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# **Service Sector Productivity in Japan: The key to future economic growth**

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## **Service Sector Productivity in Japan: The key to future economic growth<sup>\*</sup>**

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### Abstract

This paper aims to examine three issues: how bad the productivity performance in Japan's service sector has been; why it is important to accelerate TFP growth in the service sector; and why TFP has stagnated in Japan's service sector. The main findings of the paper are as follows. First, TFP growth in the manufacturing sector is much higher than that in other sectors, although the manufacturing sector's share is declining rapidly. For Japan, whose population is in decline, productivity growth in the service sector is key for economic growth. Second, TFP growth in ICT-using sectors declined substantially after 1995. Third, accumulation of ICT assets in Japan was very slow in comparison with other developed countries. Fourth, the low level of intangible investment is probably one important cause of the stagnation of TFP; another is that Japan's service sector has fallen behind with regard to investment in ICT. Fifth, it seems that Japan's low metabolism also impedes productivity growth. Sixth, firms invest little in on-the-job training and off-the-job training for part-time workers, and the increase in part-time workers may have slowed down human-capital accumulation. Seventh, it appears that Japanese firms have fallen behind in terms of internationalization and economies of scale.

Key words: service sector, total factor productivity, ICT investment, intangible investment, productivity dynamics

JEL classification: L80, L90, O47, O53, J21

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## **1. Introduction**

As in other advanced countries, the share of the service sector in the economy has been steadily increasing in Japan. This means that productivity growth in this sector provides the key for Japan's future economic growth. Yet, looking at actual trends shows that productivity in this sector has stagnated for a long period. Against this background, the purpose of this paper is to examine why this is the case, reviewing previous studies on the issue and using industry level data of factor inputs and productivity.

The structure of the paper is as follows. The next section looks at the productivity performance of Japan's service sector and compares it with other major countries. It also discusses why service sector productivity is important for Japan's future growth. Section 3 then examines why productivity in Japan's service sector has stagnated for such a long period, analyzing issues such as investment in information and communication technology (ICT), intangible investment, the natural selection mechanism in the service sector, how the recent increase in part-time workers will affect productivity, and average firm size in the service sector. Finally, Section 4 summarizes the major findings of the paper.

## **2. Why is the Service Sector Important for Japan's Future Growth?**

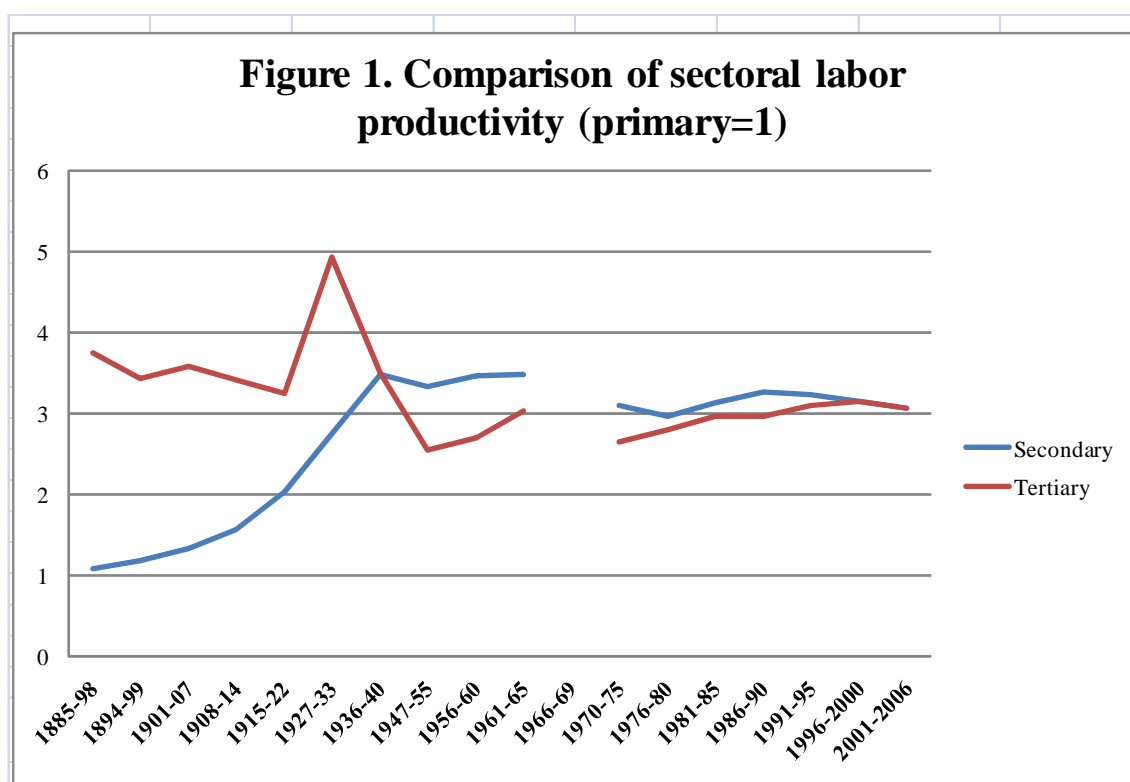
From a supply-side perspective, there are three engines for economic growth: increases in labor input, capital accumulation, and increases in total factor productivity (TFP).

Let us look at the trends in each of these components for Japan, starting with labor input. Japan's working age population, defined as those aged 15 to 64, grew rapidly during the 1950s and 1960s. However, once the baby boomer generation had come of age, the growth in the working age population declined rapidly. Specifically, while the working age population grew by an average of 1.7% annually between 1955 and 1973 and still increased at a rate of 0.7% between 1973 and 1995, it has actually been shrinking since then at an average annual rate of 0.3%.

Next, let us consider the role of capital deepening. This, in fact, accounted for much of Japan's rapid economic growth during the 1950s to early 1970s. However, as is well known, the marginal productivity of capital and the rate of return to capital tend to decline over time as capital deepening continues, so that countries cannot maintain rapid growth based on capital deepening forever. In fact, Japan's rate of return to capital fell substantially during the 1970s and then further during the 1990s and private sector

investment weakened.<sup>2</sup> Especially in the case of the manufacturing sector, capital formation became so small that the net real capital stock recorded a decline between 2000 and 2002. These trends with regard to labor input and capital accumulation mean that productivity growth is the key for Japan's future economic growth.

