The Effectiveness of China's Fiscal Policies on the Promotion of High-tech Industry

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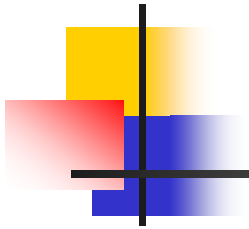
Motivation for the Analysis

- Swarming policies including fiscal policies have been introduced to stimulate the development of high-tech industry since 1990’s.
- The high-tech industry is developing rapidly without corresponding innovation capability improvement.

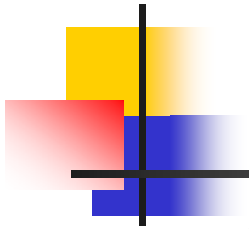
Overview of China's Fiscal Policies on the Promotion of High-tech Industry

- Background
  - As a developing country, China lack of the necessary capital and technology for the development
  - To realize the leapfrog of high-tech industry's development, China introduces series policies
  - The policies include: investment policies, favorable land prices, and especially fiscal policies



- Overview of the fiscal policies
  - Many policies are introduced by different level governments
  - On the national level, the fiscal policies could be ascribed to two groups
    - The deduction of enterprise income tax
    - The enlargement of the scope and proportion of tax credit

- Major Policies of the deduction of enterprise income tax
  - 1991, *Notice of the State Council on the approval of high-tech industry park and Related Policies*
    - For the enterprises in high-tech industry park, if the proportion of export relative to total production is greater than 70 percent , the tax rate of enterprise income tax is 10 percent.
    - 15% income tax and a two-year tax exemption is offered to new established high-tech companies in high-tech industry park of national level.



- 1994, *Notice of Preferential Policies of Enterprise Income Tax*
  - 15% income tax and a two-year tax exemption is offered to new established high-tech companies in high-tech industry park of national level.

- 2008, *Enterprise Income Tax Law of the People's Republic of China*
  - 15% income tax rate for high-tech companies was continued.
  - The tax favor was not restricted in the high-tech industry park.

- The enlargement of the scope and proportion of tax credit
  - 1996, *Regulation of Tax Policies on Encourage the Technical Progress of Enterprises*
    - the R&D fees can be deducted by the proportion of 150 percent before the income tax.

- The trend of the tax burden of high-tech industry since 1995
  - The tax burden of high-tech industry is lower than that of the manufacture.
  - The tax burden of the high-tech industry is decreasing since 1995.
  - The tax burden of the high-tech industry sectors is different.

