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The Economic Impacts of Air Service Liberalization

Updating the Landmark 2006 Study to Reflect the New Realities of Commercial Passenger Aviation



PREPARED BY
InterVISTAS Consulting Inc.

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Executive Summary

Synopsis

This study updates our previous research on the economic benefits of air service liberalization.¹ Our point of reference is air traffic between pairs of nations (rather than traffic on specific routes) which we believe to be the most important reference point on issues of negotiating air access agreements. In brief, we find that liberalization of air services continues to provide substantial benefits in terms of increased air traffic and lower fares. The magnitude of the effect of liberalization is still in the range of our previous work – we statistically tested whether the impacts were reduced since the release of our 2006 report and found that this is not the case. The updated finding is that even with today’s lower real (inflation adjusted) air fares, driven by improved aircraft economics and economies of higher route traffic, liberalization of air service between two nations will typically increase traffic by roughly 16%. This result is consistent with the findings of a large number of peer reviewed studies by academics, governments and research institutes that almost overwhelmingly finds positive benefits of liberalization. If anything, our results are more conservative than many of the other studies. We also find that a substantial number of country pairs still have not liberalized air services between their nations, and some of these are among the largest air markets in the world. Thus there are substantial benefits yet to be gained. The effect of past, recent and potential liberalization is illustrated with a number of case studies. These include examples from both passenger and air cargo services. The latter underscores the importance that 5th and 7th freedom liberalization can have for development of cargo services and hence trade connectivity between nations.²

Motivation for This Study

In 2006, in a study sponsored by 11 industry stakeholders,³ we researched and reported on the economic benefits of air service liberalization. There we found:

“...liberalization of air services between countries generates significant additional opportunities for consumers, shippers, and the numerous direct and indirect entities and individuals affected by such liberalization. Conversely, it is also evident that restrictive bilateral air services agreements between countries stifle air travel, tourism and business, and, consequently, economic growth and job creation.”⁴

¹ This study updates the 2006 InterVISTAS study: “The Economic Impact of Air Services Liberalization”. This 2015 update was sponsored by Boeing, General Electric (GE), the Aerospace Industries Association (AIA), FedEx, the World Travel and Tourism Council (WTTC), the National Association of Manufacturers (NAM), and ACI EUROPE (Airports Council International).

² The freedoms of the air are described in **Appendix A**.

³ Boeing, Airports Council International-North America, Air Transport Action Group, European-American Business Council, General Electric, IATA, the Pacific Asia Travel Association, Pratt & Whitney, US-Asean Business Council, the U.S. Chamber of Commerce and the World Travel & Tourism Council.

⁴ InterVISTAS-ga2 Consulting, “The Economic Impact of Air Service Liberalization,” June 2006.

That study found that liberalizing 320 fully or partially restricted country pair markets via new air service agreements would generate significant increases in traffic and significant gains in employment. In an industry that drives roughly 100 million jobs globally, we found that liberalizing those 320 markets would increase jobs by several million. Subsequent to that study, Inter VISTAS worked with the International Air Transport Association (IATA) to further analyze the economic impact of commercial aviation.⁵ That study focused on the relationship between a country's connectivity to the global air transport network and its level of national productivity. These effects are sometimes referred to as "catalytic impacts" (sometimes known as "wider economic benefits").

Our 2006 report is now somewhat dated, so we re-examined the issues and updated the data. Our aim was to assess whether the benefits of liberalization are still present, or whether the benefits have been largely exhausted. We also wanted to expand the case studies of liberalization, including a case which illustrates the benefits of 5th and 7th freedom traffic rights used in air cargo. Fifth freedom services continue to have some use in passenger transport, especially in the ultra-long haul markets, but are of particular importance for air cargo services. Our report has four major sections.

Literature Review. There has been considerable work done by academic and other research institutions. Empirical academic research began in the early 1990s focusing on the initial liberalization benefits from the United States' open skies policy and some other reforms such as United Kingdom (UK) – Netherlands. This body of literature has grown, and since our last report we are seeing additional studies from academic researchers as well as from other research institutes and industry associations. The literature is also evolving to relate experiences in jurisdictions other than the U.S. and North Atlantic.

The literature review of empirical papers from the early 1990's to 2014 shows that liberalization of air services generates significant positive impacts on airfares and traffic growth and demonstrates the continuous benefit of air liberalization for consumers. Empirical studies show that airfares fell 10% to 40% while traffic increased between roughly 18% and 75%, depending on the period analyzed, the methodology used and the markets included in the analysis. The studies are almost uniform in showing the benefits of air service liberalization, with almost none of the peer reviewed empirical studies finding negative benefits.

The literature has also found considerable evidence of wider economic benefits from greater connectivity enabled by liberalization. In Asia, India, the European Union (EU) or the U.S., the liberalization of air service has increased production and employment in many sectors such as tourism, and has supported international trade as well as global economic growth. It also has an effect of facilitating higher national productivity.

Estimating Benefits of Recent Liberalization. The second aspect of our report is our updated empirical investigation of the benefits of liberalization. Like our previous study, we undertook an econometric analysis of traffic data. This is a well-established research methodology used by many airline industry researchers around the world. We use the International Civil Aviation Organization's (ICAO) database on bilateral air service agreements to identify which country pairs, among the top 1,000 country pairs in terms of passenger traffic, have liberalized air service relationships. We use both 2005 data (the year of

⁵ International Air Transport Association (2007), *Aviation Economic Benefits, IATA Economics Briefing NO. 8: Measuring the economic rate of return on investment in the aviation industry.*

the previous study) and 2012 data (complete 2013 data was not yet available for other metrics included in the analysis at the time we began our research in 2014). This allows us to test whether the magnitude of the effect of liberalization has changed. In particular, we tested whether it may have decreased, indicating whether the benefits of liberalization may have waned.

Using 2012 data, we find liberalization increases air traffic by an amount similar to the finding in our previous study. The 2012 effect was found to be 13%, but the small 4% reduction in impact is of extremely low statistical significance (the t-statistic is only 0.2). Because the magnitudes of the 2005 and 2012 regression estimates are similar and because there is no statistical significance to any difference between the years, we conclude that the evidence does not support a finding that the benefits of liberalization are now lower in any meaningful way. In addition to being consistent with our previous findings, our results are roughly within the range of findings from the literature review, where econometric findings of traffic benefits of liberalization were found to increase traffic in the range of 18% to 75%. In sum, our results show that liberalization continues to provide benefits to consumers as well as increased traffic compared with routes that are still not liberalized.

The Air Transport Action Group (ATAG) reports that in 2013, the world's airlines carried 3.1 billion passengers. If all markets were liberalized, it suggests that global air traffic would have increased by roughly a half billion passengers. Further, ATAG documents that 8.7 million people globally were employed directly in aviation. Full liberalization would thus have increased employment by roughly 1.4 million. Over roughly a 20 year period, approximately another 30 million person years of employment would have been added. But the employment benefits are not confined only to airline workers. ATAG found that 58 million people are employed in aviation and in aviation-dependent tourism. A 16% increase in traffic from liberalization would have an overall effect of 9 million jobs in aviation and aviation dependent tourism.

Case Studies. While econometric analysis is useful, our approach seeks validation of results by looking at case studies of specific markets. Case studies provide valuable insights to understand the effects of liberalization on the markets analyzed. Our 2006 study examined the liberalization record for:

- U.S. – UK
- Intra EU
- UAE – UK & Germany
- Trans-Tasman (Australia – New Zealand), and
- Malaysia – Thailand.

Those findings continue to be valid today. Here we have updated the Trans-Tasman and Malaysia – Thailand cases and we add additional case studies of more recent experiences:

- Association of Southeast Asian Nations (ASEAN) countries
- U.S. – Japan
- India's domestic market, and
- International air cargo.

The latter case is especially useful as it investigates the value of 5th and 7th freedom traffic rights for cargo, an often overlooked aspect of air access liberalization. Cargo is especially important in facilitating broader trade between nations.

- The ASEAN market is an example of progressive and successful liberalization. Since 2008, restrictions on third and fourth freedom operations between capital cities of member states have been removed and in 2011, full liberalization on fifth freedom traffic rights between all capital cities took effect. The ASEAN Single Aviation Market policy will supersede existing air service agreements among member states and will have synergies with other bilateral Open Skies agreements. Market data indicate a growth in origin-destination (O&D) passengers of 116% between 2005 and 2012.
- The 2010 U.S. – Japan open skies agreement effectively eliminated regulatory limits on flights (although there continue to be capacity, i.e., slot constraints at some airports). Despite the global financial crisis, between 2005 and 2012 carriers added 7 new non-stop routes and increased the overall number of total annual departures by 60 to support the growing demand. Additional traffic growth could have been possible but for capacity constraints at several intercontinental airports in Japan.
- Our case study for India involves liberalization of domestic air service in the most populous nation in the world. Since 2005, the first full year of scheduled low cost carrier service, domestic O&D traffic in the Indian market has grown by nearly 250%. Economy cabin fares decreased by nearly 45% although premium cabin fares have increased by over 70% (a result similar to findings in other liberalized markets where service frequency is valued by business travelers). Even though there has been consolidation and airline failures in the domestic Indian market, capacity and traffic continues to grow, albeit now at a slower rate. India is one of the least penetrated air markets in the world with only 0.04 trips per capita per year as compared to 2 trips per capita in the U.S. As the middle class in India continues to grow, demand for scheduled domestic and international service will also continue to grow.
- Finally, another example of international development due to air service liberalization is cargo air service, where carriers such as FedEx are increasing activities and establishments in various locations such as Paris, Shanghai and Dubai. Due to 5th and 7th freedom rights in various air service agreements, These carriers have been able to develop these cargo hubs serving all the major economic regions and to operate ultra-long haul high capacity freighters which would not have been possible only on a 3rd freedom basis. The use of 5th and 7th freedom rights has not only allowed cargo carriers to decrease the cost of their delivery but has also improved the supply chain performance of its shipper clients, facilitating global trade.

Estimating benefits of further liberalization. Our analysis indicates that 66% of country pairs still have at least one important restrictive clause in their bilateral agreements. Thus further air service liberalization is still important. Almost 80% of the country-pairs that are not fully liberalized have at least 3 restrictive clauses in their agreements. A major portion of these remaining clauses are Predetermined Capacity, Single Disapproval Pricing and Named Routes. The markets lacking a high degree of liberalization include some of the highest traffic markets in the world. While the U.S. has achieved a high degree of liberalization with its open skies policy, and several of the EU member states have similarly liberalized (including among themselves), the markets to/from/within East, Southeast and South Asia are not yet fully

liberalized. Further, those markets are now among the largest, and they are growing quickly. Based on the data in our study, we estimate that further liberalization of these markets would produce a benefit of **47 billion U.S. dollars per annum.**

Summary

Our overall assessment is that the results of our previous study of the benefits of air service liberalization are validated. Improved market access has increased traffic. Our findings are consistent with an ever growing literature on the benefits of air liberalization, a literature which almost uniformly finds benefits from liberalization. As we concluded in 2006, liberalizing bilateral air service agreements can generate significant gains worldwide.

1 Introduction

1.1 The Previous Study

In 2006, a study by InterVISTAS Consulting (InterVISTAS) on behalf of eleven industry stakeholders⁶ examined the economic benefits of liberalizing air transport throughout the world. The study concluded that:

“...liberalization of air services between countries generates significant additional opportunities for consumers, shippers, and the numerous direct and indirect entities and individuals affected by such liberalization. Conversely, it is also evident that restrictive bilateral air services agreements between countries stifle air travel, tourism and business, and, consequently, economic growth and job creation.”⁷

The study modeled 320 country pairs that did not have deregulated, liberalized air service agreements and found significant increases in passenger traffic and economic growth. InterVISTAS’ model showed that liberalizing air service agreements in those situations would create over 24 million person years of employment over 20 years, and \$490 billion in new gross domestic product (GDP) – roughly the size of the economy of Brazil.

Subsequent to that study, InterVISTAS worked with the International Air Transport Association (IATA) to further the analysis of the economic impact of commercial aviation.⁸ This study encompassed 48 countries – including both developed and developing economies – across a ten-year period, 1996 to 2005. InterVISTAS’ analysis focused on the relationship between a country’s connectivity to the global air transport network and its level of productivity. These effects are sometimes referred to as “catalytic impacts” (sometimes known as “wider economic benefits”).

The 2006 report is now dated, and its continuing value has been discounted by some observers. In light of significant developments in commercial aviation globally, a re-examination of the economic impact of liberalized air service would provide information useful to commercial aviation interests worldwide.

1.2 The Need for an Updated Study

In the past few years, support for air service liberalization has been waning, and academic opinion leaders and organizations such as the Organization for Economic Cooperation and Development (OECD), as well as some key government aviation officials are realizing that the debate on liberalization is not over.

⁶ Boeing, Airports Council International-North America, Air Transport Action Group, European-American Business Council, General Electric, IATA, the Pacific Asia Travel Association, Pratt & Whitney, US-ASEAN Business Council, the U.S. Chamber of Commerce, and the World Travel & Tourism Council.

⁷ InterVISTAS-ga2 Consulting, “The Economic Impact of Air Service Liberalization,” June 2006.

⁸ International Air Transport Association (2007), *Aviation Economic Benefits, IATA Economics Briefing NO. 8: Measuring the economic rate of return on investment in the aviation industry.*

As the debate renews and intensifies, one criticism is that the past evidence supporting liberalization is stale. Some claim the benefits of liberalization may have been exhausted or become negative. If so, there would be no need to pursue further liberalization, and potentially some market access freedoms should be reversed. Thus, updated evidence is needed on whether air access liberalization continues to produce benefits for passengers, cargo shippers and aviation dependent sectors of the economy.

1.3 Key Objectives of the Study

This study was undertaken to update and validate the results of the 2006 study. The primary objective of this report is to analyze and present the more recent impacts of air liberalization on traffic. It provides an analysis of the economic impacts of the recent developments in air service regulation. The study undertakes a combination of empirical and academic work to demonstrate the economic benefit of air service liberalization.

1.4 Report Outline

The report is divided into six sections:

Section 1 provides the contextual information and presents the key objectives of the report.

Section 2 reviews the academic and government literature and provides an overview of the impacts of air service liberalization on airfares and traffic in various regions. The literature review encompasses the period from the early 1990s to 2012 to illustrate the impact of air liberalization for consumers. The literature review also provides a focus on the wider economic benefits enabled by air service liberalization.

Section 3 describes the methodology used for the econometric analysis and shows the impacts of air service liberalization on traffic and fares. A comparison of the current and previous results is also discussed.

Section 4 illustrates the positive impacts of air service liberalization through five case studies. The case study areas are Malaysia – Thailand, Trans-Tasman, ASEAN, India and U.S. – Japan. Each case study covers a specific bilateral or multilateral agreement and illustrates the impacts on traffic and airfares.

Section 5 discusses the expected benefit of further liberalization. In particular, the section identifies the progress still needed for further liberalization.

Section 6 finally provides concluding comments on the economic impacts of air service liberalization.

2 Literature Review

2.1 Introduction

In the late 1970s, the U.S. began the process of deregulating its domestic commercial aviation industry by diminishing government control over fares, routes, and market entry. Following the success of this experiment, many countries deregulated their domestic airline markets; however, liberalization of international airline markets has been slower to progress.

In general, bilateral air service agreements have provided the framework under which fares and service frequency between two countries are determined. The first development of air service agreements appeared at the end of World War II during the Chicago Convention in 1944. Bilateral agreements define the conditions and privileges of airlines of both countries and cover items such as: traffic rights, authorized points, capacity, pricing, and designation. (See **Appendix B** for a description of these elements.) For a long period, bilateral agreements were the primary instrument for liberalizing international air transport services.

An important development in the liberalization of air transport services was the emergence and subsequent expansion of “open skies” bilateral agreements. The purpose of open skies agreements is to eliminate governmental restrictions regarding international route rights, the number of designated airlines, capacity, frequencies, and types of aircraft that could be operated on specific routes. In 1992, the first open skies agreement was signed between the U.S. and the Netherlands. Since then, over 160 open skies agreements have been established. Still, all but a few countries prohibit foreign competition in their domestic markets by banning both the operation of foreign carriers between domestic points and cross-border ownership of national airlines.

A vast body of literature has explored the impacts of international air service liberalization. This literature has yielded important insights on how the progressive deregulation of airline operations has fostered the industry’s development. By removing government regulatory impediments, airlines have been better able to compete with each other, leading to efficiency improvements and price reductions. These improvements have generated positive impacts on the entire economy.

An overwhelming majority of the peer-reviewed research shows that liberalization confers a significant range of benefits to users (passengers, shippers, aviation dependent industries), including lower fares, higher traffic, and “wider economic benefits”. Liberalization has tended to generate an initial jump in benefits that subsequently moderates after the market is allowed to adjust to a more unconstrained basis. Further, liberalization has generated different levels of benefits depending on whether the bilateral agreements covered developed versus developing economies. Where bilateral agreements liberalized air service, fares tended to drop between 10% and 40%, depending on the methodology used for the estimate and the time period studied. Passenger traffic levels in liberalized country pairs increased between 18% and 78% compared to country pairs that remain under restrictive agreements.

Only a few papers estimated limited or a complete lack of benefits from liberalization. While there are some theoretical studies that suggest liberalization could have detrimental effects, there are no empirical studies that establish negative impacts.

This section summarizes much of the peer-reviewed literature that has been published over the past 20 years. Citations for the summarized studies are shown in **Appendix C**.

2.2 Airfares

The most expected impact of the air service liberalization was the reduction of fares. As observed in other industries (electricity, telecommunications, rail), the removal of regulatory restrictions in the air service industry was expected to reduce prices to consumers through increased competitive pressure in the market. Early studies on air service liberalization found substantial impacts on pricing and benefits to consumers.

2.2.1 Early Studies on North American Routes

In one of the first empirical studies on liberalization, Dresner and Tretheway found that increased competition brought about via liberalization significantly reduced some airfares. The authors employed a two stage least square model to estimate the effects of liberal bilateral air policies on airfares in North America. The study used panel data on 51 non-directional, long distance North Atlantic routes for the years 1976 to 1981. This data was selected to reveal the effect of U.S. deregulation on prices on international air routes. By comparing regulated and liberalized routes, they found that the pro-competitive air transport policy of the U.S. had a significant effect, reducing discount air fares by up to 35% on competitive routes. The authors estimated that welfare gains accruing to North Atlantic passengers may have totaled \$325 million in 1981 alone, representing a gain of \$45 per passenger. However, the study found no evident effect on the “full fare,” which was equated to those purchased by business and other non-discretionary travelers.

In 1993, Maillebiau and Hansen conducted a similar study on the impact on demand and consumer welfare arising from bilateral liberalization in North Atlantic routes for the years 1969 to 1989. The scope of the research was limited to five European countries (the U.K., France, West Germany, the Netherlands, and Italy). The authors developed a log-linear yield model to assess the impact of bilateral liberalization on fares. They found that liberal bilateral agreements resulted in fare reductions of approximately 40 percent. In addition, liberalization of a bilateral with one country produced impacts on neighboring countries with restrictive bilateral agreements, suggesting that the threat of traffic diversion affected regulatory policy. The study showed that liberalization produced consumer welfare increases of \$3 billion to \$5 billion, or \$400 to \$600 per traveler.

2.2.2 Impact of Liberalization on Other Countries

After two decades of progressive liberalization around the world, it was possible to expand the field of research by analyzing broader geographic regions.

In 2001, Gonenc and Nicoletti analyzed the effect of liberalization on OECD countries. The authors analyzed the implications of airline competition on airfares offered on 100 major international routes between 27 OECD countries for the period 1996 to 1997. The model took into account market concentration, the market structure of the international aviation industry, the market share of state-owned airlines, population size, airport conditions and the purchasing power parity of currencies. The study

found that on liberalized northern European routes, business fares were between 20% and 40% lower than the OECD average. Where routes were restricted by existing air service agreements (ASAs), government control of route carriers and infrastructure (i.e., slot or access) problems, fares were more than 20% higher on some Atlantic and Europe-Asia routes than their predicted level.

Doove et al. built on previous work by Gonenc and Nicoletti and examined the impact of bilateral restrictions on airfares in 35 OECD and non-OECD economies. The authors found that regulations such as designation, capacity constraints, price controls and restrictions on charter services, collectively supported international airfares between 3% and 22% higher than an estimated benchmark price on more competitive, liberalized routes. In the Asia-Pacific region, airfares were 12% to 22% higher, reflecting more restrictive systems of air passenger transport regulations. Fares in the Americas (the United States, Canada, Argentina, Brazil, Chile, Mexico and Uruguay) were between 9% and 18% higher. In Europe, the authors estimated price effects between 3% and 10% above the estimated competitive fares.

In 2002, Schipper et al. investigated the welfare effects associated with bilateral air liberalization on European interstate routes. They estimated the impacts on fares and traffic on a sample of 34 routes with varying degrees of liberalization for the period 1998 to 1992. The authors found that standard economy fares on fully liberalized routes were, on average, 34% lower than on routes without such liberalization. For the markets studied, consumer welfare was estimated to have increased by €666 million or €346 per passenger.

While initial studies focused largely on the impacts of liberalization on markets to/from the U.S., and to some extent the EU, only a few empirical studies have analyzed the impacts of liberalization on airfares in other parts of the world, such as emerging markets. In 2007, Manuela analyzed the impact of liberalization on airfares on the Philippine airline industry between 1981 and 2003. Manuela found that airfares per kilometer were 10% lower, on average, on routes with at least two airlines after liberalization. More than 90% of Philippine domestic passengers in 2003 traveled on those competitive routes, implying that most passengers benefited from lower fares as a result of competition.

In 2012, Cristea et al. empirically examined the impacts of liberalizing air services on international passenger traffic and prices. Based on T-100 international segment data for the period 1993 to 2008, the authors measured the changes to passenger traffic levels, prices and route offerings (the number of international routes available, which would not be restricted once an open sky agreement is signed) for country pairs, before and after an open skies agreement (OSA) was signed. The study found that OSAs are associated with a decrease in average fares and an increase in international passenger traffic; the increase in international passenger traffic is contingent on the prices on the route though, as it was found that for gateway to gateway routes, prices can increase due to carriers exiting the market. OSAs also encourage air service quality improvements, such as more frequent departures and more flexibility in scheduling. Combining the price, quality, and net route effects, the authors estimated that there was a 31% reduction in prices for liberalized markets relative to those who remain regulated.

Winston and Yan developed an empirical model of international airline competition to estimate the impact of open skies agreements, based on sample of the top 500 non-directional international routes from 2005 to 2009. The authors distinguished between short-run effects and long-run effects. The findings indicated that the short-run effect of an open skies agreement led to a reduction of 50% on fares in the full sample and approximately 25% in the subsample of U.S. international routes. They attributed the smaller effect on the U.S. routes to the pre-existing deregulation on U.S. international routes compared with other

countries. Winston and Yan estimated that the long-run effect of liberalization represented reduced fares of approximately 15% to 30% in the full sample and 20% or more in the subsample of U.S. international routes. The study estimated that open skies agreements generated at least \$4 billion in annual gains to travelers and that travelers would gain an additional \$4 billion if the U.S. negotiated agreements with other countries that have a significant amount of international passenger traffic.

2.2.3 Air Cargo

Most of the empirical research has focused on passenger's airfares as it was the primary focus of deregulation. However, there is also a small body of literature that has analyzed the benefit of liberalization on air cargo. Air cargo is a critically important aspect of globalized economies. It represents an estimated 1% of the volume (tonnage) shipped but 35% of the value.

