

The Causes of Japan's Economic Slowdown and Necessary Policies: An Analysis Based on the Japan Industrial Productivity Database 2018

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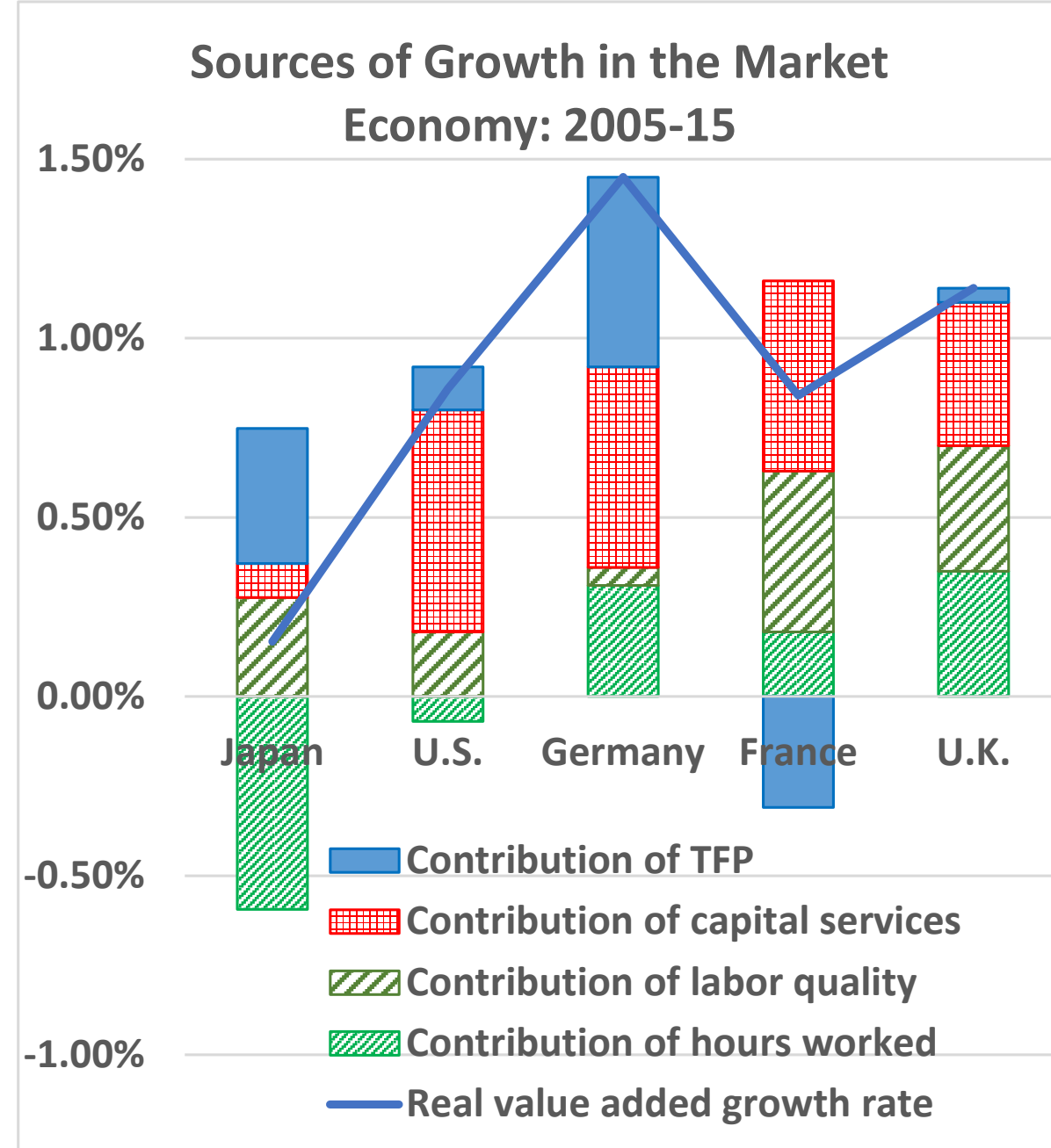
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1. Introduction

- Using a KLEMS type database, we analyze why Japan's economic growth during the 2005–2015 period was much slower than that of other major economies.
- For this analysis, we use the JIP Database 2018, which fully reflects changes in the 2008 SNA and, for example, treats research and development (R&D) expenditure as capital formation. Alongside, we use the EU KLEMS Database.
- We find that sluggish investment in capital services was the key cause of Japan's slow economic growth in addition to the decline in the working-age population.
- Based on this finding, we analyze why capital accumulation was so slow in Japan.

