

**Deregulation of the Airline Industry**

**By**

**Xiangyu Jiao**

**(6836034)**

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**Supervisor: Professor Gamal Atallah**

**ECO 6999**

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## **Abstract**

Airline transportation is an indispensable part of the world economy. The deregulation of the airline industry has received much attention as it has historically been regulated. Since deregulation, this industry has improved in many ways. At the same time, deregulation also negatively affected carriers. This paper surveys the empirical literature on the airline industry, using the U.S. airline industry to analyze the effect of deregulation. The research primarily looks at the merits and demerits of the deregulation of the airline industry, and analyzes changes using industrial organization theory. In this paper, six main issues are addressed: background, achievements, market structure, competitiveness, welfare, of the U.S. airline industry, and the global airline industry. Through a thorough analysis of these six issues, this paper will review the path of deregulation and reform in the airline industry.

**Keywords:** Airline industry, Deregulation

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## 1. Introduction

In the past three decades, the number of passengers choosing air travel has grown rapidly. According to statistics from the World Bank, the total number of air passengers in the U.S. numbered 731 million in 2011 (The World Bank, 2011), compared with 295 million passengers in the 1980s. Globally, the International Air Transport Association (IATA), through its Industry Traffic Forecast, predicts that airlines will transport 3.6 billion passengers in 2016 (IATA, 2012). That is 800 million more than the 2.8 billion passengers carried by airlines in 2011 (IATA, 2012). To put this growth in perspective, in the early 1970s, few people could afford airline fees in U.S (Goetz and Vowles, 2009). The airline industry developed rapidly due to deregulation policy improving the industrial structure, increasing market competition, promoting industrial innovation, and reducing costs. Although the deregulated airline industry abounds with paradoxes, there are significant benefits to consumers (Bailey, 1992). In addition, Goetz and Vowles (2009) stated that in spite of over 30 years of deregulation of the U.S. airline industry has maintained high levels of safety while the average fares have declined, more flights are offered, and carrier efficiency has continually increased.

Airline deregulation in the U.S. began in 1978. Deregulation is a process of removing governmental imposed entry and price restrictions on airlines. In particular, carriers are permitted to serve specific routes. After three decades of development, the airline industry has made notable achievements with deregulation (Goetz and Vowles, 2009). However, this deregulation action is still subject to debate among economists and scholars.

The purpose of this paper is to discuss the development of the airline industry and to explore the differences between regulation and deregulation. By reviewing the literature on the airline

industry and deregulation published since the 1980s, this paper discusses the development, current situation, and issues in the contemporary airline industry. The rest of the paper is organized as follows. Section 2 reviews the background of the airline industry deregulation. Section 3 shows some significant changes and achievements after deregulation. Section 4 addresses the current situation and issues about market structure. Section 5 examines competition and mergers. Section 6 discusses price and service quality after deregulation. Section 7 looks at the reforms and development of the Chinese and European airline industries. Section 8 is the conclusion.

## **2. Background**

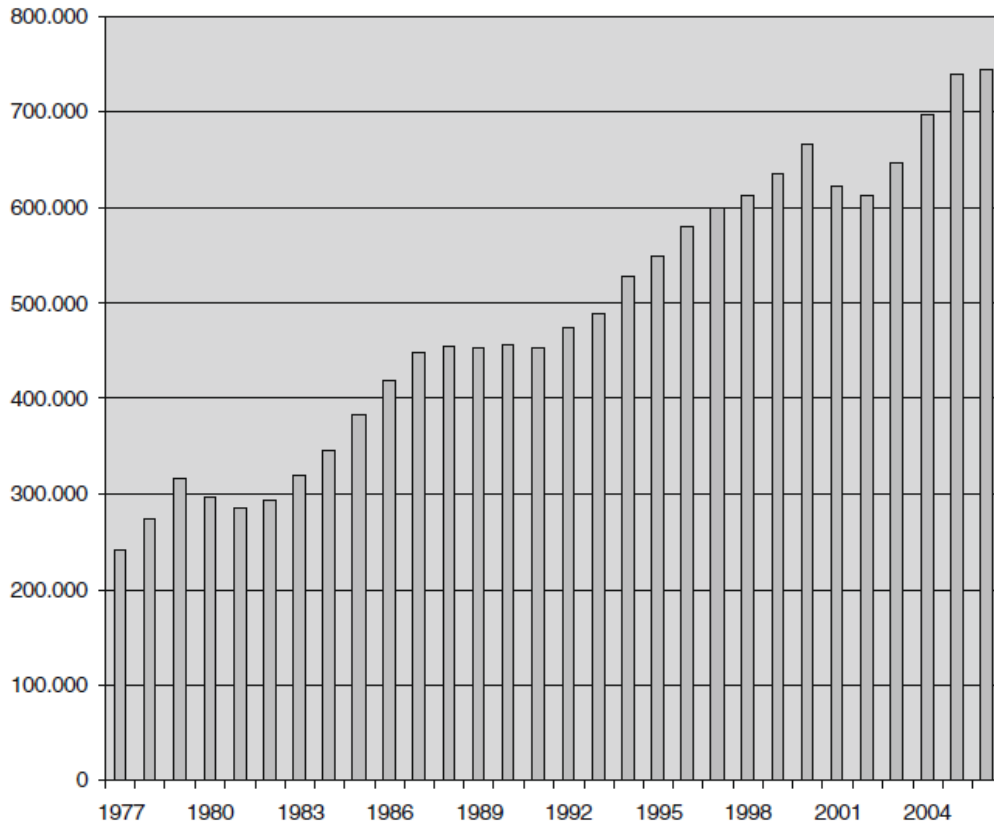
Air transport services, which include travelling passengers and air cargo services, are provided by airline companies. Airline companies today usually offer five types of services: intercontinental, intra-continental, domestic, regional, and international. Passengers can optionally choose different airlines, routes, and services. However, at its historic beginning, airline companies and passengers did not have the right to pick their own transport routes (Bailey, 2008).

In 1938, the U.S. Federal Civil Aeronautics Board (CAB) regulated the air transport routes as a public utility, which had the obligation to set schedules, fares, and routes. During this period, the CAB created an inefficient point-to-point system. Airlines could only fly intrastate routes which were not regulated by the CAB (Cudahy, 2006). Economically, the CAB usually decreased the ticket price on short routes. Likewise, increased fares for long distance flying were implemented to be more beneficial to carriers. The CAB also simultaneously required airlines to have a reasonable rate of return with fixed airfares (Baik et al., 2011).

In the early 1960s, the airline industry underwent significant technological innovations. For instance, when jets were introduced into airline services, planes had the ability to travel faster than before. As a result, the number of flights and the number of passengers grew rapidly (Global Airline Industry Program, 2006). However, under government regulation, the U.S. airline industry developed sluggishly. The CAB refused to allow new airlines to enter this industry or incumbents to enter each others' routes. Regulation turned this industry into pockets of geographic monopolies, accompanied by low economic growth, high inflation, and falling productivity. In the early 1970s, most airline companies could not maintain their operations with the higher cost of maintenance and lower profits (Thierer, 1998). As Bailey (2008) stated, "the decade prior to 1975 was characterized by double digit inflation and high unemployment. Wage and price controls had been tried and failed. So the stage was set for economic regulatory reform." (Bailey, 2008, p.3)

In order to extend the scale of airline services and rescue the airline industry, the U.S. government started implementing airline deregulation in the late 1970s. In summer of 1977, Alfred Kahn, as the administrator of the CAB, brought his proposal to the Congress. After testifying to its effectiveness, the Airline Deregulation Act was signed by President Jimmy Carter on October 28, 1978 (Goetz and Vowles, 2009). "The law proposed a gradual reduction in CAB regulation, with entry deregulation to be completed by December 31, 1981." (Bailey, 2008, p.6) Price regulation would be forbidden two years later. "The remaining CAB responsibilities of international negotiations and small community air service would shift to the Department of Transportation. Antitrust authority would be shifted to the Department of Justice."(Bailey, 2008, p.6) Safety regulation remained with the Federal Aviation Administration.

