

Service Sector Productivity in Japan: An Analysis Based on the JIP Database

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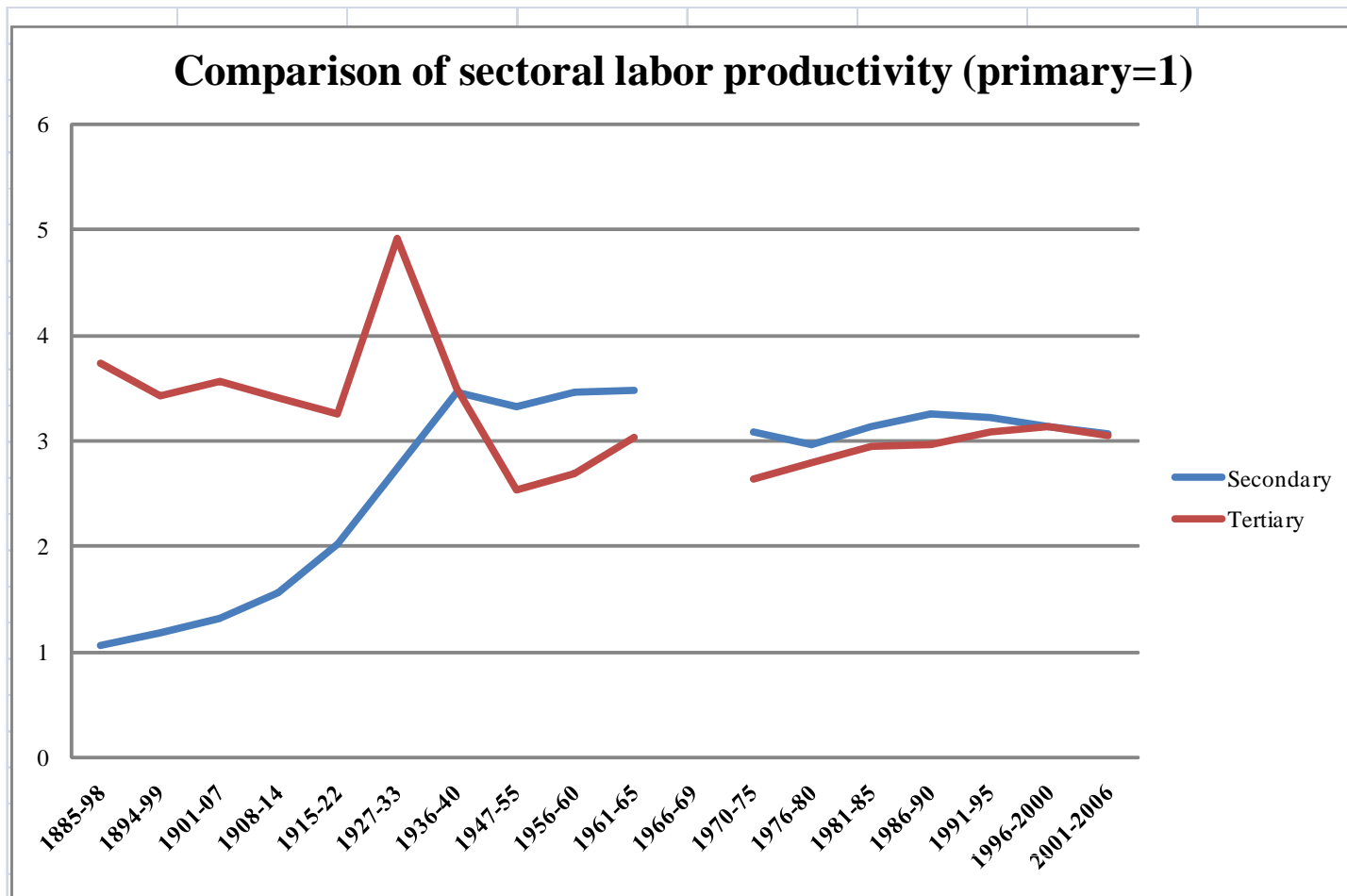
(Gakushuin University and RIETI)

1. Motivation

- **As the share of the service sector in the economy increases, productivity growth in this sector is becoming the key to Japan's future economic growth.**
- **But productivity in this sector has stagnated.**
- **Using mainly industry level data of factor inputs and productivity, we examine why service sector productivity in Japan has stagnated.**
- **We also try to answer what Japan needs to do to improve service sector productivity.**

1. Why is the Service Sector is Important for Japan's Future Growth?

- **Historically, labor productivity in the tertiary sector was not much lower than in the secondary sector except during the period of rapid industrialization from 1947-1965.**
- **But total factor productivity (TFP) growth in the manufacturing sector has been much higher than that in other sectors.**
- **However, the share of the manufacturing sector is declining rapidly.**
- **Hence, for Japan, which is now experiencing population decline, productivity growth in the service sector is the key.**



Notes:

Subsidiary occupations are taken account of for periods before the Second World War.

Data before 1965 are on a per worker basis. Data from 1973 are on a man-hour basis.

The primary sector consists of agriculture, fishery and forestry. The secondary sector consists of mining, manufacturing and construction. The tertiary sector consists of all other sectors except imputed rent.

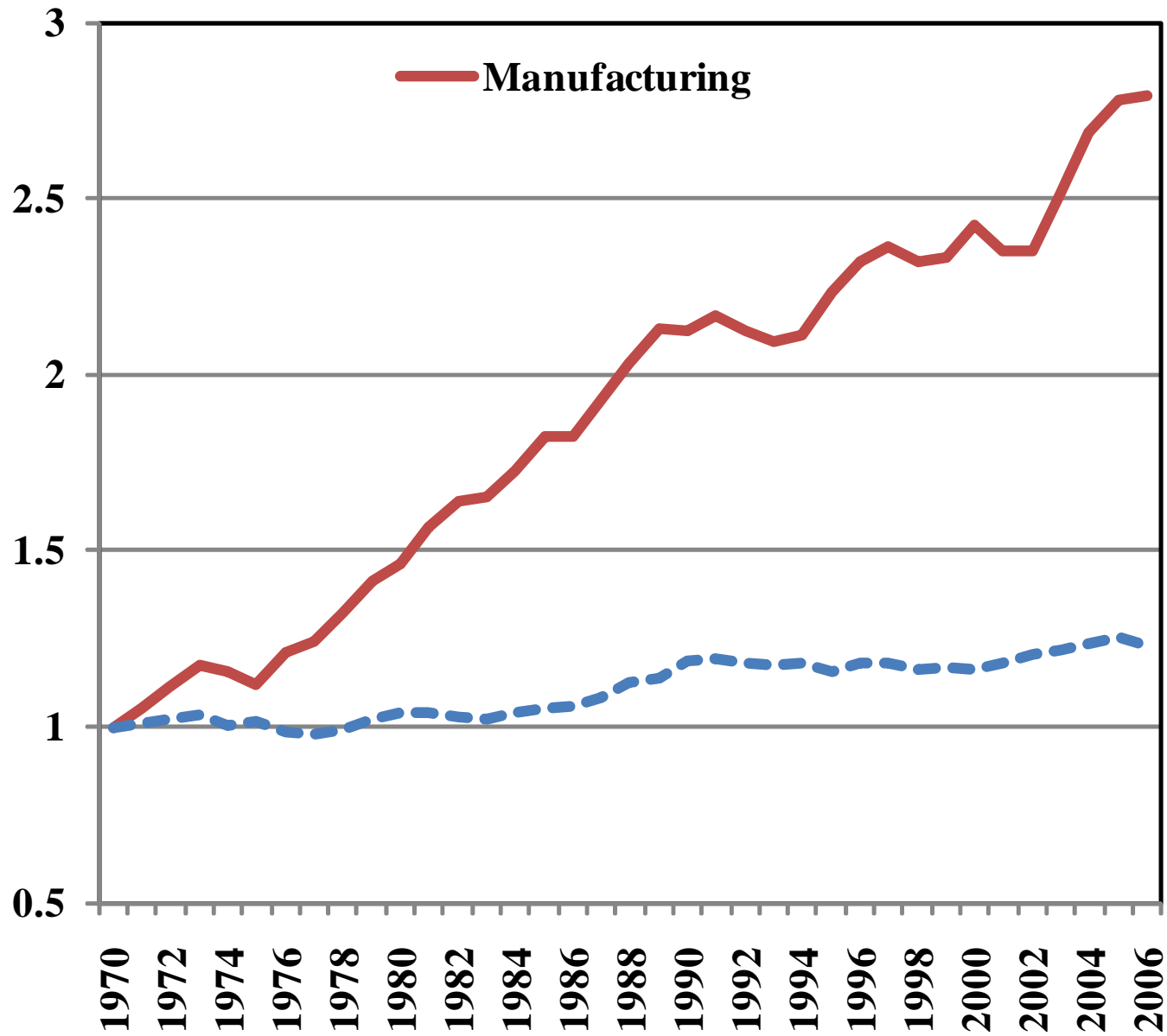
Sources:

Data for periods between 1885-1940 are from Osamu Saito and Tokihiko Settsu (2009), "Unveiling historical occupational structures and its implications for sectoral labour productivity analysis in Japan's economic growth," paper presented at INCHOS 2009, 28-30 July 2009, King's College, Cambridge, p. 31, table 11.

