Structural change of China's economic output growth: 1997-2007

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1. Introduction

The China implemented the economic policy of expanding domestic demand last decades. It is very important to understand accurately the relationship of final demand and industrial production structure. In additional, China is a development country, so it is not only to expand the industrial production scale, the most important is to promote industrial structure upgrading. Base on above problems, this paper revealed the sources and their magnitudes responsible for output changes by decomposing output demand into five elements, and it investigated the effect, the characteristics and causes of industrial structure change. Finally, it understood the problems existed when implementing policy of expanding domestic demand and adjusting demand structure to promote industrial structure upgrading.

IO model is widely used in the study of economic structural changes. Li (1998) analyzed the industrial structure of China from 1983 to 1995. Hu (2003) analyzed the economic structure and compared with Japan. The most important is the above researches did not study economic structure change by analysis of the contribution of final demand to output increase. Liu (1998) studied the sources of structural change and output growth of China's economy, but it did not include the data after 1992. This paper studied the structural change of China's economy by using the data of 1997-2007.

2. Data and method

(1) Data

The main sources of data used in this study are Chinese IO tables for 1997, 2002 and 2007, released by the Office of Input-Output Survey, China State Statistical Bureau (SSB). In addition, like most IO tables, all those three tables were constructed at current prices. It is therefore essential and necessary to consolidate the inter-industry transactions data on 2002. The data handling includes the construction of price deflating indices, the calibration of industry classification, and some necessary aggregations of sectors.

(2) Method

The matrix of input-output model is as follows:

$$X = AX + F + E - M = AX + F + E - (M_A + M_F)$$

$$= AX + F + E - (\overline{M_A}AX + \overline{M_F}F) \quad (1)$$

X: Gross output column vector of each sector; A: Intermediate input coefficient vector; F: Final demand column vector of each sector; E: Export demand column vector of each sector; M: Import demand column vector of each sector; M_A: Intermediate import column vector of each sector; M_F: Import column vector final demand of each sector; $\overline{M_A}$: The diagonal matrix of import coefficient of intermediate demand; $\overline{M_F}$: The diagonal matrix of import coefficient of final demand. Because $\overline{M_A}$ and $\overline{M_F}$ can not be obtained, so we use the average import coefficient $\overline{M}$ calculated according to gross import and demand.

Form the (1), we can decompose the economic output change into five components as follows:

$$\Delta X = X_1 - X_0 = B_1(I - \overline{M})(F_1 - F_0)$$

$$B_1(E_1 - E_0) + B_1(I - \overline{M_1})(A_1 - A_0)X_0 \quad (2)$$

3. Results and discussions

(1) Contribution of each factor to gross output

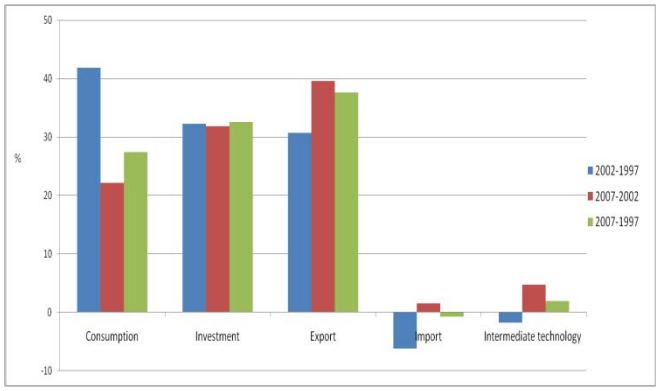

Figure 1. The contribution of each factor to gross output

Figure 1 shows the most contribution to gross output is domestic demand, so the increase of output is based on the domestic demand for China. The contribution of consumption decreased dramatically at the after stage, but the contribution of import, immediate technology, especially export increased obviously. Export is expected to be the important driving for industrial development for developing country, but for economic system of lager scale like China, it is very beneficial to establish stable structure depended domestic demand to control the harmful effect led by international situation to export.