**Figure. 1: Total US Airline passengers, 1977-2006 (in thousands)**



**Source: FAA Terminal Area Forecast (TAF), 2007**

Since the government reduced their involvement in airline company activities, domestic air travel grew significantly and average fares dropped by 40% (Goetz and Vowles, 2009). Figure 1 shows that the number of U.S. airline passengers increased dramatically from 1977 to 2006. Due to the success of U.S. deregulation, liberalization became popular worldwide, especially in Europe, Asia and South America (Shaw et al., 2009). As deregulation developed, there were significant achievements that turned up in the airline industry such as the hub-and-spoke system, open skies, and free entry and exit. However, the U.S. deregulation experience has had some negative impacts. The pressure to cut costs increased profit volatility. Mergers and bankruptcies of several airlines led to job losses and reduced wages (Global Airline Industry Program, 2006).

Moreover, hub-and-spoke systems turned some big air transport hubs into monopolies (Goetz and Vowles, 2009).

### **3. Reforms and Achievements**

Most economists believe that deregulation has had a positive effect on the airline industry. In fact, both statistics and reports support this opinion. According to statistics from IATA, the global airline industry owns more than 23,000 aircraft consisting of over 2,000 airlines operating and providing services to over 3,700 airports. "In 2006, the world's airlines flew almost 28 million scheduled flight departures and carried over 2 billion passengers." (Global Airline Industry Program, 2006) The growth of world air travel has averaged approximately 5% per year over the past 30 years, taking into account the fluctuating economic change and growth throughout the world over time (Global Airline Industry Program, 2006). From the beginning of deregulation until now, the annual growth in the airline industry has been about twice the annual growth in GDP. All these significant achievements are inseparable from understanding reforms. The hub-and-spoke system is one of the most valuable innovations following deregulation.

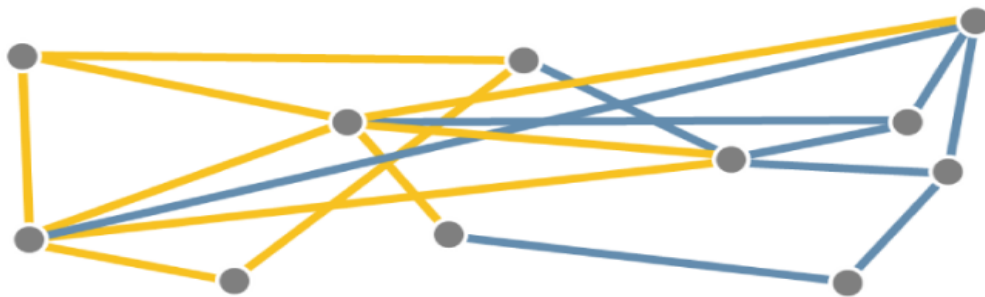
#### **3.1 The Hub-and-spoke System**

Under regulation, the CAB used an inefficient point-to-point routing system. Regulation caused the US. airline industry to become monopolistic instead of naturally competitive, especially in some big hub cities, such as New York, Los Angeles, and Dallas. Carriers, located at big cities, monopolized most of routes in their own regions (Morrison and Winston, 1989). After deregulation acts were passed, the creative hub-and-spoke system was adopted. The hub-and-spoke distribution is like a chariot wheel, in which all traffic moves along spokes connected

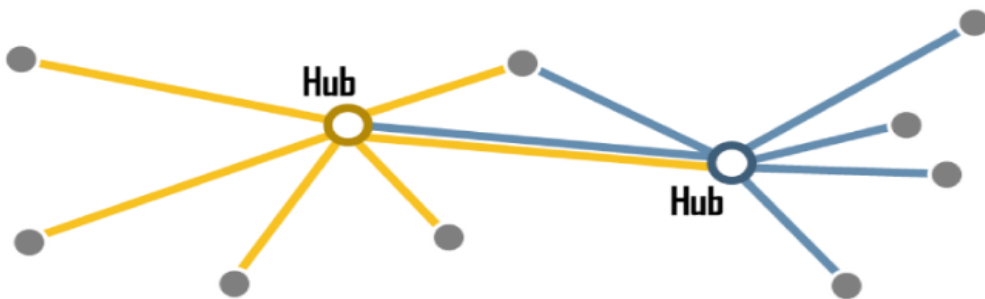
to the hub at the center, enabling system travellers a more integrated travelling system and experience. Passengers from small regions can transport themselves through air travel to a major hub airport where there are connecting flights to many other destinations (Bailey, 1992). From Figure 2, we can see the point-to-point system requires more routes and is ultimately inefficient. The hub-and-spoke network is simpler and more efficient. The hub-and-spoke systems increase possible city-to-city routes carriers can enter into. Since the 1980s, this system has been widely adopted in many industries, especially in air, railway, and road transportation. Recently, the new routing system has been proven costly for airlines to implement, and many airlines use a combination of hub-and-spokes and point-to-point routing systems (Aguirregabiria and Ho, 2010).

**Figure. 2: point-to-point system and hub-and-spoke system**  
 Yellow line represents routes from left hub, blue line represent routes from right hub

**Before Deregulation**



**After Deregulation**



Source: The Geography of Transport System  
<https://people.hofstra.edu/geotrans/eng/ch3en/conc3en/hubspokederegulation.html>

This hub-and-spokes model is more efficient than a direct routing system (Lederer and Nambimadom, 1998). First of all, it offers consumers more convenient routes. In a deregulated market, passengers refer to the airline flight schedules to choose their own flights and prices. The hub-and-spoke routing system can handle different combinations of routes and schedules. This hub network is able to more fully utilize valuable hardware resources. For example, large aircrafts usually fly with full capacity (Global Airline Industry Program, 2006). Under this system, they can fly between hubs more than once per day. This network system can reduce average operating costs through economies of scale and density. Aguirregabiria and Ho (2010) said that a hub-and-spoke system could exploit significant economics of scope at the airport level and economies of traffic density. It is easy to create new spokes to this network and this advantage can accelerate developments of the airline industry and attract airline companies to build and extend their own network system (Aguirregabiria and Ho, 2010).

In practice, designing an appropriate network becomes a critical issue for airlines. As Hsu and Wang (2013) state, in designing a hub-and-spoke network many factors should be carefully considered, such as flight frequencies, aircraft types and routes, and plans for either the summer or the winter season. External factors including economic recessions can affect how hub-and-spoke systems are geographically laid out, and the overall air traffic volume (Dobruszkes and Hamme, 2011). Based on Hsu and Wang's (2013) statement, there is a basic principle in designing a network that ensures all routes are systematically optimized. Any decision-making processes about traffic flow on one route may be impacted by disturbing factors from other routes, such as operating procedures of airports, the schedule of aircraft maintenance, and flight delay.

This viewpoint, held by many scholars, indicates that the hub network is better than the direct routes system. Bailey (1992, p.18) mentioned that "the hub-and-spoke delivery system has become the new standardized operating system for airlines." It has three major features. "First, there are cost savings to airlines from better capacity utilization." (Bailey, p.18) Second, there is greater concentration at the hub airport. The third feature is that more destinations are served nonstop from each hub. Brueckner and Spiller (1991) proved that the hub-and-spoke system can reduce passengers' cost: Higher traffic density allows the use of larger and more efficient aircraft. Intensive aircraft utilization becomes optimal as density increases given diminishing returns to flight frequency. In short, these effects lead to lower cost per passenger-mile on dense routes.

However, every coin has two sides, and a hub-and-spoke system also has negative impact on the airline industry. This was affirmed by the "Hendricks-Piccione-Tan Entry Deterrence Argument" in theoretical work. The entry deterrence argument was first published by Hendricks et al. in 1997. It proves that a hub-and-spoke network can be more profitable for incumbents. This enormous system also may deter new airline entries to this industry. Aguirregabiria and Ho (2010, p.1) have stated this argument "using a sequential game of entry between an incumbent hub-and-spoke carrier and a point-to-point regional carrier." In a hub-and-spoke system, airlines' profit function is "super modular" depending on their entry decisions for different city-pairs. This implies that an airline company with a hub-and-spoke network may operate a negative profit non-stop flight for a city-pair as operating between that specific city-pair can create positive profits connected with other routes. However, when potential entrants realize this situation, they may decide not to enter the industry. It can be especially difficult for new entrants who usually do not have enough capital to build their own networks. Thus, the hub-and-spoke system acts like an incumbents' protective screen to prevent new entrants. It does not require incumbents to

reduce their profits. This hub network model also can bring negative influence to airfares. Brueckner and Spiller (1991) found that the hub-and-spoke system could turn hubs into monopolies. In this case, some passengers switch to competitor's flights when a competitor, who serves a monopoly hub-and-spoke airline, enters a market. The traffic volume on the spokes will diminish. Due to the rising leakage rate of passengers, the marginal cost of a passenger increases on the affected spokes. While in this market the competitive pressure neutralizes higher marginal costs and reducing fares, other markets which use the affected spokes, do not benefit from adding competition. As a result, the high marginal cost leads to higher fares in these markets. In this type of monopoly market, competition triggers negative externalities outside the market.