Data for periods between 1947-65 are from Ohkawa, K. and M. Shinohara, eds., (1979), *Patterns of Japanese Economic Development: A Quantitative Appraisal* (New Haven: Yale University Press), p. 41, Table 2.12.

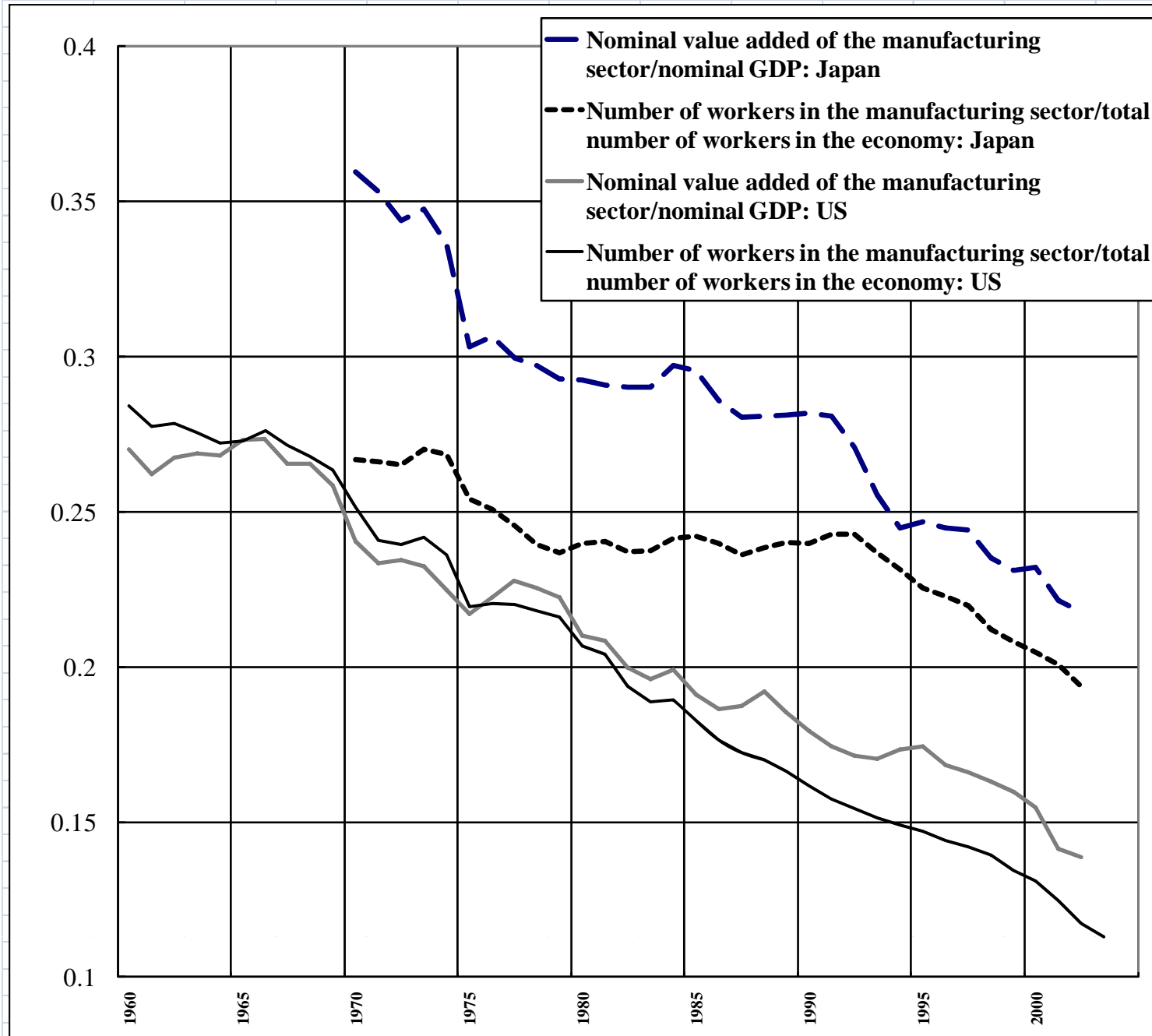
Data for periods after 1970 are from the JIP Database 2009.

Figure 5. TFP growth in manufacturing and non-manufacturing (market economy excluding imputed house rent), 1970-2006 (1970=1)



Source: JIP Database 2009.

Share of the manufacturing sector in the macro-economy: Japan-US Comparison

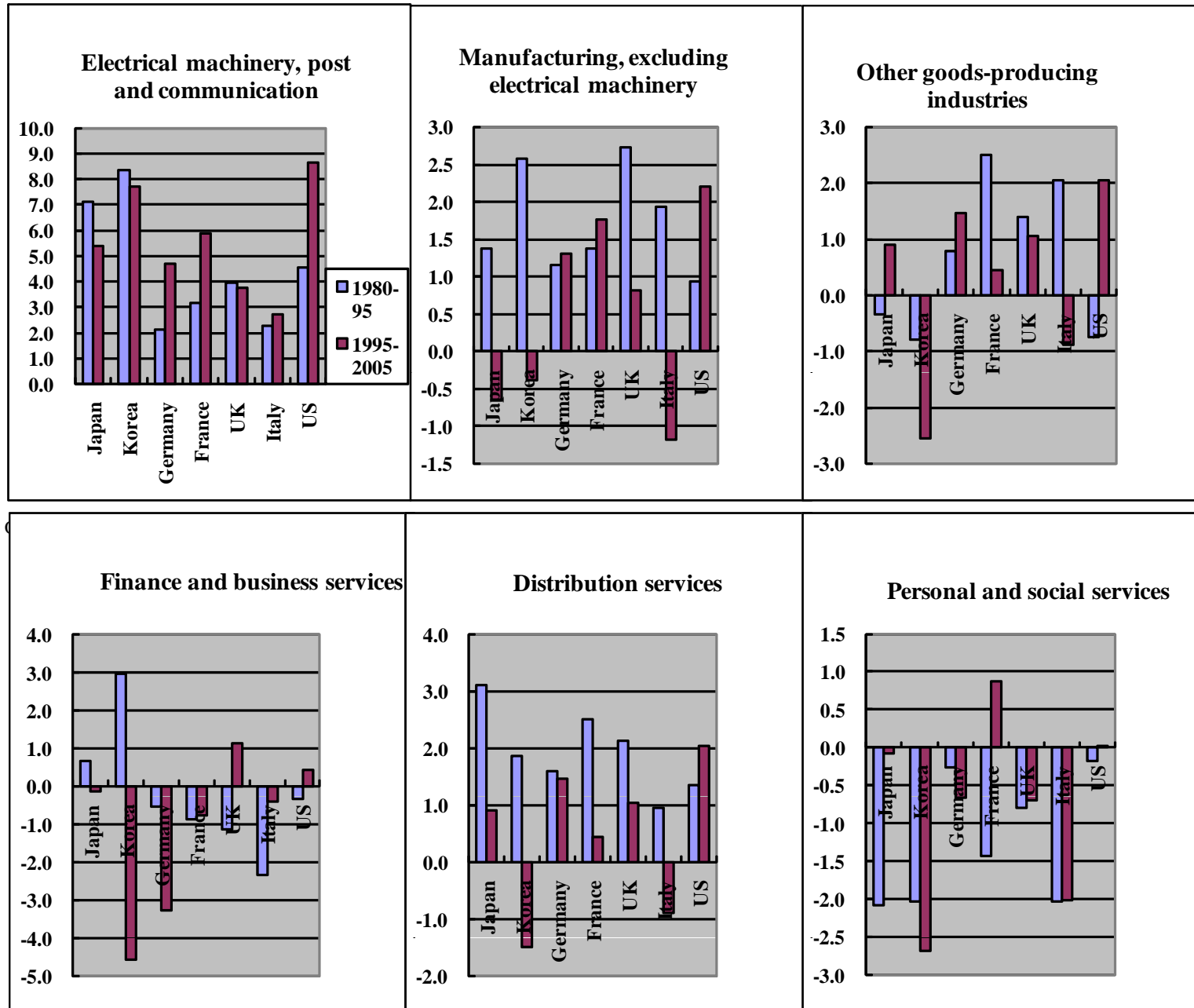


Sources: JIP 2006 and Council of Economic Advisers, *Economic Report of the President*, 2005.

