AN ANALYSIS OF THE OPEN SKIES POLICY AND ITS EFFECTS ON THE TOURISM INDUSTRY IN MEXICO

Juan Manuel Tello Contreras[1]

ABSTRACT

The New Bilateral Air Services Agreement between Mexico and the United States specifies that all cargo and passenger aircraft of both countries will allow any airline to flight from one point in the neighboring country and make a stop at another airport to pick up and unload passengers or cargo in the airports of both countries. This paper analyzes the 2016 "open skies agreement" between United States of America and Mexico and its expected effects on the Mexican airlines industry. After reviewing the evidence and analyzing the performance of Mexican and US airlines, it is inferred that the bilateral agreement will increase foreign investment in Mexico due to the entry into the market of a greater number of North American passenger and cargo airlines, but above all, will increase international trade in goods and services, being the United States airline industry the one that will benefit the most due to the superiority of the air fleet over the Mexican. The theoretical Cournot model adapted from Alves and Forte (2015) indicates that airlines that do not have the ability to compete for new routes will be adversely affected, their profits will decrease, an assertion that contradicts the expected effects in the literature.

Keywords: Open Skies Agreement, Air Transport, Cournot Model, Mexico.

JEL Classification: D43, D21

1. INTRODUCTION

Tourism in Mexico as an export sector has presented favorable results in recent years, however, in terms of aeronautical regulation, was not up to date, especially with its main neighbor and business partner, United States. As a result of this situation, since 2013, the governments of both countries have started negotiations to create an "open skies" agreement that will allow the aeronautical industries of both countries to be strengthened. In addition, it should be remembered that tourism activities in Mexico have a generalized impact on the GDP of the services sector. In this regard, the contribution of passenger transports services stands out; restaurants, bars and nightclubs, government activities; tourist trade and lodging services of hotels and motels. According to the Ministry of Tourism of Mexico Sectur (2016) in 2013, the tourism sector contributed 8.34% of total GDP, this percentage meant returning to the level it had in 2007, prior to the global crisis of 2009. The relationship between the aviation industry and tourism is that air connectivity, defined as the level of service that includes schedules, rates, frequencies, reliability and destination diversity, is an element that contributes to three main aspects of the tourism; a) enhances competitiveness; b) contributes to the economic growth of the country; and c) is an element that fuels the demand that tourism represents (UNWTO, 2015).

[1] Economic and Business Research Institute (ININEE), Universidad Michoacana de San Nicolás de Hidalgo. Michoacán, México (juan.tello@me.com)

Mexico's bilateral air service agreement with the United States of America stems from an "open skies" policy that the United States began in 1992 with the Netherlands. The 2007 agreement with the European Union was the most ambitious of them, since it covers 27 European countries, adding the latter agreement to the United Kingdom, one of its main commercial and historical partners but that paradoxically had a mutual protectionist relationship. At the microeconomic level, the essence of open skies agreements is to improve cooperative aviation marketing agreements such as codeshare, franchising and leasing and the creation of joint committees to improve deregulation in subsequent years and facilitate air flow of goods.

Bilateral agreements are expected to increase trade between the two countries, to expand cooperative opportunities between airlines, to flex their operations and to liberalize regulations. In addition, the commitment of the governments in the application of security measures for the inhabitants of both countries is expected. The governments of both countries argue as the main benefits of this agreement: increased competitiveness of the sector, increased competition, lower tariffs, increased passenger flow, creation of new direct jobs. Finally, the strengthening of companies in the aeronautical and information technology sectors is expected, which in turn would generate more direct foreign investment in national airports (Brattle Group, 2002).

It is important to mention the theoretical-descriptive sense of this document, which although it presents numerous tables and graphs, are used to describe the current situation. In this context, questions arise about the effects of the implementation of the agreement. In this context, the purpose of this document is to identify whether the flow of tourists from the United States will increase and determine whether air fares will increase or decrease due to the new agreement between the two countries. Finally, it will also try to know which airlines would benefit the most.

The present document is divided into four major sections, the first provides the background, a second section describes the bilateral air services agreement between the two countries, describes the legal aspects that shape the agreement, presents evidence on the possible economic effects of the agreement. Later in this second section, evidence is presented on the performance of national and foreign airlines within the national aviation industry. In the third section of the document a theoretical model is presented that allows considering the possible economic effects that the bilateral agreement could generate. Finally in the last section of the document the conclusions are established.

2. BACKGROUND

The aviation industry has represented one of the great transformations of the twentieth century, has boosted tourism by reducing distance and time, has allowed more and more people to know different places in the world. In the last decades, the airplane as means of transport has allowed to communicate to a greater number of travelers and move of merchandise, covering great distances to a smaller cost. According to the United Nations World Tourism Organization, UNWTO (2015), during the year 2014, more than half of the international tourists arrived at the destination by plane (54%). According to the Ministry of Tourism of Mexico, SECTUR (2016), during the first half of 2016, 75.4% of the total number of seats programmed in operation was recorded in the United States as the most important tourist market for Mexico.

A global trend that has been presented for a couple of decades is the increasing opening of borders to economic movements and particularly to tourism. The Bilateral Air Services Agreement between Mexico and the United States, which entered into force in January

2016, has been a controversial public policy, necessarily supported by both governments but has not been welcomed by all sectors, in particular by the unions. The entry agreement could hasten the bankruptcy of Mexican airlines, given that the commercial air fleet is about 350 aircraft compared to about 7 thousand that have US companies (Grupo Preferente, 2015).

The concept of "open skies" according to Button (2009) emerged in the late 1970s when the United States began to liberalize the domestic freight market and the passenger segment. It aims to make regulations more flexible for airlines and thus achieve a free environment with the least government intervention (Pitfield, 2009).

In Mexico there was a deep crisis of the tourism sector in the period from 2009 to 2011 (due to the economic crisis of 2009 and the epidemic of influenza); currently the tourism industry is experiencing a positive moment in the international component. Although the improvement in the country's tourism sector began in mid-2012, it was not until 2014 that its activity increased significantly. Starting in 2016, Mexico occupies the eighth place according to the arrival of international tourists; a possible explanation is based on a transport system that has been growing, but mainly by the geographical comparative advantage of Mexico represented by the proximity of two major issuing markets, the United States and Canada.

The previous regulatory framework mandated that as many as 2 or 3 designated airlines per country could serve a couple of cities, there was also a slow response capability out of the changing market needs, ultimately these regulations limited purchase options for the consumer. The information indicates that there are well-connected tourist destinations, Mexico City, Monterrey, Guadalajara, Cancun, Los Cabos and Puerto Vallarta, it is also clear that greater connectivity is required to cities in the interior of the country. When there are no direct flights, connections through Mexico City or other connection centers provide access routes for most passengers. However, Mexico has weak air connectivity with Europe, Latin America and particularly Asia.

The governments of both countries argue many benefits derived from the implementation of the bilateral agreement. However, there are voices that contradict government statements. Among the negative aspects that would bring a bilateral negotiation with the United States in the air transportation, Martinez (2014) points out an uneven competition since, while the United States operates 7,064 aircraft and transports 787 million users, Mexico has an air capacity of approximately 350 aircraft to carry 49 million passengers. Under this argument, the air transport unions grouped in the Federation of Trade Unions of the Sector, composed of pilots, ground workers, air traffic controllers, formed a common front to postpone the bilateral negotiation with the United States First suggesting the revision of the internal aviation law in Mexico, before negotiating with the United States, since the current regulations date back to the 1950s and require modernization. In addition, for the Federation of Airline Trade Unions, opening up the total traffic of passengers, cargo and charters to the United States would affect more than 158 thousand jobs in Mexico (Martínez, 2014).

In recent years, according to Song (2012) in the global aeronautics industry, there have been several horizontal integrations, in which groups of airlines have been created in the form of alliances (Star Alliance, One World and Sky Team) that has frequent flyer agreements and shared codes on routes. In the case of Mexico, at the end of 2008, 13 airlines operated, after Mexicana de Aviación ceased operations in 2010, and after closing a total of seven airlines (Azteca, Aerocalifornia, Aviacsa, Avolar, Alma, Nova Air and Aladia), there are only nine, according to data from the Ministry of Communication and Transport of Mexico, SCT (2016), has resulted in an increase of up to 40 percent in tariffs and a significant number of complaints about the poor service they provide.

