



Structural Changes of Chinese Economy ---Based on Input-Output Analysis

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Outline

- **Background**
- **Economic Structure**
- **Industrial Linkage**
- **Intermediate Input Structure**
- **Trade Structure**
- **Conclusions**



Background

■ A “New Normal” for China’s Economy

➤ Growth

- High speed (10%)→ Mid-high speed, 7-8%

➤ Structure:

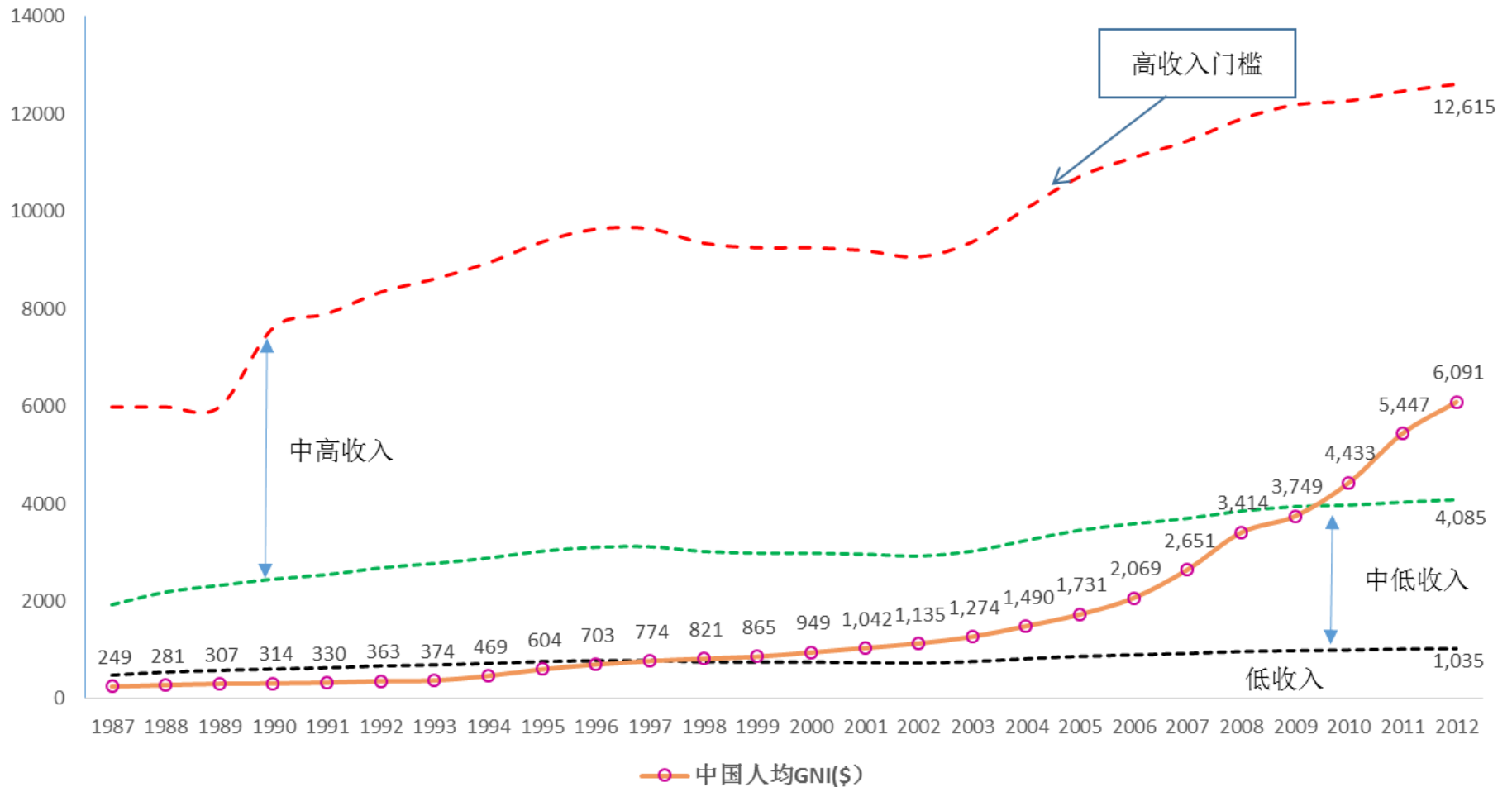
- Service sector surpassed investment to become the biggest sector in 2013.

➤ Driver Force:

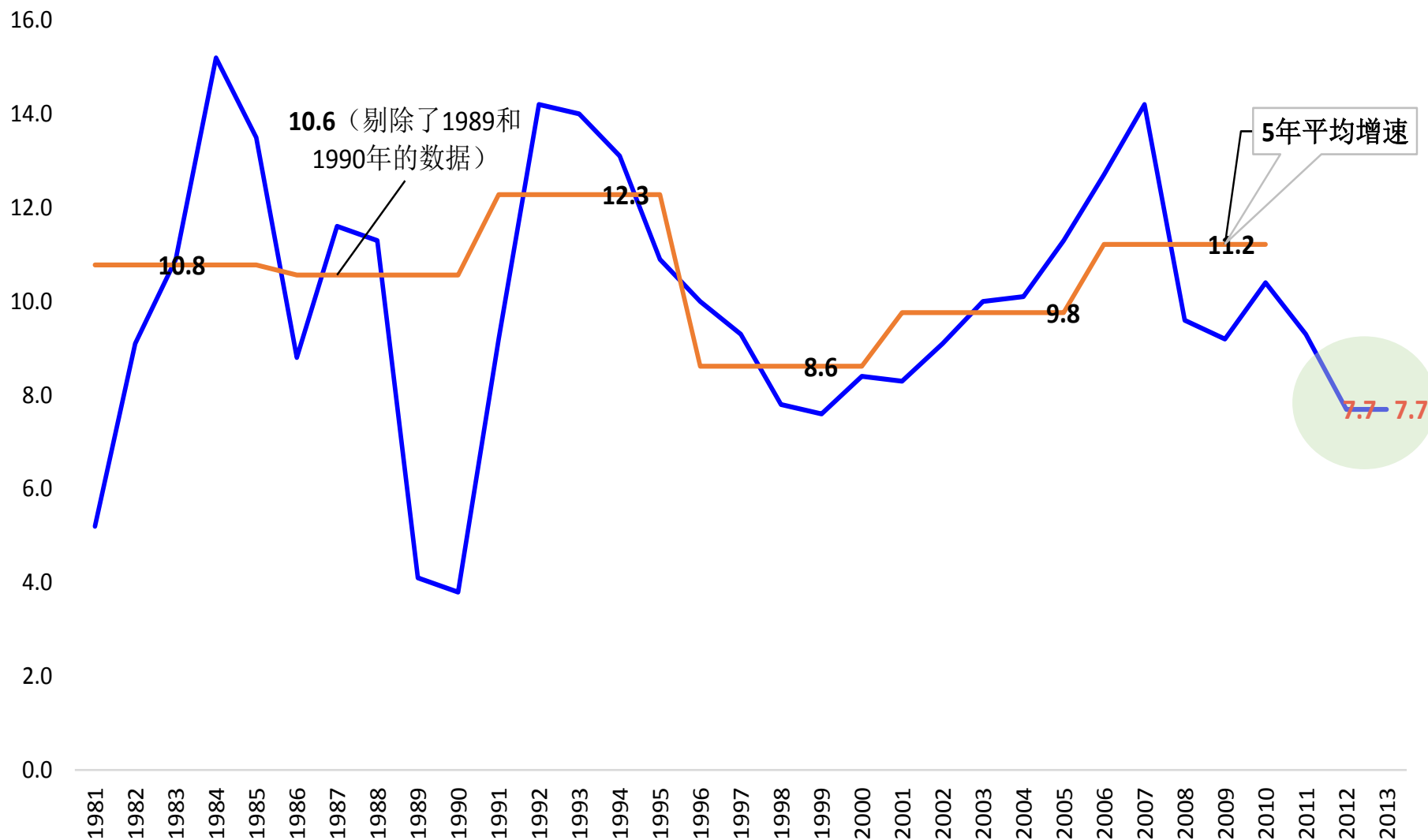
- Contribution of investment and export are decreasing.



China's GNI per capita and Classification of the World Bank

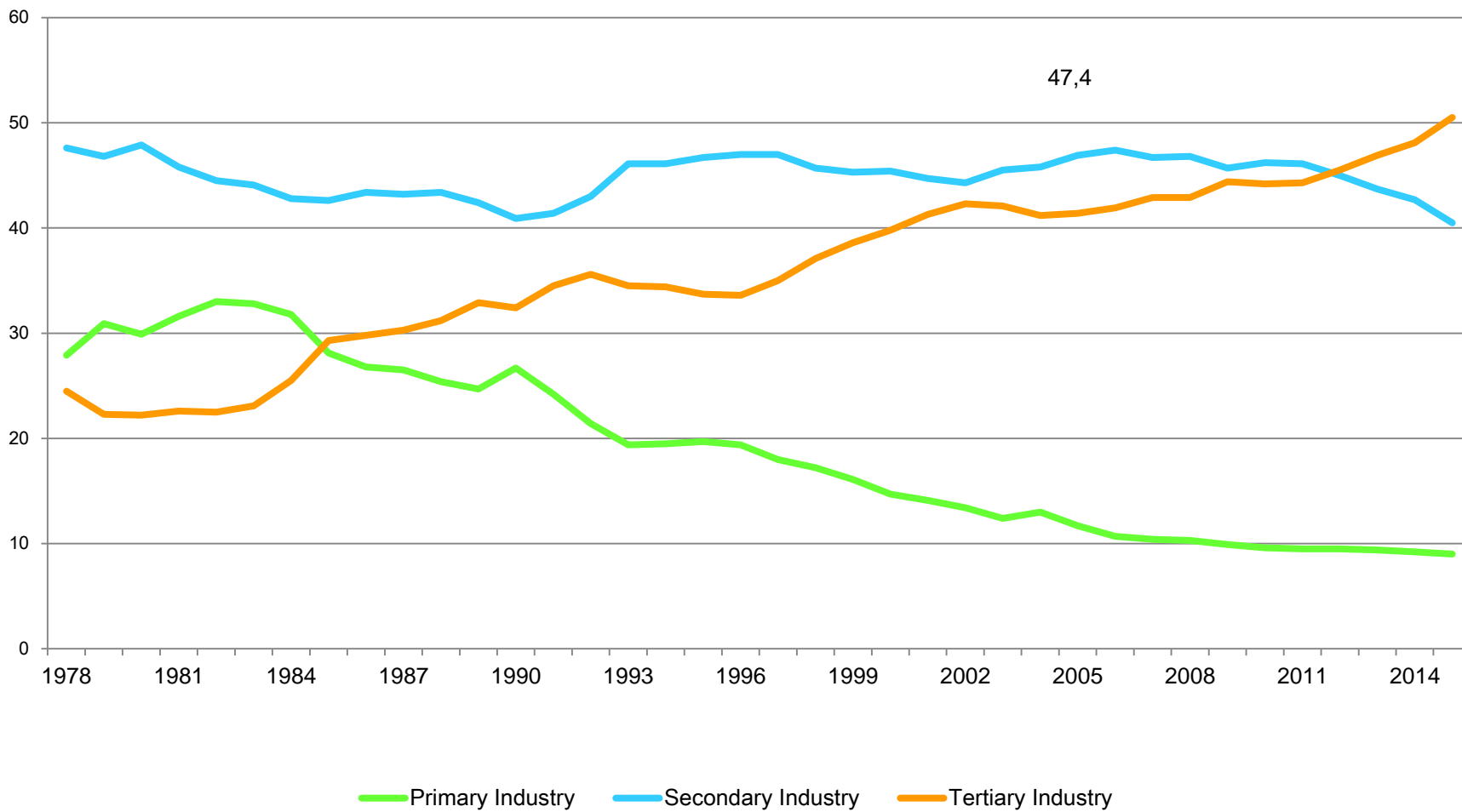


Economic Growth Rate(1981-2013)