2. Why does Productivity in Japan's Service Sector Stagnate?

- Japan experienced relatively high TFP growth in the ICT producing sector.
- However, the problem Japan is that **TFP growth in ICT-using sectors, such as distribution services (retail, wholesale and transportation) and in the rest of the manufacturing sector (i.e., excluding electrical machinery), declined substantially after 1995.**
- And these ICT-using sectors have larger shares in the economy than the ICT-producing sector.

TFP Growth in the Market Sector: by Sector and by Country

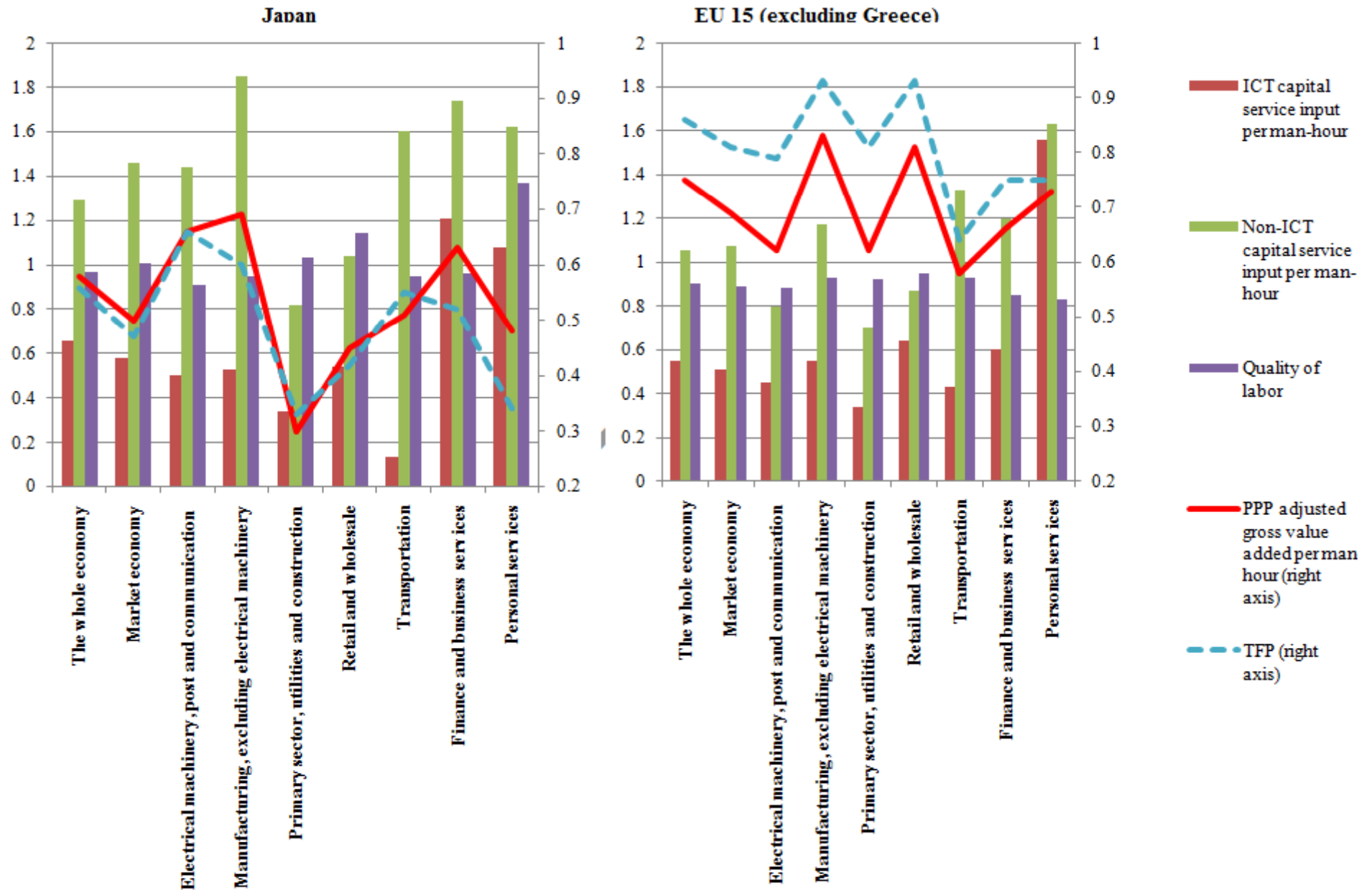


Source: Kyoji Fukao, Tsutomu Miyagawa, Hak K. Pyo and Keun Hee Rhee (2009), "Estimates of Total Factor Productivity, ICT Contributions and Resource Reallocation Effects in Japan and Korea."

International comparison of labor productivity by sector

- **Labor productivity levels in Japan's non-manufacturing sectors are less than 50 percent of the U.S. levels.**
- **In the case of non-ICT capital service input per man-hour, Japan uses much more such input than the United States.**
- **With regard to labor quality, there is not much difference between the two countries.**
- **The differences in labor productivity are mainly caused by Japan's low level of ICT-capital service input and low TFP.**
- **Since ICT investment may contribute to innovation in production processes, the difference in ICT-capital service input between Japan and the other countries is likely one of the major causes of the stagnation of TFP in Japan.**

Figure 4. PPP adjusted labor productivity, factor inputs, and TFP: Japan, EU and US comparison (2005, US=1)



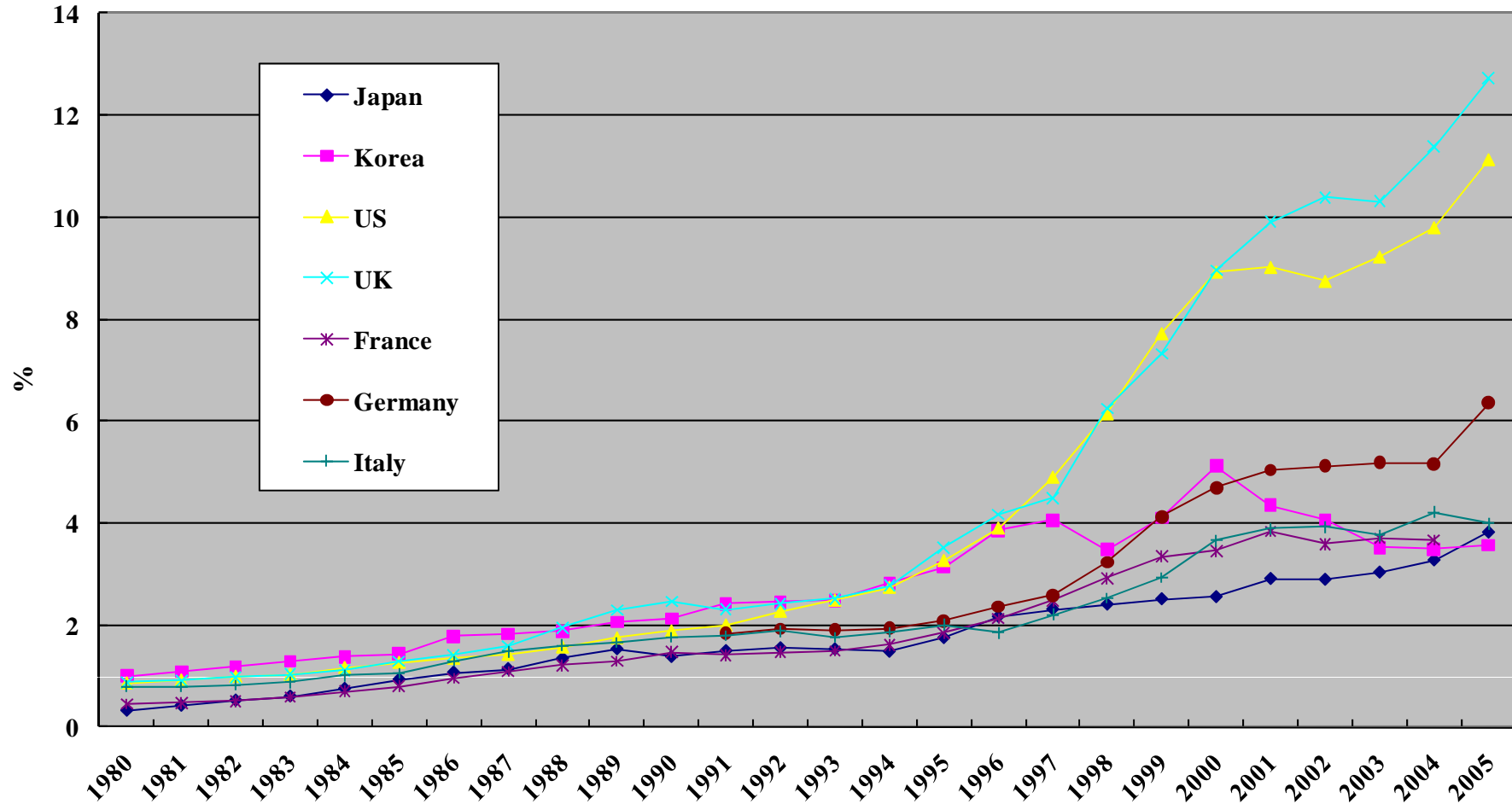
Source: Inklaar and Timmer (2008).