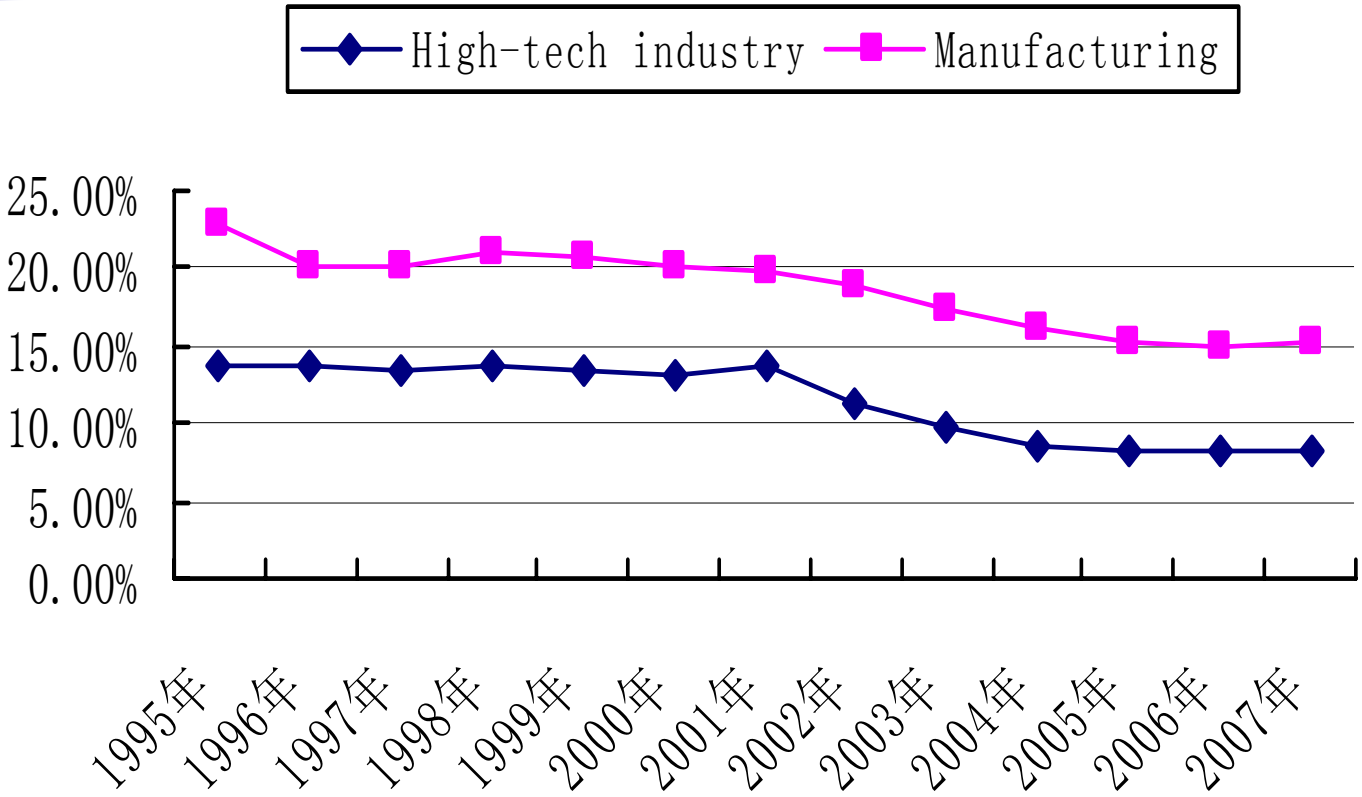


Figure 1 The Tax Burden of High-tech Industry and Manufacturing

Source: China's Statistics Yearbook on High Technology Industry

Table 1 The Tax Burden of Sub Sectors of High-tech Industry

	2003	2004	2005	2006	2007
Average Level	9.8%	8.5%	8.2%	8.3%	8.2%
Manufacture of Medicines	18.3%	17.5%	16.1%	15.0%	15.1%
Manufacture of Aircrafts and Spacecrafts	9.2%	4.9%	5.8%	6.1%	4.1%
Manufacture of Electronic Equipment and Communication Equipment	8.3%	6.4%	6.9%	7.5%	7.2%
Manufacture of Computers and Office Equipments	3.8%	4.6%	3.7%	3.9%	3.4%
Manufacture of Medical Equipments and Measuring Instrument	14.4%	12.7%	11.5%	10.7%	10.8%

Source: China's Statistics Yearbook ON High-tech Industry

Characterization of Chinese High-tech Industry

- High growth rate
  - Annual growth rate of value added is 21.8% comparing to 18.5% of manufacturing's