Historically, labor productivity in Japan's tertiary sector was not much lower than in the secondary sector except during the period of rapid industrialization from 1947-1965. Figure 1 compares labor productivity (either nominal value added per man-hour or nominal value added per worker) across sectors. The values are normalized by dividing the productivity level of each sector by the productivity level of the primary sector.



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 table 11 on page 31 of Saito and Settsu (2009).

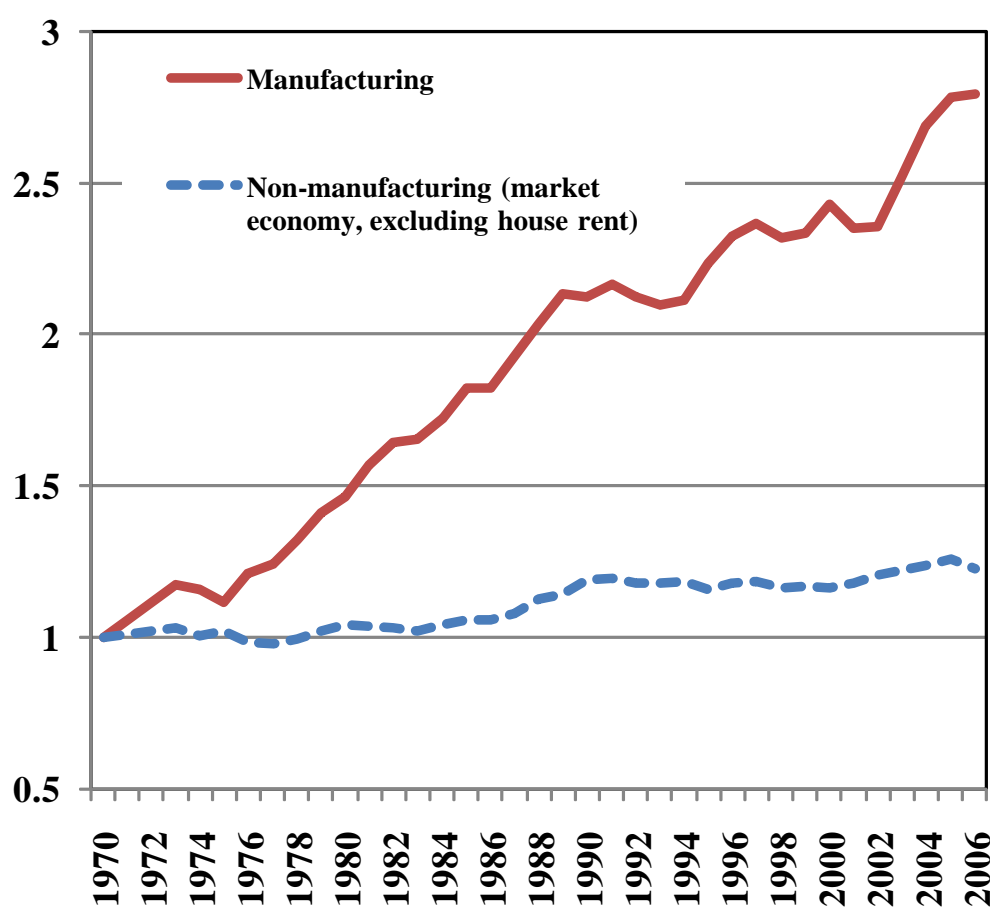
Data for periods between 1947-65 are from Table 2.12 on page 41 of Ohkawa and Shinohara, eds., (1979).

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

<sup>2</sup> It is worth noting here that, among the OCED countries, only Japan and Korea experienced very rapid capital deepening and a swift decline in the rate of return to capital. See Pyo and Nam (1999).

However, if we compare labor and total factor productivity growth in Japan's tertiary sector with that in the manufacturing sector, there is a huge difference. As Figure 2 shows, TFP in Japan's non-manufacturing sector (market economy<sup>3</sup>) grew by only 23% in 1970-2006 (for an annual growth rate of 0.57%). On the other hand, TFP in the manufacturing sector increased 2.8-fold in the same period (for an annual growth rate of 2.9%).<sup>4</sup>

**Figure 2. TFP growth in manufacturing and non-manufacturing (market economy excluding imputed house rent), 1970-2006**



Source: JIP Database 2009.