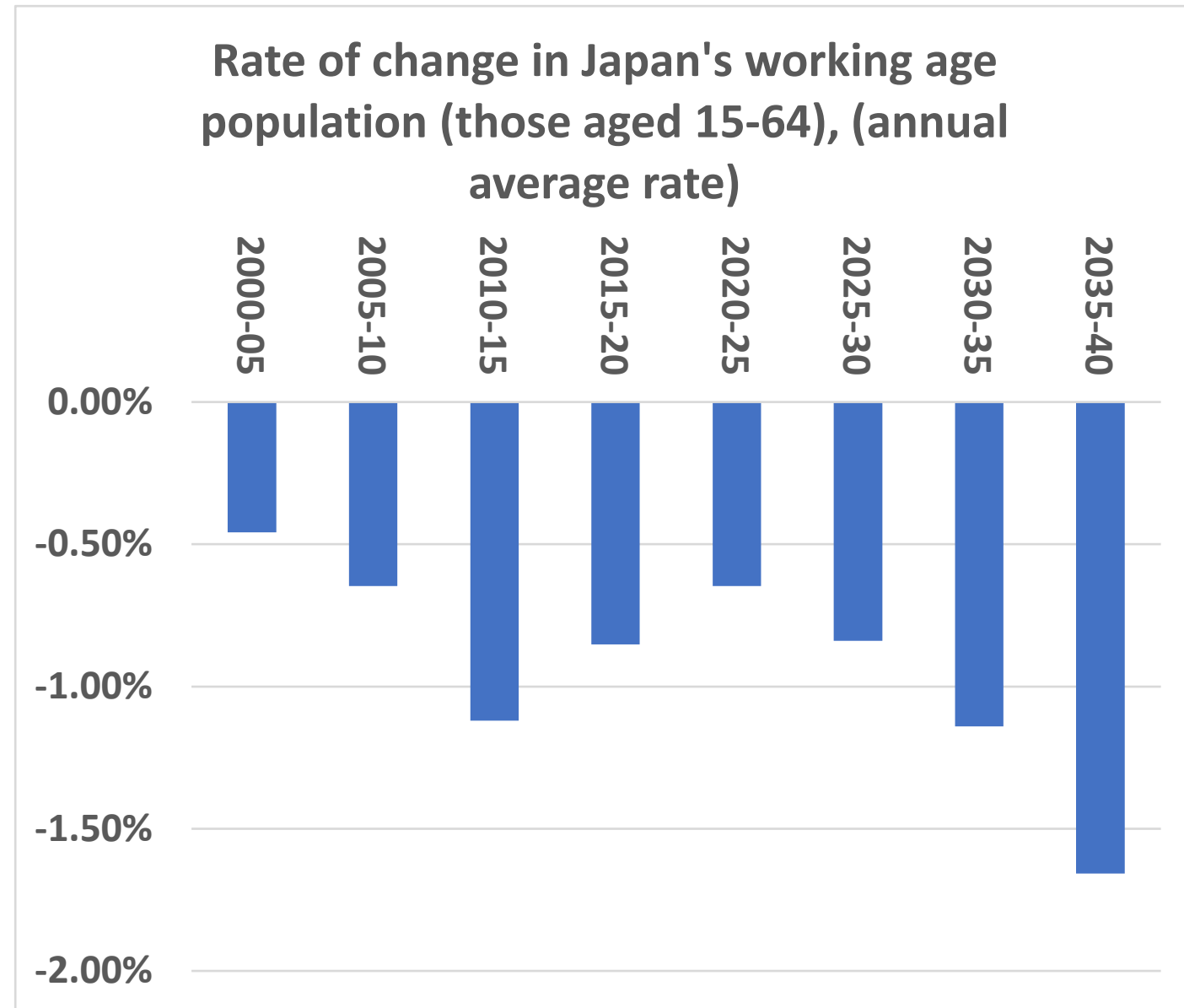
2. Sources of Economic Growth in Japan and Major Economies

- Japan's TFP growth during the period 2005-15 was the second-highest, after to Germany.
- Japan's economic growth rate was very slow because of the following two factors:
 - 1) Decline in hours worked.
 - 2) **Very sluggish capital accumulation.**



2. Sources of Economic Growth in Japan and Major Economies (contd.)

- The decline in hours worked can be easily explained by Japan's decline of working age population.
- Can Japan's very sluggish capital accumulation also be explained by population decline, as well as the law of diminishing marginal productivity of capital?



