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Open Skies Agreement Between Brazil and the United States: Regulations, Alliances, Economic Impacts and a General Long Term Projection

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This Capstone Project was prepared and approved under the direction of the Group's Capstone Project Chair, Dr. Leila Halawi
It was submitted to Embry-Riddle Aeronautical University in partial fulfillment of the requirements for the Aviation Management Certificate Program

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Date

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Abstract

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Title: Open Skies Agreement Between Brazil And United States: Regulations, Alliances, Economic Impacts And A General Long Term Projection

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This research has been developed based on the new United States and Brazil open skies agreement signed in 2018 with the goal to analyze regulations, alliances, economic impacts and a general long term projection. As a result, the model proposed indicates 14 potential new routes, 6 coming from São Paulo and Rio de Janeiro and 8 from other cities. The new routes create a new axis of air transport, with new direct flights programmed for the northeast, center-west and south regions. These new weekly frequencies allow an increase of 151 weekly frequencies between the two countries, going from the current 196 weekly frequencies to a total of 347, reaching a growth of 77% compared to the current levels. Based on the analysis of civil aviation market information between Brazil and the United States, the following proposals are consolidated and presented: investment in tourism promotion by the Ministry of Tourism of Brazil in the United States, investment in tourism promotion of the central and west coast of the United States in the Brazilian media and tour operators, facilitation of the North American visa process for Brazilians, concession of benefits and reduction of taxes on domestic flights (international feeders) and rapid analysis and approval of proposals for joint ventures between Brazilian and North American airlines.

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Introduction

Brazil and the United States are two of the three largest domestic air passenger markets in the world. Yearly, near 100 million passengers travel within Brazil (ANAC, 2018) and more than 300 million passengers in the United States (United States Department of Transportation, 2018). In Brazil, international passengers increased by 8.0% per year in the last decade, doubling the number of people interested in traveling abroad (ANAC, 2018).

According to Agência Nacional de Aviação Civil (ANAC), in 2017, 19.8 million passengers were carried on international flights to and from Brazil. From this total, BR-US market was the busiest, with more than 5.0 million passengers, close to 23% of total international travellers. Regarding freight traffic, BR-US market represents 31% of all international flow to and from Brazilian airports. In 2017, 233,000 tons were carried between these two countries.

The concept of "open skies" was firstly introduced for flights within the United States. Back in 1978, the aviation industry was largely regulated by authorities; routes, seat capacity and frequencies were controlled. However, from 1978, the Airline Deregulation Act changed the structure of the industry: seat capacities and routes could be set by the airlines according to market demand; from this moment new airlines were allowed to enter the market and prices could be reduced (Abdelhamid, 2017).

All these tendencies implied competition between the airlines, resulting in higher benefits for customers, not only in lower ticket prices but also in better services. Following this first movement in the United States, other countries and the EU also setted

up mechanisms to reduce market barriers and deregulation became a tendency worldwide.

After United States domestic deregulation, the following years were notable due to the implementation of several bilateral agreements between the United States and other national governments, such as the first agreement signed with the Netherlands, in 1992, which allowed airlines to operate internationally without regulatories restrictions between these countries (Oum, 1998).

Brazilian aviation deregulation began only in the 1990s. In 1991, after the Fifth CONAC (National Civil Aviation Council), the Ministry of Aeronautics established guidelines to gradually reduce DAC (Civil Aviation Department) actions.As a consequence of this new policy, rules for domestic air fares liberalization in Brazilian market were implemented. Therefore, regulatory measures were made more flexible however still under permanent monitoring of regulatory organization.

As a result, market was opened to new scheduled and non-scheduled airlines, including the distribution of cargo and regional services, delimitation of areas for regional air transport operation and the exclusivity seized by some companies (Ferreira, 2017).

The United States government signed approximately 125 open-skies agreements with countries from all continents. The first Latin American countries to sign such agreement were the six Spanish speaking Central American countries: Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama, on May 8th , 1997. Currently, most of continental Latin American countries hold an Open-Skies agreement with the

United States, Brazil was the last to join this group. The entire joining process on the Brazilian National Congress ended in May 2018, as displayed on Table 1:

Table 1

Open Skiesbetween the United States and Latin American countries

Country	Appliction	Date	All-Cargo 7ths
Caribean Community (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua e Panama)	In Force	5/8/97	Yes
Chile	In Force	10/28/97	Yes
Peru	In Force	6/10/98	Yes
Uruguay	In Force	10/20/04	Yes
Paraguay	In Force	5/2/05	Yes
Colombia	In Force	11/11/10	No
Brazil	In Force	(5/18/18)	No

Note. Created by the authors based on “Open Skies Partners” presented byDOT website (https://www.state.gov/e/eb/rls/othr/ata/267129.htm)

Nowadays, open- skies agreeements are vastly present and functioning in the world and are a reality between the European Union and the United States, the European Union and Canada, the European Union and the Association of Southeast Asian Nations (ASEAN) and also other 120 countries around the world, including Latin American states such as Chile, Colombia, Peru and Panama and recently approved, Brazil.

Although Brazilian government negotiates other open skies agreements, BR-US was the very first significant open skies agreement that Brazil has signed, this fact motivates this research.

According to Button (2009), the introduction of open skies agreements around the world have increased competition among airlines in relevant markets with more flights offers and reduced fares, by eliminating existing restrictions, allowing the emergence of other forms of trade associations.

Thus, at a first sight an increase in the traffic of passengers and cargo between Brazil and the United States is expected, which should result as of more flights offers and the reduction of fares and freights due to more competition and free capacity availability (Câmara dos Deputados, 2016).

Project Definition

The Open Skies Agreement (OSA), the new air traffic agreement between Brazil and the United States, is a big step for the BR-US market as it allows unlimited air frequencies between countries. The signature of this agreement provides airlines the freedom to decide their strategies, with no governments' influence or restrictions.

The open skies agreement opens a great variety of opportunities, such as new commercial agreements between airlines, new flights, more available suppliers, reduction of costs, fares and more capillarity and connectivity for airlines' network. In adittion, there are also indirect benefits, such as the creation of new jobs in the hotel chain, rental car companies and tourism industry in general, the increase of income and commercialization of cargo between countries and regions, among others.

These impacts affect the trade segment, operation market, national tourism and the protection of the various national industries that are related to civil aviation.

In 2017, the economic impact of aviation in Brazil in a direct, indirect, induced (income effect) and catalytic effect in the tourism sector was R$ 312 billion per year,

equivalent to 3.1% of all national production, close to 3.5% average of the rest of the world (ABEAR, 2017).

Brazil and the United States have a variety of complexities regarding the economic situation, operation and size of airlines, internal laws, regulations and market situation which would make the scenario of approval, application and benefits of the open skies agreement even more challenging. Considering the context of law approval and regularization of the agreement, it is important to study what would be the determining impacts on the Brazilian civil aviation sector.

The importance of studying the impacts is due mainly to the different laws, economics profiles and regulations between the two countries. In addition, the civil aviation industry is of utmost importance for economic, social and trade development throughout the world.

Project Goals and Scope

Following the importance and timeliness of the theme for the civil aviation and tourism sector in Brazil, the main objective of this research is to present the direct and indirect impacts in the economic, operational and legal spheres of the open skies agreement between Brazil and the United States and propose suggestions and possible solutions to these impacted areas.

The present research focus not only on the benefits of this deal but also on the problems it could bring to the Brazilian airlines that do not have the same level of investment, operations, regulations and economic scenario as the airlines from the United States. Both countries should at least have the same opportunities to grow and develop themselves with relatively the same potential benefits and investments.

It is hoped to find a significant positive impact on local economies, especially on Brazilian and North American touristic destinations, also boosting the current trade commerce between the two countries, as well as indirect impacts from the tourism-style passenger traffic. However, it is expected to find a challenging scenario for Brazilian airlines regarding commercial protection and strategic positioning on the routes between these markets especially due to the different operational costs.

In addition, it is expected to present throughout the research, what are the possible adjustments needed in the laws, regulations and legal terms of national aviation, involving the Ministry of Tourism, different associations of agencies, airlines and labor unions and also costs reviews and analysis, as well as some recommendations that can be adopted by Brazil and United States to promote the new destinatios.

Therefore, the specific objectives of this research are: (1) evaluate and simulate the economic impact on the matrix of tourism and business between the two countries according to the approval and application of the terms of open skies agreement, (2) list the main regulations, labor laws and operating costs between Brazilian and American airlines that may be involved in the agreement, (3) evaluate the current laws and/or aviation regulations that could be the reason for the future problems to the local airlines and how we could suggest to avoid any of the disadvantages for the airlines in Brazil and (4) propose solutions, models and/or next steps that need to be taken to maximize the potential of the agreement for both countries and may impact changes within the regulations and laws applied especially in Brazil.

Definitions of Terms

BTS	A statistical database of the United States civil aviation market developed by the United States Department of Transportation.
CADE	A Brazilian federal authority, linked to the Ministry of Justice, whose purpose is to guide, supervise, prevent and investigate abuses of economic power.
CS	Capacity Share - Percentage participation in airline ASKs on national or international routes between two points.
DOT	A federal cabinet department of the U.S. government concerned with transportation. It’s mission is to ensure U.S. has the safest, most efficient and modern transportation system in the world.
Etapa Básica	A statistical database of the Brazilian civil aviation market, developed by ANAC and with information on flights, airlines, ASK, RPKs, departures and airports from 2000 to 2018.
JBA	Joint Business Agreement - Strategic model of commercial partnership or alliance between companies aiming from simple collaboration for commercial and / or technological purposes until the merger of companies into a single company; also known in the market as JV (Joint Venture).
OAG	An air travel intelligence company based in United Kingdom that provides digital information and applications to the world's airlines, airports, agencies and travel-related service companies..

Seat Share	Percentage participation in airline seats on national or international routes between two points.

List of Acronyms

ABEAR	Associação Brasileira de Epresas Aéreas
ANAC	Agência Nacional de Aviação Civil (Brasil)
ASA	International Air Service Agreements
ASEAN	Association of Southeast Asian Nations
ASK	Available Seat Kilometer
BTS	US Bureau of Transportation Statistics
CADE	Conselho Administrativo de Defesa Econômica (Brasil)
CEO	Chief Executive Officer
CONAC	Conselho Nacional de Aviação Civil (Brasil)
DAC	Departamento de Aviação Civil (Brasil)
DOT	US Department of Transportation
ERAU	Embry-Riddle Aeronautical University
EU	European Union
FAA	Federal Aviation Administration
IATA	International Air Transport Association
IBGE	Brazil Census Bureau
ICMS	Imposto sobre Circulação de Mercadorias e Serviços
ICAO	International Civil Aviation Organization
IET	Interline Eletronic Ticket
JBA	Joint Business Agreement

JV	Joint Venture
LCC	Low Cost Carriers
LHR	London International Airport Heathrow
OSA	Open Skies Agreement
USA	United States of America

Chapter II

Review of the Relevant Literature

The theoretical approach of international operations between two countries and their various impacts, history and consequences is addressed by several authors in the published literature. Button (2009) is one of the authors with the most publications on studies of qualitative and quantitative impacts, mainly between the United States and the European Union, as presented by Mayor & Tol (2009), Alves & Forte (2015) and Zhang et al (2018). Forsyth et al. (2006) presented data on the expansion of the open skies agreement in Asian regions, something that Meyer (2002) also addressed in China's case with the United States.

There are several studies that present the impacts of adopting this measure. Bernardo & Fageda (2017) analyzed the quantitative impacts of the adoption of the open skies agreement between Morocco and the European Union. Lei et al. (2016) presented the results of the liberalization of the air transport market between China and the United States in the agreements signed in 2004, and Abeyratne (2017) applied contract theory in the open skies agreement signed between the United States and the United Arab Emirates. Further impact studies of the open skies agreement will be presented below.

For the present research, the literature will be presented in the most recent and important published works, from a historical analytical perspective of the flights between Brazil and the United States, with presentation of the operations and national airlines of both countries, followed by an analysis of flight data over the past 17 years, the presentation of agreements and memoranda signed between the governments of the two countries in the last three decades, the approval of the law of open skies in 2018 and

ending with the quantitative results and theoretical application of the open skies agreement around the world.

History about Brazilian and US national aviation markets

The beginning of the Brazilian commercial aviation, although precarious, occurred in 1927. This year the first two airlines were created in Brazil: Varig and the Condor Union, both with technical and operational assistance from the German company Condor Syndikat (Ferreira, 2017).

Varig started its operations as a small regional company operating in Rio Grande do Sul. Later it received incentives from both the federal and state government which allowed the growth of its fleet and route network. Varig counted in favor of its extraordinary growth, the intense and well-kept close relationship with the government (Fay, 2013; Monteiro, 2004; Oliveira, 2011). The company always knew how to take advantage of the opportunities and with the acquisition of competing companies became the largest Brazilian airline. In 1975, with the inclusion in the group of the competitor Cruzeiro do Sul, Varig had, until the early 1990's, the monopoly of all international routes.

For decades, Varig was admired for the quality of its services, after all the company did not have to worry about fares since domestic fares were controlled by the Brazilian government and international fares by the International Air Transport Association (IATA).

The Sindicato Condor was founded in 1927 in Rio de Janeiro as part of an initiative of the German company Condor Syndicat which had the goal to find new markets for the growing German aeronautical industry. Condor was nationalized and had

its name changed to Cruzeiro do Sul in the World War II. Years later, Cruzeiro do Sul obtained permission to fly abroad, until in 1975, faced with serious financial problems was bought by Varig (Ferreira, 2017).

Other pioneering airlines in Brazil, which stood out, were Panair do Brasil, VASP and Transbrasil.

Panair do Brasil was a subsidiary of Pan American Airways (Pan Am), which began operations in 1930 through the acquisition of NYRBA (New York-Rio-Buenos Aires Line). To avoid competing with its parent company, Panair did not fly to the United States and decided for European and Middle East routes. The Panair operated with more modern aircraft than those of the European airlines and offered an excellent on-board service. In the 1950s, Panair was leaving Pan Am, and its capital was gradually transferred to Brazilian businessmen, until its bankruptcy was decreed by the Military Regime in 1965. Shortly after the annulment of its flight rights, Varig assumed all their routes (Ferreira, 2017).

Vasp (São Paulo Airway) was created in 1933 by a group of businessmen from São Paulo. In 1935, after financial difficulties, Vasp became a state-owned company (until its privatization in 1990) - forming a sui generis case in national aviation: a state-owned company competing with several private companies. As a state-owned company, whenever it was needed, the company received large investments from the São Paulo government. Over time, the company acquired smaller companies and increased its network. In the 1950s, Varig and Vasp innovated by creating the Rio-São Paulo air shuttle service, the busiest and most profitable route in Brazil up to today.

For Beting (2007) the concept of shuttle service was an innovation that revolutionized the commercial aviation market, which was copied by several companies around the world. This service allowed a reorganization of flight schedules between the three participating companies at the time (Varig, Cruzeiro and Vasp) especially for the ease of endorsement of the tickets. The benefit for passengers was that they could board the first available flight, which on weekdays, demanded a maximum of 30 minutes wait. This agreement lasted until 1999 with the following market share: Varig 52%, Vasp 22%, Cruzeiro do Sul 19% and Sadia [later Transbrasil] with 7% (Beting, 2007).

In 2005, Vasp had its registration revoked; its bankruptcy was decreed in 2008. The company faced up to the present (2018), hundreds or thousands of labor, tax and social security lawsuits (Ferreira, 2017).