GDP Components

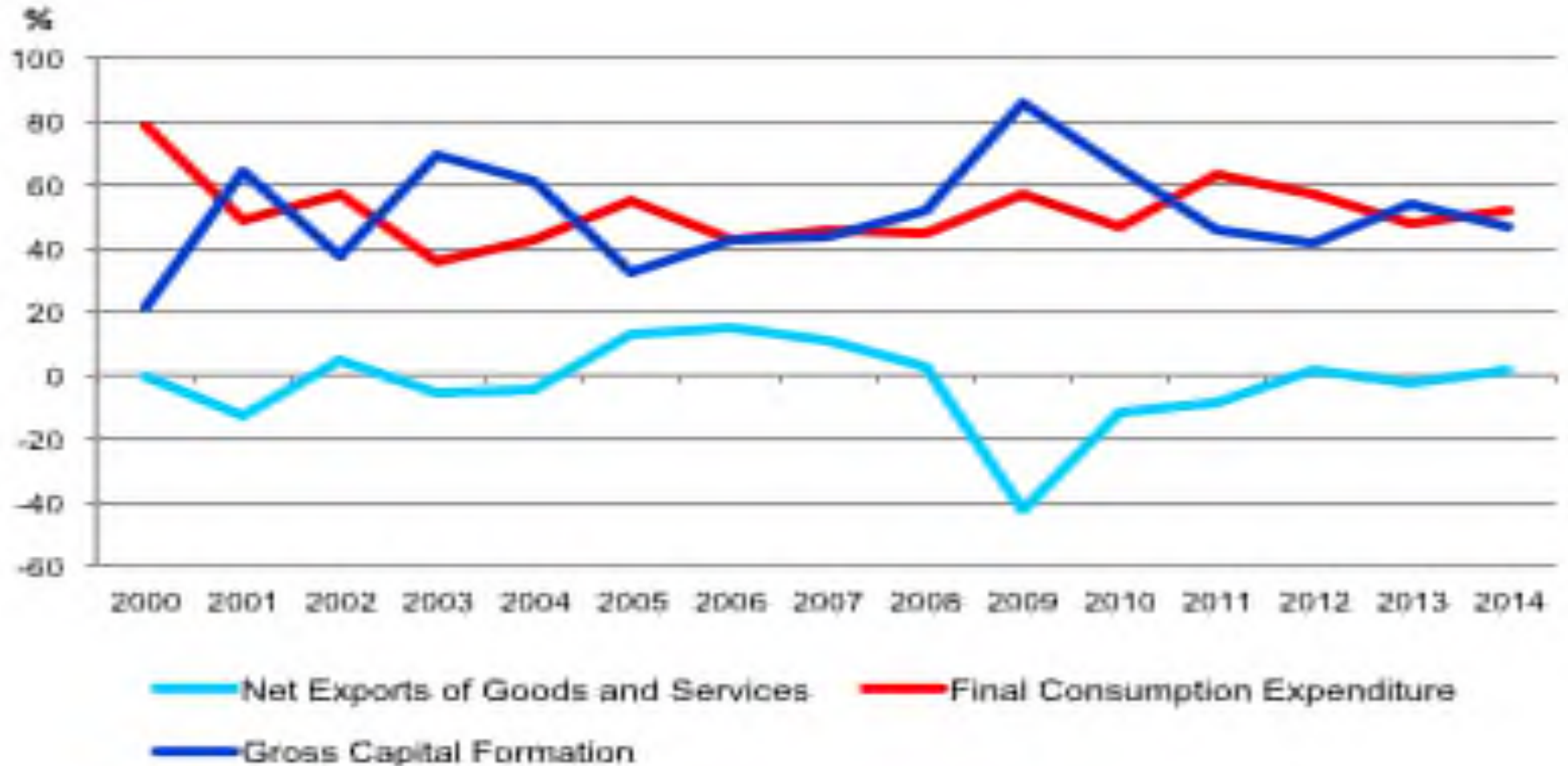
(the share of service in GDP was 51.6% in 2016)





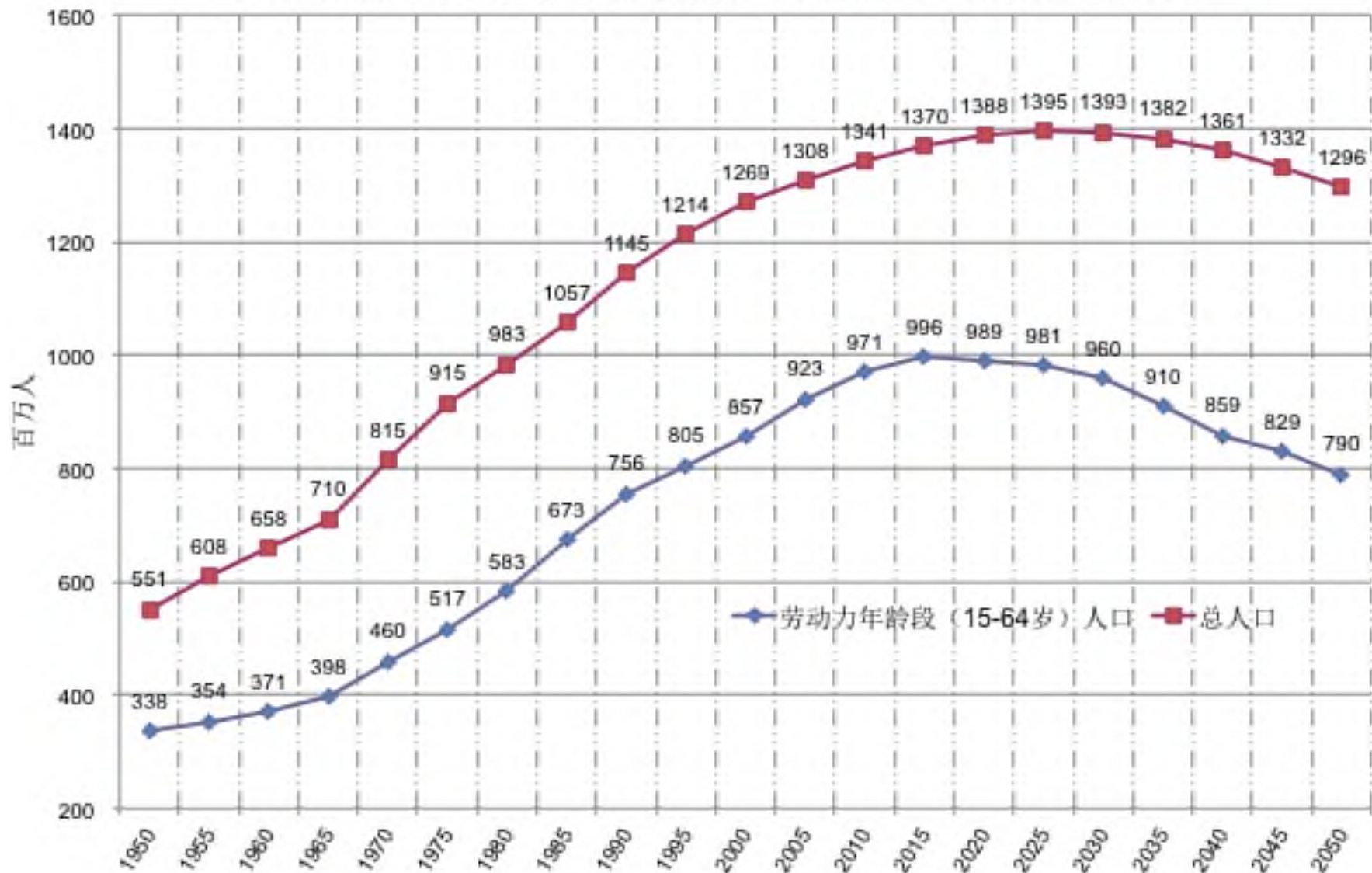
Contribution of Demand

(the contribution of consumption was 66.4% in 2015)





我国的总人口和劳动力年龄段人口（联合国的中位预测，新版）





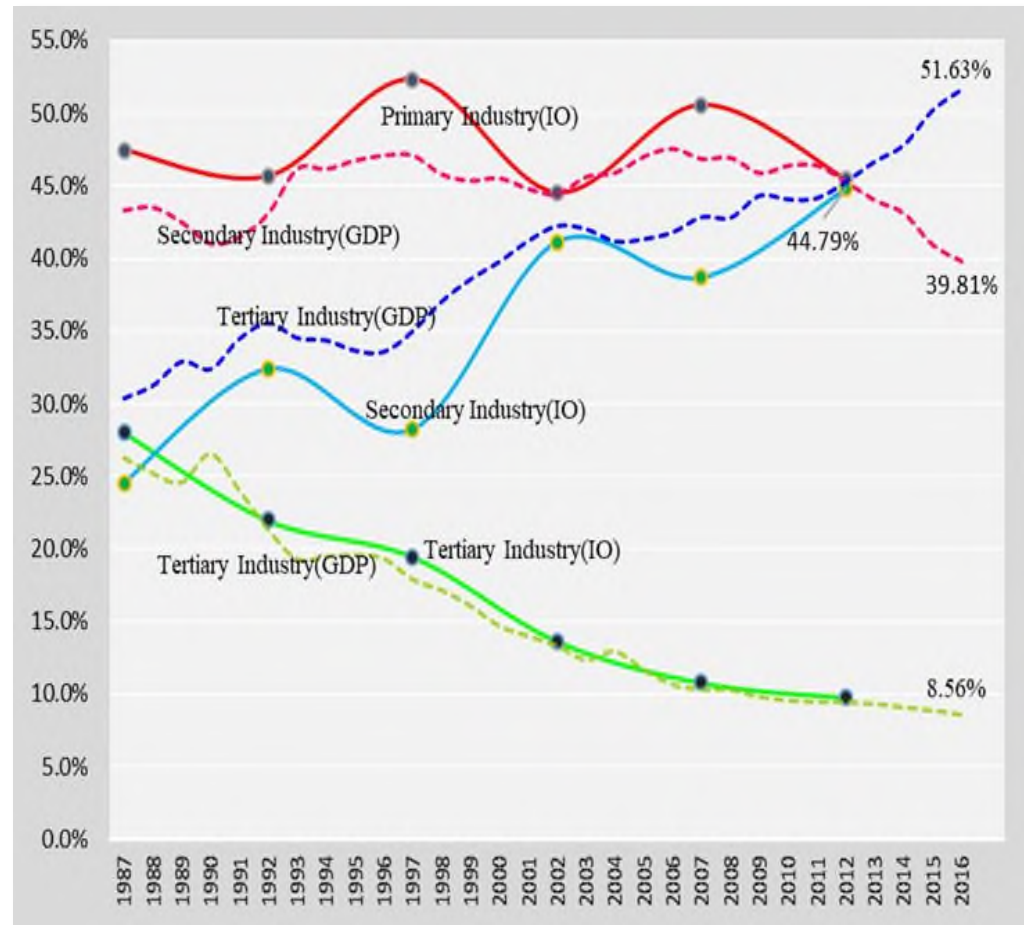
Background

- **Structural change emerges as a central feature of the process of development and an essential element in accounting for the rate of pattern of growth. (Syrquin, 2007)**
- Input-Output is a very useful structural analysis tools

Economic Structure

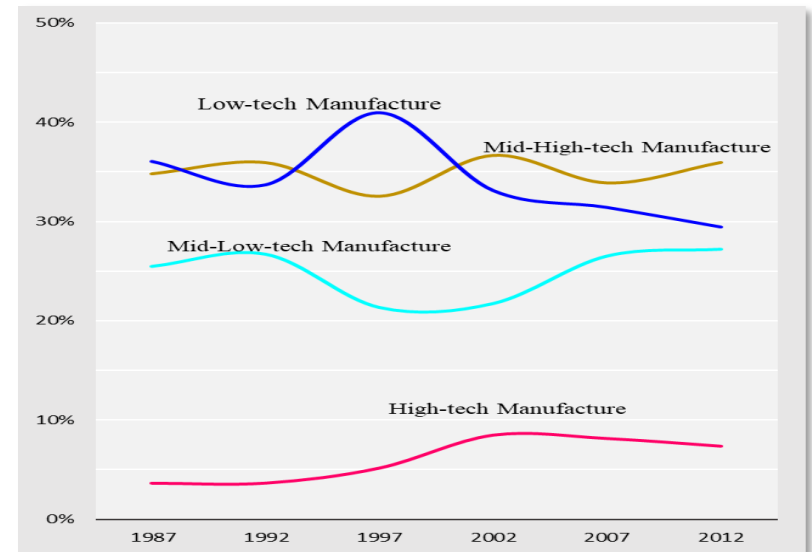
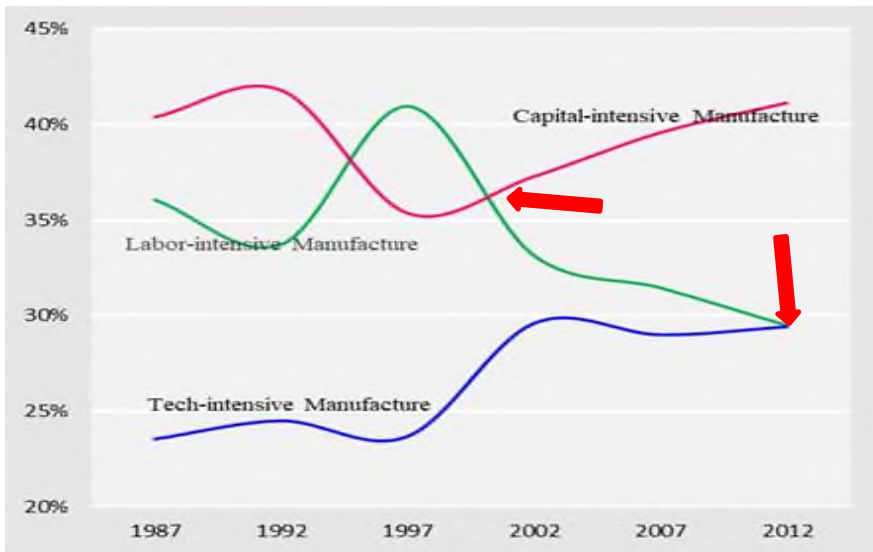
- **Economic Structure is changing dramatically from 2007 to 2012**
 - **Share of agriculture and secondary industry in GDP are declining.**
 - **Share of service in GDP is increasing and service become biggest sector in China**