3. Japan's Slow Capital Accumulation

- According to standard neoclassical growth theory, in an advanced economy, assuming that technological progress is Harrod-neutral, under steady-state growth in which the marginal productivity of capital does not diminish (balanced growth), **the rate of capital accumulation is equal to the rate of GDP growth (natural growth rate), which is defined as the sum of the long-run rate of labor input growth and the Harrod-neutral rate of technological.**
- Based on this neoclassical growth theory perspective, we calculate the natural growth rate (and the rate of capital accumulation in balanced growth, which equals the natural growth rate) and compare it with the actual rate of increase in the capital stock. For this calculation, we exclude the non-market economy, for which TFP is difficult to measure.
- Assuming Harrod-neutral technological progress, the rate of technological progress equals the TFP growth rate divided by the income share of labor.
- As the long-run rate of labor input growth, we use actual data of the sum of changes in hours worked and labor quality improvements.

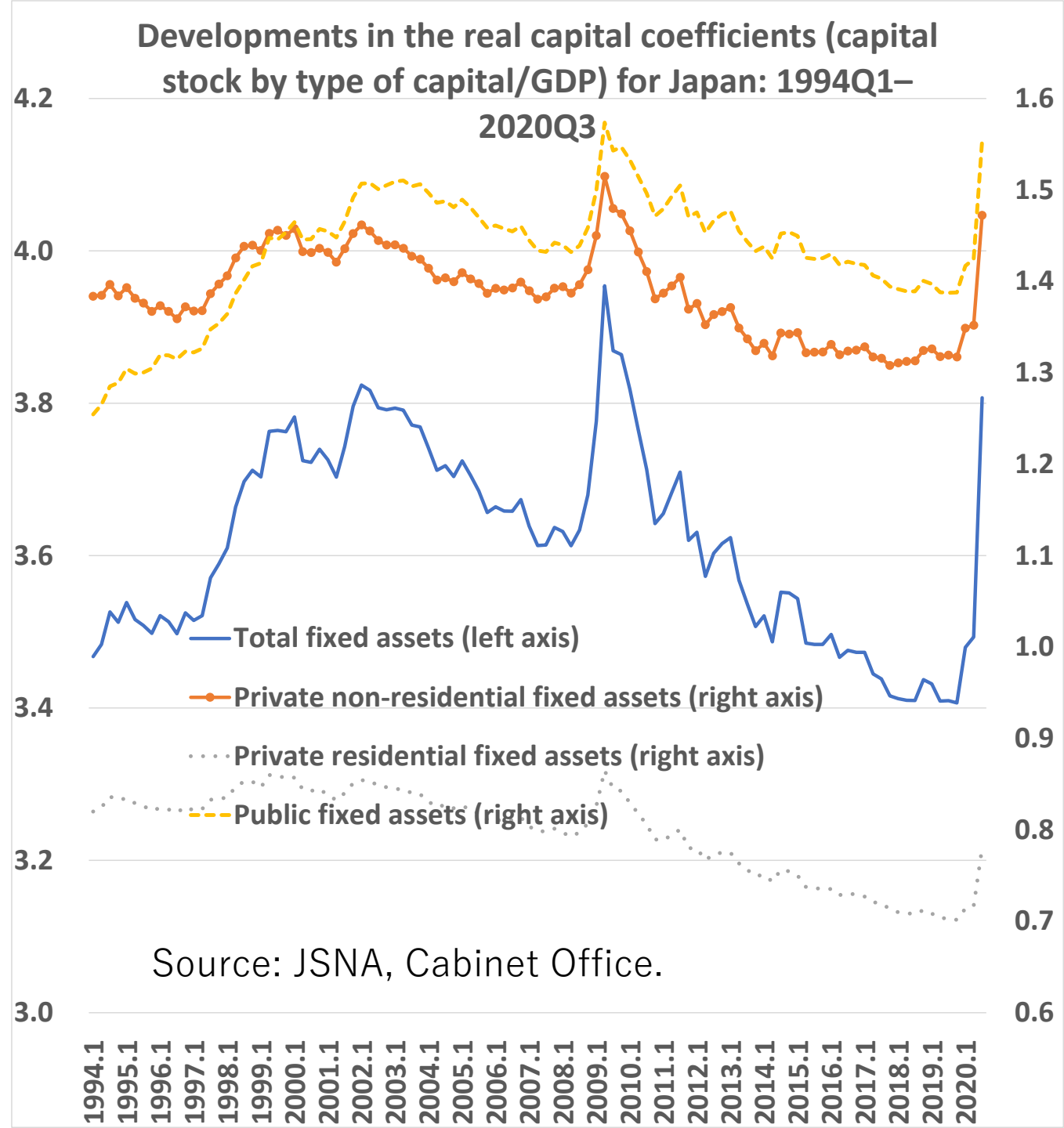
3. Japan's Slow Capital Accumulation

		Japan		U.S.		Germany	