### **3.2 Welfare Effects**

The welfare effects of deregulation of the airline industry on passengers have been studied extensively. Most economists have come to the same conclusion, that deregulation is beneficial to consumers.

Based on Schipper et al.'s (2007) finding, in the transportation market the frequency of services has a major impact on welfare. The departure frequency has an impact on the utility derived from the transport services. While, in a small market, frequency can measure the competition in capacity and prices. Frequency is one of the main factors which can determine the external cost in a market. For example, in the airline industry, the size of externalities, such as noise and pollutants, depends on the frequency of takeoffs and landings. At the end of this article, Schipper's et al. (2007, p.204) stated "The size and distribution of the welfare effects prove to depend on the type of entry. Low cost entry results in the highest welfare gains, both as a result of price decreases and of frequency increases."

Koran (1983) also studied welfare effects that occur after deregulating the airlines. In his article, he divided the welfare effects into two parts: consumer surplus and producer surplus. For the consumer's surplus, he measured the welfare effects of deregulation, which depended on the changes in fares, service quality, and the number of passengers. For the producer surplus, through analyzing "the effect of deregulation of higher load factor and aircraft utilization rates on average costs, and airline common stock prices to see what effect deregulation had on airline profits." (Koran, 1983, p.188) In his conclusion, he declared that consumer's surplus increased because the regulated fares had been above the optimal level. With deregulation, fares fell by more than enough to offset the deterioration in service quality, keeping producer surplus unaltered by this change of service cost.

Gaynor and Trapani (2004) claimed that the deregulation of airline markets led to increased consumer surplus, especially in the long-distance market. However, the quality of service also has changed with deregulation and it has impacted consumer surplus significantly. Hence, they strongly suggest that increasing the quality of services was essential to increase welfare in this industry.

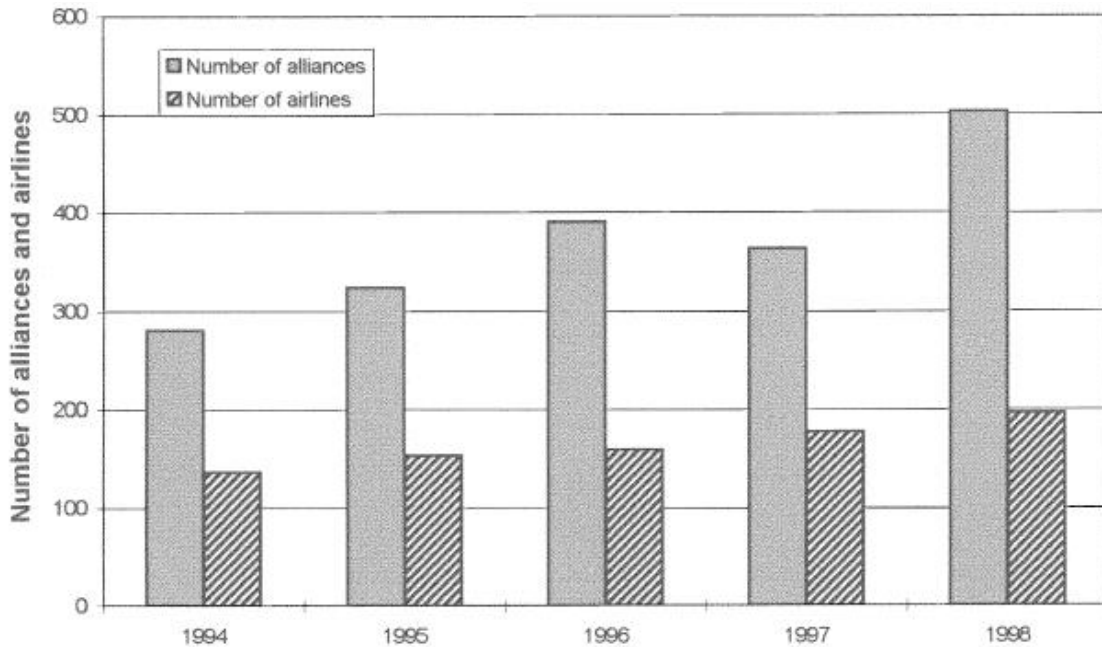
### **3.3 Open Skies**

Before the late 1970's, international governments had an input into airline decisions concerning routes, capacity and pricing. As a solution in a step toward deregulation, the United States government developed Open Skies agreements between themselves and other countries to expand flights internationally without interference by governments. The first Open Skies agreements were signed in 1979 following the deregulation act. To date, more than 60 countries have signed Open Skies agreements with the U.S. This agreement offers carriers a liberal

environment to provide more convenient and efficient air service (Crook, 2011). Direct transportation also prompts cooperation and improves flexibility for transport. This policy "rejects the outmoded practice of highly restrictive air services agreements protecting flag carriers." (Crook, 2011, p.586) The Open Skies agreements mark a turning point in airline deregulation.

### 3.4 Alliances

**Figure 3: Growth in the number of airline alliances.**



**Source: Airline Business, 1994 - 1998  
Bissessur and Alamdari, 1998, p.333**

With the development of deregulation in the airline industry, competition among airline companies intensified. In order to reduce competitive pressures in the 1990s, alliances have swept the industry (Brueckner, 2001). Figure 3, shows the number of airlines in alliances has increased from 136 to 196 during 1994 to 1998.

At the beginning of the airline industry, collaboration has been an integral part of business. At that time, agreements usually included technical cooperation -- the exchange of aircraft and joint aircraft maintenance. While, with competition intensifying in this industry, this type of collaboration cannot meet the needs of development. Contemporary alliances are therefore more strategically focused. The original intention to set up a strategic alliance was to increase the service power of carrying. Bruechner (2001) described alliances as a tool to solve the restrictions on international service codification in various bilateral agreements, which limit the entry of new carriers on routes between given countries. Along with the further development of deregulation, these restrictions have been removed in many cases through the Open Skies agreements, but alliances still provide a way to circumvent the remaining limitations. For instance, carriers can rely on an alliance partner to provide service to destinations where they lack route authority. However, even when route authority is available, alliances remain attractive because they allow US carriers to effectively extend their networks overseas without operating additional flights. Thus, the airlines can increase their global reach without investing new resources. Right now, in addition to strategic alliances, many "tactical airline alliances" are emerging. "These alliances are so called because cooperation is very narrow and prevails in only one field." (Alamdari and Bissessur, 1998, p.332) For instance, between British Midland and Lufthansa, there is only cooperation in code-sharing expressed in their agreement. The purpose of establishing tactical alliances is to reap the short term benefits, thereby allowing airlines entry to wider ranging alliances.

Since alliances can increase competition, enhance market shares, and increase profit, more and more airline carriers attempt to build profitable alliances. How to find niche partners has become a critical problem for airlines. According to Dogains (1994), there are three factors that must be

considered by airline carriers if they seek a partner to establish an alliance: ensuring a dominant position within their own home market, gaining a foothold in other regional market, and establishing a global presence. The British Airways and U.S. Airways alliance provides an excellent example to prove that these factors are necessary. At the time of alliance formation, British Airways gained access to the U.S. domestic market successfully with the help of U.S. Airways. Meanwhile, U.S. Airways avoided bankruptcy by benefiting from a cash injection from British Airways. In addition, as Alamdari and Bissessur (1998) mentioned, the degree of commitment in and the importance attached to alliances have become a significant tool of competition. The cooperation of alliances has involved a wide range of activities, such as: sales, marketing, purchasing, and maintenance.

The first and largest global airline alliance, Star Alliance, was established by United Airlines, Lufthansa, Air Canada, Thai Airway International and Scandinavian Airlines System in 1997. The creation of Star Alliance was a milestone in airline history due to its size. On March 8, 2013, TAM Airlines joined in Star Alliance, making 28 the total membership of this this alliance. Based on Star Alliance Facts and Figures (2013), collectively Star Alliance members have 4,701 aircrafts that fly over 21,900 daily flights to 1,328 airports in 195 countries. All Star Alliance members together have more than 460,238 employees (Star Alliance, 2003). In addition, the alliance brought enormous benefits to its members. In 2013, members of Star Alliance carried a total of 727.42 million passengers with U.S. \$198.98 billion annual revenues. In the same year, its market share was 23% of the global airline industry based on revenue passenger kilometers (Star Alliance Facts and Figure, 2003). Star Alliance stimulated the establishment of rival alliances, such as SkyTeam and Oneworld. This result has had a positive impact on the industry (Alamdari and Bissessur, 1998).

