Paper for the FRI Volume on *Industrial Restructuring in Japan*

Industry in Japan
Structural Change, Productivity, and Chances for Growth

KIMURA Tatsuya Martin SCHULZ

May 2003

FUJITSU RESEARCH INSTITUTE
ECONOMIC RESEARCH CENTER
1-16-1-11F Kaigan, Minato-ku
TOKYO 105-0022, Japan
Phone: +81 3 5401 8392
Fax: +81 3 5401 8438
kimurat@fri.fujitsu.com
schulz@fri.fujitsu.com

Summary

Japan is in a structural crisis that has its roots in the preservation of a postwar model of stakeholder governance and the maintenance of a "Dual Economy" between productive manufacturers in international competition and (relatively) unproductive non-manufacturing sectors that produce for a rather protected domestic market. Comprehensive market reform is necessary to solve these problems. Corporations clearly need more flexible labor and capital markets, competitively priced inputs, and the integration of high-grade outside skills.

An analysis of Adjusted TFP Change Rates shows that the manufacturing sector, but also utilities, transport and communications have strong growth potentials if they are able to cut their excessive use of capital and labor. The service sector, however, is not as productive as it should be (and this is even worse for the construction and real estate sectors). To establish the service industry not only as a pool for surplus labor, but also as an engine for growth for the entire economy, its production system clearly needs to undergo serious reform after market restrictions have been abolished and competition increased.

Contents

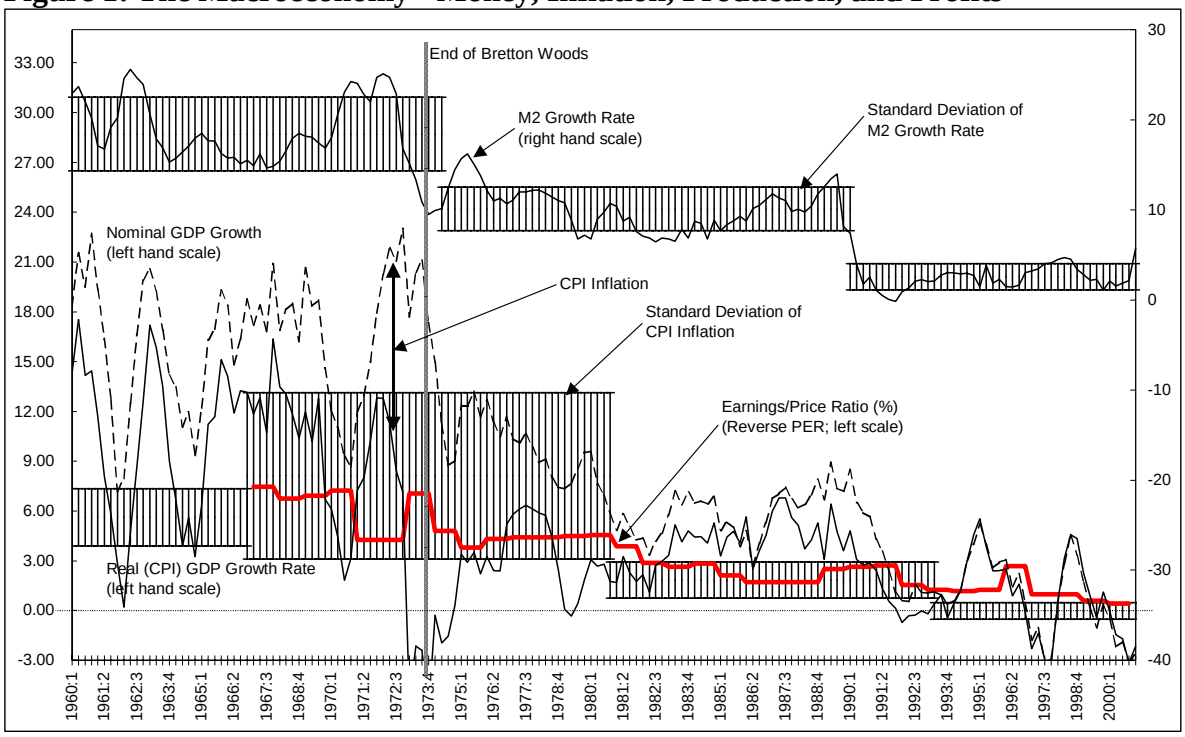
1 The Japanese Economy and Structural Change

Japan has not been able to adjust to the changes of the last decades fast enough. To explain this stagnation in one of the formerly most dynamic economies, we will first provide a short overview of the most significant macroeconomic trends of the last decades.

1.1 Structural Trends

Figure 1 gives an overview of Japan's economy after 1960 by plotting the most important macroeconomic variables. In the figure, the growth rate of money demand M2 is a good indicator not only for the situation in the financial markets but also for overall supply and demand trends. Nominal and real GDP growth, and their difference, the inflation rate, summarize the overall result and the dynamics of the economy. The Earnings-Price Ratio (reverse PER of the first section of the Tokyo Stock Exchange in percent) shows profitability and payouts of major Japanese corporations.

Figure 1: The Macroeconomy - Money, Inflation, Production, and Profits



Note: PER data are plotted as a Percent Earning Price Ratio to express a simple stockholding yield.
Source: © FRI. Data from IMF, IFS. PER data from: TSE Compact Databook, various issues.

Clearly, three distinct phases can be identified in Figure 1. During the 60s, the economy was still on its very strong post-war growth trend. High money demand and supply of around 20% was in sync with a dynamic economy with high real GDP growth rates of

around 8%. Inflation was rather high, but under control as can be seen by the low variance of inflation during that phase.

This situation of dynamic but stable high growth changed considerably during the early 70s when:

- Trade unions demanded a higher share of Japan's income for employees,
- Monetary policy after the break down of the (fixed) exchange rate system of Bretton Woods tried to stabilize growth on a too high level,
- The economy was hit by the first oil crisis, and
- The government took major steps to build up a "welfare state" by expanding coverage and payouts of pensions and health insurance.

After these shocks and structural changes, it took the economy until the end of the 70s to stabilize at a lower growth rate. During the early 80s, it finally seemed as if the economy had settled into a stable (but still successful) equilibrium akin to that of a "mature" economy, with real growth rates of around 4%, stable money demand, and low inflation. During this phase important steps toward deregulation (like deregulation of financial market, banking, and foreign capital flow controls) and internationalization were introduced. At the end of the 80s, however, it became clear that the economy had indeed not settled into a new state of equilibrium. Monetary expansion (after the Plaza Agreement) and deregulation of banking and finance gave banks and corporations the chance to expand their investments beyond the margins of feasible market risk models (which had not been developed by Japanese intermediaries at the time), beyond their international investment skills, or beyond sustainable levels (for the new equilibrium) in general. As a result, the economy overshot by developing an asset market bubble.

From the early 90s the economy went into a third phase, a phase of stagnation that has not yet been mastered. After the bubble of the late 80s burst, money demand and supply broke down when banks and corporations became haunted by bad debts and monetary policy became extremely cautious about any development that could trigger another bubble or support another "hollow" type equilibrium with unsustainable levels of investment or serious misallocations. At the same time, government policy tried to stabilize growth and employment with an unprecedented fiscal expansion. Unlike households and major corporations that reduced debt and built up cash levels (and, of course, fueled deflation in the

process), fiscal policy at the time regarded the crisis as a mere swing in the business cycle of an otherwise (or earlier) successful economy.

Today, the economy is in a situation where

- Monetary and fiscal policies have only very limited means for further stimulation,
- Households remain depressed by growing unemployment, disillusioned by government and corporate strategies, and skeptical about the progress of structural market reforms,
- Major corporations are squeezed between low current demand for their products and high levels of debts (or responsibilities) from their earlier strategies of high growth plus long term commitments to banks, employees, and suppliers, and
- Small and Mediumsize Enterprises (SMEs) are bankrupted by deflation and new startups are blocked by the unavailability of risk capital.

Clearly, all three distinct phases presented enormous challenges to Japanese industry. The first phase of reconstruction, catching up, and high growth was mastered with outstanding success. Industry, in sync with reliable policy, developed corporate strategies and production models that have been copied around the world and became a showcase for growth models in many developing countries in Asia. At the heart of this growth model was a stakeholder model that was able to overcome a situation of war destruction, capital shortage, and an underdeveloped market framework by setting up a system of implicit contracts founded on trust and long term commitments (see Schulz 2001).[1]

The second phase (in the 70s and 80s) of gradual deregulations towards a liberal market model and internationalization was intended to allow for higher degrees of consumer sovereignty, high returns of different types of assets for an ageing society, and closer international market integration for future investment chances. Corporations clearly needed more flexible labor markets, competitively priced inputs, and integration of high-grade outside skills (from universities, consulting, and internationalized financial intermediaries). This

---

[1] The “classic” Japanese corporate governance framework after WWII was oriented towards market results, but it was not based on short-term financial profitability considerations at every level of production and planning. It consisted of (i) Trade Agreements with Few Stakeholders, (ii) Public to Private Guarantees, (iii) High Leverage and Reciprocal Shareholdings, (iv) Management Incentives Towards Overall Growth, (v) Employee Incentives Towards Long Term Commitment, (vi) Tight Market Regulation, (vii) Regional Concentration, (viii) Selective Intervention by Key Stakeholders.

phase was much less successful. After proving the flexibility and stability of the earlier developed stakeholder system as a whole by adjusting to exogenous shocks and structural changes during the 70s, banks and corporations did not successfully manage to transform close stakeholder relationships into open and transparent market relationships with high payouts (to outsiders of the corporate networks) and reliable risk models.

The third, current, phase after the bubble burst in 1990, should have become a phase where shortcomings and delays of earlier partial reforms were swiftly replaced by comprehensive market reforms to offer corporations the chance to regain their flexibility in a newly calibrated market framework. By now it is clear, however, that many stakeholder relationships, that are now often called "vested interests," are hard to reform and will go on in dragging the economy. Unfortunately, after the failed attempts of the 80s and 90s, the promising reform process is now under additional pressure from debts of earlier (and current) misallocations, and from the fast progress of competitors in the U.S. and Asia who were able to build on their more flexible markets.

