

China's Slowdown and the Expected Impact on Japan's Economy: An Analysis Based on the World Input-Output Database (WIOD)

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1. Motivation

- China's economic growth has been characterized by extremely rapid capital accumulation and low total factor productivity (TFP) growth in most sectors, such as heavy and chemical industries and services (Wu 2015). Moreover, because of the one-child policy, China's demographic transition has proceeded much more quickly than in other developing economies.
- From a theoretical perspective, rapid capital accumulation coupled with slow TFP and labor input growth will result in a decline in the rate of return on capital through the diminishing marginal product of capital.
- In order for China to continue its rapid economic growth, the main driver of economic growth needs to switch from capital accumulation to TFP growth.

2. The Excess Saving Problem in China

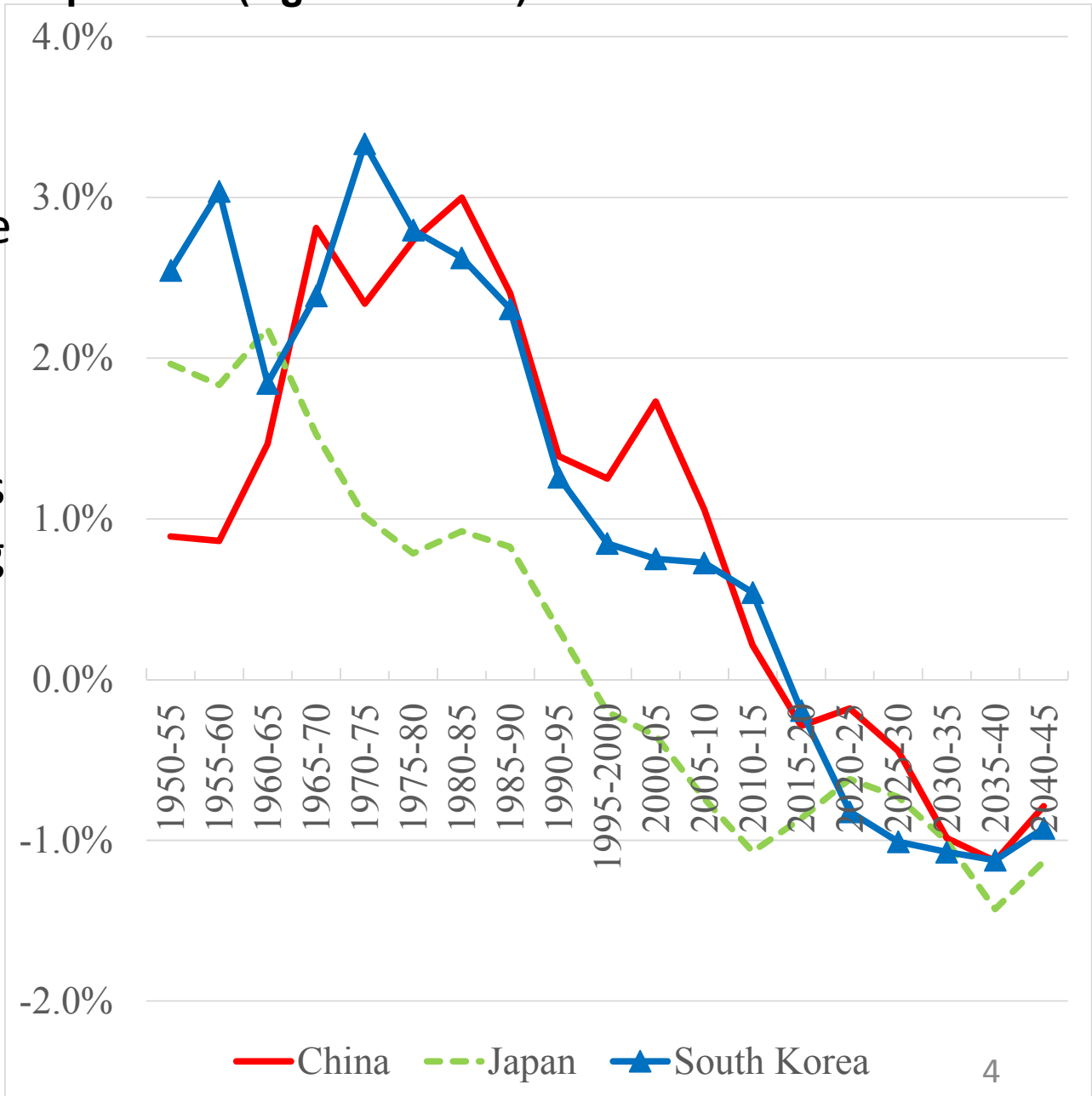
- The capital-labor ratio in China is rapidly increasing. Moreover, the working-age population will start to decline in few years.
- Moreover, on the supply side, China needs to switch from growth based on capital deepening to growth based on improvements in TFP.