Over the past 15 years, US airlines have filed a series of mergers and bankruptcies, moving from 10 major airlines in 2001, to four major airline groups (CNN, 2013). In 2001

the airline TWA was acquired by American Airlines. In 2005, America West was acquired by U.S. Airways, the latter in turn was acquired by American Airlines in 2013 to form the largest airline in the United States. In 2008, the Northwest airline was acquired by Delta Airlines to form the second largest airline. In 2010, United and Continental airlines were merged to form the third largest airline. Later that year, Southwest acquired Airtran to form the fourth largest airline in the United States. Of those ten airlines that existed, five have operated in periods of filing for bankruptcy. The airline U.S. Airways filed for bankruptcy during 2002 and 2003, United for the years 2002 to 2006, Delta and Northwest from 2005 to 2007 and finally American Airlines from 2010 to 2012 (CNN, 2013). From 2005 to 2008, about 70 of the airlines in the United States were under the protection of chapter 11 bankruptcy.

But what explains this behavior in the industry? According to Driskill (2016), the main reason leads to the reduction of fuel prices, substantial efforts have been made in fuel economy. During the last five years fundamental changes have been made, mergers and acquisitions, new forms of income, additional seats such as the direct sale of tickets, this prevents payment of commissions to intermediary companies. Other forms of income are the commissions for sale of hotel rooms while buying the plane ticket, selling food and beverages on flights. The sustained growth of the aviation industry has been reflected in the increase in the arrival of tourists, an increase in the number of routes and an increase in the number of aircraft orders

3. THE BILATERAL AIR TRANSPORT AGREEMENT

The "open skies" policy is based on the realization and entry into force of bilateral agreements between several countries, in the case of Mexico, the open skies policy has to do with the recent "Air Transport Agreement Between the Government of the United States of America and the Government of the United Mexican States", the document establishes the type of operations that the airlines of one country can carry out in the territory of the other (Diario Oficial de la Federación, 2016).

3.1 Analysis of legal aspects

The underlying framework for the regulation of international aviation is contained in the 1944 Convention on International Civil Aviation, which is commonly referred to as the Chicago Convention. The framework of the type of operations includes the concept of air freedoms, defined as nine types of operations accepted internationally by the signatory countries of the Chicago Convention of 1944 (Convenio sobre Aviación Civil Internacional, 1944). Briefly, the nine freedoms can be classified into three groups: a) freedoms that do not involve a commercial operation; b) freedoms involving only the countries that negotiate, and c) freedoms involving countries other than those that negotiate. Likewise, under bilateral agreements, air freedoms may be agreed by both countries as open, limited or closed in relation to the type of aircraft, the frequency of flights, the permitted cities or destinations and also the airlines designated for fly.

International aviation is governed by a series of government to government bilateral treaties determining levels of market access for countries respective airlines. In the legal framework, the new Air Transport Agreement between both governments replaces that approved by the Senate on November 29, 1960, which was amended seven times: July 1970, September 1988, November 1991, September and December 1997, February 1999 and December 2005. The current agreement replaces the first agreement between Mexico

and the United States signed on August 15, 1960. The agreement entered into force on January 1, 2016, the decree enacting the agreement is dated August 19, 2016.

The main points to highlight of the previous agreement are: a) the same conditions are established for passenger and cargo flights; b) the previous agreement only contemplates from the 1st to the 5th freedom, that is to say the 6th, 7th, 8th and 9th freedoms are closed; c) for the first two freedoms there are no limitations on aircraft type, flight frequency or destination cities: d) for the 3rd, 4th and 5th freedoms a limit of two designated airlines per country is established for each pair of cities, arriving even to three when they are tourist destinations and; e) fifth freedoms are limited only to certain cities incorporated in 1970 and modified in 1988 and 1991.

Table 1 shows the new freedoms negotiations between the two nations. The shaded cells indicate that the freedoms that were closed in the previous agreement are now open. For passenger flights, which are the sector that impacts the most in tourism, the modifications are presented in the elimination of the limit of designation of airlines for the 3rd, 4th and 5th freedoms, maintaining as existing these freedoms. The essence of the agreement is that the airlines market for both countries is opened, meaning it is no longer limited to a number of airlines per route. It is important to mention that derived from this agreement, the United States allows to process requests of alliances between airlines of both countries. However, it is in freight flights where greater freedoms are opened, Mexico is an exporting country so the 6th and 7th open.

Table 1. Air Transport Agreement between the Government of the United States of America and the Government of the United Mexican States

Freedoms	PASSENGERS				CARGO			
	Aircraft	Frequency of flights	Permitted Cities	Airlines designated for fly	Aircraft	Frequency of flights	Permitted Cities	Airlines designated for fly
1	Open	Open	Open	Open	Open	Open	Open	Open
2	Open	Open	Open	Open	Open	Open	Open	Open
3	Open	Open	Open	Open	Open	Open	Open	Open
4	Open	Open	Open	Open	Open	Open	Open	Open
5	Open	Open	Limited	Open	Open	Open	Open	Open
6	Closed	Closed	Closed	Closed	Open	Open	Open	Open
7	Closed	Closed	Closed	Closed	Open	Open	Open	Open
8	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
9	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed

Source: Own elaboration with data from SCT (2016)

As mentioned, the new agreement allows the US Department of Transportation to process and evaluate alliances between airlines in both countries. However, proposals for alliances require the approval of the competent authorities of both countries to ensure that they benefit the final consumer.

3.2 Analysis of economic aspects

This part of the paper discusses the economic aspects that have been identified in countries that have carried out bilateral air services agreements. The international literature analyzes aeronautical deregulation and its impacts on competition between airlines can be divided into three large groups (Wang, Bonilla & Banister, 2016). The first group discusses the

economic reasoning of liberalization; the second group focuses on the spatial characterization of deregulation, particularly on the characteristics of the airlines' networks (Dobruszkes, 2009; Goetz & Vowles, 2009; Ramos-Pérez & Sánchez-Hernández, 2014; Cristea, Hillberry & Mattoo, 2015). The third group refers to the analysis of the evolution of deregulation from the institutional point of view. According to Wang, Bonilla and Banister (2016) deregulation has had failures as well as success stories. In addition to the economic studies on the subject, studies have been carried out on the connectivity, the benefits of accessibility and the configuration of networks, all from the geographical point of view.

Studies such as Pitfield (2009) and Button (2009) examine the impacts of air transport liberalization policies on variables such as economic growth, traffic volume; they have concluded that liberalization has contributed to substantial growth in passenger traffic. Due to, among other causes increased competition and efficiency gains in the aviation industry, as well as positive externalities for the economy as a whole. By supporting the benefits of such agreements, Christidis (2016) argues that liberalization allows airlines to optimize their route networks within and outside their domestic markets. As a result, traffic flow patterns change. One scenario that has also favored industry performance is that of strategic alliances that have increased as a result of the decrease in restrictions (Yimga, 2017).

One issue that is worth mentioning has to do with the expansion of the low-cost model in airlines as a result of liberalization. The rapid growth of low-cost airlines increases competition, stimulates passenger traffic, and increases the competitiveness of the national aviation industry (Mootien, 2012). For the particular case of the "open skies" agreement between the United States and the European Union, the U.S. Department of Commerce (2007), has estimated the economic gains to consumers by $ 4 billion dollars annually through such agreements. It also estimates a 16% growth in the flow of air traffic in the United States and the support of 9 million jobs in aviation and related industries. Similar conclusions were obtained by Stober (2003) stating that the open skies agreements benefit the US aviation industry by creating larger passenger volumes, but above all by expanding the network of airlines that improve service and lower the tariffs paid by consumers.

For the United States, open skies agreements have allowed cities such as Dallas, Denver, Detroit, Las Vegas, Minneapolis, Orlando and Portland to significantly increase their international connectivity. Using a quantitative methodology, the authors Button, Neiva and Yuan (2014) conclude that transatlantic air transportation has increased as a result of the open skies agreement between the United States and the European Union. Also using a quantitative methodology, in particular a data panel analysis, Whalen (2007) confirms that alliances among airlines increase passenger volumes.

Most of the revised articles that have analyzed the impacts of open skies policy conclude that the US aviation industry has benefited, however, large American airlines (American Airlines, Delta and United) have complained about unfair competition from Gulf Airlines (Emirates, Etihad & Qatar Airways), received subsidies and privileges from their governments (Oxford Business Group, 2016).