The lack of other transportation options in the country, in addition to the aircraft used in World War II contributed to the great growth of aviation in Brazil.

On April 22, 1932, President Getúlio Vargas created the Department of Civil Aviation (DAC), subordinated to the Ministry of Transportation. From the 1940s until the early 1960s, according to Malagutti (2001), more than twenty companies were created in the country. Nevertheless, in the early 1960s Brazil had the second largest air passenger transport network in the world, surpassed only by the United States. The main companies created during this period are: Real Transportes Aéreos in 1946; the National Air Transport and the National Air Loop in 1947; and Sadia S.A Transportes Aéreos, the precursor of Transbrasil in 1954 (Ferreira, 2017).

In the 1960s, Brazilian commercial aviation was undergoing a severe economic crisis, caused by several factors, according to Malagutti (2001) which included the

excessive competition, the need for new investments and new updated fleet, specially after the war, the lack of maintenance available according to the regulations and the economic policies in place which increased the airlines costs.

So, the government together with the airlines still standing in the market, met to study a change in the regulation policy, to form and to ensure the survival of air transport in the country. Three meetings, known as the National Commercial Aviation Conference (CONAC), were held throughout the 1960s. The result of these meetings was a stimulus to merger and association of airlines.

Thus, in the late 1960s, four companies dominated the national commercial aviation market: Varig, Vasp, Cruzeiro and Transbrasil - which formed the first oligopoly of Brazilian commercial aviation - gradually reduced the number of cities served, in part due to the inadequacy of the airports, incompatible with the modern airplanes that the airlines used and partly due to the low yield that such remote routes provided to the airlines. According to Malagutti (2001), out of a total of 335 cities served by airlines in 1958, only 92 continued to have service in 1975. In addition, the controlled competition regime began, which represented the beginning of the process of state intervention in the sector, in which the government intervened heavily in the administrative decisions of the companies, through the indexation of the economy and the establishment of fares, which lasted until the 1980s.

In the 1970s, the Ministry of Aeronautics decided to develop regional aviation in the country to serve the other cities, within the concept of the new regional air transport system, subsidizing airlines that were willing to fly and from remote areas of the country, especially in the Brazilian Midwest and the Amazon region, according to Oliveira (2011).

Since there was a controlled competitor system, a specific number of companies were created in each region of the country. The following companies appeared in 1976:

a. Nordeste (Northeastern States, part of MA, ES and large part of MG),
b. Rio-Sul (States of South and RJ, part of ES and SP),
c. TABA part of the PR and MT,
d. TAM, (MS, parts of MT and SP) and
e. VOTEC (States of Tocantins and Goiás, DF, parts of PA, MG and MT).

It should be noted that the new regional transportation system also had the objective of making feasible the use of the Bandeirante airplanes, which was created by Embraer (Brazilian aircraft manufacturer), four years earlier and which was widely accepted for regional use in other countries.

The process of air industry deregulation in Brazil. In Brazil, traveling by plane was available only to very few Brazilian, usually businessmen and government travelers (Oliveira, 2011), thus having their tickets paid by a legal entity, little attention was paid to the [high] prices of tickets charged by airlines. However, it should be noted that air transportation (subsidized or not) was always related to luxury and glamor, and that airline fares (at least until Gol entered the market in 2001) were very high and only available to Brazilian on the higher level of the GDP (Fay, 2013).

During the late 1980s, the world was undergoing great changes in the political, economic and social systems and this was impacted mainly by the new liberal thoughts raising in many different countries. The governments, for the most part, reduced their control over the economy allowing it to be driven by free market forces.

In 1989 price-fixing for air tickets was abandoned, replacing it by setting a range of prices around a value fixed by the DAC. In 1991, the Fifth CONAC was held to define a policy in tune with the liberalizing tendencies. The results of this conference was that the Ministry of Aeronautics established rules to guide the action of its regulator, the DAC, which little by little had less control of the existing regulation. As a consequence of this new policy, the system of regulated liberalization of domestic air fares was implemented, that is to say, regulatory measures were made more flexible by permanent monitoring of regulatory bodies, thus the market was open to: new scheduled and non-scheduled airlines, including the distribution of freight and regional services, the delimitation of areas for the operation of regional air transport and the exclusivity enjoyed by some companies (Ferreira, 2017).

Therefore, in the 1990s, companies faced the typical problems of "free" market: intense competition, fare wars, lack of balance between seat capacity availability and demand, poorly designed planning, debt problems and extremely diverse and in some cases already obsolete fleets. The deregulation winds burst so vigorously that none of these airlines reached the year 2010 (Oliveira, 2011).

New companies and investments were encouraged with this liberalizing trend. Between 1995 and 2005, there was a significant increase in the number of companies. In February 2001, Gol, the first low cost airline in Brazil, started operations. Its entrance meant a revolution in the sector, since its fares were 40% lower in relation to the others, due to several factors, among them: the standardization of the fleet; the outsourcing of reservation services, ticket sales and track support; and simplification of on-board

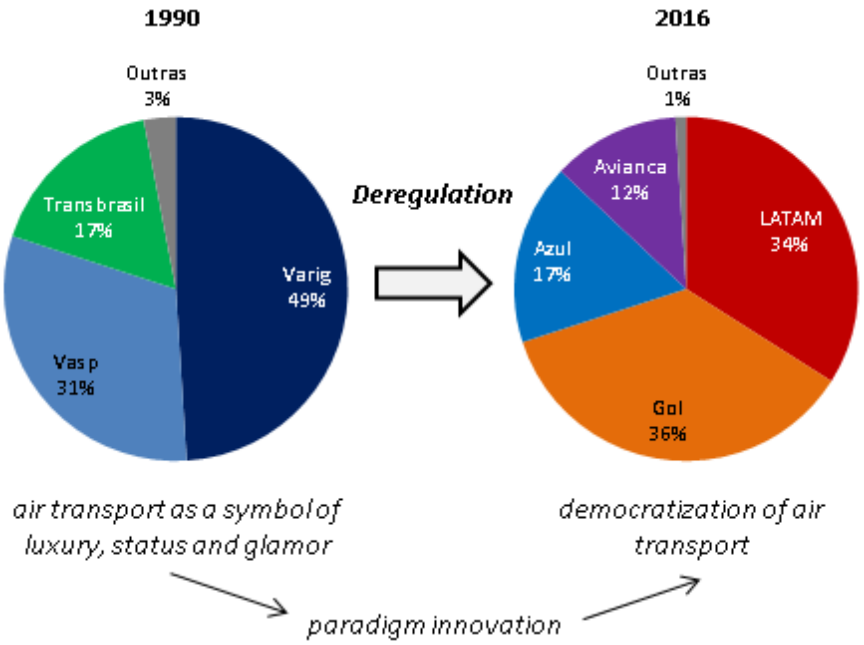
services. Following Gol's trend, new low-cost companies emerged in 2005, such as WebJet and BRA (operated only until 2007) and in 2008, Azul.

On the other hand, large companies in the market since 1990s, failed to keep pace with the liberalizing tendency and the reduction of state protectionism, thus losing competitiveness in relation to the accumulate high debts. In this context, the companies Transbrasil and Vasp ended their operations in 2001 and 2005 respectively, and Varig, the main company up to that moment, was acquired in 2007 by Gol.

Figure 1 introduced by Ferreira (2017) showed that, between 1990 and 2016, an extraordinary transformation took place in Brazilian commercial aviation.

Figure 1

Changes in air transport players in Brazil between 1990 and 2016



Note. Adapted from Ferreira (2017)

The process of deregulation in the air sector has led to more modern practices in the management of companies and has allowed the introduction of various organizational, technological and marketing innovations in the sector. There has been a paradigm shift in

the industry. Companies like Varig, Vasp and Transbrasil have disappeared from the market, while others like Tam, Gol, Azul and Avianca now occupy their share in the market.

The economic condition of Brazilian airline industry

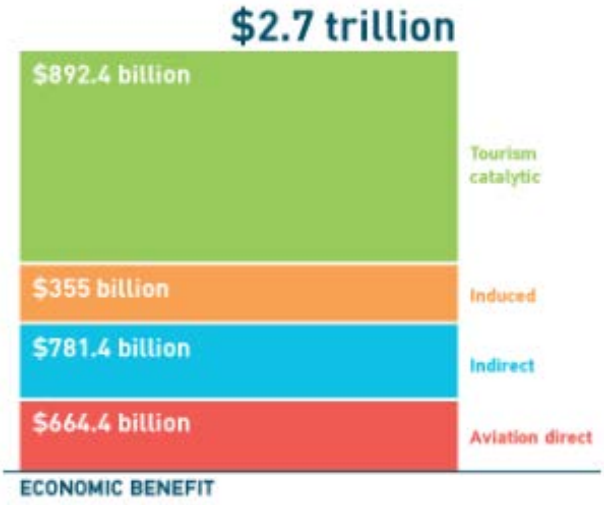
The aviation industry is responsible for $ 2,7 trillion (3,5%) of the world´s GDP from which $ 644.4 billion is related to direct GDP benefits (passenger and cargo transportation) and $ 761.4 billion to indirect GDP impacts, such as fuel suppliers, construction companies for the airports, call centers, etc (IATA, 2018). Annually, billions of people travel for tourism or business purposes and move the finances of the tourism industry in various parts of the world, making aviation a key sector for ensuring economic and social development.

If compared to the other sectors such as automative industry that represents 1.2% and chemical manufacturing with 2.1% of the global direct GDP, the airline industry is larger than both of these two examples. According to ABEAR (2016), civil aviation generates an economic impact of R$ 312 billion in Brazil in a direct, indirect, induced (income effect) and catalytic effect in the tourism sector. The amount is equivalent to 3.1% of all national production, close to the contribution of the activity to the generation of wealth in the world.

Aviation Benefits Beyond Borders (2017) presented two other important impacts: the induced, which corresponds to R$ 355 billion (that are related to the airline´s employment generating income of their staff to purchase goods and services for their own use) and the tourism, which generates R$ 892.4 billion in the GDP (it sums upwith the enormous impact of the aviation industry in the global market), as presented on Figure 2.

Figure 2

Aviation's global GDP impact (2014 estimated)



Note. Adapted from Aviation Benefits Beyond Borders' study "*Value to the economy*", accessed on https://aviationbenefits.org/economic-growth/value-to-the-economy/.

The forecast of the aircraft manufacturers estimate that the future demand for air transportation will increase an average of 4,3% per year over the next 20 years IATA, 2017). This means that by 2034, the aviation will contribute with $ 14.9 million direct jobs and $ 1.5 trillion of the worldwide GDP economy. If one includes the indirect and direct contributions, it would include 39.6 million jobs and $ 3.9 trillion in GDP. Including the tourism segment, the impact is even higher with 99.1 million jobs and $ 5.9 trillion in GDP (Aviation Benefits Beyond Borders, 2017).

This means that the air transportation is extremely important for the world and the GDP results and every single country needs to improve its aviation industry so that all involved can reach these numbers.

That is why that this research is important to understand how much more will the open skies impact the Brazilian economy.

A country that hosted the World Cup and the Olympics is well aware of the importance to facilitate the international flights and the need to have the best connections on their domestic flights.

The airline business contributes $ 17 billion (2,3%) to the Brazilian GDP which supports 837.000 of direct and indirect jobs related to this segment and pays around $ 1.76 in tax (IATA, 2015).

According to IATA study “Special report: Brazil supporting industry”, published in 2015, if there is an improvement of 10% to the domestic connectivity, there will be an incremental of approximately $ 660 million a year in the GDP. A good example of success is Canada where this industry represents nearly $ 20 billion and the tourism even doubled that number. According to Carlos Ebner, former Country Director for IATA in Brazil (2015), Brazil ignores the global standards in favor of well-intenioned but short-sighed national legislation.

The major issue for Brazil are the taxes and there are many studies about this negative impact and here it is related to a change in 1988 to the tax legislation which now brings more challenges to the airlines where the government main goal was to have extra funds.

In 2012, a major audit was done and showed that international airlines faced an unexpected tax liability of $ 10 million dollars for that financial year. The airlines were notified and were not aware because their accountants thought that they were exempted and not impacted by these new rules according to the bilateral agreements and the rule of reciprocity.

To worsen the situation, the fuel cost in Brazil is known to be very high and dominated by only a single state-owned company called Petrobras. The problem here is that, even though 75% of the fuel is produced domestically, the costs are calculated as it was imported and this is the reason Brazil had a major truck drivers strike in May, 2018. Moreover, every state has a local value-added tax called ICMS that can change from state to state and also increase the costs for the carriers. For example, in the State of São Paulo, the domestic flights have a 25% fuel tax. To resume, the fuel for most of the Brazilian carriers corresponds to about 40% of their costs versus a global average of 30%.

Although Brazil faces many challenges, the aviation has achieved quite a bit during the recent years with the innovative business models and consolidation which brought to the segment more capacity discipline, growth and sustainability. But there is still lots of opportunities of growth to the airlines segment, mainly because the ratio between airlines passengers and total population in Brazil is about 0.5/year, while in Europe this ratio achieves 3.0 and in the US it is about 2.5 flights per person per year.

Some of the steps to increase and improve the aviation industry in Brazil could be: allowing more foreign investment in the airlines, privatization of the airports and as main focus of this research, bilateral agreements between countries such as open skies agreements.

BR-US international operations analysis

Brazil and the United States represent two of the three most important domestic civil aviation markets in the world, with participation of 1.2% and 14.5% respectively (IATA, 2018). This scenario of high demand for air travel allows the two countries to structure a series of international routes throughout its history. Important tourist cities in

Brazil, such as São Paulo, Rio de Janeiro, Recife, Salvador, Fortaleza, Manaus and Brasilia, are linked to the main HUBs and distribution centers in the United States, such as New York, Dallas and Atlanta and at these US hubs, it is possible to connect to important tourist cities such as Las Vegas, Miami and Orlando.

Currently, there are about 4.5 million people traveling annually between Brazil and the United States, which reached 5.4 million people in the years 2014 and 2015, after the boom of the national economy with a growth of 87% since 2000 (ANAC, 2018). This growth is a direct effect of the increase of frequencies and the seat capacity during the last two decades, when several agreements and memorandums were signed by both governments.

According to statistical data published by ANAC in 2018, the total seats offered in 2017 between Brazil and the United States reached 5.7 million seats, out of a total of 25,096 operating flights. This helped the ASK to increase from 28.1 billion ASKs in 2010 to 37.5 billion ASKs in 2017, an average growth of 1.7% per year. This growth is lower than in other international markets where for Argentina it was 4.2% a year, Chile 7.8% a year and the European market, 3.5% a year. This shows that there is an opportunity of capacity and demand growth, considering flights and seat offer from Brazil to USA.

The growth in the seat offer of international flights from Brazil is visible in several Latin American countries, with a strong economic and social impact in Brazilian culture, such as Argentina, Panama and Chile and in some European countries, such as Portugal and Spain. Table 2 shows the increased of seat capacity in the Brazil - United States market compared to other foreign markets.

