

Japan's Economic Growth Seen through Industry-Level and Firm-Level Data

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Outline of Report

1. **Slowdown in accumulation of production factors as source for growth**
2. **What is needed to maintain growth (per capita)?**
3. **Contribution of IT investment and effect of IT investment goods price**
4. **Distortions in industrial structure and the economic growth ratio**
5. **Japan's potential capacity for future growth**

**1. Slowdown in accumulation
of production factors as
source for growth**

1 . Slowdown in accumulation of production factors as source for growth

Comparison between US and Japanese growth

Japanese Reference Data:

- Japan Industry Productivity Database (JIP Database), 84 industrial categories, 1970 - 98**
- Fukao, Miyagawa, Kawai, Inui et. Al. (2003), in Economic Analysis No. 170.**
- All data published of the website of the Economic and Social Research Institute:
<<http://www.esri.go.jp/jp/archive/bun/bun170/170index.html>>**

Factors contributing to the fall in Japan's growth rate:

- 1) decline in capital accumulation ratio,
- 2) decrease in labor input (numbers & hours),
- 3) decline in labor quality growth

Sources of Economic Growth: US-Japan Comparison

Panel A. The Result of Growth Accounting for the US Economy by Jorgenson et al (2002): 1973-2000

(Annual Rate, %)

	Real GDP Growth	Man-hour growth	Labor productivity (GDP/man-hour) growth	TFP growth	Contribution of labor quality growth	Contribution of capital services/man-hour growth		
			c=a-b		e	Sub-total	Contribution of IT capital	Contribution of non-IT capital
	a	b	c=a-b	d=c-e-f	e	f=g+h	g	h
1973-1995	2.78%	1.44%	1.33%	0.26%	0.27%	0.80%	0.37%	0.43%
1995-2000	4.07%	1.99%	2.07%	0.62%	0.21%	1.24%	0.87%	0.37%

Jorgenson et al. (2002)

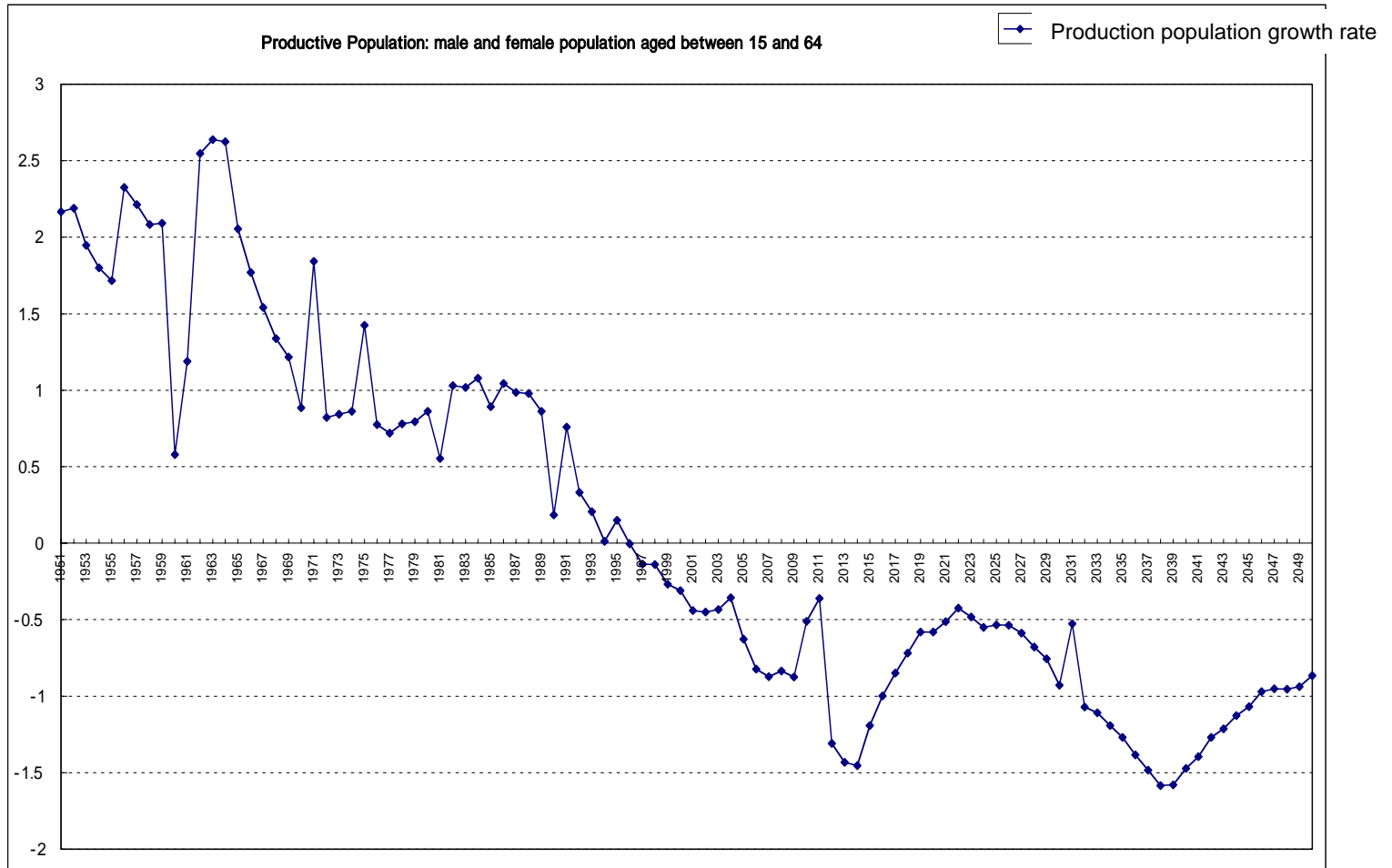
Panel B. The Result of Growth Accounting for the Japanese Economy: 1973-1998

(annual rate, %)

	Real GDP Growth	Man-hour growth	Labor productivity (GDP/man-hour) growth	TFP growth	Contribution of labor quality growth	Contribution of capital services/man-hour growth		
			c=a-b		e	Sub-total	Contribution of IT capital	Contribution of non-IT capital
	a	b	c=a-b	d=c-e-f	e	f=g+h	g	h
1973-83	3.56%	1.53%	2.03%	-0.30%	0.65%	1.68%	0.16%	1.52%
1983-91	3.94%	1.79%	2.15%	0.40%	0.46%	1.29%	0.37%	0.92%
1991-98	1.25%	-0.08%	1.34%	0.03%	0.21%	1.10%	0.33%	0.76%
						1995-98	0.52%	0.63%

Calculated from JIP database.