Using data on air transport costs from the U.S. Imports of Merchandise Database for the period 1990 to 2003, Micco and Serebrisky developed an empirical model to estimate air transport costs using variables such as country of origin, point of entry into the U.S., product types and weights. They found that open skies agreements reduced air transport costs by 9% and increased the share of imports arriving by air by 7 percent. However, they also found that these results held for developed and upper-middle-income developing countries, but not for lower-middle-income and low-income developing countries, which did not see a reduction in air transport costs. For developing countries, air transport costs were not found to decrease from Open Skies Agreements until at least five years had passed since the agreement was signed; an initial decrease in cost was found in the year of signing, but this was not statistically significant. Years 1-4 were found to have positive but small effects on cost, though these results were not statistically significant.

While the existing findings are positive, the body of literature on air cargo is not expansive enough to draw broad conclusions on the impacts of liberalization. This is, in part, because air cargo data on traffic and rates are not publicly available on a route-by-route or country-pair basis.

2.3 Traffic Stimulation

Consistent with the fare reducing effects, the literature tends to uniformly demonstrate that air service liberalization has a positive impact on stimulating passenger traffic. There are differences in the extent to which travel may be stimulated, depending on a number of factors, such as geographical location, existing traffic, market structure or the use of different methodologies (e.g., different estimation techniques and the use of cross-sectional or time series data). The time series studies tend to focus on increased rate of traffic growth, while cross-sectional studies focus on snapshots of differences between liberalized and non-liberalized routes. In any event, studies found an increase in traffic in each market analyzed.

2.3.1 Impact of Liberalization on U.S. and EU Routes

In 1992, Dresner and Windle examined the impact of the U.S bilateral policy on passenger travel. Using data from the U.S. DOT on air passenger travel between the U.S. and foreign countries with at least 100,000 passengers in 1989, as well as data on bilateral agreements, they found that country pairs characterized by more liberal air service agreements (with liberal pricing and capacity clauses) experienced 46% higher passenger levels than did those with non-liberal agreements.

In Maillebiau and Hansen's 1995 study, the authors evaluated markets between the U.S. and five European countries (the UK, France, West Germany, Netherlands, and Italy) for the years 1969 to 1989. Their findings indicated that traffic between the U.S. and the five European countries increased by 56% as a result of liberalization.

In 2002, Schipper et al. estimated that in country pairs that are fully liberalized, airlines operated 36% more frequencies for the period 1988 to 1992. The results indicate that an increase in passenger numbers did not lead to an increase in departures in the same proportion. These results suggested that the increase in frequency could be accommodated by an increase in load factor (if aircraft size is constant).

In 2007, Booz Allen Hamilton assessed the potential economic impacts of an open aviation area between the EU and the U.S. Their study showed that removing restrictions on international air services across the North Atlantic would lead to an increase of 26 million passengers over five years, equivalent to 34% more than without liberalization.

2.3.2 Impact of Liberalization on Other International Routes

In 2008, Piermartini and Rousova assessed the impacts of air transport liberalization on passenger flows. Based on a sample of scheduled international passenger traffic across 184 countries (approximately 80% of global international passenger traffic) in 2005, the authors found a significant positive correlation between the degree of liberalization and the volume of passenger traffic. In particular, agreements that removed pricing and capacity restrictions, granted cabotage rights, and/or included the possibility for foreign carriers to operate air services had the strongest impact on traffic volumes. They estimated that passenger traffic among countries with the most liberal agreement was over 78% higher than among countries with the most restrictive type of regulation.

Warnock-Smith and Morell estimated how traffic growth in tourism-dependent economies in Caribbean member states would be affected by air transport liberalization. Their study assessed the relationship between air traffic growth and air policy reform using data on three U.S-Northern Caribbean country pairs from 2005-2006. The authors' regression analysis revealed a significant positive correlation between air policy reform and traffic growth; thus, a more liberalized air policy reform would lead to an increase in air passenger traffic.

In 2012, Cristea, Hummels and Roberson found that passenger traffic in countries that had signed open skies agreements rose 18% more than in non-liberalized countries after five years. The authors also found that the introduction of new routes accounts for over one-third of the increased traffic growth in Open Skies Agreement signatory countries.

In 2013, Piermartini and Rousova expanded on their earlier work on passenger flows and focused on four aspects of liberalization: (1) multiple designation provisions; (2) free determination of capacity; (3) free pricing and community of interest; and (4) cabotage. They estimated that worldwide adoption of free determination of capacity and free pricing would lead to a 5% and 9% increase in traffic volumes, respectively. Granting cabotage rights to all country pairs was estimated to increase passenger traffic by 10 percent.

2.4 Economic Growth and Wider Economic Benefits

Beyond the impact on prices and traffic volumes, recent literature has provided a greater degree of understanding on the broader economic effects of air service liberalization. Economic impact analysis has been widely used to evaluate the direct, indirect, and catalytic effects of the aviation sector on employment and output. A number of studies have also investigated the link between air service liberalization and trade. Overall, the literature suggests that air service liberalization drives employment in aviation and related industries, facilitates access to international markets, allows firms to develop competitive advantages, and encourages firms to invest in foreign countries.

2.4.1 Output and Employment Effects

A number of studies have empirically investigated the link between air service liberalization and economic output and employment. In 2002, the Brattle Group examined the potential economic impact from establishing an Open Aviation Area between the EU and the U.S. The study estimated that the direct employment increase attributable to improved pricing synergies and the elimination of output-restricting bilateral agreements would range from 2,800 to 9,000 employees in the EU aviation industry and 2,000 to 7,300 additional employees in the U.S. aviation industry. The examination suggests that an Open Aviation Area would benefit a large number of other industries in the EU and U.S. as well. The authors found that increased airline revenue from liberalization would lead to additional economic output in “directly related” industries ranging from €3.6 billion to €8.1 billion a year. Still, this figure excludes any of the potential impact on industries such as tourism and leisure that would be among the most significant beneficiaries of aviation liberalization.

In 2007, a report from Booz Allen Hamilton showed that removing restrictions on international air services across the North Atlantic would lead to an increase of 26 million passengers over five years, equivalent to 34% more than without liberalization. Consequently, liberalization of air services between the EU and the U.S. would create an additional 72,000 jobs across the EU and U.S. needed to service the additional demand. Likewise, the report estimated that air cargo traffic would also increase by 100,000 to 170,000 tons, creating an additional 5,000 to 9,000 new jobs. Improved airline cooperation is estimated to result in €160 to €340 million per year in consumer benefits, and added pressure on airline costs is expected to generate as much as €3.8 billion in consumer surplus in any one year.

Although the literature has traditionally focused on transatlantic service between the EU and the U.S., additional research on liberalization has developed from the emergence of the principal Gulf carriers, Emirates, Etihad, and Qatar. In 2006, InterVISTAS analyzed the impact of air liberalization between Germany and the United Arab Emirates. The study concluded that traffic was 19.7% higher than it would

have been without liberalization. The increased traffic also generated additional benefits for the UAE (the equivalent of 745 new full-time positions), with a \$15 million increase in GDP. In Germany, 2,600 new full-time positions were created, accompanied by \$152 million growth in GDP. Similar results were found when analyzing liberalization between the UK and the UAE. Traffic grew by 54 percent, generating over 5,300 full-time positions in the UAE and an increase in GDP of over \$110 million. In the UK, the additional traffic supported over 18,700 full-time positions along with \$1 billion in additional GDP.

In Asia, air service development also provides important wider economic benefits. In 2013, the Civil Aviation Authority of Singapore (CAAS) presented the benefits of air service liberalization to the Singapore economy during an ICAO conference. The study showed that passenger traffic recorded double-digit growth over the three previous years. This growth was mainly driven by low cost carriers (LCCs) in the region enabled by air service liberalization. The study also showed that air transport contributed nearly S\$20 billion to the Singapore economy in 2011 (6% of Singapore GDP) and generated about 163,000 jobs. The study also estimated the wider economic benefits and found that air transport further enabled an additional S\$43 billion due to tourism, trade and investment and facilitated the creation of an additional 484,000 jobs for the Singapore economy.

In 2012, DLR also examined the effects of Emirates on the German economy. The study examined potential employment effects associated with providing air transport services and purchasing aircraft, engines, spare parts and maintenance services. DLR estimated that the total impact (direct, indirect, induced, and catalytic) from service by Emirates was approximately 12,500 new German jobs in 2010 to 2011. In addition, Emirates generated around 485,000 overnight stays by tourists in 2010. Tourists traveling on Emirates to Germany spent €76 million, creating 2,600 German jobs (direct, indirect, and induced).

Similarly, in the same year, the National Council of Applied Economic Research (NCAER) assessed the economic impact and regional benefits of Emirates' operation in India. The study estimated that Emirates' operation in India directly contributed US\$274 million to the air transport sector in 2010 to 2011 – equivalent to 0.32% of India's transport GDP for the year. This direct contribution, in turn, generated a total economic output of US\$596 million. Emirates' operation in India supported over 72,000 jobs through its demand for services required for its operation and through the multiplier effect on other sectors. The study also estimated that the foreign exchange earnings from tourists flying through Emirates were US\$1.15 billion in 2009.

Research on other developing regions shows similar benefits. In 2014, IATA commissioned InterVISTAS to undertake a study of the impacts of liberalizing intra-African air markets. The study focused on 12 countries and involved modeling the transmission mechanisms by which liberalization leads to greater air connectivity. The findings indicate that liberalization will stimulate tourism between the countries, generating an estimated \$1.3 billion in additional tourism spending. Trade, investment, and other economic benefits stemming from increased aviation activity are also expected to generate considerable employment and economic output. Liberalization between the 12 countries studied is estimated to generate 155,100 jobs in aviation, tourism, and the wider economy and contribute \$1.3 billion to annual GDP (about 0.07% of the GDP of the 12 countries).

2.4.2 Trade and Investment

The literature also indicates that air service liberalization can be an important catalyst for international trade and investment. In 2008, Geloso Grosso investigated the link between a more liberal air cargo regime and increased bilateral merchandise trade in the Asia Pacific region. The author found that more liberal air service policies are positively, significantly and robustly associated with higher bilateral merchandise trade. This impact is greater for country pairs that have a direct air transport link, but is also significant for country pairs that rely on transit through third countries. In addition, a strong relationship is found between bilateral liberalization and trade in manufactured goods, time sensitive products, and parts and components.

Similarly, in 2009, Achard tested the assumption that more liberal air service agreements were associated with higher trade flows, all else being equal. The model used data collected by the International Air Transport Association (IATA) of the top 100 routes between 2002 and 2007 to assess the correlation between the degree of liberalization and the volume of air cargo. The study found that there is a significant positive correlation between more liberal ASAs and trade flows.

2.5 Limited Impacts of Air Service Liberalization

A portion of the literature argues that air service liberalization could have limited or negative economic impacts on air service and fares. However, a number of these studies do not develop empirical models and/or econometric procedures to quantify those negative impacts.

In 1994, Savage et al. examined the gains in cost efficiency and improvements in service quality that would be caused by introducing greater competition in Australia's international air transport markets. The study used a theoretical perfect competition model to evaluate net changes in Australia's economic welfare from modifications to air services agreements. The authors found that profits for the tourism industry and gains to Australian travelers may not fully offset losses to Australia's airlines. The author concluded that it is only in Australia's interests to liberalize an air service agreement if the proportion of business traffic on the route is less than 30 percent. However, these findings are speculative and were not based on observed data or empirical analysis.

In 2012, Forsyth evaluated whether Germany would gain or lose from allowing airlines of the United Arab Emirates, specifically Emirates Airlines, to fly to Berlin. The study used a cost benefit framework to assess the liberalization proposal. Forsyth argued that there were two potential negative effects of liberalization. First, increased outbound tourism may offset the benefit of increased inbound tourism on a country's economy. Second, greater competition on international routes may erode market shares and profit from incumbent airlines. The erosion of profits, in turn, could have a negative impact on industry employment in the home country. Here again, the findings were theoretical not demonstrated with actual data.

In 2014, Dresner et al. investigated the effects of Gulf carrier competition on U.S. carriers' passenger volumes and fares in international route markets. The study estimated impacts on fares and number of passengers. The findings indicated that greater competition by Gulf carriers in U.S. international markets is associated with small fare reductions for U.S. carriers in route markets connecting the U.S. with Africa, Asia, Australia, and Europe. In particular, the authors found that a 1% growth in total Gulf carrier traffic to

or from the U.S. was associated with less than 0.1% decrease in airfares. While this is still a desirable outcome for consumers, the magnitude of change is smaller relative to other research in this area.

2.6 Concluding Remarks on the Literature Review

The research on airfares and traffic flows shows that liberalization of air services generates significant additional opportunities for air transport users. Subsequent to liberalization, studies shows that airfares fall 10% to 40% while traffic increases as much as 75%. Removing restrictions on pricing and capacity appear to have the most sizeable effects. Allowing for foreign competition on domestic point-to-point routes (cabotage) is expected to confer significant consumer benefits, although it may have a negative impact on producer surplus. The literature does not reconcile the difference in magnitudes across studies. However, examining the methodologies used by these studies, we infer that as time progressed, liberalization had the general effect of lowering of fares and growing traffic in all markets (non-liberalized markets have to compete with liberalized destinations). As a result, while liberalization still has the effect of reducing fares and increasing traffic, the difference between liberalized and non-liberalized markets is now smaller, although still meaningful and significant.

The literature review also shows considerable evidence of wider economic benefits provided by air service liberalization. Those wider economic benefits (sometimes called catalytic impacts) are driven by the increased connectivity enabled by further liberalization. In Asia, India, the EU and the U.S., the liberalization of air service has increased production and benefits in other sectors such as tourism, international trade, and overall economic growth. The literature also shows that the emergence of the Gulf carriers has stimulated traffic and generated consumer benefits in the regional markets they serve. Finally, few papers have identified limited impacts. One example often cited is that the outbound tourism may offset the benefit of increased inbound tourism. However, the impacts advanced in these papers are based on theoretical rather than empirical analysis.

3 Assessing the Economic Impacts of Air Service Liberalization

3.1 Introduction

The literature review has demonstrated that liberalization continues to create consumer benefits not only in liberalized markets but also in non-liberalized markets. Differences between liberalized and non-liberalized markets are smaller but still significant. This section presents the empirical analysis used to demonstrate that liberalization continues to create positive impacts for consumers. First, it provides a description of our econometric model. This model has been designed to identify the effects of liberalization and can be estimated by Ordinary Least Squares (OLS) regression analysis. Then we present the dataset used to analyze the effects of liberalization. This dataset contains all information on existing restrictions on bilateral agreements of the top 1,000 international country pairs. Two periods of time, 2005 and 2012, have been selected to identify the continuous impact of liberalization. Economic variables such as population and GDP have been added to this dataset to increase the predictive power of our model. Finally, the results are discussed.

3.2 Econometric Model

The econometric model chosen for this empirical analysis expresses the air traffic between any particular country-pair as dependent on geographical, socioeconomic and regulatory variables.⁹

Based on the review of the literature as well as our past work, key variables to include in the analysis are Gross Domestic Product (GDP) and Distance. As well, we introduce an indicator variable to detect the presence of a liberalized air services agreement (ASA). Our experience also suggests that there are other factors that affect traffic on nation pairs, and that these tend to differ between regions. Thus we include a set of regional indicator variables (dummy variables).

Mathematically our model is specified as follows:

$$\ln(\text{Traffic}) = \text{Constant} + \beta_1 \ln(\text{GDP Product}) + \beta_2 \ln(\text{Distance}) + \beta \cdot \text{Bilateral Indicators} + \beta_K \cdot \text{Region Indicators} + \beta_{K+1} \ln(\text{Var}_{K+1})$$

Where:

- *Traffic* is the dependent variable,
- *GDP Product* is the product of the two separate country GDPs,

⁹ The model we estimate is what econometricians refer to as a reduced form model. It is built from separate equations for supply and demand but solves for the traffic variable to eliminate the challenges of simultaneous equations.

- *Distance* is the total distance in kilometers between the two countries based on their coordinates,
- *Bilateral Indicators* are the indicator variables for the various forms of regulation,
- *Region Indicators* are the indicator variables for the other factors that affect traffic for a given nation pair,
- Var_{K+1} are other quantifiable explanatory variables that affect traffic levels.
- $\ln()$ refers to the variables inside of the parentheses transformed by the natural logarithm.

This model is what economists refer to as a reduced form model of market quantity (traffic). As such, it can be estimated by Ordinary Least Squares (OLS) regression analysis.

As is common with models using cross sectional data, there is heteroskedasticity in the residuals from the model. This does not bias the coefficient estimates but does result in higher standard errors of the regression coefficient estimates. We investigated correcting for heteroskedasticity by using a weighted least squares method, but this did not improve results so we utilized our simpler OLS results.

The model above can be estimated separately for each of the two years of data we have, or it can be used for a data set which uses (pools) the data for the two years. For the pooled model we also introduced an indicator for 2012. This time shift variable controls for other factors that cause traffic in the later year to be higher.

3.3 Description and Sources of Data

3.3.1 Country Pair Data

Our analysis uses data on traffic between country pairs. Some studies use data on individual city pairs but such an approach could overestimate liberalization benefits by focusing only on the routes that are actually operated nonstop and which may carry substantial connecting traffic to other markets. Using country pair data we are able to focus on the travel between two nations, including travel on thinner routes that may require one or stops or connections. It is our view that when analyzing the impact of bilateral air policy, country pair data is especially insightful and relevant as it directly addresses the issues and objectives of the air service agreement negotiators.

3.3.2 Endogenous Variable: Traffic

The regression analysis looked to analyze the impact of liberalization on passenger traffic. We measure passenger traffic as origin-destination traffic. This will include passengers flying on nonstop services as well as passenger flying on indirect services that make a connection.

The passenger traffic data was sourced from an independent commercial third party provider of fare and traffic data for individual airline routes. The data is widely utilized in the industry, both for scientific and market research and is used by governments, academics, airports and airlines. The data, which encompassed most international origin-destinations, covered the periods of 2005 and 2012.

The top 1,000 country pairs were used (based on traffic levels). The top 1,000 list did change between 2005 and 2012, and for our analysis, only country pairs appearing in both years were included.

Additionally, observations were removed from the analysis where the country pairs were considered domestic routes.¹⁰ As well, data points were removed where bilateral data was not available.

3.3.3 Bilateral and Socio-Economic Variables

Bilateral Indicators

Using the ICAO World Air Service Agreements (WASA) Web Database, information on specific aspects of bilateral agreements was collected for the various country-pairs, where available.¹¹ The bilateral variables have been coded so that a '1' indicates restriction. Information was gathered for the following:

- **Airline Designations:** this variable indicates the number of airlines permitted to fly between a given country-pair. Restrictive bilateral agreements will limit the number of airlines to one per country, in many cases, based on approval as well. The indicator variable was set to '1' when the bilateral included only single airline designations for the given country-pair, and '0' otherwise.
- **Capacity:** two variables were created to indicate the whether or not restrictions on capacity were included in the bilateral agreement. Restrictions on capacity include the number of seats and frequency of flights between the two countries.
 - The first variable indicated whether or not the bilateral was restrictive for capacity within the country-pair, via a predetermined capacity clause; the variable was coded '1' if the capacity within the country-pair was pre-determined (the most restrictive form) and '0' otherwise.
 - The second variable indicated whether or not the capacity was the "Bermuda" type, which is less restrictive than pre-determined capacity; Bermuda capacities are subject to a regular process of consultation. The variable was coded '1' if the bilateral contained a "Bermuda capacity" type of restriction and '0' otherwise.
- **Pricing:** this variable indicates whether or not the pricing clause of a given bilateral is restrictive. The variable is coded '0' for a double disapproval pricing clause (the non-restrictive clause) and '1' for other more restrictive forms of pricing.
- **Route Designations:** this variable indicates whether or not there are restrictions on the routes allowed between the two countries. Specifically, whether or not the destination points are named. The variable is coded '1' when the points allowed within the countries are named and '0' otherwise.

¹⁰ The country pairs were removed as they can be classified as domestic routes (and as such, there will be no bilateral necessary for traffic between the two countries). Examples are the France to overseas regions country pairs and the United States to its territories (e.g., Guam).

¹¹ Additional research was also needed to fill in gaps for many of the "open skies" agreements, particularly for Canada, the United States and the European Union. This information was gathered from the various government websites.

- Fifth Freedoms: this variable indicates whether or not fifth freedom rights are granted in the bilateral agreement.¹² The variable is coded '1' if fifth freedom rights are not granted and '0' otherwise.

In addition, an indicator variable was created to assess the fully restrictive bilateral agreements contained in the dataset. The variable was coded '1' when a given observation was fully restrictive in the five different areas (pricing, capacity, airline designation, route designation and fifth freedom allowance).

Socio-Economic and Other Variables

Traffic and fares are also affected by various socio-economic factors. The following variables were tested in the regression analysis:

- Gross Domestic Product (GDP): GDP is included in the final model specification, as it has a significant impact on traffic levels. The GDP variable included was calculated as the product of the two GDP's for a given country-pair; it is measured in billions of current U.S. dollars. The GDP data was sourced from the World Bank, through its statistics database. Where data was missing from the World Bank, additional data was pulled from IMF statistics database.
- Population: Population was tested as a possible explanatory variable but not included in the final model. The underlying data is the annual population for a given country, which was sourced from the World Bank database. The square root of the product of the populations for a given country pair was then taken; this represents the geometric average population for the country-pair.
- Trade Flows: A variable estimating trade flows was tested as a possible explanatory variable but not included in the final model. This variable measures the relationship between each country's services trade with all countries to define a country-pair propensity. The trade flow term for a given country pair was calculated, using export and import data sourced from the World Bank, as:

$$\begin{aligned} & \text{Exports of Services by Country A} * \text{Imports of Services by Country B} \\ & + \\ & \text{Exports of Services by Country B} * \text{Imports of Services by Country A} \end{aligned}$$

Geographic variables were also tested:

- Distance: this variable measured the distance between the countries in each given pair, measured in kilometers.
- Country-Pair Regions: This indicator variable was created to account for differences in flows between continent regions. A variable was created for each of the intra- and inter- flows (i.e., if the country pair was the United States and Canada, the indicator for Intra-North America would be coded '1'). The regions included were the following continental areas: North America, South America, Europe, Africa, Latin America (including Mexico), CIS countries, Asia and Oceania.

¹² Fifth freedom traffic rights allow the airline of one country to carry traffic from its home base to the other country; the carrier is then allowed to drop off and pick up traffic destined for a third country. This is sometimes known as beyond rights.

There were other variations on variables that were tested, but ultimately were not included in the final model, including different forms of measuring GDP.

Total data points

Although the initial dataset began as the top 1,000 routes for each of two years (2,000 observations), once observations were removed for missing data (bilateral and socio-economic) as well as the previously mentioned dual-year and non-domestic routes, a total of 1,344 observations were included in the pooled dataset.

3.4 Results

Table 3-1 presents the results of the regression analysis, including the coefficient, standard error and t-statistic estimates. These results are based on 1,344 observations.

Table 3-1:
Regression Results
Pooled 2005, 2012 Country Pair Airline Traffic

Variable	Coefficient Estimate	Standard Error	T-Statistic
Constant	4.52	0.05	9.03
GDP Product	0.38	0.01	29.39
Distance	-0.51	0.03	-14.88
2012 Indicator	0.09	0.04	1.93
Fully Restrictive ASA Indicator	-0.16	0.10	-1.61
Regional Indicators (20 indicators)	Results in Appendix	Result in Appendix	Results in Appendix

R-square: 0.50; Adjusted R-square: 0.50

The R-square values indicated a generally reasonable model 'fit' for cross section data. The coefficient estimates had the expected signs.

The key variable of interest is that for the fully restrictive ASA indicator. Because the model is in natural logarithms, the coefficient can be interpreted as the percentage effect of liberalization on traffic. The results indicate that liberalization increases air traffic between nations by 16%.¹³ This is almost identical to

¹³ The p-value for the variable is 10.8, or roughly a 90% confidence level (10% significance level).

our findings in our 2006 study. Our finding is at the lower end of the range of empirical studies in our literature review and thus is a conservative finding. One reason for this is that our data is nation pairs, rather than specific routes. A finding of liberalization having a higher percentage impact on particular major nonstop routes where new service was launched is tempered somewhat by lower traffic routes on smaller origin-destination pairs.