3.3 Analysis of the commercial and tourist aviation industries in Mexico

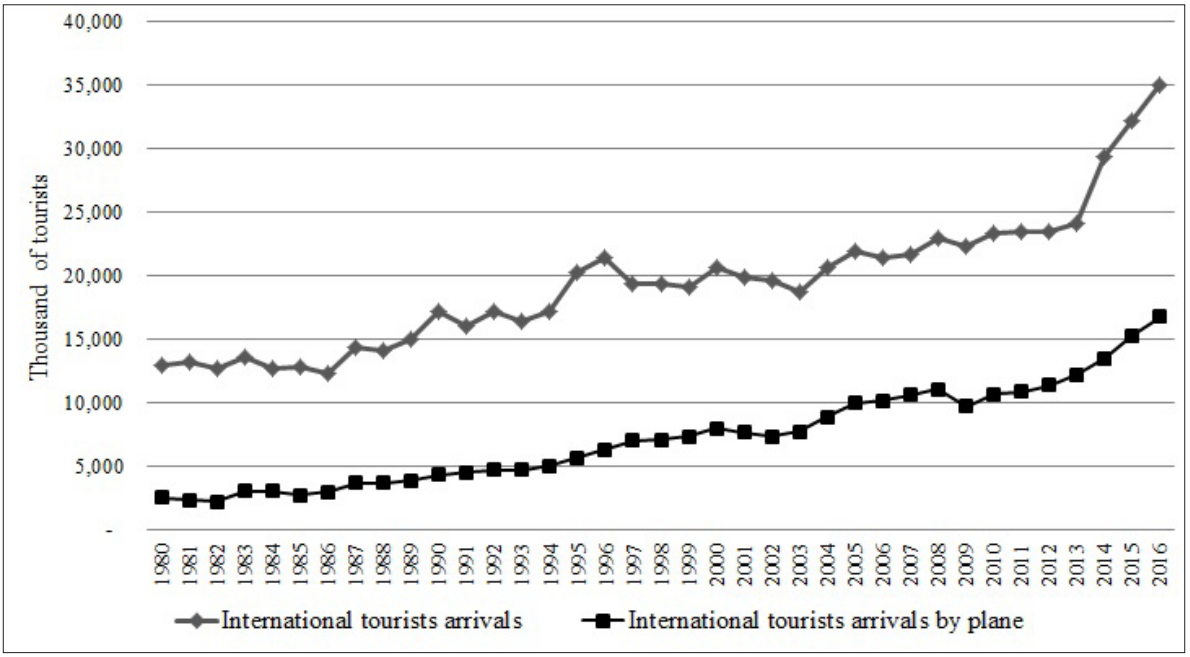
At the beginning of the document it was mentioned that the commercial aviation industry has very characteristic aspects that limit the performance of the airlines. The following is a brief analysis from the point of view of the company. The industry is characterized by information asymmetries where dynamic pricing policies of airlines make it difficult for consumers to understand pricing.

In general, it is an industry characterized by low profit margins caused by unique cost structures and demand shocks (CNN, 2013). The cost structure depends on each airline and its business model, but on average 30% of the costs are allocated to wages, 18% to fuel costs,

both of which are the main concepts. In recent years the global commercial aviation industry has recovered mainly from declining fuel prices and an increase in demand after the 2009 economic crisis. The bargaining power of buyers is high, as leisure customers are extremely price sensitive, there is little customer loyalty, product differentiation is very limited (United States Department of Transportation, 2017). The bargaining power of airline suppliers is high since there are very few, basically a duopoly between Boeing and Airbus companies when large-capacity passenger aircraft is involved. The threat of entry of new airlines is low as it is an industry intensive in capital and labor. Established airlines benefit from alliances and economies of scale (United States Department of Transportation, 2017). Finally, the threat of substitute transport services is average when it comes to short distances since users can be transported by car, bus and high-speed rail (Dobruszkes, Dehon & Givoni, 2014). However when distances are wide, the threat of substitute transportation is low. The International Air Transport Association (IATA) expects industry worldwide to double net profits in 2016 due to low fuel costs and rising demand.

The following is a brief diagnosis of the tourism industry in Mexico and the importance of air transport. Figure 1 shows the total international tourist's arrivals to Mexico from different countries of the world and the international tourist's arrivals by plane. It is observed that during the period from 1980 to 1986 there was no substantial change in the arrival of international tourists to Mexico. However, since 1988 there has been a significant growth in the arrival of tourists, surpassing since 1990 the barrier of the fifteen million international tourists.

Figure 1. Mexico´s total international tourist's arrivals and international tourist's arrivals by plane from 1980 to 2016



Source: Own elaboration with data from Banco de Mexico (2017)

It is observed that in 1980, 12.9 million international tourists arrived in Mexico, of which 2.4 million arrived by air, these figures indicate that 19.1% of all international tourists arrive by air. In 1990 this figure increased to 25.1%; in 2000, the percentage was 38.6%. Finally in 2016, 48% of international tourists arrived in Mexico by plane.

The years 1995 and 1996 stand out, where for the first time more than 20 million tourists arrived to Mexico. During the period from 2005 to 2013 the arrival of international

tourists to Mexico remained in the range of 22 to 24 million tourists. In addition, the case of the Mexican tourism sector is very interesting due to the negative effects it has experienced fundamentally in the last 10 years, particularly in 2009 where there was a global financial crisis and influenza type AH1N1. However, in 2010 there was a 4% increase in the arrival of international tourists, which was insufficient to offset the losses of the previous year.

Table 2 shows tourist's arrivals and air travelers to Mexico by main nationalities at the end of 2013 and a comparison with 2011 and 2012. As mentioned, the United States is the main market for tourists to Mexico, as shown in table 2, the United States market represents 55% of total arrivals to Mexico by air, this figure represented 6.4 million arrivals in 2013, in addition it shows a growth rate of 9% with respect to 2012 and of 13.1% compared to 2011.

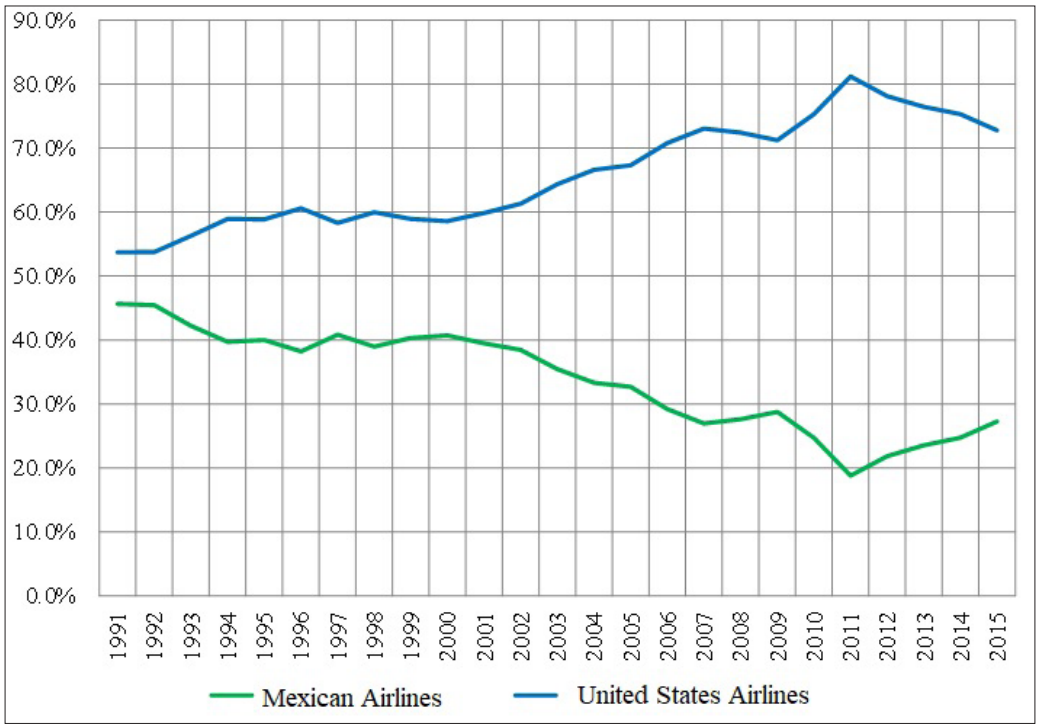
Table 2. Country of origin of tourists arriving in Mexico by plane

2013 Ranking		Tourists 2011	Tourists 2012	Tourist 2013	Market Share 13´	Variation 13/12
TOTAL		**10,143,220**	**10,804,749**	**11,774,155**	**100%**	**9.0%**
1	United States	5,728,166	5,941,911	6,478,968	55.0%	9.0%
2	Canada	1,563,150	1,571,543	1,599,409	13.5%	1.8%
3	United Kingdom	330,072	363,42	414,039	3.5%	14.0%
4	Spain	279,531	278,812	282,255	2.4%	1.2%
5	Brazil	196,267	248,899	267,507	2.2%	7.5%
6	Colombia	125,882	163,725	262,654	2.2%	60.4%
7	Argentina	200,694	251,221	257,820	2.1%	2.6%
8	France	186,780	202,855	199,866	1.6%	-1.5%
9	Germany	165,136	172,841	187,141	1.5%	8.3%
10	Venezuela	88,806	129,331	164,968	1.4%	27.6%

Source: Elaborated by the author with data from SECTUR (2016)

The favorable evolution of the number of US tourists to Mexico is probably due to an improvement in the economic conditions of that nation, particularly the income of its inhabitants and the greater preference for short trips to nearby places.