Table 2

Seat capacity evolution between Brazil and international markets

	2010	2011	2012	2013	2014	2015	2016	2017
United States	2.05	2.39	2.69	3.09	3.32	3.43	2.75	2.77
Argentina	2.11	2.15	2.19	2.17	2.18	2.17	2.41	2.51
Portugal	0.85	0.93	0.94	0.92	0.94	0.95	0.90	1.01
Chile	0.47	0.54	0.65	0.64	0.73	0.86	0.92	1.04
Panama	0.22	0.33	0.47	0.58	0.62	0.65	0.55	0.66
Spain	0.42	0.56	0.50	0.49	0.59	0.61	0.62	0.54
Europe	2.95	3.36	3.44	3.42	3.58	3.68	3.55	3.35
Americas	7.16	7.85	8.31	8.81	9.23	9.39	8.75	9.20
Asia & Africa	0.47	0.57	0.67	0.69	0.87	0.84	0.88	0.88

Note. Created by the authors based on data available on ANAC database

The seat offer is mostly operated by US airlines, representing 66% of the seats offered in 2017. Among the Brazilian companies, LATAM Airlines represents the largest seat share, with 69.8% of the total operated by Brazilian companies, followed by Azul (25.2%) and Avianca (5.0%).

Up to June of 2018, the levels of seat capacity and share remain close to the results of 2017, as shown in Table 3, with Brazilian airlines still accounting for the smallest part of operations (40%). LATAM Airlines accounted for 57.3%, followed by Azul (29.4%) and Avianca (13.2%), which by 2014 represented only 1% of total flights from Brazil. Both companies began offering direct flights to Miami, Fort Lauderdale and New York. This doesn't include GOL flights, from Fortaleza and Brasilia to Miami and Orlando, which will start in November, 2018.

Table 3

Seat share between Brazilian and American carriers on BR-US market

	2011	2012	2013	2014	2015	2016	2017	2018
American	72%	71%	71%	72%	64%	65%	66%	60%
Brazilian	28%	29%	29%	28%	36%	35%	34%	40%
LATAM	*100%*	*100%*	*100%*	*99%*	*82%*	*78%*	*70%*	*57%*
Azul	*0%*	*0%*	*0%*	*1%*	*18%*	*22%*	*25%*	*29%*
Avianca	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*5%*	*13%*

Note. Created by the authors based on data available on ANAC database

The scenario of the last 17 years has varied considerably, especially when focusing on the market concentration. In 2000, the major five airlines (Brazilian and American airlines) dominated 75% of the seat offer, while in 2017 this number increased to 92%, showing a growth path. Table 4 shows the market concentration in seat offered since 2000 as a percentage of total offered, ranked by the major airlines operating the international routes between the two countries.

Table 4

Market concentration on BR-US routes

	2000	2005	2010	2015	2016	2017	2018	Δ
TOP 1	24%	32%	31%	36%	35%	33%	31%	+7pp
TOP 2	19%	15%	26%	29%	27%	24%	23%	+4pp
TOP 3	17%	12%	13%	13%	14%	15%	13%	-4pp
TOP 4	8%	9%	10%	13%	13%	14%	13%	+5pp
TOP 5	6%	9%	9%	7%	8%	9%	12%	+6pp
Others	25%	23%	11%	2%	3%	5%	8%	-17pp

Note. Created by the authors based on data available on ANAC database

The concentration of the market shows a change in the operating strategy and cost and revenue efficiency of international airlines that leave left the market and opened more space to competitors. In 2000, about 11.3 of the seats offered were offered by Asian airlines, such Japan Airlines and Korean Air.

Another factor was the market exit of some of the most important Brazilian players. Varig was responsible for 19.5% of the seat offer in 2000 and declared bankruptcy in 2006, the year in which it stopped its operations. On the US side, Delta Airlines gained market share, rising from a 2.9% share of seats in 2000 to 14.1% in 2017.

In the 2000s, most routes between the two countries were centralized in the cities of São Paulo and Rio de Janeiro, which accounted for 95.3% of the total seats offered (ANAC, 2018). Over the years, the share of flights to and from other Brazilian airports increased, mainly on routes to and from new domestic hubs such as Campinas, Belo Horizonte, Recife and Brasilia. As can be seen from Table 5, São Paulo and Rio current represent 82.6% from the total of seats offered in 2017, 12.7 points less than in 2010.

Table 5

Seat share offered by Brazilian departure city

	2000	2005	2010	2015	2016	2017	2018	Δ
São Paulo	71%	76%	60%	55%	60%	64%	62%	-9pp
Rio de Janeiro	25%	20%	27%	16%	19%	19%	18%	-7pp
Campinas	0,0%	0,0%	0,1%	8,8%	7,5%	7,0%	7,3%	+7pp
Belo Horizonte	1,6%	0,0%	1,6%	2,8%	2,5%	2,5%	3,7%	+2pp
Recife	0,9%	0,0%	2,3%	1,4%	1,0%	2,1%	2,5%	+2pp
Others	2,2%	3,5%	7,0%	10,2%	5,4%	3,6%	4,4%	+2pp

Note. Created by the authors based on data available on ANAC database

A Path to the BR-US OSA

The rules governing international operations between Brazil and the United States until 2008 were signed on March 21, 1989 in the "Agreement on Air Transport between Brazil and the United States of North America". The law was in effect and ruled for 19 years, and it restricted the total weekly frequencies of the same airline between the two countries to a maximum of 105 flights.

Until the signature of the open skies agreement, all airlines from Brazil and USA had limited number of frequencies between the two countries according to the Memorandum of Consultations signed on 2008.

In 2008, the number of flight frequencies per week were determined according to the following criteria:

a. Until June 30, 2008, one hundred and five (105) frequencies per week as a maximum operation for an airline, for service to any point or points in Brazil;

b. Effective July 1, 2008, an additional twenty-one (21) frequencies per week, for service to any point or points in Brazil except Sao Paulo Terminal and Rio de Janeiro, limited to points in the North, Northeast; and Mid-west regions of Brazil and/or Belo Horizonte ;

c. Effective June 1, 2009, an additional seven (7) frequencies per week, for services to any point or points in Brazil except Sao Paulo Terminal, limited to points in the North, Northeast, and Mid-west regions of Brazil' and/or Belo Horizonte and/or Rio de Janeiro;

d. Effective October 1, 2009, an additional seven (7) frequencies per week, for services to any point or points in Brazil;

e. Effective October 1, 2010, an additional fourteen (14) frequencies per week, for service to any point or points in Brazil;

f. Effective October 1, 2011, an additional fourteen (14) frequencies per week, for service to any point or points in Brazil, except Rio de Janeiro and Sao Paulo Terminal;

g. Effective October 1,2011, an additional fourteen (14) frequencies per week, for service to any point or points in Brazil, except Sao Paulo Terminal;

h. Effective October 1, 2012, an additional fourteen (J 4) frequencies per week, for service to any point or points in Brazil, except Rio de Janeiro and Sao Paulo Terminal;

i. Effective October 1, 2012, an additional fourteen (14) frequencies per week, for service to any point or points in Brazil, except Sao Paulo Terminal;

j. Effective October 1,2013, an additional fourteen (14) frequencies per week, for service to any point or points in Brazil;

k. Effective October I, 2013, an additional fourteen (14) frequencies per week, for service to any point or points in Brazil, except Sao Paulo Terminal;

l. Effective October 1, 2013, an additional fourteen (14) frequencies per week, for service to any point or points in Brazil, except Rio and Sao Paulo Terminal;

m. Effective October I, 2014, an additional twenty-one (21) frequencies per week, for service to any point or points in Brazil, except Rio de Janeiro and Sao Paulo Terminal;

n. Effective October 1, 2014, an additional fourteen (14) frequencies per week, for service to any point or points in Brazil;

o. Effective October 1,2014, an additional fourteen (14) frequencies per week, for service to any point or points in Brazil, except Sao Paulo Terminal.

Taking into account the constant frequency increases that the agreement generated, it was also possible to increase the flight offers between the two countries, growing from 17,952 anually flights in 2000 to 30,110 in 2014, an annual growth rate of 3.8%, and also allowed airlines to offer direct flights from secondary cities in Brazil, areas that did not have the opportunity to develop and consolidate international services before. As previously stated, up to 2008, approximately 95% of the seats were allocated to flights from São Paulo or Rio de Janeiro, according to ANAC data published in 2018.

As of 2009, with the addition of 21 frequencies to the maximum allowed (which were not allocated to any specific city), the percentage begins to decrease to 91% in 2009, 87% in 2010, 83% in 2011 to reach 80% in 2018 in the cities of São Paulo and Rio de Janeiro and there were new services launched from other cities such as from Campinas (which currently represents 7.3% of seats), Belo Horizonte (representing 3.7%), Recife (2.5%), Brasilia (2.0%), Manaus (1.7%) among others, as presented on ANAC's 2018 data base.

Once every year the number of flights were increasing, the growth went from 105/week in 2008 to 259/week in 2014, which resulted in an increase of 120% between 2008 and 2014.

This flight frequency increase in Brasil in 2014 was only lower than the growth in Panama (up 291%) but higher than Argentina (+22%), Portugal (+10%) and Chile (34%).

Table 6 below displays seat capacity offer's evolution on international markets to and from Brazil between 2008 and 2014.

Table 6

Seat capacity evolution in main international markets

	2008	2014	Δ%
United States	1,51	3,32	+120%
Argentina	1,79	2,18	+22%
Portugual	0,86	0,94	+10%
Chile	0,55	0,73	+34%
Panama	0,16	0,62	+291%
Spain	0,45	0,59	+30%
Europe	3,06	3,58	+17%
Americas	5,99	9,23	+54%
Asia & Africa	0,30	0,87	+185%
Total	9,35	13,69	+46%

Note. Created by the authors based on data available on ANAC database

On the restriction side, American Airlines operated virtually from 2000 to 2007 with an average operation of 100 flights per week between Brazil and the United States, reaching 95% of the weekly flights capacity allowed.

As of 2008, frequency increases allowed American Airlines (AA) to increase its flight offer to 219 weekly frequencies in 2014, about 85% of the capacity allowed, as shown in Table 7.

The growth in seats offered generated an increase in demand for flights from Brazil to the United States, which caused the market load factor to increase from 72.9% between 2000 and 2007 to 80.1% from 2008 to 2014, an improvement of 7.3 percentage points.

Table 7

Maximum allowed weekly frequencies evolution

	2000	2008	2009	2010	2011	2012	2013	2014
Maximum weekly freq.	105	126	140	154	182	210	238	259
AA weekly freq.	104	91	100	126	144	165	197	219
% of the maximum freq.	99%	72%	72%	82%	79%	79%	83%	85%
Industrial Load Factor	66%	88%	78%	80%	81%	80%	79%	79%

Note. Created by the authors based on data available on ANAC database

The signature of the Memorandum of Consultations in 2008 allowed, as of October 1st, 2015, the airlines to provide international air transportation without limitation regarding frequencies of service between Brazil and the United States. As a result, approval of the open-skies agreement was expected for the following years, ensuring a natural evolution of capacity offer in this market.

OSA: terms and definitions. In presenting the definition and concepts that permeate open-skies agreements to the rest of the world, it is important to highlight the main rules and ideas of this type of agreement, as well as include some explanations about air freedom agreements.

First of all, when the actual literature explain International Air Service Agreements (ASA), it's the same as a bilateral air transport agreement or a multilateral air services agreement, a contract to liberalize aviation services, usually commercial civil aviation, between two or more countries. An ASA establish clauses on traffic rights, where it can define how many and which routes may be flown between the bilateral or multilateral partners and which airports may be used for these flights.

It defines if it will involve only the country's main airports/hubs or secondary airports as well, capacity designation, how many flights per week or how many seats/passengers per week. It also can define the capacity share by country/partner, ownership and control that defines the maximum number of airlines that may be nominated by the countries and the ownership criteria carriers must meet to receive/maintain designation, fares and prices policies and other issues like competition policy, safety and security standards.

To determine the rules about aircraft traffic in each country, IATA developed a general rule called Freedom of the Air, rules that are negotiated between the parties. Freedoms of the Air are traffic rights allowed airlines of one country to operate in the territory of the other country and/or beyond. There are nine freedoms of the air:

- First Freedom of the Air: "the right or privilege, in respect of scheduled international air services, granted by one State to another State or States to fly across its territory without landing (also known as a First Freedom Right)." Example: A flight from country A flies over country B.
- Second Freedom of the Air: "the right or privilege, in respect of scheduled international air services, granted by one State to another State or States to land in its territory for non-traffic purposes. (also known as a Second Freedom Right)." Example: A flight from Brazil do not embark / disembark passengers, cargo and mail in country B.
- Third Freedom of The Air: "the right or privilege, in respect of scheduled international air services, granted by one State to another

State to put down, in the territory of the first State, traffic coming from the home State of the carrier. (also known as a Third Freedom Right)." Example: A flight from Brazil has the right to disembark, in country B, passengers, mail and cargo shipped in the territory of the country of nationality of the aircraft

- Fourth Freedom of The Air: "the right or privilege, in respect of scheduled international air services, granted by one State to another State to take on, in the territory of the first State, traffic destined for the home State of the carrier. (also known as a Fourth Freedom Right)." Example: A flight from Brazil has the right to embark, in country B, passengers, mail and cargo destined for the territory of the country of nationality of the aircraft.
- Fifth Freedom of The Air: "the right or privilege, in respect of scheduled international air services, granted by one State to another State to put down and to take on, in the territory of the first State, traffic coming from or destined to a third State. (also known as a Fifth Freedom Right)." Example: A flight from Brazil has the right to embark, in country B, passengers, mail and cargo destined for the territory of another country, as well as to disembark, in country B, passengers, mail and cargo from another country, on flights originated and / or intended to the country of the company.
- Sixth Freedom of The Air: "the right or privilege, in respect of scheduled international air services, of transporting, via the home State

of the carrier, traffic moving between two others. The so-called Sixth Freedom of the Air, unlike the first five freedoms, is not incorporated as such into any widely recognized air service agreements such as the "Five Freedoms Agreement"". Example: A flight from Brazil has the right of the Brazilian company designated to carry passengers, mail and cargo between two other countries, with intermediate landing in Brazil.

- Seventh Freedom of The Air: “the right or privilege, in respect of scheduled international air services, granted by one State to another State, of transporting traffic between the territory of the granting State and any third State with no requirement to include on such operation any point in the territory of the recipient State, i.e the service need not connect to or be an extension of any service to/from the home State of the carrier.” Example: A carrier from Brazil has the right to transport traffic from a State to a third party without passing through the territory of the flag State of the aircraft.
- Eighth Freedom of The Air: “the right or privilege, in respect of scheduled international air services, of transporting cabotage traffic between two points in the territory of the granting State on a service which originates or terminates in the home country of the foreign carrier or (in connection with the so-called Seventh Freedom of the Air) outside the territory of the granting State (also known as a Eighth Freedom Right or "consecutive cabotage").” Example a carrier from

Brazil has right to transport traffic between two points in the territory of a State other than that of the flag of the aircraft.

- Ninth Freedom of The Air: “the right or privilege of transporting cabotage traffic of the granting State on a service performed entirely within the territory of the granting State. (also known as a Ninth Freedom Right or "stand alone" cabotage).” Example: A airline from Brazil has the right to transport traffic entirely within a third State.

Finally, the open skies concept, according to the U.S. Department of State (2017), are bilateral air service agreements negotiated between countries to provide rights for airlines to offer international passenger and cargo services.

As presented by the literature, an open skies agreement is pro-consumer, pro-competition, and pro-growth, as presented by Button (2009), InterVISTAS (2015), Winston & Yan (2015) and Zhang et. al. (2018). The agreement include reciprocal obligations to eliminate government interference in commercial airline decisions about routes, capacity, and pricing, so airlines can provide more affordable, convenient, and efficient air service to consumers, promoting more travel and trade agreements and facilitating broad economic growth.