In our earlier work we separately estimated the effects of different bilateral clauses on traffic. We did similar analysis in our updated research, but found that the individual effects, while often of similar magnitude to our previous study, were of marginal statistical significance. We are thus unwilling to claim with a high degree of confidence that we have uniquely identified the exact numerical effect of each clause in a bilateral air services agreement.¹⁴ As well, in recent years there is greater standardization of the package of liberalization clauses, so we focused on the findings of the collective effect of air service liberalization.

3.5 Has the Liberalization Effect Changed?

We also estimated a model where the liberalization effect was allowed to be different in each of 2005 and 2012. **Table 3-2** presents the results of the regression analysis, including the coefficient, standard error and t-statistic estimates. These results are based on 1,344 observations.

¹⁴ We conducted a joint F-test of these coefficients and found collectively the various coefficients have explanatory power in the regression, even if individual coefficients have marginal statistical significance.

**Table 3-2:
Regression Results
Pooled 2005, 2012 Country Pair Airline Traffic
Liberalization Effect Different in Each Year**

Variable	Coefficient Estimate	Standard Error	T-Statistic
Constant	4.52	0.05	9.03
GDP Product	0.38	0.01	29.36
Distance	-0.51	0.03	-14.87
2012 Indicator	0.08	0.05	1.83
Fully Restrictive ASA Indicator	-0.17	0.13	-1.36
Shift in Fully Restrictive ASA Indicator for 2012	0.04	0.19	0.22
Regional Indicators (20 indicators)	Almost identical to Table 4-1	Almost identical to Table 4-1	Almost identical to Table 4-1

R-square: 0.50; Adjusted R-square: 0.50

As can be seen, the GDP, distance and 2012 indicator coefficients are almost identical with those presented in **Table 3-1**. The Fully Restrictive Indicator Variable is almost unchanged (-0.17 versus -0.16), although it is somewhat lower in statistical significance. The key variable is the shift in the Restrictive ASA indicator. This is of small magnitude (4% lower impact of liberalization in 2012), but of unacceptably low statistical significance. These results lead us to conclude that we cannot reject the hypothesis that the liberalization effect in 2012 is the same as in 2005.

3.6 Conclusion

In this section we undertook our own empirical analysis of the effects of liberalization on passenger traffic. This is a well-established research methodology used by many airline industry researchers around the world. Using data for both 2005 and 2012, we were able to test whether the magnitude of the effect of liberalization has changed; in particular whether it may have decreased, indicating whether the benefits of liberalization may be waning. Our finding is that liberalization increases air traffic by 17%. This is almost identical the finding in our previous study (16%). We tested whether the effect was different in 2012. The 2012 effect was found to be 13%, but the finding is of extremely low statistical significance (the t-statistic is only 0.2). We thus conclude that the impact of liberalization on air traffic continues to be high, validating our previous findings. Because both magnitudes of the pooled regression estimates are similar and there is no statistical significance to any difference between the years, we do not find any convincing evidence that the effect of liberalization is now lower in any meaningful way.

4 Case studies

4.1 Introduction

The objective of this section is to provide detailed illustration of the effect of liberalization on selected markets. More precisely, we analyzed the ASEAN market, the Trans-Tasman routes between Australia and New Zealand, the Malaysia – Thailand market, the U.S. – Japan market, the Indian domestic market and finally air cargo's use of 5th and 7th freedom rights to develop global air cargo connections. These case studies encompass a broad range of regional markets and provide detailed information on trends in traffic, capacity and on airlines' strategies following the liberalization.

4.2 ASEAN

4.2.1 Background

The Association of Southeast Asian Nations (ASEAN) was formed in 1967 by Thailand, Indonesia, Malaysia, Singapore and the Philippines. ASEAN serves as a regional bloc, similar to the European Union. It works to harmonize policy and encourages cooperation on trade, tourism, and economic growth. Since it was originally founded, the ASEAN group has expanded and now includes Brunei, Vietnam, Laos, Myanmar and Cambodia. The region has a population of approximately 600 million which is about 9% of the world population. In 1997, ASEAN established an end-goal of full economic integration by 2020. On January 2007, the member states agreed to accelerate the fulfilment of this goal by five years to the end of 2015.

The region as a whole sits at a crossroads of global travel. The ASEAN Single Aviation Market (ASEAN-SAM) is the region's major aviation policy geared towards the development of a unified and single aviation market. The roadmap to ASEAN-SAM was ratified by member countries at the ASEAN Transportation Ministers Meeting in Singapore at the end of 2007. The ASEAN-SAM is intended to fully liberalize air travel between member states by 2015. However, the extent of liberalization between and among the ASEAN member states is relatively limited compared to other international agreements. It does not include, for example, 7th freedom rights. The current state of liberalization is a product of successive packages agreed to by most – but not all – ASEAN member states.

In May 2009, ASEAN member states signed the Multilateral Agreement on Air Services (MAAS). This agreement incorporates two "protocols" that removed restrictions on third/fourth and fifth freedom access respectively among the ASEAN capital cities. The agreement effectively allowed designated airlines of any signatory country to operate to, from, and beyond any capital city in another signatory country.

In 2010, liberalization was extended to secondary cities. The Multilateral Agreement on Full Liberalization of Passenger Air Services (MAFLPAS) eliminated restrictions on third, fourth, and fifth freedom access to all cities in signatory countries.

However, not all ASEAN members have signed both of those agreements. The Philippines and Indonesia have not accepted MAAS protocols 5 and 6, which provide for third, fourth and fifth freedoms between capital cities. Indonesia, Cambodia and Laos remain opposed to MAFLPAS protocols 1 and 2, which offer

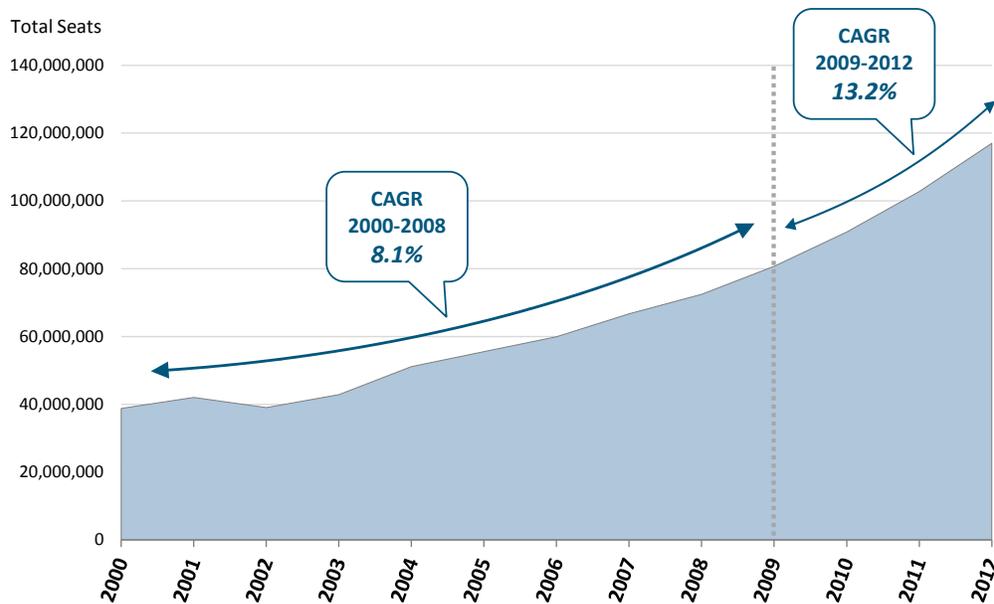
fourth and fifth freedoms between secondary cities. Thus, liberalization within the region has improved over time, but has not reached the same extent as embraced in other global regions (e.g., intra-European Union).

4.2.2 Capacity and Traffic

Traffic growth in the Asia-Pacific region in general has been among the fastest growing in the world for years. The ASEAN countries reflect the overall strength of the region.

From 2000 through 2012, passenger traffic grew at a compounded annual rate of 9.6 percent. However, the growth following the ASEAN-SAM agreement was significantly faster than prior to the agreement. Between 2000 and 2008, growth in the region averaged 8.1 percent annually. From 2009 through 2012, growth averaged 13.2 percent. (See **Figure 4-1**).

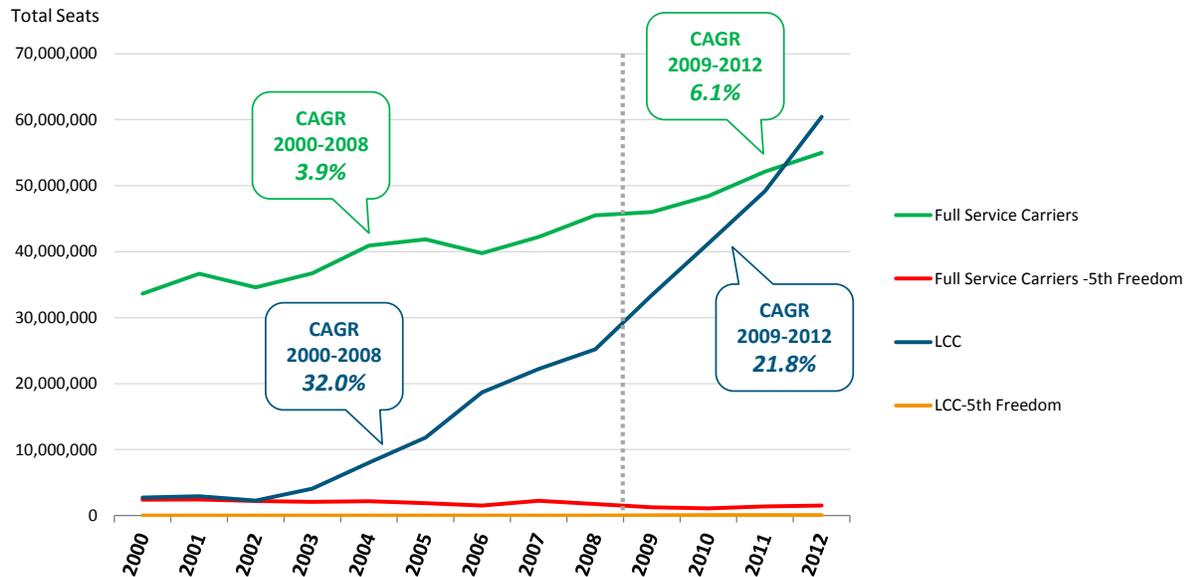
Figure 4-1:
Total Annual Scheduled Seat Capacity in the ASEAN Market, CY 2000-CY 2012



Source: Innovata Schedules via Diio

Much of that growth was led by low cost carriers. Between 2009 and 2012, ASEAN's full service carriers, led by Garuda Indonesia and Malaysia Airlines, grew by 6.1% annually. However, ASEAN's low cost carriers, led by Lion Air and the AirAsia Group, have grown over 3.5 times faster or by 21.8% annually on average. (See **Figure 4-2**) The number of low cost carriers that operated in the ASEAN market jumped from 4 in 2000 to 16 in 2008 to 20 in 2012.

**Figure 4-2:
Annual Scheduled Seat Capacity in the ASEAN Market by Carrier Type, CY 2000-2012**



Source: Innovata Schedules via Diio

- Lion Air began operations in Indonesia in 2000 with a single aircraft. Lion Air rapidly added service, expanding its fleet to meet demand for new service in the world's fourth most populous country. Over 95% of Lion Air's capacity, including capacity of its regional subsidiary Wing Air, operated in domestic Indonesia markets. By 2008, it was flying to 36 cities in Indonesia, as well as locations in Malaysia, Vietnam, and Singapore. In 2011, the airline jointly announced with Boeing plans to purchase \$22 billion worth of aircraft -- including 29 737-900s and a 201 of the new 737 MAXs, along with options for 150 additional future aircraft. An associate company of Lion Air, Thai Lion Air, began operations later in 2013 from Bangkok's Don Mueang International Airport.
- Air Asia. Unlike Lion Air, AirAsia also grew by adding locally-owned affiliates. Since 2004, AirAsia implemented a strategy of cross-border joint-ventures to penetrate new markets and increase overall market share. Currently the AirAsia Group includes Malaysia's AirAsia, long-haul AirAsia X, AirAsia Philippines, Indonesia AirAsia, Thai AirAsia and Philippines's AirAsia Zest. Nearly 40% of the Group's ASEAN services operate in international markets between the ASEAN countries. AirAsia's international expansion would not have been possible without the liberalization of the ASEAN market.
- Tiger Airways Holdings is the Singapore-based corporate holding company for a group of low cost carriers, including the flagship Tigerair (Tiger Airways Singapore). Tigerair commenced operations to Bangkok in 2004. Several other affiliated companies also flew in the region. These included Tigerair Mandala, which launched operations in 2012 from its home base in Jakarta and Tigerair Philippines, which was the Philippines affiliate of Tigerair.

- Jetstar. The Jetstar Group is a value based, low fares group of airlines operating in the leisure and value based markets. The Group comprises multiple affiliated airlines, including:
 - Jetstar Asia based in Singapore. The company is majority owned by a Singapore company (51 per cent), with the Qantas Group holding the remaining 49 per cent. Jetstar Asia's inaugural flight was in 2004. It operates to 22 destinations.
 - Jetstar Pacific based in Vietnam (majority owned by Vietnam Airlines with the Qantas Group holding 30 per cent). Jetstar Pacific Airlines became the first low cost airlines in Vietnam when it launched in May 2008.

- Others. A number of other LCCs began operations with the ASEAN community. These include:
 - CitiLink, which was established as a low-cost subsidiary of Garuda International in 2001. In 2012, Garuda spun it off as a separate business entity. It operated 14 A320 aircraft at the time. Malindo Air, a joint venture between Malaysia Airlines and Lion Air, launched in 2013, with hubs at the Kuala Lumpur International Airport (KLIA) and the Sultan Abdul Aziz Shah Airport in Subang, Selangor (the major airport serving Kuala Lumpur prior to the construction of KLIA).

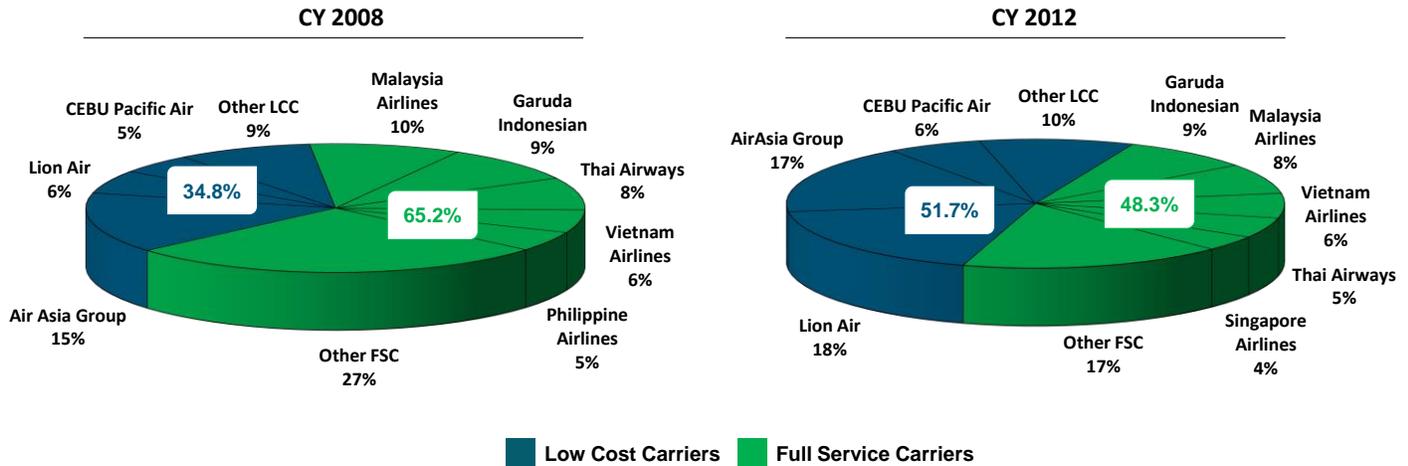
 - Nok Air. Nok Air was established in 2004, with its major hub at Don Mueang International Airport (Bangkok) and secondary hub in Chiang Mai International airport. It mostly flies on domestic Thai routes, but also operates one international route from Bangkok to Yangon (Myanmar).

Many of these LCCs began operations domestically and then expanded into selected international destinations where allowed, depending on particular bilateral air service agreements between country pairs. For example, AirAsia and affiliate Thai AirAsia entered the Malaysia-Thailand market in 2004. The bilateral agreement between Malaysia and Thailand permitted AirAsia and Thai AirAsia to expand in the market by new designations and frequencies. This sort of development contributed to the gain in LCC capacity prior to the adoption of the MAAS and MAFLPAS agreements beginning in 2009.

Fifth freedom carriers also operated in the ASEAN market but they captured a smaller share of the market in 2012 than they did in 2000, as shown in **Figure 4-2**. (Fifth freedom full service carriers in the market included Qatar, Cathay Pacific and Lufthansa.) Seat capacity of fifth freedom full service carriers decreased by 3.7% annually from 2000 through 2012. In addition, other low-cost fifth freedom carriers also offered some service in the market. The largest fifth freedom low cost carrier was Australia's JetStar. Its locally-owned affiliates JetStar Asia, JetStar Pacific and Valuair also served the ASEAN market during the period.

The total market share captured by low cost carriers increased significantly after the MAAS and MAFLPAS agreements. As **Figure 4-3** shows, the share captured by low cost carrier market share increased from about 35% in 2008 to 52% by 2012. Both Lion Air and the AirAsia Group operated more seats in the ASEAN market than the top 5 incumbent full service carriers – Garuda Indonesia, Malaysia, Vietnam Airlines, Thai Airways and Singapore Airlines.

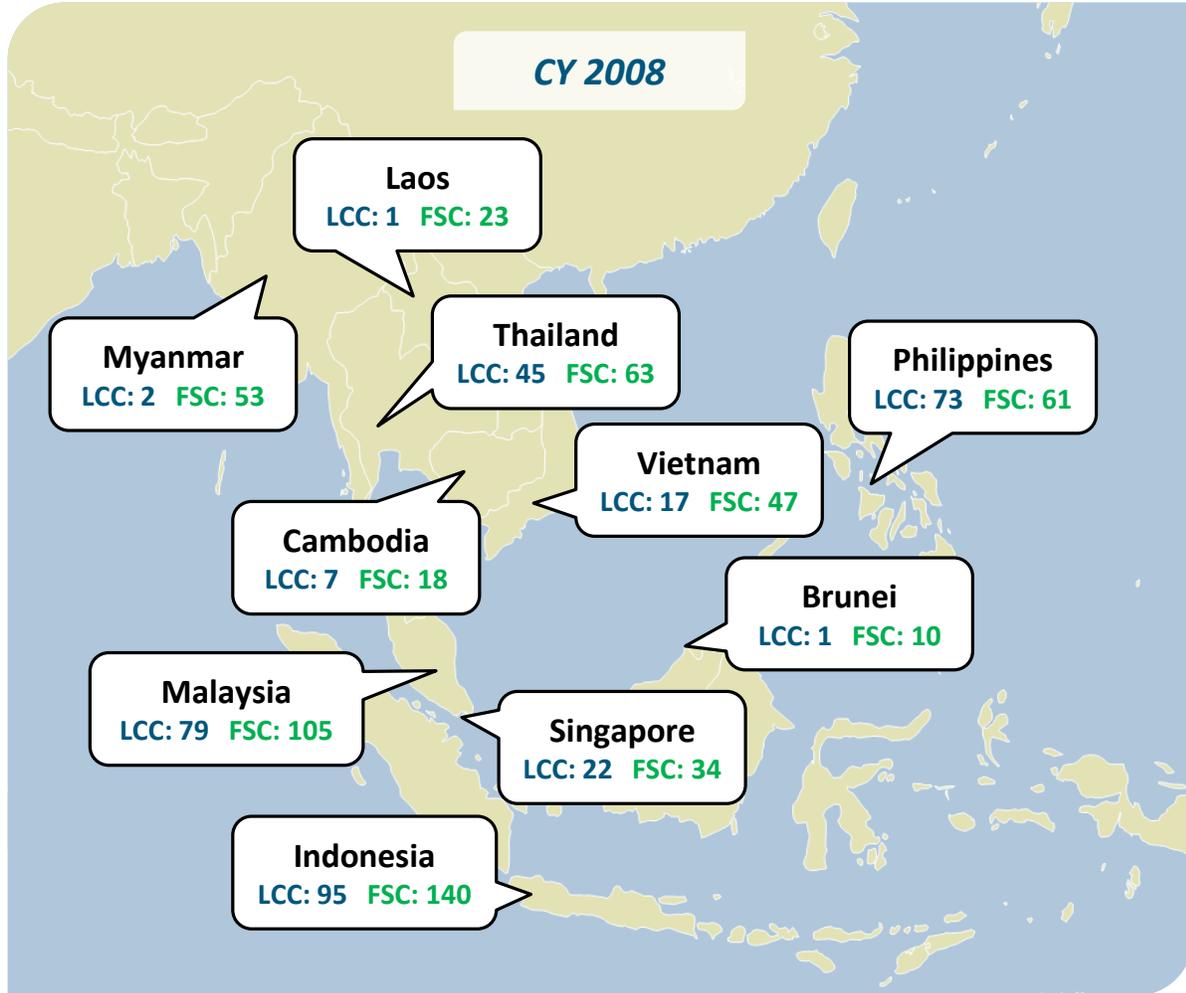
Figure 4-3:
Total Annual Scheduled Seat Capacity in the ASEAN Market by Carrier, CY 2007 and CY 2012



4.2.3 Trends in Capacity and Traffic

By CY 2008, low cost carriers had established themselves in a large number of nonstop markets within the ASEAN community. **Figure 4-4** shows the number of routes served by full service carriers (FSCs) and low cost carriers (LCCs) by country of origin. Overall, low cost carriers provided scheduled service in slightly less than 50% of the total of 543 nonstop ASEAN airport pairs served. The country with the highest low cost carrier penetration rate was the Philippines, where low cost carriers operated in 84% of nonstop routes. In addition, low cost carriers operated in 50-60% of routes in Indonesia, Malaysia, Singapore and Thailand. In Laos and Myanmar, less than 5% of all nonstop routes were served by low cost carriers.