Figure 2. Market share of the number of passengers transported in regular service between Mexican airlines and United States airlines



Source: Own elaboration with data from Banco de Mexico (2017)

In addition, information from the Ministry of Tourism, SECTUR (2016) indicates that for the first half of 2016, there was an increase in the number of frequencies and the opening of 15 new routes in international operation to have a total of 361 routes. Direct operations to Mexico began with the incursion of three new foreign airlines. The first Dynamic Airways (American) to cover the following routes: Los Angeles-Cancun and New York-Cancun; Alitalia covers the route Mexico City-Rome; Finally the Portuguese airline Orbest that connects the city of Lisbon with Cancun. In the same period of time, seats programmed in international operations registered growth of 9.9%, going from 11.8 to 13.0 million scheduled seats (SECTUR, 2016).

In 1991 Mexican and United States airlines carried almost the same amount of passengers, about 5 million. While Mexican airlines have carried about six million passengers during the last 24 years, US airlines transported more than 18 million passengers in 2016. Another way of presenting the information is shown in Figure 2, which shows the market share of Mexican and US airlines in the transportation of passengers in Mexico. Fundamentally since the last 25 years, Mexican airlines have lost market share.

3.3.1 Performance of national airlines in the Mexican aviation industry

This section of the document characterizes the main topics of analysis of the tourism industry in Mexico, from the number of passengers, frequencies and routes, in order to better understand the aviation industry and have a much clearer vision of its performance. Table 3 shows the 20 routes that represent 41.1% of the total number of passengers transported in regular international service during the year 2015.

Table 3. The 20 international routes of Mexico with greater flow of passengers in 2015

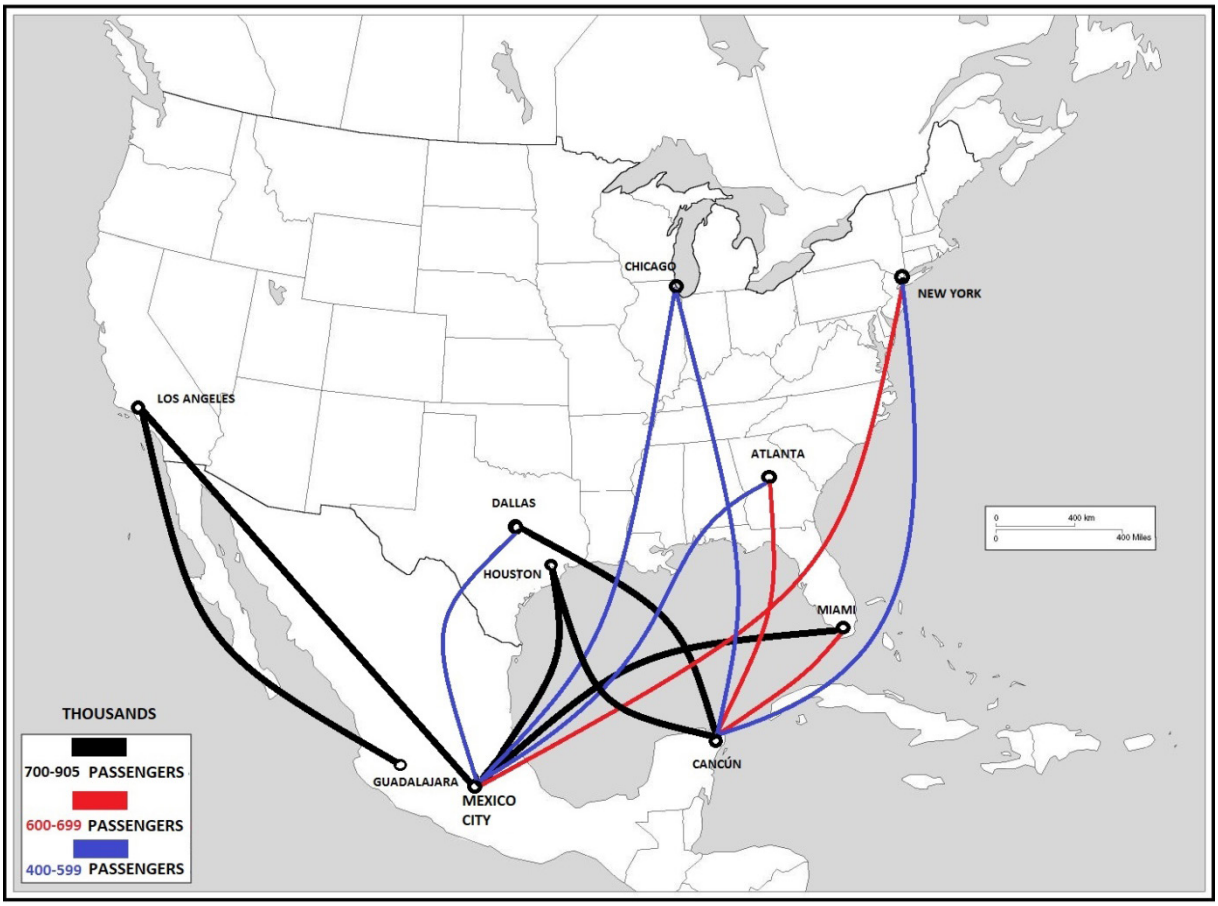
Route	Origin	Destination	Passengers transported 2015	Change 2014 vs 2015
1	Mexico City	Los Angeles	903,283	11.2%
2	Los Angeles	Guadalajara	798,443	2.2%
3	Miami	Mexico City	768,682	10.8%
4	Mexico City	Houston	751,453	8.5%
5	Dallas – Fort Worth	Cancun	737,728	8.8%
6	Houston	Cancun	711,062	21.6%
7	Cancun	Atlanta	682,645	-3.1%
8	New York	Mexico City	669,193	120.5%
9	Mexico	Bogota	661,166	15.6%
10	Toronto	Cancun	605,718	15.1%
11	Miami	Cancun	601,117	15.1%
12	Mexico City	Madrid	596,163	9.9%
13	New York	Cancun	562,172	109.6%
14	Chicago	Cancun	535,452	22.3%
15	Panama	Cancun	530,643	1.0%
16	Mexico City	Dallas - Fort Worth	524,166	9.1%
17	Mexico City	Chicago	501,261	8.0%
18	Panama	Mexico City	428,471	16.1%
19	Paris	Mexico City	426,363	1.4%
20	Mexico City	Atlanta	418,183	-5.3%

Source: Own elaboration with data from SECTUR (2016)

In Mexico, only three destinations are really connected to the United States (Mexico City, Cancun and Guadalajara). Mexico City is very well connected to destinations on the East Coast of the United States. As can be seen in figure 3, there are no routes with a lot of passenger flow connecting Mexico and the West Coast of the United States, only have solid routes with Los Angeles. Figure 3 is very important since it indicates the lack of connectivity and the number of routes between both countries; fundamentally it is observed that the United States is better connected than Mexico. Cancun is very well connected by air; it is precisely this connectivity that has allowed it to position itself as the most important tourist destination in Mexico.

There are also several destinations with opportunities in the business segment, so the need arise to deconcentrate the traffic of the international airport of Mexico City and increase the connectivity in other tourist destinations.