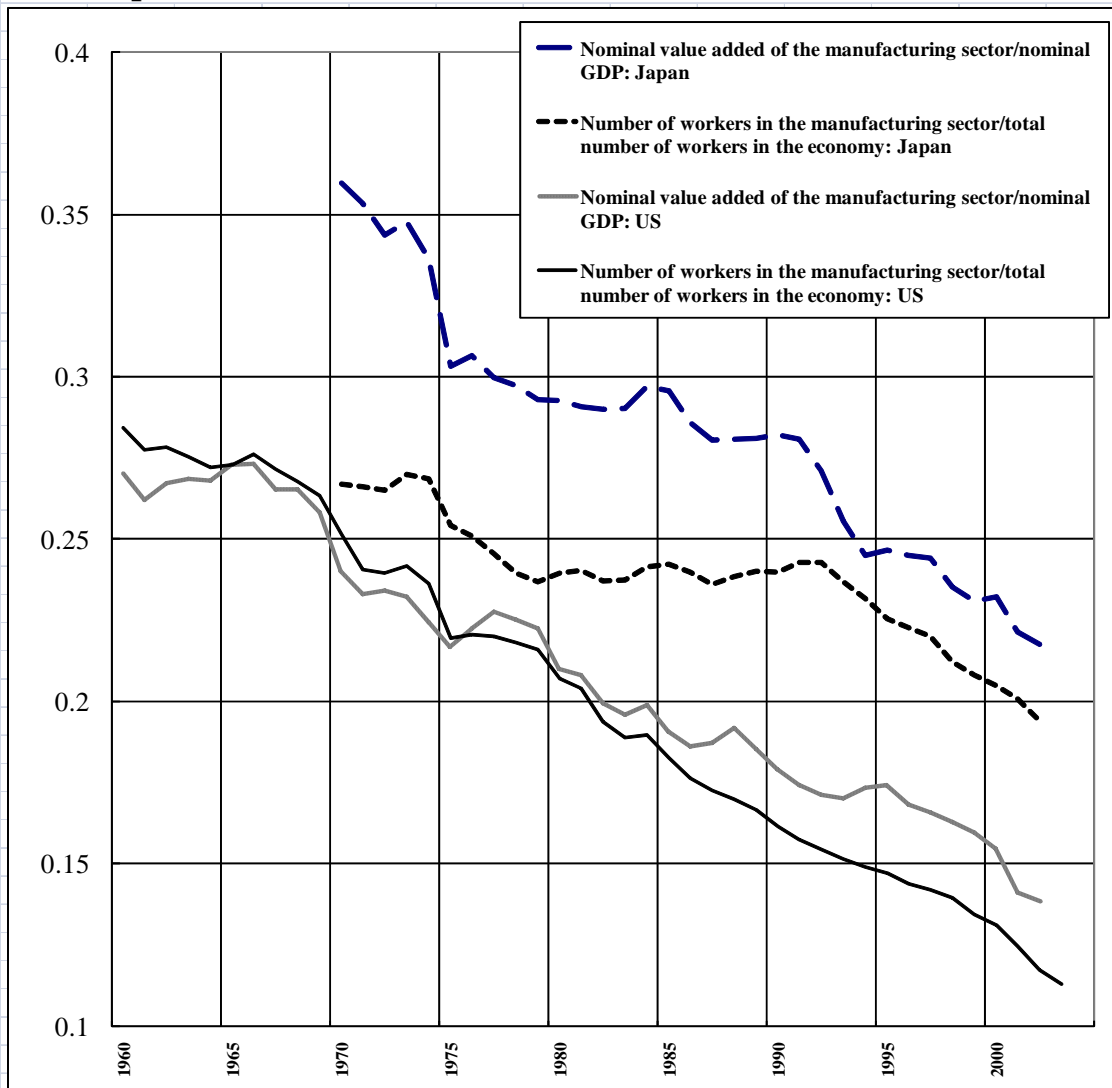
<sup>3</sup> The term “market economy” here means that education, medical services, government activities, and imputed house rent are excluded.

<sup>4</sup> In the 1990s and early 2000s, TFP growth in the manufacturing sector also stagnated. The sharp decline in TFP growth in the manufacturing sector can be partly explained by the idling of capital stock, which was caused by the recession in this period. However, even taking account of the decline in the capacity utilization rate of capital, we obtain a similarly rapid declining trend in TFP growth in the manufacturing sector.

Despite the low productivity growth in the non-manufacturing sector (Figure 2), the level of labor productivity relative to the manufacturing sector, as seen in Figure 1, did not decline drastically, because of the sharp increase in the relative price of non-manufacturing output vis-à-vis manufacturing output.

As in other developed economies, the share of the manufacturing sector in Japan's economy overall is declining rapidly. As Figure 3 shows, the manufacturing sector accounted only for 22% of Japan's nominal GDP in 2002, while its share in terms of employment was only 19%.

**Figure 3. 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.

Figure 3 also shows that de-industrialization in Japan accelerated twice during the period since 1970: after the first oil shock in the early 1970s, and then in the early 1990s following the burst of the “bubble economy.” The second acceleration in de-industrialization seems to have been caused by a decline in the domestic demand for investment goods and by the relocation of production through foreign direct investment. In the 1990s, Japanese firms shifted production to other Asian countries (primarily the ASEAN countries and China) in order to lower wage and other production costs. In the case of the electrical machinery industry especially there was a sharp increase in overseas production and a decline in domestic production and net exports in the period 1990-2003.

Since it is mainly large productive firms that invested abroad, this relocation of production may well have led to the closure of productive establishments in Japan: only 44% of all the establishments which existed in 1990 survived until 2003 and not many new establishments were opened during this period. As a result, the number of establishments declined by 33%. It is important to note that even among establishments with the highest level of labor productivity in their respective industry, the survival rate was not much higher: only 47% of establishments ranked in the top three deciles in each of the 50 manufacturing sectors in 1990 survived until 2003.<sup>5</sup>

Judging from the fact that de-industrialization has proceeded even further in the United States than in Japan (Figure 3), it seems likely that Japan’s manufacturing sector will continue to shrink in the future. And with de-industrialization set to continue and the total labor force shrinking, acceleration in service sector productivity growth is becoming all the more important for Japan’s future economic growth.

Comparing Japan’s productivity performance with that of other countries, we find that there is certainly a lot of room for improvement, both in manufacturing and in services. Figure 4 shows sectoral TFP growth in the market economy for major developed countries for 1980-1995 and 1995-2005. Japan experienced relatively high TFP growth in the information and communication technology (ICT)-producing sector (electrical machinery, post and communication). However, the problem for 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. The average share of labor input (hours worked) in the ICT-producing sector in Japan’s total labor input in 1995-2005 was 4.7%, while the labor input shares of distribution services and the rest of the