		1995-2005	2005-2015	1998-2005	2005-2015	1995-2005	2005-2015
Labor input growth	a	-0.69%	-0.58%	0.05%	0.18%	-0.57%	0.52%
TFP growth	b	0.77%	0.38%	1.41%	0.12%	0.48%	0.53%
Harrod-neutral technological progress	c=b/d	1.39%	0.69%	2.22%	0.20%	0.67%	0.77%
Labor income share	d	55.4%	54.9%	63.5%	60.0%	71.4%	68.6%
Natural growth rate	e=a+c	0.70%	0.11%	2.27%	0.38%	0.10%	1.30%
Actual capital stock growth rate, G(K)	f	1.34%	0.01%	5.32%	2.36%	3.10%	1.80%
G(K) – natural growth rate	g=f-e	0.64%	-0.09%	3.05%	1.98%	3.00%	0.51%
		France		U.K.			
		1995-2005	2005-2015	1997-2005	2005-2015		
Labor input growth	a	1.22%	0.86%	0.81%	0.99%		
TFP growth	b	0.84%	-0.31%	1.42%	0.04%		
Harrod-neutral technological progress	c=b/d	1.19%	-0.42%	2.06%	0.06%		
Labor income share	d	70.6%	73.4%	68.9%	70.8%		
Natural growth rate	e=a+c	2.41%	0.44%	2.87%	1.04%		
Actual capital stock growth rate, G(K)	f	3.10%	1.80%	5.17%	1.92%		
G(K) – natural growth rate	g=f-e	0.69%	1.37%	2.30%	0.88%		

Note: Calculations are based on data for the market economy. 6

3. Japan's Slow Capital Accumulation

- We can't explain Japan's sluggish capital accumulation by population decline and the law of diminishing marginal productivity of capital.
- Japan experienced an almost continuous sharp decline in capital coefficients from 2003.