Figure 4-4:
ASEAN Nonstop Services by Country, 2007

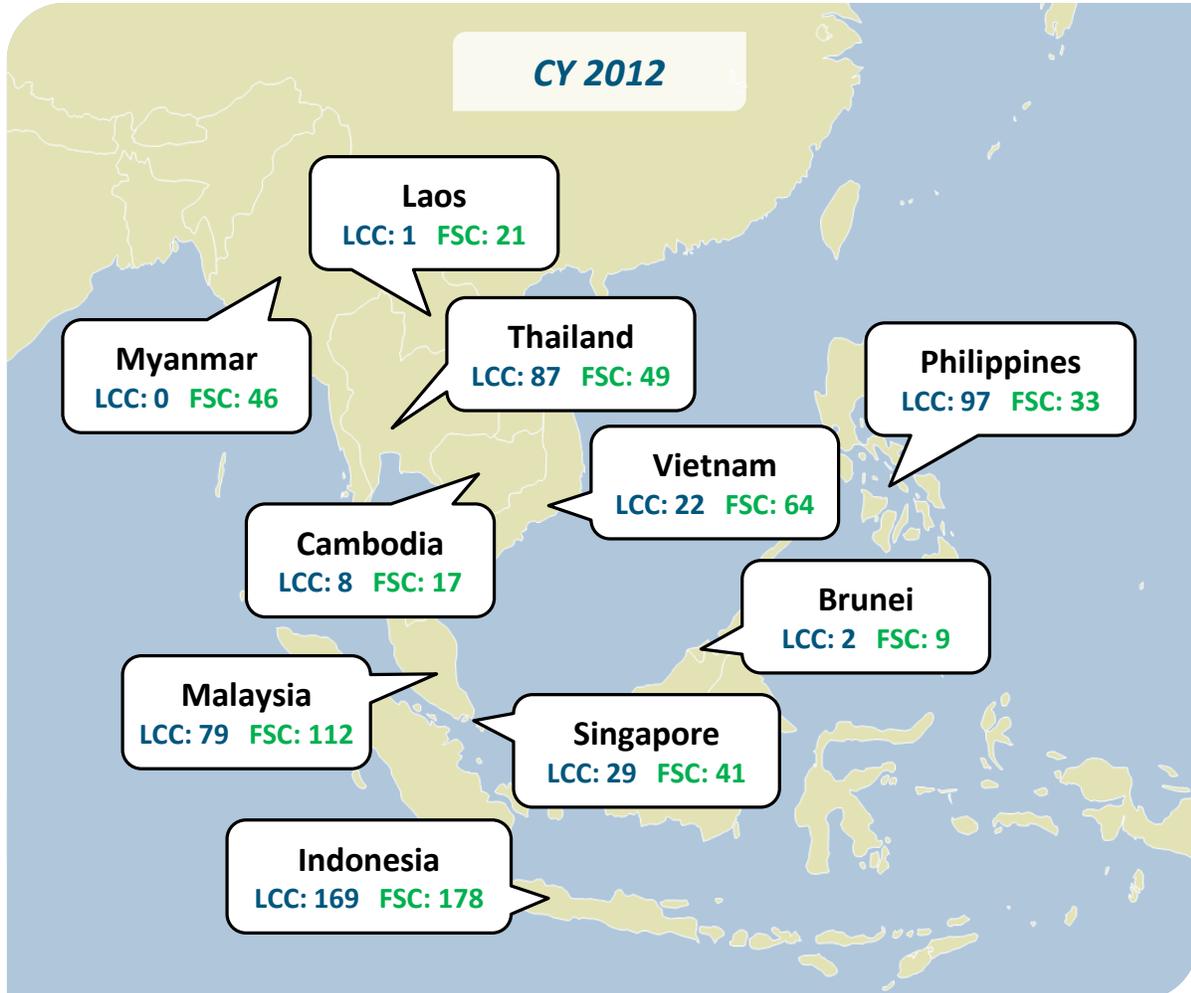


Source: Innovata Schedules via Diio

Note: Numbers indicate the total number of unique airport pairs served nonstop by carrier type from each country.

Figure 4-5 shows nonstop routes served in the ASEAN market by country in CY 2012. A total of 663 airport pairs were flown by all carriers in 2012 – an increase of 120 markets over 2008 (21 percent). That increase is entirely due to the expansion of low cost carrier service. Full service carriers operated the same number of markets in 2012 as they did in 2008. The number of routes served by low cost carriers increased by 50 percent between 2008 and 2012.

Figure 4-5:
ASEAN Nonstop Services by Country, 2012



Source: Innovata Schedules via Diio

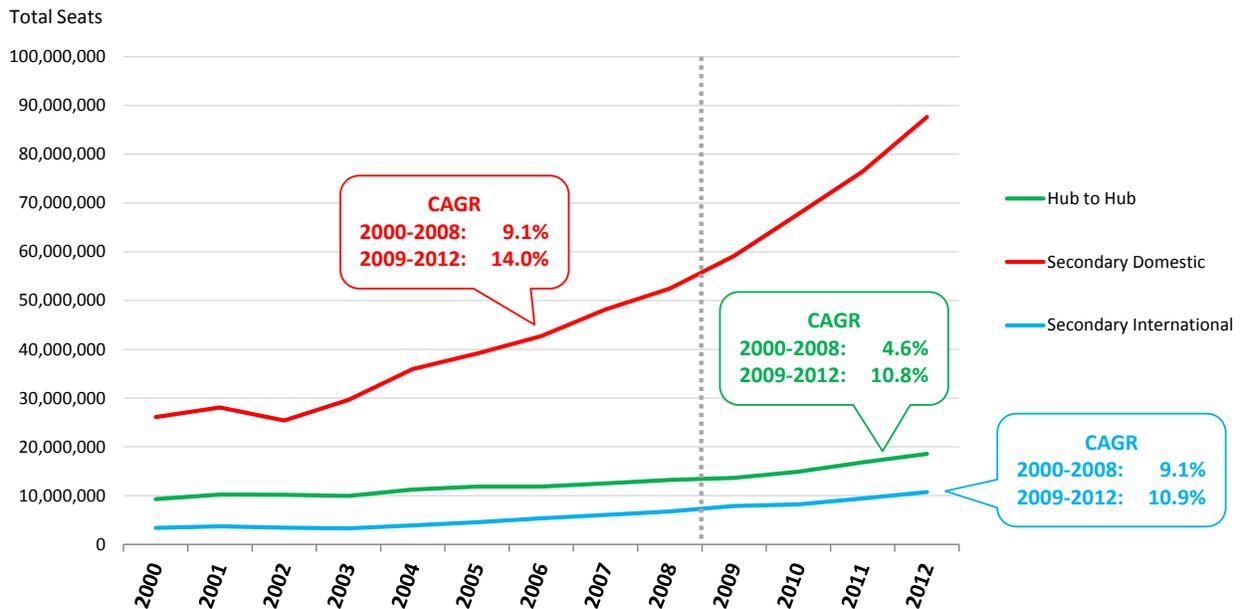
Note: Numbers indicate the total number of unique airport pairs served nonstop by carrier type from each country.

Low cost carriers increasingly competed in more markets in 2012. Low cost carriers operated in 99% of nonstop routes from the Philippines. In Thailand and Indonesia low cost carriers operated in over 65% of nonstop routes and over 50% of routes in Malaysia and Singapore. In addition, low cost penetration rates were between 20% and 45% in Cambodia, Vietnam and Brunei. Altogether, of all nonstop routes served in the ASEAN, low cost carriers operated in 60 percent of the markets.

The largest increase in capacity has been in secondary domestic and international markets, as shown in **Figure 4-6**. Hub-to-hub (capital-to-capital) capacity between ASEAN countries increased by 10.8% annually since 2009, but capacity in secondary markets increased by 13.7% a year (14% in secondary domestic markets and 10.9% in secondary international markets). While low cost carriers continued to serve hub-to-hub (capital-to-capital) markets, they rapidly expanded services in secondary markets (which may have included routes between hubs and smaller destinations). In 2008, low cost carriers

operated 23.9% of capacity in hub-to-hub markets. By 2012, LCCs offered nearly 40 percent of all available seat capacity in hub-to-hub services. In secondary domestic and international markets, low cost carriers LCCs greatly expanded their overall market share. In 2008, LCCs offered approximately 37% of seat capacity in those markets. By 2012, that had grown to nearly 55% of seat capacity. The top secondary routes include Jakarta-Surabaya, Hanoi-Ho Chi Minh City, Bangkok-Phuket, Cebu-Manila, Kota Kinabalu-Kuala Lumpur and Surabaya-Makassar.

Figure 4-6:
Annual Scheduled Seat Capacity in ASEAN Markets, CY 2000-2012



Source: Innovata Schedules via Diio

As service in the ASEAN market has grown, traffic has grown rapidly as well. Since 2005, domestic and international O&D traffic in the ASEAN market has more than doubled as shown in **Figure 4-7**. Low cost carriers in the ASEAN market continue to order aircraft, add new markets and launch affiliates, including Lion Air's Thai Lion Air in 2014, which will continue to increase traffic. The market's two largest low cost carriers, Lion Air and AirAsia, have ordered more aircraft than any other Asia-Pacific carriers. As the ASEAN market continues towards a unified and single aviation market, opportunities for new low cost carrier service still exist in this large and growing air service market especially in medium/longer-haul routes. Countries such as Vietnam, Cambodia and Laos with lower penetration rates by low cost carriers present particular opportunities. The additional benefits from Open Skies will be more limited if all the countries do not sign off on all the protocols.

**Figure 4-7:
O&D Passengers and Scheduled Departures and Seats
in ASEAN Market, CY 2005-2012**

Year	O&D Psgrs	Annual Departures	Annual Seats
CY 2005	65,118,073	811,995	111,081,041
CY 2012	140,658,685	1,532,848	234,009,302
Change 05-12	75,540,612	720,852	122,928,260
% Chng 05-12	116.0%	88.8%	110.7%

Note: Includes domestic and international traffic and services
Source: MIDT Booking Data and Innovata Schedules via Diio

4.3 Australia-New Zealand (Trans-Tasman) Market

4.3.1 Background

This case study describes the effect of liberalizing aviation in the market between Australia and New Zealand. That market is commonly referred to as the “Trans-Tasman” based on the name of the sea between the two countries. These two have been closely linked through British Commonwealth colonial ties and as a result of geographic isolation.

The first steps towards economic liberalization can be traced to 1966 when the New Zealand and Australia Free Trade Agreement was signed. This agreement was in place for 17 years until March 28, 1983 when the Australia-New Zealand Closer Economic Relations Free Trade Agreement (ANZCERTA) was concluded. The ANZCERTA set a foundation as an innovative agreement, which not only created a liberal business and economic regime for goods and services, but also set a collaborative umbrella to deal with customs, transport, regulatory, product standards and business law issues. The ANZCERTA established a market that maintains one of the most open economic trade relationships between any two countries in the world. The ANZCERTA is continually reviewed to ensure that the agreement remains effective in all sectors of the economy.

Single Aviation Market. Australia and New Zealand concluded a Single Aviation Market (SAM) agreement, effective November 1, 1996. The goal of the SAM was to bring the two countries closer together within the elements of the ANZCERTA. The main components of the agreement included the opening of ownership and control regulations in the bilateral market, the introduction of unlimited frequencies for Trans-Tasman services and a provision that allowed airlines of either country to operate domestic flights within the other country. While the SAM agreement opened up many new opportunities within the Trans-Tasman market, it did not address “beyond markets” to third countries. Regulatory controls over flights in those markets were still covered by the original 1961 Australia – New Zealand Air Services Agreement and the subsequent 1992 Memorandum of Understanding. Two different labels of air carriers were created from the agreement: the “Domestic” and the “SAM” airline. The “Domestic” airline

designation allowed carriers to fly domestic services in each other's domestic market and the "SAM" designation harmonized ownership, control, technical and safety certifications from each countries regulatory agencies.

During this period, Air New Zealand held an equity position in Ansett Australia and British Airways a position in Qantas. The SAM agreement broke barriers in the carriage of cabotage traffic, created ownership and control flexibilities, and deregulated capacity, designations, and frequencies. More importantly, the SAM agreement laid the foundation for a more liberal agreement that would open markets beyond the Trans-Tasman.

Open Skies. The Australia – New Zealand Open Skies agreement was initiated in November of 2000 and entered into force on August 8, 2002. This agreement removed the last substantive restrictions within the bilateral air services market and served as the culmination of a truly open bilateral air service market. There were no longer any restrictions on flights to, within, and beyond the territory of the other party. Before the Open Skies agreement, beyond rights were limited to a set number of weekly frequencies. Seventh freedom cargo operations were included to help extend the single market outwards in the air cargo market. New beyond markets brought greater capacity on the Trans-Tasman as new international connections were created between major cities.

4.3.2 Capacity and Traffic

Since 1994, capacity and traffic on services across the Tasman Sea have shown steady growth by most air carriers. While liberalization facilitated growth, the market did not experience sharp increases in services. The liberalized agreements established a regime in which the Trans-Tasman market became a breeding ground for competitive air service by carriers in the bilateral market, and also from third country carriers from the Middle East, Southeast Asia and Latin America (carriers Aerolineas Argentina and LAN). Liberalization also resulted in fragmentation of the market (i.e., expansion of service to new destinations) and new opportunities for low cost carriers. With fewer restrictions on frequencies, ownership, control, designations and beyond rights, carriers expanded. This environment permitted flag carriers to connect the Trans-Tasman to their global networks, while giving low cost carriers flexibility to add markets and frequencies for market presence.

The flag carriers and incumbents, Air New Zealand and Qantas, remained dominant forces in terms of passenger growth and market share. Air New Zealand and Qantas both started their own low cost carriers to keep up with the growing competition in the market. Air New Zealand-owned Freedom Air operated from 1995 to 2008 and Qantas started wholly-owned subsidiary JetStar in 2003.

Another more recent entrant is now the third largest Trans-Tasman carrier and second largest Australian carrier, Virgin Australia (originally Virgin Blue Airlines, rebranded as Virgin Australia in 2011), which was founded in 2000. Freedom Air, Jetstar and Virgin Australia all opened Trans-Tasman routes to alternate secondary airports and tourist destinations. In 2010, regulators from both Australia and New Zealand approved a code-sharing agreement between Air New Zealand and Virgin Blue (later renamed Virgin Australia), which allowed both airlines to codeshare on trans-Tasman flights and on connecting domestic flights. Air New Zealand subsequently purchased a 26% shareholding in Virgin Australia Holdings.

Figure 4-8, Figure 4-9 and Figure 4-10 compare nonstop routes between 1995, 2001 and 2012 and illustrate the fragmentation that has taken place in this major market for both business and leisure traffic. In 1995, before the Single Aviation Market was established, carriers operated nonstop service on 12

Trans-Tasman routes. In 2001, there were 13 route pairs that received nonstop service. By 2012, following Open Skies, the number of nonstop Trans-Tasman routes has grown to 23.

**Figure 4-8:
 Trans-Tasman Nonstop Services – CY 1995**



Source: OAG Schedules

**Figure 4-9:
 Trans-Tasman Nonstop Services – CY 2001**



Source: Innovata Schedules via Diio

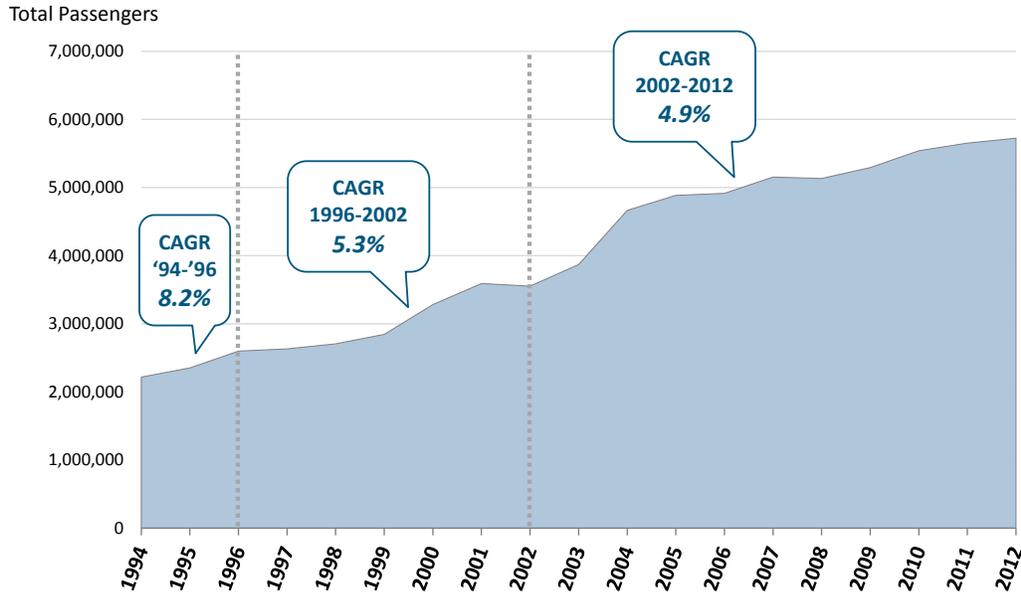
**Figure 4-10:
 Trans-Tasman Nonstop Services – CY 2012**



Source: Innovata Schedules via Diio

In addition to new routes, the liberal market environment has allowed for new secondary gateways to compete for traffic, especially in New Zealand. The full spectrum of high volume, tourist-oriented and secondary destinations have grown. **Figure 4-11** and **Figure 4-12** illustrate the trend since 1994. Overall total uplift/downlift passengers have grown by 5.4% annually since 1994. And despite the effects of the global economic downturn beginning in 2007, the growth of passenger traffic from 2002 to 2012 reached 4.9% a year.

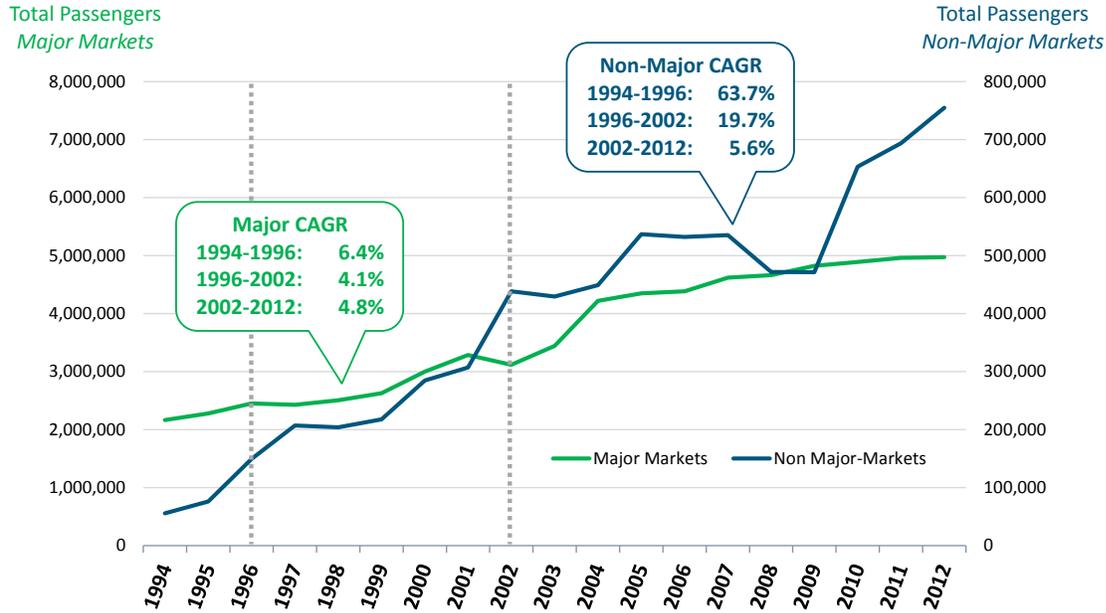
**Figure 4-11:
 Analysis of Growth in Total Passengers in the Trans-Tasman Market, 1994 - 2012**



Source: Australian Government, Department of Infrastructure and Regional Development, International City Pair Data

Liberalization allowed carriers to find opportunities for growth by opening operations to non-major (secondary) markets. The compound annual growth rates (CAGR) in passengers in non-major markets exceeded the growth in major markets. Those were markets where new entrants opened service.

**Figure 4-12:
Analysis of Growth in Major Markets vs. Non-Major Markets, 1994 - 2012**



Note: Major Markets include all routings between the main locations in New Zealand (Auckland, Christchurch, and Wellington) and Australia (Sydney, Melbourne, Brisbane, Adelaide and Perth). Non-major markets are all other markets including from main markets to secondary points and between secondary points.

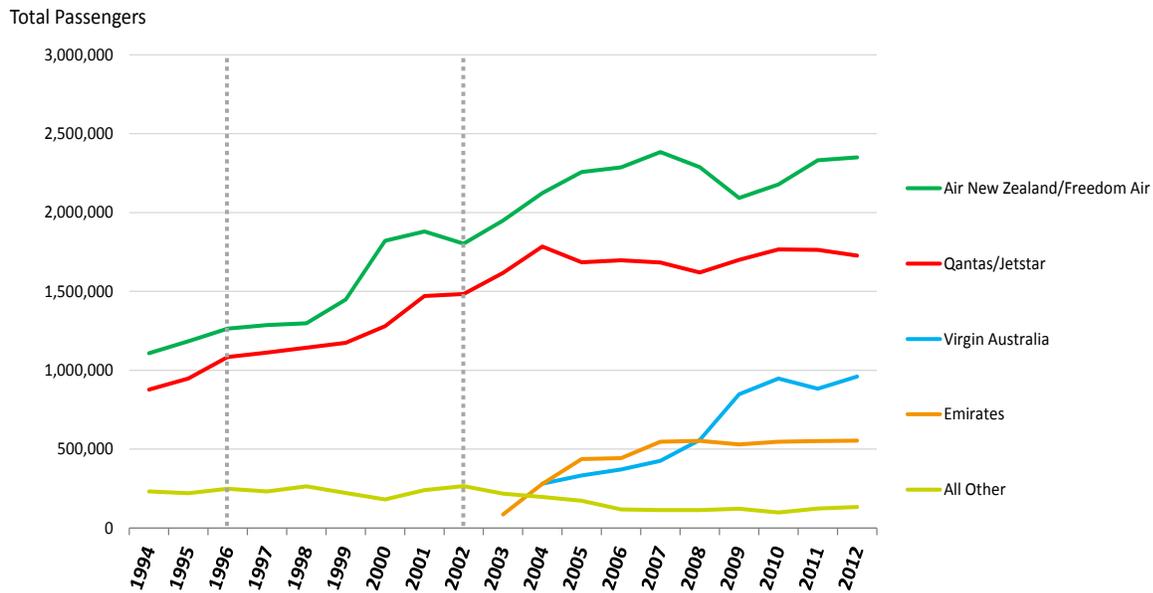
Source: Australian Government, Department of Infrastructure and Regional Development, International City Pair Data

4.3.3 Market Trends

The 1996 SAM agreement and the 2002 Open Skies agreement between Australia and New Zealand provided the Trans-Tasman with a liberal government regime for air services. The dominant flag carriers survived the two liberalizing agreements, have grown their traffic, and generally maintained their market position. Air New Zealand and Qantas continually adapted to new low cost and third country carriers such as Emirates in the market.¹⁵ Liberal beyond market rights have helped to connect the Trans-Tasman to international networks of both Qantas and Air New Zealand. **Figure 4-13** illustrates total passenger by carrier in the Trans-Tasman market and **Figure 4-14** analyses top countries served by passengers.

¹⁵ Emirates was allowed to operate in the Trans-Tasman after Australia and the United Arab Emirates signed a liberalized air service agreement in 2002 that permitted designated UAE carriers to operate 5th freedom services beyond Australia. Emirates operated tag flights beyond Sydney, Melbourne, and Brisbane to New Zealand. In 2010, Virgin Australia (then Virgin Blue) signed a code-sharing agreement with Etihad Airways. 2011, Air New Zealand signed a code-sharing agreement with Etihad. In 2013, Qantas signed a code-sharing agreement with Emirates.