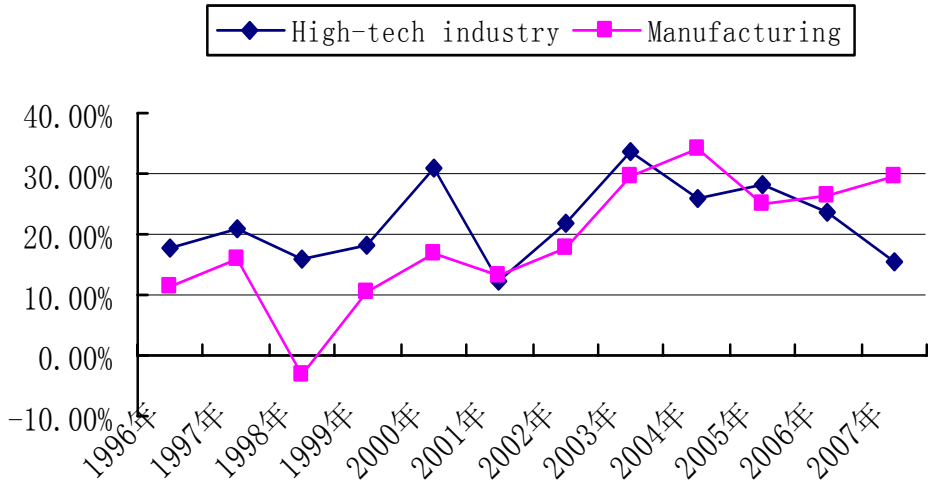


Figure 2 The Value Added Growth Rate of High-tech Industry and Manufacturing
Source: China's Statistics Yearbook on High Technology Industry

- The growth rate of different sector varied
  - Manufacture of computer and office equipments has the highest growth rate.

Table 2 The High-tech Industry Gross Output of Different Sectors (Billion RMB)

	1995	2007	Annual Growth Rate
Manufacture of Medicines	96.1	636.2	15.6%
Manufacture of Aircrafts and Spacecrafts	26.9	102.4	10.8%
Manufacture of Electronic Equipment and Communication Equipment	218.2	2508.8	20.7%
Manufacture of Computers and Office Equipments	35.4	1485.9	33.3%
Manufacture of Medical Equipments and Measuring Instrument	33.1	312.8	18.8%

Source: China's Statistics Yearbook on High Technology Industry, Computed by Authors

- The value added rate decreased
  - The index measures the innovation ability.
  - The decreasing accelerated after 2001.

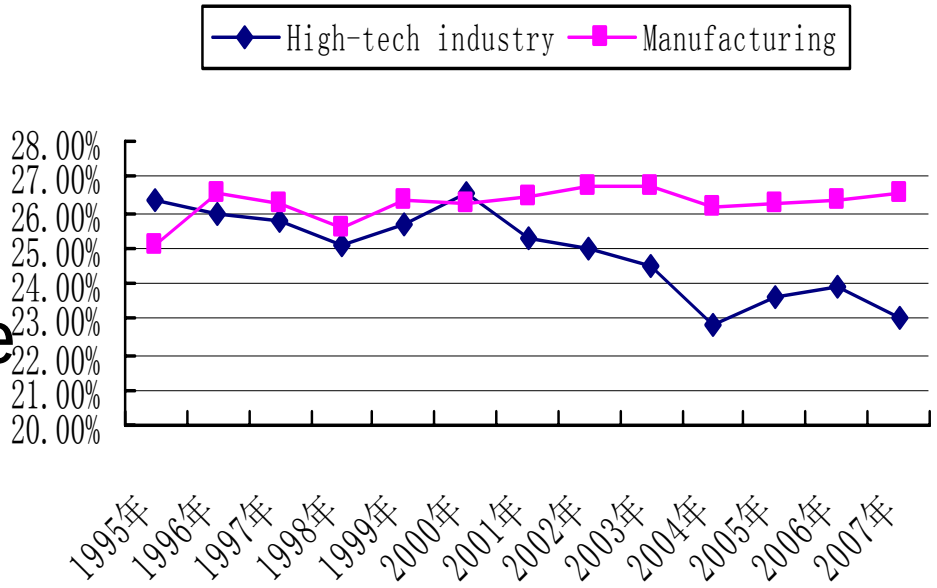


Figure 3 The Value Added Rate of High-tech Industry and Manufacturing
Source: China's Statistics Yearbook on High Technology Industry

- The value added rate has tight relevance with the output growth rate
  - the higher growth rate of gross output, the more decreased of the value added rate .