1.2 Structural Challenges of the 70s and 80s

During "high growth," governance in Japan was based on a system of contributions from different stakeholder groupings, closely interlinked as "insiders" of the corporate finance and production process. Workers traded low real incomes for lifetime employment, consumers accepted high current prices for future growth and income, financial institutions discounted group-based and implicit governmental guaranties for low risk premiums, and corporations took the risks for high-growth, low (current) yield investment and diversification.

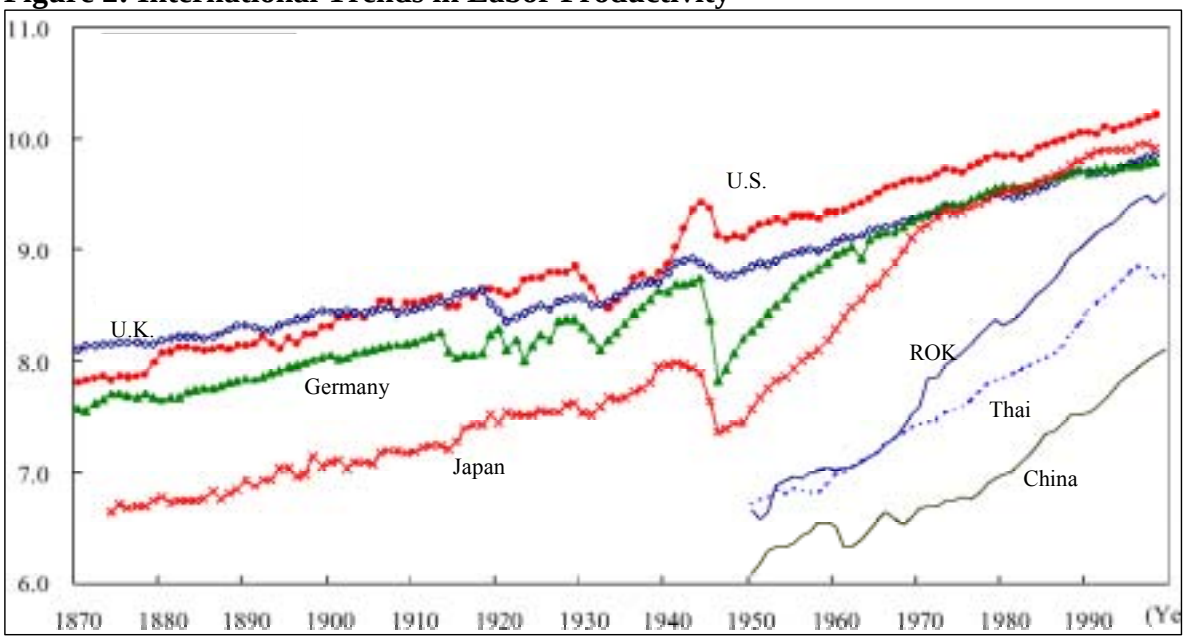
But by the early 70s Japan was not a developing economy anymore. The system, which worked well before, had outlived itself by becoming too complex for a mature economy. [2]

For further literature on the efficiency of the Japanese system, see – from different perspectives – Kaplan (1997), Sheard (1997) or Prahalad (1997). For some early and consistent criticism, in contrast, see Kester (1991) and Jensen (1991), or later Jensen (1997).

[2] The organization in groupings requires barriers for entrance and exit because high fluctuations would undermine the negotiated contracts. For the unemployed in a stakeholder economy, for example, it is rather difficult to reenter employment in one of the groupings. Offering lower wage demands, for example, is often not sufficient because existing employees cannot easily be dismissed or their contracts renegotiated. Furthermore, for the unemployed the acceptance of a lower-paid job becomes risky if the required qualifications are regarded as mediocre because entrance into the old qualification bracket might become blocked. Unemployed as a stakeholder group (though rarely organized), on the other hand, might be able to negotiate higher payouts and benefits compared to a more flexible market setup.

Figure 2 summarizes this argument that is also at the heart of the "classic" (exogenous) growth theory by simply plotting the long term growth trends of major economies. The hypothesis implies that economies can only grow considerably stronger than their peers during a phase of "catching up" when technology can be imported and allocation remains steered to high investment while not realizing possible levels of current consumption.

Figure 2: International Trends in Labor Productivity



Note: Note: Natural logarithm value of per capita GDP expressed in dollars.
Source: METI (2002): White Paper on International Trade. Data from Maddison, Angus (1995) and (2001).

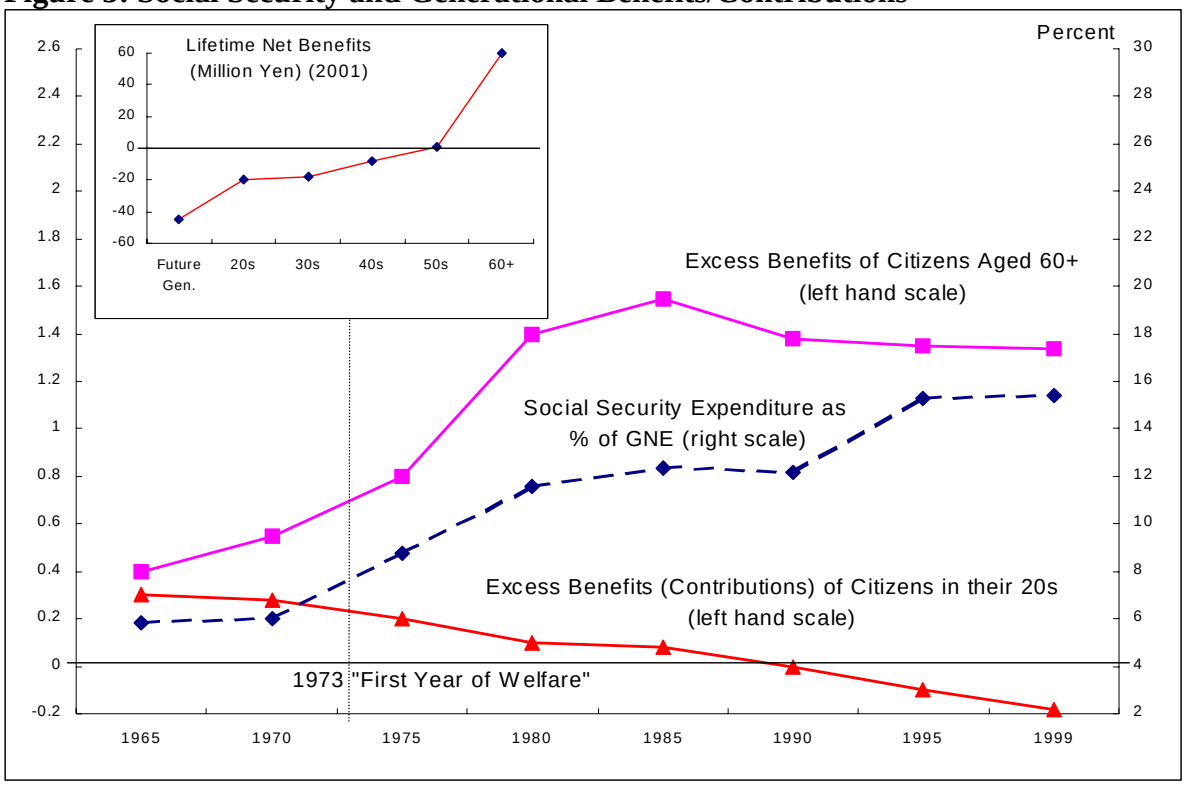
In Japan, the breakdown of the postwar high growth trend came together with (rather) exogenous shocks like the breakdown of the Bretton Woods (fixed) exchange rate system, which had allowed for a considerable under-valuation of the yen, and the oil shock, which increased the input bill for Japan's high-growth industries.

Much more important, however, were endogenous changes that marked the end of the structural trend and the beginning of the end of Japan's stakeholder model. Ongoing international trade liberalization and growing capital flows made Japan's relatively high consumer prices more transparent to Japanese households. At the same time, they increased the chances of major banks and corporations diversifying their portfolios away from (formerly) high-growth but low-payout stakeholder relationships. These trends made existing stakeholder relationships more difficult to control and less promising.

At the same time, Japan's still relatively young workforce (because of the casualties of WWII) asked for higher payouts from their long-term contracts, which had consistently

been trailing GDP growth rates, and started to question their quality of life in a high-growth economy, and the terms of their retirement. As a consequence, the consumptive public works budget increased and social security expenditures in GNE (Gross National Expenditure) increased considerably from 1973 - the "first year of welfare," as the government coined it.[3]

Figure 3: Social Security and Generational Benefits/Contributions



Note: Excess Benefits are defined as ((Benefits/Contributions)-1). Values higher than 0 mark higher Benefits than Contributions by Age-Group. Benefits include benefits from social security, government consumption and investment. Contributions include taxes.
Source: © FRI. Data from: Cabinet Office (2002): Annual Report on Japan' s Economy and Public Finance; Statistical Yearbook 2002.

Figure 3 summarizes these developments by not only plotting social expenditure as a percentage of GNE. The figure also shows the benefit-contribution ratio for citizens aged 60 or older and for those in their twenties. Excess benefits, which have necessarily always been positive for retirees, had remained quite low until the first half of the 1970s when they started to increase sharply to become 150% higher than the contributions of the age group in 1980. With this development not only citizens in their 40s and 50s became net

3 Most prominent were the elimination of medical costs for the elderly, the substantial expansion in public pensions and the adjustment of pensions to standard income (wages), as well as the indexation of public pensions.

contributors to the welfare system, but also those in their 30s (not plotted in the figure). From the mid-80s even those in their 20s became net contributors.

Clearly, however, when young people, who are still investing in their education and skills, are also asked to contribute to social security for the elderly their means towards further advancement are decreasing. Furthermore, the small graph in the figure also shows that the level of benefits, or the lifetime bet benefits of the elderly, have reached a rather high level of about 60 million yen, while current youth of today have to expect a bill exceeding 40 million yen on top of the accumulation of their own nest eggs.[4] This development, if not reversed, might impose strong disincentives and might even drive young employees into black labor markets, as has already happened in a related case in Italy (Barkmann/Schulz 1998).