## **4. The Aviation Market Structure**

The air transport industry is representative of the state of the economy as a whole. As Lukyanov and Tissen (2009), on the supply side, the market has been developed due in part to applied aviation technologies. This infrastructure using specialized technology thrives on population mobility that cultivates a social good. The characteristics of airline market structures have attracted much attention from economists.

### **4.1 Contestability**

In a contestable market, there is a small number of incumbent facing strong competitive pressure from potential short-term entrants. This theory has been applied to analyze markets characterized by free entry and exit (Bailey and Firedlander, 1982). The definition of "free entry and exit" implies that a new entrant has the same technology and quality as an incumbent. Baumol et al. (1982) stated that contestable markets share many properties with competitive markets. The essential attribute is that in equilibrium profit are nil and price must equal average cost in the long-run.

At the same time, a contestable market has some differences with a perfectly competitive market. Like Lukyanov and Tissen (2009) mentioned, the effects of scale can limit the number of participants, but firms cannot make their prices higher than average costs. In addition, Spence (1976) stated that the contestable market theory offers a substitute for perfect competition. Perfect competition is known to be unrealistic. Meanwhile, the contestable market provides a more reliable welfare standard. The contestable market has several characteristics: "free access to the technology for both incumbents and newcomers; existence of the real possibility of

competition; negligible irreversible costs of entry; implementation of a "hit-and-run" strategy by the newcomers." (Lukyanov and Tissen, 2009, p.30).

One evident property of contestable markets is called "hit and run". The strategy "hit and run" is defined as follows: the incumbents reduce the market price to defend their own profits as soon as new entrants enter into the contestable market and earn profits. However, the new competitors leave the market rapidly after they obtain short-term profits. In other words, a firm in contestable market has to practice low price, otherwise it will encourage entry and quite exit.

Contestable market theory has played a significant role in the airline industry. Under the deregulation of the aviation industry in the U.S., more new entrants were allowed into the airline market and caused the incumbents' market shares to shrink rapidly. Lowering entry barriers, the threat caused by potential entrants would produce fierce competition even with only one firm serving the market. This threat can compel incumbents to defend their market by decreasing price and improving service quality. The monopoly position of the aviation industry has become open to competition due to deregulation. In the meantime, production efficiency has improved dramatically.

According to Butler and Huston (1989, p.31), "the existence of the significant scope economies across routes and scale economies within routes may greatly increase the minimum efficient scale at which entry may occur." Bailey et al. (1985) stated that the passenger's money was not saved if he or she has to pay extra money for the flight from the hub to the final destination. The reason is that the interlined passenger has to pay on average 25% more than what is paid by online connecting passengers. With respect to the principle of time costing money, Carlton et al. (1980) concluded that interline passengers waste an average of 37 minutes

more than passengers who are travelling on a single carrier. Sometimes passengers have to get to their terminals and transfer their luggage by themselves. "As the result of these factors, the way in which carriers exploit the scope economies inherent in the hub-and-spoke network is to schedule those flights offering the most profitable connection opportunities, even if some of these flights could not be supported by local traffic alone." (Butler and Huston, 1989, p.31)

#### **4.2 Sunk Costs**

"Sunk costs are those costs that (in some short or intermediate run) cannot be eliminated, even by total cessation of production." (Baumol and Willig, 1981, p.40) Those costs do not change with output and do not vary with scale. Sunk costs have already been incurred and have been represented as a non-recoverable commitment to output in an industry and thus are not recoverable in the case of exit. Sunk costs should be considered as the prime impediment to entry in a contestable market (Clark and Wrigley, 1997).

Due to the importance of the sunk cost effect, scholars have used two approaches to model those costs: one is in sight of the structure, another is the behavioural approach. Sunk costs create barriers to prevent new entrants from entering and to protect the profits of incumbents. According to Cabral and Ross (2008), sunk investments increase the exogenous or endogenous barriers to entering with a sunk investment, the entry risk becomes higher with a greater requirement for entry as well as a diminished threat to incumbents. The behavioural approach derives from the strategy literature on commitment.

Sunk costs impede hit-and-run entry and can include the overhead costs of plant creation and disassembly. These costs are not time sensitive and often represent fixed capital costs of a plant.

The main sunk costs in the airline industry are the airport plant cost, such as runways, towers, and ground facilities. Instead of airlines, municipalities are the preferred location for this cost. Municipalities often choose specific airlines, which encourages carriers to determine the price, under long-run contract to cover the sunk costs of airports. Carriers could either block all competitors or extract monopoly rents from new entrants if carriers hold a long-run contract (Bailey and Panzar, 1981).

### **4.3 Barriers to Entry**

McDougall and Robinson (2001, p.659) state that "entry barriers are key industry structural characteristics that impact business performance." Appropriate barriers can protect incumbents and restrict competition in a market. Under regulation, entry barriers were high enough to prevent new companies from entering airline industry. Limited access to airport facilities was the major issue that maintained high entry barriers.

Before 1978, airport construction and expansion were regulated strictly. This regulation affected airport prices and capacities. While, airlines require enplaning and deplaning gates to provide service at an airport, they had to spend large amounts of money to lease airport gates. Airport gates to this point had been exclusively used by incumbents (McDougall and Robinson, 2001). New entrants usually do not have enough capital and/or the opportunity to lease airport facilities the availability of which are rare. This has turned airlines into a high-investment and high-risk industry for new entrants.

After deregulation, the privatization change in airports became flexible and efficient. It allowed new entrants to sublease gates and other facilities from incumbents. Since adopting the

hub-and-spokes system, a great number of airports were built and provided more gates to carriers. In order to further lower the barriers to entry, President Bill Clinton signed AIR 21 (the Aviation Investment and Reform Act for the 21st Century) into law in 2000. "The act identified a set of major airports that, on a reasonable basis, had to be available to all carriers wishing to serve them. The set of airports identified by AIR 21 were commercial service airports that had more than 25% of the total number of passenger boardings each year in the United States and had one or two air carriers that controlled more than 50% of the passenger boardings." (Ciliberto and Williams, 2010, p.467) Increasing welfare, enhancing competition, and decreasing fares are the main benefits from lowering entry barriers. As Schipper et al. (2007) stated "the size and distribution of the welfare effects prove to depend on the type of entry. Low cost entry results in the highest welfare gains, both as a result of price decreases and of frequency increases." (p.204)

## **5. Growth, Competition and Mergers**

Now, deregulation is widely accepted. This is the main factor that caused a dramatic decline in the number of airlines through merger and bankruptcy. Figure 4 below shows the significant number of bankruptcies, mergers, and acquisitions in the airline industry between 2000 and 2008 (Goetz and Vowles, 2009, p.260). The corporate control of the airlines has been stipulated since deregulation. After deregulation, how to survive and develop in the liberalized market became a critical issue to airlines. Since the 1980s, in order to adapt to this new environment, most airlines have decided to merge (Goetz and Vowles, 2009). After the merger, airlines - especially smaller ones - could control more hubs and own more routes. They were able to compete with powerful carriers. Usually there are two reasons to chase a merger (Goetz and Vowles, 2009). First, if market power is the reason for a merger, the result will be an increase in the level of producer

price, a diminution in output or a decrease in quality. Second, if the merger is motivated by the desire for greater efficiency, the scenario will be reversed and lead to an increase in social welfare. Many economists are concerned that mergers could cause monopolies in the airline industry (Goetz and Vowles, 2009).

**Figure 4: Significant U.S. airline bankruptcies, mergers and acquisitions, 2000-2008**

Airline	Entered bankruptcy	Exited bankruptcy	Ceased operations
<i>Bankruptcies and terminations</i>			
Midway	August 2001		October 2003
Sun Country			January 2002
Vanguard			July 2002
US Airways	August 2002	March 2003	
United	December 2002	February 2006	
Hawaiian	March 2003	June 2005	
US Airways	September 2004	September 2005	
ATA	November 2004	March 2006	April 2008
Delta	September 2005	April 2007	
Comair	September 2005	April 2007	
Northwest	September 2005	May 2007	
Independence	November 2005		January 2006
Big Sky			January 2008
Champion	March 2008		May 2008
Aloha			March 2008
Skybus			April 2008
Frontier	April 2008		
Airlines		Date	
<i>Mergers and acquisitions</i>			
TWA acquired by American		April 2001	
US Airways merged with America West		September 2005	
Delta merged with Northwest		April 2008 (subject to regulatory approval)	
United alliance agreement with Continental		June 2008	

**Source: US Air Transport Association, 2008**

Empirical studies of deregulated airline markets usually discuss market competition. This competition between airlines occurs mainly between individual city pairs. The reason why competition attracts so much attention, according to Bruechner and Spiller (1991), "because of

the cost complementarities inherent to new hub-and-spokes networks, competition in a single market usually creates negative network externalities, causing a reduction in traffic throughout the network. Furthermore, competition may also imply a reduction in total social surplus." (p.323) They found competition in an airline hub-and-spokes system might have harmful effects outside the market.