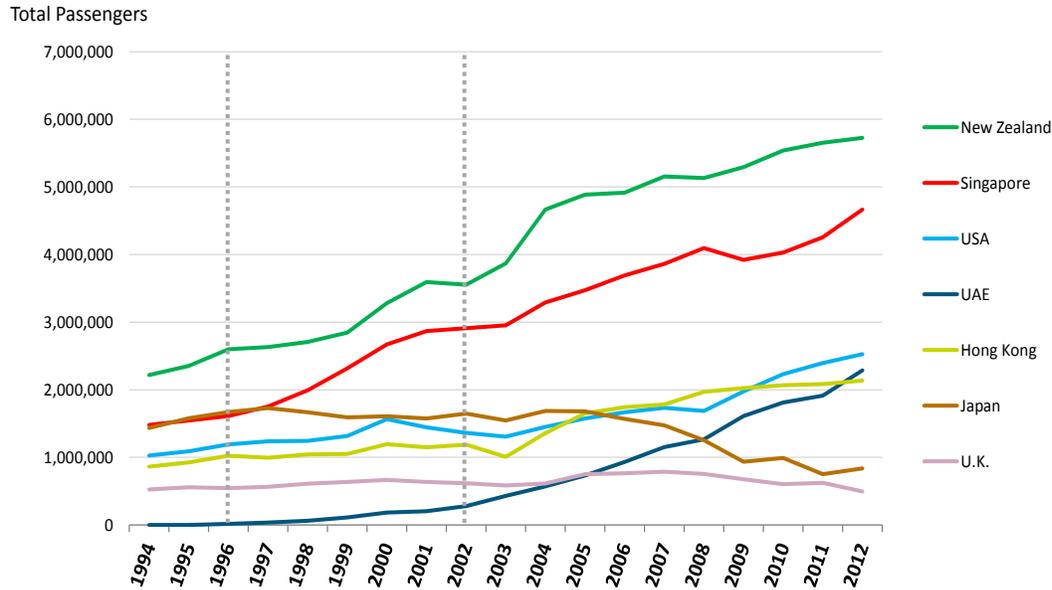
Figure 4-13:
Total Passengers in Trans-Tasman Market by Uplift/Downlift Carrier



Source: Australian Government, Department of Infrastructure and Regional Development, International Airline Data

Figure 4-14 shows Australian international passengers by country for top destination countries. This chart highlights the importance of the Trans-Tasman routes to both countries. New Zealand has always remained the top destination for Australian international travelers. Singapore, another country known for liberal aviation policies, also shows growth. (Singapore Airlines and Virgin Australia formed a code-sharing partnership in 2012.) The market entry by a major Gulf State carrier – Emirates – is also quite evident, with passenger traffic growing by roughly 2 million passengers since 2002. (Qantas later formed a strategic alliance with Emirates in 2013.)

Figure 4-14:
Australian International Passengers by Uplift/Discharge Country



Source: Australian Government Department of Infrastructure and Regional Development, International Airline Data

Overall, despite being a mature market, the Trans-Tasman market continues to experience growth, as airlines have created new alliances and opened services to new markets. Liberalized agreements with third countries also allowed for fifth freedom operations that passengers embraced. The total number of O&D passengers in the Trans-Tasman market, as **Figure 4-15** shows, grew by 14.5% from 2005 to 2012. This is faster than the growth in nonstop scheduled service offered, both departures and capacity (seats). Average fares for both premium cabin and economy cabin passengers have also increased.

Figure 4-15: O&D Passengers, Average Fares and Scheduled Departures and Seats in Trans-Tasman Market, 2005-2012

Year	O&D Psgrs	Avg. Prem Cabin Fare	Avg. Econ. Cabin Fare	Annual Departures	Annual Seats
CY 2005	3,892,096	\$660	\$186	19,280	3,916,026
CY 2012	4,468,773	\$1,359	\$309	20,239	4,132,908
Change 05-12	576,677	\$699	\$122	959	216,882
% Chng 05-12	14.8%	105.9%	65.7%	5.0%	5.5%

Source: MIDT Booking Data and Innovata Schedules via Diio

4.4 Malaysia – Thailand

4.4.1 Background

Malaysia and Thailand sit at a crossroads of global travel. The original air service agreement between the Malaysia and Thailand governments was signed in 1969. This agreement type (Bermuda I) allows named points, carrier designations, frequencies and capacity to be added in the market based on government consultations. While more restrictive than the “American style” Open Skies, the agreement’s Bermuda I provisions allow new services to be introduced to the market. Subsequent Memoranda of Understanding (MOUs) between Malaysia and Thailand have allowed services and frequencies to increase, thus driving an increase in overall traffic.

Many attributes of a liberalized market can be found within the terms of the agreement between the countries. They include no restrictions on points served, multiple designations, code sharing rights and open frequencies. Fifth freedom, intermediate or beyond, and seventh freedom cargo operations are included in the agreement. As in most other bilateral agreements, cabotage is not included.

Malaysia and Thailand have numerous air service agreements with third countries. They have both concluded Open Skies agreements with the United States. Both currently support a multiple designation policy as a way of increasing their countries’ role in global tourism and trade. With regards to points served, Malaysia and Thailand have pen policies. The key restriction in the Malaysia-Thailand bilateral agreement covers beyond rights and seventh freedom cargo operations. Code sharing rights have allowed Malaysia and Thai Airways to cooperate on routes between the two countries.

Role of ASEAN. The Association of Southeast Asian Nations (ASEAN) was formed in 1967 by Thailand, Indonesia, Malaysia, Singapore and the Philippines. ASEAN serves as a regional bloc, similar to the European Union. It works to harmonize policy and encourages cooperation on trade, tourism, and economic growth. ASEAN now includes Brunei, Vietnam, Laos, Myanmar and Cambodia. In 1997, ASEAN established an end-goal of full economic integration by 2020. On January 2007, the member states agreed to accelerate the fulfilment of this goal by five years to the end of 2015.

One of the trade areas closely analyzed by the ASEAN countries is air transport. The ASEAN Single Aviation Market (ASEAN-SAM) is the region’s major aviation policy geared towards the development of a unified and single aviation market by 2015. The roadmap to ASEAN-SAM in 2015 was ratified by member countries at the ASEAN Transportation Ministers Meeting in Singapore at the end of 2007. The ASEAN-SAM is expected to fully liberalize air travel between member states.

Malaysia and Thailand are both signatories to the successive air service agreements made to encourage liberalized air service among the ASEAN countries. Both signed the 2009 Multilateral Agreement on Air Services (MAAS). This agreement incorporates two “protocols” that removed restrictions on third/fourth and fifth freedom access respectively among the ASEAN capital cities. The agreement effectively allowed designated airlines of any signatory country to operate to, from, and beyond any capital city in another signatory country. Both also signed the Multilateral Agreement on Full Liberalization of Passenger Air Services (MAFLPAS), which eliminated restrictions on third, fourth, and fifth freedom access to all cities in signatory countries. This allowed both countries to promote travel to secondary international destinations for tourism (Thailand: Phuket, Chiang Mai; Malaysia: Langkawi).

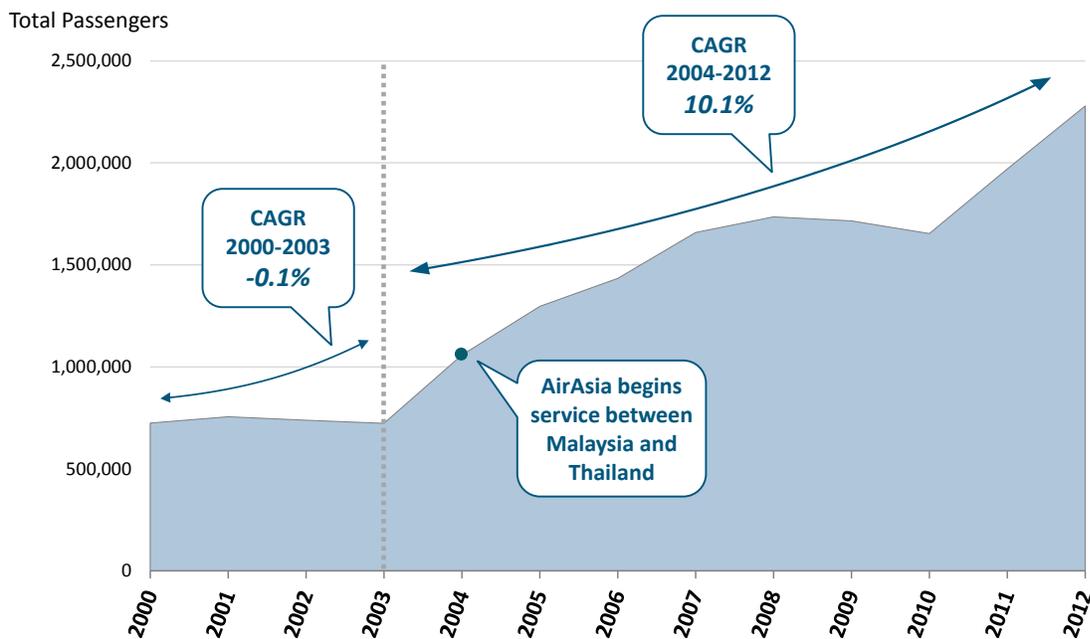
4.4.2 Capacity and Traffic

For many years, the Malaysia-Thailand market was dominated by Malaysia Airlines and Thai Airways. Due to flexibilities in the air service agreement, both were able to serve any points in each other’s country while maintaining capacity at levels that were profitable for both flag carriers. The agreement allowed the flag carriers to enter into cooperative marketing agreements (i.e. code sharing). The two carriers had codesharing operations for many years, creating control over capacity and traffic growth. In addition, Malaysia and Thailand separately had agreements with third countries that accommodated carriers on the Kuala Lumpur-Bangkok route as fifth freedom operators. Carriers such as Lufthansa, Egypt Air, Qatar Airways, and Gulf Air have served this route on a fifth freedom basis.

Malaysia-Thailand capacity and traffic changed significantly as new low cost carriers entered the competitive landscape. In 2004, AirAsia and affiliate Thai AirAsia began scheduled service in the Malaysia-Thailand market causing a surge in capacity (available seats). The bilateral agreement between Malaysia and Thailand permitted AirAsia and Thai AirAsia to expand in the market by new designations and frequencies.

Despite the global financial downturn that began in 2007, total seat capacity in the market increased on average by 10.1% annually from 2004 to 2012.

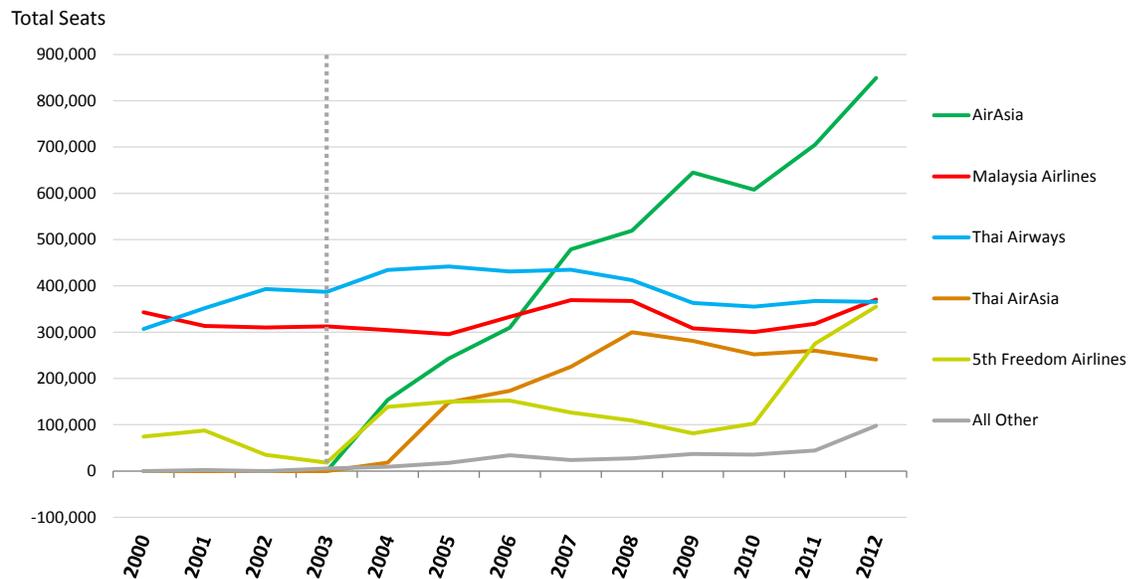
Figure 4-16:
Total Annual Scheduled Seat Capacity in Malaysia-Thailand Market, CY 2000-CY 2012



Source: Innovata Schedules via Diio

Figure 4-17 highlights the increase in capacity in the Malaysia-Thailand market driven by low-cost carrier AirAsia. Seat capacity offered by AirAsia and Thai Air Asia combined grew by 26.0% a year from 2004 to 2012. Their low cost structure helped spur traffic while generating increased competition from the incumbent flag carriers. Although incumbent flag carriers Malaysian Airlines and Thai Airways remained major players in the market, their combined capacity was relatively flat. Since 2004, Malaysian Airlines' capacity increased by 2.5% annually while Thai Airways' capacity decreased by 2.1%. Fifth freedom airline capacity between Malaysia and Thailand grew by 12.5% in that same period.

Figure 4-17:
Annual Scheduled Seat Capacity in Malaysia-Thailand Market by Carrier, CY 2000-2012



Source: Innovata Schedules via Diio

The growth highlighted in

Figure 4-16 and **Figure 4-17** is a result of the agreement between Malaysia and Thailand that opened market entry to new carriers. The agreement does maintain the government's role in responding to market demand. AirAsia's interest in serving international markets prompted the government of Malaysia to open designations, frequencies and points in its bilateral agreements.

Trends in Capacity and Traffic Figure 4-18 shows service in the Malaysia-Thailand market in CY 2003, before AirAsia/Thai AirAsia began scheduled service. Most of the routes and capacity remained concentrated around Bangkok and Kuala Lumpur, with 75% of seats were operated between the two

hubs. The Full Service Carriers (FSCs) also operated a few routes to tourist destinations on both sides of the border. This service was dominated by Malaysia Airlines and Thai Airways.

Figure 4-18:
Malaysia-Thailand Nonstop Services 2003



Source: Innovata Schedules via Diio

By contrast, the effect of liberalizing the air service agreement between the countries is vividly highlighted by **Figure 4-19**, which illustrates the expansion of markets served – mostly by new low cost carrier service -- beyond the major hubs. Bangkok’s second airport (Don Mueang airport) developed into a regional commuter flight hub and low cost carrier hub while Kuala Lumpur Sultan Abdul was mainly used by commercial turbo prop operators. Kuala Lumpur Sultan Abdul is also one of the main hubs of Firefly, Malaysian Airlines’ regional affiliate established in 2007.

As AirAsia and Thai AirAsia grew domestically they also developed an international network to destinations such as Kuala Lumpur-Bangkok/Phuket and Bangkok-Penang. These routes were already served in 2003, but the entry of the low cost carriers in these markets added significantly to the total available capacity.

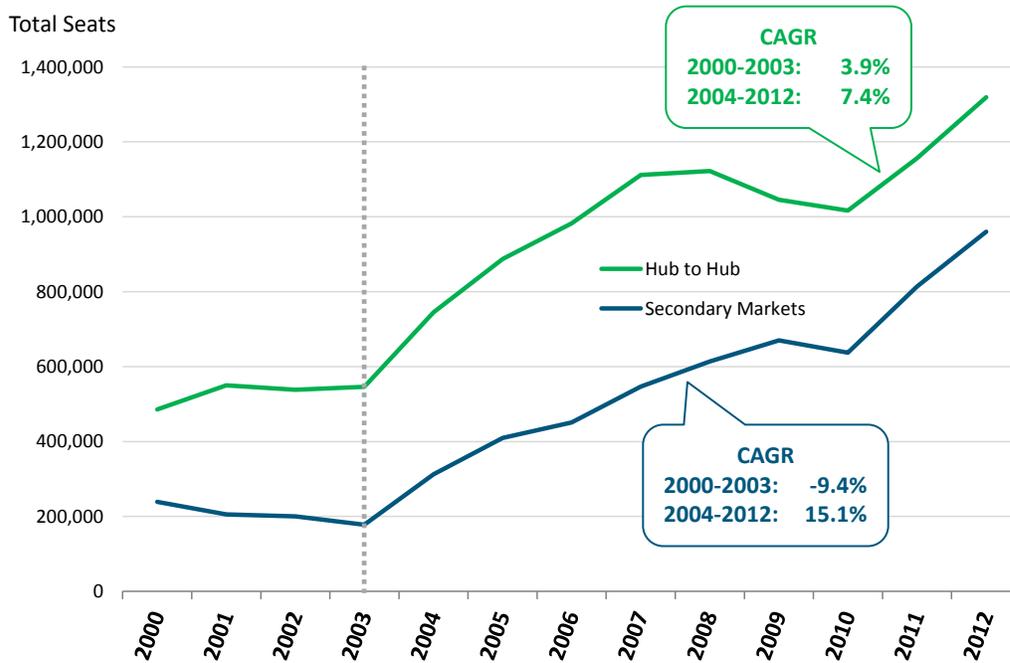
Figure 4-19:
Malaysia – Thailand Nonstop Services 2012



Source: Innovata Schedules via Diio

The LCCs also helped develop connections into secondary markets such as Chiang Mai. Previously, a passenger who wanted to fly to or from Chiang Mai could only connect over BKK. However, as shown in **Figure 4-20**, new point-to-point services offered by AirAsia/Thai AirAsia developed those secondary markets. Now, a passenger could fly from Malaysia to Chiang Mai directly via Kuala Lumpur. The number of nonstop routes served tripled from 5 in 2003 to 15 in 2012. Since 2004, capacity in secondary markets has grown more than twice as fast as capacity between the major hubs of Bangkok and Kuala Lumpur.

Figure 4-20:
Growth in Scheduled Seat Capacity in the Malaysia-Thailand Market, Primary Hubs vs. Secondary Markets



Source: Innovata Schedules via Diio

As the Southeast Asian market has grown, Malaysia Airlines and Thai Airways have had to change their overall strategies to compete with new entrants. AirAsia and Thai AirAsia continue to grow rapidly and are major influences on the flag carriers. However, third country carriers (i.e., 5th freedom carriers such as Egypt Air, Lufthansa and Qatar) have had little effect in the Malaysia-Thailand market. Since 2005, the first full year of AirAsia and Thai AirAsia service, O&D traffic in the Malaysia-Thailand market has nearly doubled as shown in **Figure 4-21**. AirAsia/Thai AirAsia have also influenced average fares paid by travelers in the market. Economy cabin fares have decreased by nearly 15% while premium cabin fares have increased by over 35%. Full service carriers have been able to increase fares for first and business class passengers not served by low fare carriers.

According to a report from the Asian Development Bank Institute, so that it could better compete with Air Asia, Malaysia Airlines and its subsidiaries in 2008 became the first full service carrier in the ASEAN region to offer “free seats” (i.e., the price charged covered only surcharges such as fuel, insurance,

airport tax, and administration fee) for all domestic destinations. Malaysia extended this offer to all destinations within ASEAN countries, with the exception of Yangon.¹⁶

**Figure 4-21:
O&D Passengers, Average Fares and Scheduled Departures and Seats
in Malaysia-Thailand Market, CY 2005-2012**

Year	O&D Psgrs	Avg. Prem Cabin Fare	Avg. Econ. Cabin Fare	Annual Departures	Annual Seats
CY 2005	1,271,199	\$299	\$159	6,372	1,296,598
CY 2012	2,453,724	\$409	\$137	11,943	2,279,053
Change 05-12	1,182,525	\$110	-\$23	5,572	982,455
% Chng 05-12	93.0%	36.9%	-14.4%	87.4%	75.8%

Source: MIDT Booking Data and Innovata Schedules via Diio

4.5 U.S. - Japan

4.5.1 Background

This case study examines the impact of the liberalization of the air services agreement between the governments of the United States and Japan.

The Japanese economy was the 5th largest in the world in 2013, with a GDP of \$4.9 trillion (USD), according to the World Bank. It is a hub of economic activity and connectivity both within greater Asia and between Asia and the Americas. As International Air Transportation Association (IATA) CEO Tony Tyler noted: “Japan is important to global air transport. And air transport is critical to Japan. ... [T]here is no clearer example of the aviation industry being a catalyst for economic growth than Japan where it provides vital — irreplaceable — links to global markets.”¹⁷

The economies of the United States and Japan are closely linked by trade. In 2013, Japan was the 4th largest goods trading partner with the U.S., with \$204 billion in total (two ways) goods trade.¹⁸

¹⁶ Tham, S. Y. 2008. ASEAN Open Skies and the Implications for Airport Development Strategy in Malaysia. ADBI Working Paper 119. Tokyo: Asian Development Bank Institute. Available: <http://www.adbi.org/workingpaper/2008/11/04/2736.asean.open.skies.airport.development.strategy.malaysia/>

¹⁷ Tony Tyler, quoted in “Strengthening Japan’s Aviation Competitiveness – Reducing Cost of Infrastructure,” Press Release No. 37 (International Air Transport Association, September 19, 2012).

¹⁸ Office of the U.S. Trade Representative, <https://ustr.gov/countries-regions/japan-korea-apec/japan>

Air service has always been a critical element of and instrument of that trade. Bilateral air service agreements between the two nations date back to 1952, when the Civil Air Transport Agreement was signed in Tokyo. That agreement authorized Northwest, Pan Am and Japan Air Lines (JAL) (the “incumbent carriers”) to operate between the two countries and granted relatively generous Fifth Freedom beyond rights to the U.S. incumbents. JAL operated one Fifth Freedom flight beyond the U.S. (to Brazil). The 1952 agreement also allowed the U.S. carriers to operate from any U.S. city to Japan, but restricted the outbound gateway cities for JAL to Tokyo and Osaka.

During the 1980s, the U.S. and Japan signed a series of Memorandums of Understanding (MOU) that gradually altered the 1952 treaty. New markets were opened with restrictions on capacity. United Airlines replaced Pan Am as an incumbent when United bought Pan Am’s Pacific routes in 1985. FedEx became an incumbent cargo operator in 1988 when it purchased Tiger International Inc., parent of the Flying Tiger Line, what was then the world’s largest air cargo carrier. Other carriers gained access to the market through the MOU process. These non-incumbent or “MOU carriers” included American; Continental, its subsidiary, Continental Micronesia; Delta; UPS; All Nippon Airways (ANA); NCA; and Japan Air Systems (JAS).

Fifth freedom operations were contentious. The Japanese airlines complained about the perceived inequitable treatment that they were afforded under the 1952 agreement. In 1996, Northwest filed a complaint with the U.S. DOT against the government of Japan. Northwest argued that Japan refused permission for it to operate a fifth freedom flight from Seattle over Tokyo to Jakarta (Indonesia), in violation of the terms of the 1952 treaty. DOT eventually agreed with Northwest, but deferred any responsive action. In 1998, the U.S. and Japan signed an MOU that further amended the U.S.-Japan bilateral air service agreement and expanded the operating rights of U.S. and Japanese carriers in these markets.

4.5.2 The Open Skies Agreement

In 2009, the U.S. and Japan signed a new MOU that significantly liberalized the 1952 agreement. That MOU was formally adopted by both countries in 2010. It effectively eliminated regulatory limits on flights and has been characterized as an “Open Skies” agreement. Hawaiian Holdings Inc., United Parcel Service Inc. and US Airways Group Inc. are among other U.S. carriers that no longer face flight limits under the Open Skies agreement.

Under the terms of the 2010 agreement, both U.S. and Japanese carriers could offer scheduled flights from Tokyo Haneda Airport (HND) to U.S. cities. While slot awards are generally not part of bilateral air service agreements, the Japanese government also agreed to increase the number of operating slots at Tokyo Narita International Airport (NRT). The total number of operations at Narita was to increase from a maximum of 220,000 in 2009 to 270,000 annual movements as of March 31, 2013. (That day also marked the inclusion of NRT in the Open Skies framework and marked the relaxation of night-time operation restrictions.) The airport intends to increase capacity further to 300,000.

Following the formal agreement between the two countries, the U.S. Department of Transportation (DOT) granted antitrust immunity to two joint ventures between U.S. and Japanese airlines.¹⁹ DOT granted antitrust immunity for the separate applications of (1) Star Alliance members All Nippon Airways, Continental Airlines and United Air Lines²⁰ and (2) American Airlines, Inc., and Japan Airlines.

4.5.3 Access to Haneda Airport

Tokyo is served with two major airports. Tokyo Narita International Airport is the primary facility that serves international long-haul traffic. It was planned during the 1960s to relieve congestion at closer-in Tokyo Haneda Airport. Narita opened for operations in 1978. Since then, it has grown to become the 13th largest airport in the world in terms of total international passenger traffic in 2013.

Tokyo International Airport at Haneda is at the center of the Japanese aviation market, with about 48 percent of Japan's total air passengers traveling through Haneda. In 2013, based on data from ACI World, it was the world's fourth busiest airport, serving 68.9 million total passengers. Both JAL and ANA have hubs at Haneda. The airport is also the preferred gateway for many Tokyo travelers, being geographically much closer to downtown Tokyo than Narita International, which is nearly 80 km to the east.

