of GALs as an initial North Atlantic-based construction whose major actors are still from the US and the European Union, and with prospects of continuing their expansion to India, China and Africa, gains importance. Indeed, from a foreign policy motivation, it might not seem unreasonable to advocate for the success of GALs over global connectors in the Middle East or, tentatively, Far East Asia as a way to withhold influence in a global industry of high strategic relevance.
- **National security:** the importance of aircrafts for national security and the possibility of a temporary nationalization of airlines in the advent of global disruption are elements that, despite the low probability of occurrence and the debatable effectiveness of the measure, should not yet be dismissed as a factor of relevance for promoting the business models and economic viability of national carriers over the business models of foreign carriers. Under this policy goal, cross-border mergers are a tool of integration between network legacy carriers that should not be avoided as this would open the airline industry to foreign ownership. From a different perspective, a caveat of market concentration in few financially-integrated airline groups is that the air transportation service could be more vulnerable to the financial distress of one of the large airline groups, potentially disrupting the national economy if operations of just a single, but relevant, player ceased.
- **Job retention:** the airline industry is a source of high earning jobs, and this could be an additional argument to protect national carriers from high-growth foreign carrier like Emirates by creating a regulatory framework that favors allied airlines.

To sum up, from the political strategic perspective presented here, there might be an interest in allowing airlines to consolidate operations through the granting of antitrust immunity in the North Atlantic market. In fact, this can translate into a competitive advantage of EU and US network legacy carriers over unaligned foreign carriers with international services. More importantly, this strategic position can contribute to achieve foreign policy goals in such a manner that balances the preservation of national sovereignty with the circumvention of more protectionist approaches.

Within the domestic markets in Europe and the US there are other **unaligned airlines** like easyJet, JetBlue, Ryanair, or Southwest Airlines that might not welcome the provision of antitrust immunity in transatlantic markets on the basis that they also favor aligned carriers in their domestic markets.

Actually, this exceptional regulatory treatment for transatlantic services cannot be treated independently from the supply of domestic services. As GAL members operate domestic routes that are partially feeding international routes, unaligned airlines could claim that the benefits from granted antitrust immunity can bring to a cross-subsidization from international operations to a domestic network with more frequencies and lower yields that captures more passengers on domestic itineraries. From this perspective, the benefits from granted antitrust immunity should not be merely seen as compartmentalized to transatlantic markets, but they might create advantages over carriers in domestic markets, distorting the fundamentals of equal treatment in domestic competition.

Airlines workers and, especially, **labor unions** have an important bargaining power in the airline industry. Indeed, in the rights and benefits, well-organized workers can even shape regulation to their favor, as explained by Stigler (1971). So far, as joining global airline alliances is a strategy that seems to contribute to find a sustainable business model in the industry, and as it is not traditionally related to labor cuts, this strategy should be in the interest of airline workers.

In the particular case of the most important suppliers, the two largest **aircraft manufacturers** Boeing and Airbus, they are interested in the generation of new air travel demand and, ultimately, the increase in demand of seat capacity. Both cheap airfares and shorter total travel times contribute to that end. Consequently, the position of Boeing and Airbus with respect to GALs could be more likely neutral in comparison with the plans of rising Gulf Carriers and the tentative international expansion of LCCs, which also boost traffic. Instead, other **suppliers** in the airline industry might feel more inclined to support network legacy carriers and the GAL's strategy instead of other business models, as the former are oriented to serve business-passengers, and this leaves more space for adding value in the supply chain.

Overall, there is a widespread consensus that alliances can have a very positive impact on the public interest when partners do not coordinate to increase prices or reduce output, as this still leaves alliance partners as competitors. Some skepticism, however, has arisen over the need of antitrust immunity for airlines to provide better services to customers in terms of schedules and prices, even on connecting routes. Further integration within the GALs seems positive for the airlines involved in the cooperative agreements and, ultimately, these positive effects might be transferred to costumers. However, there are concerns about the reduction in the number of real competitors and the evolution towards a oligopolistic industry if potential incoming airlines find significant barriers to entry to airports and international airspace jurisdictions.