As the following Figure 4 shows, did this fast change from a relatively young and cheap workforce to a relatively old and demanding one not only imposes considerable burdens on society, but also has direct consequences for the corporations.

4 It must be taken into consideration, however, that past generations and the present elderly generation had participated in economic activities before the development of a social security system and paid directly for health care services and supported their parents.

Figure 4: Labor Force Structure Change (1980-2000), Productivity, and Income by Age Group (2001)

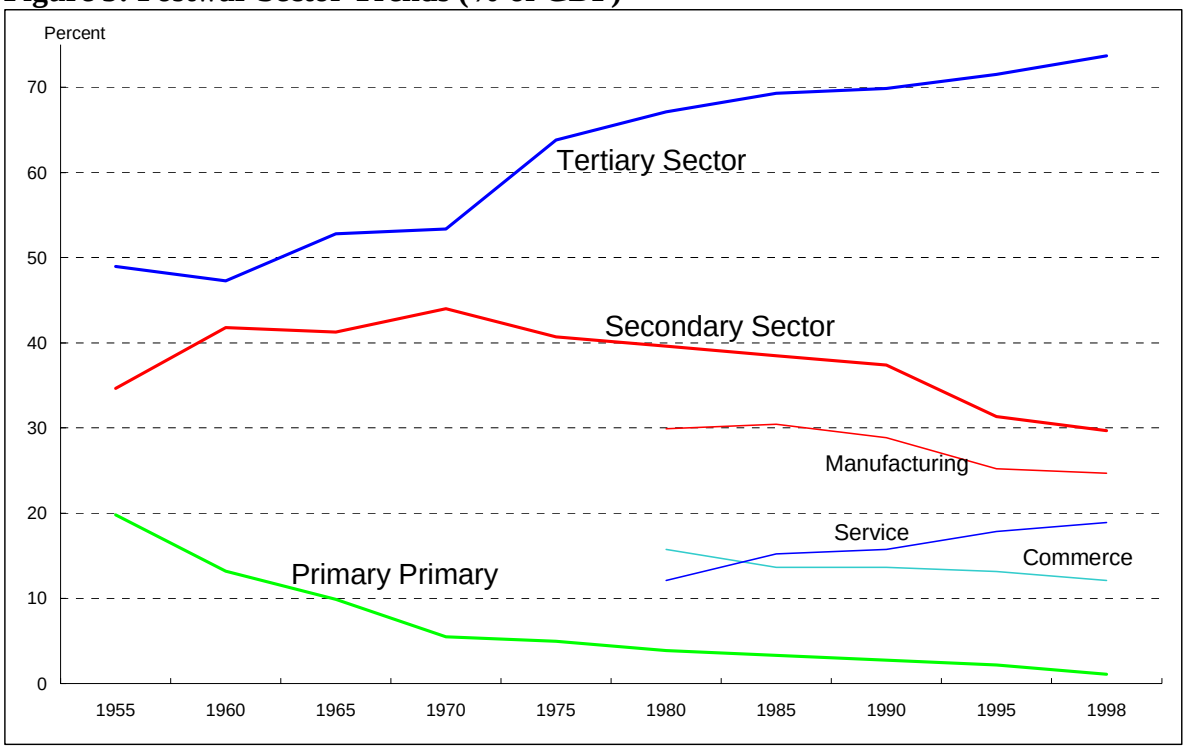
Note: Model Income = upper secondary-school graduate male clerical and technical workers income by age. The Productivity Indicator by Age Group is based on the % Ratio of Employees Working Long Hours (more than 60 a week), discounted by an index of age-group labor cost. Labor Force Structure Change is the 1980-2000 change of the age group in total work force.
Source: © FRI. Data from Statistical Yearbook (2002); Ministry of Public Management, Home Affairs, Posts and Telecom., Labor Force Survey 2002.

Figure 4 plots the change of the labor force shares by age group between 1980 and 2000 with the percentage scale on the left and an indicator for productivity by age group with the index scale on the right. The ball-sizes of this productivity graph symbolize a model-employee's levels of income throughout his/her work life (from 174,000 yen in the 20s to 502,000 yen during the last decade before retirement). Due to the ageing of Japan's population and existing long-term contracts, younger employees at Japanese corporations decreased between 2% and 4.5% during these two decades, while the share of the workforce older than 45 years increased between 4% and 5.5%. This development is not only problematic because productivity decreases in the older age groups while their income increases considerably. It also causes problems because younger employees with fresh ideas have now become a much smaller group.

With this development, lifetime employment, which was good to Japanese corporations because it encouraged Japanese employees to invest into their corporations while they were young, has started to become a burden.

The second important structural challenge for Japan's industry that will be analyzed here is the shift of consumer demand from manufactured products to services. Figure 5 demonstrates this development by plotting sector shares as a percentage of GDP.

Figure 5: Postwar Sector Trends (% of GDP)

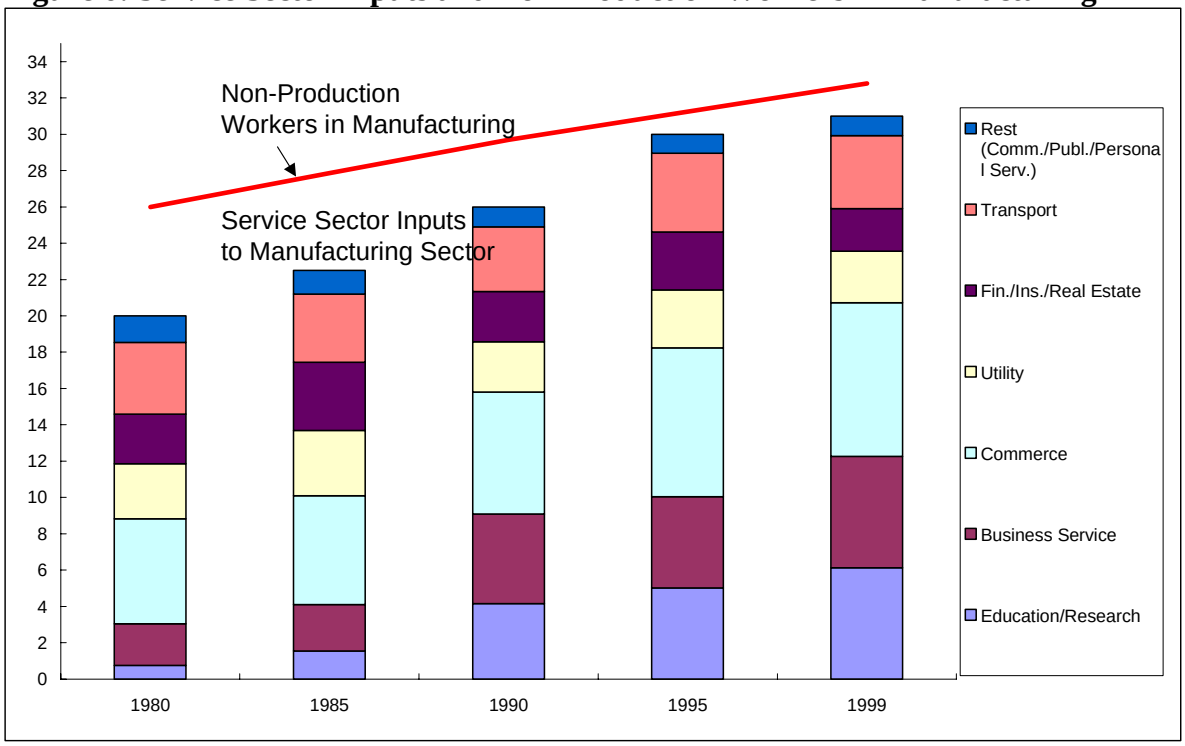


Note: Percent of nominal GDP. Data from 1955-1985 are based on SNA68; from 1990-98 on SNA93.
Source: © FRI. Data from Cabinet Office - National Accounts.

Demand for products from the secondary sector (encompassing manufacturing and construction) decreased from about 44% of GDP to below 30% between 1970 and 1998. The same trend is evident for manufacturing alone, although their falling trend has slowed from the mid-90s a little. Clearly, Japanese manufacturers have to adjust to this trend because increasing incomes decrease relative demand for manufactured products worldwide while the demand for services increases.

The importance of this trend becomes even more evident when looking at the input demand of Japanese manufacturers. Figure 6 shows that inputs from the service sector to manufacturing have increased from 20% in 1980 to over 30% of total inputs in 1999. Of these service inputs, education and research, and business services saw the highest increase in demand.