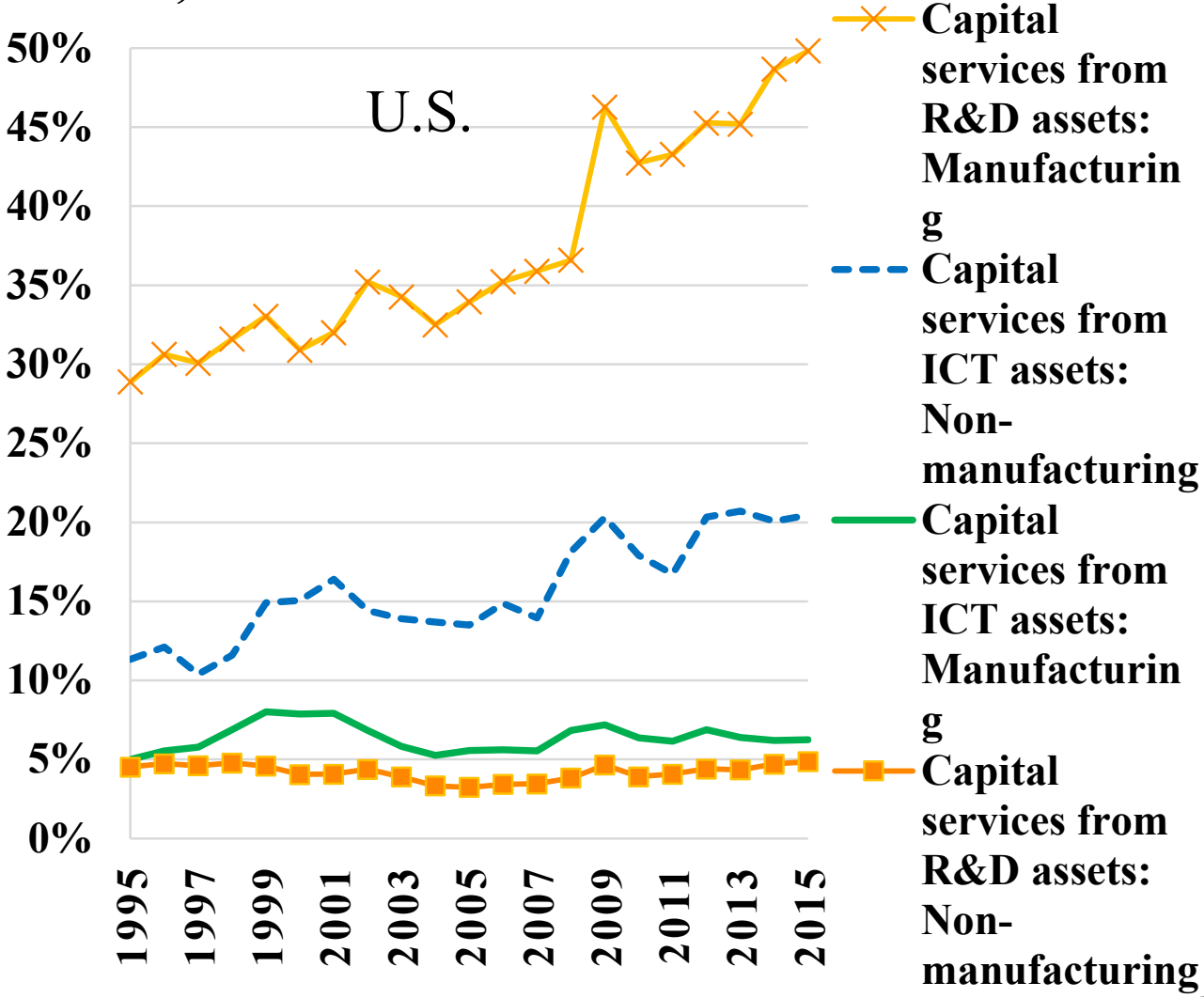
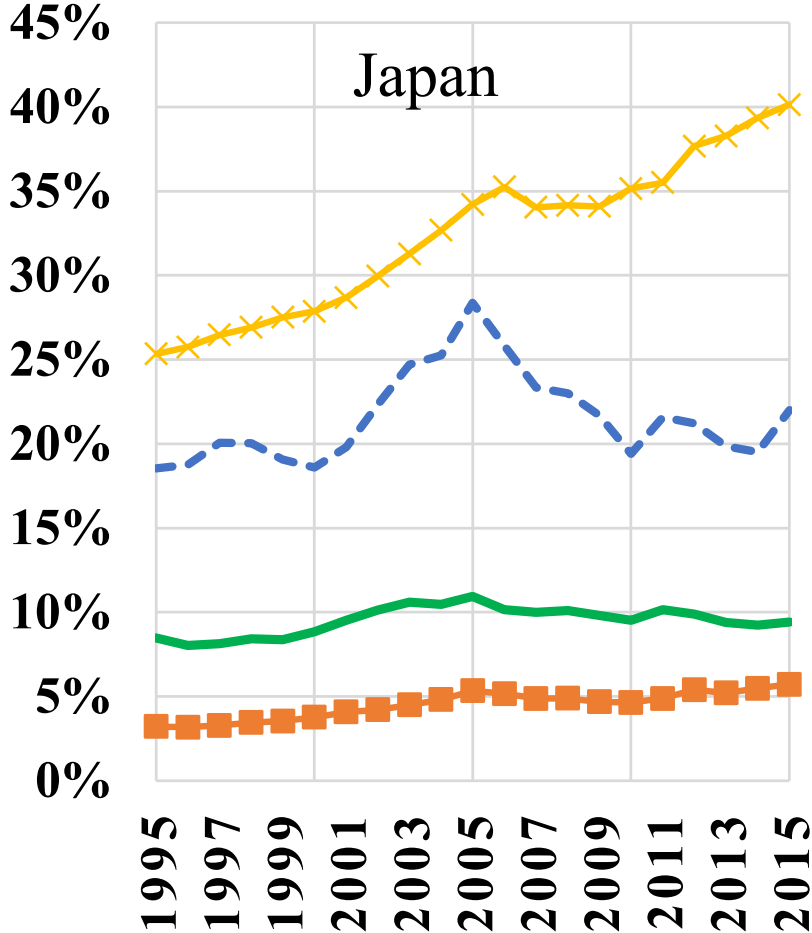