Figure 3. Air routes between Mexico and the United States with greater flow of passengers in 2015



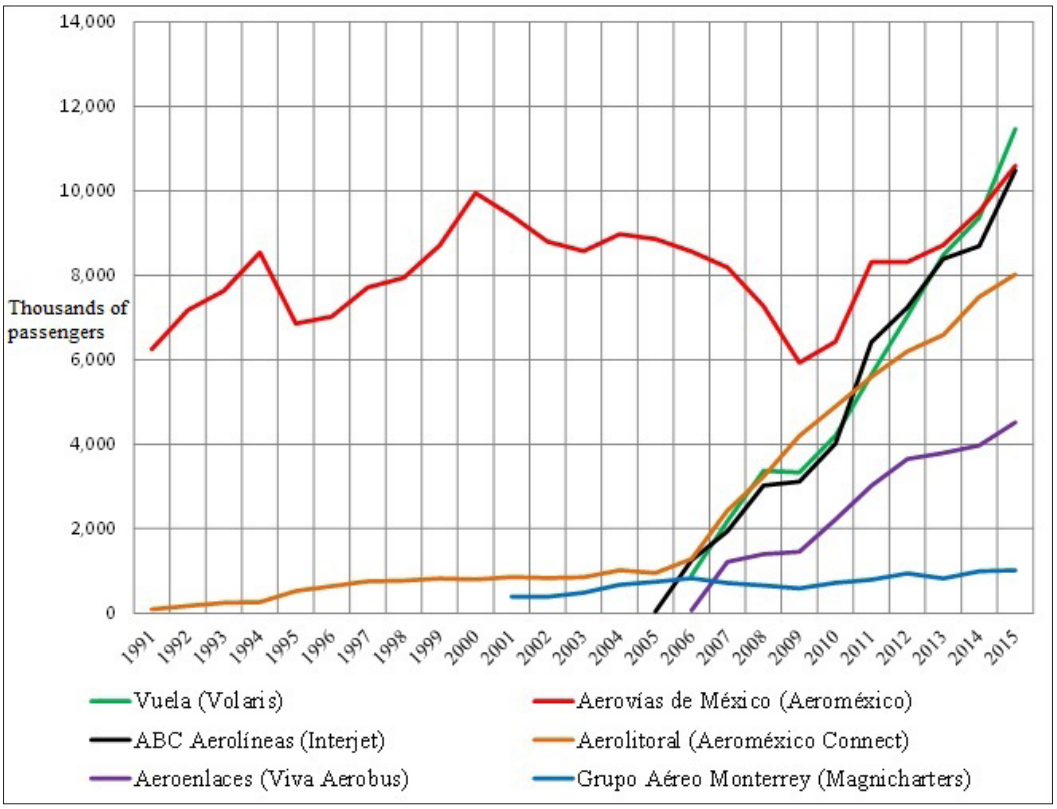
Source: Own elaboration with data from SCT (2016)

With respect to the number of Mexican cities served by regular national companies, in 1991, 60 cities were served, reaching a maximum of 66 cities in 2001, and in 2015, 58 cities were served. That is, there has been a decrease in the number of Mexican cities served by domestic airlines. On the other hand, in 1991, 24 international cities were served by national companies, showing a sustained growth until reaching the maximum of 63 cities in 2014, part of this growth is explained by the fact that the national airlines have formed part of alliances with foreign airlines by means of codes (SCT, 2016).

The data shows that the arrival of international flights to Mexican airports reached 124,114 flights in 2010. This figure represents an increase over the next four years to reach 148,930 international flights in 2014. In addition to the increase in the number of flights, there is an increase in the arrival of passengers coming from international flights, from 13,277,307 passengers in 2010 to 17,125,580 in 2014.

When analyzing the aviation industry in Mexico from a micro-economic perspective, the six Mexican airlines with the largest number of passengers transported both in domestic service and in international service can be observed in figure 4. It draws attention to the fact that only two airlines operating in 1991 are still operating, in fact Aerolitoral is a subsidiary company of Aeromexico. It can also be observed that Interjet and Volaris have had a significant growth in the number of passengers transported, obviously boosted by the bankruptcy of Mexicana de Aviation, which necessarily generated a rearrangement of routes and slots at the main airports in Mexico.

Figure 4. The six Mexican airlines with the largest number of passengers transported in domestic and international service



Source: Own elaboration with data from SCT (2016)

The following table 4 shows a measure of economic concentration of the market of Mexican airlines, as well as the number of airlines that operate and the dominant company for different years. Thus, based on the Herfindahl-Hirschman (HHI) concentration index, in 1991, there was a moderately concentrated market in Mexico. Although there were 18 airlines, Mexicana de Aviación had a 49.6% market share. Until 2005, Mexican airlines disappeared but, paradoxically, the market became deconcentrated, being now Aeromexico the dominant company. Since 2008, the number of airlines has been decreasing and the companies have been distributing the market, making it deconcentrated. Already in 2015, the dominant company is Volaris, in Mexico 9 airlines operate with an HHI of 888.

Table 4. The 20 international routes of Mexico with greater flow of passengers in 2015

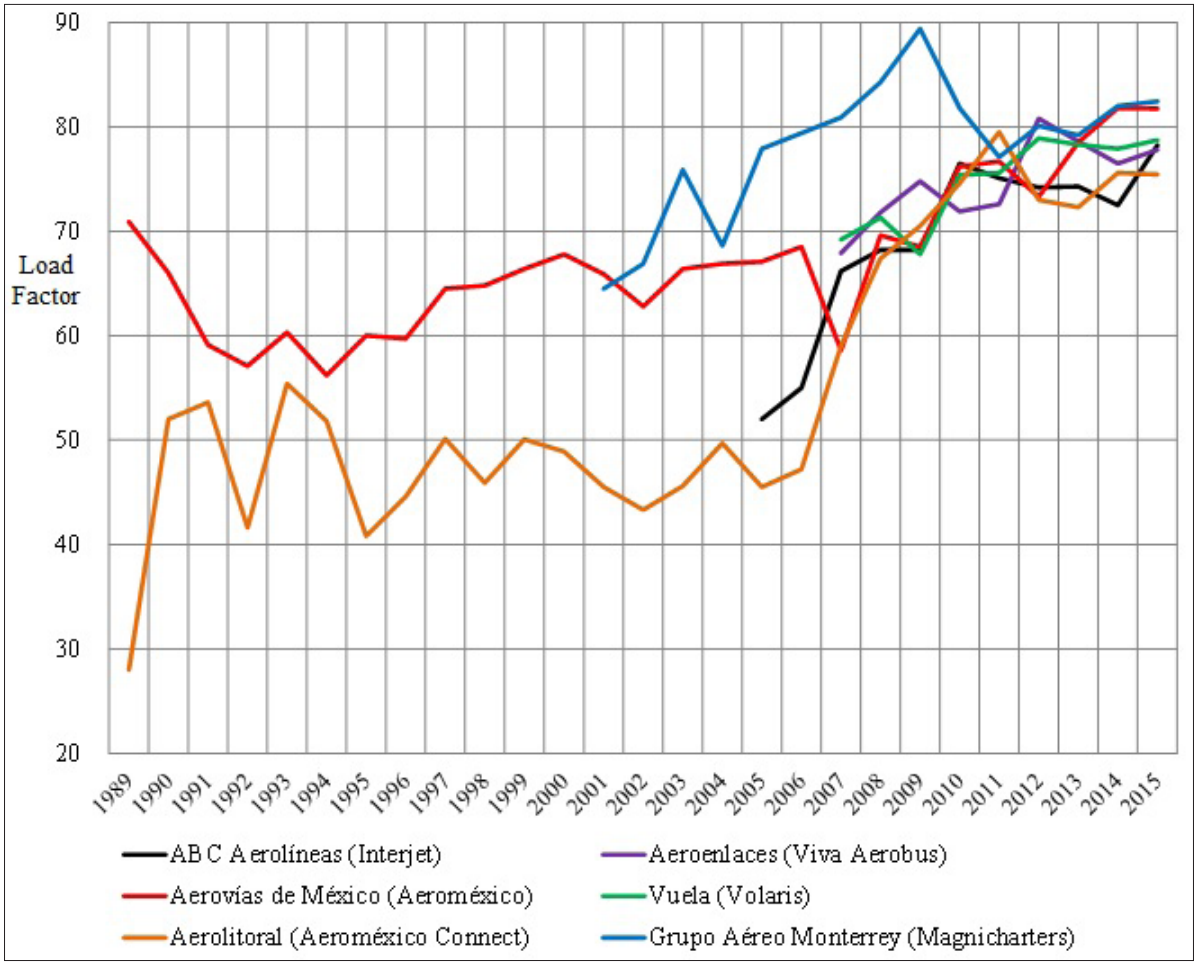
Year	HHI*	Number of airlines in operation	Dominant firm
1991	2,494	18	Mexicana de Aviación, 49.6% of market share (Declared bankrupt on 28 August 2010)
1995	1,418	19	Aerovías de México (Aeroméxico), 35.5% of market share.
2000	1,441	11	Aerovías de México, 40.7% of market share.
2005	1,294	11	Mexicana de Aviación, 31.9% of market share.
2008	870	14	Mexicana de Aviación, 23.3% of market share.
2009	934	12	Mexicana de Aviación, 21.6% of market share.
2010	763	11	Aerovías de México, 20.7% of market share.
2015	888	9	Vuela (Volaris), 24.4% of market share.

Note: * The Herfindahl-Hirschman index of market concentration is calculated by adding the squares of the individual shares of the firms making up the market. When the value of the HHI is less than 1500, the market is considered to be deconcentrated. HHI values between 1,500 and 2,500 are considered as moderately concentrated markets. When the value is greater than 2,500 it is considered a highly concentrated market (The United States Department of Justice, 2010).