International comparison of labor productivity by sector (contd.)

- We should note that it is very difficult to compare differences in the quality of services across countries and to measure PPP for services.**
- The quantity of truck transportation is basically measured by a unit of tonnage times kilometers per man-hour (how much transportation in tonnage and distance was conducted by one man-hour) and differences in quality, such as just-in-time delivery, are not taken account.**
- In retail services, the length of business hours is not taken into account. Measured productivity of German shops might be higher than that of Japanese shops because German shops are only open until, say, 6 p.m. and customers adjust their lifestyle accordingly.**

Accumulation of ICT assets in Japan and Korea was very slow in comparison with other countries.

Figure 3-2 ICT Investment/GDP Ratio in the Major Developed Countries



Source: Kyoji Fukao, Tsutomu Miyagawa, Hak K. Pyo and Keun Hee Rhee (2009), "Estimates of Total Factor Productivity, ICT Contributions and Resource Reallocation Effects in Japan and Korea."

Why was Japan left behind in ICT investment?

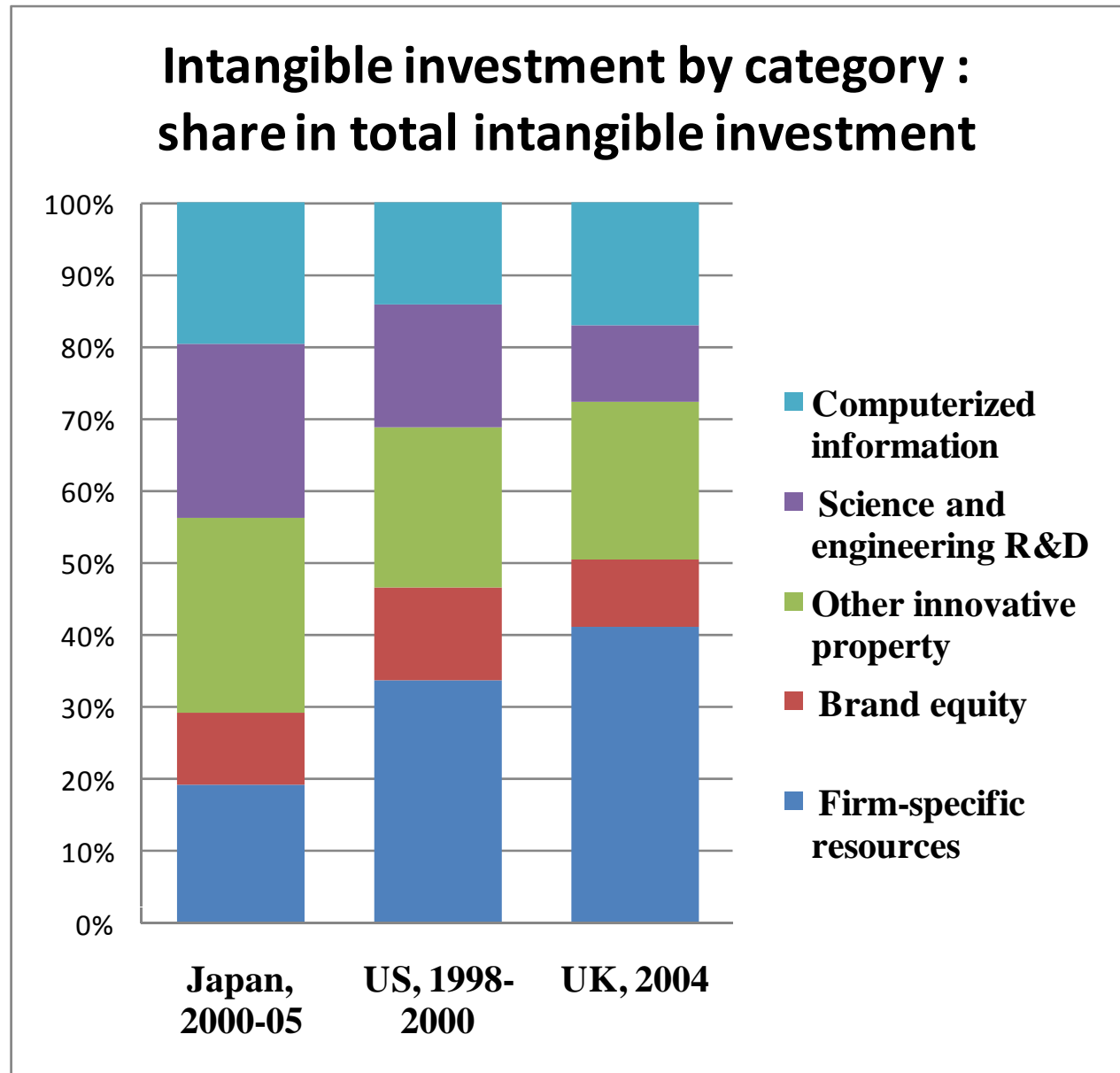
- **The ratio of custom software investment to packaged software investment is much larger in Japan than in the United States.**
- **When Japanese firms introduce ICT technology, such as an ICT system for customer services or the management of information flows within the firm, they prefer custom software in order to avoid business reorganization and the training of workers.**
- **This results in a smaller productivity improvement from ICT investment. This example suggests that it is important to compare intangible investment in Japan with that in other developed economies.**

Intangible Investment in Japan

- **The intangible investment/output ratio in Japan is smaller than that in the United States.**
- **The intangible investment/gross value added ratio in Japan's non-manufacturing sector is much lower than that in Japan's manufacturing sector.[†]**
- **The low level of intangible investment probably is one important reason for the stagnation of TFP growth and the delay of ICT investment in Japan's service sector.**

[†] Fukao, Kyoji, Tsutomu Miyagawa, Kentaro Mukai, Yukio Shinoda, and Konomi Tonogi (2009), "Intangible Investment in Japan: Measurement and Contribution to Economic Growth," *Review of Income and Wealth* 55(3): 717-736.

