

Effect Analysis on the Industrial Upgrading and Economic Growth

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Abstract

Using literature review and data analysis, this paper elaborates the connotation and the necessity of industrial upgrading, and focuses on interactive effect of the industrial upgrading and economic growth in Ji'nan by analyzing its growth and the proportion of each industry. According to the results, industrial upgrading is the strong driving force of economic development, similarly, industrial upgrading is also included in the economic development. The industrial upgrading of Ji'nan has made some achievements but problems still exist, for example, how to create the industry system with Ji'nan characteristics, promote industrial upgrading, and realize the sustainable development of Ji'nan economy.

Key words: Industrial upgrading; Economic growth; Interactive effect

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INTRODUCTION

Under the trend of quick economic globalization, and the increasingly apparent international industrial division of labor, some pressure is growing, including shortage of resources, unreasonable industrial structure, and low level of industry. Therefore, keeping long-term steady economic growth and solving a series of economic pressure must

accelerate industrial upgrading, and this is effective ways to transform the mode of economic growth, alleviate the pressure of the resources, and promote a new round of economic growth. In terms of current situation, various areas have gradually pay attention to industrial upgrading, but the research for its connotation and purpose should be improved. The connotation and necessity of industrial upgrading is introduced and the interactive effect of the industrial upgrading and economic growth is elaborated by taking that of Ji'nan in Shandong province as an example, in order to provide policy recommendations for Ji'nan industrial upgrading and economic sustainable development.

1. RELATED CONCEPT DEFINITION OF INDUSTRIAL UPGRADING

In China, there are two main types of the concepts of industrial upgrading, including "the industrial structure adjustment" and "upgrading of value chain", people do not take their differences have caused the use of mixed concepts. Due to the limited space, we state the theory of industrial upgrading from the perspective of industrial structure adjustment.

The overall level of industry is referred to analyze the concept of industrial upgrading as breakthrough, and the results showed that industrial upgrading is divided into two levels of macro and micro. The macro level refers to the industrial structure adjustment and optimization of the first, second and third industry in whole society, containing two aspects of industrial structure rationalization and industrial structure supererogation. Industrial structure rationalization is to point to the proportion, change and flow direction of each industry comply with industry inner link and law of development, ensuring the sustained, coordinated development of the industries. Industrial structure supererogation refers to play to the role of the leading industry, promote industrial

technology innovation so as to improve the quality of the industrial structure, realize the industrial structure evolution from low level to high level (He, 2006). Micro level refers to change the existing industrial structure of a particular industry from labor-intensive industries to technology-intensive industries, or raise the proportion of technology-intensive industries, promote industrial informatization and automation (Ju, 2009).

In terms of the purpose of this article, focusing on Ji'nan industrial upgrading, the regional level goal of industrial upgrading complies with characteristics of local industry multi-agent interactive cooperation, under the condition of the market competition actively innovation, make positive innovation considering the market competition, realize the coordinated sustainable development of the industry, eventually to promote the healthy and rapid development of social economy (Shu, 2009).

2. NECESSITY ANALYSIS OF INDUSTRIAL UPGRADING

2.1 Theoretical Basis

Clark in 1940 proposed "palin-clark theorem", and considered that the improvement of per capita national income levels caused labour transfer from the first industry to the second industry with the economic development, when further improved the level of per capita national income; labor force will shift to the third industry. Coontz advanced "per capita income determinism" based on this, demonstrated the change of industrial structure had an impact on economic growth, and found that there were opposite effect when economic growth to a certain extent. In accordance with analysis of Chenery and others, along with the increase of per capita income, industry structure will be changed regularly. Its basic characteristics are that the Industrial share of the gross national product (GNP) gradually rised, Agriculture share gradually declined and the Services share rised slowly. In China, Wu (1988) was among the earliest domestic scholars who discussed industrial upgrading, and his interpretation of industrial upgrading, "the upgrading of industrial structure", that eliminated labor-intensive industry rapidly, to engage in technology and knowledge intensive industry. Jiang (2005) pointed out that "the process of economic development is also the process of industrial structure adjustment and industrial structure continuously upgrading" after the study of industrial upgrading in more developed regions. These theories and further study will lay theoretical foundation for the practice of industrial upgrading.

2.2 Industrial Upgrading is an Effective Method and Necessary Tendency of Economic Development

Industrial upgrading promotes sustained and healthy development of the economy. The process of industrial upgrading complies with technological progress, rationalization and systematization of organization and management, therefore, technological progress and innovation of organization and system make the regular adjustment of industrial structure. In a period, industrial structure is in dynamic equilibrium, allocation of all kinds of resources to achieve better efficiency, provide power for the sustainable expansion of economic scale, at the same time it may become new economic growth point, and the economy achieve the optimal growth.