Composition of GDP

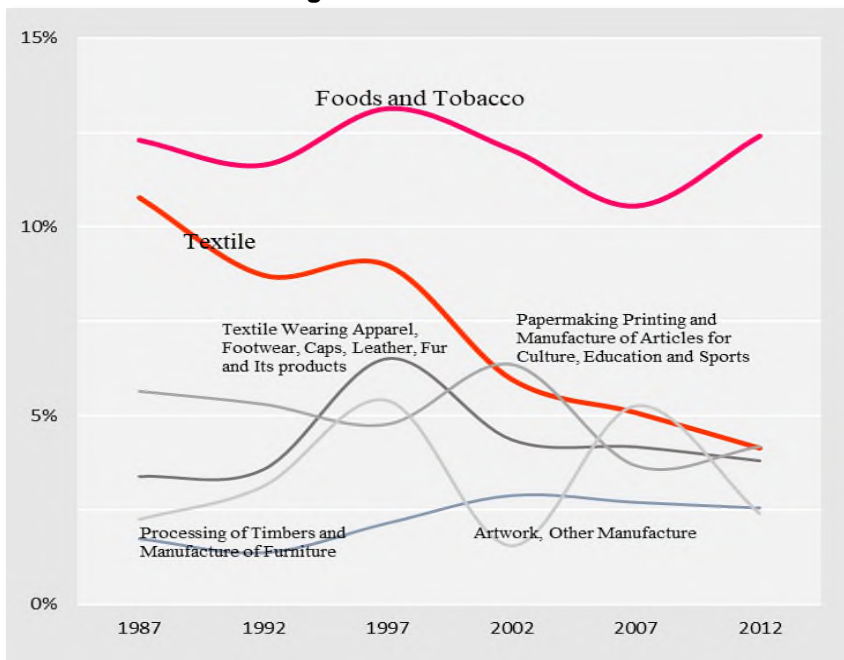


Manufacture Sector

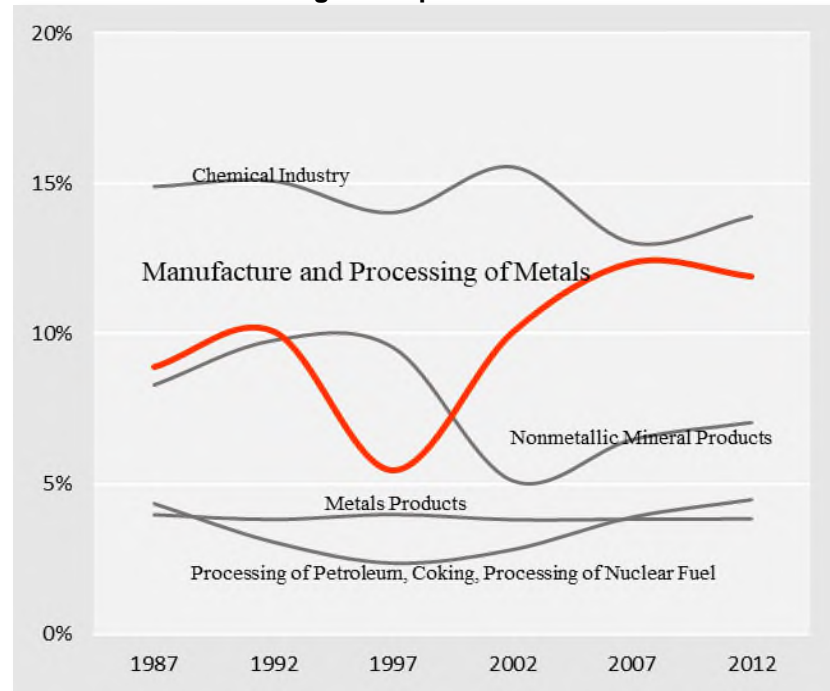
- Share of labor-intensive and low-tech manufacturing have declining since the end of 90s.
- Share of capital-intensive and Mid-tech manufacturing is increasing. capital-intensive manufacturing has surpassed labor-intensive manufacturing. Tech-intensive manufacturing is surpassing labor-intensive manufacturing.



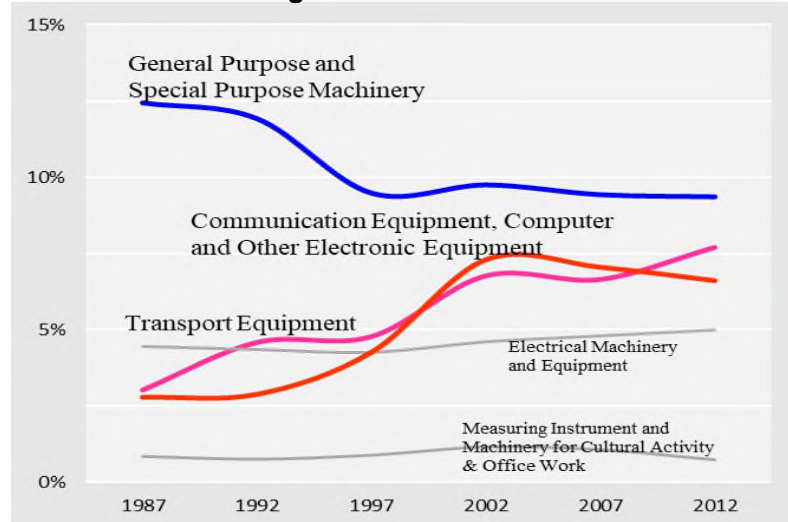
Structural Change of Labor-intensive manufacture



Structural Change of Capital-intensive manufacture



Structural Change of Tech-intensive manufacture



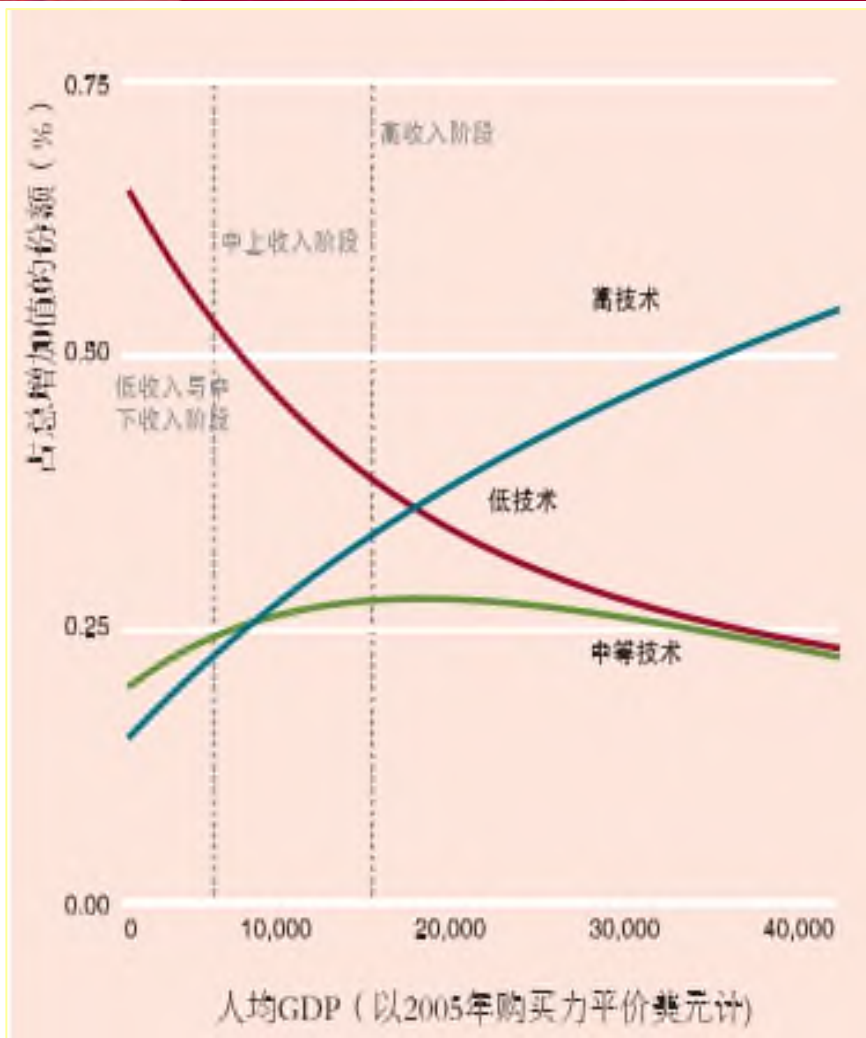


图7：1963-2007年按收入阶段和技术组别分类的制造业增加值份额变化

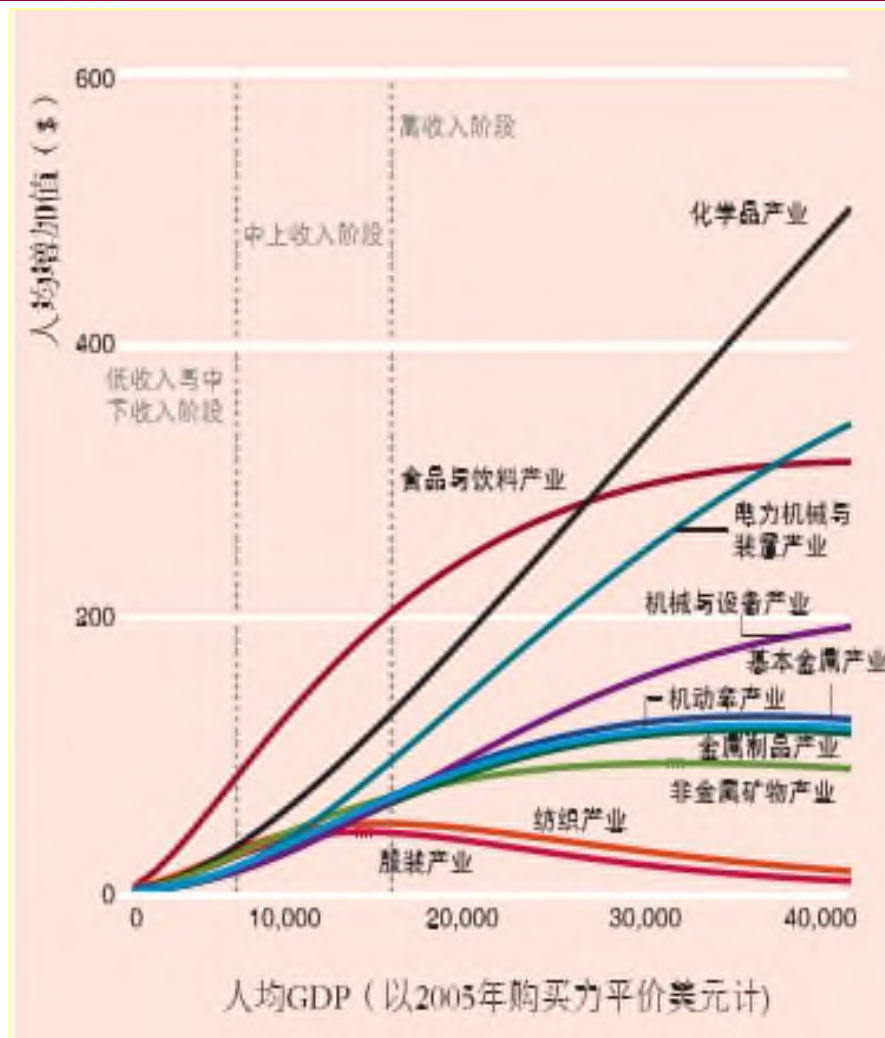
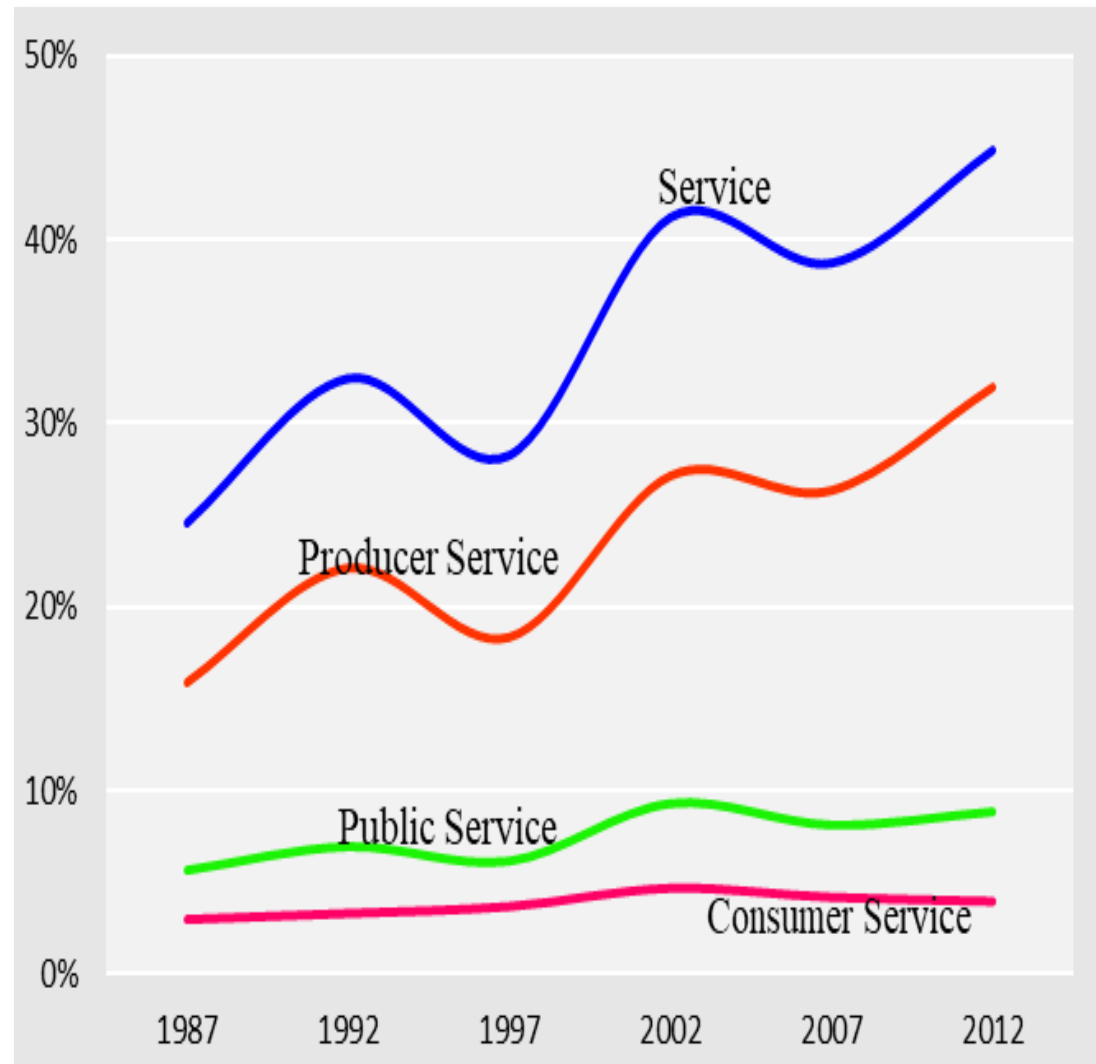