Figure 6: Service Sector Inputs and Non-Production Workers in Manufacturing

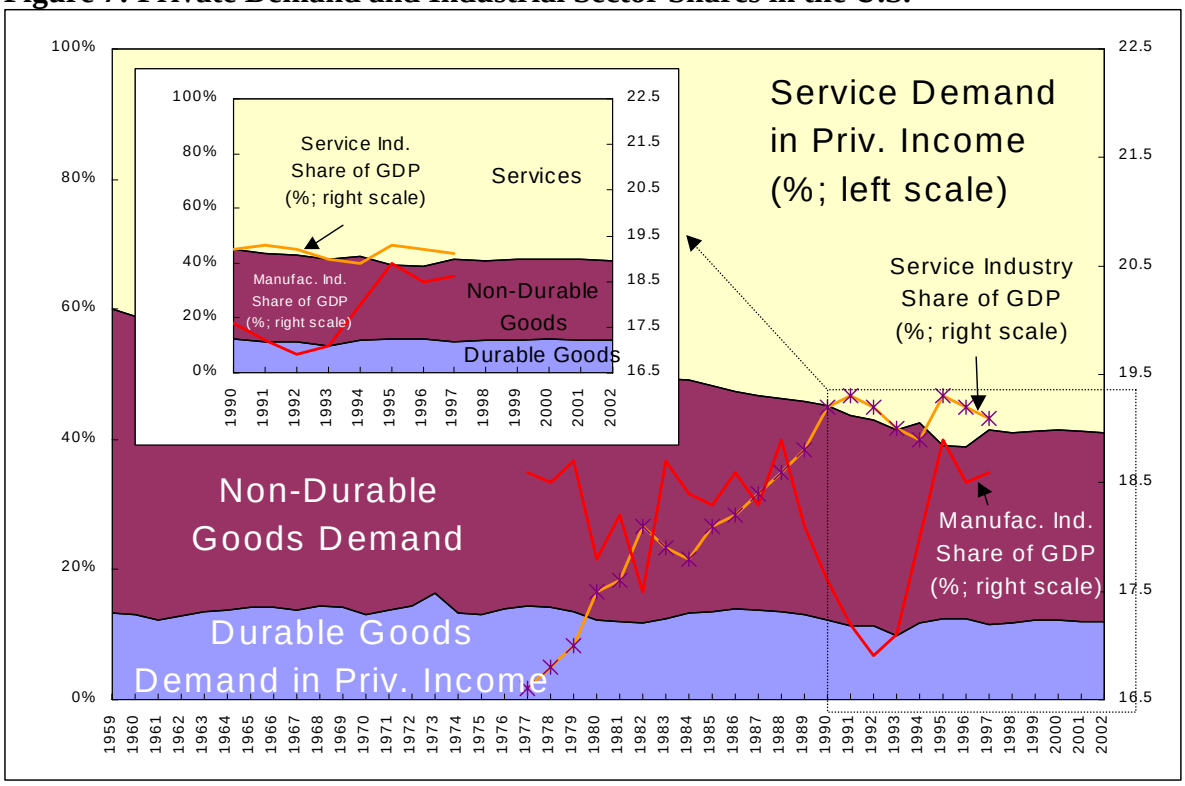


Note: Service sector inputs are interim manufacturing inputs from services sector.
Source: © FRI. For Non-Production/Transportation Workers in Manufacturing: Min. of Public Management etc. (2001) - National Census. For Service Sector Inputs: Min. of Public Management etc. (2002): Input-Output Tables and METI (2002) Input-Output Tables (Extended).

This trend to higher service demand in manufacturing is not only due to the shift from lower to higher value added products and industries (in Japan, for example, labor intensive textile production has decreased considerably). It is also due to the important trend of out-sourcing in manufacturing. Clearly, industry will only be able to beat the trend when productivity in the sector increases faster than the relative fall in demand for its products. The use of any possible productivity gain is therefore of utmost importance. In Japan, as can also be seen in Figure 6, the share of non-production and transportation workers in manufacturing industries is still increasing. Therefore there still seems to be plenty of room for productivity gains from outsourcing and buying outside expertise and knowledge.

As important and as difficult this shift in demand for manufacturing might be, Figure 7 shows for data from the U.S. that the trend can indeed be beaten, and that the sector could retain an important and stable position.

Figure 7: Private Demand and Industrial Sector Shares in the U.S.



Note: Private Demand is measured as Percent of Personal Consumption Expenditure. Manufacturing and Service Demand as Percent of GDP.

Source: © FRI. Data from Eurostat (2000) - Structural Business Statistics. Economic Report of the President Statistics (2002).

In the U.S., demand for non-durable goods as a percentage of total private income was decreasing until the mid-90s – but it seems to have stabilized at around 20% of private demand thereafter. Even earlier, from 1992, U.S. manufacturers mastered the crisis that started in 1988 and sent their market share down by 2%. With impressive productivity gains they were able to get their market share back to almost being on a par with services.

In Japan, however, the fast shift from manufacturing to service demand seems to be more difficult to master. One problem is that Japan focused even more on the development of manufacturing industries after WWII. High demand, especially from abroad, made these industries prime targets for investments and exports. Even today, the manufacturing sector has a high share of about 25% in GDP. But even more important is that Japan's stakeholder governance was able to react very flexibly on changing trends within industries and corporations, but seems to be almost blocked when it comes to reactions to structural changes between sectors and industries.

The problem for the "classic" Japanese stakeholder model with such structural changes (but also the structural changes from globalization and the ageing of society) is that an ad-

justment requires not only flexibility, restructuring, and payouts within but especially beyond the existing industrial and stakeholder groups.

- A successful reaction to structural shifts in consumer demand between sectors (and to more diverse products in general) requires the development of flexible markets outside of corporate groups for outsourcing and integration of outside skills. It also requires the concentration on products where corporations have their core-competencies.
- A successful reaction to ageing of the workforce and society as a whole requires changes in the business model of major corporations from internal growth to higher payouts to outsiders (i.e., shareholders and fund investors). It also requires the development of business skills geared to high returns from investments abroad.
- A successful reaction to globalization requires not only exports from a Japanese production base, or internationalization by exporting production bases abroad, it also requires the integration of Japanese industry into global production networks by integration of outside skills and inviting inward-FDI.

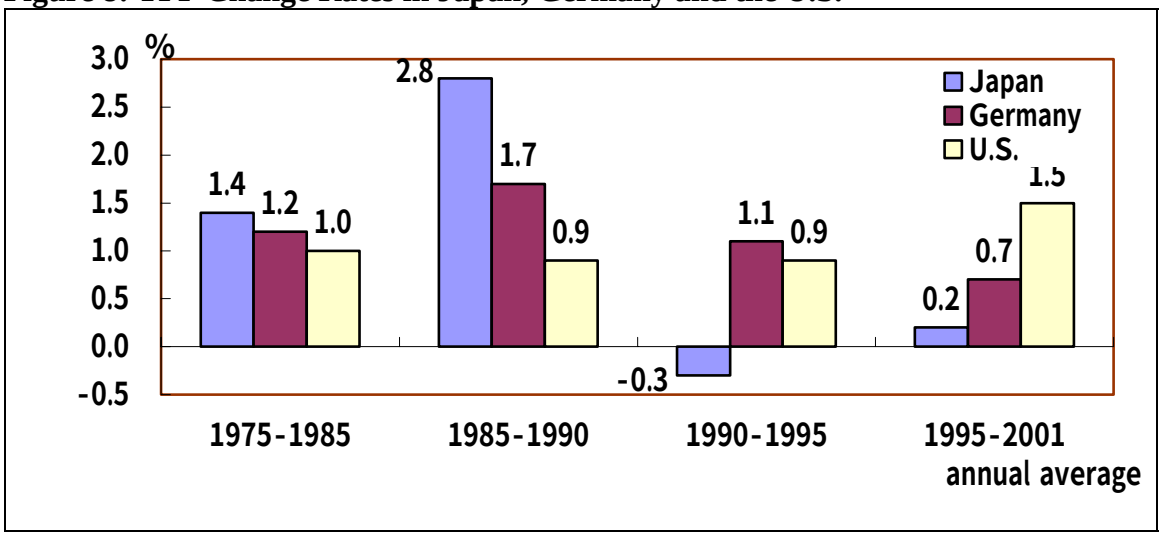
These strategies often require the opposite of what Japanese corporations did during the 70s and 80s. At that time, Japanese industry tried to save their closed networks by increasing cross-shareholding and diversification into different sectors and product lines. Foreign investments of corporations and banks often lacked skill and cooperation with foreign partners, and yielded much too little returns. Even the domestic payouts of Japanese corporations (to non-employees) in the form of dividends and stock gains became much too low to attract further investment from Japanese households (or from abroad). As a result, Japan's economy remained among the least internationally integrated economies in terms of international capital and skill flows.

1.3 Market Reforms of the 1980s and 90s: What Went Wrong?

Japan, as already discussed above, has been extremely successful with a market model that gave preference to the development of stakeholder negotiations over market solutions. Stakeholder groups, on the other hand, never seriously questioned a competitive market result as the final goal of production, and competition between and within the different groups has been maintained by keeping key areas of the economy (the export sector) open to world market competition. But today, in a globalizing world with strong outside competition, liquid markets for international capital, and growing consumer demands, open mar-

kets in a few key sectors only are not enough to secure the success of the system as a whole. The system requires a makeover in favor of flexibility and payouts on all levels, as Figure 8 shows by comparing TFP change rates with other countries. In addition to the considerable slowing of growth during the 90s, even TFP growth broke down during the first half of the 90s, while other countries like Germany and the US made considerable advancements in production efficiency (concerning this argument see section 2).

Figure 8: TFP Change Rates in Japan, Germany and the U.S.



Source: European Commission (2001): European Competitiveness Report.

As analyzed above, the problems Japan is experiencing today are rather typical for a maturing stakeholder economy. In a mature, open society stakeholder concepts lose their appeal and efficiency. Group interests are increasingly difficult to define and organize because the members of the society are becoming personally more and more independent from each other, while becoming socially increasingly dependent on the working of the society as a whole. Unfortunately, at this point the stability of a stakeholder model becomes an additional obstacle, as analyzed by Adam Smith more than 200 years ago.

As long as the system is still producing high returns, this aspect is not easily visible because the returns can be used to extend the scope of the existing stakeholder groupings, or to buy acceptance from outsiders (see Jensen 1997). But such a strategy of maintaining the status quo only undermines the efficiency of the system even further. The obvious result becomes only visible when the growth rates are finally coming down, and the system has to compete with more efficient outsiders. Now, the former strength turns into a weakness, because the lower returns will induce the insiders of stakeholder groups to stick to their stakes, and to block any further developments. The growing group of outsiders, on the

other hand, will push at their borders, and refuse to cooperate with the unwilling insiders; both forces are undermining the integrative and productive features of the system as a whole.

A successful transformation of existing stakeholder interests into market-based interests therefore requires an immediate careful equilibration of corporate governance, financial structure, and market framework changes (Schulz 2001). Unfortunately, in its first attempts at transformation by means of deregulation during the early 80s, the Japanese government did not proceed carefully enough and targeted only limited (even partial) sectors. Particularly, in the early 80s, the Japanese government introduced a major wave of liberalization in its financial markets to overcome the already visible limitations of its highly regulated financial industry.[5] This transformation became extremely unbalanced because major parts of the old stakeholder system were left in place. As a result, an asset "bubble" developed and left Japanese stakeholders not only with depressed assets values, but also with a deeply rooted distrust of their economic system, their institutions, and the concept of partial liberalization.

With this development, the problems of the Japanese economy during its transition to a liberalized market increased dramatically. Following the misallocation, future chances for strong advancement in competitiveness decreased, as the deterioration of Japan's ranking in any study on international competitiveness has shown. Even more importantly, however, private households simultaneously lost their confidence in the allocation function of the old banking structure, governmental bureaucrats, and the new capital markets. As a result, they hardly supply (capital) markets with any new capital and refuse to bail out the banking system at the same time. Today, they avoid the capital markets, keep cash, and count on deflation and appreciation of the yen for their returns.