Economic development urgently needs industrial upgrading. The degree of Social division of labor and the degree of specialization, economic scale and growth status will affect the change of industrial structure. At present, with high speed development of economy and technology, the industrial division of labor and specialization degree is to further strengthen, the demand structure and consumption structure is also to shift, on the one hand, it widens the development of relevant industries, on the other hand, this has also asked industrial upgrading to adapt to the changing economic situation.

3. INDUSTRIAL UPGRADING AND INTERACTION EFFECT: TAKING JI'NAN AS AN EXAMPLE

In recent years, Ji'nan adhere to consolidate and strengthen the first industry, improve the second industry, and develop the third industry, significant results were obtained in economic restructuring, industrial structure were constantly upgrading. From the composition, industrial proportion shifted from 10.17:43.93:45.90 in 2000 to 5.50:41.87:52.63 in 2010, and the industrial growth rate is over 10%, the industrial system is growing in direction of taking third industry as the leading industry. But compared with developed areas, the degree of industrial structure supererogation in Ji'nan is not enough, the potentialities of industrial upgrading in the economic development are to play in future.

In the traditional theory of economic growth, economic growth is the result that the factors of production like labor, capital and others increased in number and allocated rationally, industrial upgrading is excluded from the influence factors of economic growth. However, modern economic theory and practice have shown that there are highly correlation between industrial upgrading and economic growth (Ju, 2009).

Assuming that there are i industries, Y is the total output of t (t is a period), also each sector output, the relation between the economic growth and industrial growth is as follows:

$$Y = \sum_{i=1}^n Y_{it}$$

Taking method of difference both sides at the same time, and divided by Y , the result is as follows:

$$R_Y = \sum_{i=1}^n A_i R_{it}$$

R_Y is the total growth rate, R_{Yi} is the rate of each industry, A_i is the proportion of i industries accounted for the total output. Seeing from the formula that the factors affecting the overall economic growth rate are respectively the industry growth rate and the proportion of industry, industrial structure and economic growth of Ji'nan from the two aspects between 2001 and 2010 will be analyzed.

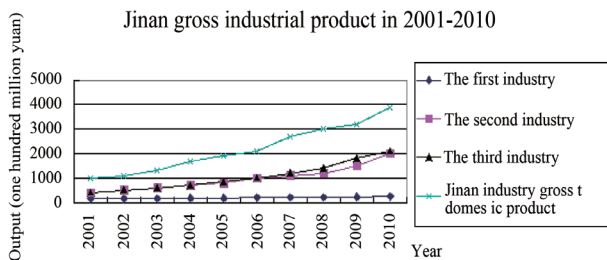


Figure 1
Ji'nan Gross Industrial Product in 2001-2010
Data sources: 2009 statistical yearbook from Ji'nan bureau.
Note: data in 2009 and 2010 from the statistical bulletin of the national economy and social development of Ji'nan

Get the chart according to the Ji'nan bureau of statistics (NBS), We can find that Ji'nan economic growth has showed a rising trend as a whole since 2001. In 2001, the city's GDP totaled 1057.92 billion Yuan, of which the second and third industry production value was 438.06 and 521.53 billion Yuan, respectively. Both Gross and the industrial output value were low; the city's GDP totaled 3351.4 billion Yuan in 2009, the second and third industry output value were 1453.60 and 1710.70 billion Yuan, respectively. The city's GDP totaled 3910.8 billion Yuan in 2010, while the second and third industry output value were 1637.45 and 2058.18 billion Yuan, thus a sharp growth was realized. According to growth rates (R_Y , R_{Yi}), the increase of the city's GDP has kept in more than 12 percentage points since 2001, the city's GDP in 2010 than that in 2009 at the same period increased by 16.9%, and the third industry reached 20.31%. Among them, it is worth noting that economic growth has slowed in 2009, fell to 11 %, this is due to the effect of economic crisis, which the economy has rebounded but foundation is not

solid, and external demand is still not restored, the second and third industry growth is slowing, after the economic crisis appears, structural contradictions revealed after the economic crisis still need more efforts to solve.