China					
	1980-1991	1991-2001	2001-2007	2007-2010	1980-2010
Real GDP growth	7.7	9.2	11.2	10.3	9.2
Growth rate of labor input	2.9	2.1	2.1	2.0	2.4
Growth rate of capital service input	9.8	12.6	17.3	22.2	13.5
Contribution of labor input growth	1.4	1.1	1.0	1.0	1.2
Contribution of man-hours growth	1.4	0.9	0.8	0.4	1.0
Contribution of labor quality growth	0.0	0.2	0.2	0.6	0.2
Contribution of capital service input growth	4.9	6.3	8.6	11.1	6.7
TFP growth	1.4	1.8	1.6	-1.8	1.2
Growth rate of labor efficiency (Harrod-neutral technical progress)	2.8	3.6	3.1	-3.6	2.5
Rate of natural growth	5.7	5.7	5.2	-1.6	4.9

Source: Wu (2015) and authors' calculation.

Annual Average Growth Rate of Working Age Population (Aged 15 to 64):

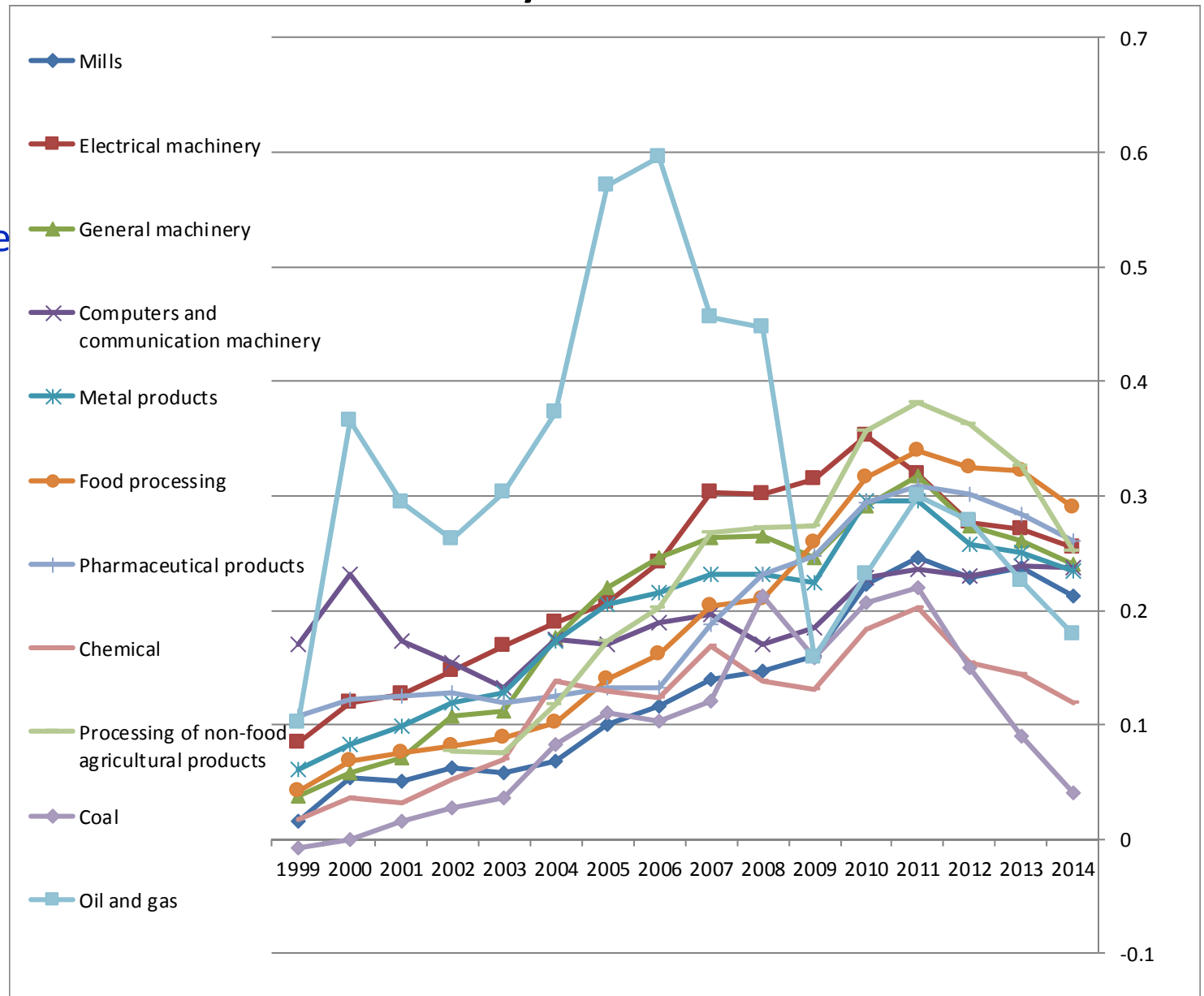
Probably as a result of the one-child policy, the annual growth rate of China's working age population has quickly declined in recent years and is now approaching zero.