Bailey (1992) also argued that the antitrust policy was not fit for airline mergers. For example, the merger of TWA (Trans World Airlines) and Ozark Airlines. "A significant amount of literature has analyzed the effects of this merger. But, even had government officials vetoed this merger, there would have been failures due to poor financial performance." (Bailey, 1992, p.23). Economic studies of substitute product competition suggest that in situations where price can be varied at will, but changes in operations are not costless, there is a tendency for the number of firms to shrink toward a lower bound, and that firms with higher quality (greater scope of operation) will tend to dominate. (Bailey, 1992) However, compared with other failed mergers, American Airline provided a particularly good example in those years immediately following deregulation. Through cutting overhead costs, restricting new hub-and-spokes system, and raising capacity, American Airlines improved itself for the new and more competitive environment. The merger was not the only way to solve the problem of competition at this juncture. The formation of international or domestic airline alliances is another proper way to relax stressed market competition, raise efficiency, and maximize profits.

Airline alliances allow airlines to coordinate operations in service, which can raise the number of airline benefits. "Most of the major alliances enjoy antitrust immunity, which allows the partners to collaborate in pricing decisions, enhancing their ability to function as a single

airline." (Bruckner, 2001, p.1476) Those actions can reduce competition among airlines in the same alliance. Passengers prefer choosing a single carrier rather than switching carriers. As Bailey (2008) mentioned, consumers believe that with a single carrier they will face fewer hassles with lost baggage, missed connections or poorly timed connections, often associated with transferring carriers. An alliance collaboration can provide this non-stop service. In an alliance, all members' networks seem like an extension of its partners' routes. Since they are all using a code sharing system, passengers can choose flights by coordinating schedules to save time. Meanwhile, the alliance also meets the demand of the domestic market.

Through studying the competitive effect of US airline alliances, Bamberger, Carlton, and Neumann (2001) addressed two main benefits from alliances. First, alliances provide substantial benefits to consumers. In particular, alliances reduce average fares and increase total traffic between cities. These consumer benefits are generated by allowing alliance members to increase the frequency of service on other routes. However, "in post-deregulation[,] markets may display non-competitive behaviour, particularly when there are dominant alliances." (Schipper et al., 2007, p.204) This motivation may have the same effect as a monopoly, increasing the level of fares.

Although a merger is not good for developing independently in the airline industry, it may be an appropriate way to raise carriers' profits. On February 2013, US Airways and American Airlines declared a merger which created the largest airline in the world. This new airline makes almost \$40 billion in revenue per year (Joyce, 2012). Nevertheless, for consumers, this merger meant convenient and faster travel. After this merger, passengers enjoyed more destinations and convenient amenities including non-stop flights. Eventually, the merger will lead to higher fares,

because it can reduce the number of airlines and reduce competition.

In conclusion, deregulation of the airline industry lowered the barriers to entry, allowed airline mergers and bankruptcies, and prompted the formation of alliances. Those actions helped the airline industry develop as well. At the same time, deregulation created a fair competitive environment. More airlines mean more competition, as each airline has to attract more passengers by competitive and reasonable fares, thus benefiting consumers.

## **6. Fares, Service Quality and Delays**

### **6.1 Level of Fares**

As Goetz and Vowels (2009, p.254) stated, "it has been well-documented that average fares have declined during the period of deregulation." Figure 5 shows that the average fare adjusted for inflation has continued to decline from 1993 to 2005. But the rapidly rising price of fuel, both adjusted and non-adjusted average fares, slightly increased after 2005. The phenomenon of decreasing average fare happened not only on domestic flights, but also in the international market (Goetz and Vowels, 2009).

During the regulation period, airfares were controlled by CAB. The strict price control not only brought relatively stable revenues, but harmed consumers' benefits and the industry's development (Bennett and Craun, 1993). Airfares are decided by airlines since deregulation was implemented. Right now, vigorous competition is the main reason behind the decline in airfares. As section 2 discussed, lower barriers let more companies joined this industry. For example, Southwest Airlines entering into the Oakland-Burbank intra-California route in 1990 that resulted in a 55% price drop for passengers (Bennett and Craun, 1993). Those new entrants

usually have lower costs than incumbent airlines, and can offer more competitive fares.

**Figure. 5: Average One-Way Fares, 1993–2007 (in US dollars).**



**Source: The Airline Origin and Destination Survey, 2008  
Goetz and Vowles, 2009, p.257**

Apart from competition, many other factors can influence the level of airfares. From the external and uncontrolled viewpoint, the airline business is very seasonal. As many people take vacations in summer, airlines become extremely busy. However, this industry usually is not busy in winter, except holidays. The result of such peaks and valleys in travel patterns is that airfares also rise and fall significantly through the process of the year (Doganis, 2006).

Fuel price is another crucial determinant of airfares (Mouawad, 2011). The location of the destination also can influence fares. There are usually several airlines service routes when the destination is a key city. Airline competition aims to lower fares while providing sufficient seats. However, if the competition comes from consumers, the effect on fares would differ. For

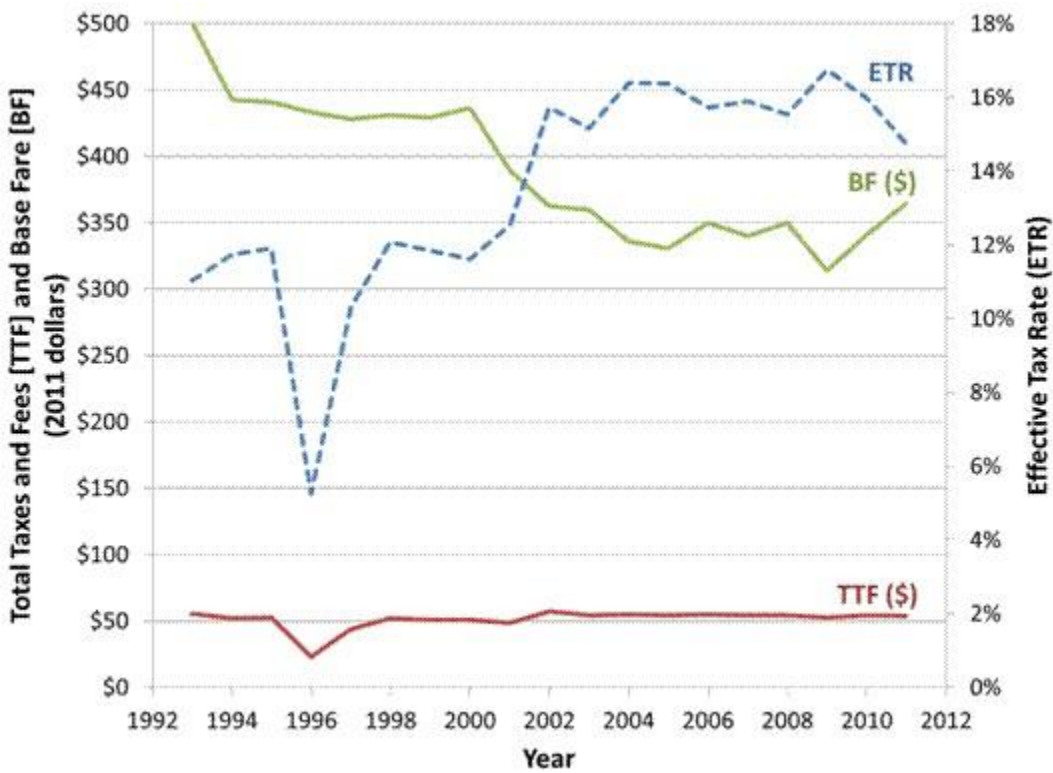
instance, nominally, the earlier consumers book the tickets, the lower fares they pay. As time gradually closes in to the date of flights, fares will rise due to competition between consumers. Custom services, such as advance seat selection and special airline meal reservation, also can increase fares (Seetaram, 2010).