Productive population declining



Sources: Figures for 1950-70 based on Population Estimates of Japan, in Population Estimates Series, No.s 36, 39, 47, Statistics Bureau
 Figures for 1979-1997 based on Japan in Figures, Ministry of Public Management. 1998 figures based on Population Estimates Annual Repo
 (Population Estimates Series, No. 71), Statistics Bureau of Japan. Figures for 1999-2050 based on Japan's Future Population Estimation

Slowdown in capital accumulation

Structural decline in rate of return on capital

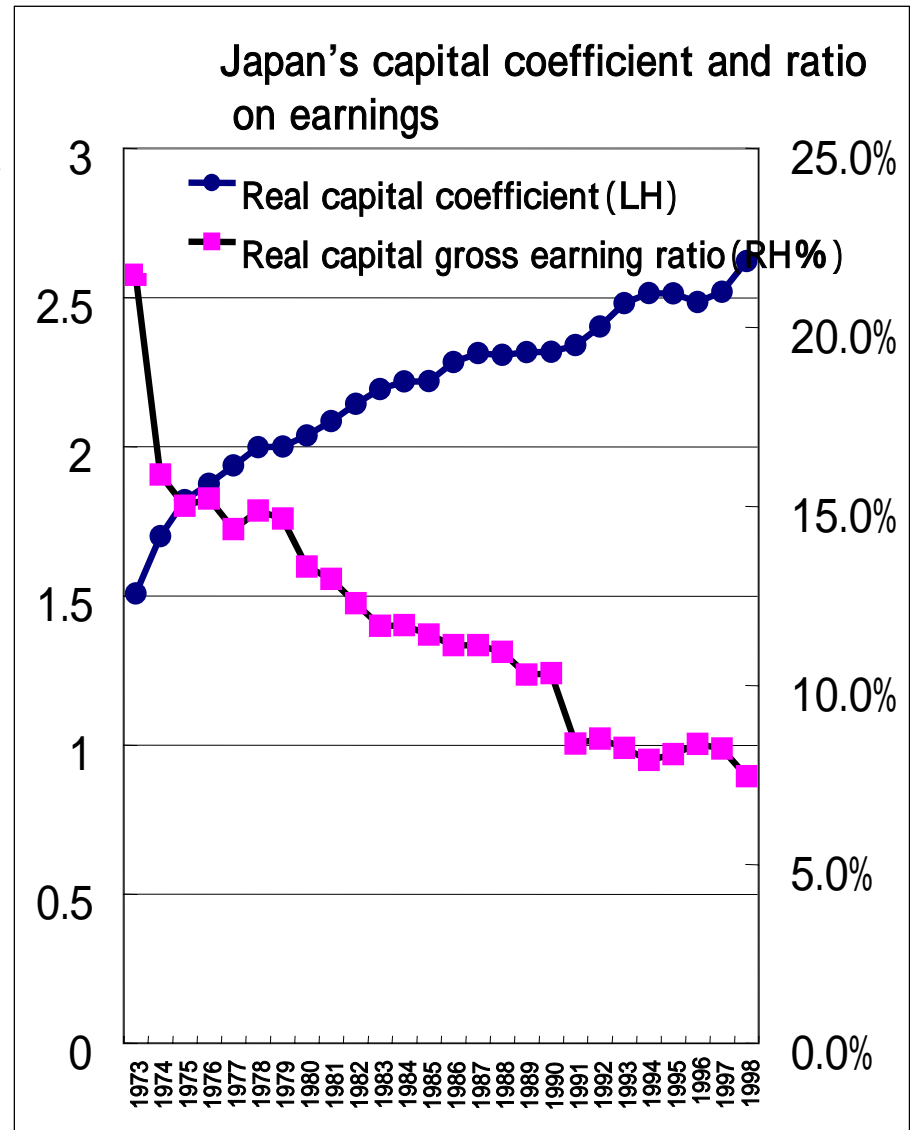
Private investment stagnation

Recession

Slowdown in labor quality improvement

Genda (1997): pay rates for university-education older workers sluggish

Godo (2001): Slowdown in catchup with US education standard



Real capital earning ratio derived from operating surplus divided by macro 1999 standard real GDP deflator
Real capital coefficient is 1990 real capital stock price by 1991 price real GDP
Author's calculation based on JIP Database (Fukao, Miyagawa, Hawaii, Inui, et.al. 2003.)