According to Humphreys & Morrell (2009), open skies agreements improve flexibility for airline operations, expand cooperative marketing opportunities between airlines, enable global express delivery cargo networks, liberalize charter regulations and took both governments to high standards of safety and security.

OSA worldwide overall analysis. As presented in the introduction of the present research, several open skies agreements were implemented around the world in the last

decades. Some great examples that involved huge aviation markets are the OSA agreement signed between United States and the European Union, between United States and Japan, between ASEAN community, between New Zealand and Australia.

According to Button (2009), open skies is a concept that emerged in the late 1970s when the United States (US) began to liberalise the domestic cargo market and the domestic passenger sector. This concept then means the liberalization of the rules and regulations of airlines, with the aim of creating a free-market environment for the airline industry, with less state intervention.

For the US market, a number of changes have been implemented with the implementation of such agreements, particularly in the areas of market access, route designation, capacity, tariffs and bilateral codeshare agreements between airlines. In the pre-1978 period the bilateral agreements in the United States were regulated by the government, making the benefits limited by several imposed rules, such as the exclusion of charter flights from the possibility of applying freedom.

Following the implementation of bilateral open skies agreements, the US government has begun to deregulate the market for domestic airlines, limiting access to foreign airlines only, but without controlling for items such as frequency or seating capacity between routes to the United States. In 1991, the government granted freedom in an unlimited way, allowing codeshare and creating a policy of free pricing between countries with bilateral agreements signed with the United States.

Button (2009) presented the evolution of the North American model of bilateral agreements in 1978 to the intermediary model of open market to foreign airlines and the final evolution to open skies agreements in 1991. The evolution of the model and its

characteristics divided between market access, designation, capacity, fares and codeshares can be observed in Figure 3.

Figure 3

Bilateral agreements evolution in the United States

		Market access	Designation	Capacity	Tarrifs
Pre-1978 bilateral air service agreements		Only to specified points Limited 5th freedm rights granted to US carriers Charter rights not included	Single - some multiple airines must be "substantially and effectively controlled" by nationals of designated state	Capacity agreed or shared 50:50. No capacity/frequency controles in liberal bilaterals, but subject to review	Approval by both governments (double approval) or as agreed by IATA
1978-1991 Open market bilaterals	**US airlines**	From any point in the US to specified points in foreign countries Extensive 5th freedom rights granted 7th freedom rights nor granted Cabotage not allowed		Break of gauge permitted in some agreements	Double disappoval (filed tarrifs operative unless both governments disapproval) or country of origin rules
	Foreign airlines	Access limited to a number of US points Unlimited charter rights	Multiple	No frequency or capacity controls	
Post-1991 Open Skies bilateral		Unlimited Unlimited 5th freedom rights		Break of gauge rights granted	Free pricing Code-sharing permitted

Note. Button (2009). The impact of US-EU "Open Skies" agreement on airline market structures and airline networks. *Journal of Air Transport Management*, 15 (2), p. 63.

Other authors have focused their efforts on understanding open skies agreements in various regions of the world. Forsyth et al. (2006) studied the implementation of the open skies concept in the Association of Southeast Asian Nations (ASEAN). This involved removal of capacity controls on routes, removal of entry barriers and facilitating the ownership arrangements, leading to efficiency gains in the ASEAN air transport industry and overall net gains in the economic welfare.

Adler and Hashai (2005) aimed to estimate the potential inter-regional passenger flows for the air transportation in the Middle East, in markets under the open skies policy, once the deregulation agreements between neighboring countries have been reached, with impacts calculated mainly at airports from Cairo, Tehran, Istanbul and Riyadh. The

authors identified that the interregional flow of passenger demand could increase by more than 51 percent and regulatory authorities should consider the necessary infrastructure and demand management policies to allow regional demand to grow.

For the US market, the US Department of Transportation (DOT) published a study in the year 2000 analyzing the impact of US-European flights prices on markets with open skies agreement. In these markets, there was a 12% drop on fares during the first three years of implementation, while in other markets without the agreement, fares decreased by less than 10% in the same period. On the demand side, the DOT reported in 2017 that total passenger traffic between the United States and open skies markets in Europe grew by more than 50% during the first seven years of implementation, with most of this growth being evident during the last 3 years.

However, the open skies agreement should not only bring benefits to the industry, as Meyer (2002) pointed out in his research of the open skies agreement between the United States and China. According to the author, due to the intense competition and the cooperation agreements signed between some airlines, some airlines will thrive in the competitive environment created by open skies agreements, while others will undoubtedly fail to continue their operations in the market.

Airlines Alliances: types, terms and perspectives. The airlines, in order to maximize its revenue, are constantly looking for incremental income. A very particular aspect from this industry is that its main players, airline carriers, are very keen to implement partnerships with other airlines, which requires a small investment, and allows access to new markets and offers distinct products to its customers. This sort of agreement, known by strategic alliances, have been defined as relative enduring

cooperative arrangements, involving flow and linkages that utilize resources and/or governance structures from autonomous organizations, for the joint accomplishment of individual goals (Bilotkach, 2018). Alliances cooperation level varies and bilateral agreements established between countries influence decisions and opportunities available on specific markets.

Interline Eletronic Ticket (IET) agreement has the lowest complexity level of cooperation between airline carriers. It permits an airline to issue tickets on a partner airline flight and also combine different airline sectors on a single ticket. IET arrangements do not require authorities approval and their implementation take less than two months. From the passengers perspective, it allows them to fly within two carriers with the same baggage allowance policy and no penalties or extra cost risks in case of a miss connection as both flights are covered under the same transportation contract.

Codeshare (CDSH) agreements allow airlines to market its own code on flights operated by a partner airline. This level of integrations requires governmental approval and bilateral agreements between countries can be crucial for partnership achievements. From the passenger perspective, it offers the same benefits as an IET agreement. However, for ailines there is more pricing rules flexibility and marketing opportunities as its brand obtains more visilibility.

Global alliances are multilateral corporate agreements among airlines. The purpose of forming an alliance between the airlines intially is to strengthen the competitive by sharing the hardware, identities and networks between members (Doganis, 2006). Nonetheless, joining an alliance is not just only the identity and the cooperation in business that are needed, but also to have an image and customer

perception that will not pull down the alliance's recognition. For example, nowadays it is almost impossible for low cost carriers to join an existing alliance as LCC have weak image, less network and poor service onborad. Alliances strictly control its servicing level quality by setting a higher mark for all participating members.

Since the start of Star Alliance, in 1997, the formation of the other two airline alliances came in to place, which are Oneworld and Skyteam. Until 2009, the three airline alliance achieved to sell more than half of the total amount of sky travellers tickets, and the annual passenger amount even reached more than 2/3, which is beyond the predition made by many experts around the world.

Although alliances models have been very successful over the last two decades, some business cooperation limitations have led to the new trend of airlines becoming partners through the creation of joint ventures, a partnership model that allows more integration into shared markets.

JV and JBA agreements. Joint Venture (JV) or Joint Business Agreement (JBA) is a business arrangement in which two or more parties agree to pool their resources for jointly optimize operations on common markets. This sort of agreement involves a high complexity level and governamental approvals. In the case of the USA, DOT approves JVs only if there is a OSA set in place with the other country. JVs have increased quite a bit during the last decade once the airline industry has been facing difficulties to keep its flights on the air with the increased globalization (Yu et. al., 2017).

These agreements have been springing up across the aviation worldwide and some of the good examples are United Airlines-Air Canada-Lufthansa and Air France-KLM-Alitalia-Delta over the Atlantic routes, Japan Airlines-British Airways-Finnair

between Japan and Europe or even United Airlines-ANA connecting Americas and the Asia-Pacific region.

These types of agreements are working only in regions where the regulatory framework allows antitrust immunity. So for these airlines, they can share revenue and costs no matter who is the operating airline on that specific route.

Once US signed the agreement with Europe in 2008, it allowed the airlines to work closer together and there is an estimate that soon about 78% of the ASK across the North Atlantic will be a result of JV and JBA agreements. One of the reasons for these new agreements is as Gareth Evans (2017), the CEO of Qantas International and Freight stated, there will be a global travel market of seven billion people and no airline alone can transport so many passengers.

These agreements are beneficial and reflect the customer demand of buying a ticket from “anywhere to anywhere” as smooth as possible, no matter who is the airline that issued the ticket and/or operating the flights. There is also the possibility to create new routes and this brings more value to the stakeholders and finally the customer itself.

The main focus of JVs and JBAs is to allow airlines to coordinate between themselves flight schedules, increase capacity during high seasons, offer more flights during the day with better connectivity and also define the cost of the flights according to strategies of all carriers involved in the agreement. According to IATA (2012), the passengers benefit with up to 27% lower fares on JV agreements once the interline fares between non-aligned airlines are much more expensive.

All services starting from the first contact of the client with the airline at reservations or website, through the airport experience at check-in, lounge, gate all the

way to the onboard services, can be aligned between the airlines which will provide their passengers a simplified and consistent service.

The BR-US OSA agreement approval law

By 2018, international air transport operations between Brazil and the United States were governed by the agreement reached between two countries in March 1989, which was based on the traditional model of reciprocal concessions for international aircraft traffic, with fixation of certain routes, limitation of the number and frequency of flights and type of aircraft, among other restrictions, including the specification of parameters for the fares and taxes.

In 2011, the OSA between Brazil and USA had just started the negotiation and it was the same time when the US president at the time, Barack Obama, came to Brazil for an official visit requested by the Brazilian President at the time, Dilma Rousseff.

During this visit, the countries signed ten cooperation agreements. The texts involved strategic areas ranging from economy and trade to science and technology, in sectors such as trade and economic cooperation, peaceful use of outer space, biodiversity research, and, finally, air transport and development of aviation biofuels and technical cooperation.

At the meeting, the "Agreement on Air Transport between the Government of the Federative Republic of Brazil and the Government of the United States of America" was signed by the Brazilian Minister of Foreign Affairs, Antonio Patriota, and the US Ambassador to Brazil, Thomas Shannon. To become valid, it is necessary by national laws that the text be approved by the Chamber of Deputies (Lower House) in Brazil, a process that took seven years to complete. In 2017, the text was approved by the plenary

and sanctioned by the current president of Brazil, Michel Temer, and the rules described in the 2011 agreement are now binding as part of the law for the aviation industry.

According to the Chamber of Deputies (2016), the main objectives of the approval of the open skies agreement between Brazil and the United States are (1) to promote an international aviation system based on competition among airlines in the market, with minimum interference and government regulation, (2) to allow airlines to offer to the public passenger tickets and cargo variety of service options, (3) to encourage airlines individually to develop and implement innovative and competitive pricing, (4) to facilitate expansion and (5) to ensure the highest level of aviation safety and security in international air transport and to reaffirm its serious concern about acts or threats to the safety of aircraft, including people or property, that adversely affect the operation of air transportation and public confidence in the safety of civil aviation.

Therefore, the agreement signed has as a goal to contribute positively to the competitiveness in the market and as an incentive to the gain of economic benefits to users of international travel between Brazil and the United States. As the agreement was approved in May 2018, it has not yet had the expected effects on the economic activity of the national airline industry nor any changes in the dynamics of flights between Brazil and the United States.

For such effects to be valid, the open skies agreement signed between the governments of Brazil and the United States establishes a series of rights for the transport operation, among them (1) the right to fly over its territory without landing, (2) the right to make stopovers in its territory for non-commercial purposes and (3) the right to execute international air transport between points on the routes within the two countries.

In short, there are no changes between the text of the law and the current air operations, being only official registration.

Among other rights signed, however, there are rules of operation of flights between the two countries which allow an unlimited and independent offer of seats by the airlines of both countries.

Each airline of the two countries may, on any and all flights, choose:

a. to operate flights in either or both directions;
b. to combine different flight numbers in the same operation;
c. to serve destinations before, during or beyond the routes within the two countries in any combination or order;
d. to omit stopovers at any destination and/or destinations;
e. to transfer traffic between any of its aircraft, at any point;
f. to operate within two cities with or without aircraft change or new flight number and to report that these services are direct services;
g. to stop at any city within or outside the two countries, carry traffic in transit through the territory and combine traffic on the same aircraft regardless of where that traffic is originated.

All such rights have been designated without limitation of direction or geographical limitation and without loss of any right to transport traffic otherwise permitted under the agreement, provided that the transport is part of a operation to a city of the airline's country.

In terms of operating capacity, the new rules allow airlines of both countries to determine the frequency and capacity of international air transport that they offer based

on commercial market considerations and the governments of both countries can not unilaterally limit the volume of traffic, the frequency or regularity of the service or the types of aircraft operated by the airlines of both countries.

According to the Brazilian Chamber of Deputies (2016), the open skies agreement negotiated by Brazil and USA is based on market rules and allows a wide flexibilization for the operation of Brazilian and American airlines on international flights with traffic to and from the United States. The only exception are "cabotage" flights that are related to a foreign airline to transport and sell seats within the domestic cities in another country.

Based on the analysis presented, on July 4, 2016, the deputies of the National Congress of Brazil approved the "Air Transport Agreement between the Government of the Federative Republic of Brazil and the Government of the United States of America" signed in 2011, which was sanctioned by the president of Brazil, Michel Temer, in 2018, becoming officially valid the new rules presented in this chapter.

OSA impacts and results achieved worldwide

A series of studies are conducted with the goal of measuring the impacts of open-skies signatures around the world, analyzing the impacts of OSA agreements, such as described by Good et. al. (1995), Mayor & Tol (2008), Button (2009), Humphreys & Morrell (2009), Mayor & Tol (2009), Pitfield (2009), Pitfield (2011) and Zhang et. al. (2018).

The study of the topic in the current literature addressed concepts in the areas of economy, social impact and the value chain of tourism to the countries that sign the agreement such as hotel chains, transportation segments, industries in general.

Several studies applied to route liberalization agreements, such as Bernardo & Fageda (2017), InterVISTAS. (2015), Ismaila et. al. (2014) and Mayor & Tol (2009), were published in various parts of the world to present impacts of the open skies agreement implementation: in the Asian market, through the open skies agreement in the ASEAN region, in the Trans-Tasman routes between Australia and New Zealand, in the international markets between Malaysia and Thailand and other various agreements signed by the United States, such as with the European Union and Japan.

The United States has open skies agreements signed between about 125 nations, including the European Union countries such as the Netherlands (10/14/92), Germany (2/29/96), Italy (11/11/98), Portugal (12/22/99), France (10/19/01) and Spain (4/30/07).

Good et. al. (1995) examined the performance of the eight largest European airlines and the eight largest American airlines in the period 1976-1986, following the start of the deregulation of the US and European markets. European deregulated carriers were as productive as their American counterparts, showing that the benefits of deregulation and privatization in terms of efficiency and productivity may be great for the European aviation industry, which would make European industry save approximately $ 4 billion per year (in 1986 dollars). The above conclusion was used as a catalyst for several other studies, more focused on the diverse impacts of signatures of open skies agreements. Mayor & Tol (2008) used a mathematical model to estimate the impact of the open-skies agreement between the United States and the European Union, which took effect in March 2008. It is estimated that the Open Aviation Area resulted in an increased competition between transatlantic carriers and, consequently, falling flight costs, bringing

the number of passengers arriving from the US to the EU increased by approximately 1% and 14%, depending on the magnitude of the price reductions.