What is more, advanced equipment and facilities can raise price competition. As Bailey (1992) stated, advances in computer technology, particularly with respect to reservation systems, have expanded the industry's core capabilities. Right now, the managers of airlines can forecast fare trends by the more sophisticated yield management system instead of simple peak and off-peak pricing schemes. With online reservation systems, airlines can adjust fares rapidly for competitors price change. Additionally, consumers are able to compare quoted prices and routes to travel more easily (Bailey, 1992).

From another viewpoint, factors from inside the airline industry also affect the level of fares, such as airport user charges, tax policy, and security fees. First, the airport congestion price is an important factor affecting the overall price. Congestion price is a method that achieves efficient resource allocation through controlling demands for airport operation. Barnhart and Vaze (2011, p.1) mention that "with airport capacity being a scarce resource, market-based mechanisms such as congestion pricing and slot auctions are expected to bring demand and supply in balance by placing monetary prices on the airport capacity." In fact, extravagant congestion price will increase airlines' operation cost, thereby raising fares. However, low congestion price can affect the normal work of an airport, such as flight delay, and flights conflicts. In the present circumstance, airport privatization is an efficient way to manage congestion fees. As Basso (2008) stated many scholars have argued in favor of airport privatization, because private

airports could charge efficient congestion prices and respond to market incentives for capacity expansions. For example, many countries, like the U.K. and Australia, have privatized some of their public airports. Those privatized airports already have exerted market power, most of the newly privatized airports have become more efficient. As a result, airlines who have rented gates from privatized airports, would have a lower fare level than others (Basso, 2008).

Figure. 6: The BF, TTF, and ETR for the U.S. flights within 48 states from 1992 to 2012



Source: MIT Global Airline Industry Program, 2012  
<http://web.mit.edu/TicketTax/>

In addition, ticket taxes and fees increase the cost of air travel to passengers directly. Currently, four types of taxes and fees are levied on domestic airfares in the U.S.: federal ticket tax (FTT), federal flight segment tax (FST), passenger facility charge (PFC), and federal security service fee (FSSF) (Yamanaka et al., 2005). Although taxes and fees mostly contribute to

development, construction, and maintenance of air traffic control, it still causes economic damage to carriers. Too high an effective tax rate will increase the financial burden to consumers, and then decrease carriers' revenues. Figure 6 shows the average base fare (BF), total taxes and fees (TTF), and the effective tax rate (ETR) for the U.S. flights within the 48 contiguous states. In this figure, the average effective tax rate increased from 10% in 1993 to 17% in 2009. A large portion of the increase is due to a significant 25% decline in the average base fare. The relative impact of taxes and fees is greatest on the least expensive tickets (MIT Global Airline Industry Program, 2012).

For carriers, high taxes and fees already have damaged the interest of airlines and hindered the development of the industry. According to Karlsson et al. (2004, p.285), "airlines have made a concerted effort to alert the federal government and Congress to the impacts of such taxes and fees on the industry: 'as a result of competitive forces at work in the industry, the absence of industry pricing power results in government imposed taxes and fees directly reducing industry revenue on virtually a dollar-for-dollar basis.'" In order to recover the loss from high taxes and fees, airlines have tried to increase fares by passing taxes to passengers. However, this measure ended in failure. For example, when Delta Airlines decided to charge passengers for taxes levied at connecting airports, competing airlines did not change their price. That forced Delta Airlines to reverse course (Karlsson et al., 2004). After the event of 11 September 2001, many national governments and airports began to increase taxes and fees or to impose new ones, such as a security service fee. This has undoubtedly worsened an already grave situation (Global Airline Industry Program, 2006).

## 6.2 Service Quality and Flight Delays

Nowadays, flight delay is one of the prime problems for passengers. Delay happens when the sky becomes crowded and the routes are congested. Although this situation is getting worse and worse, unfortunately, no one can find a proper solution to connect it.

According to the U.S. Department of Transportation (DOT), if a flight arrives at the destinations gate 15 minutes or more after its scheduled arrival time, it could be considered delayed (Arikan et al., 2013). There are several reasons for flight delays. Weather conditions, airport congestion, airspace congestion, and use of smaller aircraft by the airlines are just some of the prevalent examples (Arikan and Deshpande, 2012). Mayer and Sinai (2003) mentioned one hypothesis that minimizing the wage cost as well as maximizing the aircraft utility could cause tight flight schedules. Airlines have an incentive to reduce the scheduled flights but increase delays.

Flight delays also can be considered as a result of decreasing service quality. Many airline industry analysts studied airline service quality. Airline service quality is classified into three items: price, safety and timelines (Gourdin, 1988). In Jager and Zyl's (2013) opinion, timelines, the quality of food and beverage, luggage transportation, seat comfort, the check-in process and inboard service are the six main dimensions of airline service quality. Januszewski (2003, p.3) stated "the degree to which price responds to change in service quality should depend on consumers' willingness-to-pay for quality, as well as the availability of substitute products." As service quality depends on the costs of carriers and the price of tickets consumers are willing to pay, flight delay must be a significant reason for the decreasing service quality. It is hard to

attract customers if the flights are always delayed. The result then would be that carriers' cost would be increased and the service quality would decline.

Peak-load pricing was used as one solution in order to address the flight delay problem when some airports in the U.S. were regulated by takeoff and landing. The statistics from the DOT on the on-time performance of major U.S. carriers show that flight delays have witnessed a dramatic increase since 1987 (the first data collected). The studies by Mazzeo (2006) and Owens et al. (2006) suggest that although hubs have a higher possibility of delay than non-hubs, there is a negative relationship between airport concentration and length of delays. Mayer and Sinai (2003) reached the same conclusion on the relationship between airport concentration and length of delays.

The negative effect of flight delay on passengers is significant. As delays occur, passengers become more sensitive regarding the service provided by the airline carriers. For this reason, Hansen and Zou (2012, p.695) stated that "Administration (Federal Aviation Administration) has established multi-billion dollar investment plans to enhance the capacity of the system, under the Next Generation Air Transportation System and beyond."

In order to reduce the negative impact of flight delays, many analysts and economists discussed several solutions. One prevalent idea, proposed by Mazzeo (2003), is that the harm to airlines' profit caused by flight delay will be reduced when consumers have fewer alternatives. He also mentioned in his analysis that flight delays often happened on routes where only one carrier provides services.

Carriers have experienced fierce competition since the deregulation of the airlines in the U.S. in 1978. Carriers have to find ways to minimize their costs in order to limit the emergence of so-called "low-cost carriers" which is another result of airline deregulation (Arikan and Deshpande, 2012). The low-cost carriers' market share was increasing rapidly by offering considerably low fares. The hypothesis of Arikan and Deshpande (2012) is that low-cost carriers are usually on time due to their lower cost operation.

## **7. The Airline Industry in China and Europe**

### **7.1 Regulation and Reform of the Chinese Airline Industry**

The Chinese airline industry has grown substantially since the Chinese economic reform program in 1978. The average annual passenger growth rate is 18% from 1980 to 2007 (Heicks, 2009). The market share of civil aviation grew to 12.4% in 2006 from 1.6% in 1978. At the same time, according to Shaw et al. (2009), the percentage of growth in passenger volume for civil aviation increased 69.4 times from 1978 to 2006. Although there was a high speed growth between the 1980s and 1990s, many economists consider the Chinese airline industry still in the early stages of development (Govindasamy, 2012). In fact, the total passenger volume of the domestic airline industry in China is only equivalent to one large size American airline (Li and Jin, 2003). In order to improve the current conditions of the airline industry, the Chinese government decided to reform the operation mechanism and market structure of this industry, in particular, this is the duty of the Civil Aviation Administration of China (CAAC). Although this reforms are following the example of deregulation in the U.S, this industry is still regulated and controlled by the Chinese government.

In the 1980s and the 1990s, the Chinese airline industry was heavily regulated by the CAAC. Although the Chinese government has already reformed the airline industry since 1997, most airline carriers are still regulated by CAAC (Shaw et al., 2009). The CAAC, the equivalent of the American CAB in terms of regulation, controlled the Chinese airline industry, such as domestic routes, aircrafts, and airfares. At that time, the CAAC had ownership of more than 10 Chinese airlines, which occupied about 80% of the air traffic in China (Li and Jin, 2003). Under regulation, controlling domestic routes rights, intervening in aircrafts trade, and setting inflexible airfares were three main ways to regulate the Chinese airline industry. These three restrictions were major objects in need of reform: "As China continues to transform from a centrally planned economy to a market economy, policy liberalization and a shift of power from the central government to local governments have been observed in many sectors"(Shaw et al., 2009, p.294).

