

## An Empirical Research of Concentration of China's Civil Aviation Industry

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### Abstract

With China's sustained and rapid economic development, China's civil aviation industry gradually market-oriented, and has undergone several major reforms, gradual deregulation. At the same time, industry concentration showed a gradual downward trend. The internationally accepted measure of industrial concentration of two indicators: Industry moderate and HHI index. We described and analyzed the industry concentration and development trends on China's civil aviation industry, and we got the main factors of the change of industry concentration. Also put forward policy recommendations.

**Key words:** China's civil aviation industry; Industrial concentration; Deregulation

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### INTRODUCTION

The issue of industrial concentration is concerned by the governments and the economy scholars. On the one hand, people are eager to improve industrial concentration in some sectors in order to enhance the international competitiveness of the industry. On the other hand, it is

feared that the high degree of industrial concentration will stifle innovation and lead to monopolistic behavior. This paper aims for China's civil aviation industry concentration analysis and its trend research, to analysis the main reason of its industry concentration.

China's civil aviation industry accompanied by the growth of New China has been sixty years along since 1949. In the course of six decades, China's civil aviation industry has experienced rapid development. It can be said that the rapid development of China's economy drived the development of the civil aviation industry. In this process, China's civil aviation industry has grown, the number and scale of airlines has expanded. There were 6 state-owned airlines in China's aviation industry in 1980, and 43 in the end of 2010. The categories include state-owned airlines, private airlines and joint venture airlines. At the same time, China's civil aviation industry, industry concentration is gradually reduced. Several major industry reforms had great impact on the industry.

Industrial concentration refers to the resource or a certain industry profits, and other economic benefits index to a certain or a few particular concentration degree. There are two metrics: Concentration Ratio  $CR_n$  and Herfindahl-Hirschman Index  $HHI$ .

#### (a) Concentration Ratio $CR_n$

$CR_n$  is the industry's largest production of the first few companies (or total assets, output, sales, sales, number of employees, profit, etc.) of the total market share or industry.

$$CR_n = \frac{\sum_{i=1}^n X_i}{\sum_{i=1}^N X_i} \quad (1)$$

$CR_n$  is representative of the industry's largest companies in the industry before the concentration.  $X_i$  is the output of the  $i$  bit Enterprise,  $n$  is the number of enterprises,  $N$  is the total number of enterprises within the industry. In the formula  $n$  can be determined based on the calculated required.

According to the American economist Bain (1951) standards, market concentration will be divided into six types:  $CR_4 \geq 75\%$  is heightened oligopolistic market structure, 65% to 75% is medium (high) concentrated oligopolistic structure, 50%~65% is medium concentrated oligopolistic structure, 35%~50% is medium (low) concentrated oligopolistic structure, 30%~35% is low concentrated oligopolistic structure,  $CR_4 \leq 30\%$  30% is the atomic market structure.

(b) *HHI index*

$$HHI = \sum_{i=1}^N \left(\frac{X_i}{X} \times 100\right)^2 = \sum_{i=1}^N (S_i \times 100)^2 \quad (2)$$

*HHI* index is on the market in a particular industry, the market share of all enterprises of squares. Where  $X_i$  is the output of the  $i$  bit Enterprise (or total assets, output, sales, sales, number of employees, profit, etc.),  $n$  the former to be certain of the number of enterprises.  $N$  is the total number of enterprises within the industry. This allows readers the status of China's civil aviation industry of industrial concentration have a comprehensive and accurate grasp. Its characteristic is to give each enterprise's market share a weight, concentration characteristics of market can be further dramatically.  $S_i$  is the percentage share of a company in the industry.

*HHI* values from 1 to 10000. To compare with  $CR_n$  index, *HHI* index is more highlight market concentration, and better reflect market monopoly.

Aiming at the lack of research for China's civil aviation industry concentration problem, we study the concentration and development trend of China's civil aviation industry, and more comprehensive analysis of the present stage main influence factors that result in the change of China's civil aviation industry concentration. This allows readers have a comprehensive and accurate grasp on the status of China's civil aviation industry's concentration. and have a macro understanding about the trend. Meanwhile, we take the experience of America and so on at the same time, puts forward several policy Suggestions, in order to promote China's civil aviation industry competitiveness constantly improve and the formation of a fair and efficient industry development environment.

1. DATA

We selected a representative three airlines are: Air China, China Southern Airlines and China Eastern Airlines. These three airlines in terms of history, size of the company or organization evolved in the course of development of China's civil aviation plays a pivotal role. Undoubtedly, the Big three airlines are typical and representative in researching the concentration of China's civil aviation industry.