The increase in passengers who have been analyzed by the researchers, including the conclusion that such agreements generate significant economic benefits for the airlines of the signatory countries of the agreements, are shown by Button (2009), Yu et. al. (2017) and Cosmas et. al. (2010). The benefits impact not only the airlines, but also airports, as shown by Humphreys & Morrell (2009) when analyzing the impacts of the open-skies agreement on the international operations of Heathrow Airport, which is a natural hub for Europe and for the region of England. This resulted in a growth of 5% in the general capacity of seats and 8% in the number of flights.

Despite the success above at LHR airport, the authors diverge from general studies of impacts between the European Union (EU) and the United States (USA), stating that the benefits of the agreement between the EU and the USA provided by various studies appear to be overly optimistic. This conclusion is taken by analyzing only the operations at Heathrow, since the high prices paid for LHR slots, combined with the economic downturn and higher oil prices, means that most airlines may not achieve the level of profitability on their new services that many expected.

Nevertheless, Zhang et. al. (2018) stated that the establishment of joint ventures within international alliances showed significant impacts, stimulating carriers' entry into existing markets. Despite the overall benefits of the agreement for the industry, the authors analyzed the entry of new players in the market from the signing of the agreement and concluded that USA carriers tend to take more advantages of the OSA,

specially related to USA market. This implies that the imbalanced foreign ownership and cabotage rights could put EU carriers in a disadvantaged position.

The positive impacts of the open-skies agreement are also identified around the world, as presented by Forsyth et. al. (2006) for the ASEAN market. Although there may be differentiated impacts by countries, given that member countries differ widely in terms of their GDP per capita, their size, aviation policies and the strength of their aviation industries, there is evidence that open skies within ASEAN would bring considerable benefits to the region as a whole, though these gains might not be equally shared by all countries. This was expected mainly by the rise of low-cost companies, such as Lion Air, AirAsia and Tigerair.

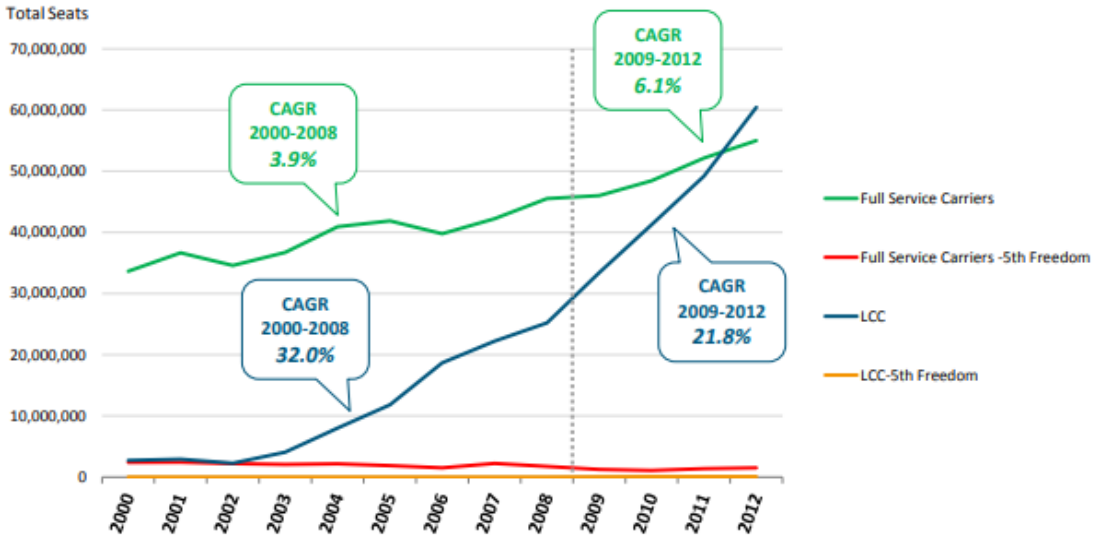
According to the authors, opening up secondary markets is giving LCCs scope to expand and demonstrate the potential gains from more extensive liberalization, with an nnual growth of 21.8% between 2009 and 2012, while during the 2000s the CAGR was 32.0% a year, as showed on Figure 4.

This fact was corroborated by InterVISTAS (2015), when evidencing that the traffic growth in the Asia-Pacific region in general has been among the fastest growing in the world for years. Between 2000 and 2008, growth in the region averaged 8.1 percent annually.

After the agreement, from 2009 through 2012, the average growth reached 13.2 percent annually, where much of that growth was led by low cost carriers: ASEAN's low cost carriers have grown over 3.5 times faster or by 21.8% annually on average, helping the total number of airlines operating in the region to grow to 20 carriers in 2012. Check the Figure 4 for more details.

Figure 4

Annual Scheduled Seat Capacity in the ASEAN Market by Carrier Type



Note. Adapted from "The Economic Impacts of Air Service Liberalization," by InterVISTAS, 2015, p. 21.

As presented in this chapter, one of the most important open skies agreements signed around the world was between Malaysia and Thailand, both countries located in East Asia. This agreement was established from the OSA signed among the ASEAN countries in 2009. According to InterVISTAS (2015), the agreement effectively allowed designated airlines of any signatory country to operate to, from, and beyond any capital city in another signatory country. As shown on Figure 4, the rise of airlines with the low cost model allowed the growth of the offer of seats between countries.

In the case of the bilateral agreement signed between Malaysia and Thailand in 2004, the total seat capacity in the market increased by 10.1% annually from 2004 to 2012, while remaining stable throughout the period between 2000 and 2003. This growth was due to to the increase of direct flights between cities that do not have airports as domestic hubs: the number of nonstop routes served tripled from 5 in 2003 to 15 in 2012

Interview (2015). Since 2004, capacity in secondary markets has grown more than twice as fast as the major hubs of Bangkok and Kuala Lumpur, as shown in Figure 5:

Figure 5

Malaysia-Thailand nonstop services between 2003 and 2012

Note. Adapted from "The Economic Impacts of Air Service Liberalization," by InterVISTAS, 2015, p. 39.

Vowles et. al. (2007) examined the various geographic shifts occurring in New Zealand air passenger service as a result of the liberal aviation policies pursued by the country. The liberalization of rules and the signing of open skies agreement in the region resulted in an increased competition in the Trans-Tasman market, making it one of the most heavily contested routes in global aviation and one of the most diverse and competitive across the world. The largest beneficiaries of this competition are passengers, along with air transport-dependent industries, such as airports, hotels and other travel-related industries.

This growth was presented by InterVISTAS (2015), confirming the growth of direct routes between the two countries: in 2001 there were 13 routes and by 2012, following Open Skies, the number of nonstop Trans-Tasman routes grew to 23, resulting in a year-on-year growth of 4.9% a year since 2002.

Figure 6 illustrates the fragmentation that has taken place in this major market for both business and leisure traffic.

Figure 6

Trans-Tasman Nonstop Services: changes between 2001 and 2012

Note. Adapted from "The Economic Impacts of Air Service Liberalization," by InterVISTAS, 2015, p. 29.

The same growth effect has even greater potential in countries with low economic development and the civil aviation industry as yet unexplored, such as the case of Nigeria presented by Ismaila (2014). The author came to the conclusion that the liberalization of market access to the open skies agreement level could stimulate traffic growth by at least 65 percent, which would impact the air fares, revenue, cost and competition in the region.

Another important African case was studied by Bernardo & Fageda (2017), when analyzing the effects of the signature of the open skies agreement between the European Union and Morocco in December 2006 and that the pre-liberalization air transport in all North African. The authors found a growth between 20% and 35% in the number of seats offered and a remarkable growth in the number of new routes. In this case, they provided evidence of the benefits that a liberalized environment may have for middle-income developing countries.

As a general analysis, the current literature confirms that the cases of open skies agreements signed were beneficial for the growth of seats capacity, inclusion of new routes and development of low cost companies.

Summary

The path to signing an open skies agreement between Brazil and the United States went through three moments:

- Signature of the "Agreement on Air Transport between Brazil and the United States of North America" on March 21, 1989
- Signature of the Memorandum of Consultations in 2008, which provided for a continuous increase in the maximum number of flights and allowed an increase in the number of flights.
- Signature of the open-skies agreement in 2018 which will give the two countries the opportunity to offer the best and limitless conditions, without governmental influence, on the offer of international flights.

In the last decades, air transportation between Brazil and the United States has increased considerably, from 2.05 million annual seats in 2000 to more than 2.70 million seats in 2017, a growth of 35% in the offer in the period. This growth is due to the Memorandum of Consultations signed in 2008 which gradually increased the maximum possible weekly flights offer for one specific airline, from a maximum of 105 weekly flights in 2008 to more than 250 in 2014 and thereafter, unlimited maximum number.

Currently, about 60% of seats are offered by US airlines, with a concentration of flights still located around the Rio-São Paulo axis, with 80% of flights departing or arriving in one of the two cities. Since 2010, there has been a tendency for international flights to increase in secondary cities such as Campinas, Belo Horizonte and Recife, which increased their share from 4.0% in 2010 to 13.5% in 2018, an increase of 9.5 points percentages.

As evidenced by the major open-skies agreements around the world, there is expected to be a considerable increase in the number of flights and the number of cities operated in both countries.

However, it is correct to say that the open skies agreement is established between two governments and, from then on, may have a reflection on the planning, operation and execution of international flights between Brazil and the United States. As presented, joint ticket marketing agreements between two airlines can begin to define the flow of passengers and the provision of flights between cities. Given that the agreement allows a liberalization of the offer of flights between the two countries, it is expected that there will be an increase of competition with the availability of more flights, leading to a constant percentage increase over the next few years of operation.

This can result in an increase in income and employment, especially in Brazilian tourist destinations, as well as a trend of relationship and signing of joint ventures and interline agreements between Brazilian and North American airlines, at a time of synergy of operations, costs and air network.

As presented, several authors have studied the impacts of adopting the open skies agreement on the demand of countries that have adopted such a regime. This is the case of the market between Australia and New Zealand, which had annual growth of seats of about 4.9% since 2002, going from 13 routes that year to 23 in ten years. The same was true for ASEAN countries, which had an average annual growth in capacity of 13.2% between 2009 and 2012, following the signing of the agreement in the region (it is recalled that before the agreement, the average growth was 8.1 % per year).

Independent of the region in the world where the agreement was signed, the current literature presented a number of positive results. The same effect is expected from the application and metodological strategy presented below for the case between Brazil and the United States.

Chapter III

Methodology

This chapter presents the methodological strategy adopted to analyze the future impacts of the open skies agreement signature between Brazil and the United States. The main objective of this research is to present the direct and indirect impacts in the economic, operational and legal spheres of the open skies agreement between the two countries and propose solutions to those abovementioned areas.

Experimental Design

The methodological application of the present research have qualitative and quantitative analysis, based on what was proposed in the specific objectives presented in the first chapter of the research. The topics analyzed are: (1) regulations, (2) alliances, (3) economic impacts and (4) general long term projections.

The first two, regulations and alliances, were presented by the explanation of the main issues and opportunities, based on a contextual analysis of the terms of the signature of the open skies agreement between Brazil and the United States. Given the growth of the possibility of strategic alliances among airlines, this research analyzed the recurring impacts of the joint business agreement between LATAM Airlines and American Airlines, approved in 2017. Additionally, this research predicted the future impacts of potential new agreements.

The last two items, economic impacts and general long term projections, were analyzed using multiple regression model, in which the amount of weekly flights frequency was explored against independent variables such as population, per capita

GDP, distance and dummies by city, in addition to the presentation of the main economic impacts airlines in Brazil face in terms of operational costs and financial margin impact.

A long-term projection of commercial air operations between Brazil and the United States was created, based on the proposal of a coefficient of opportunity of several markets and flights between cities of the two countries. From the results of the mathematical model, this research presents the main points of attention and projected impacts so that the full potential of the projection is reached in some years.

Given the long-term projection, the economic impacts of the signature of the open skies agreement is presented as an estimate of the impact on the price, demand, offer and profit of the airlines from the opening of opportunistic routes between cities that do not yet have direct flights between Brazil and the United States.

The result of the application of the multiple regression is to insert in the literature the possible impacts on secondary markets and to encourage the discussion of the economic impacts to passengers when adopting the open skies agreement between Brazil and the United States.

Regulations. The study of the market regulations and the existing rules for flights between Brazil and the United States and for specific and domestic operating rules in Brazilian and American national territory was analyzed using a qualitative and a generic analysis of the operational rules adopted in Brazil by the ANAC and United States by the FAA, as well as from the OSA approval law between the two countries.

The rules used were divided into three independent variables: rules for operation and approval of flights, costs and taxes involved in the air operation and market concentration and alliances.

The first variable, rules for operation and approval of flights was derived from the following three rugulaions:

- Decree 446/92, signed on February 7, 1992 and promulgating the "Agreement on Air Transport between Government of the Federative Republic of Brazil and the Government of the United States of America"
- "Memorandum of Consultations", signed by both governments on December 3, 2010
- Legislative Decree No. 424-B, relative to the approval of the "Open Skies Agreement between Brazil and the United States" and effective as of May 2018.

Alliances. The approval of the open skies agreement between several nations in the world made possible the creation of strategic alliances between airlines, such as joint ventures and joint business agreements. Such agreements make it possible to increase the supply and division of operations, costs, revenues and profitability for the routes in the agreements.

In Brazil, only LATAM Airlines has an JV agreement signed with American Airlines. Diverse strategic alliances such as codeshare and interline agreements are in place among other major Brazilian airlines, such as Gol and Delta Airlines, Azul and Jet Blue Airlines and Avianca Brasil and United Airlines.

These agreements are approved by the Administrative Council for Economic Defense (CADE), a Brazilian authority responsible for the analysis of mergers and acquisitions and the protection and defense of the economic agents. On September 14, 2017 CADE approved the joint venture between LATAM Airlines and American

Airlines, on the routes between Brazil and the United States, as published in the Official Gazette (DOU), section 1 and dispatch nº 1355.

Based on the publication made by CADE (2017), the qualitative analysis was applied to the potential bilateral agreements between Gol and Delta, Avianca and United and Azul and JetBlue. Therefore, this qualitative analysis also aimed to design the possible associations of airlines and to specify the competitive scenario in the flight offers between Brazil and the United States from these four large blocks of companies. These flight offers between both countries were explored in this research according the the ASK, demand and quality.

The concentration act considered for the present research was nº 08700.003715/ 2017-95, in which the body analyzes the agreement proposed by the two companies mentioned previously and discusses the possibility of negotiation strength in the market (for air transportation of passengers and cargo) and development of obstacles for new players in the market.

Economic impacts. The analysis of the economic impacts of the signing of the open skies agreement between Brazil and the United States was based on the pillars of operational costs that Brazilian airlines have.

Based on operational cost data obtained by ABEAR in the publication "Panorama 2017", this research presents the main gaps between the costs of Brazilian and North American airlines and what are the obstacles to the economic development of the sector in Brazil. The issues of costs and financial margin are presented and a reflection of the theme is discussed, focusing on the impact of these economic issues as an obstacle to the growth of international passenger flows.

In addition, a correlation analysis between dollar exchange rates, economic growth and changes in the number of international passengers between Brazil and the United States are presented to complement the possible economic impacts of the open skies agreement.