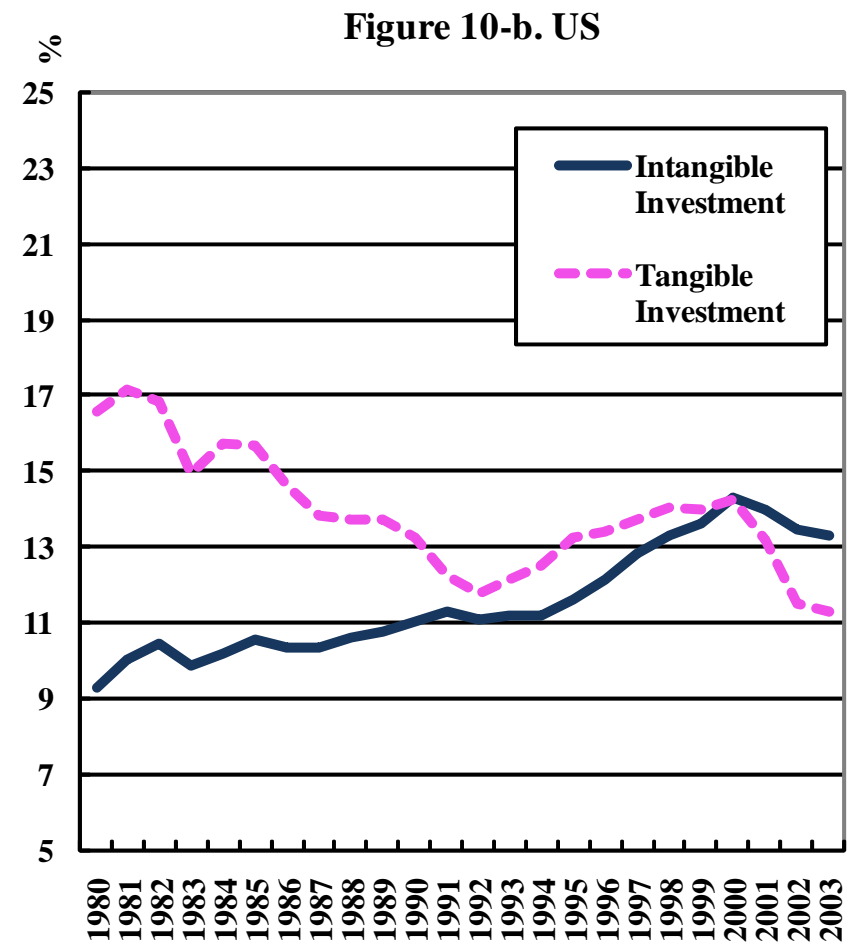
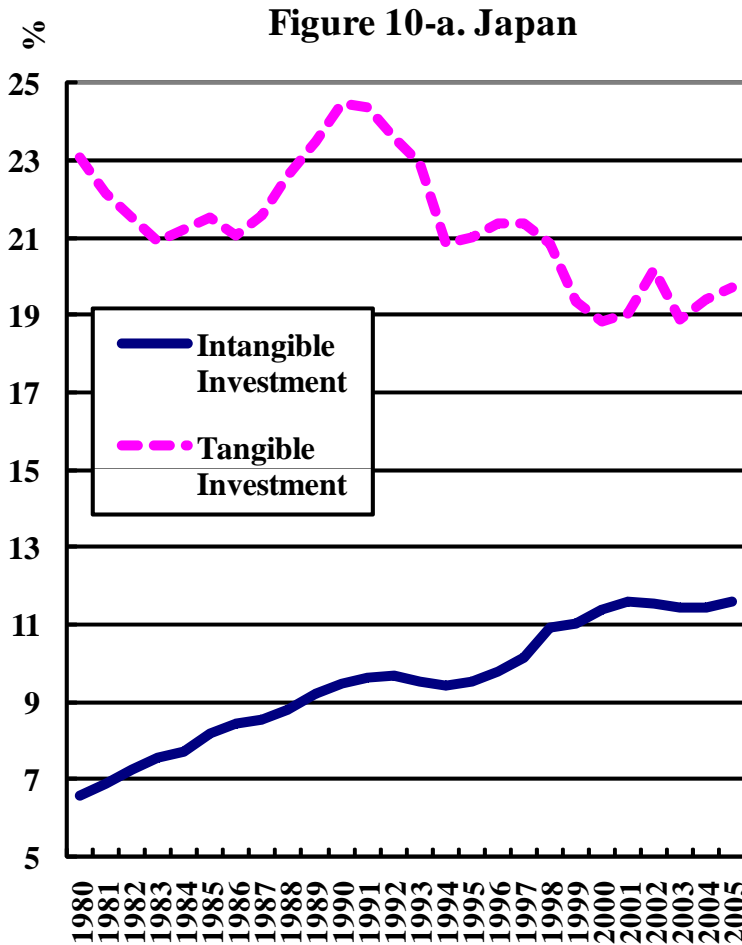
Japan invests a lot in R&D but very little in economic competencies such as brand equity, firm-specific human capital, and organizational structure.



Sources: Japan: Fukao et al. (2009), US: Corrado, Hulten and Sichel (2006), UK: Marrano and Haskel (2006).

Intangible investment in Japan is relatively small in comparison with the US.

Figure 10: Business investment (Percentage of business output): Japan-US comparison

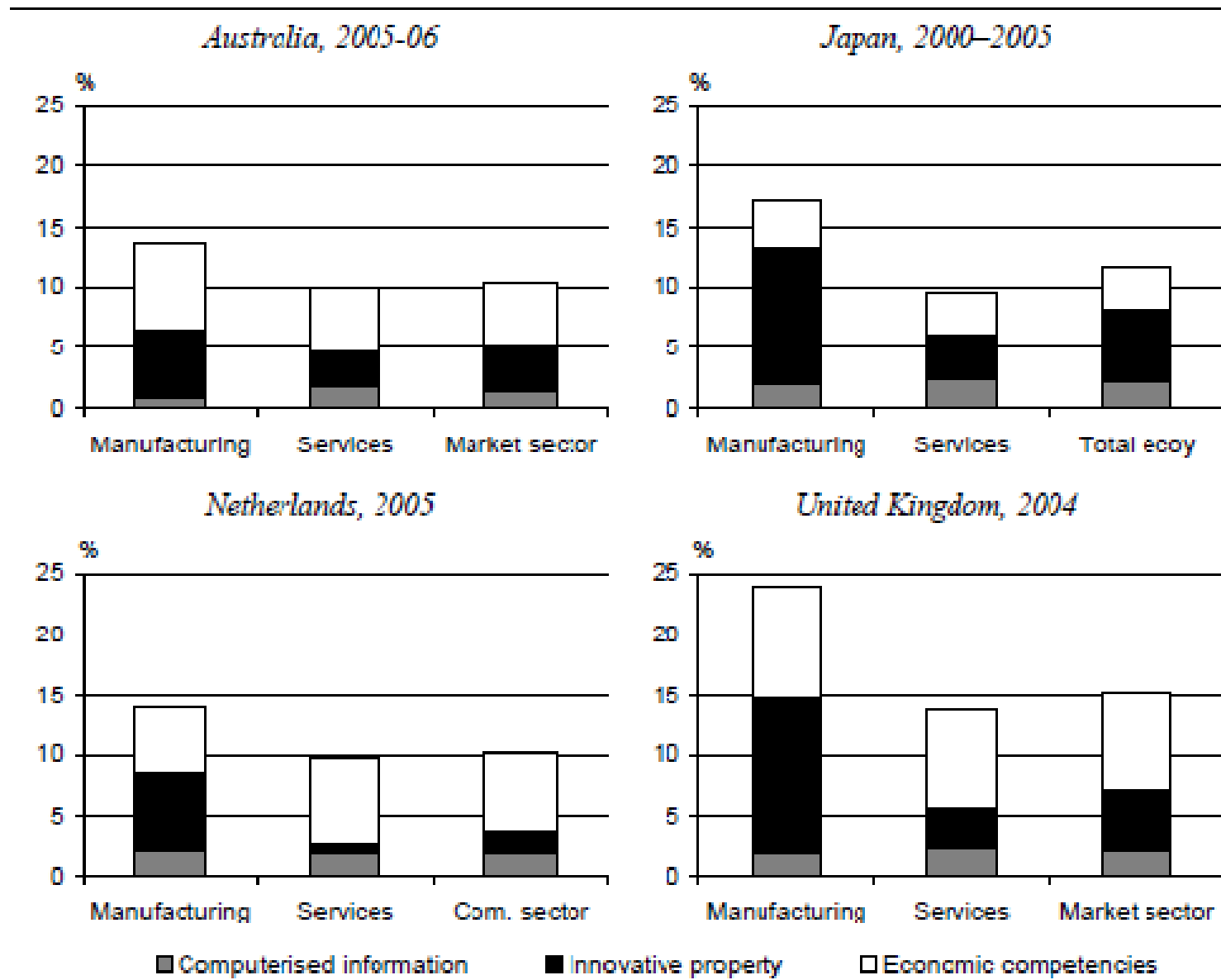


Sources: Fukao, Miyagawa, Mukai, Shinoda, and Tonogi (2009). Original data for the US are taken from Corrado, Hulten and Sichel (2005, 2006). 16