1 . Slowdown in accumulation of production factors as source for growth

Conclusion:

Japan may have fallen into the trap of successive diminution of marginal productivity

2. What is needed to maintain growth (per capita)?

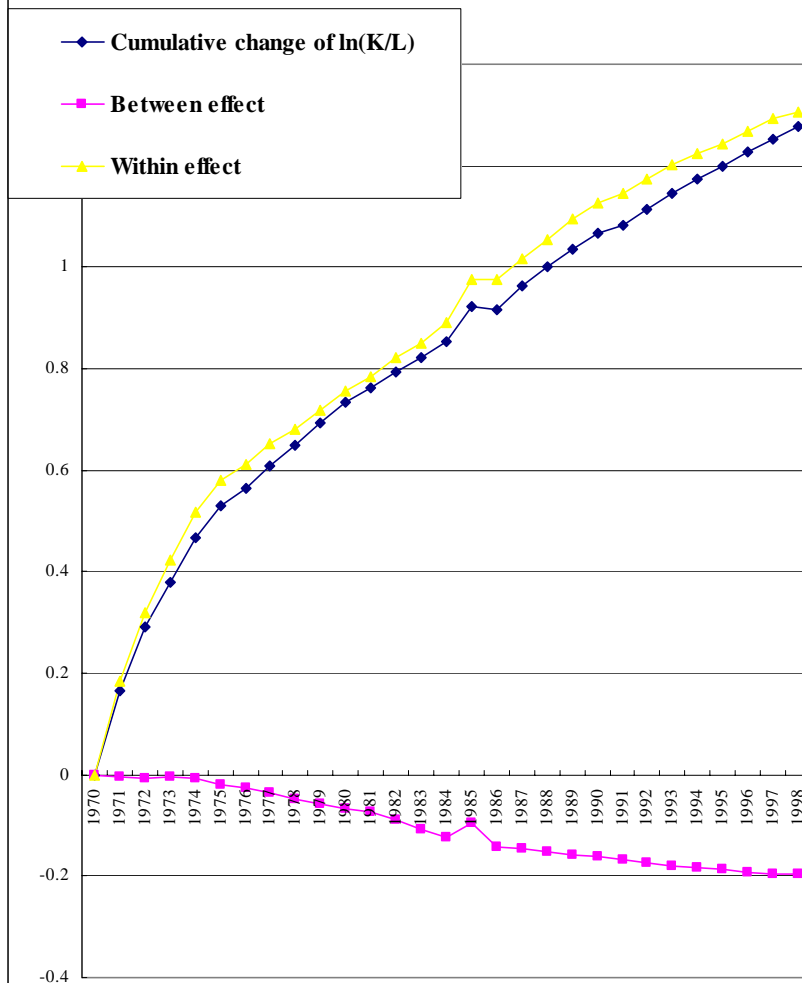
Measures to be taken – 1

Expand material- and human-capital intensive industries (industrial growth)

Growth in capital-labor ratio = increase in capital-labor in each industry + expansion of capital-intensive industries

**Ito and Fukao (2003):
Capital-intensive industries have not yet expanded**

**Decomposition of Capital-Labor Ratio Growth:
Macro Economy, 1970-98**



Growth in skilled labor ratio = increase in skilled-labor ratio in each industry + expansion of skilled-labor-intensive industries

Ito and Fukao (2003):

Capital-intensive industries have not yet expanded

Table 2. Panel C Decomposition of the growth of the share of skilled workers: The whole economy (annual rate, %)

	1980-90	1990-2000	1980-2000
Growth rate of the share	2.88	1.03	2.10
Between effect	1.02	1.06	1.02
Within effect	1.86	-0.02	1.08
Bet+With	2.88	1.03	2.10

Source: Ito and Fukao (2003), Authors' calculation based on *Population Survey* data.

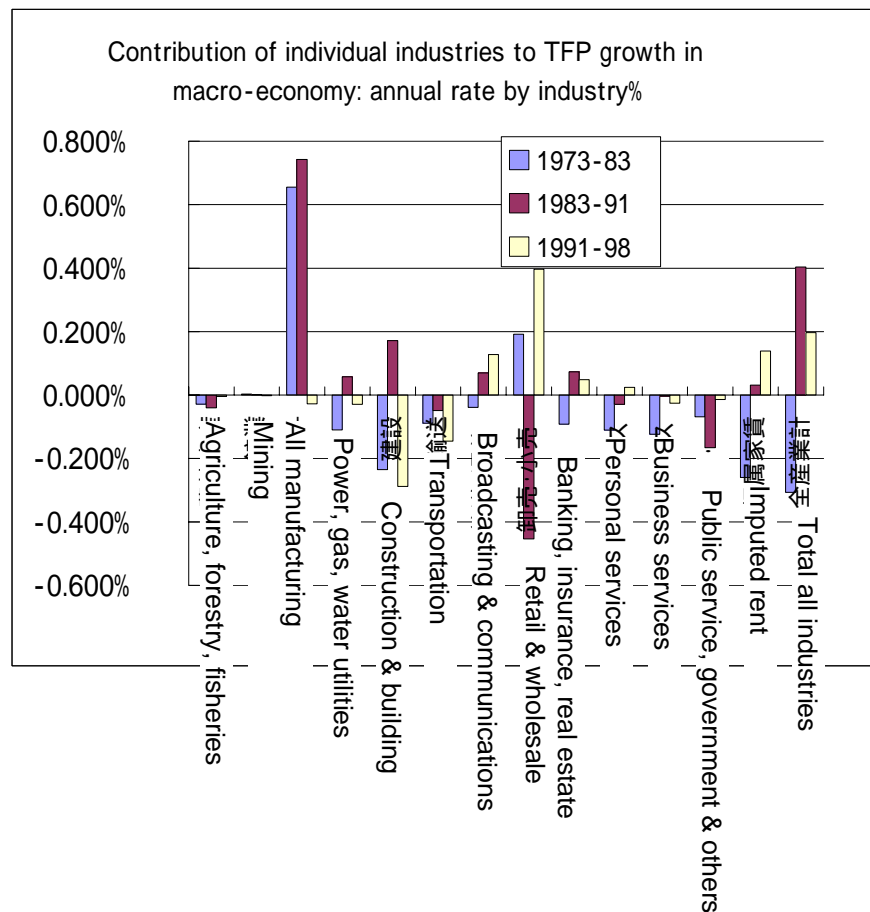
Increased acceleration of total factor productivity

- **Increasing total factor productivity contributes not only to expanded production but also to increased material- and human-capital earning ratio and the acceleration of production factor accumulation**

Measures to be taken – 2 Accelerate TFP growth by relaxing restrictions

TFP growth accelerated in industries – retail, wholesale, broadcasting, communications, banking, insurance, real estate and other services to individuals – where restrictions were relaxed.

