

Chinese Industrial Development and Policy Adjustment in Anaphase of Industrialization

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I. The Current Stage of Chinese Economic Development

1. Stage analysis from PGDP

For industrialization stages, we can use a variety of existing development models and evaluation criteria for analysis, including the Hollis B. Chenery Development Model and Kuznets development model. The well-known economist Hollis B. Chenery conducted research on the relationship between economic development level and industrial structure from more than 100 countries, and formulated a multi-country model of industrialization process. Through statistical analysis, economic development can be divided into the primary production stage, industrialization stage and developed economic stage by per capita GDP changes, including six economic growth periods. The 1st period is the primary production stage, the 2nd, the 3rd and the 4th periods correspond to earlier stage, metaphase stage and anaphase stage of industrialization, the 5th and the 6th periods are developed economic stages. According to the constant value of the US dollar in 2010, the PGDP of China was \$1,444 in

1997, and the economic development entered the initial stage of industrialization. In 2005, PGDP of China was \$2,738, and the economic development entered the metaphase stage of industrialization. In 2013, PGDP of China was \$5,722, and economic development entered the anaphase stage of industrialization. In 2016, PGDP of China was \$6,895, and the economic development was still in the further development of anaphase stage.

Table 1. Chenery Multi-Country Model of Industrialization Process

Industrialization Stage	PGDP (1964 US dollar)	PGDP (1970 US dollar)	PGDP (1980 US dollar)	PGDP (2010 US dollar)
1	100-200	140-280	300-600	680-1400
2	200-400	280-560	600-1200	1400-2700
3	400-800	560-1120	1200-2400	2700-5500
4	800-1500	1120-2100	2400-4500	5500-10200
5	1500-2400	2100-3360	4500-7200	10200-16400
6	2400-3600	3360-5040	7200-10800	16400-24600

Source: H. B. Chenery, *Industrialization and Growth: a Comparative Study*, Shanghai Joint Publishing Press, 1989. PGDP (2010 US dollar) standard is based on 1980 standard by adjustment coefficient (2.28) according to related World Bank data.

2. Stage analysis from industrial structure

In a study by the United Nations Industrial Development Organization and World Bank, Cody and other scholars judged industrialization level based on the share of manufacturing added value in total value of commodity production sectors. Manufacturing industries refer to all industries except extractive industries, water, electricity, steam and hot water. Total commodities refer to all the material production sector, including agriculture, forestry, animal husbandry and fishery, mining industry, electricity, construction and so on. Other researchers made some adjustments on the Cody index combined with the Chenery standard model. According to the adjusted index, the proportion of Chinese manufacturing added value accounted for 54.3% of total value-added in 2004, and economic development entered the late stage of industrialization. In 2014, the proportion of Chinese manufacturing value-added accounted for 57.8%, and economic development was close to the end of late industrialization.

Table 2. Share of Manufacturing Added Value in Total Value of Commodity Production

	Pre-industrialization Stage	Earlier Stage	Meta-phase Stage	Ana-phase Stage	Post-industrialization Stage
Share	< 20%	20-40%	40-50%	50-60%	> 60%

Source: Chen Jiagui, Huang Qunhui, Zhong Hongwu. The Synthetic Evaluation and Analysis on Regional Industrialization. Economic Research Journal, 2006 (6).

3. Stage analysis from employment structure

According to previous empirical research, we can summarize the characteristics of em-

ployment structure at different stages of industrialization. Because of institutional barriers and historical reasons, part of labor transferred to the secondary industry from the primary industry is in a precarious state, and some agricultural labor which has entered the secondary and tertiary industries is not reflected in statistics. Therefore, there is a certain degree of instability and inaccuracy in judgment of Chinese industrialization level by employment structure. Many studies choose the proportion of primary industry employment to measure industrialization level. In 1992, the proportion of employment in three industries was 58.6: 21.7: 18.9, which was roughly in the early stage of industrialization, but the proportion of secondary employment was relatively high. In 2006, the proportion of employment in three industries was 42.6: 25.2: 32.2, which was roughly the same as the first phase of metaphase stage. In 2016, the proportion of employment in three industries was 27.7: 28.8: 43.5, which was roughly in the transition from the second stage of metaphase stage to realization of industrialization, but the proportion of tertiary employment is relatively high.

Table 3. Employment Structure at Different Stages of Industrialization (%)

Industrialization Stage	Proportion of Primary Industry	Proportion of Secondary Industry	Proportion of Tertiary Industry
Earlier Stage	58.7	16.6	24.7
First Stage of Metaphase	43.6	23.4	33.0
Second Stage of Metaphase	28.6	30.7	40.7
Basic Implementation Stage	23.7	33.2	43.1
Complete Implementation Stage	8.3	40.1	51.6

Source: Lu Zheng, Guo Keshu, Zhang Qizi. Experience and Cost of Traditional Industrialization Strategy in China. China Industrial Economy, 2003 (1).