Gross Rate of Return on Capital in China's Manufacturing Sector: By Subsector

China's capital deepening appears to have reduced the rate of return on capital by reducing the marginal product of capital.

Since around 2010, the rate of return on capital has declined substantially in all manufacturing subsectors.

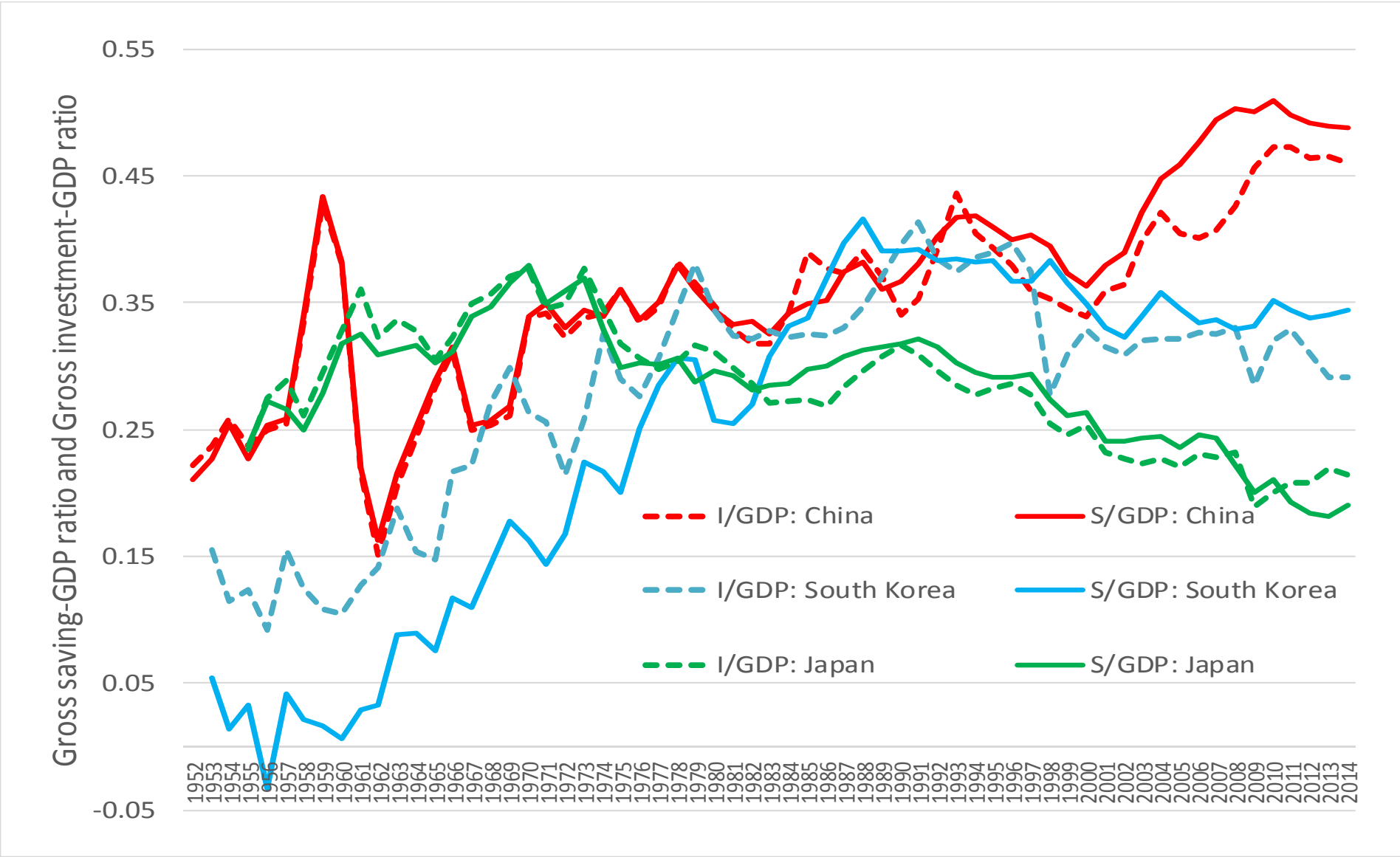


Source: CEIC Database.

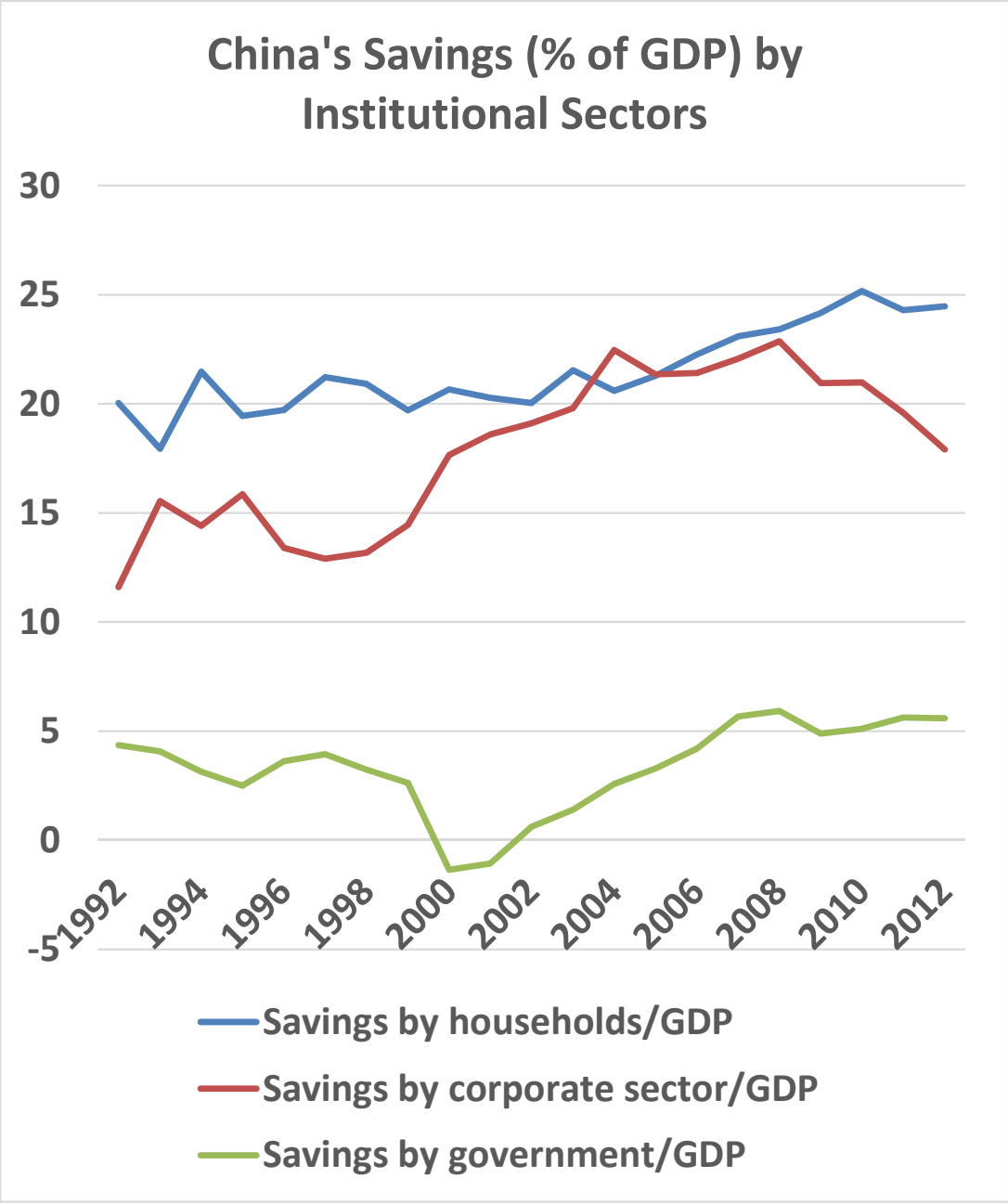
1. Motivation (Contd.)