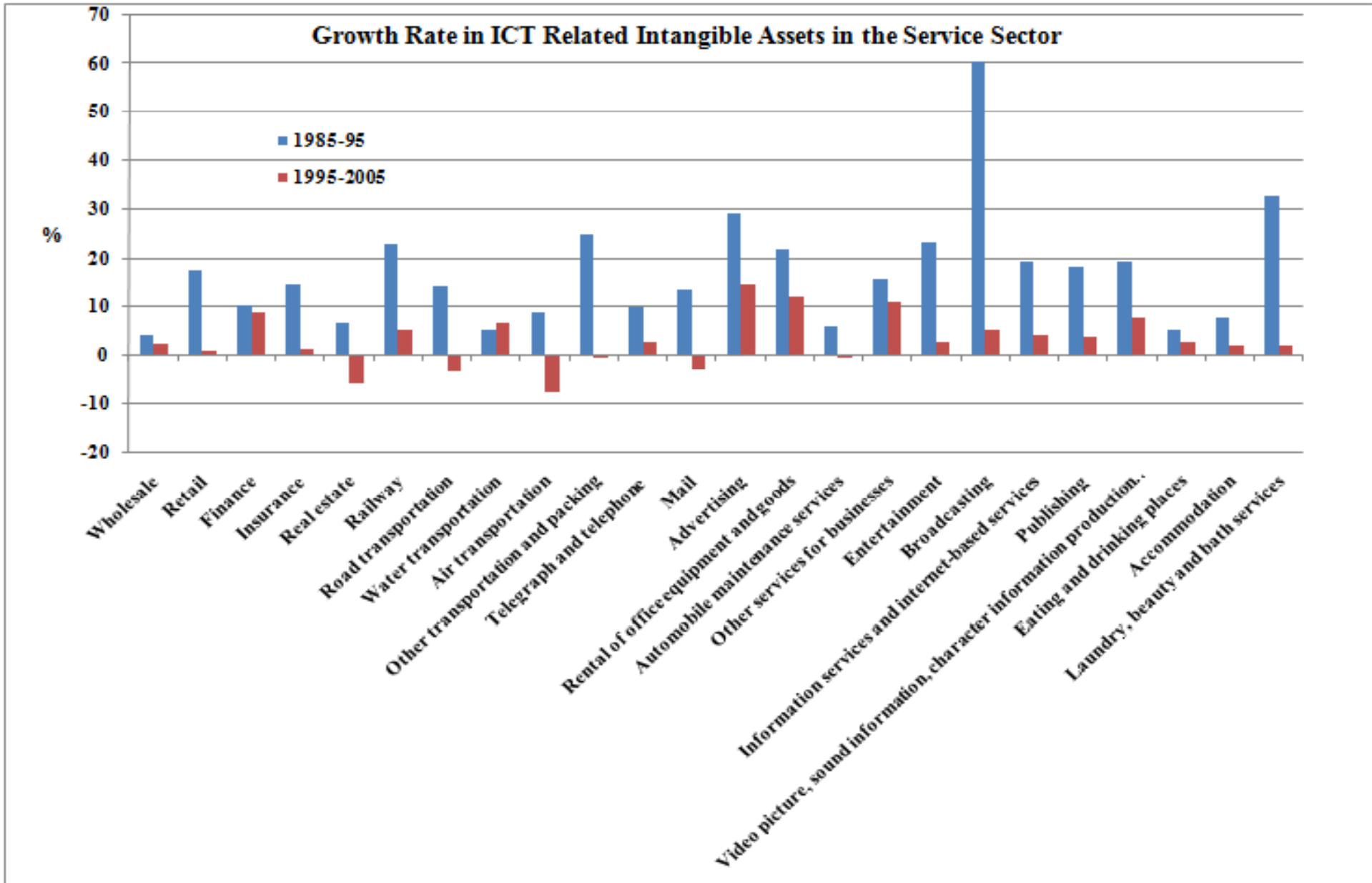
The intangible investment/gross value added ratio in Japan's non-manufacturing sector is much lower than that in Japan's manufacturing sector

Figure 6 **Intangible investment, by sector, by country**

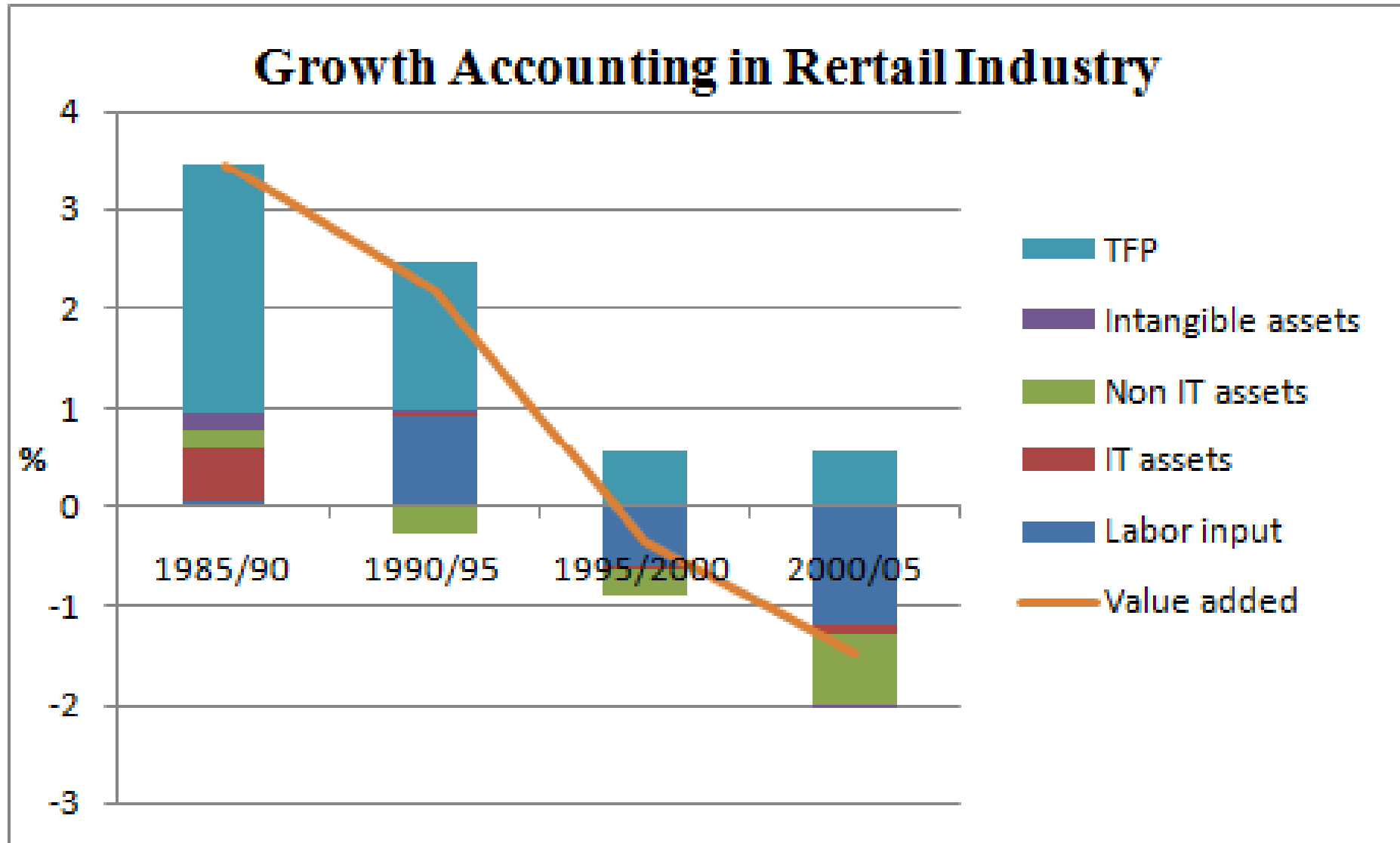
Percentage of unadjusted sector value added (before 'new' intangibles capitalised)



Intangible investment in the service sector decreased drastically after 1995.



When we focus on the retail industry, we find that intangible assets have contributed negatively to output growth and negative TFP growth in the retail industry since 2000.



In several non-manufacturing sectors, we observe large negative reallocation effects and exit effects on industry-level labor productivity growth. It seems that Japan's low metabolism also impedes productivity growth in service sectors.

Decomposition of labor productivity increase in non-manufacturing sectors: average value of results for 1997—99 and results for 2000-02, annual values, %

Industry name	Labor productivity growth	Within effect	Reallocation effect	Net entry effect	Entry effect	Exit effect
	a=b+c+d	b	c	d=e+f	e	f
Construction	-4.80%	0.07%	-5.03%	0.16%	1.48%	-1.32%
Wholesale	4.05%	1.59%	0.83%	1.63%	1.33%	0.30%
Retail	4.74%	2.53%	1.02%	1.19%	0.95%	0.24%
Real estate	1.78%	1.85%	-0.37%	0.30%	-0.66%	0.95%
Transportation	-4.84%	0.61%	-3.91%	-1.53%	-1.80%	0.27%
Warehousing and other transportation related services	-3.48%	0.72%	-4.37%	0.17%	-1.34%	1.50%
Communication	36.83%	8.60%	25.56%	2.67%	1.11%	1.56%
Electricity	-1.11%	6.88%	-8.06%	0.07%	0.03%	0.04%
Gas, water and heat supply	-3.93%	0.56%	-5.35%	0.86%	0.98%	-0.13%
Hotels	-0.23%	1.75%	-1.03%	-0.95%	-2.08%	1.13%
Broadcasting	-10.19%	0.22%	-15.38%	4.96%	4.85%	0.11%
Personal services	0.19%	0.36%	-1.74%	1.58%	-0.13%	1.70%
Business services	-0.32%	1.83%	-2.78%	0.63%	-1.54%	2.17%
Information services	-2.62%	-0.64%	-3.70%	1.72%	0.49%	1.22%
Eating and drinking places	0.77%	0.49%	-1.15%	1.44%	-2.33%	1.74%
Other services	-0.30%	0.12%	0.17%	-0.59%	0.99%	0.45%
Advertisement	-6.21%	-2.64%	-9.85%	6.29%	9.81%	-3.52%
Amusement	3.69%	3.40%	-0.26%	0.56%	-1.73%	2.28%
Medical and care services and hygiene	0.23%	0.94%	-0.06%	-0.65%	-2.54%	1.89%

Source: Kim, Kwon and Fukao (2009).

The start-up and closure rates of establishments in Japan are much lower than those in the US.