图8：1963-2007年按收入和制造业产业分类的人均增加值变化情况

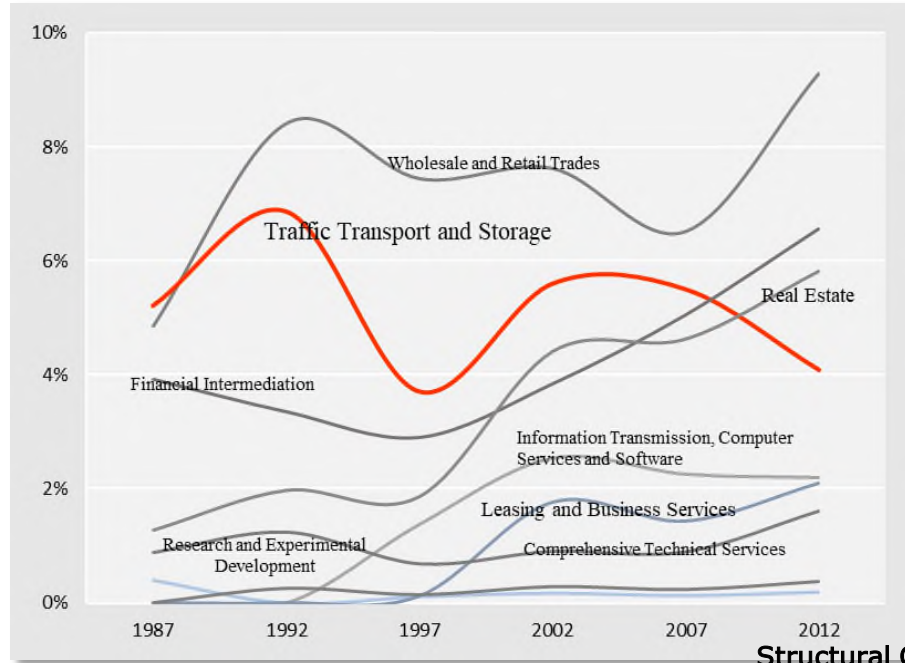
Service

- Share of Producer Service in GDP increases very quickly. It increased by 10.16 pp from 1987 to 2007, and 5.62 pp from 2007 to 2012 respectively.
- There is little increases for Share of Public service in GDP . It increased by 1.23 pp from 1987 to 2007, and 0.73 pp from 2007 to 2012 respectively,
- There is a little changes for consumer service.

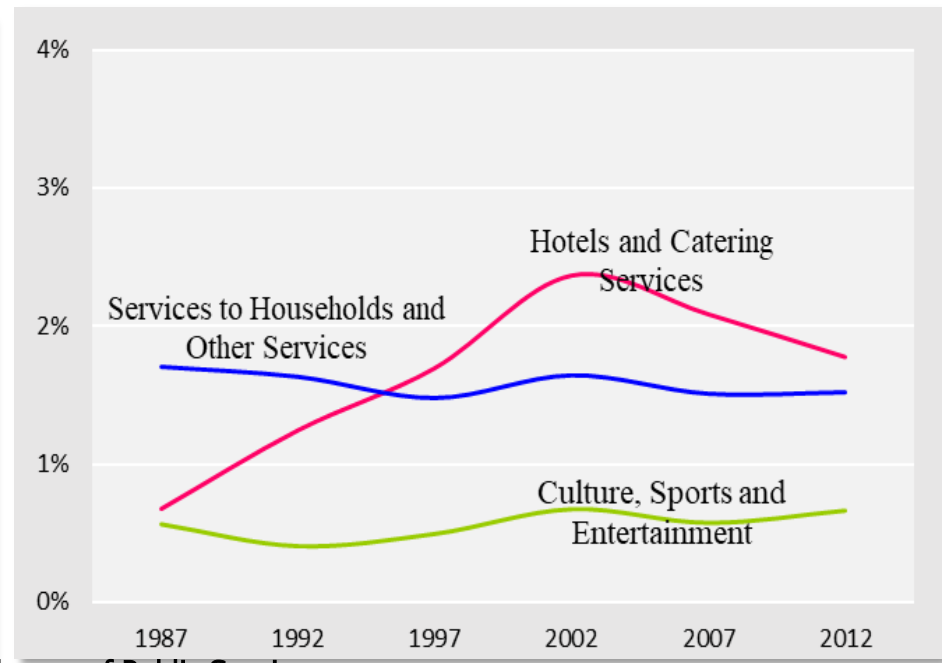




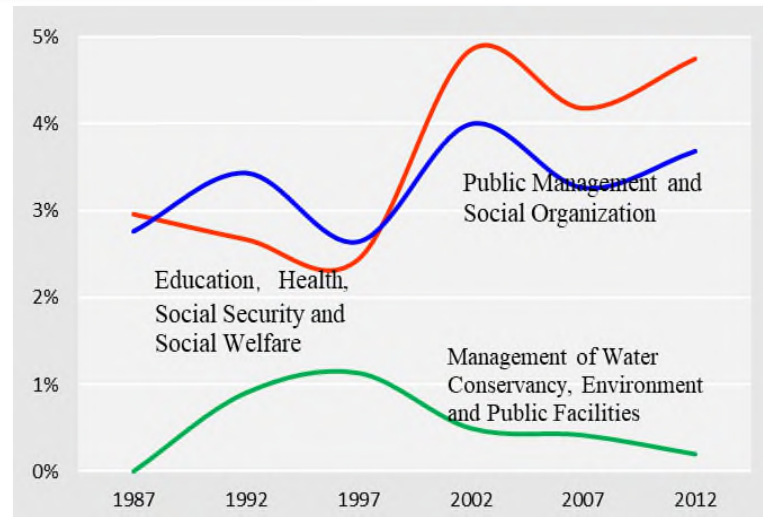
Structural Change of Producer Service



Structural Change of Consumer Service



Structural Change of Public Service





Industrial Linkage

❖ Industrial Linkage

- ❖ Influence Coefficient—Backward Linkage

- ❖ Response Coefficient—Forward Linkage

❖ The Backward Linkage of tech-intensive sector is higher than other sectors'; The Forward Linkage of capital-intensive sector is higher than other sectors'.

❖ “Leading industry”

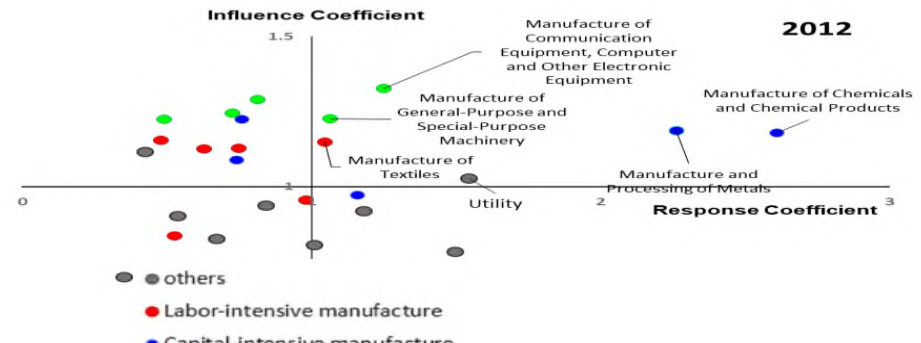
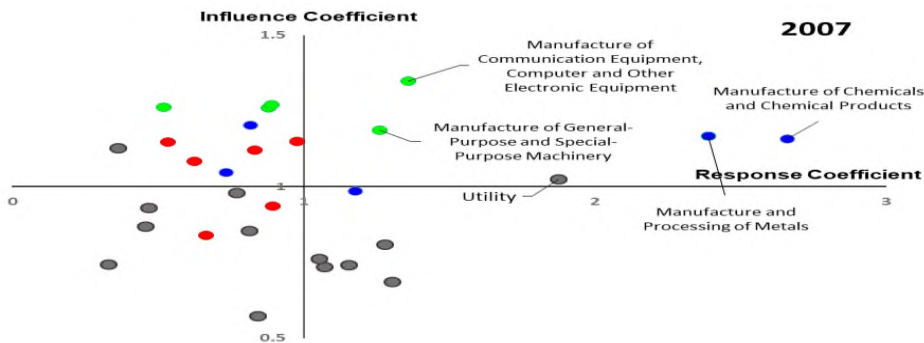
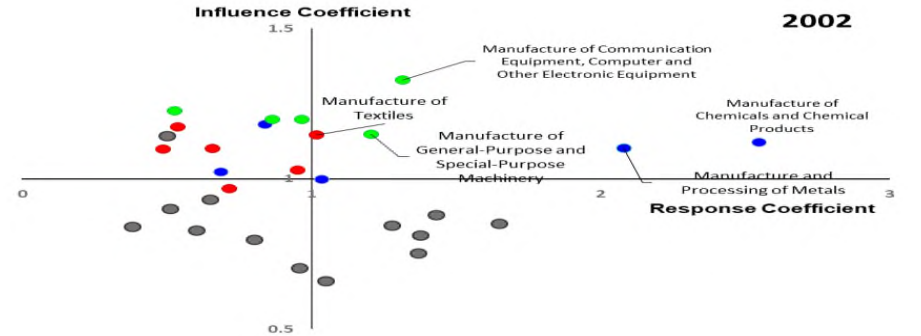
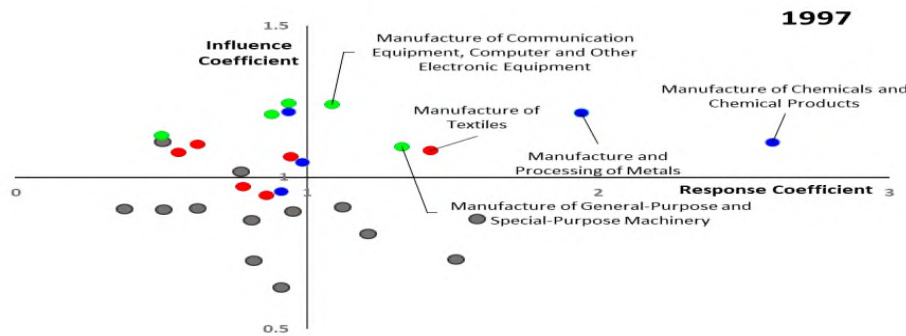
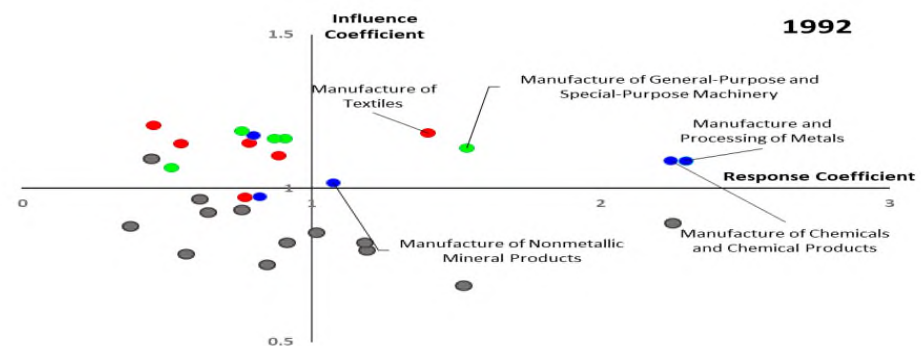
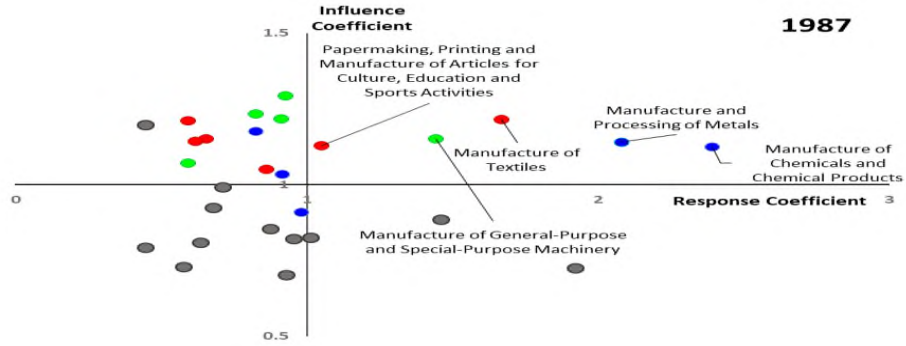
- ❖ Backward Linkage >1