General long term projection. Based on ANAC (2018) data analysis, about 80% of the seats offered between Brazil and the United States originated from the cities of São Paulo and Rio de Janeiro. On the American side, about 70% of seats on the flights have as arrival and/or departure destinations, three cities: Miami, New York and Orlando. There are more cities connected within North American territory, with twelve origins or destinations, than in Brazilian cities, with ten origins or destinations.

After the signature of the open skies agreement, this research presented a long-term projection of the offer of flights between Brazil and the United States. A quantitative analysis using multiple regression equation was made for this research. The dependent variable is the amount of weekly flight frequency between the cities and the independent variables were based on several factors that impact the flight offer: inhabitants, per capita income, industry and commerce, tourism potential, connectivity and HUB potential, distance and current capacity.

In addition, due to the current offer and its evolution during the last years, an analysis of the seat map offered between the two countries was also made, as well as the quality of the offer, the points of connection and the potential new routes.

The calculated data of the coefficient of opportunity was presented from the set of direct flights that can be offered between the 15 main Brazilian and North American cities, for a total of 225 possible direct flights.

Data Source(s), Collection, and Analysis

Recent literature has studied the effects of the open skies agreement in different countries, but always considered the date after the signature of the agreement and the recent historical basis built after the changes in flights capacities and demands.

The open skies agreement between Brazil and the United States was signed in 2018, still without concrete effects on the offer of flights between the two countries. As presented in Chapter 2, several flight increments have been verified over the past 10 years, but there are still additional opportunities. Therefore, the present research will contribute to the current literature by specifying a method for identifying opportunities (the coefficient of opportunity).

Coefficient of Opportunities. The study of the impact of the possibilities of major new connections between Brazil and the United States was made from the crossing of the coefficient of opportunities of the 15 main domestic and international markets of each country.

Based on statistical data for the year 2017 and published by ANAC and BTS for Brazil and the United States, respectively, the data that was analyzed by the coefficient of opportunities were São Paulo, Rio de Janeiro, Brasilia, Belo Horizonte, Campinas, Porto Alegre, Salvador, Recife, Curitiba, Fortaleza, Florianópolis, Belém, Goiânia, Vitória and Manaus by the Brazilian side and New York, Los Angeles, Miami, San Francisco, Chicago, Atlanta, Houston, Dallas, Washington, Boston, Orlando, Las Vegas, Minneapolis, Denver and Detroit by the North American side.

The coefficient of opportunity was calculated using the multiple regression, which resulted in a proposal of weekly frequency flights between the main cities of Brazil and

United States. The independent variables of the multiple regression and its sources were presented in Table 8.

Table 8

Variables composing the Coefficient of Opportunity

Variable	Metric	Source
Population	in million	IBGE
GDP *per capita*	BRL	IBGE
Flights frequency	# of weekly flights	ANAC
HUB Potential/P2P Force	dummy	-
Destinations to US	# of cities	ANAC
Players on BR-US market	# of players	ANAC
Direct flight time vs Actual connection time	hours	DIIO
Infrasctructure	Index	-

Note. Own elaboration

Each variable impacts the coefficient positively or negatively, depending on the indicator analyzed: a larger population with better income and potential of the city as hub has a lot more positive impacts than a city with a high offer of flights, existing direct flights and little tourism potential.

It is important to note that the research objective is only to predict the overlooked opportunities for an airline to increase seat offer: it's a proposal of future new routes.

From the above data, the calculation of the coefficient of opportunity (Equation 1a) between city i and city j is given by the amount of frequency resulted from the multiple regression minus the actual amount of frequency provided:

$$C_i^j = nfreq_i^j - freq_i^j \quad (1a)$$

Where:

C_i^j = the coefficient of opportunity between city i and j

$nfreq_i^j$ = new weekly frequencies between city i and j resulted from the multiple regression

$freq_i^j$ = actual weekly frequencies between city i and j

In order to determine the new weekly frequencies between city i and j, a multiple regression model was made, based on the actual flights offered between Brazil and the United States. The regression used 38 observations of pairs of city flights between Brazil and United States during the last 17 years, taking into consideration the maximum industry weekly flights offer during one year. As an example, the major weekly frequencies provided in a year on the market São Paulo-Miami happened on 2014, with a total amount of 42 weekly frequencies. Charter flights and pairs of cities that faced less than one weekly flight in an entire year was not considered on the regression, considering that they are not impacted by the open skies agreement, once these type of flights are provided on specific periods and do not represent the industry performance and planning of the regular routes between Brazil and United States.

The multiple regression was determined by the Equation 1b, taking into consideration that city i is a Brazilian and city j is American:

$$nfreq_i^j = c + \beta_1 popBRA^i + \beta_2 popUS^j + \beta_3 GDPBRA^i + \beta_4 GDPUS^j + \beta_5 HUBBRA^i + \beta_6 HUBUS^j + \beta_7 ATOUS^i + \beta_8 ATOBRA^j + \beta_9 dist_i^j \quad (1b)$$

Where:

$popBRA^i$ = Total city population (in million) of the Brazilian city i.

$popUS^j$ = Total city population (in million) of the American city j.

$GDPBRA^i$ = GDP per capita of the Brazilian city i.

$GDPUS^j$ = GDP per capita of the American city j.

$HUBBRA^i$ = dummy assuming value 1 if the Brazil city i is a HUB and 0 if not.

$HUBUS^j$ = dummy assuming value 1 if the American city j is a HUB and 0 if not.

$ATOUS^i$ = number of American cities with direct flights from Brazilian city i.

$ATOBRA^j$ = number of Brazilian cities with direct flights from American city j.

$dist_i^j$ = distance in miles between Brazilian city i and American city j.

The higher the coefficient of opportunity, the greater the opportunity for a new flight or an increase in supply between the two cities, after the signature of the open skies agreement between Brazil and the United States. Priority analysis was done either among all 225 combinations or just by looking at the coefficients for a given city.

Chapter IV

Outcomes

This chapter presents the results of the multiple regression statistical model for determining the coefficient of opportunity of a direct flight between two cities from/to Brazil and the United States.

The impacts of the signature of the open skies agreement between Brazil and the United States on commercial alliances among airlines, the challenge of the new routes expected, as well as the issues in terms of operating costs, capacity security and regulation are reported based on the results of the model.

The regression model results in Equation (1b):

$$nfreq_i^j = -4.24 + 0.29popBRA^i * popUS^j + 0.44HUBBRA^i + 0.24ATOBRA^j * ATOUS^i + \varepsilon \quad (1b)$$

The estimated R^2, a statistical measure of how close the data are to the fitted regression line, is 89.3% which means that the independent variables of the model proposed explain 89.3% of the weekly frequency between Brazil and United States, and the F test is significant at 5% significance.

A relevant fact in the analysis is to conclude that the explanatory variables related to the number of airports currently served by direct flights between Brazilian city i and North American city j is relevant to the model and significant. For each one new North American destination, a given city increase its weekly offer by at least 0.29 frequencies per week.

The result of the model indicates that the explanatory variables that most impact the decision of the industrial amount of weekly frequencies is the number of weekly

airports served by the current flights between Brazil and USA. This effect demonstrates the importance of capillarity in the number of destinations served between the cities of the two countries. When applying a statistical model for the combination of 225 routes between the 15 main cities in both countries, presented in Chapter 3, and measuring the coefficient of opportunity for each of the routes, the result is shown in Table 9:

Table 9

Coeficient of Opportunities

	BEL	BSB	CNF	CWB	FLN	FOR	GIG	GRU	GYN	MAO	POA	REC	SSA	VCP	VIX
ATL		1.6	1.5			1.5	7.3	5.8		1.5		1.4		1.3	
BOS															
DEN															
DFW							1.6	-1.2							
DTW															
IAD							0.5	-3.4							
IAH								-2.8							
JFK		4.2	2.9	0.5		3.2	7.3	2.8		2.0		0.7	3.6		
LAS															
LAX							4.2	6.3							
MCO		1.4	1.2			1.4	16.4	7.7		1.3		-1.4		-5.3	
MIA	6.7	7.5	6.9			7.3	15.7	10.3		5.2	9.0	11.1	9.2	14.1	
MSP															
ORD							1.8	-0.2							
SFO															

Note. Created by the researchers

Table 9 shows the coefficient of opportunity of the pairs of routes between the 15 largest Brazilian and North American cities in terms of passengers and air traffic. The coefficient represents the additional amount of direct flights between city pairs in relation to the existing weekly frequencies throughout 2017. Possible new flights are marked in red, while the expected increases for current direct flights are represented by blue color.

The results suggests 20 potential new routes, 3 coming from São Paulo and Rio de Janeiro (which already concentrate 80% of the seat capacity) and 17 from other cities. From São Paulo, the new route designed by the model is a direct flights to Boston (3.5 weekly frequencies). From Rio de Janeiro, the new routes designed by the model are direct flights to Los Angeles (4.2), Chicago (1.8) and Washington (0.5). From other cities, the new routes designed by the model are direct flights from Brasília to Atlanta

(1.6), New York (4.2) and Orlando (1.4), from Belo Horizonte to Atlanta (1.5) and New York (2.9), from Curitiba to New York (0.5), from Fortaleza to Atlanta (1.5), New York (3.2) and Orlando (1.4), from Manaus to Atlanta (1.5), New York (2.0) and Orlando (1.3), from Porto Alegre to Miami (9.0), from Recife to Atlanta (1.4) and New York (0.7), from Salvador to New York (3.6) and from Campinas-Viracopos to Atlanta (1.3).

The increase in expected flight offer, resulting from the statistical model presented above, concentrates 80% of new flights outside the cities of São Paulo and Rio de Janeiro. The new routes create a new axis of air transport, with new direct flights programmed for the northeast, center-west and south regions, as shown in Figure 7:

Figure 7

Map of new direct flights expected

Note. Own elaboration.

These new weekly frequencies allow an increase of 181 weekly frequencies between the two countries, going from the current 196 weekly frequencies to a total of 377, reaching a growth of 92% compared to the current levels.

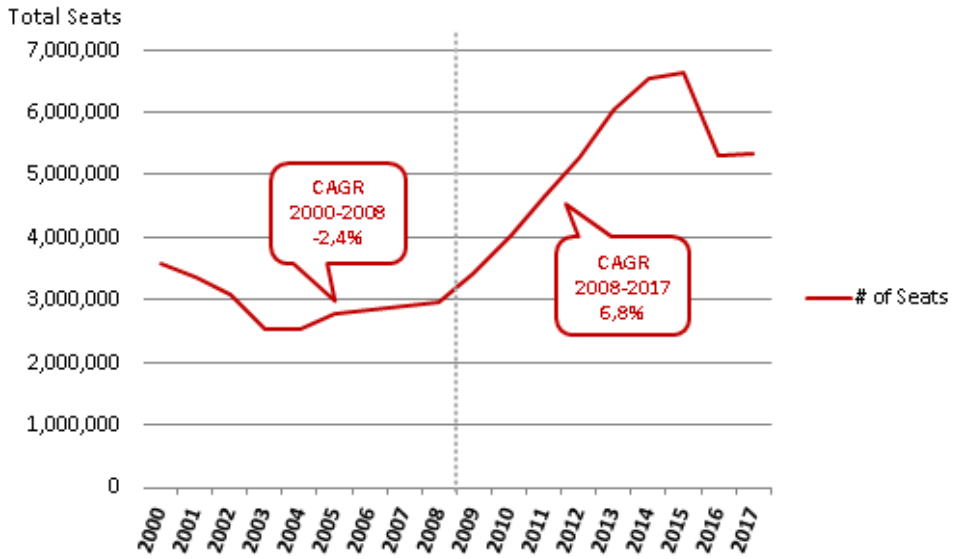
It is also possible to note the opportunity on missed routes, Denver and Los Angeles, which account for 5% of the new frequencies between Brazil and United States.

However, even with the increase of new routes, the concentration of flights on the east coast of the United States is still expected: an increase of 170 new daily flights per week is expected for this region, about 93% of new flights. The growth of new routes is in line with the development of the civil aviation and transport industry between the two countries since the signing of the Memorandum of Consultations in 2008.

Since that date, the growth of routes and the flow of passengers has been constant. The average annual growth from 2000 to 2008 was -2.4% and from 2008 to 2017 it was 6.8%, as shown in Figure 8:

Figure 8

Annual Scheduled Seat Capacity bewtween Brazil and United States



Note. Own elaboration, based on data provided by ANAC (2018).

The potential quantitative effects of BR-US OSA

The new Open Skies Agreement signed this year between USA and Brazil has a major potential of important effects in the commercial and tourist segments between both countries. The quantitative analysis was made based on several factors and variables that impact the flight offer: inhabitants, per capita income, industry and commerce, tourism potential, connectivity and product, current capacity and opportunities.

The highest number of passengers transported between both countries was in 2014 and 2015 and this result was not only due to the World Cup event because if so, the other countries would have also increased and the findings do not show much ASK from or to the other destinations.

The increased capacity soon showed low profits with the global economy and especially Brazil´s economy decreasing rapidly and in 2016, the airlines started to cancel many fligths between both US and Brazilian cities.

Even though with a high or low ASK in the markets, a large concentration of flights are in the cities of São Paulo and Rio de Janeiro and mostly operated by the US airlines which correspond to over 60% of the ASK between the two countries.

According to the analysis of OSA of USA and other countries, the best results of steady increase of flights between both countries are seen after five or more years and this shows that the new BR-US agreement is still too recent to present the best possible results. These opportunities do include the exploration of other Brazilian and US cities that could offer good connectivity within both countries. Some of the airports that could be explored are Brasilia (BSB), which is located in the central region of Brazil and offers

good connections between north and south of Brazil and Atlanta (ATL) which is also one of the hubs of the main US airlines.

Impacts of airline alliances. As presented in Chapter 2, in international aviation, cooperation between airlines is an important facilitator for the expansion of network connectivity and attaining incremental revenue. The regulatory, technical and economic limitations, historically linked to this segment, have triggered the companies to develop cooperative agreements since the beginning of the operations of international air services, such as interline, codeshare and global alliances agreements. The US-BR OSA allows American and Brazilian airlines to negotiate and possibly implement the last stage of cooperation between airlines before a merger or acquisition, which is the creation of a Joint Venture (JV) or Joint Business Agreement (JBA).

Participating carriers in a joint venture in the international market effectively integrate planning tactics of their operations, such as network decisions, and seat capacity, etc. Pricing and revenue strategies are also coordinated and managed jointly, making it indifferent to the related companies that are physically carrying passengers (term known as “metal neutrality”).

Since the first agreements were concluded, the main objective has been to integrate the international operations of the companies involved without promoting changes in the capital composition, as shareholdings are restricted according to the legislation of each country. However, competition authorities are required to recognize and approve such cooperation intentions as "actions of a single company”.

Regulation and competition policy. The main concern of the competition authorities in their field is to safeguard competition level in the market, protecting the

diffused rights of consumers and preventing access restriction into the markets for new entry competitors, a practice known in the literature as market foreclosure (Tirole, 2007). Given that, the granting of immunity can make the market less competitive by restricting consumer choice and increasing the market power of immunized companies, this matter is treated with the utmost rigor and reservations by the authorities. The judgment of immunization procedures follows the logic of authorizing joint ventures or mergers between companies. The first step is to determine the applicable market to the agreement and the capacity share that the participating carriers control in this specific market.