Nakanishi & Inui (2003): Significant acceleration of TFP growth observed in deregulated industries.



Measures to be taken – 3

Improve the metabolic function of industries with revitalized financial systems

Research analysing productivity growth in terms of individual corporation's contributions (Nishimura, Nakajima and Kiyota (2003); Fukao and Quan, 2003) shows that the effect of new entries is limited while withdrawals have negative impact (low productivity firms remain)

Figure 3.7: Ratio of establishments in operation and not in operation: comparison between USA and Japan

Figure 3.7 Panel A: Ratio of establishments in operation

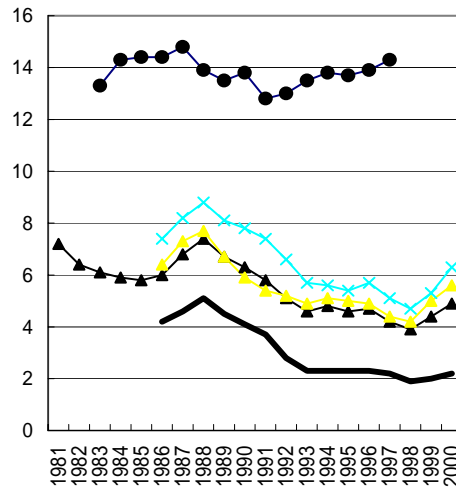
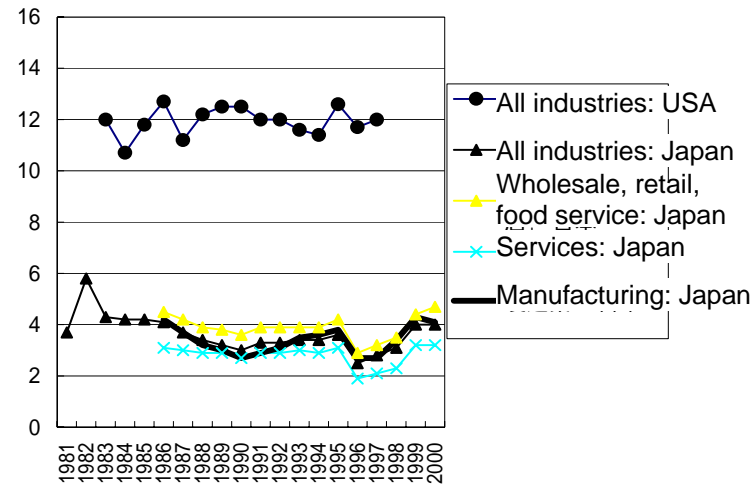


Figure 3.7 Panel B: Ratio of establishments not in operation



Sources: Fukao, Inui, Kawai and Miyagowa (20003)

Employment insurance data used for comparing US and Japanese situations. Original data: Small and Medium Enterprise Agency (2001), Study Meeting on industry "hollowing-out" and tariff policies (2002), and Small Business Administration, US Government (1998)

Measures to be taken – 3

Expand Direct Investment in Japan

Globalization and Information Technology: direct investment has made the passage of capital and management resources (technical knowledge, Management skills, etc.) across borders easy.

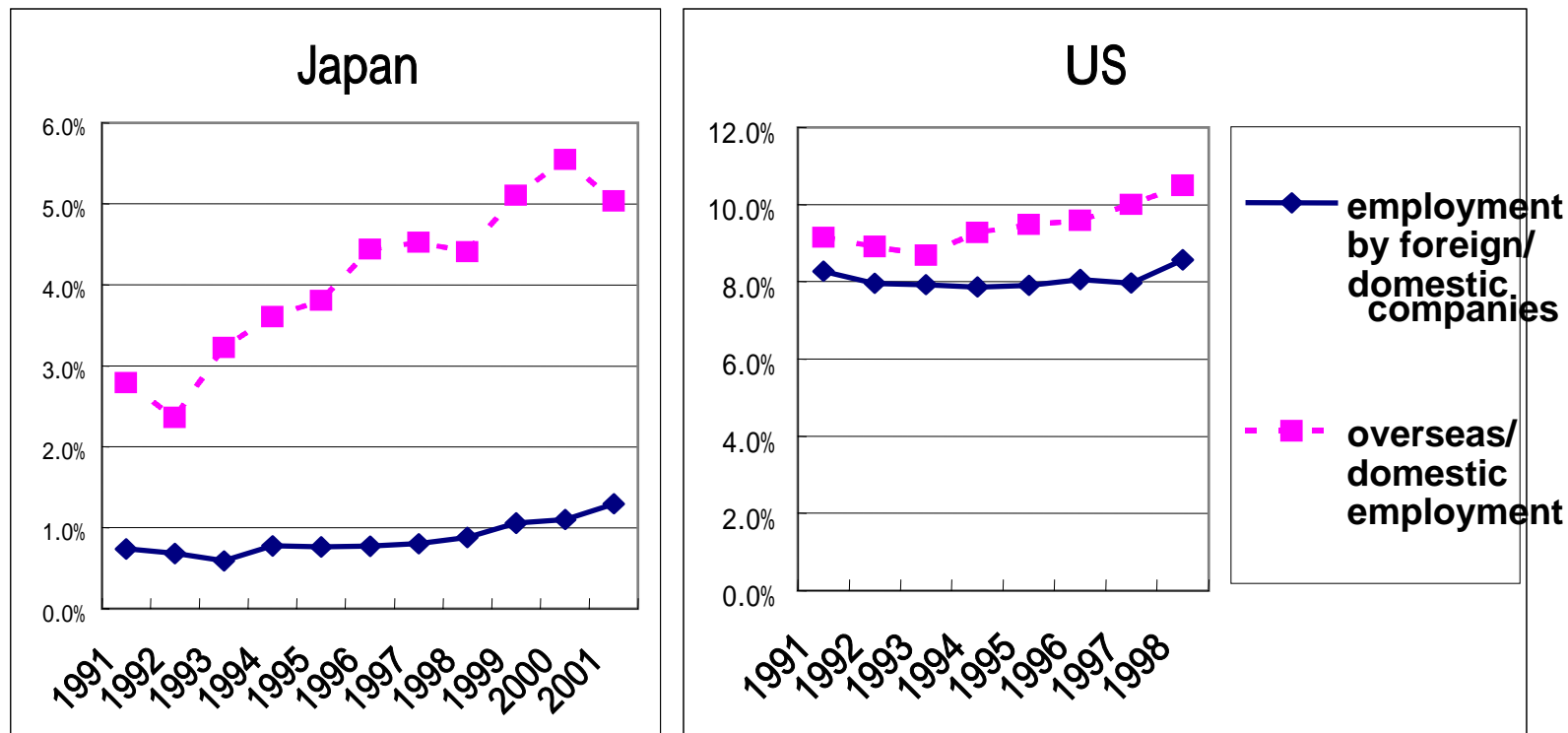
Up to 1980: the high savings rate made it possible for the Japanese to enjoy prosperity so long as corporations accumulated management resources through activities such as research and development.