- ❖ Forward Linkage >1

- ❖ Almost all leading industries are manufacturing



Industrial Linkage



- others
- Labor-intensive manufacture
- Capital-intensive manufacture
- Tech-intensive manufacture



Industrial Linkage

- Leading industries are changing over time
- Labor intensive sector (Textile&Apparel) → capital intensive (Chemicals)/ tech-intensive sector (ICT products)

	1987	1992	1997	2002	2007	2012
Textiles	●	●	●	●		●
Paper Making	●					
Chemical Industry	●	●	●	●	●	●
Smelting and Rolling of Metals	●	●	●	●	●	●
General and Special Purpose Machinery	●	●	●	●	●	●
Communication Equipment, Computer			●	●	●	●
Utility					●	●

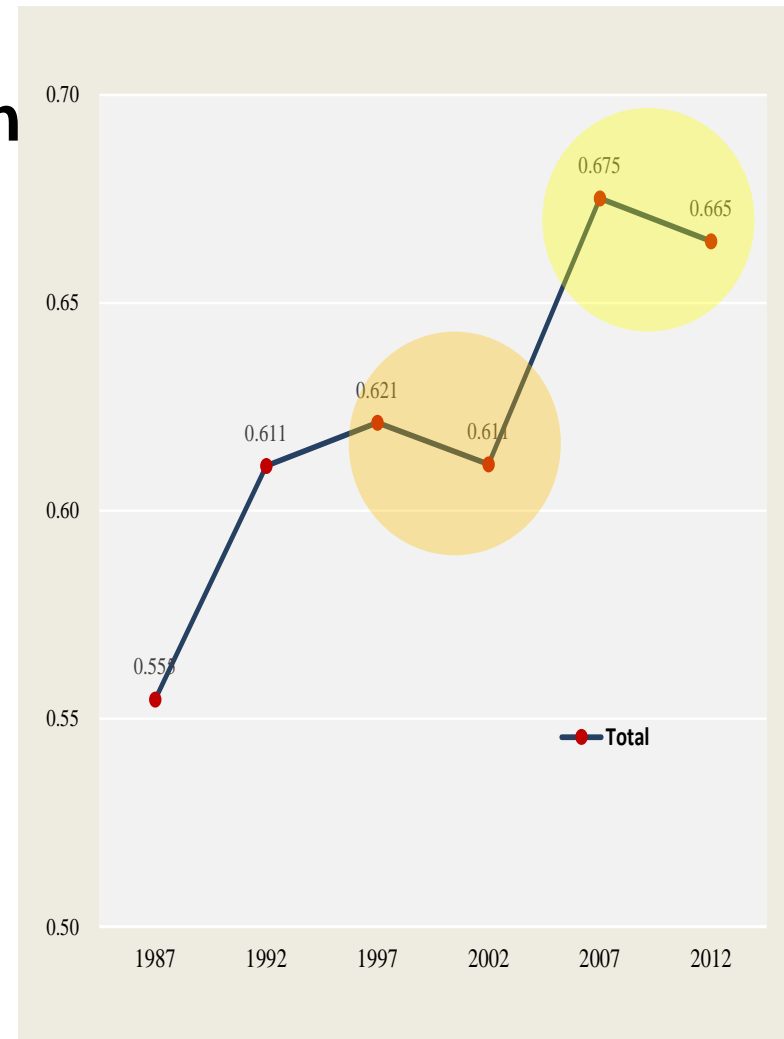


Intermediate Input Ratio

- **Overall Intermediate input ratio**
 - The total Input is sum of intermediate input and initial Input
 - Overall Intermediate input ratio is the ratio of total intermediate input to total Input
- **Sectoral Intermediate input ratio**
 - The ratio of sectoral intermediate input to sectoral total input
 - This is backward linkage

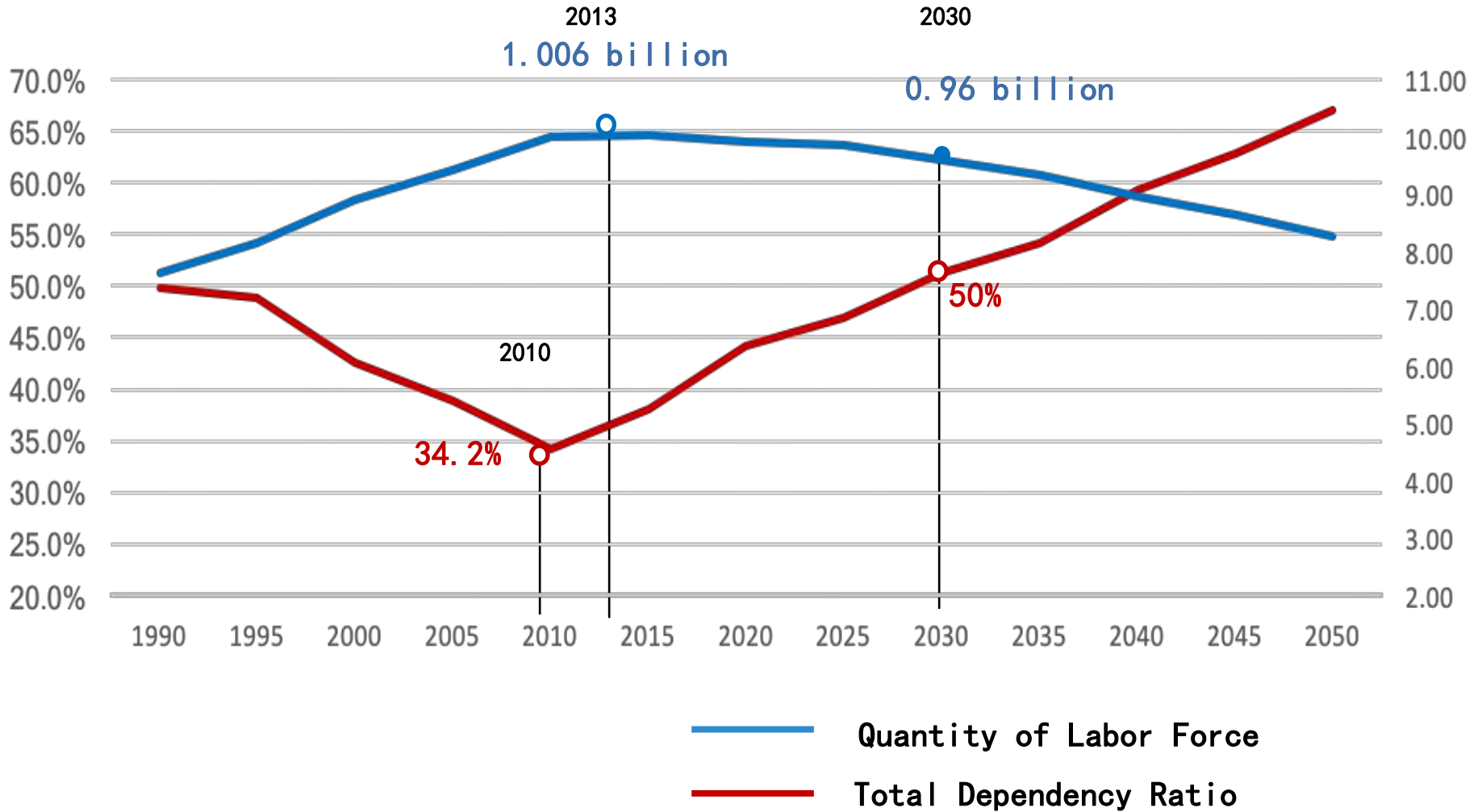
Intermediate Input Ratio: “turning point”

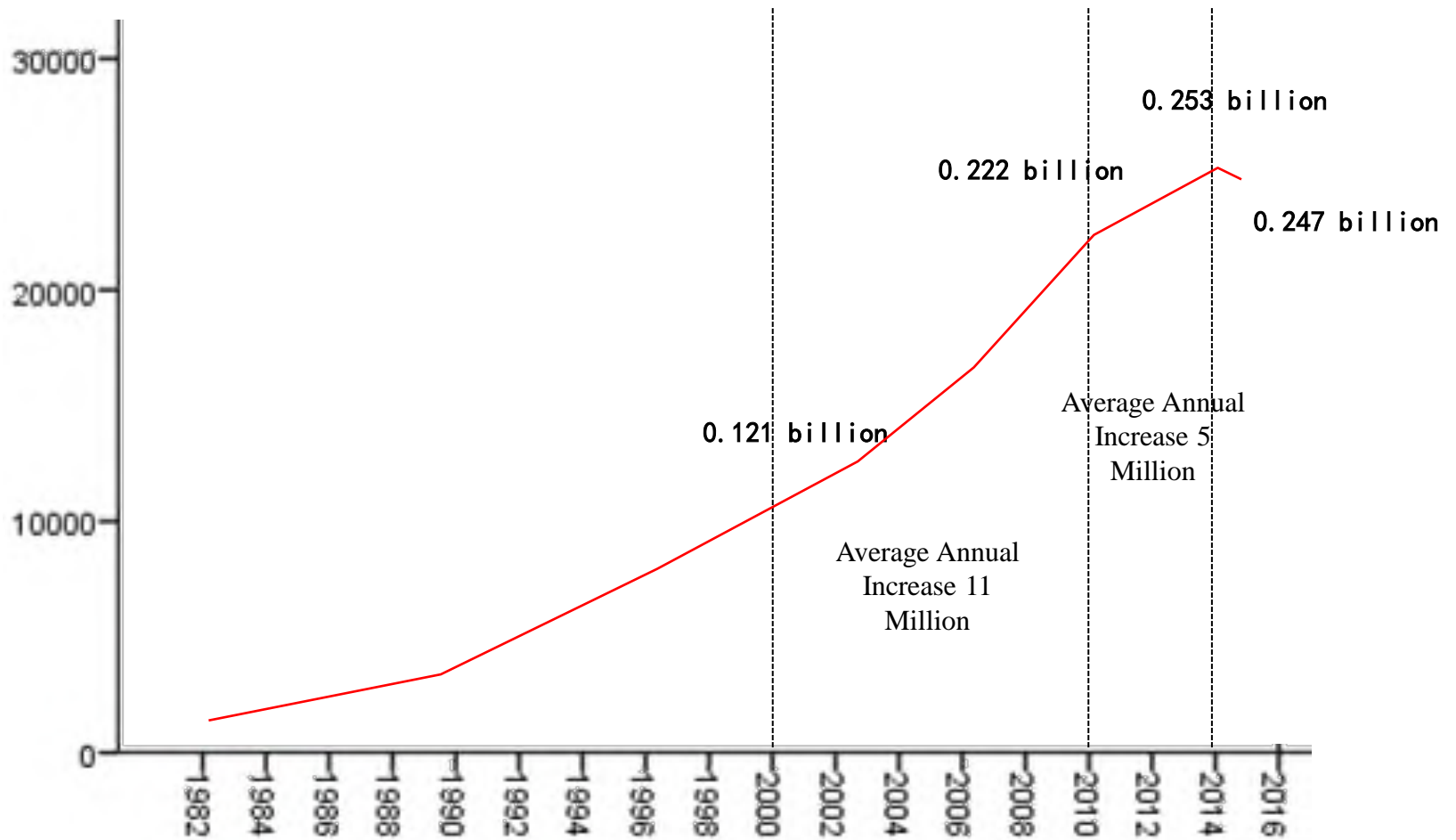
- The general trend of overall intermediate input ratio in China is increased from 0.555 in 1987 to 0.665 in 2012
- But since 1987, the overall intermediate input ratio has fallen twice
 - 1997-2002: 0.621 ↓ → 0.611
 - 2007-2012: 0.675 ↓ → 0.665
- Why?
 - What's the difference between the two falling
 - the decline in 2012: a short-term fluctuation or long-term trend? the overall intermediate input ratio