Before the 1990s, foreign airlines were not permitted to provide domestic services in China (Li and Jin, 2003). The CAAC had full responsibility to allocate domestic routes to airlines. It gave route rights to airlines based on the location of their regional hubs. There was no way to obtain route rights for new entrants. After the reforms, the CAAC deregulated allocating routes and encouraged states to establish regional carriers. As a result, a number of regional airlines emerged. By the end of 2012, there were 36 airlines in China serving in 1,136 domestic routes (Chinese Airline Industry Developed Statistical Bulletin, 2013). Although these new and small regional carriers struggle to survive because of lacking competitiveness on price and network connectivity, they still play a positive stimulating role in the reform process.

In addition, as Li and Jin (2003) stated, when airlines would purchase new aircrafts, they had

to get permission from the CAAC, the China Aviation Supplies Import and Export Corporation, and the State Planning Commission. "This approval process was highly bureaucratic and could often take many months." (Li and Jin, 2003, p.2) The CAAC also had the right to determine the types and numbers of aircrafts that airlines needed to purchase, while the decisions from the CAAC usually had less regard for real market demand. The consequence was that some airline companies bought the wrong airplanes for the wrong routes. Fortunately, this situation has been changed since China joined in the World Trade Organization (WTO) in 2001. After China joined the WTO, the Chinese airline industry faced fierce competition from foreign airlines. Under the pressure and stress of competition, the CAAC tried to reform to reduce capacity and rationalize costs (Li and Jin, 2003). Firstly, the primary stage was to merge the 10 airlines, which were controlled by the CAAC, into three airline entities. Air China, China Eastern Airlines (CEA), and China Southern Airlines (CSA), respectively located in Beijing, Shanghai and Guangdong. These three airline companies had high degree of autonomy. They had the right to financial independence. Carriers could buy aircrafts that they needed (Li and Jin, 2003). The WTO has a policy that asks every member to lower their import tax barriers to others, and Chinese airline import aircraft taxes have decreased. This reform was beneficial and reduced unnecessary costs and promoted the development of low-cost airlines. However, the CAAC still had final authority to balance them, ensuring no single company was substantially stronger or weaker than the others. For example, as Li and Jin (2003) mentioned, Air China group included Zhejiang Airlines, China Southwest Airlines, and the publicly listed China National Aviation Corporation (CNAC) which controlled 51% of Air Macau and 43% of Dragonair. CEA was the second largest of China's carrier group that had three carriers, China Northwest Airlines, Air Great Wall, and Yunnan Airlines. CEA had plenty of domestic flights, and granted international route rights. The

CSA managed three airlines, Xinjiang Airlines, Xiamen Airlines, and China Northern Airlines, with the largest domestic route network and international service to the U.S. (Li and Jin, 2003).

The CAAC set all airfares based on operating costs, market conditions, and consumer purchasing power. At the same time, the CAAC forbade any form of discount from airlines, because offering a discount without permission would potentially cause price wars. However, price wars occurred eventually (Li and Jin, 2003). In 2002, the CAAC intended to create a more orderly airline industry, to decrease competition between domestic companies, and to increase the competitive power in the international market. On the contrary, the competition between airline companies became more and more fierce, due to the liberalization of the specific fares, which then resulted in price wars (Li and Jin, 2003).

Price wars in the airline industry occur when carriers compete with each other by lowering their fares to attract more passengers. Heil and Helsen (2001) argued that a price war must satisfy one or more of these following conditions: first, the actions of price war only happen to competitors. Second, the pricing interaction is unwished-for by all competitors. Third, not a single competitor has the intention to trigger the fare war. Regulations and norms are violated by such behavior and pricing grows at a relative faster rate. Finally, the price has experienced a downward but unsustainable tendency. Hence, it is easy to distinguish the price wars by these observable conditions (Zhang and Round, 2011). For instance, in order to attract more passengers in December 2004, Air China proposed a 350 Yuan (U.S.\$56) fare on the route Beijing-Shenzhen, which represented an 80% discount on the original price a significant decrease from the previous offer which was only 30% off, around 1350Yuan (U.S.\$217). As a response, a few hours later, China Southern Airline had to offer the same or even lower fares and all flights in this route were

fully booked (Zhang and Round, 2011). This fierce price war ended after a meeting between the managers of the two airlines. This example is a typical price war in the Chinese airline industry. It matches many conditions that Heil and Helsen mentioned. In fact, price wars have appeared periodically on the vast majority of city-pair routes (Zhang and Round, 2011).

Both pricing wars and price collusions happen in China's aviation markets due to immature antitrust law. Zhang and Round (2011) provide data that demonstrated that fare wars and price collusion occur cyclically and tend to be short-lived over the period 2002-2004. Due to the considerable influence of price wars, a number of economists and scholars have studied and researched their causes and consequences. The prevailing reason for price wars is the collapse of collusion. It is well-known that airfare collusion is prevailing and prevalent in China. Zhang and Round (2011) defined collusive activity as occurring if average ticket prices increased by approximately 20% over the previous month. They concluded that most of the significant collusive agreements could result in considerable changes in airfares (Zhang and Round, 2011). Since the price agreements are released, communications between airlines are both officially and unofficially based on a day-to-day basis. The probability of mutual forbearance is zero in China's aviation market because of the role of multimarket contact. China needs an effective antitrust law for enhancing competition.

Besides deregulation and reform, China's high GDP growth rate is another main reason promoting the development of the airline industry. The Chinese economy has experienced tremendous growth in the past three decades, arising from the country's industrialization and urbanization. From 2006 to 2011, the government of China has invested around U.S. \$45.5 billion in the airline industry and this upward trend in investment would continue into the next

decade (Flight Global, 2011). China's outbound tourism has a direct impact on the airline industry. Like Blunk (1984, p.302) said, "indeed the promotion of tourism should be an important and integral part of the activities of an airline for it has a large contribution to make to the future of the world air transport industry." Since China's economic reform in 1978, urban people's average annual income has increased from 381 Yuan (U.S.\$62) to 29547 Yuan (U.S.\$4178) (Sohu Business, 2014). Under these conditions, China's outbound tourism increased sharply, facilitating the development of the airline market. All in all, the Chinese airline industry is strongly correlated with economic growth.

## **7.2 Liberalizations of the European Airline Industry**

Good et al. (1995) have studied the airline industry in the U.S. and Europe in terms of productivity and efficiency from 1976 to 1986. They mentioned that the European airline industry experienced a substantial liberalization and saved around U.S. \$4 billion per year. It was seen as a protected industry in many European countries, such as Greece, Spain, Portugal and Italy in 1986 (Good et al., 1995). The deregulation of the European airline industry was accepted and practised when the European Court of Justice declared in 1986 and admitted that the aviation industry should not be protected from competition. Some member countries began to soften their monopoly power on the airline industry prior to this declaration. Although a completely deregulated airline market existed after 1993, it is useful to evaluate the rank of competitiveness of the various European carriers and potential competitors from the U.S (Good et al., 1995).

In 1980s, the deregulation of the airline industry has spread to Europe due to the pressure of the liberalization and deregulation strategies, which were adopted in other countries (Kangis and O'Reilly, 2003). In fact, the effect of these policies, such as the liberalization and deregulation

policies in the European Union, on the airline industry in Europe is dramatic and considerable. As Kangis and O'Reilly (2003) mentioned, the so-called "flag" carriers controlled the European airline market in the traditional market. The major disadvantage these operators had was that they never considered competition since they were state-owned carriers. Under such a situation, policy makers realised that inefficiencies were significant. They began to introduce competition by removing the barriers to entrants and new carriers in the early 1980s. The protected incumbents were threatened by the competitive entrants and then forced to restructure. Kangis and O'Reilly (2003) also discussed two strategies: a focus on core activities and value-added strategies. The focus on core activities is the approach that offers lower costs in order to reduce investment costs. The typical example is Ryanair. On the other hand, value-added strategies maximize the numerator investment benefits in the ROI equation (ROI equation is the benefit of an investment divided by the cost of the investment). Aer Lingus, the national flag carrier of Ireland definitely represents this strategy. For Aer Lingus' sake, it is worthy to provide a quite reinforced service quality although it is costly (Kangis and O'Reilly, 2003).