Figure 4.1 Start-up and Closure Rate of Establishments: Japan-US Comparison

Figure 4.1. Panel A. Start-up Rate: Japan-US Comparison %

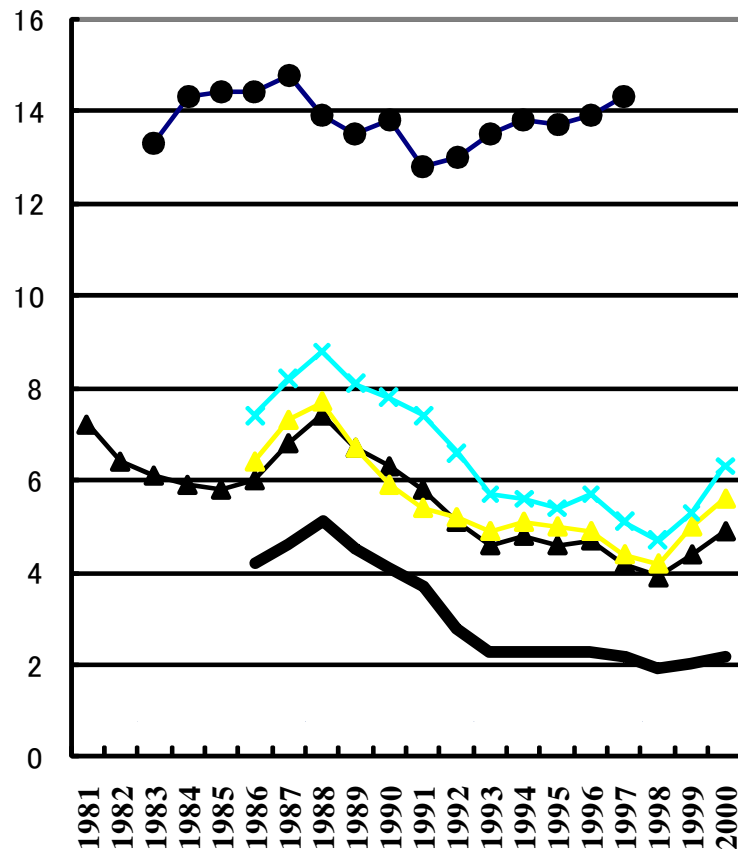
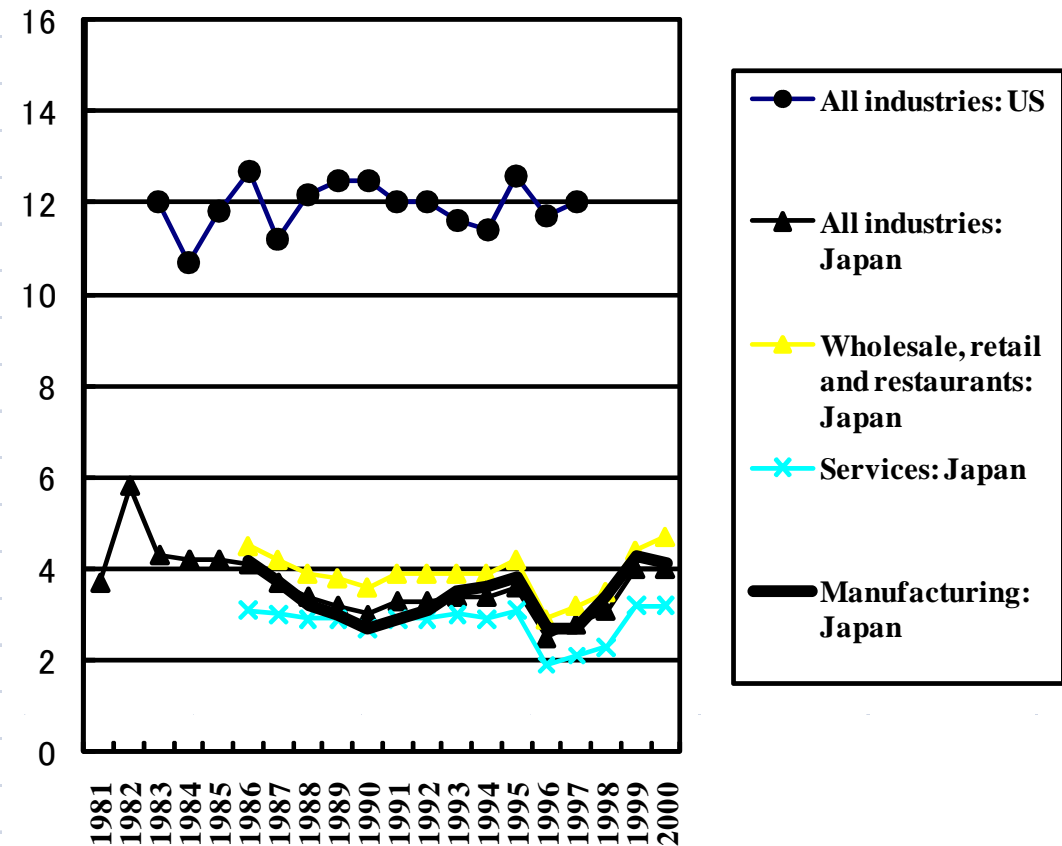


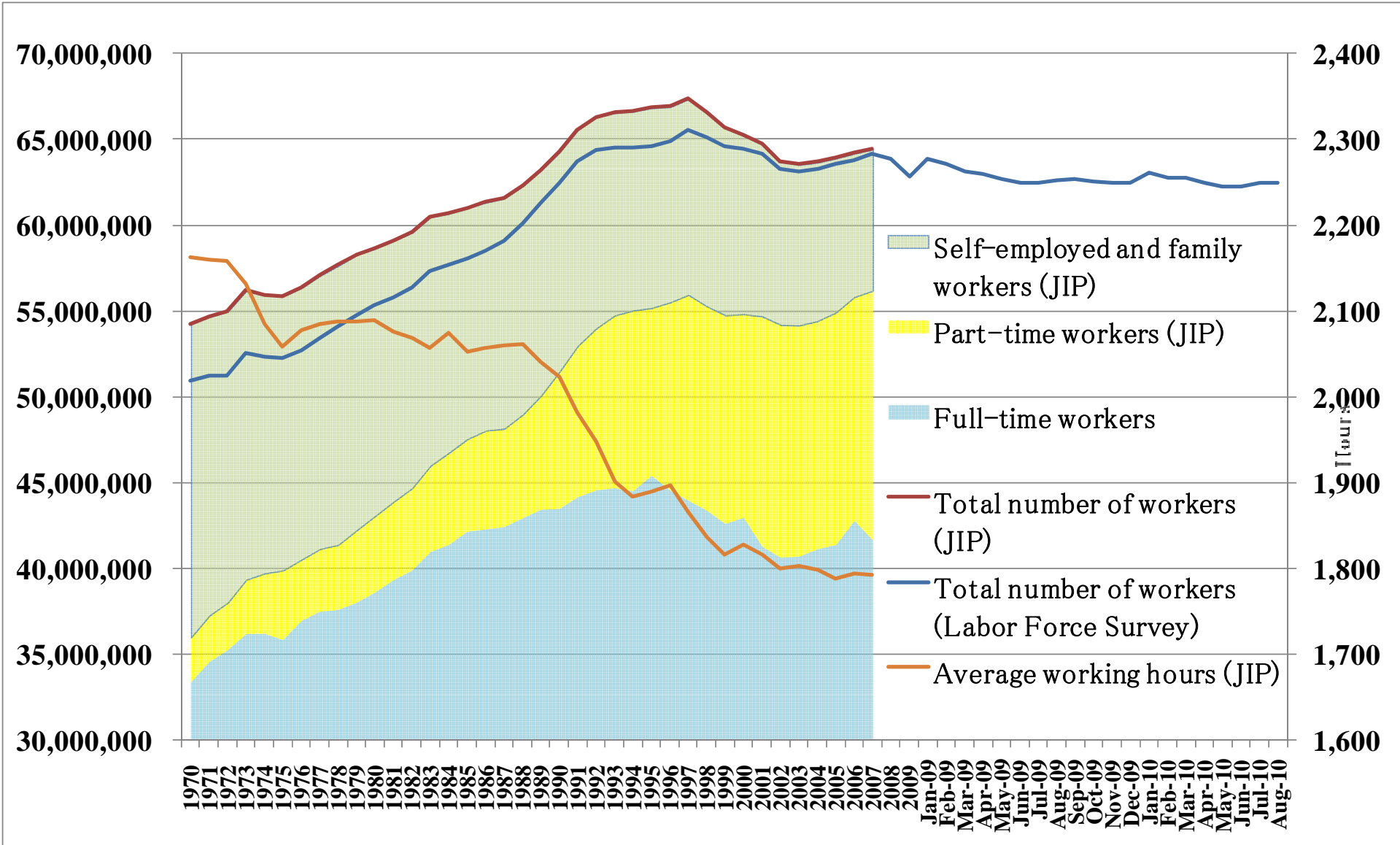
Figure 4.2. Panel B. Closure Rate: Japan-US Comparison %



Note: Data are based on statistics from the employment insurance program of each country.