Source: Own elaboration with data from SCT (2016)

According to data from the Ministry of Communication and Transportation SCT (2016), in 2015 the five national companies that carried the largest number of passengers in domestic and international service and accounted for 95.9% of the total market in that year, are stated As follows: Volaris (24.4%), Aeromexico (22.5%), Interjet (22.3%), Aerolitoral (17.1%) and Viva Aerobus (9.6%). In the last 25 years, in Mexico, 35 airlines have operated, in 2015 only nine operated, without considering the charter companies. Regarding the passenger load factor used as a measure of performance for each of the six main airlines operating in Mexico, it has been that until before 2007, the performance was not good since dominant companies like Aeromexico and Aerolitoral had factors of Occupancy less than 70% and 50% respectively. Aeromexico operated airplanes with 30% of idle seats (see figure 5).

Figure 5. Passenger load factor of the six regular national airlines in Mexico



Source: Own elaboration with data from SCT (2016)

It can also be seen that as of 2009, the load factor reported by the six airlines improved considerably, in fact, all airlines report load factors greater than 75% in 2015, with Aeromexico and Magnicharters, reporting the highest load factors greater than 80%. In

Mexico there are only eight national airlines that carry the largest number of passengers, the supply they generate is very small compared to that of the United States airlines. The flight team available in 2015 to operate by these eight airlines is 301 aircraft only. This number of aircraft generates a total offer of 39,473 seats. Aeromexico and its subsidiary Aerolitoral hold a dominant position since both airlines have 125 aircraft (41.5%) and 15,638 seats available (39.6%). With regard to employment, the eight airlines in 2015 employed 16,974 people, Aeromexico being the largest employer. Deepening the subject of personnel, it is observed that Aeromexico absorbs a large part of the administrative staff of Aerolitoral, which makes the latter company more profitable.

Some of the inefficiencies of Mexican airlines are observed in the high percentage of administrative staff they own, particularly Volaris. The most efficient companies are those with a higher percentage of personnel assigned to pilots and crew. Data from SCT (2016) indicates that Mexico's airport infrastructure in 1991 consisted of 82 airports, 44 were international. In 2005, 29 airports were classified as nationwide. By 2015, 63 were international airports.

3.3.2 Performance of United States airlines in the Mexican aviation industry

With respect to the number of Mexican cities served by foreign airlines, in 1991, only 12 cities were served, reaching a maximum of 38 cities in 2007, and by 2015, 32 cities are served. There has been a growth of 316% in 25 years in the number of Mexican cities served by foreign airlines. The supply of US airlines is much higher than the Mexican one, the five companies that carry more passengers to and from Mexico are: United Airlines, which owns 713 aircraft, American Airlines 687, Delta Airlines 882, U.S. Airways 340 and Alaska Airlines 137 aircraft. Among those five airlines own 39% of the total US commercial aircraft fleet. Together they own 2,759 aircraft out of a total of 6,788 (U.S. Department of State, 2007). In 1991, United States airlines transported 83.9% of the total number of passengers transported by foreign companies. From that date onwards, they lost market share, reaching 74.4% in 2010 and 69.8% in 2015.

Table 5. Total passengers transported by foreign companies in regular operation in Mexico (thousands)

Year	United States Airlines	Canadian airlines	European Airlines	Center and South American Airlines	Asian Airlines	Total	Market Share of United States Airlines
1991	4,599	115	416	307	42	5,479	83.9%
1995	5,212	153	580	509	74	6,528	79.8%
2000	7,872	63	1,085	725	54	9,799	80.3%
2005	11,998	584	1,577	961	59	15,179	79.0%
2010	13,431	1,697	1,662	1,255	2	18,048	74.4%
2015	18,357	2,742	2,314	2,884	0	26,298	69.8%

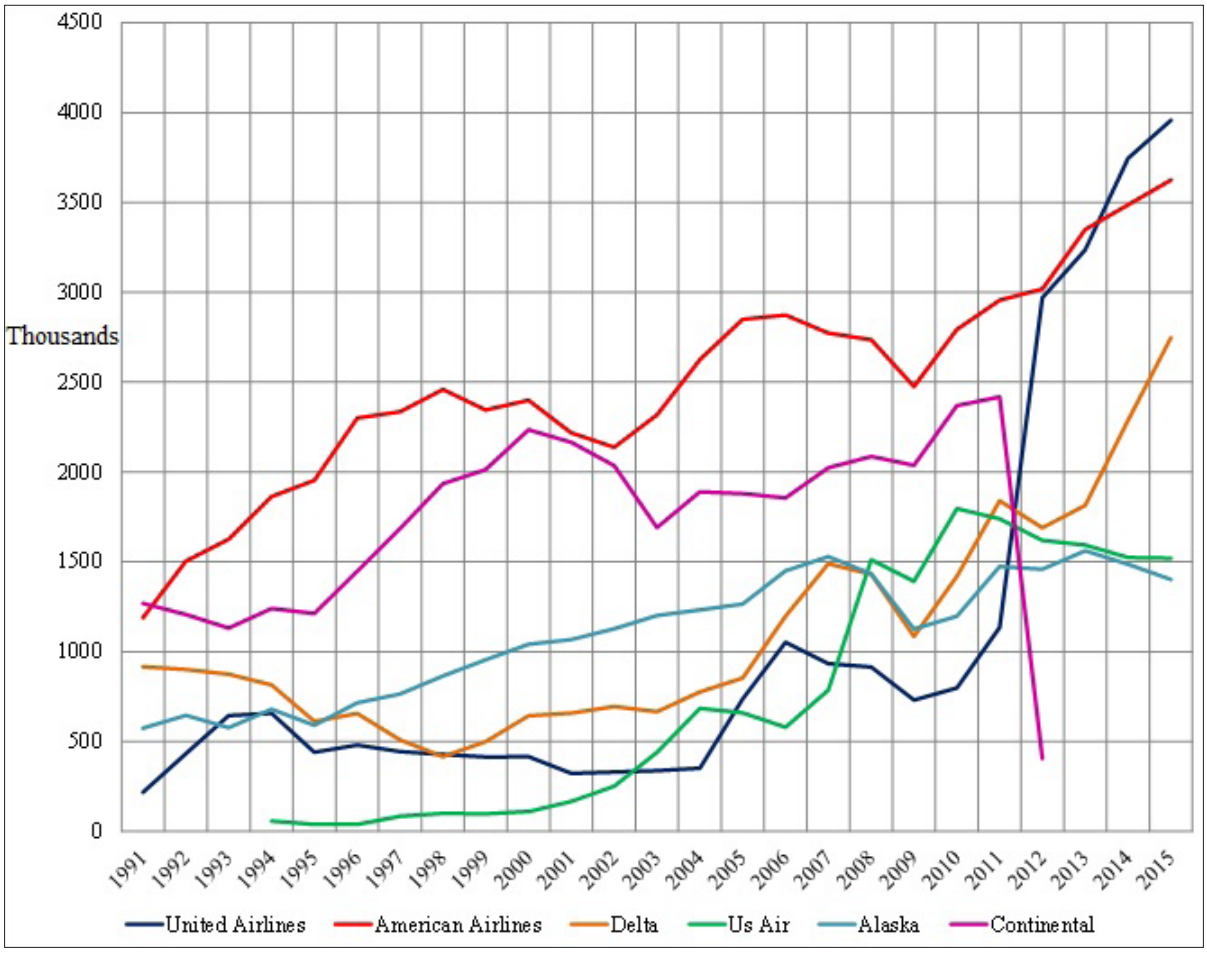
Source: Own elaboration with data from SCT (2016)

By 2015, according to data from SCT (2016), the five companies that carried the largest number of passengers in Mexico and accounted for 72.2% of the total market in that year are as follows: United Airlines (21.5 %), American Airlines (19.7%), Delta Airlines (14.9%), US Airways (8.2%) and Alaska Airlines (7.6%). Historically, American Airlines has been the dominant firm by number of passengers in Mexico since 1991 and until 2013. The second airline with the highest passenger flow since 1991 and until 2011 was Continental Airlines,

which in May of 2010 merged with United Airlines, making it the most transported airline in 2014 and 2015 (see figure 6).

Based on the Herfindahl-Hirschman concentration index (HHI), the market for US airlines operating in Mexico during 1991, 1995 and 2000 was moderately concentrated, with seven airlines operating in 1991 to 13 firms in 2000 in subsequent years, a greater number of airlines operated in Mexico until reaching 23 airlines with an HHI of 1,093 in the year 2008. From 1995 to 2010, American Airlines has been the dominant carrier with market shares ranging from 19.3% to 27.4%. In the year 2015, the dominant company has been United Airlines, derived from its merger with Continental. As a summary, it can be inferred that the market of airlines operating in Mexico has been concentrated, but maintains acceptable levels of competition.