History and Forecasting of Quantity of Labor Force and Total Dependence Ratio (% , 100 million)

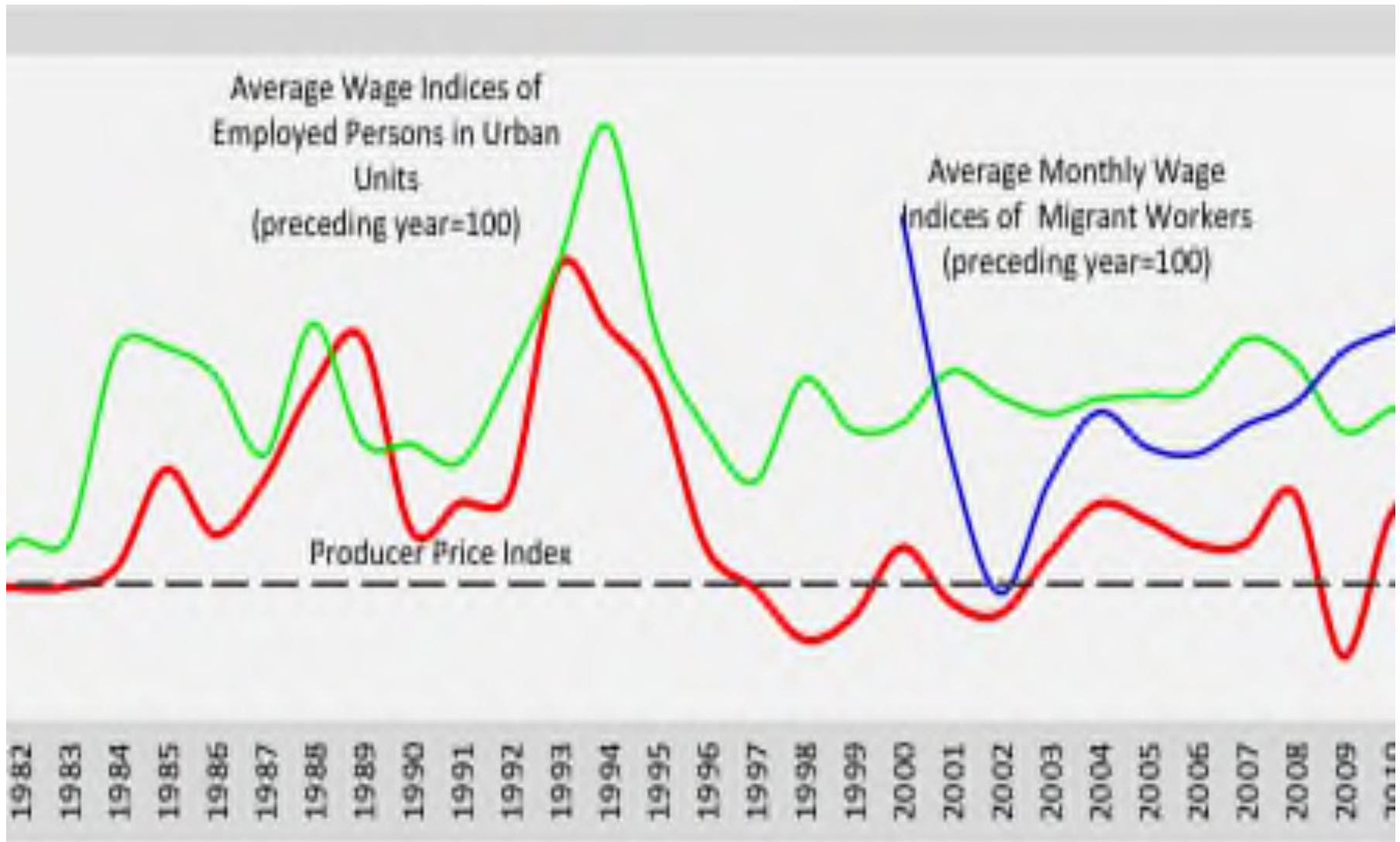




Change of National Floating Population(billion)



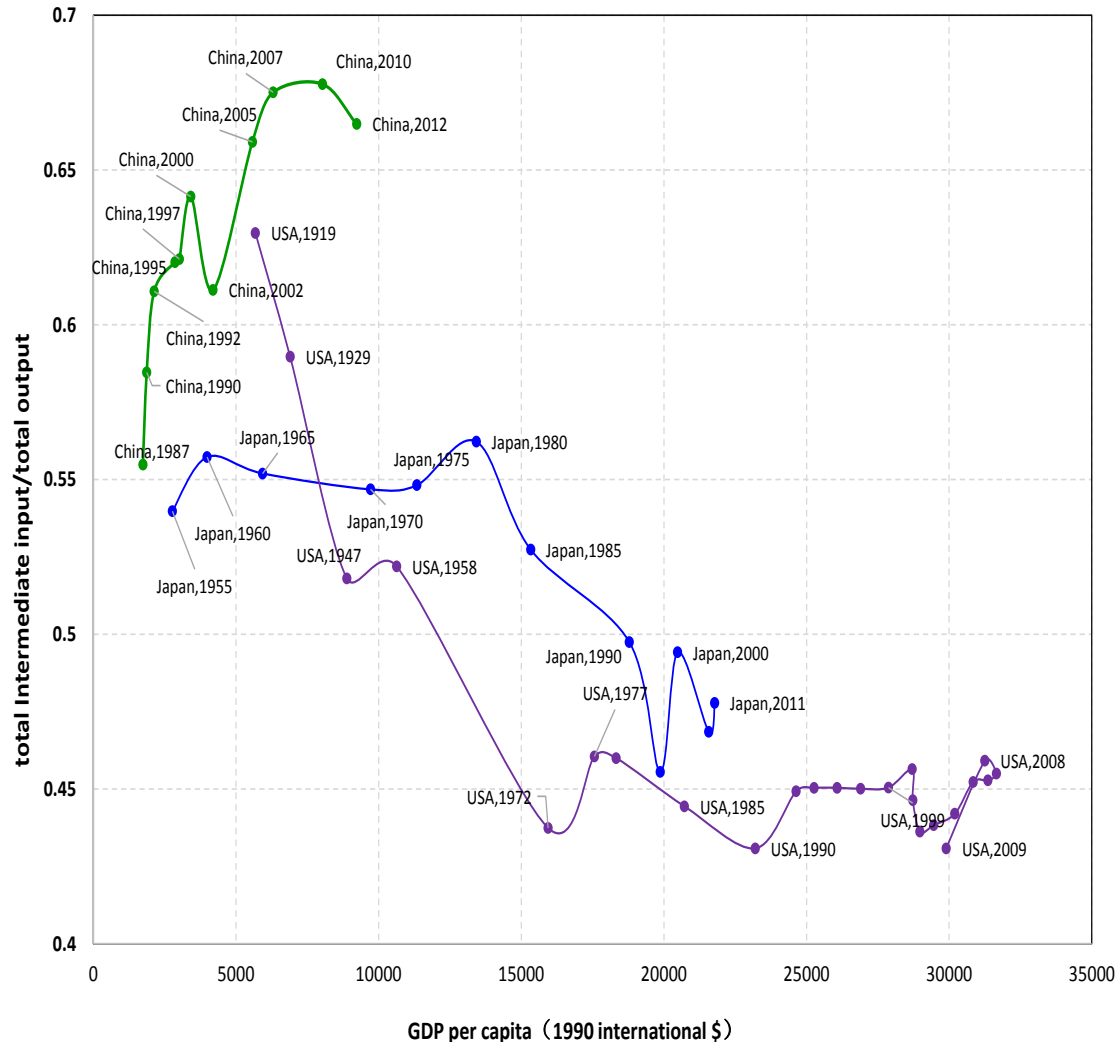
Comparison of wage index and PPI





International Comparison

- China's overall intermediate input ratio is much higher than USA and Japan (in the same development level)
- China's OIR decline in 2012 is consistent with international trends
- Continued Increasing of service after 2012 will be an important sign that the decline of overall intermediate input rate in long-term.



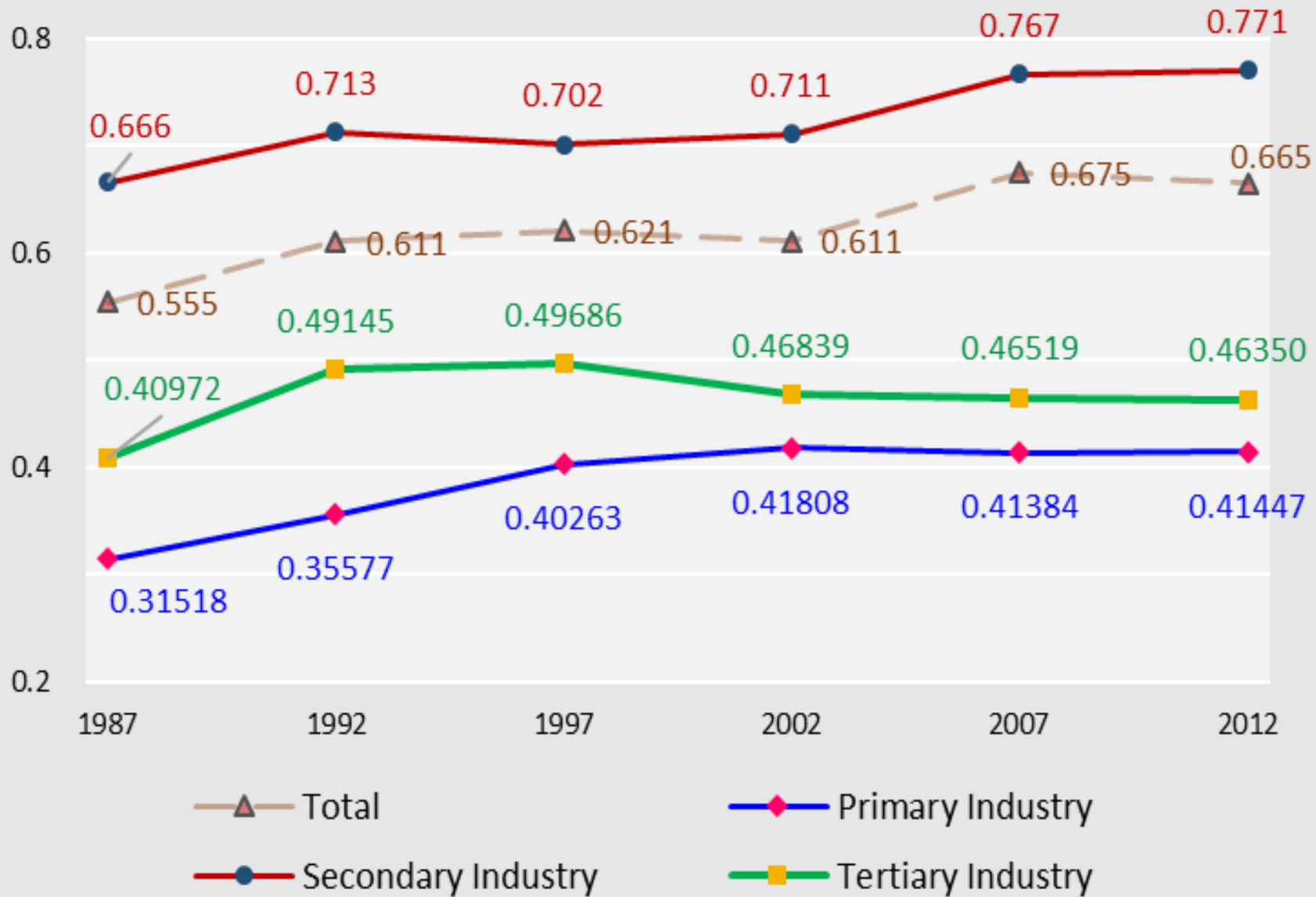
Reasons...