4. Input of Information and Communication Technology and Intangible Assets

- One of the reasons for Japan's sluggish productivity growth that has been frequently highlighted is weak investment in information and communication technology (ICT) and intangible assets (see Fukao et al., 2009, and Fukao et al., 2016).
- We examine this issue through comparisons of ICT inputs and intangible asset investment between Japan and the United States

4. Input of Information and Communication Technology and Intangible Assets

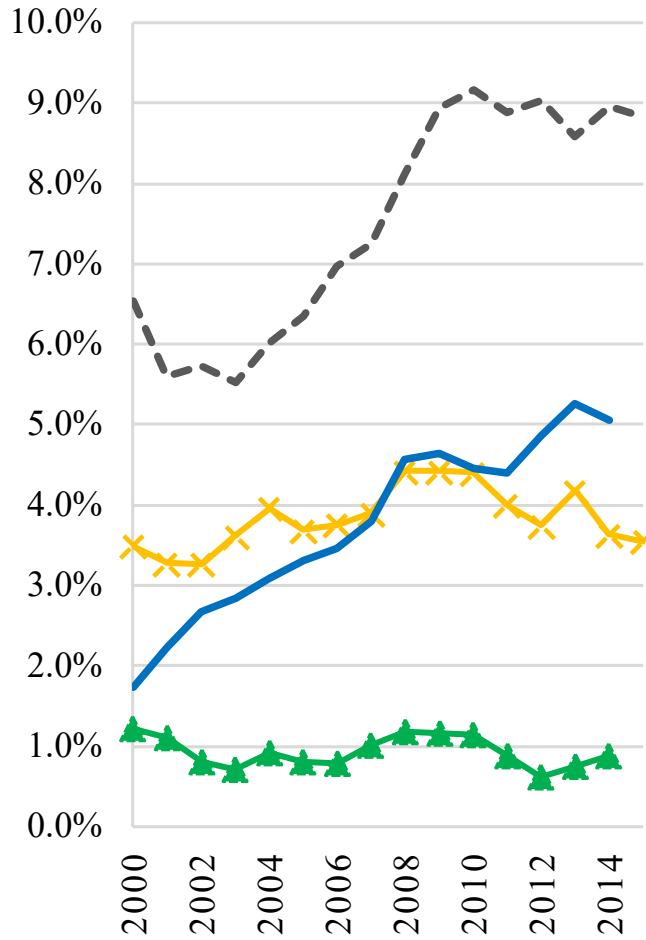
Share of R&D and ICT capital services in total capital services input (market economy): Japan-U.S. comparison, 1995–2015



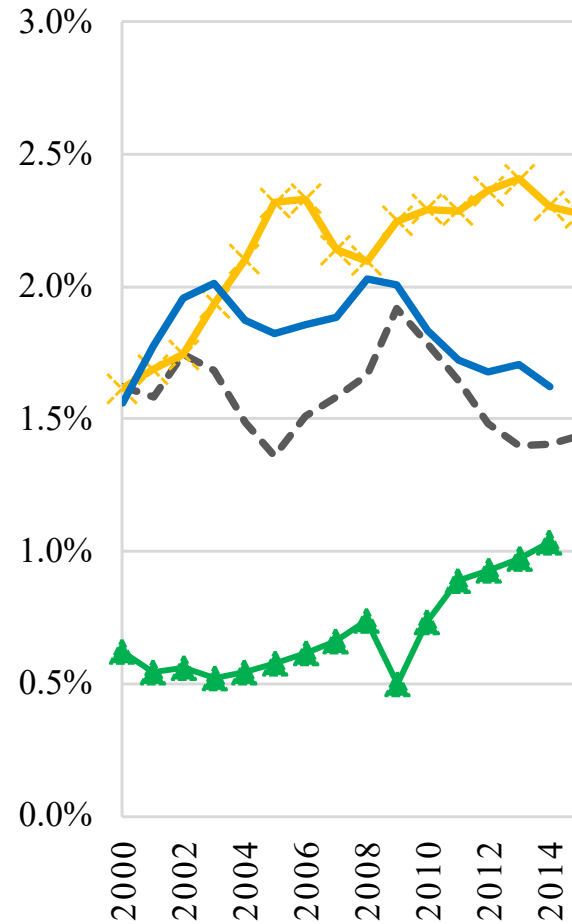
4. Input of Information and Communication Technology and Intangible Assets