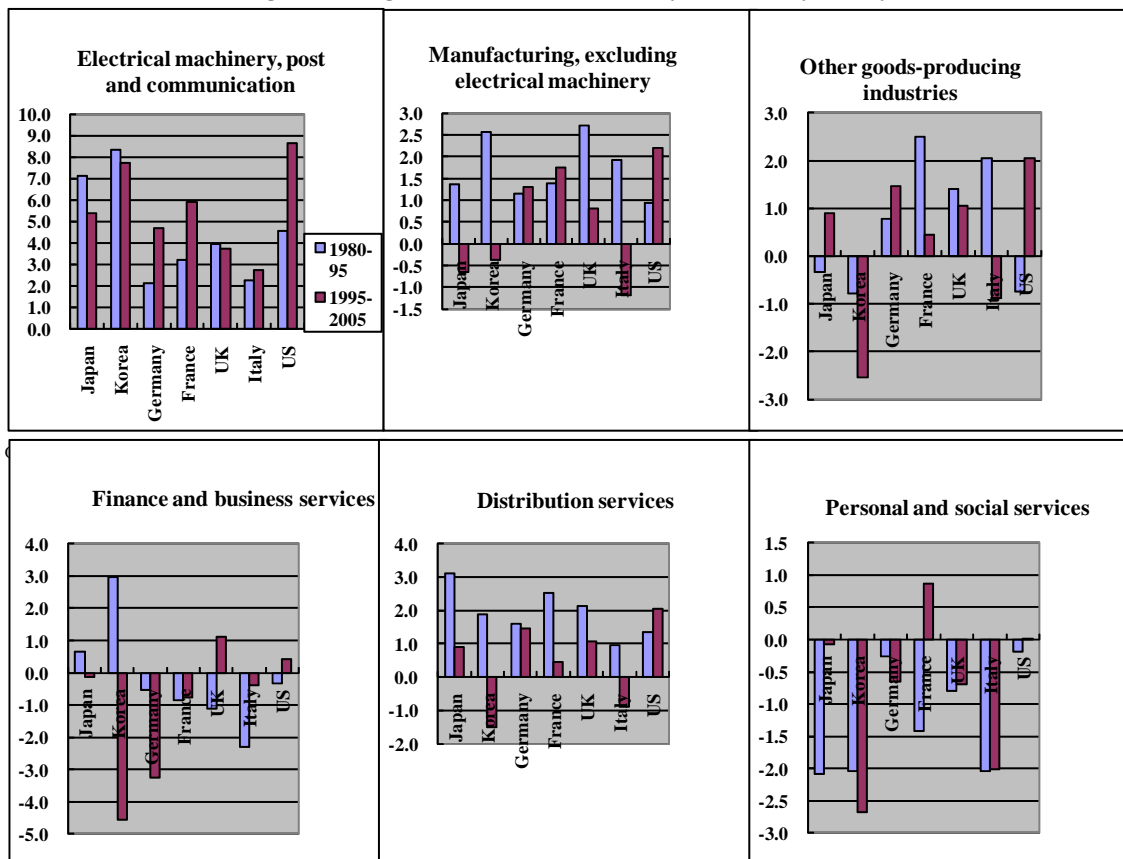
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<sup>5</sup> See Fukao, Kim and Kwon (2008).

manufacturing sector were 23.4% and 16.8%, respectively.

This pattern differs substantially from that observed for the United States, which experienced an acceleration in TFP growth not only in ICT-producing sectors but also in ICT-using sectors. On the other hand, South Korea and most of the European countries did not experience an acceleration of TFP growth in ICT-using sectors. In other words, the ICT revolution in ICT-using sectors occurred only in the United States.

Figure 4. TFP growth in the market sector: by sector and by country



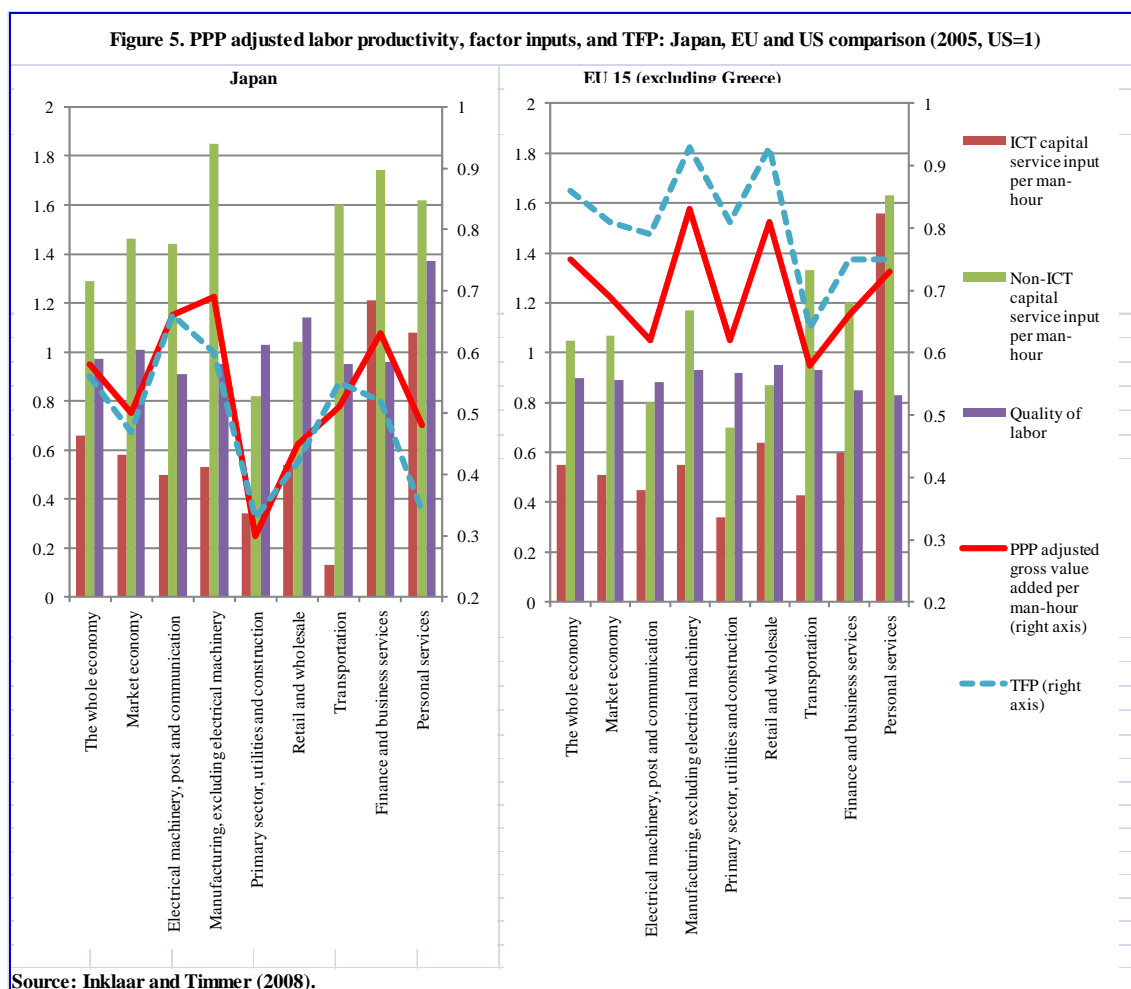
Source: EU KLEMS Database, March 2008.

Next, Figure 5 compares sectoral labor productivity in Japan and the EU 15 countries (excluding Greece) relative to that of the United States. The figure also provides a comparison for four factors that underlie differences in labor productivity, that is, differences in the quality of labor, differences in ICT capital service input per man-hour, differences in non-ICT capital service input per man-hour, and differences in the TFP level.