Haneda was the primary international airport serving Tokyo until 1978; from 1978 to 2010, Haneda handled almost all domestic flights to and from Tokyo as well as "scheduled charter" flights to a small number of major cities in East Asia, while Narita International Airport handled the vast majority of international flights. In 2010, a dedicated international terminal was opened at Haneda in conjunction with the completion of a fourth runway, allowing long-haul flights during night-time hours.

Haneda opened up to long-haul service during the daytime in March 2014. At that time, Haneda's official capacity increased to accommodate roughly 40 additional international flights per day. Of those, MLIT noted that it would allot 20 for domestic airlines and the rest for foreign carriers. According to the airport, international carriers now offer nonstop service to 25 cities in 17 countries.

Following the Open skies agreement with the U.S., DOT also allocated four daily slot pairs to U.S. carriers to provide scheduled combination services between the U.S. and Haneda Airport. The U.S. DOT allocated the four slot pairs to Delta (two slot pairs), United, and Hawaiian. Delta used one of those slot pairs for service from Detroit. It later moved that service to Seattle. However, as of February 2015, the DOT agreed to review the allocation of the slot pair awarded to Delta for service from Seattle for possible re-allocation. Several U.S. carriers had argued that Delta's Seattle-Haneda service was not an effective commercial use of the rare slot pair.

¹⁹ For a discussion of linkage between open skies and the granting of antitrust immunity for airline alliances, see International Transport Forum of the OECD, "Air Service Agreement Liberalisation and Airline Alliances," 2014. This report was prepared for ITF by InterVISTAS Consulting Inc.

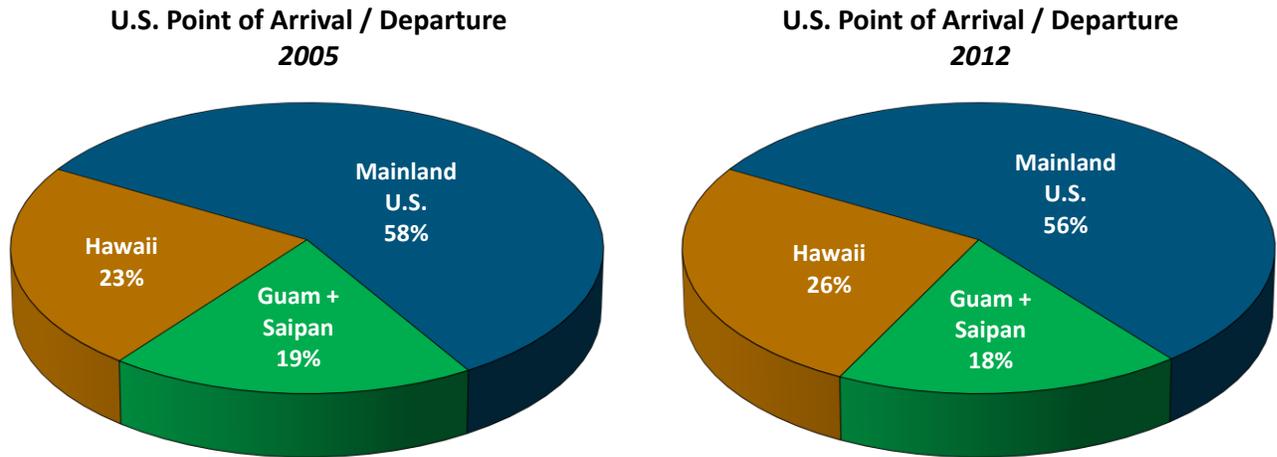
²⁰ Although the merger between United and Continental closed on October 1, 2010, the Department's analysis of the application for antitrust immunity assumed that the two airlines would remain separate and independently operated corporations.

4.5.4 Service to U.S. Island Territories and Hawaii

A unique aspect of U.S. – Japan traffic is that a large portion flies between Japan and the U.S. territories of Guam and the Commonwealth of the Marianas Islands (Saipan) – two significant tourist destinations for Japanese-originating traffic. Nearly 20% of the seats available in the U.S. – Japan market were scheduled for service to Guam and Saipan in 2005. If Honolulu is included with Guam and Saipan as another major tourist destination, then 42% of all seats between the two nations were operated to those destinations in 2005.

Those travel patterns changed slightly in 2012. The share of seats going to U.S. island destinations rose to 44%, in part because of the new access that Hawaiian Airlines gained.

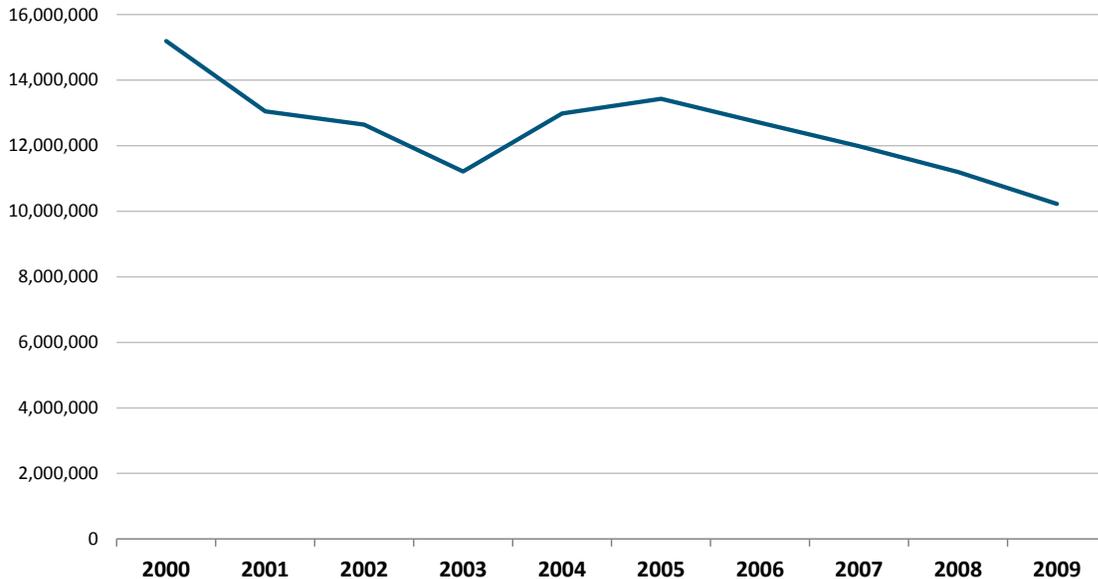
Figure 4-22:
U.S. Point of Arrival / Departure, 2005 vs. 2012



4.5.5 Change in Passenger Traffic and Capacity

Total passenger traffic between the U.S. and Japan declined in the years leading up to the open skies agreement. At least part of the reduction in total traffic may be attributable to the global slowdown in passenger demand following the 9-11 attacks on the United States. In addition, the global financial crisis of 2007-2008 also significantly reduced passenger demand.

**Figure 4-23:
Total passenger traffic on-board, U.S. – Japan, 2000 – 2009**



- Between 2000 and 2003, total passenger traffic in the U.S. – Japan market fell by over 25%, from 15.2 million to 11.2 million.²¹
- After rebounding temporarily, total U.S. – Japan traffic fell for four consecutive years between, dropping by another 3.2 million annual passengers from 13.4 million to 10.2 million (-24%).

In total, between 2000 and 2009, total US-Japan traffic dropped by nearly 5 million, or 33 percent. Of the carriers in the market, only American Airlines flew more traffic in 2009 than it did in 2000 (an increase of 52,000, or 8 percent). All others lost traffic. ANA’s passenger traffic dropped by nearly 700,000 (47 percent). Delta/Northwest’s total traffic fell by 860,000 (21 percent). United/Continental’s traffic dropped by 580,000 (20 percent). And fifth freedom airlines flowing passengers on the US-Japan segment (e.g., China Airlines, Korean Air, Malaysia, Airlines, Singapore Airlines, Thai Airways, and Varig) also flew less traffic in 2009 than they did in 2000.

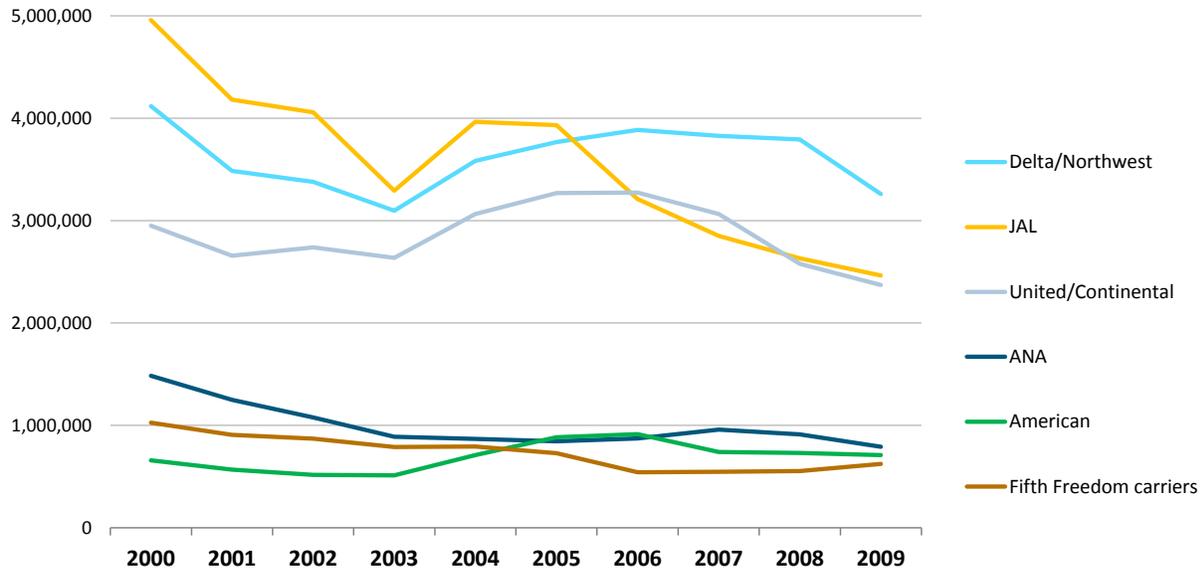
The largest loss of passenger traffic, however, was experienced by JAL, which failed financially, coinciding with the global financial crisis. JAL suffered nearly \$1.4 billion in losses from March to September 2009.²² At the point of announcing its bankruptcy in January 2010, JAL held nearly \$25 billion

²¹ Figures from U.S. Department of Transportation T-100 onboard data.

²² Harry Garner, “The Economic Downfall of Japan Airlines and Prospects for Reorganization,” Bloomberg Law Reports –Bankruptcy Law, 4 no. 34, 4, 34.

in debt, requiring significant restructuring.²³ Between 2000 and 2009, JAL’s total Japan – U.S. passenger traffic collapsed by half, dropping from nearly 5 million to 2.5 million annually.

Figure 4-24:
Change in Passenger Traffic by Carrier, 2000 - 2009



4.5.6 Change in Passenger Traffic Following Open Skies

Passenger traffic increased notably following the Open Skies agreement. Between 2009 and 2012, total traffic increased by 1.2 million (11 percent). Every carrier except JAL carried more traffic, including the 5th freedom carriers. (JAL’s traffic continued to drop until beginning to recover in 2012.)

Figures 4-25 through **4-27** illustrate the change in traffic and the markets operated between the U.S. and Japan between 2005 and 2012.

²³ Hiroko Tabuchi, “JAL Bankruptcy Sets Off Reorganization and State-Led Bailout,” The New York Times, January 19, 2010. JAL was able to reimburse its debts in full after its relisting on the Tokyo Stock Exchange on September 19, 2012.

**Figure 4-25:
 Traffic Growth by Carrier, 2008-2012**

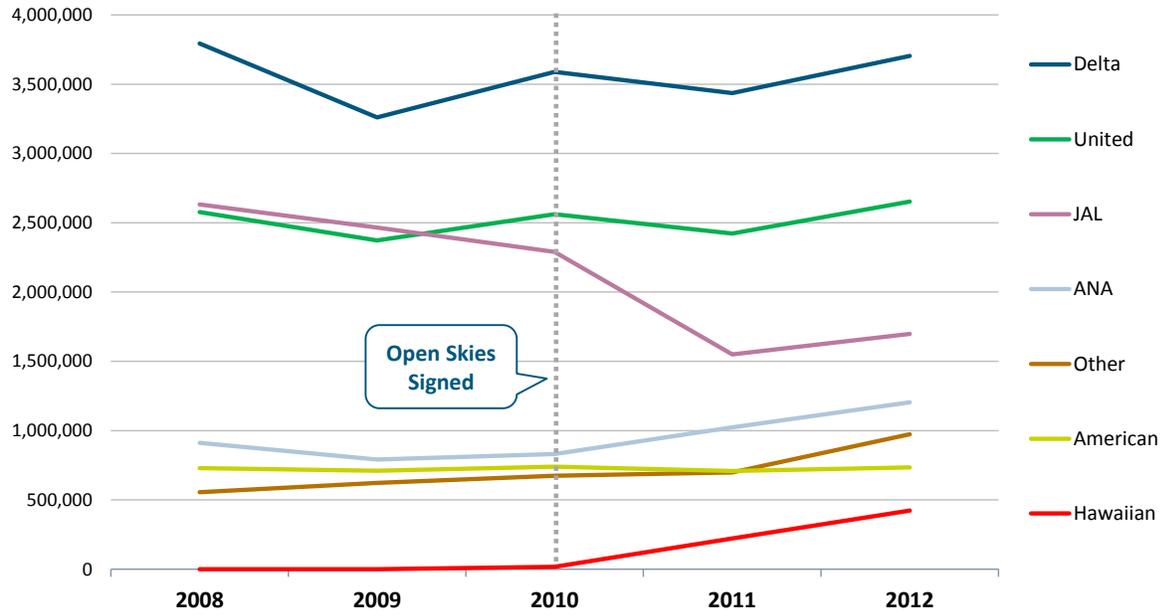
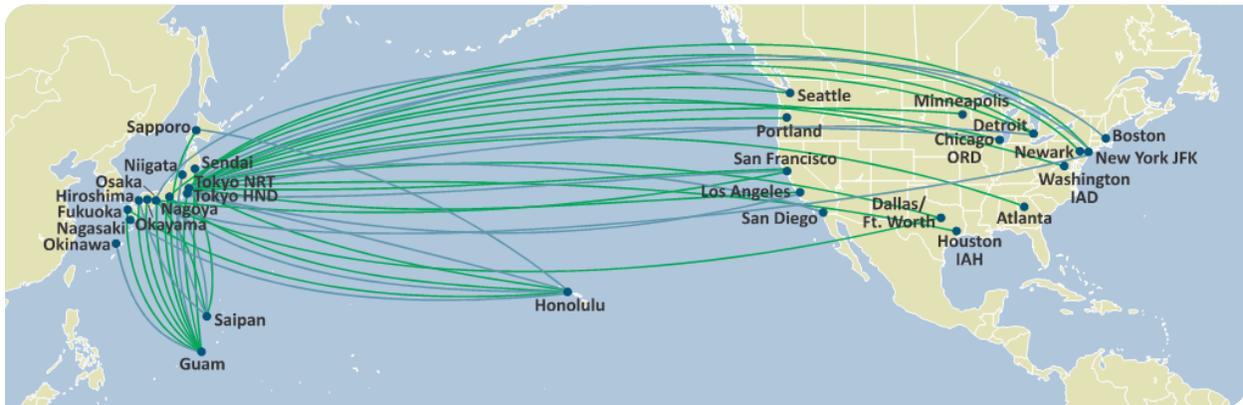


Figure 4-26:
Air Service between the U.S. and Japan, 2005



Figure 4-27:
Air Service between the U.S. and Japan, 2012



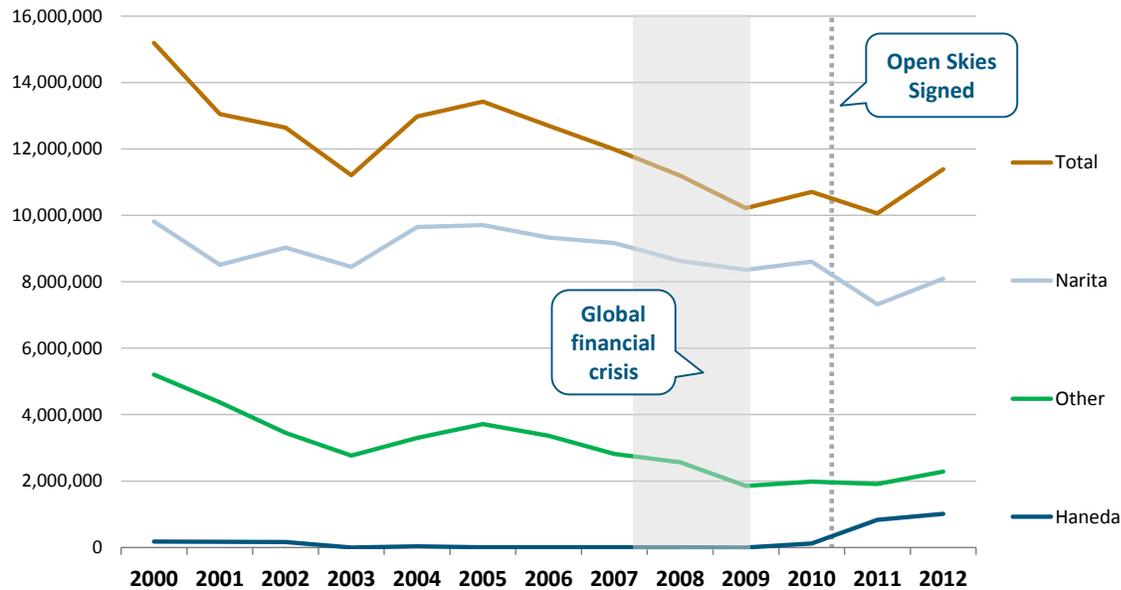
The 2010 Open Skies agreement created the opportunities for carriers to expand into new markets. These included:

- Hawaiian Airlines, which initiated service in late 2010 from Honolulu to Tokyo, Osaka, Fukuoka, and Sapporo.
- JAL and ANA, which launched new nonstop service to different U.S. cities, notably using new B787 widebody aircraft. For example, JAL launched service from Narita to Boston and San Diego and ANA launched service from NRT to Seattle.

In addition, the agreement led to the creation of new highly-coveted slots at Haneda International Airport. As a result, carriers launched a number of new markets in 2012:

- ANA launched service to Honolulu and Los Angeles.
- JAL launched service to Honolulu and San Francisco.
- Delta began serving Haneda from both Detroit and Los Angeles
- United launched service to San Francisco.
- Hawaiian began service from Honolulu.

**Figure 4-28:
Passenger Traffic Rebounded Following Open Skies**



Despite the global financial crisis, between 2005 and 2012, carriers added 7 new nonstop routes and increased the overall number of total departures by 60. That is, in general, the Open Skies agreement allowed carriers to open new markets, and total passenger traffic to rebound to the highest levels in five years.

The liberalized agreement between the U.S. and Japan helped reverse years of passenger traffic declines and created the opportunities for carriers to begin serving new markets.

4.6 Role of 5th and 7th Freedoms in Enhancing Global Air Cargo Connectivity

4.6.1 Background

Air liberalization is commonly thought to benefit only passenger air services. Often overlooked, however, is the positive impact that air liberalization has on air cargo and cargo networks, which grow and expand independent of passenger air services. In terms of weight, an estimated 1% of cargo is transported by air; however, it represents 35% of trade by value. Thus, air cargo operations are integral to global economic growth

Air cargo can move internationally by different methods. According to the World Bank, the industry can be divided into different segments.²⁴

- Scheduled passenger airlines. Much cargo is transported in the bellies of passenger airlines. Passenger airlines may also operate dedicated freighters, such as Cathay Pacific. Passenger airlines carrying cargo are referred to as "combination carriers."
- Scheduled cargo only: Carriers such as Cargolux provide regularly scheduled cargo-only flights. Combination carriers and dedicated carriers, along with their freight forwarders, together account for 90% of all air freight tonnage.
- Integrated express carriers: These carriers provide full service and compete with the more traditional freight forwarder/scheduled carrier combination. The cargo carried consists mostly of small packages. Integrated carriers move goods from origin to destination. In addition to transporting goods between airports, integrated carriers provide door-to-door service for packages and freight, including ground transportation. Examples of integrated carriers are FedEx and UPS.
- Dedicated charter operators: These are operators that are hired for specific delivery and do not carry a regular schedule. Providers of complex services are included here, such as extra-heavy lifting capabilities.

Carriers using 5th and 7th freedoms can effectively build extensive air cargo networks that span continents, which link markets around the globe enabling businesses to expand their product and service offerings more broadly.

4.6.2 Air Liberalization Enables Trade and Economic Growth

In 1992, the volume of air cargo tonnage handled by U.S. carriers was 7.5 million ton-miles of international air cargo. Currently, the total volumes have increased to 50 million ton-miles, or a nearly 7 fold increase in traffic over the past 20 years. Open skies and other air service agreements that have allowed air carriers to expand their networks and transport more goods, which have resulted in greater reach and opened up new trade opportunities.

²⁴ <http://www.ppiaf.org/freighttoolkit/knowledge-map/air>

The Air Transport Agreement between the U.S. and Europe signed in 2007 did not have any restrictions on 5th freedom flights within or beyond the EU. As a result, U.S. cargo operators were allowed to develop hub operations in Europe. Cargo services are further promoted through the guarantee of access to customs facilities and processing, choices for ground-handling, and the use of surface transportation in connection with flights. Through these provisions, cargo carriers have the ability to control cargo from the point of pick-up to the final destination.

In response, U.S. cargo operators made major investments in foreign airports that not only serve the U.S. to European market, but also provided enhance cargo connectivity within Europe and connected Europe with the global market to facilitate the movement of high-value express cargo. This is illustrated by FedEx's development of its hub at Paris' Charles de Gaulle International Airport and UPS' operations at Cologne. In 2014, UPS estimated the value of its investment at Cologne-Bonn to be \$200 million (USD). The US-EU agreement for example also allowed FedEx to operate service between London Stanstead and Paris. At its Paris facility, as far back as 2009, FedEx reported that it was operating 300 flights per week.²⁵

The development of hub operations like these has allowed the integrated cargo operators to develop and expand their business models. The freedoms allow FedEx to utilize ultra-long range aircraft freighters, with high capacity to serve multiple markets which are not possible on a 3rd freedom basis.

FedEx has developed a hub at Kansai International Airport in Osaka, Japan, and a hub at Dubai International Airport (United Arab Emirates) using 5th and 7th freedom rights. The North Pacific Regional Hub at Kansai serves as a consolidation and transshipment point for shipments between Asia and the United States, giving customers greater access to and from markets in Asia-Pacific, the Americas and Europe. On top of the current direct flight routes to the United States, a new route to Indianapolis in Indiana has been added. For service delivery to Europe, there are regular flights to Paris via Narita.

The Dubai hub, enabled by the U.S. – U.A.E. open skies agreement, allows FedEx to better link the Middle East to its Asia, Europe and India hubs. The hub allows shippers and receivers to access North America, Europe, the Middle East and India to have reduced delivery time frames and later pick-up deadlines, which increase the productivity of their businesses and the level of customer service they offer.

The development of offshore cargo hubs to facilitate trade is not confined only to U.S. cargo carriers. DHL expanded its presence in Bahrain in 2005, where it established a regional headquarters. The air carrier built expanded aircraft hangar space and warehousing space to accommodate increased connections and links to DHL's other hubs in Europe.²⁶ In 2011, DHL added a direct Cincinnati service to Bahrain to connect North America with the Middle East. In addition to connecting two world regions with better service, the route decreased delivery time by one day to help meet growing demand. Additionally, the route has allowed DHL to invest and expand its global connections and improve customer service.²⁷ These service expansions would not be possible without 5th and 7th freedom rights.