4. Stage analysis from urbanization rate

From international experience, in a fairly long historical period, urbanization and industrialization are largely consistent. Driven by the economic laws of industrialization, the population and capital continue to gather in the city, so there is a clear positive correlation between industrialization and urbanization. Due to the lag of urbanization process of migrant workers, the level of urbanization in China is low for a long time. From 1981 to 2002, the urbanization rate of Chinese resident population was below 40%, which hovered at the initial stage of industrialization. The annual increase rate of urbanization was 0.9 percentage points in that period. Since 2003, the urbanization rate of resident population exceeded 40%. In 2011, the urbanization rate of Chinese resident population was higher than 50%, which reached the middle stage of industrialization. In 2016, the urbanization rate of Chinese resident population was 57.35%, indicating the end of metaphase stage of industrialization. During 2011-2016, annual increase rate of urbanization was 1.22 percentage points. However, in 2016, the urbanization rate of household population was 41.2%, which was at the initial stage of industrialization and lower than that of resident population by 16.15 percentage points.

Table 4. Urbanization Level at Different Stages of Industrialization

	Pre-industrialization Stage	Industrialization Process			Post-industrialization Stage
		Earlier Stage	Meta-phase Stage	Ana-phase Stage	
Urbanization level	<30%	30-50%	50-60%	60-75%	> 75%

Source: Chen Jiagui, Huang Qunhui, Zhong Hongwu. The Report on Chinese Industrialization. Social Science Academic Press, Beijing, 2007.

II. Main Characteristics of Industrial Development in Anaphase of Industrialization

1. Development model of the Chinese industry will undergo profound changes

The current period is key for Chinese industrial upgrading and industrialization realization. With gradual optimization of factor endowment structure and straightening out of institutional mechanism, Chinese industry will enter a different development form and transit from traditional development model to advanced industrial "upgraded version." In the process, some backward and long-standing development trends will gradually fade away, and some new and emerging development trends will gradually form. Specifically, the speed transits from high-speed growth to high-middle speed growth, and the structure transits from heavy industry dominant by energy and raw materials industry to technology-intensive industry dominant by high-end equipment, precision manufacturing industry, and the development model transits from extensive scale growth to intensive quality growth, and the driven factors transit from primary elements such as labor, capital and other factors to advanced elements such as innovation, efficiency and value. Only through successfully realizing the change of industrial development, the process of industrialization can be completed in true sense, so as to cross the "middle income trap" and enter a higher level of development.

2. Innovation the determinant of high-grade industrial upgrading

With scale and cost advantage regression of primary elements, technological innovation will become the only path of Chinese industrial sustainable development. After experiencing rapid growth of textile industry supported by large-scale labor investment and rapid growth of heavy industry supported by large-scale capital investment, Chinese industry is expected to enter a new stage of rapid development of advanced manufacturing industry supported by the technological upgrading and innovation. Historical experience shows that, in the period of economic transformation, only by focusing on technological innovation and enhancing technology level can the economy obtain new development opportunities. At present, global technological changes are booming. More and more Chinese enterprises will adopt new technologies, new equipments and new materials to prompt production facilities and technological conditions, and Chinese industrial international competitiveness is expected to be reshaped and enhanced. Intelligent technology and green production technology will become main directions in future.

3. Going abroad an important aspect of Chinese industrial adjustment

Products export, capital investment and industry going abroad are three stages of industrial internationalization. The economic influence of one country is not determined by export volume, but by the volume of capital invested which has profound impact on global economic rules and trade patterns. In 2014, Chinese outward investment exceeded the amount of foreign capital inflows. During the 13th Five-Year Plan period, Chinese opening up strategy will be more perfect, especially with the implementation of “one belt one road”

development strategy and FTA speeding up. Chinese industry going out is facing unprecedented opportunities. On one hand, Chinese high-quality enterprises can integrate all resources at home and abroad, and the pace of industrial upgrading will greatly accelerate. With the equipment, technology, standards and services going out, international production collaboration network dominant by Chinese enterprises will be more perfect. On the other hand, Chinese enterprises can effectively extend the life cycle of traditional industries by investing in developing countries to build processing and assembling bases. It is important to industries which have lost or are losing their comparative advantages. At the same time, through investment in scientific research institutions or technology companies in developed countries, Chinese enterprises can effectively solve problems of shortage of elements in industrial upgrading.

III. Main policies of Korea in Anaphase of Industrialization

1. Stage change of Korea industrial development

In the 1960s, the Park Chung-hee government put forward an "export first doctrine," "export founding" and other slogans, and made policies of encouraging enterprises to expand exports. From 1963, Korean economy entered a sustained high growth period, focusing on the development of import-substitution industries and export industries such as textile. In 1973, Korea issued the "Heavy Chemical Industry Declaration," and steel, nonferrous metals, machinery, shipbuilding, automotive, electronics, petrochemical, cement, ceramics and fiber industries were identified as ten strategic industries. In 1986, with the "three low" phenomenon of the international economic environment (low exchange rate, low interest rate and low oil price), Korean economy entered a new stage of development. During 1986-1988, average annual growth rate of economy exceeded 12%. In the 1990s, Korean economy began to shift to a completely open system, and basically completed its industrialization process in the late 1990s. According to the constant price of dollars in 2010, Korean per capita GDP in 2016 was 25,459 US dollars, which was already a typical developed economies. From an international perspective, the process of industrialization in Korea has a characteristic of time compression. Compared to 100-200 years process of foreign industrialization, Korea has completed industrialization process in only about 40 years.