The applicable market is defined by a set of cities, regions or countries' pair or groups, in which the companies involved operate. Given the market power that participating companies have in such market and the existence of a barrier to entries related to airport congestion, authorities may reprove the implementation of this sort of cooperation. It is worth noting that joint ventures in the airline sector do not fit into the particularly beneficial case of pre-market agreements (when the objective is the launch of new product or service), since the main motivation is rarely the development of new routes. Usually, this type of cooperation is set in a pre-existing service (Bilotkach, 2012).

In the US, the government has authorized antitrust immunity in international markets since the 1990s. Department of Transportation (DOT) is the institution responsible for judging antitrust immunity applications in the country's international air transport. In addition, the Department of Justice (DOJ) is always invited to participate in the approval process and its analyses play an important role in the decision regarding immunizations.

According to DOT (2018), for many past applications, the principal public interest benefit furthered by DOT's grant of immunity has been the negotiation of open skies agreements with the home country of the U.S carrier's alliance partners. In the present matter, open skies agreements have been signed with the home countries of all foreign applicants, and those foreign carriers will continue to be members of the immunized alliances whatever DOT decides here. Where an application does not directly promote open skies with its attendant consumer benefits, applicants bear a heavy burden to prove benefits specific to their alliance agreements that justify immunity. Where an application involves the presence of two majors domestic competitors, the request for immunity warrants particularly close scrutiny.

Nonetheless, the creation of joint ventures can generate complications according to the DOJ's view as reducing competition in the market where the two companies should continue to compete (due to the proximity created between the companies, facilitating collusion) would lead to two evidences of possible anti-competitive effects of immunization:

a. Routes with fewer competitors lead to higher rates (the reduction from 2 to 1 companies serving a route raises tariffs by about 15%, while the reduction from 3 to 2, or 4 to 3, the effect is close to 6.5%);
b. Immunized companies' fares are commonly higher than non-immunized companies in flights connecting with JVs' routes;

Based on such possibilities, DOT may approve JV agreements with restrictions. American Airlines and Lan Chile case was the first one between companies from South and North America. The agreement was made possible because of the pioneering South

American open skies agreement between the United States and Chile, signed in 1999. American and LAN Chile were criticized at the time by other US companies that feared an excessive concentration of the market, especially in the stretch Miami-Santiago, the most important in passenger volume. The arguments were rejected by the DOT, which provided for increased competition in the market as a whole in view of the liberalization of capacity.

An example used as a model by the DOT at the time was the experience of Central America, which signed six OSAs with the US in 1997, leading to a significant increase in air traffic thereafter. Antitrust immunity between American and LAN Chile was then approved in 1999, with the exception of the Miami-Santiago stretch.

In Brazil, the antitrust authority in the country is the Brazilian System for the Defense of Competition, composed of the Administrative Council for Economic Defense (CADE), attached to the Ministry of Justice, and by the Secretariat for Economic Monitoring attached to the Ministry of Finance. In order to approve any cooperation application, there is a case-by-case analysis, weighing the efficiencies and anticompetitive effects resulting from the concentration, so the decision of approval will be based on this measured results. In any case, it is important to point out that in the current Brazilian legislation there is still no formal antitrust or political immunity institute the one of exception for the coordinated action of companies, as in the American and European legislation.

Although the proliferation of open-skies agreements have been reducing many regulatory ties worldwide, restrictions on foreign capital in Brazil persists, preventing mergers and acquisitions. Antitrust immunity thus appears as an alternative way of

integrating the international operations of airlines without the need for changes in their capital structures and Brazilian aviation will be affected soon with the intensification of this debate as OSA is now a reality and BR-US market players have an enormous potential to cooperate and optimize resources.

New routes and challenges. The new BR-US Open Skies Agreements allows the airlines between both countries to operate without any restriction on the number of flights and as shown in our study, AA has been using the maximum of flights allowed between US and Brazil and now AA will probably be the first ones to increase the fligths with their JVA with Latam. The other airlines never really used the maximum of the permitted operation.

The findings of this study show that the existing airlines today have opportunities to explore and increase flights of cities in the northeast of Brazil such as Recife (REC), Fortaleza (FOR) and Salvador (SSA) and also develop new routes to the south states of USA the aircrafts that can do up to six hours of flight.

The challenges are related to the airport infrastructure at the Brazilian airports once the current economy does not allow the goverments to invest any further and the best alternative, as already in place at some airports, is to have private investment. These new investments will increase the local job opportunities and consequently, the local economy and tourism.

However, there is also a challenge of driving demand to and from new cities with direct flights between the two countries. Cities like Denver and Los Angeles will face challenges from point to point demand stimulation (demand for passengers who complete their travels in these destinations). Both cities function as domestic HUBs in the United

States, and thus most passengers are expected to choose these destinations as points of connection to other cities. There is a possibility that with the new OSA and open cooperation between the airlines, the connectivities within the domestics network in each country will be revised and improved to make these US hubs more competitive increasing revenue and balancing the costs for the airlines with JVB.

The same effect happens with cities with smaller populations in Brazil, such as Recife, Fortaleza, Belo Horitonte, Porto Alegre and Curitiba. The cities located in the south of Brazil are weak when analyzing the potential aspect of domestic HUB, but can serve as a connection for flights from other regions of South America, such as Buenos Aires, Montevideo and Asunción, as well as interior routes in countries of the Southern Cone. Recife appears with high potential for connecting flights from Northeast Brazil.

The challenges that the new routes and new cities will face are also directly related to the corporate and cargo industry. It is important that these new routes can stimulate an increase in the trade between companies and industries in the affected regions: thus, there will be a contribution and stimulation to the business between Brazil and the United States, affecting directly the flow of corporate passengers.

Finally, as already mentioned in this research, joint venture agreements may stimulate and serve as a solution to the demand challenges of new flights, since airlines that are part of such agreements may simplify their domestic networks and allow a high potential to ensure sustainable load factor in long-term operation of the routes.

Tourism industry impacts. One of the first opportunities that the new BR-US OSA will bring is the tourism segment improvement specially in the areas where there are airports that are not explored today such as Salvador, Recife, Fortaleza, Manaus and

Belem from the Brazilian side or San Francisco, Denver, Los Angeles and Chicago from the US side.

The new freedom for any airline to fly from one country to the other one will also give passengers from both countries new access to new destinations and consequently new tourism businesses.

According to the 2018 study Panorama da Comercialização, made by the Embratur, a public organism of the Ministry of Tourism of Brazil, there's a potential to some specific areas in Brazil in diferent tourism segments, such as beaches, culture, adventure, sports, corporate events and luxury destinations. The reaserch that was made with touristic operators in United States showed an opportunity to sales destinations such as Pantanal, Manaus and Bonito as ecotourim and adventures destinations, providing unique experiences as well as visiting tourist attractions with lush nature. Another unexplored destinations that could be impacted is Fernando de Noronha (state of Pernambuco), Trancoso (state of Bahia) and Ilha do Papagaio (state of Santa Catarina) as luxury segment, tourism products that offer security, exclusivity, quality of services, privacy and destinations that are not seen as popular.

BR-US OSA Broader issues

To achieve the growth potential of the number of direct flights between Brazil and the United States, since the signing of the open skies agreement, a series of structural factors must be reviewed by the public spheres of both countries. However, it is on the Brazilian side that the main negative deviations exist. These include the ability of airports to serve large aircraft and a high flow of passengers, operational costs for Brazilian

airlines, which differ mainly in labor rules and taxes, and the national economic context, mainly related to increase income and economic stability and the exchange rate.

These impacts will be presented in the following sections, from a general and macro perspective of reality, establishing a direct relationship with the increase of direct flights between Brazil and the United States.

Operational Costs between BR and US airlines. For a capital-intensive industry, such as the civil aviation industry, maintaining a competitive operating cost structure in the market is of great importance for successful flight and margin growth.

In large numbers, the operating margin of North American airlines is bigger (and more constant) than the results found by Brazilian airlines: Delta Airlines, American Airlines and United Airlines showed EBIT margins of 14.8%, 11.0% and 10.5%, respectively, according to data released by airlines in its 2017 financial reports. GOL, Azul and LATAM Airlines reported EBIT margins of 13.0%, 11.1% and 7.0% respectively.

Even with positive operating margins in 2017, the civil aviation industry in Brazil experienced years of constant losses due to high costs and the economic crisis: from 2011 to 2014 the industry went through four consecutive years of losses, adding a total loss of R$ 13 billion reais (US$ 6.5 billion - average dollar quotation between 2011 and 2014).

Much of this difference in margin and financial results is in the regulatory operating costs that apply in Brazil and do not apply in the United States, such as the ICMS tax for domestic flights in aircraft kerosene. Another impact factor is with respect to the price of oil, quoted internationally in dollars: therefore, fuel costs for Brazilian airlines increase directly with the increase in the price of oil, since the revenue is received

in Brazilian national currency (the American airlines have their revenues tied directly to the dollar).

The aviation kerosene supplied in Brazilian domestic flights includes ICMS, PIS and COFINS taxes, whose rates are up to 25% in the case of ICMS and 1.25% and 5.8% in the cases of PIS and COFINS, respectively. In international flights there is no taxation of aviation fuel, as a result of multilateral international agreements to which Brazil is a party.

These applicable taxes make fuel 30% more expensive for Brazilian airlines when flying domestic than US carriers flying within the USA. As international segments between BR-US are feeded by a large amount of domestic flights and Brazilian carriers' sales force is much more focused on these passengers connecting within Brazil before boarding in the international sector, it shall represents a long term risk for such players.

Unequal tax operational costs conditions provided by each government on itineraries affected by BR-US OSA can be an important predictor of who will strengthen its position in the market in the coming years. In order to guarantee that Brazilian carriers are not harmed, local authorities should review its policies before signing this sort of agreement with any foreign country, so as to avoid unfair factors once market is deregulamented.

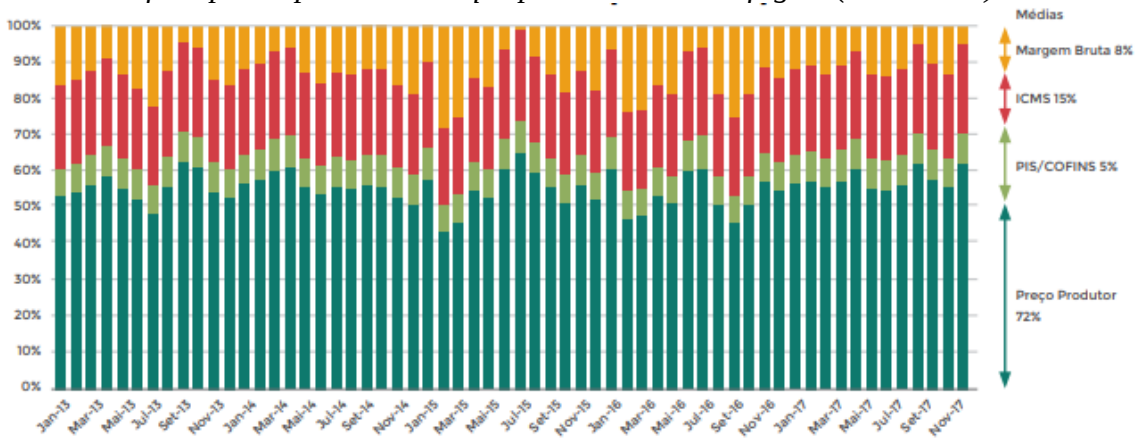
According to data from ABEAR (2018), the cost of airplane fuel in Brazil is one of the highest in the world. In large Brazilian airports such as Belo Horizonte (IATA: CNF), Campinas (IATA: VCP) and São Paulo (IATA: GRU), the price of airplane kerosene per liter is between US$ 1.40 and US$ 1.90 , while at international airports like

Frankfurt (IATA: FRA), London (IATA: LHR) and Madrid (IATA: MAD) the same cost is between US$ 0.90 and US$ 1.20.

Figure 9, taken from the "Panorama 2017" publication produced by ABEAR, shows that about 20% of the cost of airplane kerosene paid by Brazilian airlines on national flights is attributed to federal and state taxes:

Figure 9

Evolution of tax participation in the qav price in domestic flights (2013-2017)



Note. ABEAR (2018).

Finally, the cost of these taxes linked to domestic flights hampers the profitability of connecting flights to international destinations, hampering the possible flow of unattractive regions to the market of flights between Brazil and the United States. In summary, exemption from these taxes on international flights would allow better competition between Brazilian and US airlines, improving the overall economic benefit to passengers and airlines.

Brazilian economics. The analysis of the Brazilian economy and its reflections on the flow of passengers between Brazil and the United States are complex and require a series of steps. For this research, the impacts of the exchange rate and the growth of economic activity will be presented.

The exchange rate between US dollars and Brazilian reais is one of the main decision factors for individuals when deciding for an international trip. A US$ 1,000.00 airfare between Brazil and the United States varies year by year in Brazilian reais: it cost R$ 2,280.00 reais at the end of 2013 and currently costs R$ 3,960.00 reais, an increase of 74% in the Brazilian national currency (in this period, the economy fell 8% according to data from the Central Bank of Brazil).

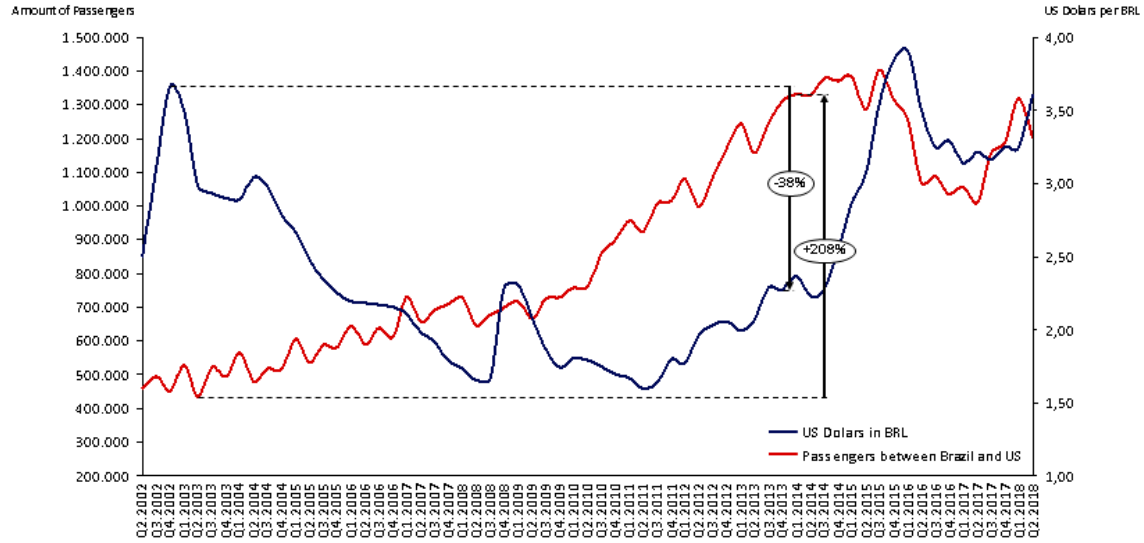
Between 2002 and 2013 the rate between US$ and Brazilian real fell by 38%, from R$ 3.67 per US$ 1.00 to R$ 2.28 per US$ 1.00, which helped to increase the number of passengers in 208% in the period.

Starting in 2013, reflecting on the decline in Brazilian economic activity, the dollar rose 72% to 2016, returning to levels of R$ 3.91 per US$ 1.00, which caused the number of passengers to fall 20% in the period and reach the same amount of quarterly passengers flown five years ago. From 2016 to early 2018, the dollar again lowered its price and fell 17%, contributing to the timid growth of 5% in passenger flow.