Figure 6. The six United States airlines with the largest number of passengers transported to and from Mexico on regular service



Source: Own elaboration with data from SCT (2016)

4. THEORETICAL MODEL

This section of the document presents a theoretical Cournot model proposed by Alves and Forte (2015), the authors analyze the case of an open skies agreement between Brazil and the European Union, and it can be adapted without any problem to the case addressed in this document.

4.1 Cournot model for the analysis of the effects of the Agreement

As mentioned, in the case of open skies agreements, a greater number of airlines can operate a certain route. This part of the document tries to analyze whether the open skies agreement, which allows the entry of new airlines, would increase competition, reduce tariffs and therefore benefit consumers. In this sense, the scenarios are related to the entry of airlines in certain market segments and the implementation of collusion between two airlines, one of which is the incumbent.

The profit of a firm depends on how much it produces and sells. But the profit of a firm depends also on how much its rival produces and sells. The more its rival sells, the lower the market price will be, and the lower its profits. There is a payoff interdependency. Each firm knows that if it can unilaterally increase its market share by producing more, its profits will increase. However, each firm also knows that if all firms compete aggressively for more market share, they will be all worse off. Thus lower prices will lower both aggregate and individual profits. The theoretical model is adapted from Alves and Forte (2015); the description of the model is depicted in the annex.

The model assumes constant marginal costs for each airline. The reverse demand (price) function of a particular airline is defined as the function of the traffic or flow of passengers that is satisfied by the competitors (Cournot competition). The adapted model represents the international market between the United States and Mexico and consists of three market segments: New York (JFK) – Mexico City (MEX), from Mexico City (MEX) to Morelia (MLM) and New York (JFK) to Morelia (MLM). It is assumed that in this market only three airlines operate (United Airlines, Aeromexico and Aeromar), the first being a US airline.

In the initial situation, United Airlines is only present in the JFK-MEX segment. While Aeromexico and Aeromar are present on the MEX-MLM route. So none of the three airlines operate the full JFK-MLM route. Under this scenario, a tourist who would like to travel from New York to Morelia must buy two tickets, the first to transport him from JFK to MEX and the second ticket that takes him from MEX to MLM but can be from either of the two local airlines. The first segment of the route is a monopoly; the second part is a duopoly. Under this initial scheme, three possible scenarios are presented.

4.1.1 Expected effects of the Agreement

In the first scenario, United Airlines enters the JFK-MLM route allowing the firm to be present in the three market segments (JFK-MEX, JFK-MLM and MEX-MLM). So while United is the only airline operating international flights (monopoly), competition increases on the MEX-MLM route. When comparing the results of the initial situation and the results presented in this first scenario, the model suggests that prices on JFK-MLM and MEX-MLM routes should decrease. The effect on the JFK-MEX segment is not clear, as it depends on several factors. Because the JFK-MEX route does not have many substitutes, the price should increase, as the open skies agreement does not introduce additional competition, there is no pressure to reduce the price. Again, the JFK-MLM segment should be cheaper because it is offered by United Airlines.

This result is consistent with the conclusions of Cournot (1838), that is, in the case of two complementary goods (JFK-MEX and MEX-MLM routes) that are produced by a single firm, prices will be lower and larger quantities. So it benefits the consumers of the full route. Similarly, United Airlines will have greater profits than the sum of Aeromexico and Aeromar's profits when it comes to the MEX-MLM route and United will have higher profits under the open skies agreement. Aeromexico and Aeromar will have lower profits under the open skies agreement as competition increased and lower prices were established. One important finding is that passengers benefit from the open skies arrangement for the

JFK-MLM and MEX-MLM route segments. Considering the effects on tourism, it would necessarily increase the number of tourists that would travel to Morelia, due to the decrease of prices. On the other hand, passengers on the JFK-MEX route will experience higher prices because the route remains monopolistic.

In the second scenario, United Airlines enters the MEX-MLM market and Aeromexico enters the JFK-MEX market. As a result, JFK-MEX market competition is increased compared to the first scenario, since the JFK-MEX route is operated by two companies while Aeromar only operates the MEX-MLM route. Comparing the expected results from the initial situation, in the second open skies scenario, prices in the three segments (JFK-MEX, MEX-MLM and JFK-MLM) would decrease, increasing the number of passengers and benefiting passengers in all markets. With respect to airlines' profits, the effects of liberalization are not uniform. While Aeromexico earnings increase in this second scenario, Aeromar is damaged by deregulation, which reduces its profits, because the MEX-MLM segment decreases in price. The entry of United Airlines into the MEX-MLM segment increases competition. Finally under this scenario, United's earnings will depend on the level of efficiency of the company.

In the third scenario, United and Aeromexico collude to operate JFK-MEX flights by offering JFK-MEX and MEX-MLM routes to their passengers under the collusion scheme, both firms agree on the amounts they will offer and maximize profits. Comparing the results from the initial situation against this third scenario, once again the price of JFK-MLM decreases and generates greater flow of passengers. The price in the MEX-MLM segment remains the same, as does the number of passengers. Analyzing airlines' earnings, it can be concluded that after the open skies agreement, United and Aeromexico earnings would increase. This increase is expected since the objective of collusion is the joint maximization of the profits of both companies. Finally, traffic in the JFK-MEX segment would be expected to increase or decrease as in the first scenario.

Comparing the expected results of the three scenarios, it is observed that the second scenario is the one that benefits the passengers the most due to the decrease of the prices in the three segments of the flight and is the one that would generate greater flow of passengers and tourists. However, this second scenario is also the one that generates more incentives for the collusion of the airlines since it is the third scenario that generates more profits for the airlines. The above results are summarized in table 6.

Airlines that do not have the ability to compete for new routes will be adversely affected, their profits will decrease, an assertion that contradicts expected effects in the literature. Part of this assertion is explained by the strategic behavior adopted by airlines, the restructuring of routes and networks, frequent flyer programs as well as the limited capacity of airports can delimit the positive effects expected by governments.

This paper has documented the power and market share in Mexico owned by Aeromexico and Delta Airlines. In order to keep their dominant positions in the industry, both airlines notified the Mexican Federal Competition Commission (COFECE, 2016) on May 8th, 2015 of their intention to carry out an alliance based on a Joint Cooperation Agreement, to operate all current and future flights between Mexico and the United States.

Table 6. Summary of expected results of the theoretical model

	Segment 1. JFK-MEX	**Segment 2. MEX-MLM**	**Segment 3. JFK-MLM**	**Results of open skies against initial situation**
Initial situation with no open skies	Only United Airlines (monopoly)	Two options: Aeromexico or Aeromar (duopoly)	No airlines	
First scenario. Because of open skies, United enters the complete route JFK-MLM.	One option: United Airlines (monopoly)	Three options: Aeromexico, Aeromar, and United.	One option: United Airlines	Price decreases in segments 2 and 3, more passengers because of the increase in competition. United get more profits. Aeromexico and Aeromar get less profit.
Second scenario. Because of open skies, United enters the route MEX-MLM and Aeromexico enters the route JFK-MEX.	Two options: United Airlines and Aeromexico (duopoly)	Three options: Aeromexico, Aeromar and United.	Two options: Aeromexico and United	More competition in JFK-MLM route. Decrease in prices in the three segments, so there will be more passengers. Aeromexico gets more profits. Due to deregulation, Aeromar will get less profit. United's earnings will depend on the efficiency level of the company. It is the most beneficial scenario for passengers and the one that attracts more tourists to Mexico. But it is also the one that generates more collusion incentives for airlines.
Third scenario. United and Aeromexico colluded over quantities to operate the JFK-MEX route.	Two options: United Airlines and Aeromexico (duopoly)	Three options: Aeromexico, Aeromar and United.	Two options: Aeromexico and United	More competition in JFK-MLM route. Decrease in prices in the three segments, so there will be more passengers. Delta and Aeromexico get more profits. Aeromar will get less profit.

Source: Own Elaboration

Evidence has also been presented indicating the merger and alliances that have taken place since 2005 both in Mexico and the United States, in response to increasing competition among airlines, as well as the change in consumer behavior and due to the reinforcement of companies operating under the low-cost business model. The traditional airlines that have a dominant position have formed alliances that ideally will allow them to generate savings through economies of scale and that should be reflected in price reductions. However, these alliances must be approved by the responsible agencies in both countries, given the potential risk of affecting the market when the efficiency gains derived from these agreements, instead of being passed on to consumers, translate into price increases (Kwoka & Shumilkina, 2010).

Some of the risks of alliances according to COFECE (2016) are: a) the elimination of competitive pressure in those routes where the airlines collude, being that before the signing of the agreement they competed; b) by increasing their presence and market power in the routes where they originally coincided, can increase prices, reduce the supply of routes or prevent the entry of new competitors and c) generate effects of concentration of slots in the airports where they coincide, which gives them competitive advantage over competing airlines.