Often, the crisis of the 90s has been misinterpreted as a simple line of policy failures. Surely, the pace and success of reform in Japan during the 90s has been slow (see the following sections), while monetary and fiscal policies have been deadlocked. Already from the 70s, fiscal policy increased its thrust and debts to fulfill higher demands for social security and public services in what had become an affluent society. Monetary policy, at the

---

5 This liberalization was in line with – even initiated by – a major wave of financial liberalization in almost all industrialized countries to adapt to growing capital flows and advancements in information technologies.

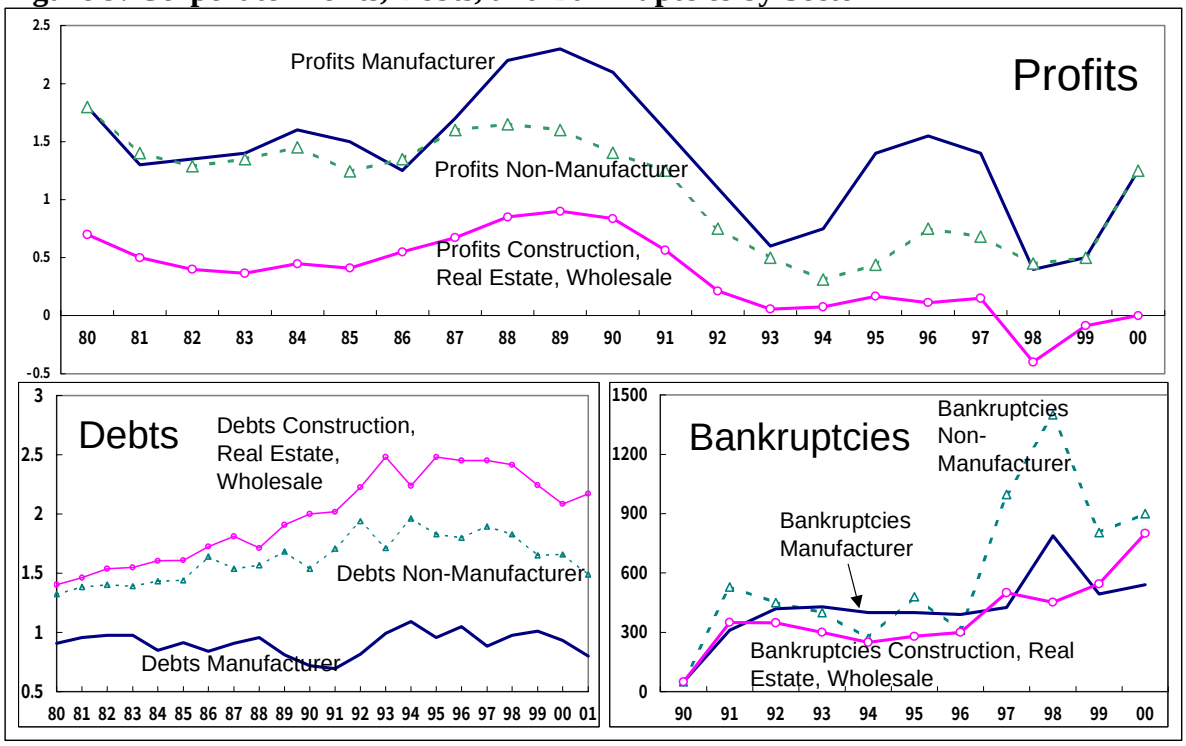
same time, reinforced its disinflationary stance to secure lower consumer prices and a strong exchange rate during the 80s. In the 90s the system then ran out of control when the MOF first started to use its fiscal might to bolster flagging investment demand after the Japanese asset bubble burst, and than desperately tried to soften the edges of the deepening crisis with an enormous fiscal expansion. The BOJ, on the other hand, became convinced that the Japanese economy was in the midst of a severe structural crisis that needed monetary constraints to press ineffective, reluctant, and protected stakeholder corporations into high gear restructuring.

As a consequence, public programs have encouraged entire sectors to keep employment high and allowed them to retain their inefficient business practices. Other, potentially more efficient, companies have been suffering under a (relatively) restrictive monetary policy that, at the same time, has made credit increasingly unavailable and raised real lending rates beyond levels of the booming US.

Today, the most notorious of the inflated sectors that have been supported by public money include construction, wholesale and retail, real estate, finance, and services. Together these industries account for 60% of Japanese companies although they generate just 32% of the nation's revenues. In the meantime, they also represent up to 85% of all big bank non-performing loans. Within this group, the worst cases are probably construction and retail. The construction industry now has 15% more companies than a decade ago, and has surpassed the U.S. construction industry in size, while the retail sector has increased total floor space despite severe overcapacity and falling sales.

Figure 9, by plotting profits, debts, and bankruptcies for the manufacturing, non-manufacturing, and the combined construction, real estate, and wholesale sectors, gives an impression of a policy that heavily supported misallocations in the Japanese economy.

Figure 9: Corporate Profits, Debts, and Bankruptcies by Sector



Note: Profits are defined as the ratio of net profits to sales. Debts are expressed as Debts/Value Added. Bankruptcies are expressed as Liabilities index numbers (1990=100).

Source: Cabinet Office (2002): Annual Report on Japan' s Economy and Public Finance.

Obviously, the sectors with the lowest returns, construction, real estate, and wholesale, have not only demanded but also received the highest amount of credit relative to their value added. These industries also avoided high-volume bankruptcies much longer than the manufacturing and non-manufacturing sectors could.

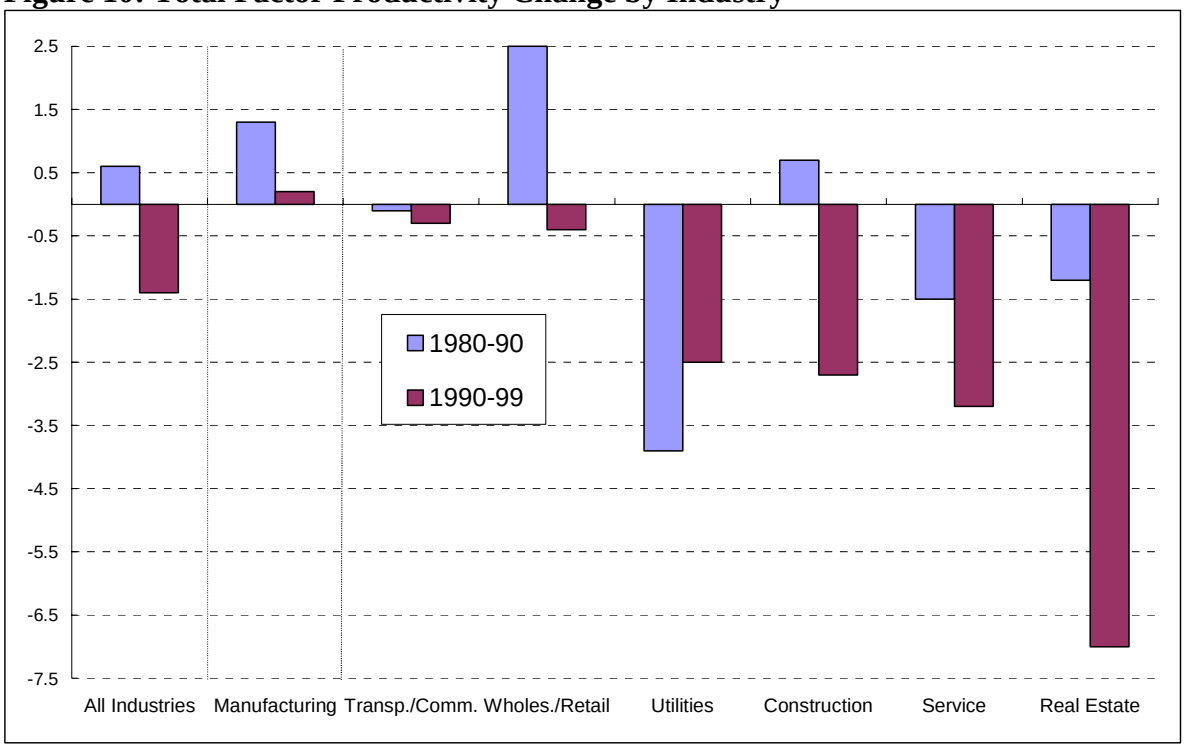
Fortunately by today, it has become a widely accepted fact that the downturn of the Japanese stakeholder system is not a temporary crisis that can be overcome by waiting, filling up some holes, or by reluctant partial reforms in areas of the most obvious shortcomings. The system needs a general overhaul, or comprehensive market reforms, to adapt to the structural changes, and to rebuild its flexibility for the challenges in the decades to come.

2 Productivity and the Case for Reform

2.1 The "Dual Economy"

Lagging reforms during the last two decades (and more) preserved an industrial structure that has often been described as a "Dual Economy" between productive manufacturers in international competition and (relatively) unproductive non-manufacturing sectors that produce for a still largely protected domestic market. Figure 10 supports this picture by contrasting TFP changes of the manufacturing sector with other industries in the 80s and 90s.