The figure shows that the labor productivity gap between Japan and the United States is larger in the non-manufacturing sector than in the manufacturing sector. Labor



productivity levels in Japan's non-manufacturing sectors are generally less than 50 percent of the US 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.<sup>6</sup>



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.

We should note that it is very difficult to compare differences in the quality of services across countries and to measure PPP for services. For example, the quantity of

<sup>6</sup> In the case of finance and business services and personal services, ITC capital service input per man-hour is not lower than in the United States. The differences in labor productivity are caused by Japan's low level of TFP.

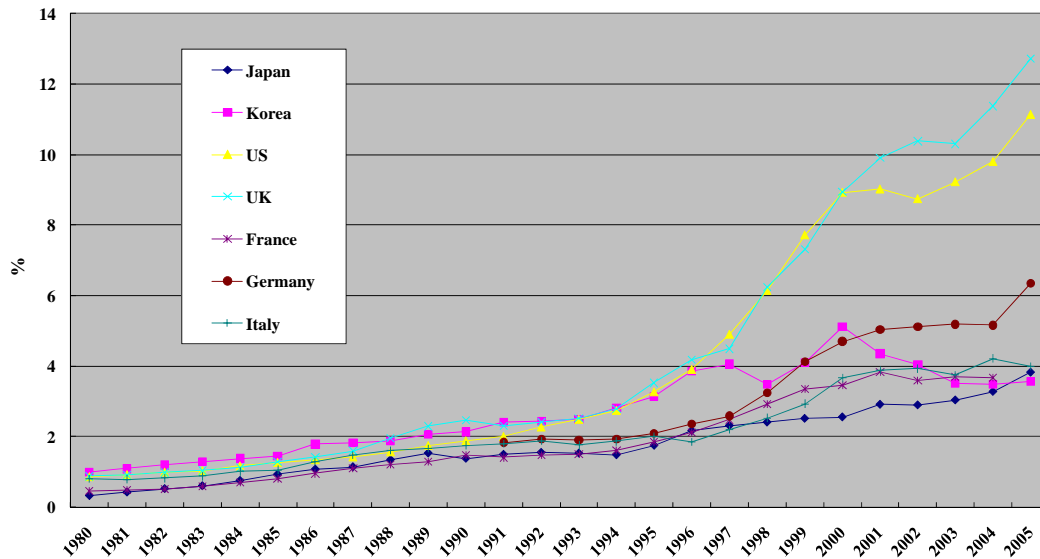
truck transportation is basically measured as a unit of tonnage multiplied by kilometers per man-hour (how much transportation in tonnage and distance was conducted by one man-hour) and differences in quality, such as just-in-time delivery, are not taken account. Similarly, in retail services, the length 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.

### **3. Why Has TFP in Japan's Service Sector Stagnated?**

This section examines why TFP in Japan's service sector has stagnated. According to the analysis in the previous section, one "prime suspect" is the slower accumulation of ICT capital in Japan, and this section looks at this issue in greater detail. However, additional factors, which may have contributed to the stagnation of productivity in Japan's service sector, such as slow accumulation of intangible capital, an insufficient natural selection mechanism, are also considered.

Starting with the issue of ICT investment, Figure 6 compares the ratio of ICT investment to GDP across the major developed countries. The figure shows that accumulation of ICT capital was very slow in Japan. It seems that Japan did not experience an ICT revolution in ICT-using sectors simply because it did not undertake sufficient ICT investment.

**Figure 6. ICT investment/GDP ratio in the major developed countries**

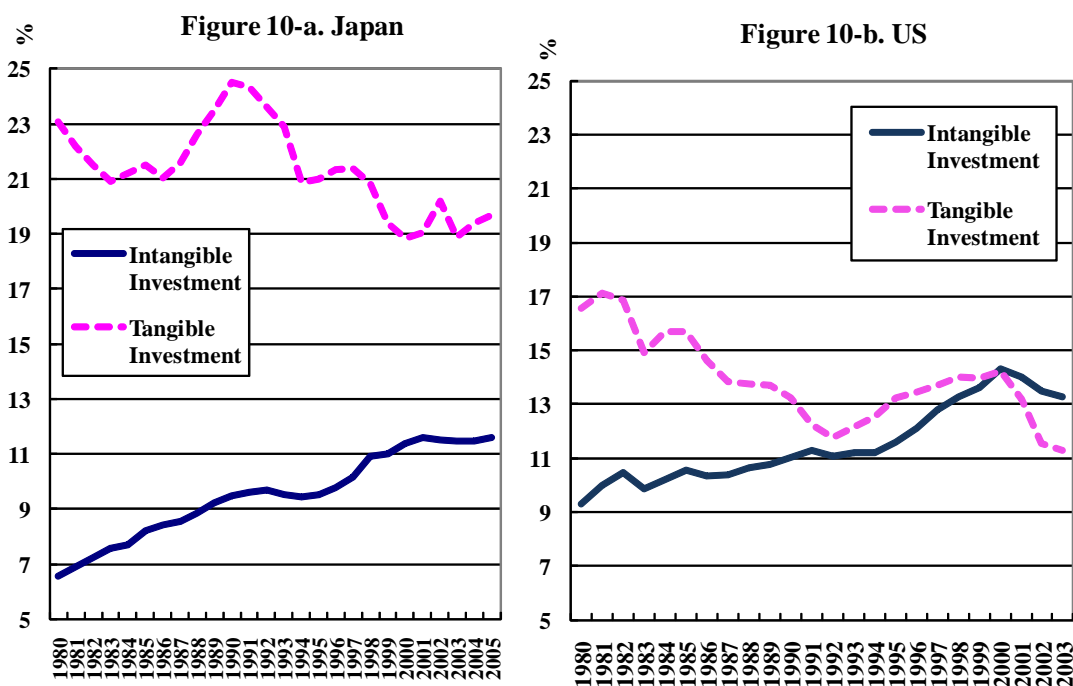


Source: Fukao, Miyagawa, Pyo and Rhee (2009).

Why was Japan left behind in ICT investment? There are likely a number of reasons. One possibly is that 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, 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.

As Figure 7 shows, the investment/value added ratio in Japan has been much lower than that in the United States. However, in this context it is interesting to note that contrary to the case of intangible investment, Japan's tangible investment/value added ratio is much higher than that in the United States.