- **Structural decomposition is effective means to investigate why...**
- **The change of “Overall Intermediate input ratio” can be divided into two parts:**

- Change of industrial structure: **A**
- Change of Intermediate input rate by industry: **B**

$$R_{ALL} = \sum \alpha_i r_i \quad \Delta R_{ALL} = \sum_{i=1}^3 \Delta \alpha_i r_i^0 + \sum_{i=1}^3 \alpha_i^1 \Delta r_i = A + B$$

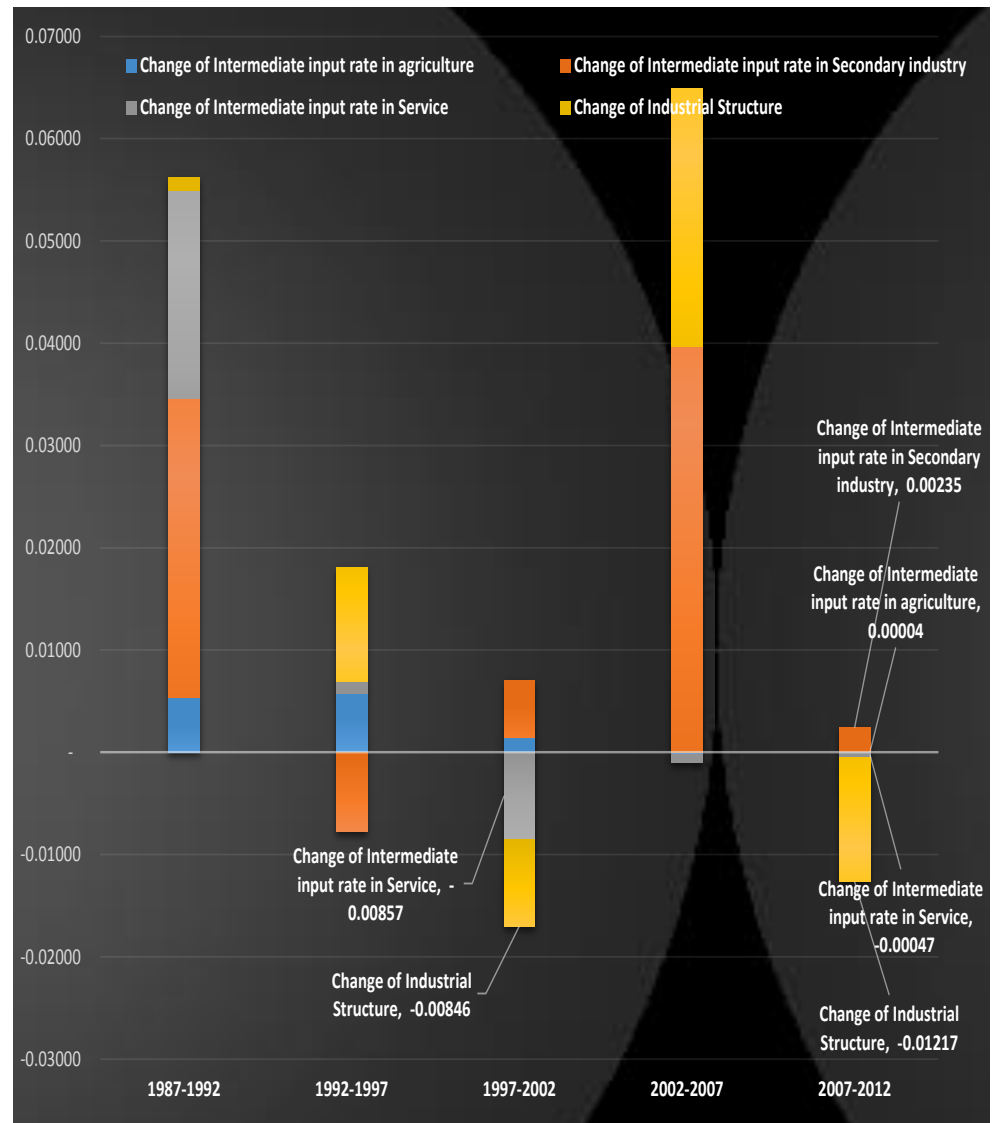
- Where R_{all} is Overall Intermediate input rate, α is the share of output by industry (industrial structure), r is Intermediate input rate by industry.
- A denotes the effects of Change of industrial structure; B shows the effects of Change of Intermediate input rate by industry.



	Effect from change of IIR of Primary Industry	Effect from change of IIR of Secondary Industry	Effect from change of IIR of Tertiary Industry	Effect from change of Sectoral Structure	Total
1987-1992	0.00892	0.02155	0.02646	0.00112	0.05805
1992-1997	0.00912	-0.00609	0.00153	0.01817	0.02273
1997-2002	0.00211	0.00553	-0.01171	-0.0139	-0.01797
2002-2007	-0.00046	0.02687	-0.00124	0.01949	0.04466
2007-2012	0.00006	0.00161	-0.00076	-0.01486	-0.01395

Comparing Two declines

- The drop in 2012 is bigger than that in 2002
- Different reasons
 - 2002
 - Leading cause: the decline of intermediate input ratio in service
 - No. 2 cause: structural change
 - 2012
 - Leading cause: structural change. Almost all of the drop in 2012 comes from structural change.
 - The effect of structure change in 2012 is much bigger than that in 2002





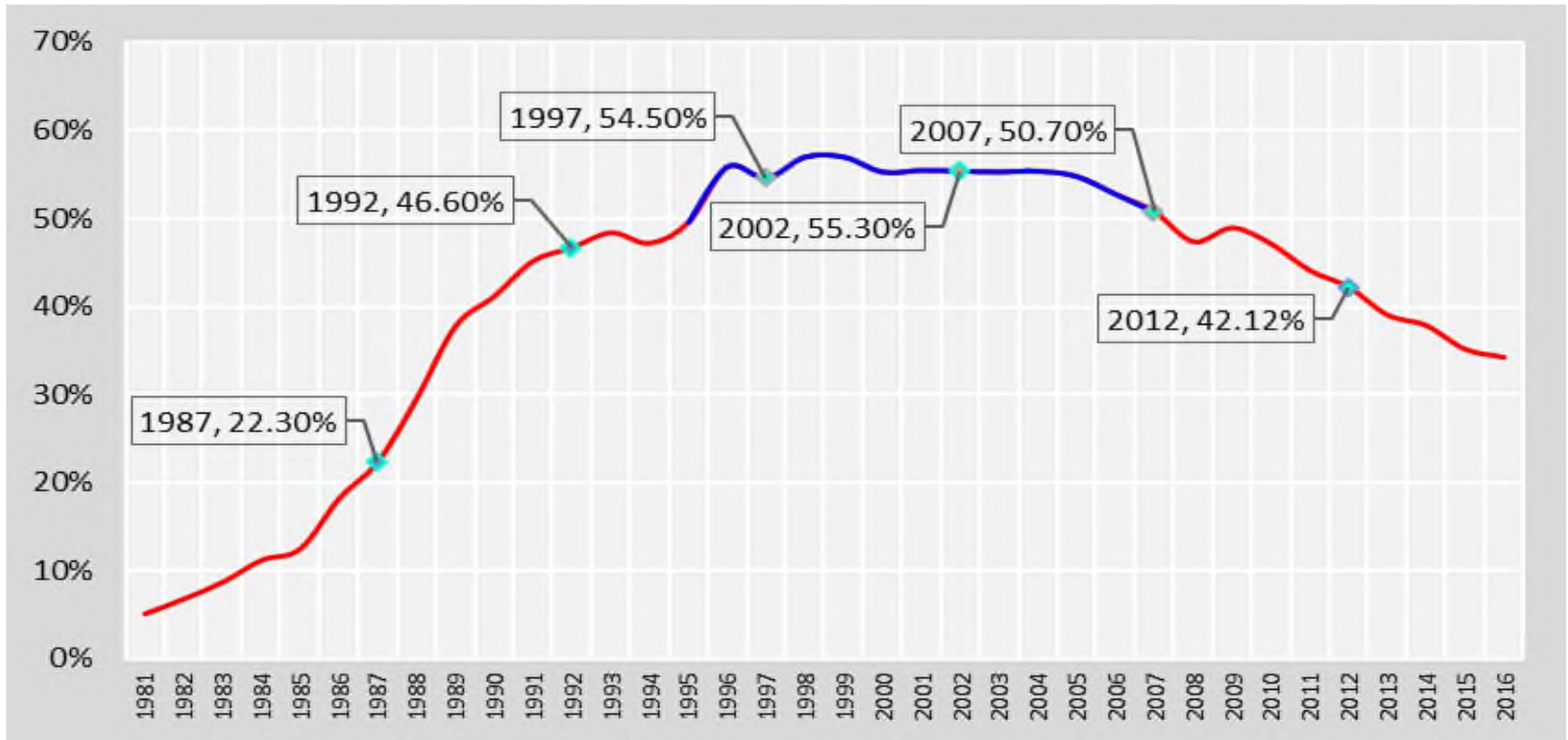
Other Factors

	1987	1992	1997	2002	2007	2012
Manufacture of Prepared Animal Feeds	0.0150	0.0246	0.0661	0.0412	0.0747	0.0900
Manufacture of Fertilizers	0.0588	0.0574	0.0567	0.0494	0.0570	0.0592
Manufacture of Pesticides	0.0055	0.0096	0.0100	0.0074	0.0104	0.0133
Manufacture of Machinery for Agriculture, Forestry, Animal Production and Fishery	0.0036	0.0083	0.0076	0.0069	0.0058	0.0065
Utility	0.0042	0.0021	0.0075	0.0116	0.0096	0.0100
Sum	0.0869	0.1021	0.1479	0.1166	0.1574	0.1789

- **The shares of Intermediate Input from other sectors to Agriculture are increasing**

Other Factors

Change of proportion of processing trade export



- Value added ratio of Processing trade was 0.386
- Value added ratio of ordinary trade was 0.792



Influencing Factor	Influencing Channel	Impact
Rising of Wages	Price of Labor Rises Faster than Product Reduces Value-added Ratio	Down
Change of Economic Structure	Decreasing of Share of Second Industry, which has a Higher Intermediate Input Ratio	Down
Change of Labor Division	Increase Nodes in Producing Chain which Results in Calculating More times	Up
Improvement of Technology	Widespread of Machine Instead of Labor in Production process	Up
Change of Relative Price of Producing Factors	Change in Price of Commodity Influences Input of Dependent Sectors	TBD
Change of Relative Share of Different Trading Style	Value-added Ratio of Processing Trade is Lower than General Trade, while the Former Share is Decreasing.	Down
Improvement of Management	Saving Input	Down

International trade

	Export				Import			
	1997	2002	2007	2012	1997	2002	2007	2012
I	2.47%	1.53%	0.70%	0.57%	3.13%	2.53%	3.15%	4.19%
II	81.22%	77.24%	85.42%	81.48%	92.06%	90.42%	88.98%	87.20%
III	16.31%	21.23%	13.89%	17.95%	4.81%	7.06%	7.87%	8.61%

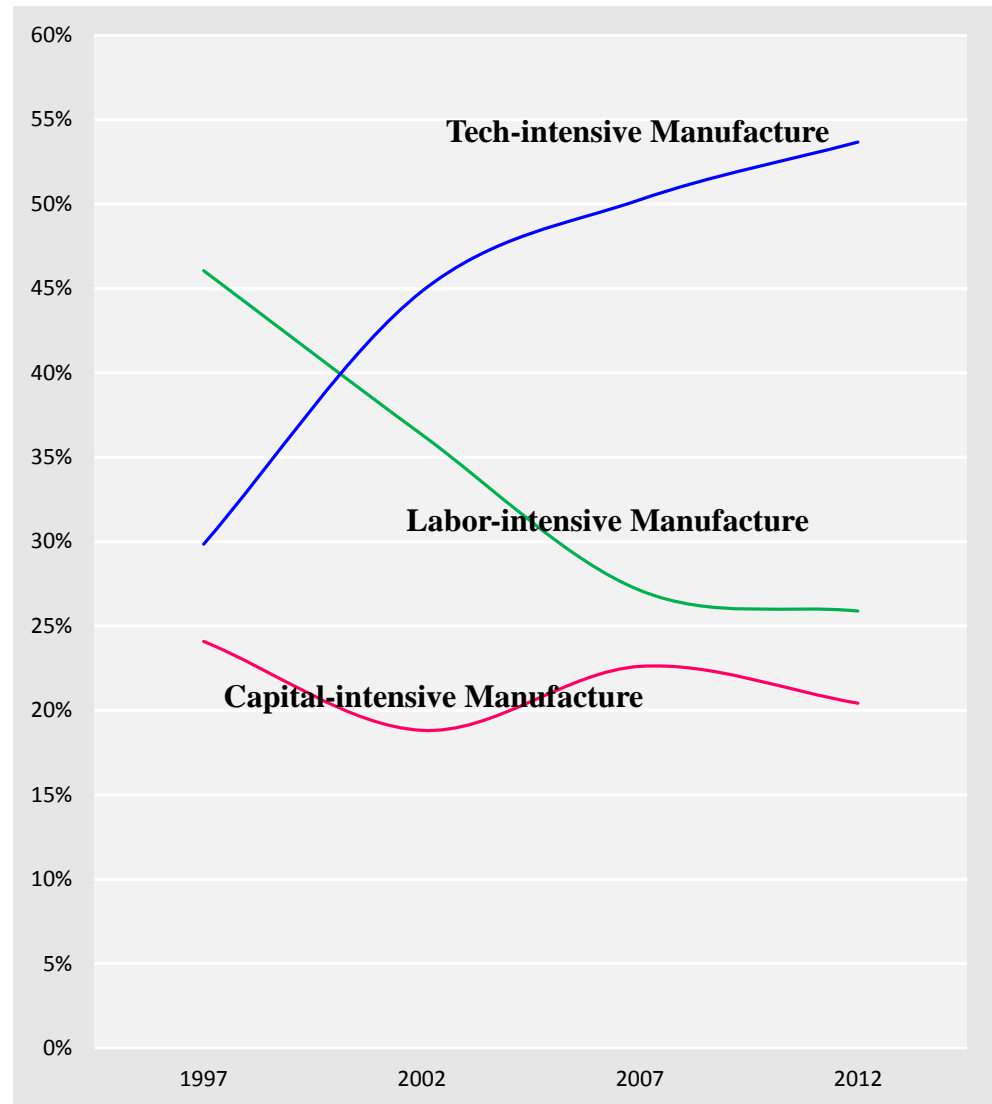
- From 2007 to 2012 Export proportion of Tertiary Industry is increasing, while the import proportion is increasing also.