²⁵ <http://about.van.fedex.com/newsroom/europe-english/fedex-hub-at-roissy-charles-de-gaulle-expands-to-mark-10th-anniversary-2/>

²⁶ <http://www.arabianbusiness.com/dhl-expands-bahrain-hub-64368.html>

²⁷ <http://gulfnews.com/news/gulf/bahrain/dhl-introduces-direct-bahrain-cincinnati-route-1.819556>

4.7 India

4.7.1 Background

The following case study summarizes the effects of liberalizing the domestic air service market in India as a result of deregulation. India is the second most populous country in the world with over 1.3 billion people. The Indian aviation market is the 9th largest market. It is also one of the fastest growing aviation markets, projected to be ranked 3rd globally within the next 5-10 years. In addition, the Indian domestic market is the 5th largest domestic O&D market in the world.

In 1953, the Government of India established the Air Corporation Act which combined all domestic services. The government of India decided to “guide the orderly growth and evolution” of the industry by creating two state-owned national carriers – Air India (for international travel) and Indian Airlines (for domestic travel). Existing carriers (many of which were making losses) were folded into these airlines.

The deregulation of the Indian economy that started in the mid-1980s proceeded more aggressively after the New Economic Policy in 1991, eventually leading to opening up the airline sector. The repeal of the Air Corporation Act in 1994 removed the monopoly on scheduled services and enabled new privately-owned airlines to operate schedule services. This allowed carriers that formerly operated only charter services (such as Jet Airways) to offer competitive scheduled service against incumbent “national carriers” Air India and Indian Airlines. Over the following years, several new airlines including Damania, EastWest, Jet, Sahara, Modiluft and NEPC started operations. However, high fuel costs, infrastructure constraints, and regulatory burdens and requirements (e.g., to operate to certain specified locations traditionally regarded as underserved), coupled with poor management and assorted business challenges led to a shakeout of carriers. Jet and Sahara were thus the only survivors of the first phase of liberalization of the Indian domestic airline industry.²⁸ Jet catered to business travel by focusing on punctuality and excellent service. Sahara offered connectivity to a part of the country that was historically under-served.

In 2003, a second phase of development of the Indian airline industry began. New privately-owned low cost carriers began operating scheduled services and changed the face of travel in India by reducing fares, adding nonstop routes and enhancing the ability of the growing middle class population to travel.

- Air Deccan. Air Deccan was created in 2003. Air Deccan’s CEO G.R. Gopinath said, “Deccan was founded on the simple but grand vision that every Indian must fly.” It was the first airline in India to fly to second tier cities like Hubballi, Mangalore, Madurai and Visakhapatnam from metropolitan areas like Bangalore and Chennai. Air Deccan’s phenomenal growth spurred the entry of more than half a dozen low-cost air carriers in India. Facing rising fuel prices, infrastructure constraints, and increasing competition, it was acquired by Kingfisher in 2007 and became known as Kingfisher Red, and eventually ceased operations in 2011.
- Kingfisher. Kingfisher Airlines was also established in 2003. It was owned by the Bengaluru based United Breweries Group. The airline started commercial operations in 2005 and

²⁸ Krishnan, Rishiksha T., The Indian Airline Industry in 2008, Indian Institute of Management Bangalore, v 2.0 / 1.7.2008, available at <http://www.iimb.ernet.in/~rishi/Indian%20Airline%20Industry%20in%202008%20v2.0.pdf>

international operations in 2008. By late 2011, Kingfisher Airlines had the second largest share in India's domestic air travel market. However, the airline struggled financially and in 2012, its license was suspended by the Indian Directorate General of Civil Aviation.

- SpiceJet launched in 2005 and built itself around new generation Boeing 737s. With a keen focus on controlling operating costs, SpiceJet achieving the lowest costs in the Indian industry and a flight dispatch reliability exceeding 99.5%. Spicejet also emphasized ancillary revenue to augment its low fares.
- IndiGo launched in 2006 and followed a course similar to that of SpiceJet, except that it was based on the A-320 aircraft. IndiGo made the headlines when it announced an order for 100 A-320 aircraft soon after its inception. IndiGo's management team included significant industry experience. It was led by Rakesh Gangwal, former CEO of US Air.
- Jet Lite is the successor to Sahara. Jet Airways took over Air Sahara in 2007 and renamed it JetLite. The carrier then ceased operations in 2011 when it was merged with Jet Airways's other subsidiary, JetKonnnect. (JetKonnnect has since ceased to operate as a separate brand; it was folded into Jet Airways in 2014.)
- GoAir began operations from Mumbai in 2005. It adopted a "dynamic fleet strategy" under which they brought aircraft into its operations during the winter peak season and returned aircraft to the lessors in the low season.

In 2007, the government of India decided to bring both Air India and Indian Airlines, along with Air India Express and Indian Airlines' low cost subsidiary Alliance Air under the control of one body. Air India and Indian Air were merged into under a single holding company (Air India Limited) in 2011.

4.7.2 Capacity and Traffic

The deregulation of India's domestic aviation market created near explosive growth in operations and passenger traffic.

Since 2004, there has been tremendous capacity growth in the Indian domestic market and low cost carriers have led this very rapid growth. **Figure 4-29** and **Figure 4-30** illustrate that change over time. Domestic Indian passenger traffic has increased by 13.9% a year since fiscal year 2000 and by 18.5% a year since fiscal year 2004. In 2011, the CAPA Centre for Aviation reported that domestic traffic growth in India was the fastest in the world, surpassing growth in China and Brazil. "India's domestic aviation market expansion has been the strongest in the world, tripling in the past five years, according to IATA, to become the ninth largest aviation market in the world."²⁹ That same report noted that India had witnessed an increase from 500 weekly departures in 1994 before deregulation to nearly 15,000 departures daily at in November 2011. In the prior ten years, domestic air traffic quadrupled from 13 million to 52 million.

Much of that growth occurred on new entrant airlines. Passengers carried by private airlines, both low cost carriers and full service carriers, grew by 24.4% annually from 2004-2012 while "national carrier"

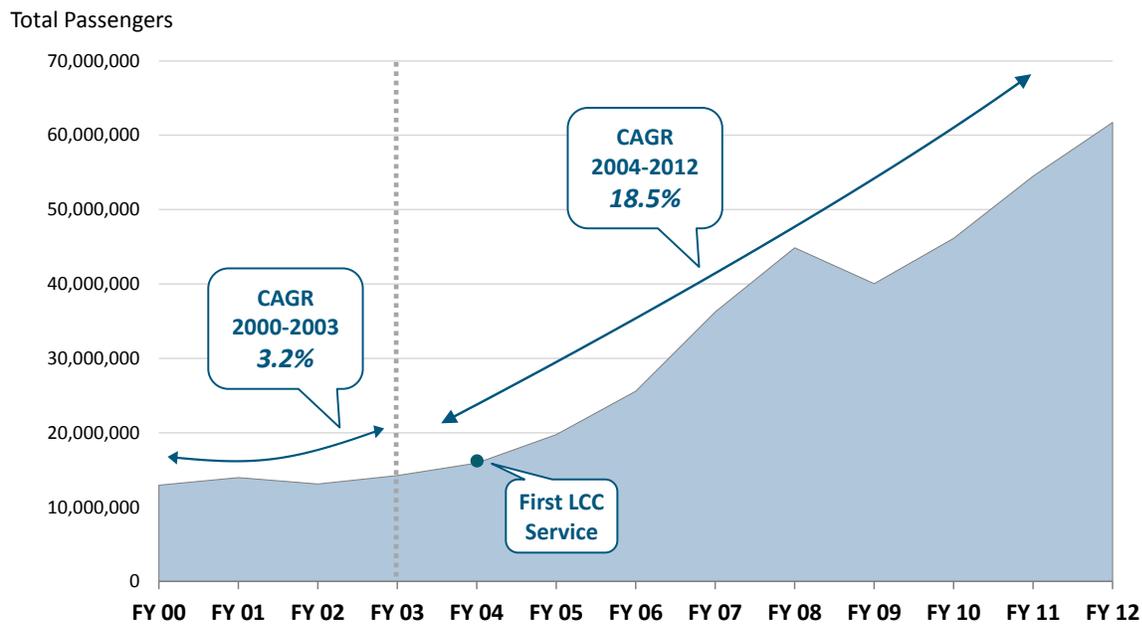
²⁹ CAPA Centre for Aviation, "India: the world's fastest growing domestic aviation market," November 2011, available at <http://centreforaviation.com/analysis/india---the-worlds-fastest-growing-domestic-market-62124>

(state-owned and controlled) traffic grew by only 4.3% annually. The largest increase in capacity (schedule seats) and traffic occurred from new entrant low cost carriers. The majority of private airlines in the market are low cost carriers.

Air Deccan exhibited phenomenal growth and spurred the entry of more than a half dozen low-cost air carriers in India. Low cost carriers now rank among the largest carriers in the domestic market in terms of capacity and passengers carried. This includes Spice Jet, IndiGo, and Go Air.

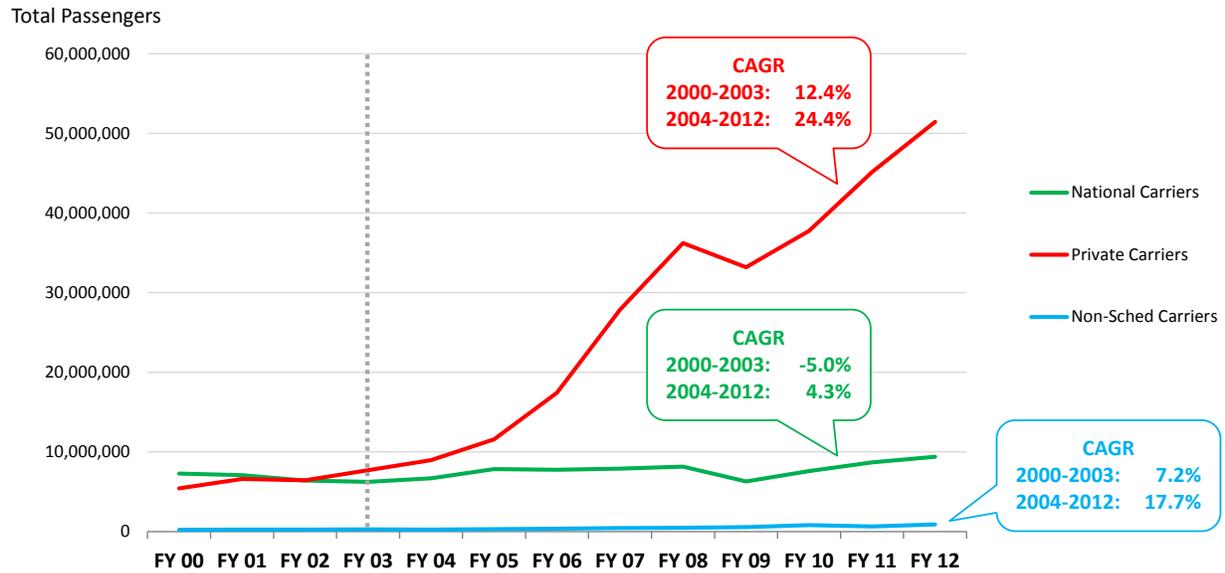
The growth of the low cost carriers also forced mainstream domestic Indian airlines to lower their fares and change their operating strategies. In order to compete better with the emerging low cost carriers, Air India established a low cost subsidiary of its own in 2007 called Air India Express. Until recently, Jet Airways also had a low cost subsidiary named Jet Konnect (formerly known as Jet Lite). While fifth freedom carriers are a very small portion of the domestic Indian market, foreign carriers have started entering the market in other ways. In mid-2014, Air Asia established the first joint-venture low cost carrier in India, Air Asia India.

**Figure 4-29:
Total Passengers Carried in Domestic India Market**



Source: Directorate General of Civil Aviation, Ministry of Civil Aviation, India

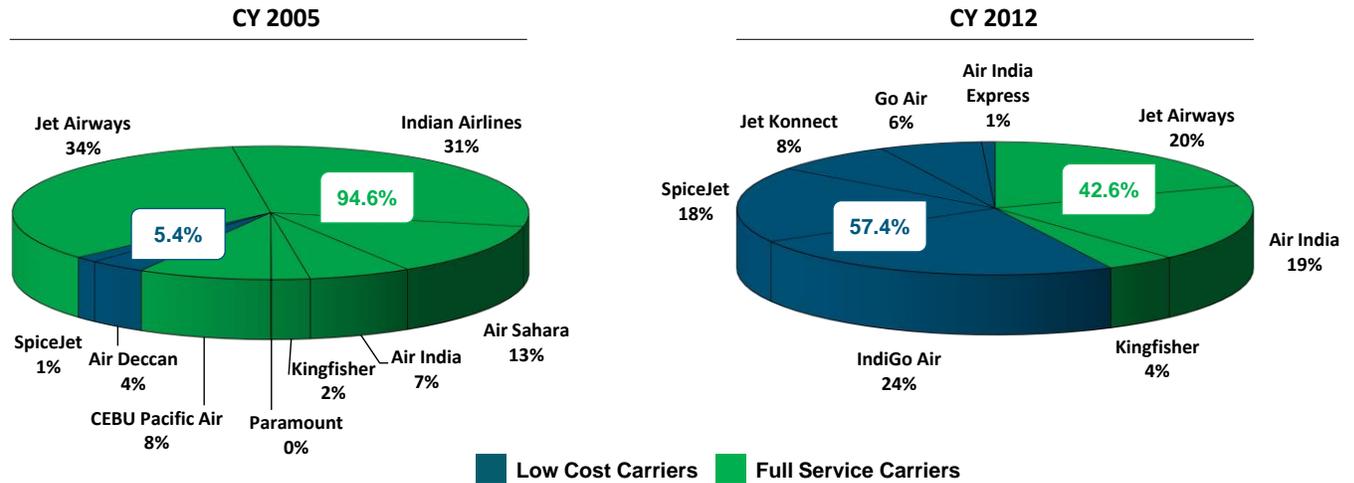
Figure 4-30:
Total Passengers Carried in Domestic India Market by Carrier Type, FY 2000 - FY 2012



Source: Directorate General of Civil Aviation, Ministry of Civil Aviation, India

Figure 4-31 below shows, overall low cost carrier market share of scheduled capacity was about 5.4% in 2005. That share increased to an amazing 57.4% by 2012. The largest carrier in the domestic Indian market is the low cost carrier IndiGo. In addition, the second largest low cost carrier, Spice Jet, operates almost as many seats as the two largest full service carriers. In 2005, six full service carriers operated in the market while only two were low cost carriers. In 2012, there are five low cost carriers and three full service carriers.

Figure 4-31:
Annual Scheduled Seat Shares in the Indian Domestic Market by Carrier and Carrier Type, CY 2005 & CY 2012

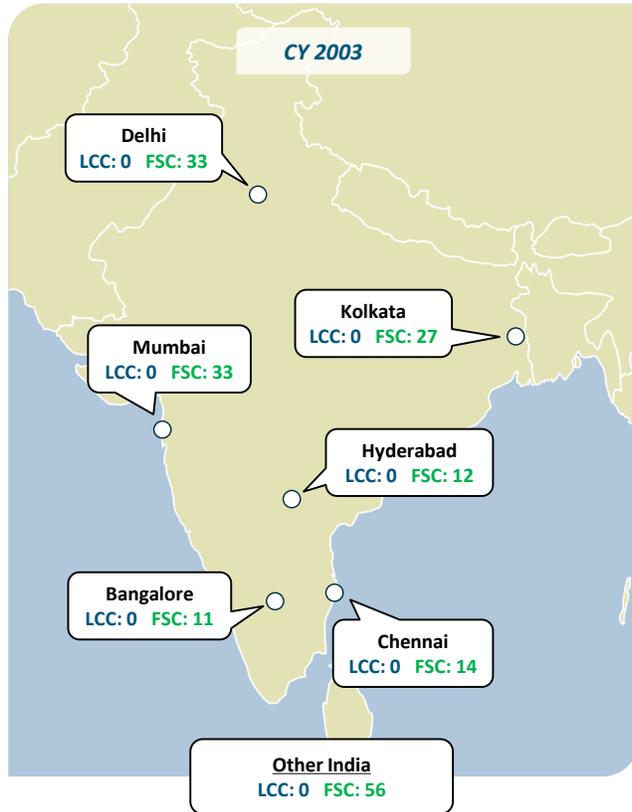


Source: Innovata Schedules via Diio

4.7.3 Trends in Capacity and Traffic

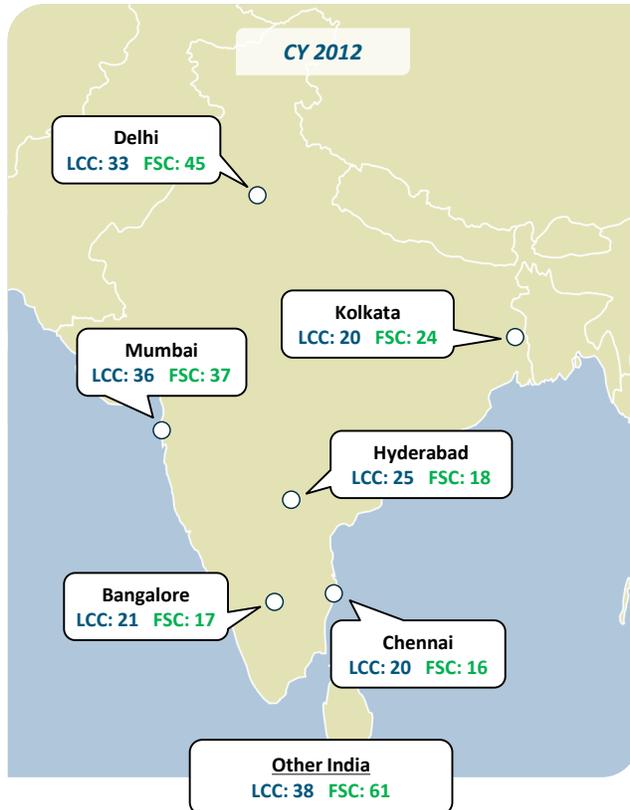
Figure 4-32 shows nonstop domestic routes served from the six largest (or major) Indian airports (Bangalore, Chennai, Delhi, Hyderabad, Kolkata and Mumbai) and other Indian points in CY 2003. In total there were 175 nonstop markets served, and approximately 30% (56 in total) of those routes did not involve the largest airports. This includes routes such as Ahmedabad-Vadodara, Calicut-Cochin and Goa-Poona. Overall, airlines operated more domestic nonstop routes from Delhi and Mumbai than other Indian airports.

Figure 4-32:
Nonstop Domestic Routes Served from Top Indian Airports by Carrier Type, CY 2000



Source: Innovata Schedules via Diio

Figure 4-33: Nonstop Domestic Routes Served from Top Indian Airports by Carrier Type, CY 2012

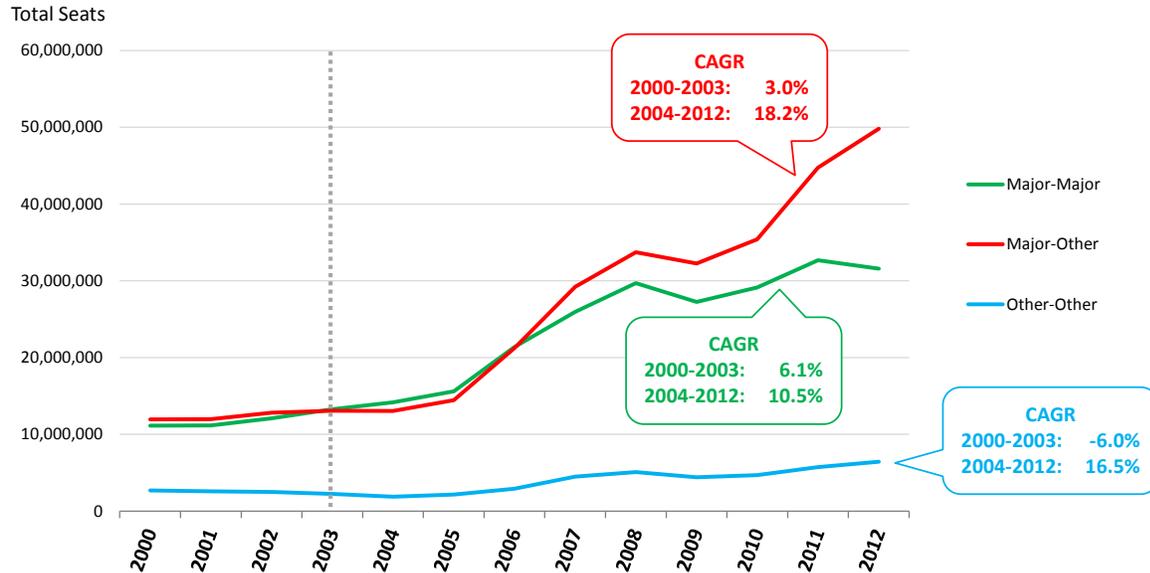


Source: Innovata Schedules via Diio

Comparing the differences in service patterns shown in the maps for 2003 and 2012 leads to a number of conclusions about the effects of deregulation. The total number of routes in **Figure 4-33** reflects both the increase in service resulting from new low cost service and the competitive response of full service carriers. The total number of domestic nonstop routes has increased by nearly 45% from 175 to 254. Low cost carriers operate on 181 (or 71%) of those routes. In Hyderabad, low cost carriers operate on all of the nonstop routes served. In addition, while approximately 70% of routes still are to/from and between the top airports, the number of routes operated between secondary Indian airports increased from 70 in 2003 to 77 in 2012. Delhi has also overtaken Mumbai as the airport with the most nonstop domestic routes served.

Service to secondary airports increased significantly over time. Services between the six largest airports or major markets themselves increased by 10.5% annually since 2004, while capacity from those top markets to secondary Indian airports increased by over 18.2% a year. Nonstop capacity between the secondary markets themselves has increased by 16.5% annually. Annual seats between the major markets and secondary Indian airports currently account for approximately 57% of domestic Indian capacity, while seats between the major markets themselves accounts for 36% of capacity.

Figure 4-34
Annual Scheduled Seat Capacity in the India Domestic Market by Market Type, CY 2000-CY 2012



Note: Major markets include the 6 largest Indian airports: Bangalore, Chennai, Delhi, Hyderabad, Kolkata, Mumbai.
Source: Innovata Schedules via Diio

Economy cabin fares have decreased by nearly 45% (while premium cabin fares have increased by over 70%). While full service carriers have lowered economy fares to compete with low cost carriers, they have been able to increase fares for first and business class passengers not served by low cost carriers. Even though there has been consolidation and airline failures in the domestic Indian market, capacity and traffic is expected to continue to grow, albeit at a slower rate. As the middle class in India continues to expand, and as the nation addresses critical constraints on its aviation infrastructure, passenger demand for

Year	O&D Psgrs	Avg. Prem Cabin Fare	Avg. Econ. Cabin Fare	Annual Departures	Annual Seats
CY 2005	15,841,316	\$186	\$113	260,122	32,237,616
CY 2012	54,073,729	\$319	\$63	595,328	87,846,996
Change 05-12	38,232,413	\$133	-\$50	335,206	55,609,381
% Chng 05-12	241.3%	71.4%	-44.1%	128.9%	172.5%

scheduled domestic and international service is also expected to grow.

5 Benefits of Further Air Liberalization

5.1 Introduction

The previous sections have illustrated and demonstrated the continuing positive effect of liberalization on consumer welfare through lower fares and increased traffic. In this section, we focus on the benefits of future liberalization. More precisely, we analyze the bilateral agreements of our dataset to identify the restrictions that have been removed since 2005 as well as those still in place in 2012.