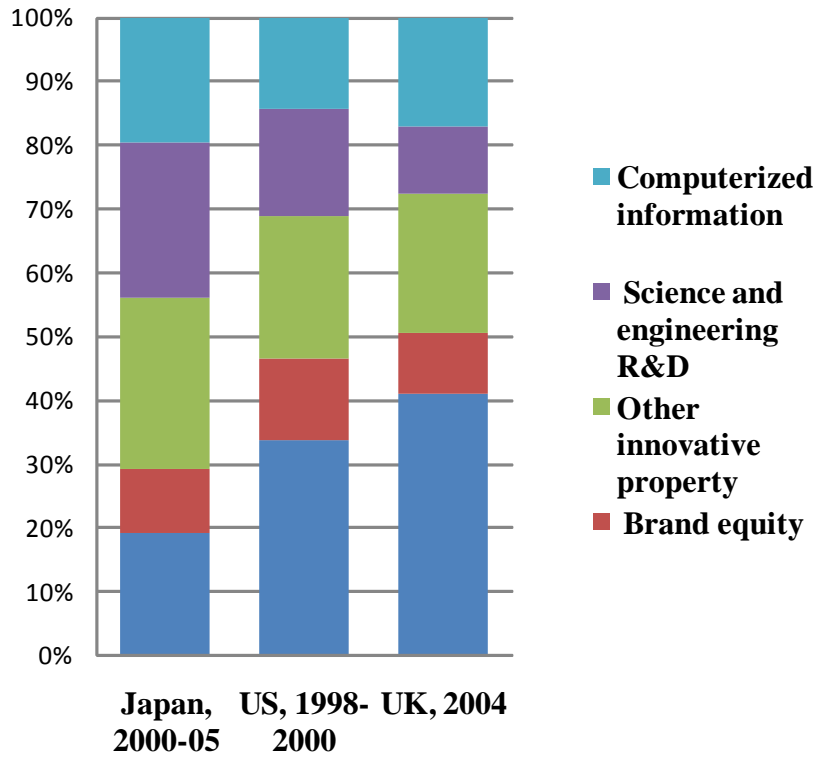
Figure 7. Intangible and tangible investment over value added ratio: Japan-US comparison



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

Next, Figure 8 compares the composition of intangible investment in Japan, the United States, and Britain. The figure suggests that, compared with the other two countries, Japan invests a lot in R&D, most of which is conducted in the manufacturing sector, but very little in economic competencies such as brand equity, firm-specific human capital, and organizational structure.

**Figure 8. Intangible investment by category: share in total intangible investment**



Sources: Japan: Fukao, Miyagawa, Mukai, Shinoda and Tonogi (2009), US: Corrado, Hulten and Sichel (2006), UK: Marrano and Haskel (2006).

Table 1, which is based on Fukao, Miyagawa, Mukai, Shinoda and Tonogi (2009), compares intangible investment by category in the manufacturing sector with that in the service sector.<sup>7</sup> During the period of 2000-2005, intangible investment/value added ratio in the service sector was 9.5 percent, about one half of the corresponding ratio, 17.3 percent, in the manufacturing sector. This large gap is mainly caused by the fact that most R&D investment in Japan is conducted by the manufacturing sector. Figure 9 shows the results of growth accounting with intangible capital by sector.<sup>8</sup> We can see

<sup>7</sup> In Fukao, Miyagawa, Mukai, Shinoda and Tonogi (2008, 2009), the service sector is defined as the whole economy minus manufacturing, agriculture, forestry, fishing, mining, construction, and the public sector.

<sup>8</sup> We should note that, in this growth accounting, accumulation of human capital, except firm-specific human capital, is not taken account of.

that the contribution of intangible investment to labor productivity growth in the service sector is on a declining trend and has been much smaller than that in the manufacturing sector. The low level of intangible investment is one important cause of the stagnation of labor productivity in Japan's service sector.

Unfortunately, there are no estimates of intangible investment by sector for other countries that are compatible with the estimates in Fukao, Miyagawa, Mukai, Shinoda and Tonogi (2008, 2009).<sup>9</sup> Therefore, it is premature to conclude that productivity growth and ICT investment in Japan's service sector lag behind those in other countries because of Japan's low level of intangible investment.

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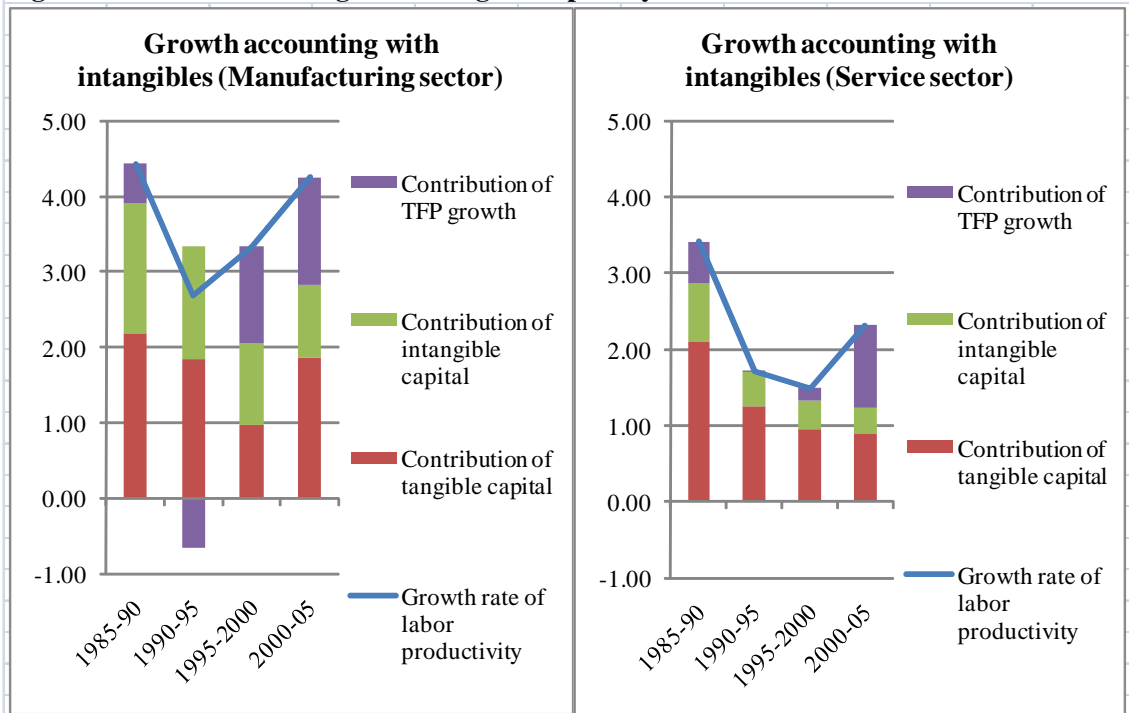
<sup>9</sup> However, one such project is currently in progress at the Productivity Commission of the Australian Government.