- There is no clear evidence that the U.S. tends to have a higher share of ICT and R&D assets while Japan tends to have a higher share of other assets.
- As highlighted, for example, by van Ark (2016), there has recently been a growing tendency not only to invest in ICT assets outright but also to purchase ICT services from ICT service vendors, including the use of cloud services.
- Using IO tables, we compared the value added ratios of ICT capital services input and intermediate ICT services input in the finance, wholesale, and retail sectors, which can be regarded as ICT-intensive industries, in Japan and the U.S.

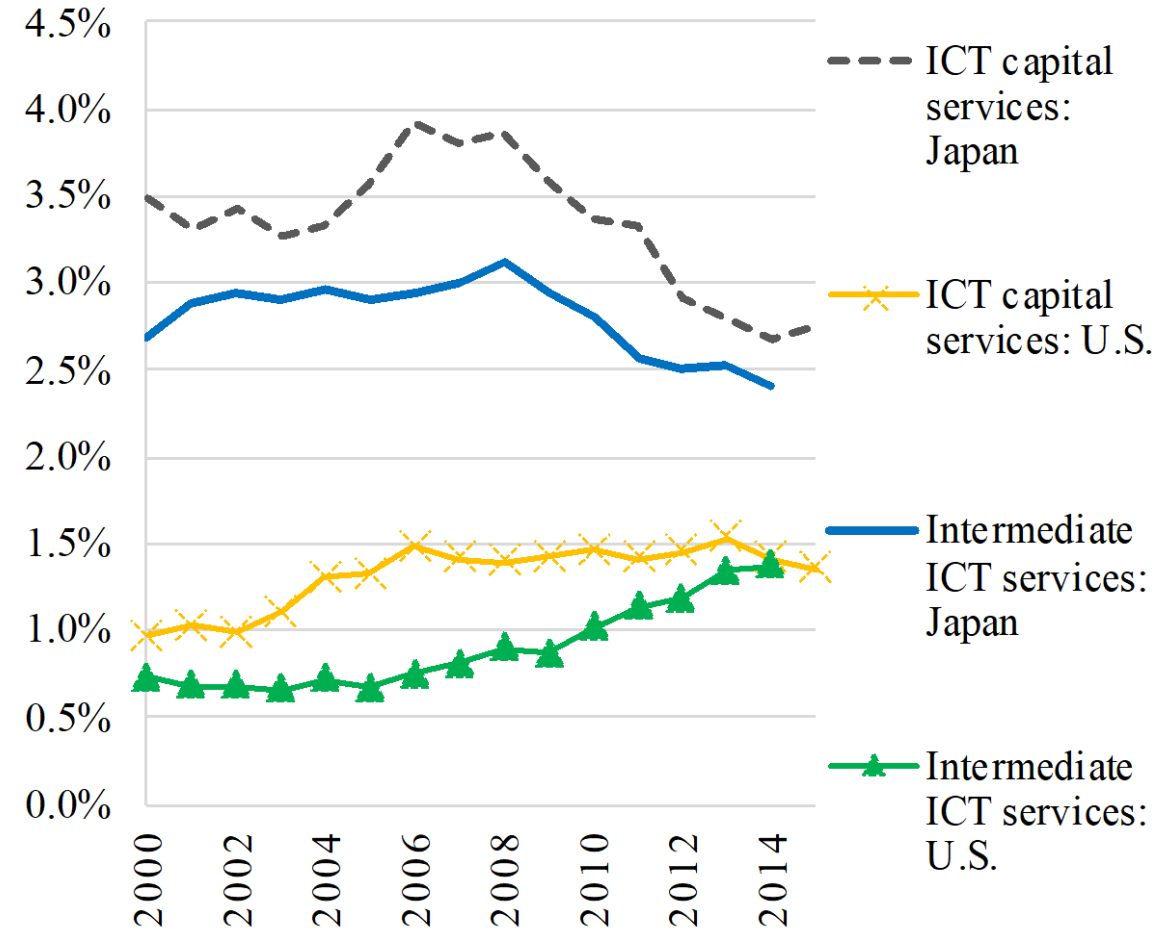
ICT capital services input and intermediate ICT services input in Japan and the U.S.: Finance, wholesale, and retail, 2000–2015