- However, such a switch in the growth engine will give rise to an excess saving problem.
- For sustainable growth, China also needs to increase its domestic consumption and reduce its high gross saving-GDP ratio and gross investment-GDP ratio.
- Exports to China from some developed economies such as Japan, Germany, and South Korea mainly consist of investment goods, advanced materials, and parts and components, which are used as inputs in the production process of investment goods in China and other Asian countries. For such economies, China's transformation might have a large negative impact (Wolf 2015).
- The main goal of the paper is to examine this issue in detail.
- To take indirect effects into account, we use the World Input Output Database (WIOD).

To achieve sustainable growth, China needs to switch from investment-led growth to consumption-led growth.



Source: National Accounts Statistics.

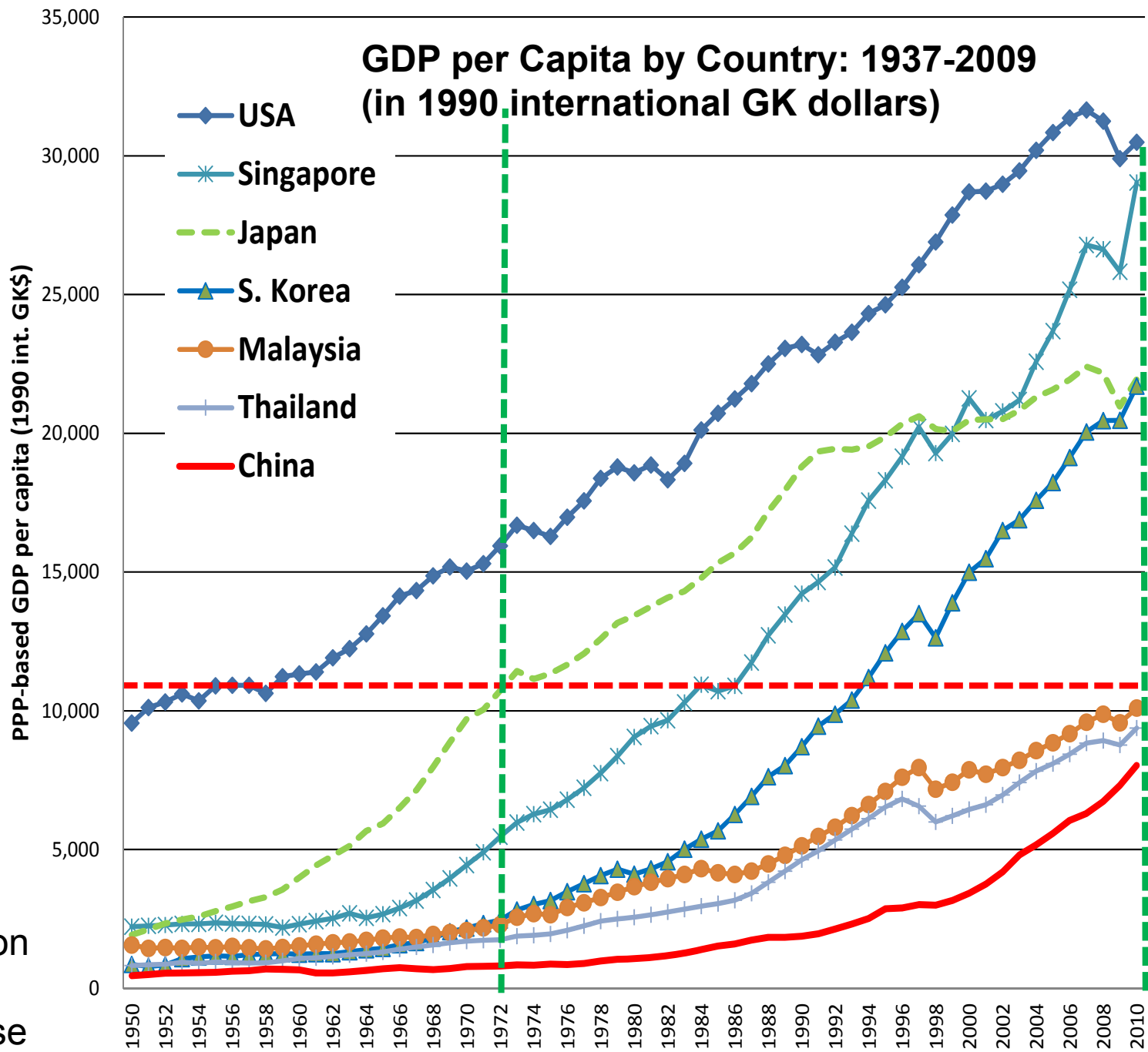


Source: CEIC Database.

2. Expected Impact of China's Slowdown on Developed Economies

We compare the following three scenarios regarding China's final demand in 2020 and economic growth from 2015 to 2020.

- (1) Optimistic scenario (GDP growth rate=6.2%, I/GDP=0.501)
- (2) Slowdown scenario (GDP growth rate=4%, I/GDP=0.501)
- (3) Structural reform scenario (GDP growth rate=6.2%, I/GDP=0.3)



Maddison
Project
Database

2. Expected Impact of China's Slowdown on Developed Economies

Data and Analytical Approach

The WIOD covers 35 industries in each of the 41 countries (including the rest of the world) for the years 1995 to 2011.

The difference in the number of workers in each sector of each country caused by the difference in final demand, Δf , is determined by