(2) Contribution of each factor to gross output of each sector

The structural decomposition analysis of industrial production change for each sector for the period of 1997-2002 and 2002-2007 is shown in table 1. The contribution of consumption centralized in the tertiary industry and food products of the second industry, but compared with 1997-2002, the contribution social services of 2002-2007 decreased dramatically. The contribution of investment centralized in the metal products, machinery industry, especially construction, but the contribution of 2002-2007 declined dramatically, the machinery industry and electronic machinery increased compared with 1997-2002. For export, the most contribution is the telecommunication equipment, chemical, machinery, and they increased compared with

1997-2002, especially telecommunication equipment. This result indicated the economic structure upgrading. Because the export centralized in the light industry of wear and food manufacture last decades. In additional, the contribution of import of all sectors increased at the after stage, especially metal products, machinery and equipment, wearing and textiles and chemical. The contribution of intermediate technology for each sector mainly centralized in the second industry. The greatest change is nonmetal mineral products and mining, the increased obviously at the after stage. Because the contribution of total intermediate technology increased compared with 1997-2002, this indicates a deepening and strong interdependence between industrial sectors over the data period.

Table 1 Structural decomposition analysis of industrial production change of 1997-2002 and 2002-2007

	Consumption		Investment		Export		Import		Intermediate technology	
	1	2	1	2	1	2	1	2	1	2
Agriculture	1.73	0.67	0.99	0.56	0.95	0.93	-0.35	-0.14	-0.76	-0.58
Mining	1.13	0.35	1.23	0.92	0.79	0.90	-0.41	-0.14	-2.27	-0.10
Food products	1.10	2.60	-0.03	0.50	0.48	0.70	-0.06	-0.02	-0.31	0.99
Wearing and textiles	1.01	1.47	-0.53	0.48	2.62	3.57	-0.69	0.48	-1.21	0.48
Sawmills and furniture	0.35	0.19	0.40	0.65	0.55	0.74	-0.02	0.04	0.40	0.03
Paper products	1.17	0.56	0.33	0.36	0.92	0.91	-0.01	0.07	0.16	0.20
Petroleum and coking	0.75	0.39	0.57	0.54	0.59	0.63	0.08	0.02	-0.67	-0.07
Chemicals	2.48	1.53	1.43	1.76	2.99	3.84	-0.80	0.25	0.64	0.76
Nonmetal mineral products	0.35	0.13	0.77	1.81	0.44	0.73	-0.21	0.05	-2.99	1.30
Metal products	1.33	0.75	3.93	3.88	2.43	4.11	-0.58	0.46	1.12	0.13
Machinery and equipment	1.54	1.42	4.88	6.30	2.27	3.67	-0.50	0.24	0.79	0.77
Electric equipment	0.53	0.51	0.75	1.58	1.68	1.72	-0.67	0.22	-0.18	0.28
Telecommunication equipment	1.18	0.66	2.03	1.08	4.66	9.39	-0.40	-0.19	0.54	0.40
Cultural machinery	0.11	0.10	0.12	0.19	1.02	0.66	-0.25	0.09	0.03	0.07
Other manufacturing	0.24	0.27	0.31	0.41	0.22	0.48	-0.04	-0.03	-0.54	0.15
Electricity, gas and water	1.55	1.17	0.82	1.42	0.75	1.61	-0.36	0.19	0.23	1.59
Construction	0.52	0.25	8.18	5.14	0.18	0.09	-0.02	-0.01	-0.09	-0.23
Transport and Post	3.36	1.47	1.76	1.31	1.97	1.57	-0.26	-0.02	2.06	-0.24
Trade and restaurant	4.62	2.07	1.87	1.04	2.62	1.29	-0.14	-0.03	-0.03	-1.06
Finance and insurance	1.51	0.99	0.56	0.49	0.57	0.65	-0.17	0.08	0.85	-0.11
Real estate	3.13	0.40	0.66	0.48	0.13	0.11	-0.02	0.00	0.53	-0.19
Social services	9.13	3.46	1.24	0.96	2.09	1.25	-0.31	-0.11	0.88	0.15
Public administration	3.08	0.77	0.00	0.00	-0.13	0.01	0.00	0.00	-0.93	0.02

Notes: 1 and 2 denotes the period of 1997-2002 and 2002-2007 respectively.

4 Conclusions

This paper studied the sources of structural changes in output growth of China's economy over recent 10 years. The results indicated that the increase of output is based on the domestic demand in China. But the contribution of export increased obviously. The contribution of import for output growth increased compared with before stage, but the percent of contribution is not great. The contribution of total intermediate technology increased compared with the period of 1997-2002. This indicates a deepening and strong interdependence between industrial sectors over the data period. So the policy of expanding domestic demand is very important to economic stabilization. In additional, we can find the effect of industrial structure upgrading is very obvious by structural decomposition analysis of industrial production change.

However, there is not the comparing of china structure change and other country, especially developed country. This is very significant to China to investigate how to deal with the international economic situation, such as economic crisis, at the industrial development stage.

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