Considering this, COFECE (2016) found that the combined market power of Aeromexico and Delta would give them the ability to raise prices without other companies being able

to counteract this effect. Limits were also encountered on the entry or development of competing airlines (current and potential) on the routes to and from Mexico City, due to the saturation of the Mexico City Airport and the hoarding of the designations by part of Aeromexico and Delta.

5. CONCLUSION

The United States open skies policy since 1992 has been very beneficial to that country. However, in Mexico, US airlines have been losing market share to airlines in other countries, from 83.9% in 1991 to 69.8% in 2015. The Bilateral Air Services Agreement between Mexico and the United States specifies that all cargo and passenger airplanes of both countries will allow any airline to make one-way flights from the United States to Mexico and to another airport to collect and unload, and whether passengers or cargo to airports throughout Mexico and within the United States.

In the "open skies" policy, the airlines market for both countries is basically opened. It is important to mention that derived from this agreement, the United States allows to process requests of alliances between airlines of both countries. However, it is in freight flights where greater freedoms are opened, since Mexico is an exporting country, thus opening the 6th and 7th freedoms. Fundamentally since the last 25 years, Mexican airlines have lost market share. For example, in 1991, domestic carriers transported 73.9% of total passengers, now in 2015, transporting 63.2%. The loss of market by domestic companies could be even greater with the entry into force of the new agreement of open skies signed between Mexico and the United States.

In order for Mexico to continue maintaining high levels of international tourist arrivals, it is necessary to improve and strengthen mobility and connectivity policies from the point of origin to the destination. The information analyzed suggests that Mexico should strengthen the Mexican national aviation industry so that it can be more competitive, particularly with the United States aeronautics industry as its main market for tourists to Mexico.

Although air service liberalization agreements with the United States and Canada as an open skies strategy increase Mexico's connectivity and increase the tourists arrivals, it is recommended to focus on increasing connectivity with those secondary markets with greater potential, particularly using a low-cost business model that allows you to boost tourist destinations from point to point.

One strategy that may represent better scenarios for Mexico is to first strengthen the domestic market, while at the same time strengthening the productivity and capabilities of Mexican airlines. In the last 25 years, in Mexico, 35 airlines have operated; in 2015 only operate 9, without considering the charter companies. The supply of US airlines is much higher than the Mexican ones, the five companies that carry more passengers to and from Mexico are: United Airlines, which owns 713 aircraft, American Airlines 687, Delta Airlines 882, U.S. Airways 340 and Alaska Airlines 137 aircraft. Those five airlines own 39% of the total US commercial aircraft fleet. Together they own 2,759 aircraft out of a total of 6,788 (U.S. Department of Commerce, 2007).

After reviewing the evidence and analyzing the performance of Mexican and US airlines, the bilateral agreement between Mexico and the United States known as "open skies" will increase international trade in goods and services, being the United States aeronautical industry that will benefit most due to the superiority of the fleet of aircraft over the Mexican and to the difference so notorious in the performance of both industries.

Finally in 2016, 48% of international tourists arrived in Mexico by plane, these results indicate the importance of airplanes as a means of connectivity for the tourism industry in

Mexico. Once the arguments and figures are set forth, it is only to be hoped that the open skies agreement will bring with it the positive effects announced, so that empirical research is needed to identify and quantify the true impacts of this policy. For the time being, the theoretical Cournot model presented indicates that airlines that do not have the ability to compete for new routes will be adversely affected, their profits will decrease, an assertion that contradicts the expected effects in the literature.

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ANNEX

The next section describes the Cournot model adapted from Alves and Forte (2015). It is assumed that airlines compete in quantities. The following notation is used:

NL = is the route from New York to Morelia.
NM = is the route from New York to Mexico City.
ML = is the route from Mexico City to Morelia.
P_{NL} = Is the reverse demand function for the market segment New York to Morelia.
P_{NM} = Is the reverse demand function for the market segment New York to Mexico City.
P_{ML} = Is the reverse demand function for the market segment Mexico City to Morelia.
a = is the reserve price in the market New York to Mexico City.
b = is the reserve price in the market Mexico City to Morelia.
c = is the marginal cost.
d = is the reserve price in the market New York to Morelia.
x = is the quantity demanded of the route New York to Mexico City.
y = is the quantity demanded of the route Mexico City to Morelia.
z = is the quantity demanded of the route New York to Morelia.
= profits of United Airlines.
= profits of Aeromexico.
= profits of Aeromar.

The following tables depict the equilibrium prices, quantities and airlines profits under the different scenarios described in this paper.

Table A.1. Before liberalization, is the initial situation with no open skies

Equilibrium prices	Quantities (traffic)	Airline´s profits
$P_{NM}=\frac{1}{12}(3a-b+4c+3d)$	$x=\frac{1}{12}(9+b-4c-3d)$	$\pi_1=\frac{1}{72}(3a-b-8c+3d)^2$
$P_{ML}=\frac{1}{3}(b+2c)$	$y=\frac{2}{3}(b-c)$	$\pi_2=\frac{1}{9}(b-c)^2$
$P_{NL}=\frac{1}{4}(a-b+4c+d)$	$z=\frac{1}{4}(3d-a-b-4c)$	$\pi_3=\frac{1}{9}(b-c)^2$

Source: Adapted from Alves and Forte (2015)

Table A.2. Under first Scenario: because of open skies, United Airlines enters the complete route JFK-MLM

Equilibrium prices	Effect versus scenario before liberalization	Quantities (traffic)	Effect versus scenario before liberalization	Airline´s profits	Effect versus scenario before liberalization
$P_{NM}=\frac{1}{2}(a+c)$	Ambiguous effect	$x=\frac{1}{2}(a-c)$	Ambiguous	$\pi_1=\frac{1}{4}(a-c)^2+\frac{1}{16}(b-c)^2+\frac{1}{4}(d-c)^2$	Increase
$P_{ML}=\frac{1}{4}(b+3c)$	Decrease	$y=\frac{3}{4}(b-c)$	Increase	$\pi_2=\frac{1}{16}(b-c)^2$	Decrease
$P_{NL}=\frac{1}{2}(d+c)$	Decrease	$z=\frac{1}{2}(d-c)$	Increase	$\pi_3=\frac{1}{16}(b-c)^2$	Decrease

Source: Adapted from Alves and Forte (2015)

Table A.3. Under second scenario: because of open skies, United Airlines enters the route MEX-MLM and Aeromexico enters the route JFK-MEX

Equilibrium prices	Effect versus scenario before liberalization	Quantities (traffic)	Effect versus scenario before liberalization	Airline´s profits	Effect versus scenario before liberalization
$P_{NM} = \frac{1}{3}(a + 2c)$	Decrease	$x = \frac{2}{3}(a - c)$	Increase	$\pi_1 = \frac{1}{9}(a-c)^2 + \frac{1}{9}(d-c)^2 + \frac{1}{16}(b-c)^2$	Ambiguous
$P_{ML} = \frac{1}{4}(b + 3c)$	Decrease	$y = \frac{3}{4}(b - c)$	Increase	$\pi_2 = \frac{1}{9}(a-c)^2 + \frac{1}{9}(d-c)^2 + \frac{1}{16}(b-c)^2$	Increase
$P_{NL} = \frac{1}{3}(d + 2c)$	Decrease	$z = \frac{2}{3}(d - c)$	Increase	$\pi_3 = \frac{1}{16}(b-c)^2$	Decrease

Source: Adapted from Alves and Forte (2015)

Table A.4. Under third scenario: United Airlines and Aeromexico colluded over quantities to operate the JFK-MEX route.

Equilibrium prices	Effect versus scenario before liberalization	Quantities (traffic)	Effect versus scenario before liberalization	Airline´s profits	Effect versus scenario before liberalization
$P_{NM} = \frac{1}{2}(a + c)$	Ambiguous	$x = \frac{1}{2}(a - c)$	Ambiguous	$\pi_1 = \frac{1}{8}(a-c)^2 + \frac{1}{8}(d-c)^2 + \frac{1}{18}(b-c)^2$	Increase
$P_{ML} = \frac{1}{3}(b + 2c)$	No change	$y = \frac{2}{3}(b - c)$	No change	$\pi_2 = \frac{1}{8}(a-c)^2 + \frac{1}{8}(d-c)^2 + \frac{1}{18}(b-c)^2$	Increase
$P_{NL} = \frac{1}{2}(d + c)$	Decrease	$z = \frac{1}{2}(d - c)$	Increase	$\pi_3 = \frac{1}{9}(b-c)^2$	No change

Source: Adapted from Alves and Forte (2015)