Figure 10: Total Factor Productivity Change by Industry



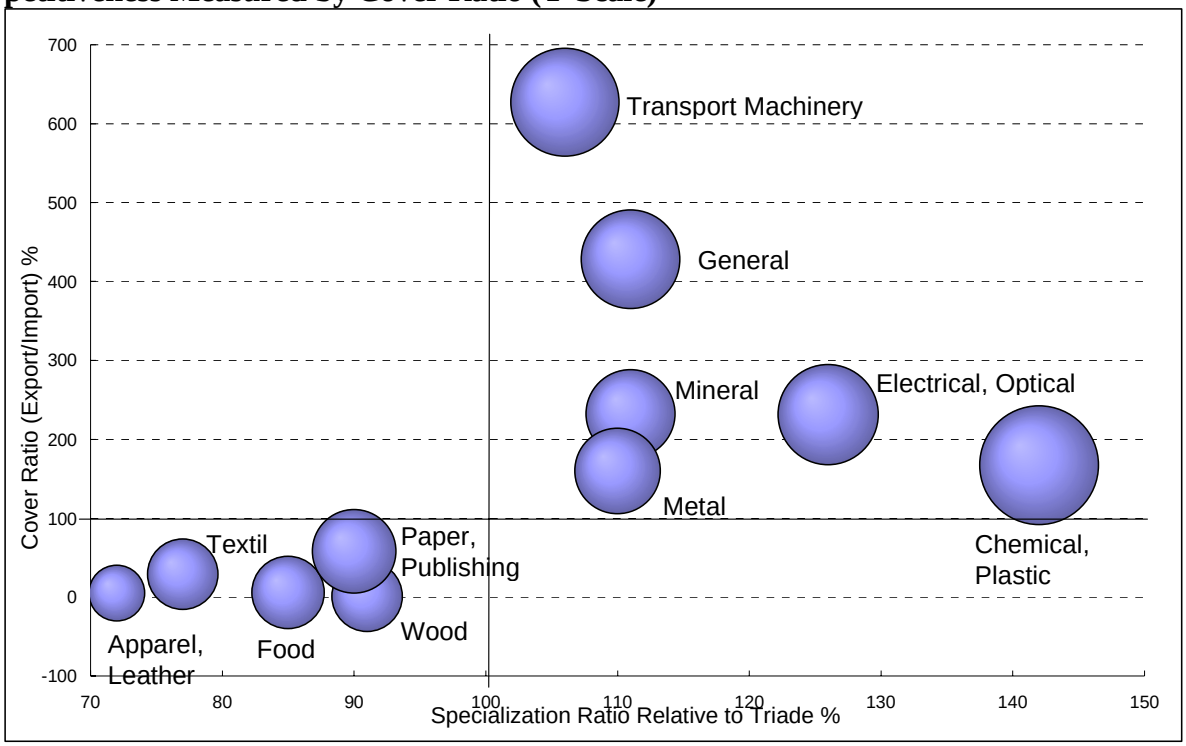
Note: Please note that the calculation methods are different from Figure 8, the results therefore differ as well. Capital in the manufacturing sector is adjusted by the utilization rate of capital. For 1999 the Deflator for the calendar year instead of the fiscal year was used.
Source: © FRI. Source: MOF Printing Bureau (various): Annual Financial Statements of Corporations; various other sources.

As already shown above, Japan's TFP for all industries decreased during the 90s. TFP change in the manufacturing sector, however, decreased much less than any other sector or the industry as a whole, although business conditions and factor utilization deteriorated considerably during the stagnation of the 90s (section 2 will draw an even more extreme picture of this discrepancy). The overall fall in productivity is therefore mainly due to decreasing productivity in non-manufacturing sectors from utilities to real estate.

It is, however, not true that only Japan's export industries retained their productivity[6]. Figure 11 shows that not only industries with a high export share like car manufacturers retained high levels of productivity, chemical and plastic producers as well as electrical and optical manufacturers have been successful as well - although their cover-ratios are not particularly high. Productivity in these industries was driven by the high levels of competition in Japan's domestic market, as is evident in the high specialization ratio of these sectors (see the note below the figure).

Other manufacturing industries, however, that did not face strong competition in international and domestic markets, like textiles and food, have indeed been the lagging part of the "Dual Economy."

Figure 11: Productivity (Ball-Size), International Specialization (X-Scale), and Competitiveness Measured by Cover Ratio (Y-Scale)



Note: Productivity is measured as relative value added per worker. The production specialization ratio is the share of the production of a NACE sector in the total production for manufacturing for Triad member divided by the same share for the whole Triad. If the value is greater than 100 for a sector, the Triad member is relatively more specialized in this sector than the Triad as a whole. The cover ratio is given in Percent of Exports divided by Imports.

Source: © FRI. Data from Eurostat (2000): Structural Business Statistics. For Productivity: Meti (2000) White Paper on SME.

Because of these huge differences in productivity, growth, and chances between the industries and because of the limited chances for a fast demolition of the "Dual Economy" that

6 Because of data availability problems, we had to use an indicator for labor productivity in this case.

is dragging the entire country, it is most important to analyze the determining factors behind the performance of each industry. In the following, we will therefore try decompose TFP changes in each industrial group into the underlying factors of labor and capital utilization as well as the efficiency of production.

2.2 TFP Change Rates, Adjusted Rates and Sector Trends

Given the huge changes the Japanese economy has been undergoing during the last decades, simple indicators for assessing the efficiency of production like labor productivity draw a too limited picture of changes in all economic activities. The reason is that labor productivity merely measures the product (production volume) per unit of labor input. When actions are taken to reduce labor input, for example, the productivity of labor will improve (provided that the product does not change). This is unproblematic as long as other input factors like capital do not change or technology improves efficiency at the same time. If, however, additional capital inputs are made in conjunction with the reduction of labor inputs, the impact of these inputs would have been mis-accounted.

TFP, in contrast, takes into account the input quantities of all productive factors. Changes in productivity will therefore be more appropriately accounted as gains in efficiency from changes in the quantities of factors or to the efficiency of their use in the production process. Unfortunately, however, most existing TFP change rate analyses are still misleading – especially in an economy that is undergoing fast structural changes. To construct a more appropriate "Adjusted TFP Rate Indicator," five main problems need to be addressed (for a more extensive explanation see the appendix 2.4):

- First, unrealistic assumptions about production functions and the market environment are to be avoided by using methods of gross accounting.
- Second, the use of net capital stock data for tangible assets (in contrast to gross data) is necessary.
- Third, real estate assets need to be included.
- Fourth, adjustments for the utilization rates of capital stock for industry as a whole and in the non-manufacturing sector need to be included.
- Fifth, estimated shortages and surpluses in labor need to be adjusted.

As can be seen in Table 1, the results from TFP estimations that include these adjustments (Kimura 2002a and 2002b) are substantially different from those measured with the conventional methods without making the adjustments:

Table 1: Conventional and Adjusted TFP Change Rates

	81～	86～	92～	96～	91～
All Industries：Non-Adjusted	-0.7	1.9	-1.9	-0.6	-1.5
Adjusted	1.6	3.6	-0.5	1.6	0.5
Construction：Non-Adjusted	-1.7	3.2	-4.3	-3.7	-2.2
Adjusted	—	—	0.2	-3.0	—
Manufacturing：Non-adjusted	0.2	2.5	-0.1	0.2	0.2
Adjusted	2.2	3.3	2.7	2.6	3.1
Wholesale and retails：Non-Adjusted	0.8	4.2	0.0	-2.3	0.3
Adjusted	—	—	3.0	1.4	—
Real Estate：Non-Adjusted	-4.7	2.3	-7.9	-4.2	-9.4
Adjusted	—	—	-4.3	-10.2	—
Transport and Communications：Non-	-0.4	0.1	-2.3	5.3	-1.6
Adjusted	—	—	-0.8	2.7	—
Electric, Gas and Waterworks：Non-Adjusted	-6.2	-1.5	-3.3	-2.2	-2.7
Adjusted	—	—	2.2	3.6	—
Service：Non-Adjusted	-3.0	-0.1	-3.7	-3.4	-3.0
Adjusted	—	—	-0.1	-0.5	—

Note: During each period (81～85, …) annual averages of change rates in percent are shown.
Source: Kimura (2002a)

The adjusted results for industry as a whole makes it clear that the conventional method underestimates the gains in TFP (or efficiency of overall production) by 1.4% for fiscal 1992-95 and 2.2% for fiscal 1996-98. The same is true for most individual industries, although in varying degrees. (Only the average values for fiscal 1996 - 98 for the real estate as well as the transport/communications industries are overestimates.)

In the non-adjusted data for both periods, the average annual TFP change rates were positive only for the manufacturing and transport/communications industries in fiscal 1996 - 98. When the adjustments are made, the results for the manufacturing, wholesale and retail, electric, gas and waterworks industries showed positive TFP change rates in both periods. In the construction industry the same is true in fiscal 1992 – 95, and the transport/communications industries were able to have positive rates in fiscal 1996 – 98.

2.3 Implications for Reform

The results of these adjustments to TFP estimates have strong implications for reform requirements and the direction of Japanese industries. The underestimation of TFP change rates implied that productivity of the (operational) production system and structure have deteriorated considerably during the 90s and that problems in the efficiency of production seemed bigger than they really were. If judgment, on the other hand, is based on the adjusted measurement results, productivity in the latter half of the 90s kept growing at the same level as in the early 80s. Economic growth on a par with the early 80s should there-

fore have been possible with the existing production system (including the pace of improvement) if demand would have been growing as before, or if factor inputs would have been adjusted by shifting them to other uses with greater flexibility.

For individual industries the adjusted TFP change rates also imply rather different strategies than the conventional ones. Measuring with the conventional methods, the manufacturing industry, in particular, would have had a TFP change rate of 2.5% for fiscal 1986-90 but only -0.1% for fiscal 1992-95 and 0.2% for fiscal 1996-98. Such low values would be indicative of a significant slowdown in improvements of production efficiency.[9] Based on the adjusted results, however, the TFP change rate for the 1990s remained on par with the much more successful 1980s, and the pace of improvement of production efficiency had been steadily maintained. Interestingly, almost the same is true for the utility industries[10] (electricity, gas and waterworks), and the transport and communications industries.

The construction and real estate industries, on the other hand, are generally regarded as being inefficient, and this is indeed evident in the adjusted TFP change rate data. These industries have significant problems with their production system. For the construction industry the TFP change rate was only –3.0% in 1996-98, and in the real estate industry it was only –10.2%. As their production efficiency continues to worsen, it is clear that there are deeply rooted structural problems in these industries that need to be resolved before a return to growth becomes likely in these industries. The wholesale and retail industries, on the other hand, which are often regarded as being as inefficient as the construction and real estate industries (and conventional TFP rates support this impression), have maintained the pace of improvement in production efficiency throughout the decade.[11]

Unfortunately, the service industry that has been increasing their industrial share in GDP over the last decades, and is regarded as the solution to many employment problems that

---

9 In the measurements of the TFP change rate for the manufacturing industry, corrections are normally made to allow for the capital utilization rate. In the pre-correction measurements given in Table 3-2, however, the capital utilization rate is not allowed for the manufacturing industry. The measurement results for the TFP change rate, for which corrections of the pre-correction measurement were made only with regard to the capital utilization rate for the manufacturing industry, are 2.3% for fiscal 1986 - 90, 0.9% for fiscal 1992 - 95 and again 0.9% for fiscal 1996 - 98.