$$\Delta e = Z\Delta q = Z(I-A)^{-1}\Delta f$$

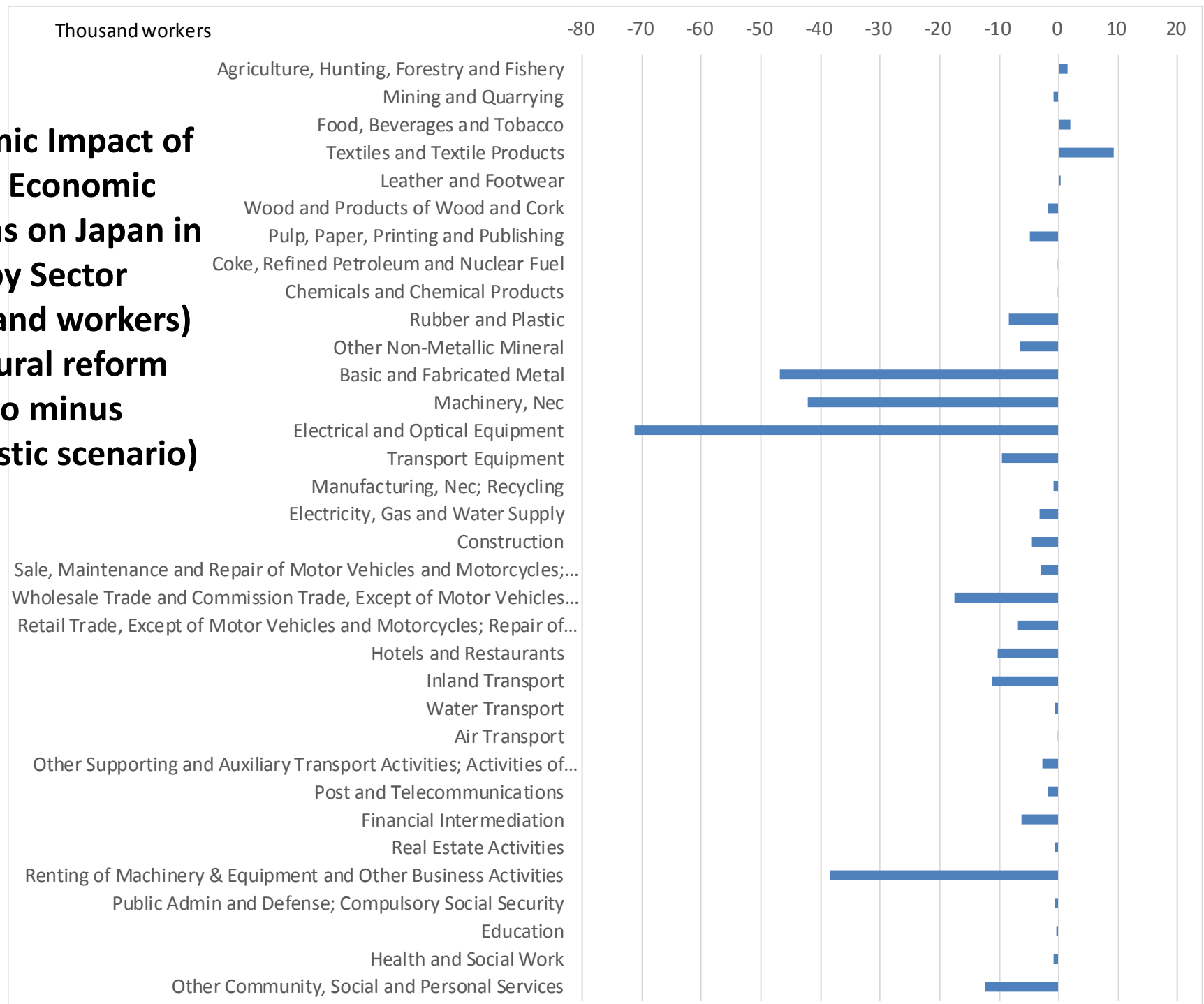
We assume that within each of China's final demand components (household and government consumption, gross fixed capital formation, and inventory investment), the share of demand for the output of each industry in each country remains constant.

3. Main Results

Economic Impact of China's Slowdown and Economic Reforms on Japan, the United States, and Germany in 2020 (thousand workers)

		Japan	United States	Germany
a	Impact of growth slowdown: Slowdown scenario (GDP growth rate=4%, I/GDP=0.501) minus optimistic scenario (GDP growth rate=6.2%, I/GDP=0.501)	-204	-211	-174
b	Impact of structural reforms: Structural reform scenario (GDP growth rate=6.2%, I/GDP=0.3) minus optimistic scenario (GDP growth rate=6.2%, I/GDP=0.501)	-302	-135	-225
b-a	Comparison between structural reforms and slowdown: Slowdown scenario (GDP growth rate=4%, I/GDP=0.501) minus structural reform scenario (GDP growth rate=6.2%, I/GDP=0.3)	-98	76	-51

**Economic Impact of
China's Economic
Reforms on Japan in
2020: by Sector
(thousand workers)
(Structural reform
scenario minus
Optimistic scenario)**



3. Main Results (contd.)

- Japan and Germany would suffer more from structural reforms in China than from a slowdown in growth.
- Meanwhile, in the case of the United States, the employment decline triggered by structural reforms would be much smaller than the employment decline caused by a growth slowdown.
- Under China's economic reforms, the largest decline in Japan's employment would occur in investment goods sectors such as basic and fabricated metal, machinery not elsewhere classified, and electrical and optical equipment. Renting of machines and equipment and other business activities would also be hit hard. The total employment decline in the four sectors would be 199,000, making up about two-thirds of the overall estimated decline in employment in Japan.