**Table 1: Intangible investment by category in the manufacturing sector and the service sector**

	Manufacturing sector		Services sector	
	2000-2005 (billion yen)	Ratio to value added (%)	2000-2005 (billion yen)	Ratio to value added (%)
<b>Computerized information</b>	<b>2,447</b>	<b>(2.09)</b>	<b>6,125</b>	<b>(2.37)</b>
Custom software	1,526	(1.30)	4,197	(1.61)
Packaged software	184	(0.16)	388	(0.15)
In-house software	510	(0.45)	1,065	(0.42)
Databases	226	(0.19)	475	(0.18)
<b>Innovative property</b>	<b>13,316</b>	<b>(11.22)</b>	<b>9,161</b>	<b>(3.55)</b>
Science and engineering R&D	9,312	(7.83)	1,052	(0.40)
Mineral exploitation	0	(0.00)	16	(0.01)
Copyright and license costs	472	(0.41)	4,152	(1.61)
Other product development, design, and research expenses	3,531	(2.98)	3,940	(1.54)
<b>Economic competencies</b>	<b>4,657</b>	<b>(3.95)</b>	<b>9,292</b>	<b>(3.59)</b>
Brand equity	1,876	(1.59)	3,477	(1.33)
Firm-specific human capital	584	(0.49)	1,334	(0.54)
Organizational structure	2,198	(0.91)	4,480	(0.36)
<b>Total</b>	<b>20,420</b>	<b>(17.27)</b>	<b>24,577</b>	<b>(9.51)</b>
Intangible investment/Tangible investment	0.9		0.5	

**Source: Fukao, Miyagawa, Mukai, Shinoda, and Tonogi (2009)**

**Figure 9. Growth accounting with intangible capital by sector**



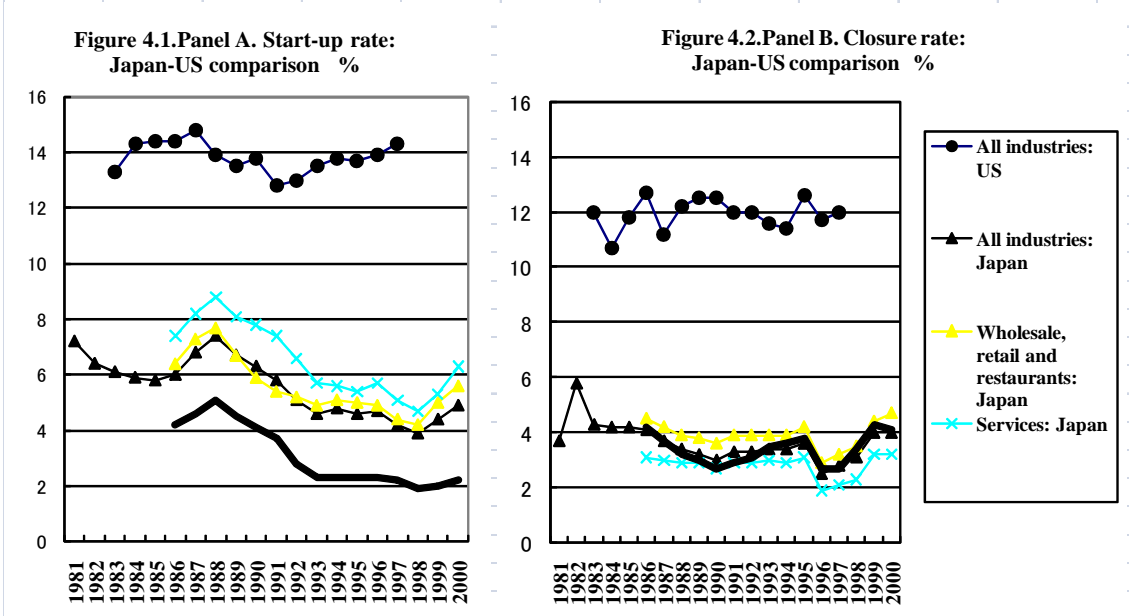
Source: Fukao, Miyagawa, Mukai, Shinoda, and Tonogi (2008).

Another possible reason for the stagnation of TFP in Japan's service sector is that the natural selection mechanism is not working properly. An indication of this is provided in Figure 10, which shows that start-up and closure rates of establishments in Japan are much lower than those in the United States. Further evidence is provided in the study by Kim, Kwon and Fukao (2007), which, using firm level data for Japan's service sector, decomposes productivity dynamics in the periods 1997-1999 and 2000-2002. Following Griliches and Regev (1995), the study decomposed changes in the average labor productivity in a particular industry into the following four effects: the within effect, the reallocation effect, the entry effect, and the exit effect.

The results of that analysis are shown in Table 2. They indicate that in several non-manufacturing sectors, such as construction and transportation, large negative reallocation effects and exit effects on industry-level labor productivity growth can be observed. In many industries, such as, business services, personal services, advertisement, and information services, net entry effects (entry effects plus exit effects) took positive values, but they were more than offset by the large negative values of reallocation effects. Thus, it seems that Japan's low metabolism also impedes productivity growth in service sectors.



Figure 10. Start-up and closure rate of establishments: 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 (2002).

Figure 2. Decomposition of changes in labor productivity 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 service	-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 (2007).

Another important factor which may be having a negative effect on TFP growth in Japan’s service sector is the rapid increase in part-time workers in the 1990s. As Figure 11 shows, the share of part-time workers in total workers increased sharply in some

service sectors, such as retail, finance, telecommunication, and information services. Moreover, the increases in these service sectors are larger than those in manufacturing sectors, such as computers and related devices, communication equipment, and automobiles. Although the share of part-time workers declined in many sectors during the economic expansion of the 2000s, it still remains at a high level.