Since the Brazilian population's income is made up of Brazilian reais, any change in the dollar's price affects the purchasing power of the national currency and thus directly impacts the demand for international flights, mainly to the United States. Figure 10 illustrates the quarterly results of passenger numbers and dollar prices vs. Brazilian reais in the three periods analyzed:

Figure 10

Quarterly variation of exchange rate and passengers between Brazil and United States



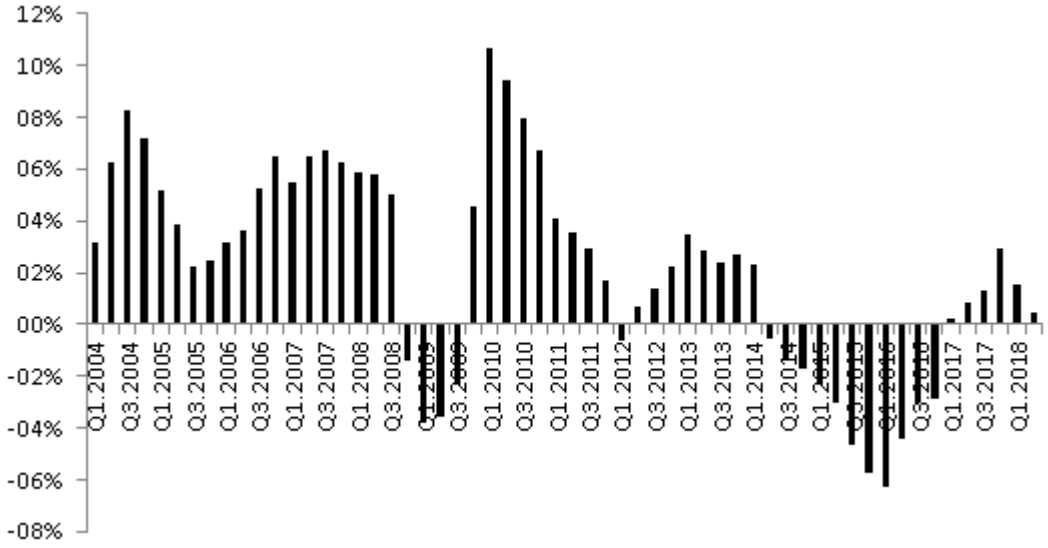
Note. Own elaboration, based on data provided by Central Bank and ANAC (2018).

Income generation and the stability of the national economy also contribute to consumer decision-making and to the profitability of national airlines. Even with a substantial increase in the dollar price, economic growth can positively contribute to leisure decision making by individuals in the economy. Booth economic indicators need to be tracked by the government in order to the family's budgeting procees to consider an amount of money to spend on international travels beyond Latin America.

In the three periods analyzed previously, in which it's possible to find fluctuation on the economic KPIs – and that have impacted the continuous growth of the tourism industry – the economic activity index, calculated by the Central Bank of Brazil, increased 46% between 2002 and 2013, fell 9% between 2013 and 2016 and rose 2% between 2016 and 2018, as shown in Figure 11:

Figure 11

Quarterly variation of economic activity



Note. Own elaboration, based on data provided by Central Bank (2018).

These variations are directly related to the exchange rate and to the variations in the flows of passengers. The sustainable growth and full achievement of the potential of direct flights between Brazil and the United States presented in this research will only be possible with the stability of the national economy and with a balanced exchange rate scenario with the generation of income to Brazilian families and companies.

Cabotage flights. The open skies agreement signed between Brazil and the United States does not provide for the granting of eighth freedom to the airlines of both countries, that is, an American airline will not be able to operate and sell internal sections in Brazil and neither a Brazilian airline may operate and sell domestic parts in the United States.

As presented in Chapter 2, this concept is provided for in IATA international standards, but is rarely used or allowed between countries in the world, mainly to protect the national industry in the civil aviation sector.

In a way, the open skies agreement could benefit from adopting eighth freedom for airlines with code-sharing agreements (interline, joint venture, joint business agreement), since flights leaving sources with poor potential for results in point-to-point sales could be monetized since it is allowed to make stops for internal connections with the possibility of ticket sales.

A study could be conducted by national tourism agencies in Brazil and the United States, as well as representatives of airlines, to stimulate the possibility of eighth freedom with mandatory repercussions in the operation of international flights to cities with little potential for success. This would allow both US and Brazilian airlines to monetize their international flights to offer passengers from more cities the possibility of direct scale without harming the domestic industry.

In a simple example, if the new flight from Recife to New York proposed by the model operated with an occupancy factor of less than 70%, it could result in a decrease in frequencies. However, if the company that started operating this route could increase it with a flight leaving Belo Horizonte to Recife, the potential of the occupation factor could increase to 80% and make the flight even more profitable.

From the national point of view, since only 0.7 frequencies per week are estimated between Recife and New York, the new foreign airline would have a participation of only 3.3% in the current capacity share, which has 51.7 frequencies per week, operated by airlines Brazilians.

Therefore, the present research believes that one should analyze the cases in which the entry of a foreign airline would result in a net gain of international passengers without harming the national civil aviation industry.

New Horizons

Since the signing of the Memorandum of Consultations in 2008, the offer of flights between Brazil and the United States has grown. This was possible from the release of a maximum number of flight restrictions between the two countries, which at that time prevented the growth of seat capacity. There has been a gradual liberalization of restrictions and, currently, there is no ceiling or need for regulation by the authorities of both countries, reflecting the signature of the open skies agreement.

The new drive for constant and strong supply growth will be possible with some structural changes, especially in Brazil, related to operating costs, population income, national security issue and profitability of the Brazilian airlines. In USA, the main focus will be related to investment from the government in tourism promotion and continuous facilitation of the e-visas, which already increased by 45% since the creation of the online service.

However, only with the approval of the open skies agreement will it be possible to highlight in the near future associations of joint ventures between airlines in Brazil and the United States, such as LATAM Airlines and American Airlines. There is still room for an agreement between Gol and Delta Airlines and another between Azul and/or Avianca Brasil and United Airlines.

The US Perspective. In 2018, Embratur, an organ of the Ministry of Tourism of Brazil, launched a survey called Panomara da Comercialização, a survey that presents the perception of the international tourist trade in relation to Brazilian tourism. In this research, the perception of the North American trade is that Brazil is seen as a distant destination, a difficult destination for a weekend gateaway, is perceived as an expensive

destination in relation to its main competitors, making it difficult to divulgate and sale, besides being reported the concern with issues such as safety and epidemics, in addition to the fact that it is not requested by the main competitors of South America.

Another point considered by tourism operators who responded to the survey is the need for diversification of products and training, as well as the delivery of explanatory material for the trade.

Given these factors, it is essential to the Brazilian government to invest in the Brazilian tourism promotion in the United States, adopting measures to stimulate the various North American tourism niches, such as the beach (Rio de Janeiro, Salvador, Fortaleza), culture (Salvador, Manaus, São Paulo, Rio de Janeiro), ecotourism and adventure (Pantanal, Manaus and Bonito) and luxury tourism and also develop good relationships with the US government to increase the tourist relationship between both countries.

In addition to promoting Brazilian destinations, the ease of issuing visas can be a continuous lever for increasing the flow of Americans to Brazil. Recently, the Brazilian government adopted the policy of issuing electronic visas for Americans, which facilitated the process and increased over 45% the total number of Americans who requested a visa to Brazil, according to data from the Ministry of Tourism of Brazil.

Not only US, but also Australia, Canada and Japan have the possibility to request e-visas to Brazil and all countries have increased the number of visas requested since January, 2018.

According to Valor Economico (24/07/2018 - *Entrada de turistas cresce 8% este ano e país pode ampliar visto eletrônico*), a well-known Brazilian business newspaper,

there was an increase of 8% of tourists to Brazil during the first semester of the 2018 and there is a possibility that Brazil will finally break through the average number of 6 million tourists a year and reach a million more this year – around 7 million tourists. This would be a remarkable development for Brazil proving that the e-visa was one of the right steps in the direction to increase the tourism in the country.

The Brazilian Perspective. According to the results of the multiple regression model and the estimates of growth of up to 181 weekly frequencies between Brazil and the United States, it is important to analyze the pillars necessary to ensure that this future growth occurs.

As shown in Chapter 3, the supply of flights is concentrated on the North American East Coast, mainly on the Rio-São Paulo axis and offered and increased participation by North American airlines. To change this reality, it will require investment by Brazilian airlines to increase the offer of flights from Brazil to the United States, based on a strategy of mini-HUBs in Brazilian airports not yet served by direct flights.

This is the case of Gol, which will begin in December 2018 direct flights between Brasilia and Fortaleza to Miami and Orlando. In order for the regular operation of these flights to be guaranteed, the company is changing its domestic network in Brazil to increase the connection of flights from other destinations to the North American territory.

However, the opportunity to explore the west coast of the United States is still little known among Brazilians. Cities such as San Francisco, Las Vegas and Los Angeles have high tourist potential but are still not served by good flight connections between the two countries. Currently, for a resident of the southern region of Brazil (which has large

cities such as Porto Alegre, Curitiba and Florianópolis) it is necessary to have at least two connections of about 3 hours each, with a total of 22 hours of flight between the southern region of Brazil and the west coast of the United States when a direct flight would take around 10 hours, depending of the origin/destination cities.

Looking Ahead. The structural changes in the Brazilian economy and in the national security of the country, observed as a risk by the North Americans, may take years to be solved depending totally on the new Brazilian government. However, it is important to note that there are still opportunities for connection between large urban centers in the two countries.

The implementation of joint venture agreements between airlines of the two countries should improve the profit potential and make additional flights attractive between new destinations. It is expected that three major airline groups will be formed: LATAM and American Airlines, Gol and Delta Airlines, Azul, Avianca Brasil and United Airlines. These agreements will enable better internal connections in Brazil and the United States, from direct flights between national HUBs in both countries.

The costs of taxes on domestic flights in Brazil is another obstacle for a steady growth. As presented in the section Operational Costs between BR and US Airlines, fuel tax costs in Brazil are a key factor for the profitability for the airlines and specially the domestic operations. To create connecting flights in domestic hubs and increase the capillarity of direct flights, it is necessary for the Brazilian government to grant tax exemption, at least on flights connecting direct flights between Brazil and the United States. This would have direct benefits to demand, decrease the cost of flights to cities

without direct connections, as well as increasing the supply of connections and improving the internal flow of passengers.

The implementation of a policy of easing the issuance of visas for Americans has led to a boost in the demand for travel to Brazil. This process can also be implemented in Brazil, where, today, a passenger interested in traveling to the United States needs to participate in the visa application process which only happens in the cities of São Paulo, Rio de Janeiro, Brasilia and Porto Alegre.

Investment in tourism promotion by responsible government agencies is also a necessary factor in sustaining strong supply growth: the US government needs to invest in Brazil to attract people interested in traveling to the central and west coast regions, while the Brazilian must invest in the North American trade to train and explain the benefits of selling attractive destinations in Brazil.

Finally, income and security are public policy factors that must be sustained, regardless of the reason or root cause. The Brazilian government will be responsible for these two pillars that are directly related to the foreign interest in traveling to Brazil and the ability of a Brazilian to pay the costs of travels abroad.

Chapter V

Conclusions and Recommendations

The current research had as main objective to present the impacts of the signature of the open skies agreement between Brazil and the United States, which took place in 2018. Examples from other countries regarding the OSA between two countries implied a substantial increase in the number of flights resulting of an incremental opportunity between both the countries.

Therefore, it is expected that this type of agreement will also benefit the air transportation between Brazil and the United States.

Conclusions

Brazil and the United States are two of the top five worldwide domestic markets in the civil aviation It would be normal to think that both countries are also the most connected countries in terms of international flights. However, the regulatory model that lasted until 2008 between Brazil and USA allowed a maximum of 105 weekly frequencies between both countries.

The signature of the open skies agreement aims to allow unrestricted number of flights between both countries. The research carried out and presented in the previous chapters concluded that there is a possible creation of 181 new weekly frequencies, which imply on a 93% growth in relation to the current offer of direct flights between the two countries. Also, the study presented some new US cities to be connected to the Brazil which are: Los Angeles and Denver.

For this growth to be possible, the following recommendations will be presented in economic, legal and operational terms for Brazilian and North American airlines.

Future studies on the topic may include impacts on the national tourism matrix, the direct, indirect and induced jobs that will be created by the new flights, as well as the economic impact of the cash flow brought to the country by North American tourists. In addition, new open skies agreements were signed by the Brazilian government in 2018: Finland, the United Kingdom and the Netherlands. Future studies may apply the current methodology adopted to understand and design future impacts on international flights between Brazil and these new OSA.

Recommendations

The main objective of this research was to present the direct and indirect impacts in economic, operational and legal terms of the open skies agreement between Brazil and the United States, as well as to propose suggestions and possible solutions for the impacted areas.

Based on the analysis of civil aviation market information between Brazil and the United States, the following proposals are consolidated and presented:

a. Investment in tourism promotion by the Ministry of Tourism of Brazil in the United States, mainly with booklets, online trainings, roadshows, presence at main tradeshows in the market, TV and radio advertisments, social media development and overall dissemination of national destinations;
b. Investment in tourism promotion of the central and west coast of the United States in the Brazilian media and tour operators;
c. Facilitation of the North American visa process for Brazilians through the implementation of the virtual interview and request system for approval

and granting visas to Brazilians following the model already applied for North American citizens for Brazil;

d. Review taxation and the price of jet fuel for domestic flights that connect with international flights, to ensure cost competitiveness between Brazilian and North American airlines
e. Rapid analysis and approval of proposals for joint ventures between Brazilian and North American airlines, with application of competitive stimuli by the Brazilian economic defense agency (CADE) to increase the offer of flights.

As for the opportunities for new flights between the two countries, the main markets not yet explored and which are recommendations for new flights are:

a. Departing from Sao Paulo, the new route presented by this research are direct flights to Denver
b. Departing from Rio de Janeiro, the new routes presented by this research are direct flights to Washington, Los Angeles and Chicago
c. Departing from other cities, the new routes designed by the model are direct flights from Brasilia to Atlanta, New York and Orlando, from Belo Horizonte to Atlanta and New York, from Curitiba to New York, from Fortaleza to Atlanta, Orlando and New York, from Manaus to Atlanta, Orlando and New York, from Porto Alegre to Miami, from Recife to Atlanta and New York, from Salvador to New York and from Campinas-Viracopos to Atlanta.

The plan to expand the routes between the two countries will only be possible with the economic stability of the exchange rate and growth in Brazil, as well as industrial incentives to the sector and airlines to identify opportunities in financial results with the implementation of the new routes.

Key Lesson Learned The research presented made it possible to understand the rules of operation of direct flights between Brazil and the United States, as well as to understand the potential of new markets and to find opportunities for improvement, diversification and growth in the number of seats offered annually between the two countries. Through a regression model, 181 additional weekly frequencies were proposed to the already existing ones, from markets still little explored between Brazil and the United States.

Qualitative research has identified in the spheres of costs, regulations, alliances and economic impact other opportunities for improvement and obstacles in the historical process of supply growth between the two countries. Following the signature of the open skies agreement between Brazil and the United States, some key recommendations were proposed.

Finally, the opportunity to understand the industrial and supply context between the two countries was important for the consolidation of learning in the areas of economics and finance, marketing, airline operations and regulations.

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