International trade

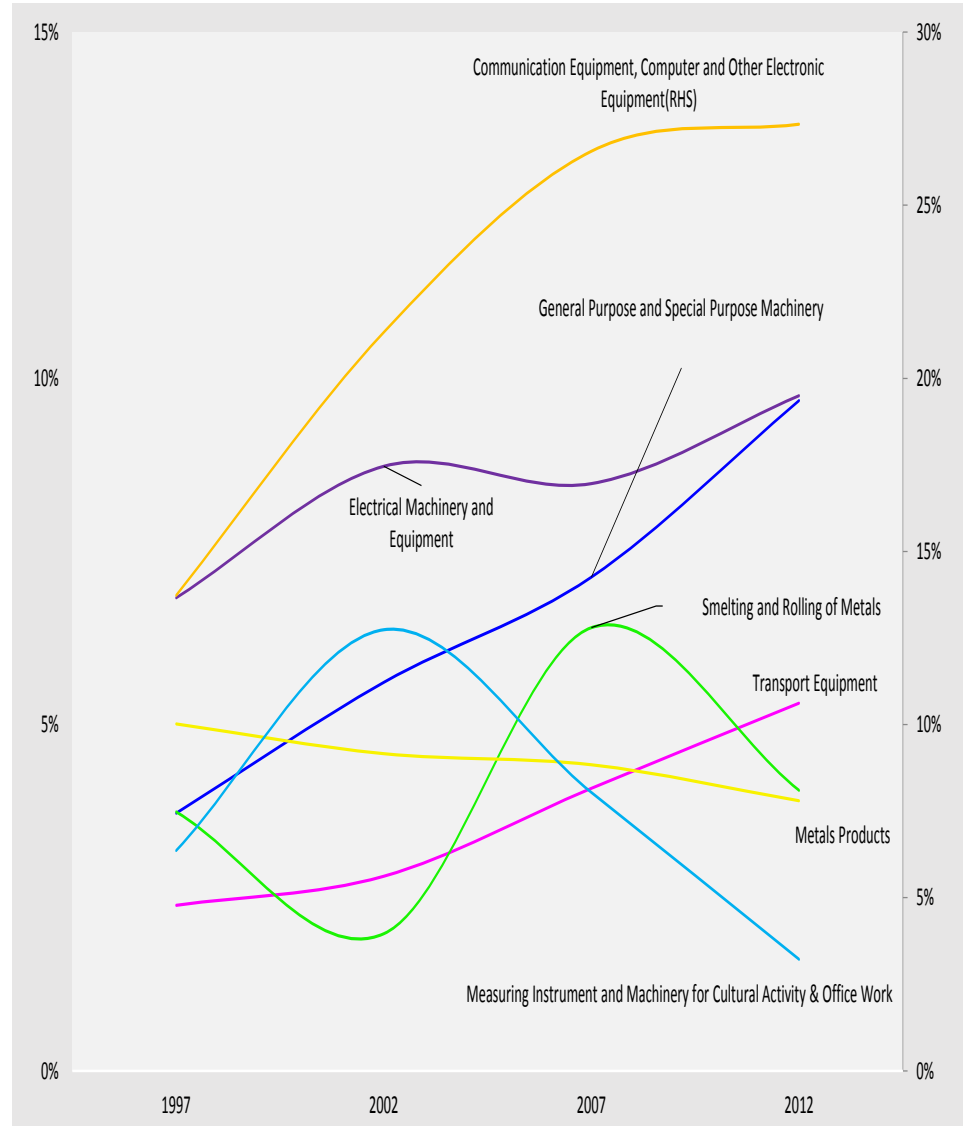
- **Upgrading in trade**
- **Export proportion of Labor-intensive manufacture decreases**
- Manufacture of Textile Wearing Apparel, Footwear, Leather, Fur, Feather and Its Products/Manufacture of Textile
- **Export proportion of Capital-intensive manufacture remains the same**
- Manufacture of Chemicals and Chemical Products / Manufacture of Fabricated Metals Products, Except Machinery and Equipment
- **Export proportion of Tech-intensive manufacture largely increases**
- Communication Equipment, Computer and Other Electronic Equipment/Measuring Instrument and Machinery for Cultural Activity & Office

Work



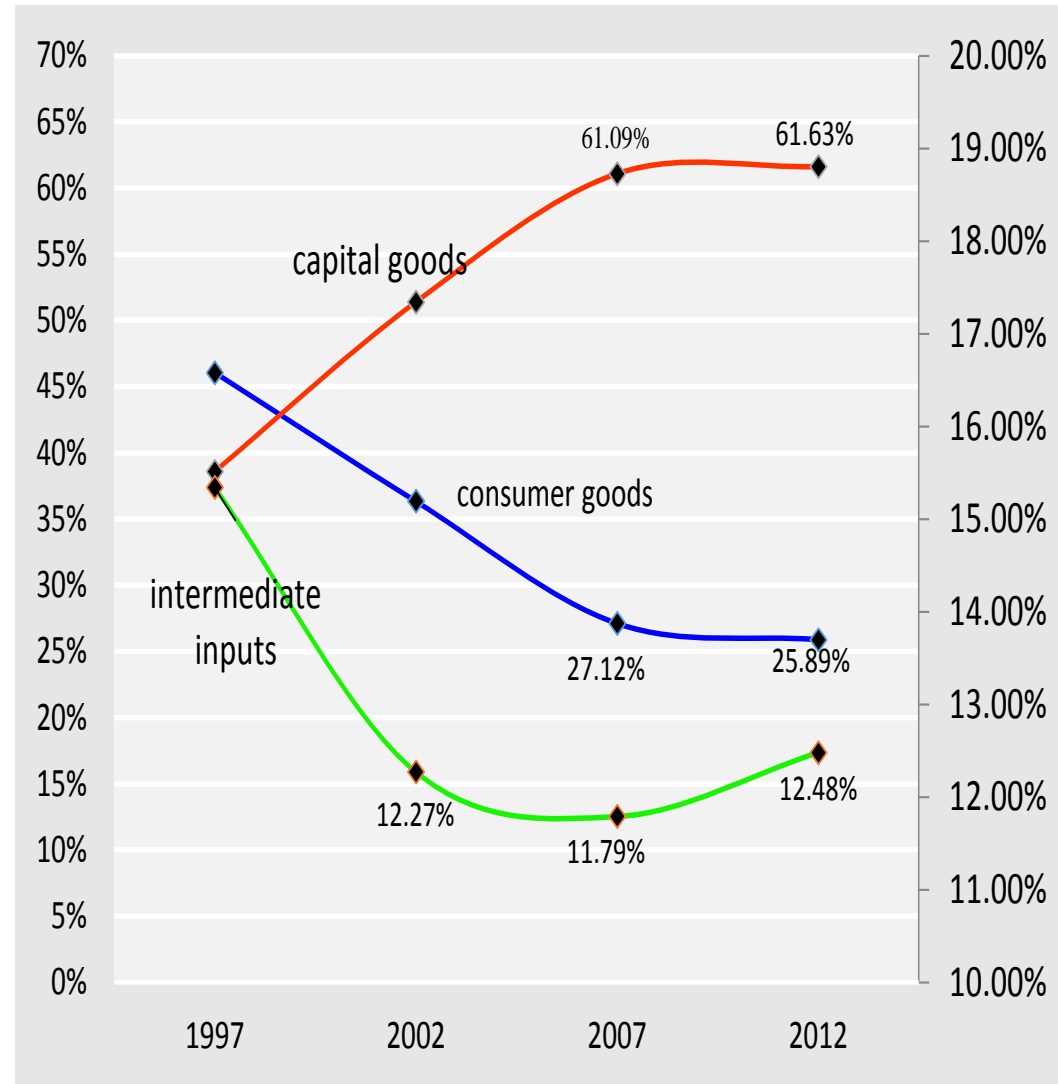
International trade

- **Upgrading in trade**
 - **The share of Machinery & transportation equipment export in total export continued to increasing very quickly.**



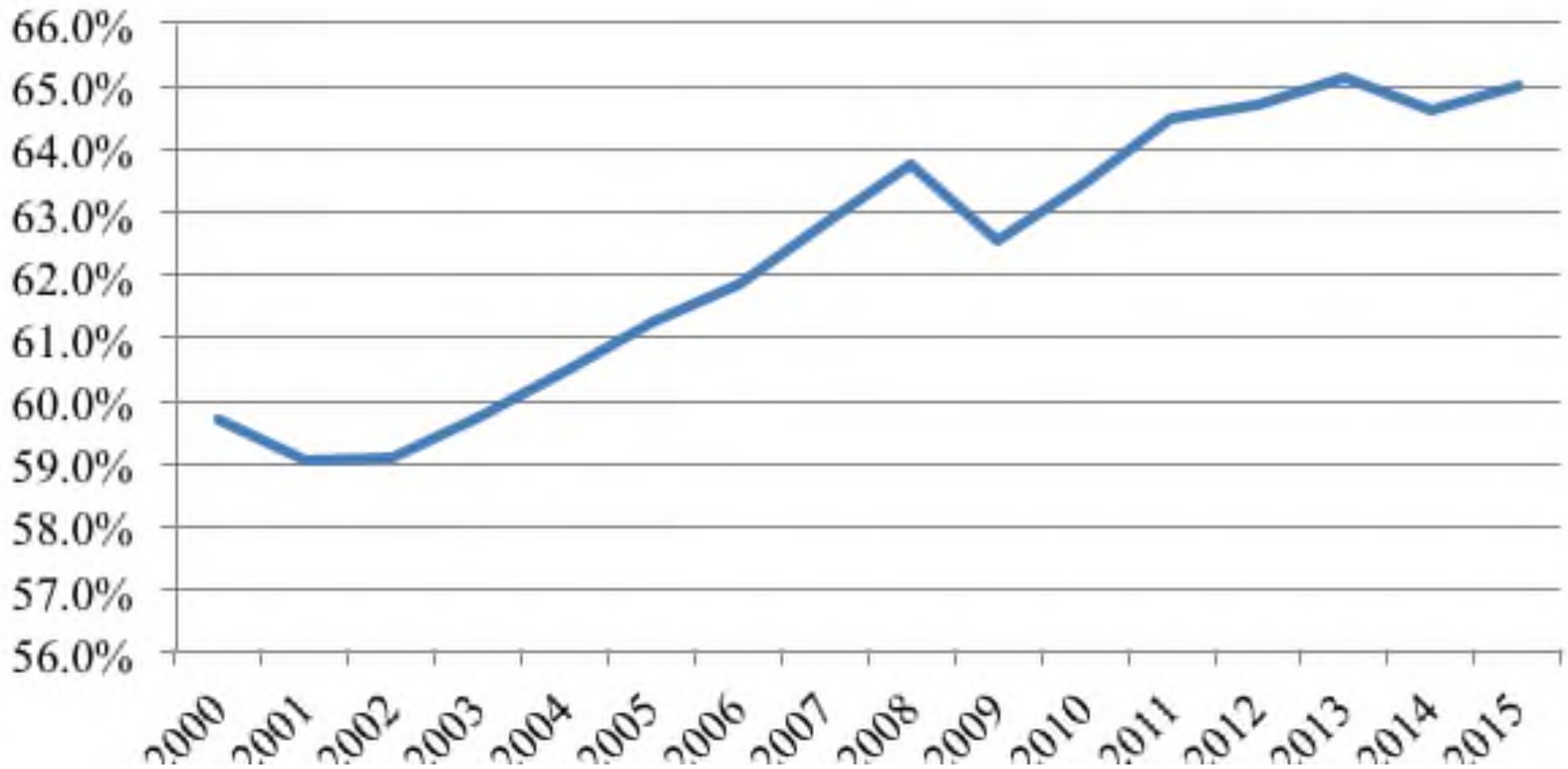
International trade

- The share of intermediate goods export in total export swing from falling to rising in 2012.





The share of intermediate goods export (2000–2015)





Conclusion

- **Input-Output Tables show us plenty of structural evidence that China's economy is undergoing transformation and upgrading.**
- **The main feature of this transformation is the growing impact of the service sector on China's economy.**



Conclusion

- **The manufacturing sector is still of fundamental importance to China's economy and the manufacturing is upgrading from low-medium to medium-high level.**
 - Structure of Manufacture- Proportion of Labor-intensive manufacture declines
 - Leading Industry changes-from labor-intensive to Tech-intensive manufacture
 - Foreign Trade Structure **upgrading**-Export and import proportion of Capital-intensive, Tech-intensive manufacture increases
- **The share of intermediate goods export in total increases from 2007 to 2012**



THANK YOU VERY MUCH!