Based on this analysis of existing restrictions in the bilateral agreements, it is possible to identify the level of effort to support further liberalization in the coming years. Finally, we provide an estimation of the expected benefits of further liberalization assuming that all the bilateral country pairs of our dataset would be liberalized.

5.2 Global Impact

We first take a look at the existing research estimating the overall impact of further liberalization. The Air Transport Action Group (ATAG) reports³⁰ that if all markets were liberalized, global air traffic would have increased by roughly a half billion passengers. This estimation is based on 3.1 billion passengers carried by the world's airlines in 2013.

Further, ATAG documents that 8.7 million people globally are employed directly in aviation. Full liberalization would thus have increased employment by roughly 1.4 million. Over roughly a 20 year period, that would equate to nearly 30 million person years of employment.

But the employment benefits are not confined only to airline workers. ATAG found that 58 million people are employed in aviation and in aviation dependent tourism. A 16% increase in traffic from liberalization would have an overall effect of 9 million jobs in aviation and aviation dependent tourism industries.

5.3 Further Liberalization

The above economic impacts assume that liberalization is present in all markets. Here we take a more realistic approach by focusing only on the country pairs among the top 1,000 (defined in terms of passenger traffic) that have not liberalized. **Table 5-1** indicates that in our sample of country pairs (only those with existing air service agreements in both 2005 and 2012), 66% are still not fully liberalized. In other words, those agreements include at least one restrictive clause among those considered.

³⁰ Air Transport Action Group (ATAG), April 2014, Aviation Benefits Beyond Borders
http://aviationbenefits.org/media/26786/ATAG_AviationBenefits2014_FULL_LowRes.pdf

**Table 5-1:
Breakdown of the Top 1,000 Country-Pairs by Year**

	2005	2012	2005 Traffic	2012 Traffic	Example Route
Number Deleted From the Data	328	328	Not applicable	Not applicable	United States-Guam
Number with "Any" Restriction	476	448	273,422,100	386,101,950	United States-Mexico
Number with Restrictions on Routes	436	374	231,634,900	295,186,950	Japan-South Korea
Number with Restrictive Pricing	410	410	219,603,200	343,018,900	Germany-Russia
Number with Single Airline Designation	152	130	68,248,800	83,994,500	Canada-Thailand
Number with Restricted or No Fifth Freedoms	149	132	74,161,150	109,919,500	China-South Korea
Number with Predetermined Capacity	298	278	139,462,600	226,018,040	Canada-China
Number with Bermuda Capacity	142	126	114,606,900	119,754,550	Canada-Japan
Number with "All" Restrictions	42	33	18,518,700	27,474,400	China-Philippines
Number with No Restrictions	196	224	249,488,350	359,757,500	Germany-Spain

Notes: Dual year observations only

Country pairs deleted from the dataset due to being domestic routes, having missing data (i.e., bilateral info, socio-economic), or not being in both years.

Of the top 1,000 country pairs, we eliminated 328 from our analysis due to missing data or other reasons. For the remaining 672 pairs, 476 had some form of restriction in 2005. In 2012, this number decreased to 448, a decrease of 5.8% in 7 years. Over the same time period, the number of fully liberalized country pairs grew from 196 to 224, an increase of 14%. The most frequently removed restriction was the restriction on routes; 62 country pairs removed that restriction between 2005 and 2012.

The country pairs that are still not liberalized include a number of the largest nation pair markets in the world, especially those in Asia such as China – South Korea, Japan – South Korea, Indonesia – Malaysia, and Malaysia – Singapore.

In 2012, the state of liberalization could be described as follows:

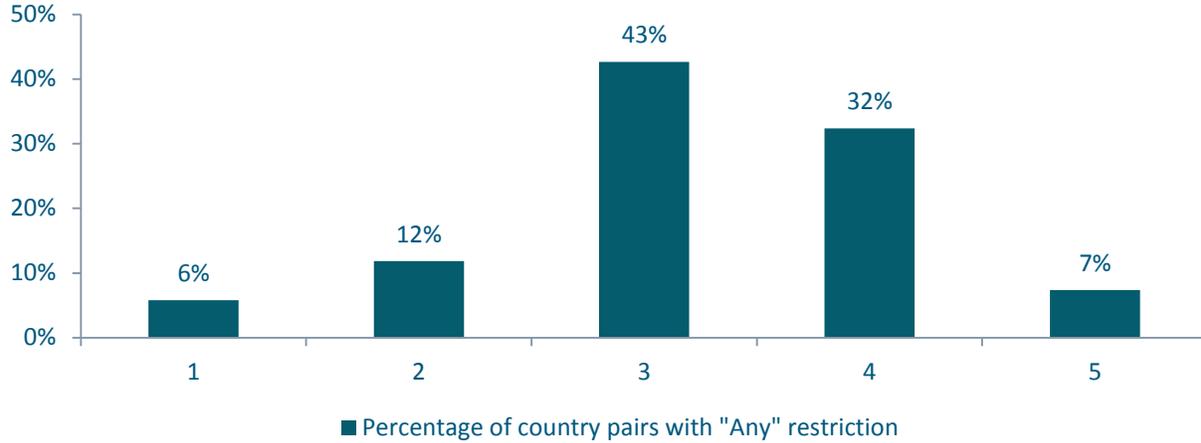
- Only 33% of bilateral agreements are fully liberalized, meaning they have no restrictions among those considered in this study.
- Among those having at least one restriction, we observe that:

- The primary restrictions that still remain are “restriction on routes” and “restrictive pricing” with respectively 92% and 86% of country pairs agreements still having these restrictions
- 62% of country pairs still have the “Predetermined Capacity” restriction.
- Roughly 30% of country pairs still have one of the following restrictions:
 - Single Airline Designation
 - Restricted or No Fifth Freedoms
 - Bermuda Capacity
- Finally, 7.3% are still fully restricted.

Little progress has been made on liberalization among the top 1,000 country pairs analyzed. To further analyze the state of liberalization in 2012, we examined the number of restrictions that remained in each country pair. Bilateral air services agreements are characterized by different combinations of restrictions. One way to identify the extent of liberalization is to consider the number of restrictions included in each bilateral agreement. This simple analysis provides insight on the effort needed to reach a higher level of liberalization. For example, if 100% of the partially liberalized bilateral agreements would only have one remaining restriction, one can assume that liberalization has made good progress.

However, the reality is different. The analysis of the number of remaining restrictions per country pair revealed that major progress in air service liberalization is still needed. Of those country pairs that have at least one restriction in **Table 5-1**, 82% still have 3 or more restrictive clauses and 39% have 4 or 5 restrictive clauses. These numbers suggest that the level of effort to liberalize air service is still relatively high. To advance liberalization and its consumer benefits globally, international organizations such as IATA, ICAO or OECD will need to strengthen their communication and promotion efforts.

**Figure 5-1:
Percentage of Country Pairs by Number of Restrictions in 2012**



Source: ICOA data

Another way to analyze the extent of liberalization globally is to identify patterns in the restrictions remaining in bilaterals. This analysis shows which restrictions are generally removed first by country pairs.

Table 5-2 summarizes which restrictions still remain in country pairs, depending on the number of restrictions they have.

**Table 5-2:
Percentage of Country Pairs by Restrictive Clause in 2012**

Number of restrictive clauses remaining	Predetermined Capacity	Single Disapproval Pricing	Named Routes	Airline Designations	Bermuda Capacity	Fifth Freedom
1	8%	35%	12%	0%	4%	42%
2	49%	68%	36%	2%	32%	13%
3	53%	98%	93%	2%	41%	12%
4	80%	99%	97%	64%	19%	40%
5	97%	100%	100%	100%	3%	100%

Source: ICAO data

We observe that the remaining restrictions depend on the level of liberalization:

- For those country pairs that only have one restriction, 35% have a restriction on “single disapproval” and 42% on fifth freedom.
- For those country pairs that only have two restrictions left, a large part of them (68%) have a restriction on “single disapproval”, almost half of them have “predetermined capacity”. We observe that contrary to the country pairs with only one restriction, only 13% have a restriction on fifth freedoms.
- For those country pairs that only have two restrictions left, an overwhelming majority (>93%) still have restrictions both on “single disapproval pricing” and “named route” and half of them have predetermined capacity. Here again, we observe that only 12% of them have restricted fifth freedom rights.
- For those country pairs that have 4 restrictions left, we note that the Bermuda Capacity restriction is the first removed (19%) followed by fifth freedom (40%) and airline designation (64%).
- For those country pairs that have 5 restrictions left, apart from a few exceptions, only the Bermuda Capacity restriction is removed (3%).

These observations illustrate that liberalization of air service agreements still requires support to progress. To enable the air service liberalization to deliver its benefits to consumers, the focus should be made on those country pairs with only one or two remaining restrictions. If only these country pairs were fully liberalized this would represent an increase of 55% of fully liberalized country pairs compared to 2005.

5.4 Benefits of Further Liberalization for Restricted Country Pairs in Our Study

Given the range of impacts found in this study and other recent studies, air liberalization is still providing positive benefits for consumers. Our econometric analysis shows that the progress of liberalization between 2005 and 2012 has increased traffic by 16%.

Our results are in line with recent academic literature. The 2012 study by Cristea, Hummels and Roberson showed that traffic growth in countries that signed open skies agreements (OSAs) rose 18% more than in non-liberalized countries after five years. The study also showed that the introduction of new routes accounts for over one-third of the increased traffic growth in OSA signatory countries.

That same year, Winston and Yan estimated the impact of open skies agreements based on sample of the top 500 non-directional international routes from 2005 to 2009. The findings indicated that the short-run effect of an open skies agreement led to a reduction of 50% on fares in the full sample and approximately 25% in the subsample of U.S. international routes. The study estimated that open skies agreements have generated at least US\$4 billion in annual gains to travelers and that travelers would gain an additional \$4 billion if the U.S. negotiated agreements with other countries that have a significant amount of international passenger traffic.

According to our data (Table 3-1), the country pairs that have restrictions account for 386 million passengers. **If only these pairs adopted liberalized air service agreements, we estimate that the change would increase passenger traffic annually by 62 million, which in turn would generate \$50 billion annually increased GDP (Table 5-3).**

**Table 5-3:
Parameters Used for Computation**

Parameters	Value
Number of passengers considered (A)	386,101,950
Impact on traffic from our econometric model (B)	16%
Additional traffic estimated (A*B)	62 million
ATAG estimation of GDP impact (total economic impact -this includes direct, indirect, induced and tourism catalytic) ³¹ (C) (US dollars 2012)	\$2.4 trillion
ATAG number of passengers considered (D)	2.97 billion
GDP impact / passenger (C/D) (US dollars 2012)	\$808 per passengers
Total estimated impact (US dollars 2012)	\$50 billion

Further liberalization would generate significant benefits. It would create 62 million additional passengers due to lower fares and air service development. Based on our sample and the results of ATAG’s analysis, we estimate that further liberalization would generate US\$50 million. But to reach these results, bilateral agreements need to be relaxed. In 2012, only 33% of the bilateral agreements considered in our analysis were fully liberalized. The number of fully liberalized agreements increased by 14% between 2005 and 2012.

³¹ Air Transport Action Group (ATAG), April 2014, Aviation Benefits Beyond Borders
http://aviationbenefits.org/media/26786/ATAG_AviationBenefits2014_FULL_LowRes.pdf

6 Summary and Concluding Comments on Air Service Liberalization

This report shows that academic and research institute studies continue to find substantial economic benefits of air service liberalization. Our empirical analysis validates this general conclusion and our results are in line with recent research that demonstrates that air liberalization continues to produce benefits for consumers.

Literature Review. Academics and other research institutions have long studied the impacts of air service liberalization. Since our previous study, this body of literature has continued to grow. We found and reviewed additional studies from academic researchers as well as from other research institutes and industry associations. The literature has expanded to cover experiences in regions other than the U.S. and North Atlantic.

The literature review of empirical papers reveals that liberalization of air services generates significant positive impacts on airfares and traffic growth – that is, airfares generally fall and that passenger traffic grows. The research also demonstrates the continuous benefit of air liberalization for consumers. Empirical studies show that airfares fell 10% to 40% while traffic increased between roughly 18% and 75%, depending on the period analyzed, the methodology used and the markets included in the analysis. With few exceptions (which tended to rely on economic theory rather than empirical data analysis), these peer-reviewed studies clearly quantified that liberalization benefits consumers of air service liberalization.

Estimating Benefits of Recent Liberalization. This report included a new econometric analysis of the effects of liberalization, focusing on the top 1,000 country pairs in terms of passenger traffic. We used data from 2005 (the year of the previous study) and 2012 (the most recent available at the time of this research) to test whether the effect of liberalization has changed since our earlier report. In particular, we tested whether the benefits of liberalization may have waned.

The analysis revealed that liberalization increases air traffic by an amount similar to the finding in our previous study. Statistically, the results of this analysis were not significantly different from the results obtained from the prior report. As a result, we concluded that the evidence does not support a finding that the benefits of liberalization are now lower in any meaningful way. In addition to being consistent with our previous findings, our results are roughly within the range of findings from the literature review, where econometric findings of traffic benefits of liberalization were found to increase traffic in the range of 18% to 75%. In sum, our results show that liberalization continues to provide benefits to consumers as well as increased traffic compared with routes that are still not liberalized.

Liberalizing air services also generates significant employment benefits. The Air Transport Action Group (ATAG) reported that in 2013, the world's airlines carried 3.1 billion passengers. If all markets were liberalized, global air traffic could have increased by roughly a half billion passengers. Based on ATAG's estimate that 8.7 million people globally were employed directly in aviation, full liberalization would thus have increased employment by roughly 1.4 million. Over a 20 year period, approximately another 30 million person-years of employment would have been added. But the employment benefits are not confined only to airline workers. ATAG also reported that 58 million people are employed in aviation and

in aviation-dependent tourism. Based on an increase of 16% in traffic from liberalization, another 9 million jobs in aviation and aviation dependent tourism might have been generated.

The case studies included in this study highlight some of the dramatic changes in air service that have been achieved following liberalization, not only with passenger service but with cargo activities as well. They also illustrate the likely changes that can be anticipated in countries and regions where air service remains governed by relatively restricted bilateral agreements.

Benefits of further liberalization. Despite the growing recognition of the benefits that liberalization generates for airlines, employees, and consumers, our analysis indicated that two-thirds of country pairs still have at least one important restrictive clause in their bilateral agreements, most commonly Predetermined Capacity, Single Disapproval Pricing and Named Routes. Thus, significant potential future gains are still available from further air service liberalization.

The markets lacking a high degree of liberalization include some of the highest traffic markets in the world. These include many to, from, and within East, Southeast and South Asia. Further, those markets are now among the largest, and they are growing rapidly. We estimate that further liberalization of these markets would produce a benefit of 47 billion U.S. dollars per annum.

Summary. The results of our previous study of the benefits of air service liberalization are validated. Improved market access has increased traffic and has benefitted consumers. These findings are consistent with an ever-growing literature on the benefits of air liberalization, a literature which almost uniformly finds significant benefits to carriers, employees, consumers, and governments from liberalization. As we concluded in 2006, liberalizing bilateral air service agreements can generate significant gains worldwide.

Appendices

Appendix A: Freedoms of the Air

The Chicago Convention of 1944 provided the framework for today's system of bilateral Air Service Agreements (ASAs). The convention identified the five freedoms of the air that defined the terms for future negotiations of air traffic rights.

First freedom rights or "the right of innocent passage" is the right to fly over the other contracting party's territory.

Second freedom rights provide for the airline(s) of one contracting party to stop in the territory of the other contracting part, for technical reasons only. No traffic is allowed to enplane or deplane.

Third & Fourth freedom rights allow the carriers of two contracting parties (countries) to carry traffic between the two countries.

Fifth freedom rights allow the carriers of one contracting party to carry traffic destined for a point intermediate, or beyond the territory of the other contracting party. In either case, the service must originate within the territory of the contracting parties.

Sixth freedom traffic is that traffic which originates behind the gateway of one of the contracting parties, and is destined for the territory of the other contracting party. For example, hub carriers in Europe often carry traffic from points in the Middle East or Gulf States to a hub in Europe for the sole purpose of moving that traffic from its origin to another destination in Europe or North America. The practice is common, often creates contentiousness, and is not covered by bilateral agreements.

Seventh freedom rights allow the carriers of one contracting party to carry traffic between two countries without any connection to the home country. Seventh freedom operations often take place among global all-cargo air carriers and are very infrequent in passenger operations.

Appendix B: Elements of Bilateral Air Service Agreements

The Chicago Convention of 1944 laid down the current framework for international aviation. The Convention saw a very close association between national governments and the airlines that would operate the international services. In the immediate postwar era, most airlines were owned by their respective governments, and were considered to play important roles in national defense, “showing the flag” by operating high profile but money-losing routes, and serving as important tools of foreign policy. The very high fares made them largely unimportant as a mode of transportation. Their roles of generating income as businesses and fostering economic development in the communities they served also were largely irrelevant.

The Convention stipulated that two nations, seeking to be linked by commercial services, would negotiate the terms through concluding a “bilateral air service agreement” or “bilateral.” This would specify the conditions under which the proposed services would operate, in terms of the privileges granted by either signatory country to the airline or airlines of the other party. The agreement would cover such items as:

- The allowable routes that could be operated. This could range from a general statement such as “any point in Country A to any point in Country B” to an exhaustively detailed specification of individual airports, and what points could or could not be combined on a particular flight and in what order.
- Whether the flights between countries A and B could involve third countries. The agreement would often state that cities in third countries could be served only as enroute stops (“Intermediates”) on flights linking nations A and B, or by flights that continue onward after operating the A-B or B-A sectors (“Beyonds”).³² In many instances, the bilateral agreements specify in meticulous detail what services could be operated, whether the airline(s) can carry revenue traffic on such flights, what combinations of intermediate/beyond points are permissible, frequency restrictions and other minutiae.
- The number of airlines that each country may designate to the international services.
- The capacity that the airlines of each country could offer.
- A method for setting fares on the route. The agreement would specify the conditions necessary for a fare proposed by the airline of one country to become operative.
- Various “doing business” issues such as repatriation of currencies, the ability to select handling agents at foreign airports and use of computer reservations systems.

Once the two nations have concluded the bilateral agreement, each country is permitted to select the airline or airlines to operate the routes. This capability is considered an important expression of national sovereignty. Some agreements do restrict these choices. Virtually all bilateral agreements allow a nation to designate only those airlines that can demonstrate that they are corporate citizens of that country. This requires that they be substantially owned and under effective control by nationals of that country. This rule reflects the traditional identification of airlines with specific countries; a situation prevailing when the

³² An airline of country A seeking to operate a flight from A to B and on to nation C would require that both the A-B and A-C bilateral agreements would permit the service.

Convention was signed. It does not accommodate a regime where airlines are an industry “like any other,” with multinational ownership, control and operations.

The Chicago Convention framework clearly distinguishes between international and domestic services. Domestic services are strictly a matter for the respective national government. Virtually all countries prohibit foreign airlines from offering purely domestic services. They may, however, allow foreign operators to operate international flights to third countries, such as Singapore Airlines’ Los Angeles-Tokyo-Singapore route.

The Chicago Convention and the underlying bilateral agreements have become increasingly controversial. The next section summarizes how this machinery can limit international aviation.

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Appendix D: Regression Results

Table D-1 and **Table D-2** present the same regression results as seen in Section 4, with the addition of estimates for the regional indicators.

**Table D-1:
Regression Results
Pooled 2005, 2012 Country Pair Airline Traffic**

Variable	Coefficient Estimate	Standard Error	T-Statistic
Constant	4.52	0.05	9.03
GDP Product	0.38	0.01	29.39
Distance	-0.51	0.03	-14.88
2012 Indicator	0.09	0.04	1.93
Fully Restrictive ASA Indicator	-0.16	0.10	-1.61
Regional Indicators			
Africa-Asia	-0.23	0.22	-1.01
Africa-Europe	0.02	0.14	0.17
Africa-Oceania	-0.12	0.56	-0.21
Asia-CIS	0.61	0.27	2.25
Asia-Europe	-0.44	0.11	-4.07
Asia-Oceania	0.37	0.16	2.40
CIS-Europe	-0.78	0.27	-2.87
CIS-North America	-0.62	0.56	-1.11
Europe-Oceania	-0.12	0.24	-0.51
Intra-Africa	0.32	0.19	1.69
Intra-Asia	0.43	0.12	3.53
Intra-Europe	-0.29	0.13	-2.24
Intra-Latin America	-0.47	0.56	-0.84
Intra-North America	1.52	0.57	2.67
Intra-Oceania	1.62	0.26	6.25
Intra-South America	-0.15	0.18	-0.83
Latin America-North America	0.80	0.17	4.79
Latin America-South America	-0.34	0.23	-1.46
North America-South America	-0.01	0.20	-0.03

Variable	Coefficient Estimate	Standard Error	T-Statistic
Trans-Atlantic	-0.09	0.11	-0.80
Trans-Pacific ³³	Removed (Base case)	Removed (Base case)	Removed (Base case)

R-square: 0.50; Adjusted R-square: 0.50

³³ The Trans-Pacific Indicator was chosen as the base case for the regression, and was therefore removed from the computation.

**Table D-2:
Regression Results
Pooled 2005, 2012 Country Pair Airline Traffic
Liberalization Effect Different in Each Year**

Variable	Coefficient Estimate	Standard Error	T-Statistic
Constant	4.52	0.05	9.03
GDP Product	0.38	0.01	29.36
Distance	-0.51	0.03	-14.87
2012 Indicator	0.08	0.05	1.83
Fully Restrictive ASA Indicator	-0.17	0.13	-1.36
Shift in Fully Restrictive ASA Indicator for 2012	0.04	0.19	0.22
Regional Indicators			
Africa-Asia	-0.23	0.22	-1.01
Africa-Europe	0.02	0.14	0.17
Africa-Oceania	-0.12	0.56	-0.21
Asia-CIS	0.61	0.27	2.25
Asia-Europe	-0.44	0.11	-4.06
Asia-Oceania	0.37	0.16	2.40
CIS-Europe	-0.78	0.27	-2.87
CIS-North America	-0.62	0.56	-1.11
Europe-Oceania	-0.12	0.24	-0.51
Intra-Africa	0.31	0.19	1.69
Intra-Asia	0.43	0.12	3.52
Intra-Europe	-0.29	0.13	-2.24
Intra-Latin America	-0.47	0.56	-0.84
Intra-North America	1.52	0.57	2.67
Intra-Oceania	1.62	0.26	6.24
Intra-South America	-0.15	0.18	-0.83
Latin America-North America	0.80	0.17	4.79
Latin America-South America	-0.34	0.23	-1.46
North America-South America	-0.01	0.20	-0.03

Variable	Coefficient Estimate	Standard Error	T-Statistic
Trans-Atlantic	-0.09	0.11	-0.80
Trans-Pacific ³⁴	Removed (Base case)	Removed (Base case)	Removed (Base case)

R-square: 0.50; Adjusted R-square: 0.50

³⁴ The Trans-Pacific Indicator was chosen as the base case for the regression, and was therefore removed from the computation.

Mr. Steve Martin
Senior Vice President

Telephone: 202-688-2220
Fax: 202-688-2225
web: www.interVISTAS.com

InterVISTAS Consulting Inc.
1150 Connecticut Ave., N.W., Suite 601
Washington, DC 20036

Mike Tretheway
Executive Vice President and Chief Economist

Telephone: 604-717-1801
Mobile: 604-763-1801
e-mail: Mike.Tretheway@interVISTAS.com

InterVISTAS Consulting Inc.
550-1200 West 73rd Avenue
Vancouver, BC, Canada V6P 6G5

Telephone: 202-688-2220
Fax: 202-688-2225
web: www.interVISTAS.com



Prepared by

InterVISTAS Consulting Inc.

1150 Connecticut Ave, NW
Suite 601
Washington, DC 20036

Telephone: +1-202-688-2220

Facsimile: +1-202-688-2225

www.intervistas.com