Today: Japanese prosperity is dependent on attracting corporations, including local ones, to establish their business in Japan.

. . . The world economy has shifted to competition between regions offering corporate incentives, a global competition in which Japan, where FDI significantly exceeds domestic investment, is losing.

Foreign direct investment cannot offset hollowing out of industries due to low Japan-bound direct investment (employment)

Domestic/foreign direct investment and employment – Japan:US comparison



Sources: Data for employment in Japan by foreign companies, same as Table 1.1.

Data for employment in US by foreign companies, based on OECD Measuring Globalization 2001.

Data for total Japanese domestic employment based on 2002 *Economic and Financial Annual Report*.

Data for total US domestic employment gained by totaling private sector employment listed in The Chairman of the Council of Economic Advisors, 2003 *Economic Report of the President*

- **In terms of potential capacity, there is considerable room for capital expansion in Japan.**
- **Kimura and Kiyota (2003), and Murakami and Fukao (2003): TFP of foreign-owned companies is 10% higher, even when other conditions are controlled.**
- **Fukao and Amano (2003): It will be difficult to achieve Prime Minister Koizumi's target of doubling inbound investment within five years doing nothing more than disseminating information.**

3. Contribution of IT capital accumulation and effect of IT asset price deflators

Contribution of IT capital to Japanese economic growth has increased in the latter half of the 1990s

- Jorgenson and Motohashi (2003): JIP database shows increase in IT capital accumulation since second half of 1990s, despite low growth rate.
- JCER database for just the private sector shows the same results. 36% of economic growth in the latter half of the 1990s derived from IT investment. Jorgenson and Motohashi (2003) found an even higher contribution of 41%.

Contribution of IT capital to Japanese economic growth has increased in the latter half of the 1990s

Growth Accounting 1(SNA base)				
	1990/80	2000/90	1995/90	2000/95
GDP Growth	4.4	1.5	1.5	1.4
Labor Growth	0.7	-0.6	-0.7	-0.4
Labor Productivity	3.8	2.0	2.2	1.9
Intra-sectoral Capital Deepening	1.8	1.2	1.3	1.1
IT Capital Deepening	0.5	0.3	0.2	0.5
Reallocation Effects of Capital Deepening	0.0	0.1	0.1	0.0
Reallocation Effects of Labor Shifts	0.7	0.0	0.2	-0.2
Intra-sectoral TFP Growth	1.3	0.8	0.7	0.9

According to Jorgenson and Motohashi's calculations, contribution of IT capital accumulation is greater

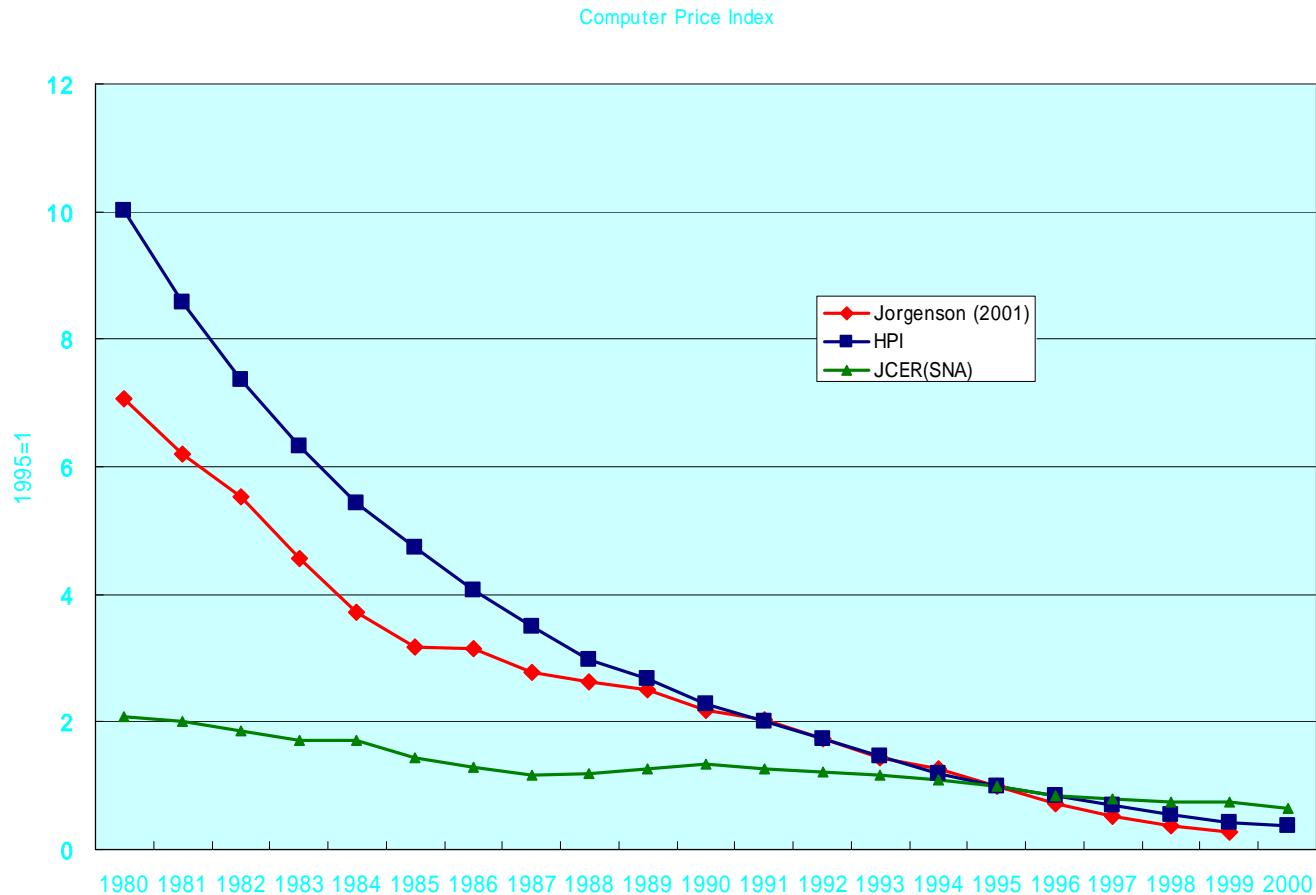
Comparison with Jorgenson and Motohashi (2003)