Finance



Wholesale



Retail

Sources: See Table 3 for the sources for ICT capital services and the denominator, value added. Intermediate ICT

- Japan's accumulation of ICT and R&D capital has been very slow in recent years. However, we found that the share of ICT and R&D investment in total investment is not particularly low when compared with the U.S., although the issue of price differences between Japan and the U.S. in terms of ICT capital services and intermediate ICT services needs to be borne in mind.

METI's Statistics on Intermediate Input Prices: 2012

	Relative price: Japan/US
Telephone call (within city)	1.62
Telephone call (400 km)	3.56
Minimum charge for telephone line (business use)	0.99
Telephone call (international)	9.54
High-speed digital leased line	4.05
International leased line	7.94
Minimum charge for ADSL internet connection	1.09
Cellular phone call charge (one minute)	3.56
Cellular phone monthly fee (packaged plan)	2.92
Packaged software (average cost to purchase 100 sets of Windows Vista, Word 2007, and Excel 2007)	2.27
Outsourcing of payroll accounting	2.56

- What is concerning for Japan's future growth is not that the technologies employed by firms are not ICT- or R&D-intensive, but that, generally, firms do not invest to begin with.

4. Input of Information and Communication Technology and Intangible Assets

Real capital stock growth rates: Japan-U.S. comparison by type of assets and sector (annual rate, %)

	Japan				U.S.			
	1995-2000	2000-2005	2005-2010	2010-2015	1995-2000	2000-2005	2005-2010	2010-2015
Total capital stock								
Market economy	1.94%	0.73%	0.04%	-0.01%	6.13%	4.90%	2.40%	2.33%
Manufacturing	1.15%	0.62%	0.39%	-0.16%	4.39%	2.24%	1.73%	1.69%
Services	2.26%	0.77%	-0.09%	0.04%	6.70%	5.65%	2.57%	2.48%
ICT capital stock								
Market economy	10.14%	5.34%	2.18%	1.12%	15.12%	6.48%	5.82%	3.89%
Manufacturing	8.43%	5.72%	1.98%	0.70%	13.69%	0.74%	5.22%	3.05%
Services	10.62%	5.24%	2.24%	1.23%	15.34%	7.21%	5.88%	3.97%
R&D capital stock								
Market economy	3.02%	1.81%	1.42%	0.70%	5.02%	3.17%	3.66%	3.10%
Manufacturing	2.80%	1.84%	1.77%	0.88%	5.11%	3.81%	4.13%	3.04%
Services	3.88%	1.66%	0.02%	-0.09%	4.76%	1.16%	1.98%	3.32%

5. Concluding Remarks

Why Is Japan's Capital Accumulation So Sluggish?

- Demographic factors? ← Partly yes. But these are not enough to fully explain the sluggishness.
- Slow TFP growth? ← No. Japan's TFP growth was higher than that of U.S., U.K., and France.
- Weak investment in ICT and R&D? ← No. Firms generally do not invest much to begin with.

Other potential explanations

- SMEs are left behind? ← No. Large firms also do not invest much.
- Increase of low wage part-time workers (female workers and elderly workers)? ← Probably, partly yes.

5. Concluding Remarks (Contd.)

Other potential explanations (contd.)

- Excess investment in other major countries? ← Probably, partly yes. From the 1990s, when Japan's prolonged stagnation began, to the early 2000s, authorities tried to maintain economic growth by promoting private investment through monetary easing and public investment. It appears as though the U.S. economy after the global financial crisis resembles Japan's economy during the 1990s.
- It is also possible that although it has not yet resulted in higher TFP growth, the emergence of new technologies is generating vigorous investment. Fierce competition among companies trying to lead the so-called Fourth Industrial Revolution that is currently underway is triggering investment in R&D and ICT. For example, the total R&D investment of Apple, Amazon, Microsoft, Intel, and Google in 2016 was approximately 7.2 trillion yen. This is more than half of the 13.3 trillion yen R&D investment by all Japanese firms together (according to the 2017 Survey of Research and Development).