Table 3 Value Added Rate of Different Sectors (%)

	1995	2007	Changed
Manufacture of Medicines	27.5	35.9	8.4
Manufacture of Aircrafts and Spacecrafts	29.8	28.5	-1.2
Manufacture of Electronic Equipment and Communication Equipment	24.9	23.2	-1.7
Manufacture of Computers and Office Equipments	26.1	15.3	-10.8
Manufacture of Medical Equipments and Measuring Instrument	30.1	30.7	0.6

Source: China's Statistics Yearbook on High Technology Industry, Computed by Authors

Theoretical Models

- Indexes definition
  - The index measuring encouraging extent of fiscal policies

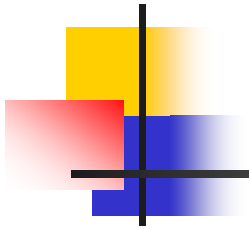
$$TAXF = TAXM - TAXH$$

  - The index measuring the development of high-tech industry

Value-added

  - The index measuring the innovative capability

$$VAD\_RATE = VALUE\_ADDED / OUTPUT$$



- Ideas for the analysis
  - Modeling the functions that define the value added and the innovation capability
  - Take TAKF into the functions
  - Judging the effectiveness of the fiscal policy by the statistical significance

- Function Structure
  - The value added determination function

$$HIOUTPUT = f(K, L, TAXF)$$

  - The innovative capability determination function

$$VAD\_RATE = f(R\&D, HR, TAXF)$$

Empirical Analysis

- Data
  - All the five sectors of the high-tech industry
  - Scope: from 1995 ,when China has the high-tech industry statistics to 2007
- Models
  - Panel data regression with varied coefficients in the sectors
  - Fixed effect after hausman test

Results of the empirical test(1)

Dependent variable: value added of high-tech sector, 1996-2007

Constant coefficient	-6.38[1.25]**
Log fixed capital	0.81 [0.08]**
Log TAXF_M	0.19 [0.08]**
Log TAXF_AS	0.37 [0.15]*
Log TAXF_EE	0.2[1.04]
Log TAXF_CO	0.06[0.10]
Log TAXF_MM	-0.39[0.54]
Observations	60
R-squared	0.93

Robust standard errors in brackets; * significant at 5%; ** significant at 1%

TAXF_M,TAXF_AS,TAXF_EE,TAXF_CO,TAXF_MM represent the TAXF for the sectors of Manufacture of Medicines, Manufacture of Aircrafts and Spacecrafts, Manufacture of Electronic Equipment and Communication Equipment, Manufacture of Computers and Office Equipments and Manufacture of Medical Equipments and Measuring Instrument respectively.

Results of the empirical test(2)

Dependent variable: value added rate, 1995-2007

Constant coefficient	-0.5[0.21]**
Log human resources	0.17[0.06]**
Log R&D inputs	0.05 [0.02]**
Log TAXF_M	0.01 [0.06]
Log TAXF_AS	-0.01 [0.05]
Log TAXF_EE	0.20[0.10]*
Log TAXF_CO	0.86[0.16]**
Log TAXF_MM	-0.09[0.09]
Observations	65
R-squared	0.93

Robust standard errors in brackets; * significant at 5%; ** significant at 1%

Conclusions

- Fiscal policies have supported the advancement of China's high-tech industry, but the influence on different sub sectors is not the same.
  - Fiscal policies have effects on the output of Manufacture of Medicines and Manufacture of Aircrafts and Spacecrafts.
  - Fiscal policies have effects on the innovation capacity of Manufacture of Electronic Equipment and Communication Equipment and Manufacture of Computers and Office Equipments.

Explanation of the results

- The explanation for the manufacture of medicines
  - Competitive market structure
  - The characteristic of medicines R&D process
  - Higher tax burden than other sectors
- The Explanation for the Manufacture of Aircrafts and Spacecrafts
  - High technical requirement.
  - Domestic enterprises take main role in this sector.

- The Explanation for manufacture of electronic equipment and communication equipment, manufacture of computers and office equipments
  - The development of the sectors is driving by FDI, fiscal stipulation is not the major reason for the inflow of FDI in these sectors.
  - Appropriate tax favor would benefit the MNC to localize more high value-added production arrangement in China.

Thanks!