2. Korean policy adjustment in anaphase of industrialization

Amidst its rapid economic growth period, intervention by the Korean government in the economy was obvious, and role of Ministry of Commerce and Industry was strengthened. Korean government not only provided economic development direction for each period, but also intervened in industrial development through a selective policy financial system. In cultivation of specific strategic industries, the government set investment targets for backbone industry and social capital, and raised investment funds relying on policy finance. One part of government intervention was direct control, such as constructing large-scale projects in backbone industry and social areas through public enterprises. The second part of government intervention was indirect guide, such as using interest rates, exchange rates, taxes and wages to induce investment funds flow to specific sectors selected by government. Since the 1980s, with economic liberalization and openness, economic operation mode transited from government-led to civilian-led. After the introduction of the Industrial Development Law in 1985, the heavy industry policy of the Ministry of Commerce and Industry was gradually replaced by civil freedom and innovation policy. Now, industrial policy of Korea is only in limited fields of economic development, and the impact is relatively small. Current Korean industrial policies mainly focus on basic research and development, SME development and environmental protection.

IV. Industrial Policy Change of China in Anaphase of Industrialization

1. Policy comparison between meta-phase and anaphase of industrialization

In the industrial catch-up period, Chinese enterprises can adopt clear paths to learn and follow the path of advanced countries to achieve industrial gradient development. There was a large number of R&D resources, technical resources and management resources for learning. Due to the lack of resources, capital, technology and experience in domestic market, Chinese industrial policies in this period had obvious government intervention color, and focus on introduction of technology, export support and capital investment. When more and more areas arrive at the parallel development stage, Chinese enterprises will have no convenience in technical introduction and learning, and need to strengthen original independent innovation. Especially for innovative industries, different countries have no huge gap in development, no breakthrough in technology and no complete market advantage, so Chinese enterprises have great space to get rid of the past catch-up model and realize leading development. As innovative industries are in the beginning period, the development concept, product design and technical path are not mature, so the government should give back its role in the choice of technical paths and organizational models to industrial actors (mainly enterprises). Industrial policies in this period are auxiliary and guiding, rather than direct intervention, and mainly play a guiding role in the creation of innovative environment and cultivation of elements conditions.

2. Direction of policy adjustment in future

To adapt to the characteristics of innovative industries, the government should establish new policy-making mechanism which enterprises can deeply participate in. At present, enterprises in policy-making process are relative passive, and an effective mechanism of participating in policy-making has not been established. Enterprises are development pioneer and practitioners, and the government should positively accommodate the needs of enterprises in the policy formulation process, in the following stages: firstly, take a variety of effective ways to promote enterprises fully participating in policy-making; secondly, strengthen investigations of enterprise development. Policy arrangements should focus on the new trends, new situations, new difficulties and problems of enterprise development; thirdly, encourage enterprises to participate in various platforms construction, and guide enterprises to participate in relevant standards drafting, industrial associations and alliances creation, research projects design and implementation.

To realize the maximum growth potential of the market, relaxing access and strengthening supervision should be equally emphasized. Relaxing market access means that industry development has a greater degree of activity. In fact, all high-quality resources may be a key force in development of innovative industries, including manufacturing companies, scientific research institutions and internet companies. Therefore, the government should further promote reform of administrative approval system in industrial sector. With the exception of approval related to national security, environmental protection, production safety and other laws and regulations, the enterprises can make their own decision-making according to the law. At the

same time, pre-regulatory-based access management system should be reformed, and supervision in the course and postmortem supervision need to be strengthened. The government has to strengthen enforcement efforts of patent law, copyright law, trademark law and other law, and investigate and deal with unfair competition behavior which hinders free development.

To expand overseas development space for industry, a new pattern of opening up should be actively built. Seizing the opportunity of implementation of the "one belt one road" strategy, the government should construct a new all-round opening-up pattern, including the horizontal competition with developed countries, economic integration in surrounding regional, and bilateral FTA construction with important countries. For the competitive advantage sector, these industries should further integrate global advantages of different resources, and enhance the value chain management level. For the comparative advantage sector, the domestic factor of industrial development is improving rapidly. These sectors should construct regional value chains to provide enough space to enhance industrial advantages. For the advantages subsidizing sector, the advantage of domestic factor is gradually weakened, but these sectors can integrate low-end elements of developing countries, in order to release the development potential and gain more revenue.

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