	1995/90				2000/95			
	SNA base (M)	SNA base (J&M)	HPI base (M)	HPI base (J&M)	SNA base (M)	SNA base (J&M)	HPI base (M)	HPI base (J&M)
GDP Growth	1.5	1.7	1.6	1.9	1.4	1.6	1.9	2.2
Contribution of Labor Growth	-0.5	-0.2	-0.5	-0.2	-0.3	-0.2	-0.3	-0.2
Capital growth	1.1	1.2	1.2	1.3	1.0	0.7	1.3	1.4
IT capital growth	0.2	0.2	0.3	0.3	0.5	0.4	0.7	0.9
TFP growth	0.9	0.7	0.9	0.7	0.7	1.0	0.9	1.1

Effects of IT asset price

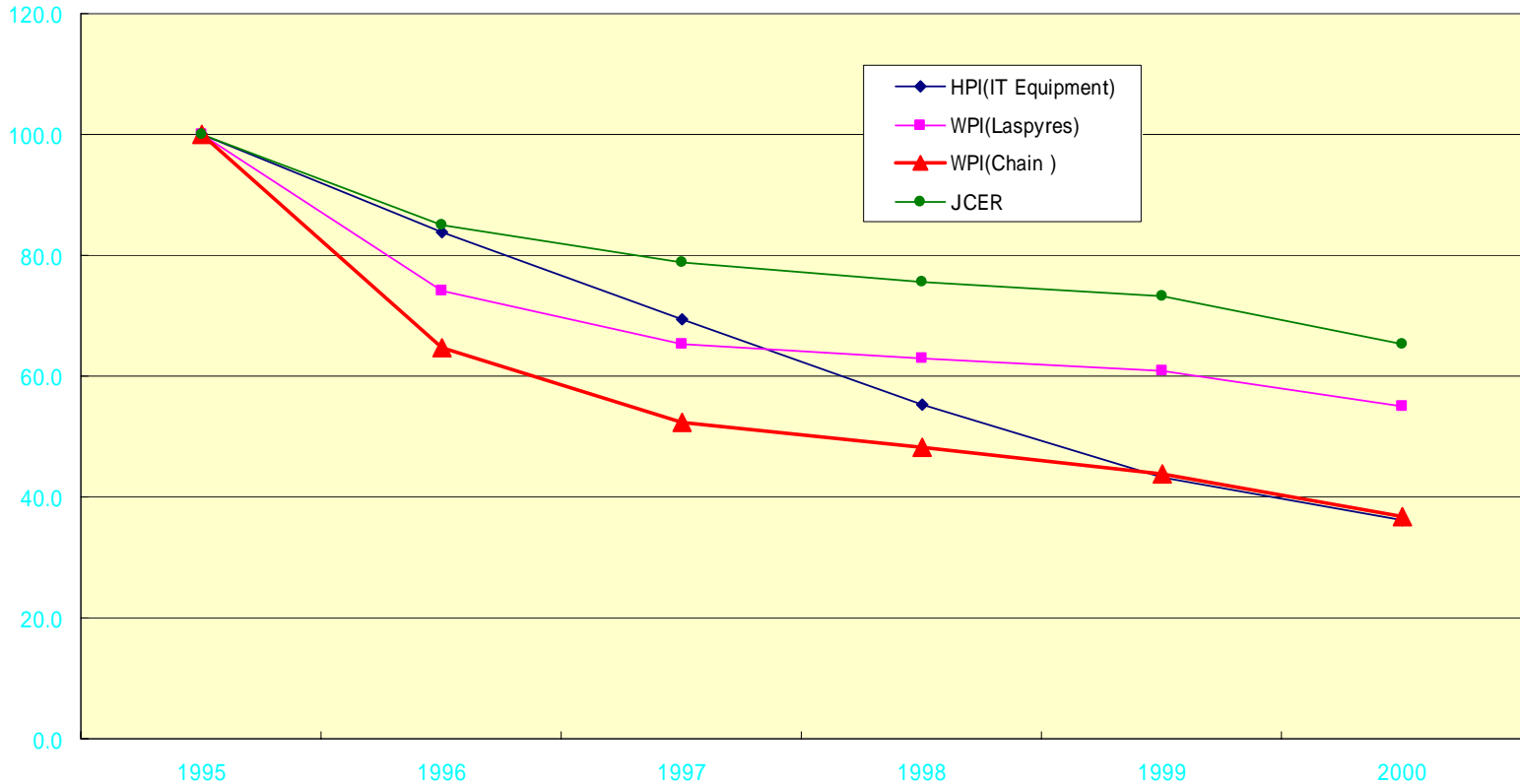
- Economic growth rate depends on measurement of IT asset price deflator.
- The decrease of computer price in the US is faster than that in Japan and other developed countries Harmonized price index (HPI).
- The price deflator of HPI is consistent with chain price index published by BOJ.