Amid uncertainty, an adaptive strategy is the provision of time-limited antitrust immunity. The ex post facto empirical analysis by scholars and policy analysts would provide enough evidence to evaluate the convenience of renovating this form of merger-like integration in the transatlantic O-D markets. In that assessment, the many vested interests of the involved stakeholders and the importance of the airline industry as an enhancer of business, tourism, socio-economic development, and national and foreign policy should not be disregarded by policy-makers. Finally, the implications of these experiences in both the EU and the US could be made extensive to the entire global airline industry, being a referent for future international bilateral and multilateral agreements between countries—in a similar way as the Deregulation Act in the US in 1978 has been a model for the worldwide liberalization of domestic markets.

Chapter 5: Conclusions

The goal of this thesis has been to provide an explanatory framework that could identify the reasons of the continuous growth of the three global airline alliances (GALs) a decade after they were launched. The intention has been to provide a holistic view on GALs from transport economics, public policy and corporate strategy perspectives. As part of this work, in Chapter 3 we have analyzed the relation between the growth of GALs from 2006 to 2011 and the evolution in the code share agreements' strategy of enrolled carriers during that period. The other chapters of the thesis have provided a framework for comprehending the past, present, and future of global airline alliances. Following, in Section 5.1 we summarize the most relevant contributions of this thesis, and in Section 5.2 we propose a few lines of research that could build on the work developed here.

5.1 Research contributions

Based on the findings in previous chapters, the following conclusions can be drawn from this thesis on the impact of alliances on members' network development:

- In most of the largest economies in the world the air transportation sector has substantially higher barriers to foreign investment than all other industries, including extensively regulated service sectors. This makes the provision of international air services an exceptional case in an increasingly globalized world. Indeed, the combination of augmenting international human mobility and the existence of barriers to entry in foreign bases supports the logic behind the development of collaborative agreements between airlines such as global airline alliances.
- Membership in a global airline alliance for developing an international network has been adopted by 18 of the 20 largest airlines in the world. All these members together gather half of the world capacity and two-thirds of the international traffic. However, global alliances are not the only strategy for network growth; in fact, they have been limited to the so-called network legacy carriers. Among the top-150 airlines only 30% are aligned with a global airline alliance. Low cost carriers and a group of rising carriers in the Persian Gulf have more recently opted for the provision of international air services with different strategies, which are also depicted in this thesis.

- The benefits of alliances for enrolled members are largely based on the economies of density and scope associated with code share agreements and, tentatively, on the collaboration in pricing and scheduling in antitrust immunized partnerships. Further gains like efficiency improvements from learning, cost savings from joint purchasing, an adequate reallocation of resources, or marketing benefits from the association with the “global airline alliance brand” depend on a closer collaboration between members. These potential benefits are amid a trade-off between the gains from consolidation and the dilution of some competitive advantages of firms, like the marketing strength of the “national brand” among consumers.
- Global airline alliances are the preferred scheme for airlines in the development of an international code sharing network. In an analysis of the code share agreements in force in the period 2006-2011, we observe that as more airlines joined each GAL, their members increased the proportion of code share agreements with partners of the same GAL. We also observe that code share agreements between GAL partners were much less prone to be broken than agreements with non-partner airlines. In fact, 75% of the broken partnerships were due to exceptional reasons: either one of the airlines disappeared or it exited the initial GAL. Overall, every year there are more long-term code share agreements between members of the same GAL, and a decreasing need to develop code share agreements with non-partner airlines.
- The size of the global alliance plays a relevant role. Members of Star Alliance, the largest GAL, have, all else equal, significantly more code share routes and code share agreements than carriers aligned with SkyTeam and oneworld. Members of the smallest alliance, oneworld, need to develop a higher percentage of their code share agreements outside the global alliance but, also, during 2006-2011 they made more use of all the possible partnerships available within the GAL than members of Star Alliance and SkyTeam. Still, airline size is the most determining factor of the number of code sharing routes of a given airline, predicting 50% of its code shares.
- The transatlantic (Europe-North America) market is the more relevant flow for global airline alliances at present and in the mid-term future. It is the origin of global airline alliances were initiated, the largest intercontinental flow in the world, and where the three GALs together hold their largest market share. Also, all else equal, airlines operating in the transatlantic market have significantly more code sharing routes than aligned carriers

based in other regions. Within the regulatory framework, the first phases of the EU-US Air Transport Agreement initiated in 2008 are the most advanced bilateral agreements in the industry and they could consolidate the European Union and the United States into a single, liberalized market, the so-called Open Aviation Area. In the meanwhile, each GAL has a group of two to five airlines granted with antitrust immunity by the US to coordinate operations in the transatlantic markets.