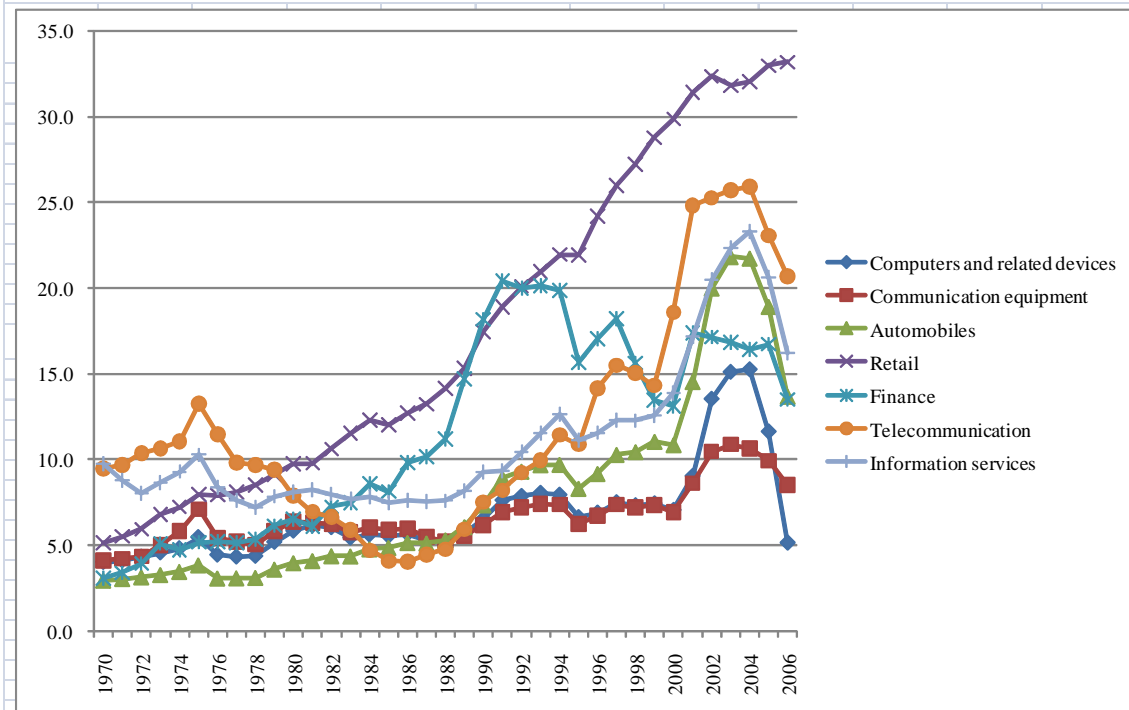
This increase in part-time workers will slow down human-capital accumulation, as firms invest little in on-the-job and off-the-job training for part-time workers (Fukao, Miyagawa, Mukai, Shinoda and Tonogi, 2009; Ikenaga and Kawaguchi, 2010). According to Kim, Fukao and Makino (2010), the increase of part-time workers from 1990 to 2000 reduced Japan's human capital by 2.0 percent.<sup>10</sup>

As shown in Fukao et al. (2006), the productivity gap between part-time workers and regular workers is larger than the wage gap between them, suggesting that firms pay a premium to part-time workers in order to obtain flexibility of employment. Thus, the increase in part-time workers poses a problem not only in term of equity but also in terms of productivity.

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<sup>10</sup> During this period, many elder employees, who were less educated on average than younger employees, have retired. Moreover, the share of the self-employed, whose average labor income is smaller than that of other workers, has declined. These factors contributed to the growth of human capital in Japan. In total, the growth rate of human capital in Japan was not lower than that in the United States.

**Figure 11. Share of part-time workers in total workers by sector: 1970-2005 (in %)**



Source: JIP Database 2009.

A final issue to be pointed out here that may contribute to Japan's disappointing productivity performance is that Japanese firms in service sectors tend to be smaller than, for example, their US counterparts in the same sector. Table 3 compares the number of listed firms and their average size measured in terms of the number of workers in the United States and Japan. The data are on a consolidated basis for all stock market-listed firms. In the manufacturing sector, the gap between Japan and the United States in terms of average firm size is not very large. However, in the case of wholesale and retail as well as other services, US firms are much larger than Japanese firms on a consolidated basis. This difference in average firm size implies that Japanese firms in these sectors are much less likely to be internationalized and enjoy economies of scale than their US counterparts.

**Table 3. Number of listed firms and their average size measured by consolidated workers: US-Japan comparison (based on consolidated financial data of all listed firms)**

	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					

Source: Kwon (2010).

#### 4. Conclusion

This paper aimed to examine three issues: the productivity performance in Japan's service sector; why it is important to accelerate TFP growth in the service sector; and why TFP has stagnated in Japan's service sector. The main findings of the paper are as follows.

- (1) 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 for economic growth.
- (2) TFP growth in ICT-using sectors declined substantially after 1995.
- (3) Accumulation of ICT assets in Japan was very slow in comparison with other developed countries.
- (4) The low level of intangible investment is probably one important cause of the stagnation of TFP; another is that Japan's service sector has fallen behind with regard to investment in ICT.
- (5) It seems that Japan's low metabolism also impedes productivity growth.
- (6) Firms invest little in on-the-job training and off-the-job training for part-time workers. The increase in part-time workers may have slowed down human-capital accumulation.
- (7) It appears that Japanese firms have fallen behind in terms of internationalization and enjoying economies of scale.

Unfortunately, these are deep-seated structural issues that cannot be resolved overnight. Moreover, they tend to be closely intertwined and overcoming them will require both changes in economic policies and corporate practices. For example, 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 for greater labor market flexibility.

Similarly, 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 continue 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.

To end on a brighter note, although the challenges for Japan's economy are considerable, they are not insurmountable. Moreover, the fact that Japan's productivity in many service sectors lags behind that of, say, the United States also carries the promise of catch-up growth in these areas. If Japan's firms were to invest in ICT and intangible assets to a similar extent as their US counterparts and invested in the training of those now working part-time, this could provide Japan with productivity growth in these sectors for years to come.

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