Table 1
Ji'nan Industry Growth Rate in Gross Domestic Product (GDP) in 2001-2010 (%)

Year	Gross	Primary industry	Secondary industry	Tertiary industry
2001	12.05	2.40	5.62	20.34
2002	12.50	1.76	14.51	12.83
2003	13.62	4.75	17.35	11.94
2004	18.35	15.05	22.64	15.04
2005	17.27	11.41	19.68	15.90
2006	16.44	8.03	15.95	18.21
2007	17.29	3.57	15.60	20.83
2008	17.74	16.44	14.91	20.51
2009	11.07	6.91	9.24	13.16
2010	16.69	15.00	12.65	20.31

Table 2
Ji'nan Industry Proportion of Gross Domestic Product (GDP) in 2001-2010

Year	Gross	Primary industry	Secondary industry	Tertiary industry
2001	100	9.29	41.41	49.30
2002	100	8.41	42.15	49.44
2003	100	7.75	43.54	48.71
2004	100	7.53	45.11	47.35
2005	100	7.16	46.04	46.80
2006	100	6.64	45.85	47.51
2007	100	5.86	45.19	48.95
2008	100	5.80	44.10	50.10
2009	100	5.59	43.37	51.04
2010	100	5.50	41.87	52.63

Data sources: 2009 statistical yearbook from Ji'nan bureau.
Note: data in 2009 and 2010 from the statistical bulletin of the national economy and social development of Ji'nan

With regard to the concern of R_{Yi} in the table, we see that the development of the tertiary industry of Ji'nan has shown an accelerating trend, and since 2006, the growth rate of the tertiary industry has exceeded GDP growth. From the growth point of view, in 2008, the second and third industries have accounted for more than 94% proportion, especially the tertiary industry to GDP ratio also increased with economic development, 2010 has reached 52.36%, combined with Table 1, Table 2 to get (R_{Yi} , A_i), and $R_Y = \sum_{i=1}^n A_i R_{it}$, you can see the combination of the tertiary industry's contribution to economic development increasing year by year.

Chinese scholars Jiangfan had work out the three industrial added value equation analysis of the results on the basis of statistical data around the world, saying that “in the course of development of the tertiary industry, whether the employment proportion or the added proportion, there is a significant turning point. In fact, when a country’s per capita GDP reached \$ 5,000, the third industry will have the rapid growth but the secondary industry will continue to decline”. Through the data from Tables 1 and 2 show that since 2005, the proportion of secondary industry by the Ji’nan 46.04% downward trend to 41.87% in 2010, while the proportion of tertiary industry in 2005 46.80% all the way up to 52.63%, indicating that the development of the tertiary industry in Ji’nan turning point has come, as it comes, the tertiary industry will enter a rapid development period (Li, 2005).

But we have to see that Ji’nan still has a large gap when comparing to the developed cities, such as Shanghai. Taking a example of the 2010 data, Shanghai tertiary industry was 9618.31 billion Yuan, accounting for 57% of GDP; Ji’nan tertiary industry was 2058.18 billion Yuan, accounting for 52.63 percent of GDP; while the national tertiary industry accounted for 43.0%. Thus, Ji’nan tertiary industry and economy although higher than the national average, but significantly behind Shanghai and other provinces.

The above analysis shows that the trend of industrial upgrading of Ji’nan City had gradually increased in recent years, the proportion of tertiary industry increased year by year, and industrial upgrading had promoted sustainable economic development. In the process of the development

future, using the information technology to stimulate industrialization and strengthen joint development of manufacturing and services. Meanwhile, actively developing the modern service industry, to modify the traditional service industry, improving product value and operating efficiency, to further develop the economic potential of the tertiary industry, accelerate industrial upgrading. As the capital city of Ji’nan, to achieve the implementation of the scientific concept of development, we must transform the economic development mode, taking the industrial upgrading as a prominent position.

REFERENCES

- He, L. S. (2006). Industry transfer, industry to undertake, industrial upgrading. *Journal of Contemporary Finance and Economics*, (12). (In Chinese).
- Jiang, Y. Z. (2005). Research of industrial upgrade path in industrialization leading regional. *Chinese Industrial Economy*, (5), 74-80. (In Chinese).
- Ju, R. L. (2009). *Modern industry economics*, Ji’nan: Shandong People’s Publishing House. (In Chinese).
- Li, J. F. (2005). *Studies of China’s service industry development*. People’s Publishing House. (In Chinese).
- Shu, Y. F. (2009). *Research of the problem about industrial upgrading in less developed areas* (Doctoral dissertation). Jiangxi University of Finance and Economics, Nanchang. (In Chinese).
- Wu, C. B. (1988). Paper on industrial upgrading of ASEAN. *Economic Adah*, (1), 26-30. (In Chinese).