One famous case of deregulation in Europe is the deregulation of the Dublin-London route. On this route, the monopoly structure was changed in May 1986 (Barrett, 2009). The Air Transport Bill 1984 was proposed for penalizing the sale of discount airline tickets between Ireland and the U.S. (Barrett, 2009). In fact, the Bill was delayed due to the public dissatisfaction with higher fares. Under public pressure, policy makers had to introduce competition and liberalization. The effect on market size in the Ireland-Britain airline market has been considerable and significant. (Barrett, 2009). Compared with the incumbent carriers, new entrants, such as Ryanair, increased in market share by reducing fares. They became the main force to promote contestability in the European airline industry since they aimed to destroy the

alliance between the protected carriers. Barrett (2009) also pointed out that deregulation in the airline industry both increased the low-cost seats and Irish tourism. More specifically, visitors increased 60% after aviation deregulation was announced in Ireland. These additional visitors coincide with rapid job growth (25,000 jobs). In general, the international competitive power of Ireland has increased dramatically under the airline industry deregulation (Barrett, 2009). He concluded that the regulated airline industry reduces productivity and labor's incentive. Collusion between incumbents has been weakened and a new wage structure, so-called "two-tier" has been established, with deregulation.

As a crucial aspect of competition, regional aviation service has experienced speedy development in Europe. Hanlon (1992) mentioned that the number of passengers in the regional airlines has grown about 24% since 1989, three times faster than the majority of airlines in member countries in Europe. Inter-Regional Air Services Directive, the first movement to deregulate, was issued by the European Commission (EC) in 1983. The 1983 Directive should have been aimed to assist airlines to offer international services on regional routes (Hanlon, 1992). However, the 1983 Directive has a number of restrictions. More specifically, only 70-seat airplanes and routes at least 400 km long can be qualified to the regional air services. The limitations on the services were not re-examined until 1993. After 1993, the European Commission licensed airlines' rights to fly within the Community. As Hanlon (1992) mentioned, there are two factors that promote that regional services cooperation with the major services. One of them is the computer reservations systems (CRSs), another is frequent flyer programmes (FFPs). Those two factors potentially have a negative impact on airline competition. In order to avoid entry barriers, regional airlines decided to sacrifice their independence, and established connections with the majors airlines connected with the regions to build more feeds. Hanlon

(1992) provided the detail of the cooperation between the regions and the majors. He emphasized code sharing as the key for the link. Code sharing is assigning the interconnected services by using the same flight number. By practising code sharing, screening can occur prior to exiting regions in order to feed into the major airline's CRS. These major airlines can market themselves as a quasi-seamless product due to the collaboration of the regional airlines (Hanlon, 1992).

As competition in the aviation industry services increases, the airline industry can be classified in two categories: low cost carriers (LCC) and the traditional full service carriers (FSC). As Hunter (2006) mentioned, the low cost carriers (LCC) are based on cost leadership while the incumbent full service carriers (FSC) are based on a variation strategy. These two different categories have represented opposite points in the competition and business strategy. Compared with the FSC, the LCC has shrunk and minimized costs by decreasing overhead, providing low cost service, and using cheaper airports (Hunter, 2006). The LCCs have provided many point-to-point routes, which the FSCs have never offered. The customer groups are different between the LCCs and the FSCs. The Dublin- London route is a good example. Aer Lingus served mainly people working for large companies while Ryanair mainly provided service to people working for smaller companies. The FSCs have experienced a decrease in flying passengers for a long time and they intended to copy some of the LCCs' strategies (Hunter, 2006). FSCs cannot be successful in the short-term because their structure and culture does not accept the low-cost paradigm. Hunter (2006) stated that further reorganization and innovation will happen in the future.

For Lawton (1999), low prices are only achieved when the operational efficiency of the company has been maximized. Traditional incumbent carriers have been threatened due to the

emergence of the low-price rivals. Ryanair is the most successful example in the European low price airline market. As an independent carrier, Ryanair has attacked the position of Aer Lingus. Lawton (1999) pointed out that Ryanair's strategy was offering a low cost and no-frills service to all passengers. In other words, Ryanair never labelled passengers as inherently different from each other, such as business people or students. In this way Ryanair has achieved obviously sustainable lower costs while maximizing profit. The study of Ryanair significantly impacted the airline industry in Europe and other countries by representing an example of an effective low cost competitor (Lawton, 1999). In 2011, Ryanair was ranking as the seventh largest airline in the world. As the largest airline in Europe, Ryanair carried over 76 million passengers, much more than Aer Lingus (8.9 million) in 2011 (Convery, 2012).

### **8. Conclusion**

This paper discussed the literature on the major issues in the deregulation of the airline industry, published during the period 1980-2014. In today's world, the air transport industry is an indispensable element that facilitates economic growth, stimulates tourism, international trade, and globalization. In the first section, the paper described the current situation of the airline industry. After deregulation, the industry developed rapidly due to the liberalization of airlines, market competition, and market structure improvement. The second section reviewed the history of the airline industry during the period of government regulation. At that time, the U.S. airline industry was a monopolistic market. Incumbents controlled most of the market share and routes. It was not easy to enter the market because the industry was controlled strictly by the government. Less competition, higher fares, and strict regulation impeded the development of

the industry. In order to improve the situation of the U.S. airline industry, the government decided to deregulate and signed it into the law.

The third section listed some major reform and achievements from deregulation. First, hub-and-spokes systems were introduced. Before deregulation, airlines operated with an inefficient point-to-point route system. The new route system increased the number of routes and airports, consequently promoting development (Hsu and Wang, 2013). Second, deregulation raised social welfare because of the lower average cost and low fares (Schipper et al., 2007). Meanwhile, carriers earned more revenue because the number of air-passenger increased rapidly (Koran, 1983). Third, the Open Skies agreements offered more international routes and more opportunities for the international airline industry through the establishment of alliances, carriers strengthened cooperation, and increased service power (Crook, 2011).

In the fourth section, the new market structure of the industry was discussed. The role of the contestability is significant due to the lowering of entry barriers and the increased risk caused by the potential entrants (Bailey and Firedlander, 1982). Sunk costs were also discussed. There are two approaches to model the effect of sunk costs (Cabral and Ross, 2008). One is the structural approach, another is the behavioral approach. Plant cost is the prime factor of the sunk costs in the aviation industry. The last aspect discussed in this part were the barriers to entry.

The fifth section considered the competitive situation. Deregulation brought more competition to the airline market (Bruechner and Spiller, 1991). Since the establishing of competition, passengers benefited from decreasing fares. In the meanwhile, competition promoted the development of the aviation technology and operating strategy, such as establishing alliances

(Bruckner, 2011). However, deregulation also caused many airlines to go bankrupt and prompted mergers (Goetz and Vowles, 2009).

The sixth section addressed issues of airfares, service quality and flight delays. It is clear that the cost of the regulated airlines was high because the price level was high. Since deregulation removed priced controls and established competitions among carriers, airfares have decreased significantly (Goetz and Vowles, 2009). In addition, the development of internet technology, taxes and all kinds of fees also affected the level of fares. However, the service quality dropped a lot with lower fares (Januszewski, 2003). Therefore, the combination between fares and service quality is an appropriate way to measure consumer surplus. Flight delay also can be considered as are form result of decreasing service quality. Mazzeo (2003) provided that the harm to airlines' profit caused by flight delay will be reduced when consumers have fewer alternatives.

The seventh section discussed deregulation in the Chinese and European airline industries. China followed its own way to deregulate and reform the airline industry, because of different political systems and business cultures from the U.S. Although the reform and high GDP growth rate improved the Chinese airline industry, there are still many issues that must be addressed in this market (Zhang and Round, 2011). These include price wars, collusive behaviour, and regional protectionism. In Europe, the impact of liberalization and restructuring on the airline industry was dramatic (Kangis and O'Reilly, 2003).

As Bailey (1992) argued, the airline industry was deregulated not because economists or politicians knew what the deregulated equilibrium would look like, but because they believed that the deregulated outcome would be better than regulation. The evidence shows that deregulation has brought significant opportunities to the airline industry. For the industry, today,

carriers have a higher passenger volume, provide more flight routes, and operate in a more efficient hub-and-spoke system. From the consumers' perspective, they can get cheaper fares and more frequent flights than ever before. Although deregulation has paradoxes and there are areas to be improved, the airline industry with deregulation has broad prospects for development.

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