Sources: Small Business Administration, US Government (1998), Small and Medium Enterprise Agency, Ministry of Industry, Trade and Industry, Japanese Government (2001), and Study Group on "Industry Hollowing-out" and Tariff Policy, Ministry of Finance, Japanese Government.

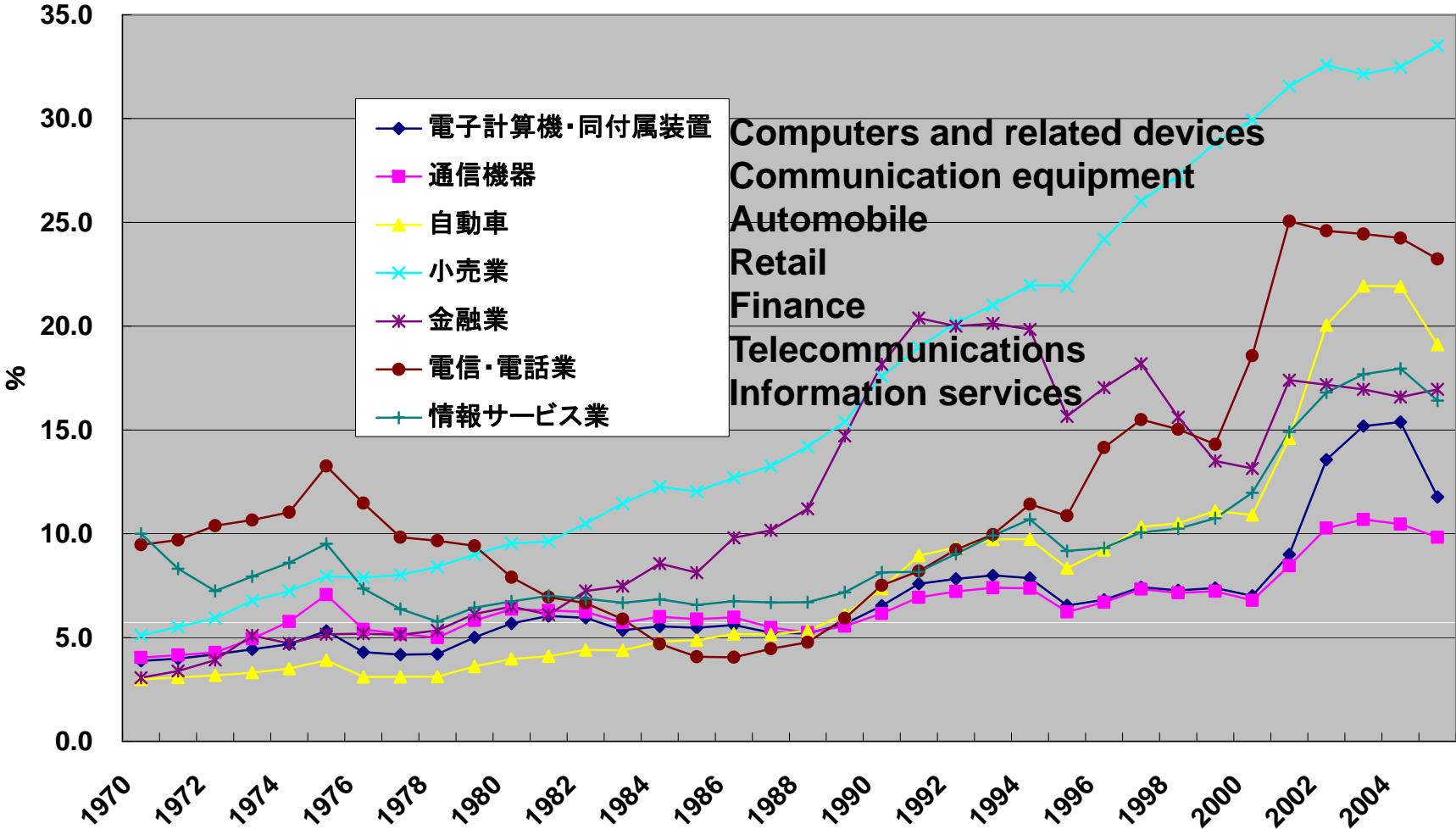
Figure 11. Increase in part-time workers in Japan



Source: JIP Database 2010.

Figure 11. Increase in part-time workers in Japan

Percentage of part-time workers in total workers by sector: 1970-2005



Source: JIP Database 2008.

Increase in part-time workers in Japan (contd.)

- **Firms invest little in on-the-job training and off-the-job training for part-time workers. The increase in part-time workers will slow down human-capital accumulation.**
- **The productivity gap between part-time workers and regular workers is larger than the wage gap between part-time workers and regular workers. It seems that firms pay a premium to part-time workers in order to obtain flexibility of employment.[†]**
- **The increase in part-time workers is not only a problem of inequality but also a problem of productivity.**

[†] **Kyoji Fukao, Ryo Kambayashi, Daiji Kawaguchi, Hyeog Ug Kwon, Young Gak Kim, and Izumi Yokomaya (2007) “Deferred Compensation: Evidence from Employer-Employee Matched Data from Japan,” Hitotsubashi University.**

Size and Internationalization of Firms

In the case of commerce and other service sectors, US firms are much larger than Japanese firms on a consolidated basis. It seems that Japanese firms are left behind in internationalization and in enjoying scale economies.

Number of listed firms and their average size measured by consolidated workers: US-Japan comparison, consolidated												
	Manufacturing				Wholesale and retail				Other services			
	Number of Japanese firms	Average number of workers	Number of US firms	Average number of workers	Number of Japanese firms	Average number of workers	Number of US firms	Average number of workers	Number of Japanese firms	Average number of workers	Number of US firms	Average number of workers
2000	909	7,306	1,451	7,145	262	2,554	363	19,620	148	1,866	655	7,183
2001	774	6,611	1,466	6,729	243	1,626	361	20,302	157	1,462	655	7,096
2002	1,079	4,799	1,490	6,501	418	1,093	368	19,857	315	906	691	7,745
2003	1,291	4,546	1,558	6,314	540	1,207	375	21,841	398	855	690	7,418
2004	1,567	4,702	1,575	6,560	630	1,506	390	21,404	496	999	717	7,658
2005	1,622	4,960	1,606	6,376	668	1,597	389	23,175	564	981	715	7,736
	Communication				Other industries							
2000	17	16,422	96	11,576	234	5,970	763	5,302				
2001	13	19,438	102	10,938	214	4,343	827	4,981				
2002	23	11,193	108	10,664	307	2,944	848	5,111				
2003	32	8,046	121	9,453	367	2,858	894	4,822				
2004	44	6,440	122	9,204	466	3,191	963	5,120				
2005	50	5,881	123	9,281	493	3,052	967	5,195				25

Source: Kwon (2010)

Summary

- **TFP growth in the manufacturing sector is much higher than that in the other sectors. However, the share of the manufacturing sector is declining rapidly. For Japan, which is now experiencing population decline, productivity growth in the service sector is key to economic growth.**
- **TFP growth in ICT-using sectors declined substantially after 1995.**
- **Accumulation of ICT assets in Japan and Korea was very slow in comparison with other countries.**
- **The low level of intangible investment probably is one important reason for the stagnation of TFP growth and the delay of ICT investment in Japan's service sector.**
- **It seems that Japan's low metabolism also impedes productivity growth.**
- **Firms invest little in on-the-job training and off-the-job training for part-time workers. The increase in part-time workers will slow down human-capital accumulation.**
- **It seems that Japanese firms are left behind in internationalization and in enjoying scale economies.**

Summary

- **If Japan's comparatively low investment in ICT indeed is the result of a reluctance to reorganize business structures and retrain workers, this may in turn be linked to the increase in part-time workers, which at least in part is a consequence of Japan's labor market structures. Possible government policies to address these issues would include the provision of structures and incentives that facilitate and reward investment in ICT (and intangible assets) and in the training of part-time workers and mitigate the polarization in the labor market between regular workers and part-time workers while at the same time providing greater labor market flexibility.**
- **Slow growth, the low metabolism of the economy, and the fact that Japan's service sector has fallen behind in terms of internationalization and exploiting economies of scale are all interrelated. Many areas of the service sector remain heavily regulated, thus preventing competition and greater dynamism through the entry, growth, and exit of firms. Obvious policy measures would be to proceed with deregulation and, for instance, facilitating inward foreign direct investment to encourage the entry of firms that already operate internationally and enjoy economies of scale.**