- The literature has generally reported lower fares in complementary alliances, while the research on parallel alliances (from hub to hub) is yet inconclusive. Overall, there can be upward pressures on fares from the price-setting ability of airlines under antitrust immunity and the reduction in the number of real competitors, as well as downward pressures from efficiency gains from cooperation in carriers' operations. The final impact on airfares in a given market depends on the balance between upward and downward forces, which is conditioned by the competitive pressure from other airlines.
- Global airline alliances will still play a leading role in the future. In the advent of a common EU-US regulatory framework that allowed cabotage operations and cross-border mergers, we do not identify relevant revenue growth opportunities in the transatlantic market resulting from further consolidation. The stronger growth in other international and intercontinental flows and the persistence of regulatory barriers to foreign investors augur the reinforcement of global airline alliances as a strategy for the development of international networks of legacy carriers.
- The positive impact of global airline alliances is widely acknowledged. There is less agreement about the effects of granting allied carriers with antitrust immunity. From a consumer's perspective, airlines' consolidation entails a trade-off between the efficiency gains for airlines that could be translated into a cheaper and more coordinated service, and the reduction of competitors to just three independent servers and the potential monopolistic or oligopolistic practices that this could entail. A market-based system for slot distribution among airlines at congested airports that reduced barriers to entry for potential unaligned competitors could facilitate more competitive pressure on aligned airlines, especially at capacity constrained airports.

5.2 Future research directions

Although this thesis has provided a basis for understanding the use of GALs by airlines for developing code share agreements and, hence, expanding their network of destinations, we have not studied the effects of GALs on the annual revenue or net income of enrolled carriers. Further research should evaluate this impact in order to assess the economic value-added of strategic alliances in the airline industry. Oum et al. (2000) have estimated productivity and profitability for aligned airlines, although they only considered each code share agreement as a binomial variable that noted the major or minor extent of the agreement. The availability of data for the number of code sharing routes in each agreement—as shown in Chapter 3—and the ability to weight each route, according to estimations of demand or partner size, could help to introduce a more accurate characterization of each agreement to address this line of research.

Chapter 2 explored the potential benefits of alliances for airlines. The next step is to examine the operational challenges for airlines enrolled in global alliances. The adaptation of revenue management systems to collaborative agreements within global alliances is a field that researchers are actively studying, as pointed out by Jain (2011). The same author calls attention to different schemes of revenue sharing between alliance partners that could be analyzed for their possible future implementation. Another area to be studied is the co-adaptation of airports and global airline alliance operations. In fact, this latter relation is a key element for comprehending the functioning of global airline alliances in their provision of seamless connections to passengers. Furthermore, a deeper understanding of the role of airports in global airline alliances could provide relevant knowledge about the convenience of different systems of slot allocation that could contribute to a more competitive industry.

This thesis has presented some implications arising from the relation between the size of a GAL and the code share strategy of its members. However, we have not proved the existence of a causal relationship between GAL size and volume of code share agreements or network size. The general perception is that members benefit from a global alliance covering more international destinations, as this can provide a more complete and robust service to each airline's consumer base. At the same time, as the number of members increases, network overlapping is more likely to occur and some airlines might be exposed to limitations to growth. On the whole, finding the optimal size of each global airline alliance is a question of great interest that could, for example, be studied with a game theory approach in which the interests of the different actors involved in the alliance were

considered. Some relevant findings could arise with an impact on other multilateral strategic organizations as well.

Finally, any future significant deviation from the international regulatory framework presented in both Section 2.2 and Section 4.4 could have an important impact on the evolution of global airline alliances. In the same way that this work builds on the initial study of Fernandez de la Torre (1999) on airline alliances, which was written in a period in which multilateral strategic alliances were just beginning, prospective studies could explore the changes of alliances in a future environment. In all respects this thesis tries to provide a suitable framework for future research analyses of global airline alliances as a strategy for international network development.

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