10 Although it is, unfortunately, not possible to make this kind of comparison with the 1980s because the capital utilization rate cannot be adjusted for these periods.

11 Because many small-scale businesses closed down, it is possible that much of the improvement in production efficiency was in fact due to the increase in the average scale of the remaining businesses.

come from the "drain" of production sites to overseas countries, is not as productive as it should be. The adjusted TFP change rates show a declining pattern of production efficiency throughout the 1990s, from -0.1% in fiscal 1992 - 95 to -0.5% in fiscal 1996 - 98. The production system in services therefore needs to be considerably improved to establish the service industry not only as a pool for surplus labor, but also as an engine for growth for the entire economy.

The result of these experiments is that the adjusted TFP change rate data show a still rather healthy production system in major industries. It can also be concluded that on an industry-by-industry level, TFP changes have remained rather stable and competitive not only in the manufacturing industries but also the transport/communications and utility industries. These industries clearly have strong growth potentials if they are able to cut their excessive use of capital and labor. Given their dynamics in efficiency advancements in production, these industries would also be able to make fast adjustments to any new changes in demand if (but only if) they become integrated in more flexible factor markets.

An expansion in demand alone, as it has been tried with the "Keynesian" public work policies of the 90s, however, would not be enough to return to sustainable growth. These policies have the tendency to support the least productive industries and to preserve input-output patterns that need adjustments, as our data show. Sectoral surpluses in labor and capital instead need to have the chance and incentive to flow into other sectors and new markets. The next section will show some of such chances and necessities.

It would therefore be necessary to undertake a closer study of the TFP change rates based on a breakdown by scale of business.

3 Chances for Industry

The breakdown of industrial productivity is due to delayed adjustments of labor and capital inputs in all industries, plus TFP inefficiencies in the non-manufacturing sector. Cutting through defunct stakeholder relationships and building up flexible factor markets is therefore of utmost importance. Japanese industries, especially in manufacturing, would than have the chance to use their still evident productive potentials to become internationally competitive again.

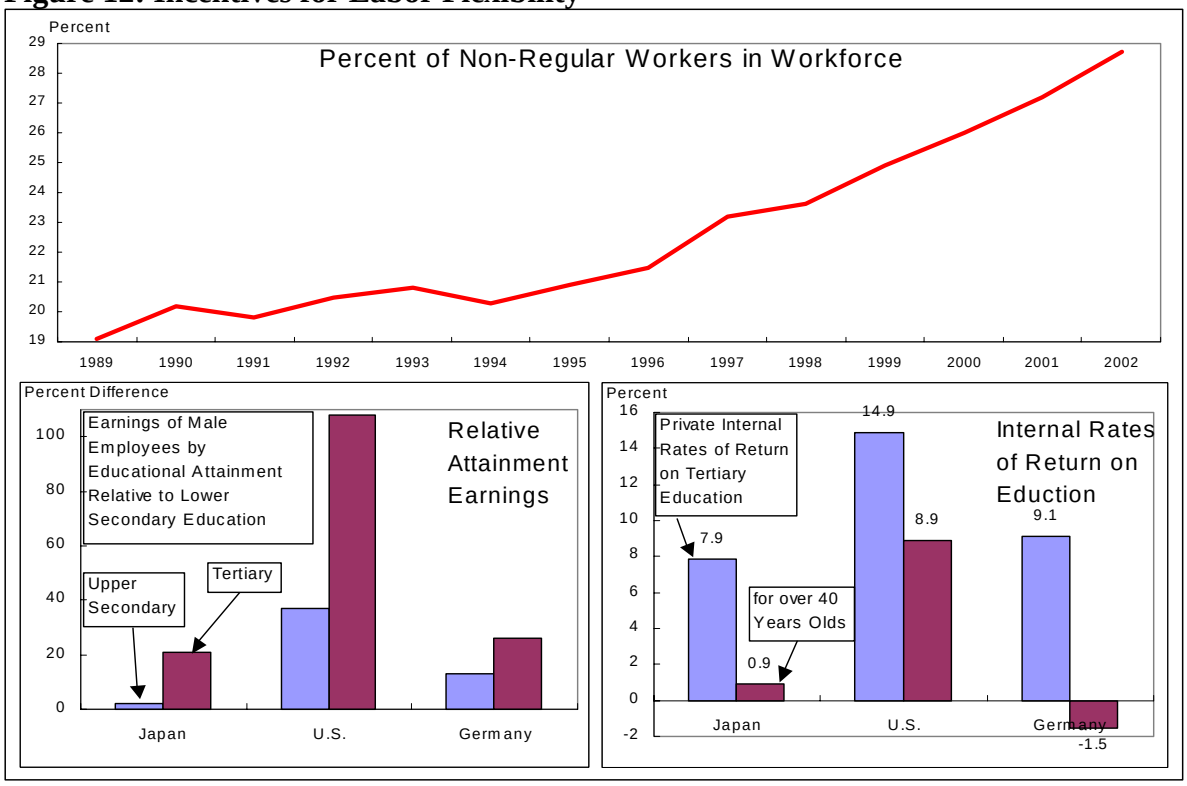
Regarding the delays in such structural reforms, the 90s have been coined a "lost decade." This perception is certainly not true because the time was indeed spent to move the Japanese stakeholder society closer to a market based economy in most key areas. Today, it is highly visible that the transformation is widely accepted in the meantime, and that most required steps are on their way (see Schulz 2001). A general solution will take even more time, however, and gains in productivity at competitors in the U.S. and Asia are advancing fast. Even those industries that retained their productive dynamic during the 90s are therefore required to move even faster to make up for the current structural shortcomings of the Japanese economy.

To do so, the requirements and strategies for Japanese industries are not much different than in other developed countries and the chances are as plenty as ever. Promising technologies and markets can be found in ICT, environment preservation, and demand shifts of ageing societies as well as the fast developing Asian markets. Some strategies and measures, however, should be more promising in Japan than in other countries because they pose a higher obstacle in Japan than in other countries or because Japan is considerably lagging in these fields. Some of them will be listed in the following sections.

3.1 Labor (Market) Incentives

One of the most pressing issues for corporations is labor market reform. As can be seen in Figure 12, corporations have been moving fast (from the mid-90s) in dealing with existing inflexible labor market regulations by reducing their regular workforce and replacing it with temporary staff. Today, the share of non-regular workers (29%) has reached one of the highest levels in any OECD country.

Figure 12: Incentives for Labor Flexibility



Note: Relative Attainment Earnings for Upper Secondary and Tertiary Educated Employees are calculated as Percent differences to Lower Secondary Level.

Source: © FRI. For Non-Regular Workers: Min. of Public Management etc. (2001) - Labor Force Survey - Special Survey. For Relative Attainment Earnings and Internal Rates on Education: Bloendal et. al. (2001): Investment in Human Capital, OECD WP.

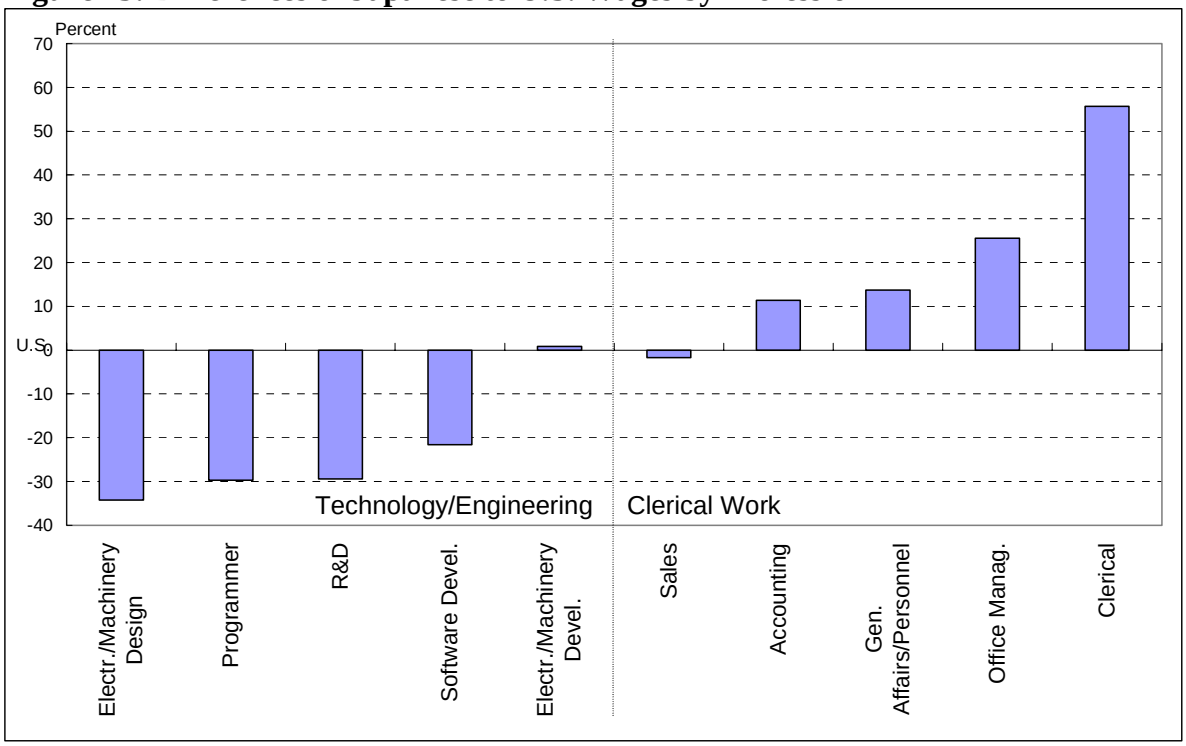
This shift has already reduced labor costs at corporations considerably and has increased their flexibility. The strategy is far from being optimal, however. The use of a non-regular workforce is undermining one of the traditional strengths of Japanese corporations: the well-trained and devoted workforce. Current Japanese labor markets are still far from being able to support and deliver the necessary specialists and re-allocate mid-career employees with special skills. The still existing practice of major corporations to focus on general in-house training is probably as much to blame for this situation as existing labor market regulations are.