Large drops in US computer price index



HPI movement consistent with BOJ's chain price index

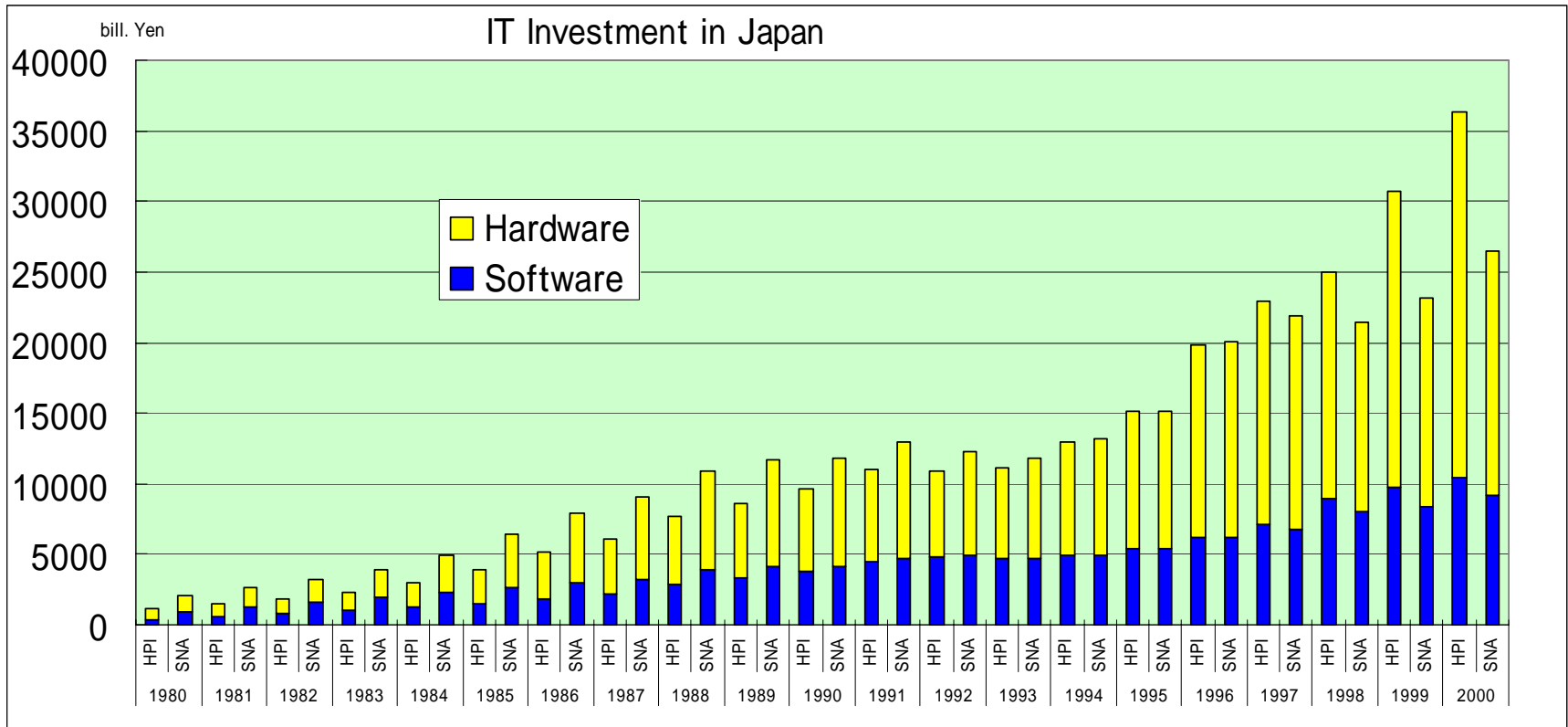
Comparison of Price Indices in Computer(1995=100)



IT investment with HPI and growth accounting

- In 2000, IT investment (including software) using HPI reached 36 trillion yen – 27% higher than IT investment using the SNA price deflator.
- Recalculating growth for the JCER database using HPI shows higher economic growth and greater contribution from IT capital accumulation in the latter half of the 1990s

IT investment increases greatly when HPI is used



In growth accounting using HPI, contributions of both GDP and IT capital accumulation increase

Growth Accounting 2(HPI base)