Total turnover as examining index, we can get the China's civil aviation market concentration index ( $CR_3$ ) of three from 1958 to 2010:

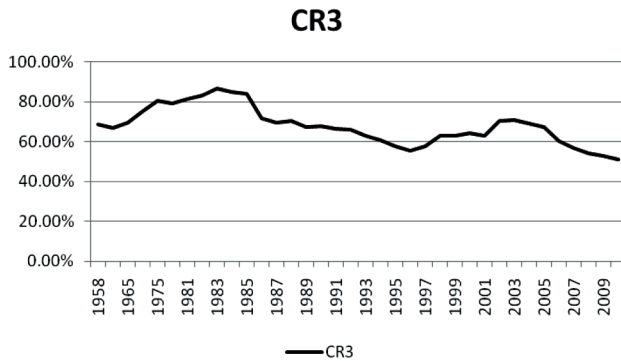


Figure 1  
China's Civil Aviation Industry in 1958-2010 3 Companies Concentration  
Source: Compilation of Statistics of China's Civil Aviation (2002); Statistical Data on Civil Aviation of China (1996-2011)

Also use total turnover as examining index, we can get the *HHI* value of China's civil aviation industry from 1958 to 2010:

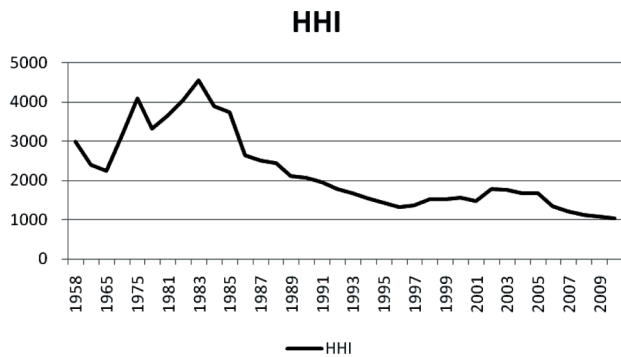


Figure 2  
China's Civil Aviation Industry Herfindahl Index, 1958-2010  
Source: Compilation of Statistics of China's Civil Aviation (2002); Statistical Data on Civil Aviation of China (1996-2011)

Comparative Figures 2 and 3 we find that China's civil aviation industry concentration can be divided into three stages. The first stage is before 1983, this phase of industrial concentration is rising. This stage is the most strictly by national regulation of China's civil aviation history, civil aviation belonging to the army management during this period, completely out of the market mechanism, to become political accessory. The second stage is from 1983 to 2001, industrial concentration falling at this stage. Since 1980, China's civil aviation reformed for the first time, and approached on the market-oriented. In the 1980's local airlines have established and expanded gradually. In such a market environment gradually, the industrial concentration showed a trend of decline. The third stage is from 2002 to 2010. The Big three airlines group was founded in 2002, directly under the original airlines merger restructuring, the resources of the state-owned airlines integrated, in order to

maximize the economies of scale. In 2002, the industrial concentration suddenly rebounded, but the scale effect did not last too long. From 2002 to 2012, China's civil aviation industry concentration ratio continued to decline. From this we find that the development track of the civil aviation industry is towards the more freedom, more open, and more vitality in the direction of development.

## 2. ANALYSIS OF THE MAIN INFLUENCE FACTORS

### 2.1 SOE Reform

The mainly differences of economic structure between China and the developed countries such as the United States, mainly for the status of state-owned property rights in the country's economic life. The most important factor of China's civil aviation industry concentration change should be the reform of state-owned enterprises. State-owned enterprise reform is the most important motivation to promote the Chinese market institutions from monopoly gradually to fair competition. Since China's reform and opening up in 1978, China civil aviation has experienced three stages roughly. Since March 15, 1980 onwards, China's civil aviation industry formally separated from the military, it towards the "entrepreneurial way". In 1987, the comprehensive implementation of the civil aviation management system reform, airlines became independent operation self-sustaining commodity operators. In 2002, Air China group co., LTD. China Eastern airlines group co., LTD. China southern airlines group company and so on three big air transport group was established. The three enterprise reform has a huge impact on China's civil aviation industry.

### 2.2 Globalization

As the China's accession to the WTO in 2001, the Chinese economy increasingly opened to the public. Since then, China exchanged with other countries in the world increasingly, in economy, science and culture. This is a positive and far-reaching effect on China's civil aviation. Especially, since China's civil aviation deregulation in 2005, the private airlines and air sino-foreign joint airlines entered. These non-state aviation enterprise not only has strong vitality, but also dynamic. They promoted the rapid development of China's civil aviation, and accelerate the decline in industrial concentration.

### 2.3 Development of Information Technology

The development of information technology. Historically, industrial concentration resulting from technological

progress has been one of the most important reasons. Because the technological progress often change the minimum economic scale of the industry, leading to purchase annexation of change and influence of industrial concentration. In recent years, the development of information technology impacts the industrial concentration changes of almost all industries directly. The development of information technology makes the airlines ticket reservation positions more convenient and efficient distribution and information analysis ability, at the same time, the cost is greatly reduced. This seems to make the development of small and medium-sized airlines more beneficial, in a way to enhance their competitiveness. Therefore, the development of information technology for industrial concentration has a certain influence on China's civil aviation industry.

## CONCLUSION

We believe that China's civil aviation should continue to deepen the reform of state-owned airlines, adapt to the market economic law requirements, and adjust the structure of property rights, in order to enhance the competitiveness of state-owned enterprises. In addition, the government should further deregulation to allow more private airlines and foreign airlines to enter, in order to strengthen the competitiveness of the industry, promote the industry growing. Meanwhile, the government should strengthen the monitoring of the merger behavior, as well as market manipulation.

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