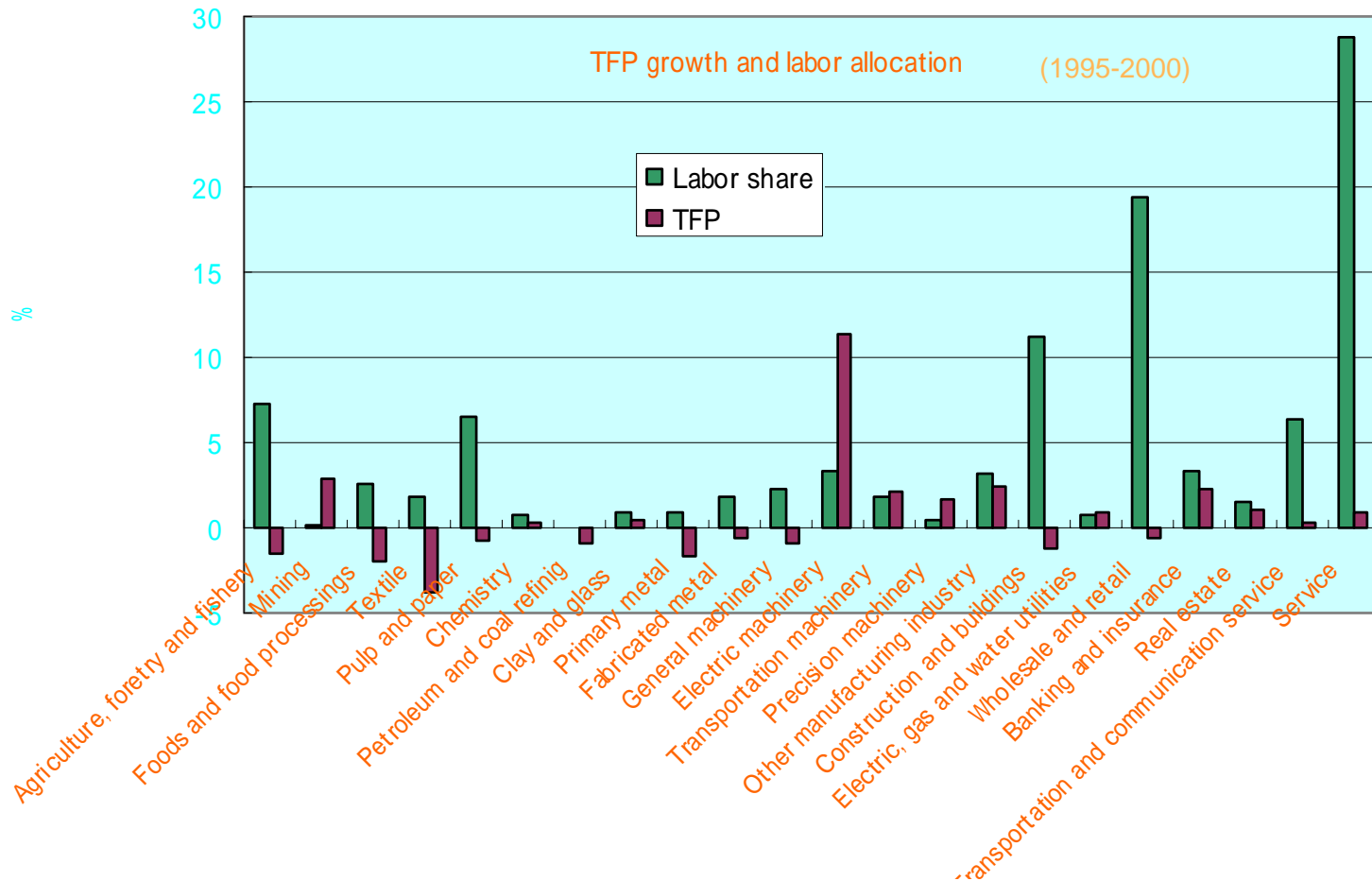
Growth Accounting 2(HPI base)				
	1990/80	2000/90	1995/90	2000/95
GDP Growth	4.4	1.7	1.6	1.9
Labor Growth	0.7	-0.6	-0.7	-0.4
Labor Productivity	3.7	2.3	2.3	2.3
Intra- sectoral Capital Deepening	1.8	1.4	1.5	1.3
IT Capital Deepening	0.6	0.6	0.4	0.7
Reallocation Effects of Capital Deepening	0.0	0.1	0.1	0.0
Reallocation Effects of Labor Shifts	0.7	0.0	0.1	-0.2
Intra- sectoral TFP Growth	1.2	0.9	0.7	1.1

4. Industrial structure distortions and the economic growth rate

Distortions in industrial structure offsetting the contribution of IT capital

- Why is Japan unable to break away from 1% growth even though IT capital has been increasing?
- Not only has labor contribution been declining overall, the effects of labor reallocation have had a negative impact, offsetting IT capital accumulation effects and the contribution of TFP growth.
- Fiscal expansion leads to increased labor sharing in low-productivity industries such as construction and building.

Misallocation of labor in the latter half of the 1990s



5. Japan's potential capacity for future growth

Will the Japanese economy recover?

- Two key points for the first decade of 2000 to be the restoration period for the Japanese economy:
 - (1) continue IT capital accumulation
 - (2) correct distortions in industrial structure
- If labor, finance, and capital all make a fundamental shift to high-productivity industries, contributing to a return to levels of the late 80s to early 90s, 2% growth may be possible.

Achieving 2% growth through continued IT investment & correcting distortions in industrial structure

Growth Accounting 3 (incl. forecast)					
	1990/80	2000/90	1995/90	2000/95	2010/00 (Forecast)
GDP Growth	4.4	1.5	1.5	1.4	1.8-2.3
Labor Growth	0.7	-0.6	-0.7	-0.4	-0.5
Labor Productivity	3.8	2.0	2.2	1.9	2.3-2.8
Intra-sectoral Capital Deepening	1.8	1.2	1.3	1.1	1.2
IT Capital Deepening	0.5	0.3	0.2	0.5	0.5
Reallocation Effects of Capital Deepening	0.0	0.1	0.1	0.0	0.0
Reallocation Effects of Labor Shifts	0.7	0.0	0.2	-0.2	0.2-0.7
Intra-sectoral TFP Growth	1.3	0.8	0.7	0.9	0.9

Measures to be taken

- 1. Expand material- and human-capital intensive industries (deepening industrial growth)**
- 2. Accelerate TFP growth by relaxing restrictions (expand special economic zones to motivate competition for revitalization at local level, remove entry barriers, etc.)**
- 3. Improve the metabolic function of industries through revitalized financial systems (from corporate finance to enterprise finance)**
- 4. Expand direct investment in Japan (remove barriers to entry, privatization, offer incentives at local government level)**
- 5. Promote investment tax credit to expand IT investment**
- 6. Review and improve efficiency of allocation of resources in the public sector in order to realize an adequate industrial structure (re-examine government spending on decentralization and initiate PFI and other commercial methods)**