To show this, Figure 12 also plots the relative earnings that employees could expect from outside education and skill advancement. In Japan, the relative earnings gain an employee is likely to gain if he invests in personal education by advancing beyond lower secondary school is only minimal (especially compared to the U.S.). This is especially true for mid-career employees (around forty years old) who decide to advance by further education at university level. Their internal rate of return on education is only a miserable 0.9% in Japan while they could win a more competitive rate of almost 9% in the U.S. Clearly, such

low returns constitute disincentives for employees to use labor and training markets as flexible career advancement tools.

The same disincentives for employees also exist in the wage structures within the corporations. Figure 13 plots Japanese wages by profession relative to U.S. wages. As an inheritance from the Japanese stakeholder system, managerial incentives towards overall growth, and the slow restructuring of lifetime contracts have biased the wage structure in Japan in favor of clerical and managerial work. A machinery designer, for example, earns over 30% less than his U.S. colleague, while the income of a clerical worker is 56% higher than in the U.S.

Figure 13: Differences of Japanese to U.S. Wages by Profession



Note: Relative Wages are calculated as Percent differences to U.S. worker wages on basis of 2000 U.S. Dollars.

Source: © FRI. Industrial Structure Council (2002): Service Economy/Employment Subcommittee Report - Toward the Establishment of a Diversified, Creative Work System Conforming to the Trend Toward a Service Economy.

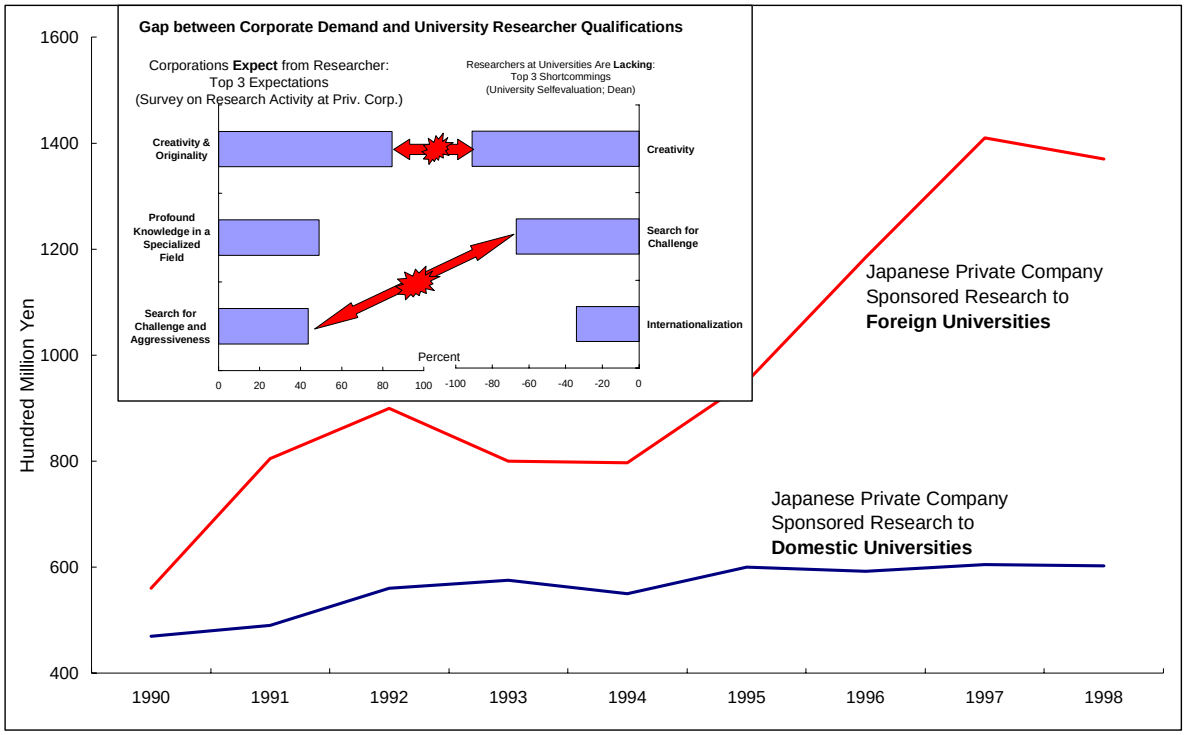
Beyond calls for political deregulation, it is therefore one of the most important issues for corporations to increase the incentives for appropriate skill-advancement and career choices (and not to only reduce the regular workforce). When wage structures and incentives within major corporations have been adjusted to honor productivity and skills more reliably and transparently, the development of appropriate labor markets will follow.

3.2 R&D and Training: Outsourcing and Integration

Japan's markets for research and training are poorly developed. Since major corporations heavily relied on in-house training and research, universities have remained out of touch with their potential markets (see the mismatch in the small chart of Figure 14). Still today, Japanese universities focus only on general BA-level education for post-schoolers before they enter the corporations to receive their necessary training there. The number of MA and Ph.D. level students is still negligible.

As a consequence, when Japanese corporations demand outside research or think about outsourcing, they turn to foreign universities, as can be seen in Figure 14.

Figure 14: Private Company Sponsored Research and Demand to Japanese Universities



Note: The Statistics to the answers of the Company and University Surveys are given in Percent of Replies. The data on Sponsored Research are from 2000, the Corporate Survey Data on Researcher Requirements are from 1999, and the University Self-Evaluation Survey is from 1995.

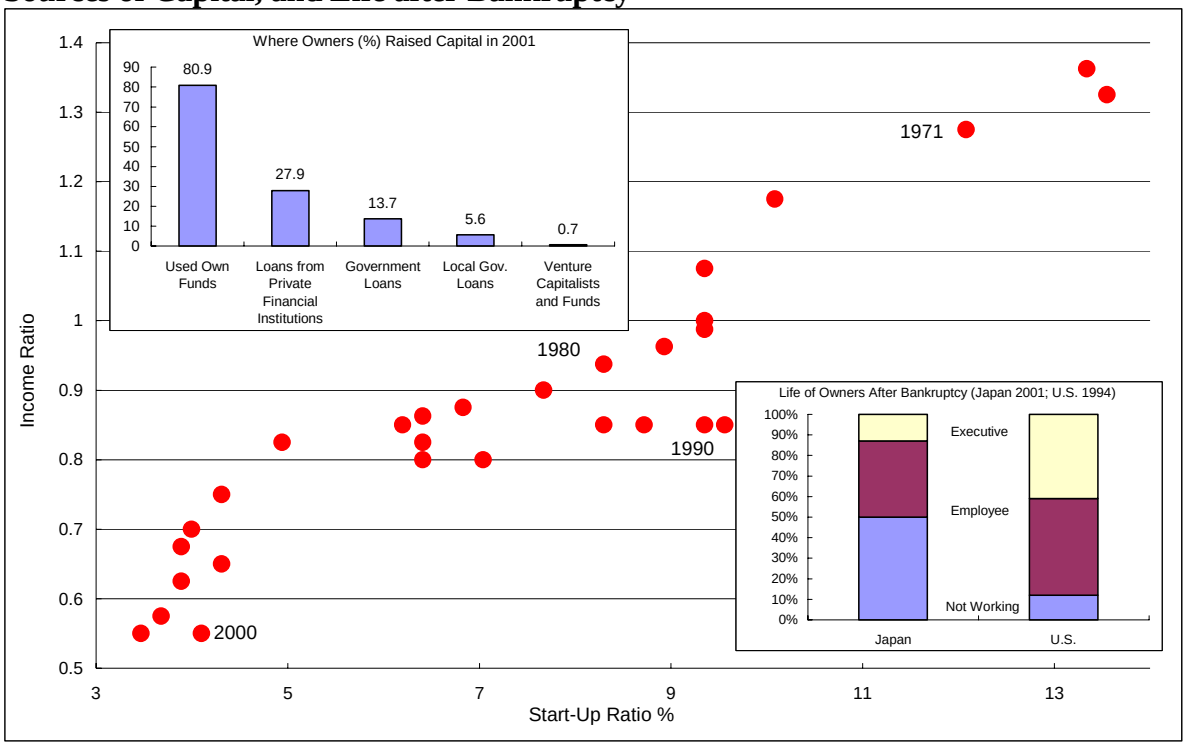
Source: © FRI. METI (2000) - Industry- Academia Liaison Promotion Subcommittee Report Material.

To change this situation, corporations should actively try to develop business ties with universities. This would produce chances for universities to deliver the research that is needed in the corporations, and would also improve the integration of MA and Ph.D. level students in the workforce of corporations.

3.3 Entrepreneurial Incentives

Another important field is the reestablishment of an entrepreneurial spirit in Japan. Until the 70s, Japan always had a rather high startup ratio (around 10%) of new businesses. This has deteriorated during the last decades, with the ratio now being only around 4 percent, the lowest among industrialized countries (Figure 15).

Figure 15: Income of Entrepreneurs Relative to Employees, Startup Ratios, Sources of Capital, and Life after Bankruptcy



Note: Income Ratio is the ratio of SME Entrepreneur Incomes relative Earnings of Regular Corporate Employees. Percent of Capital Raised is based on the Percent of Answers of a Survey on Startups. Life of Owners After Bankruptcy in the U.S. is based on 1994 data from the Small Business Administration.

Source: © FRI. Data from METI (2002): White Paper on Small and Medium Size Enterprises in Japan.

One of the reasons for the low startup ratio is, of course, the low growth rate of the economy. Another important reason is, however, the decline in the income ratio between entrepreneurs and salaried workers. With the operating income of a proprietorship decreasing to only half of wage incomes, the incentive to venture into risky entrepreneurship has decreased considerably.

As in the cases before, the background for this development is the defunct state of Japan's stakeholder system together with an ageing workforce. In a seniority-based wage system, an ageing workforce has the chance of increasing its average salary level (as shown above). If not counteracted, this development widens the income gap to entrepreneurs who do not

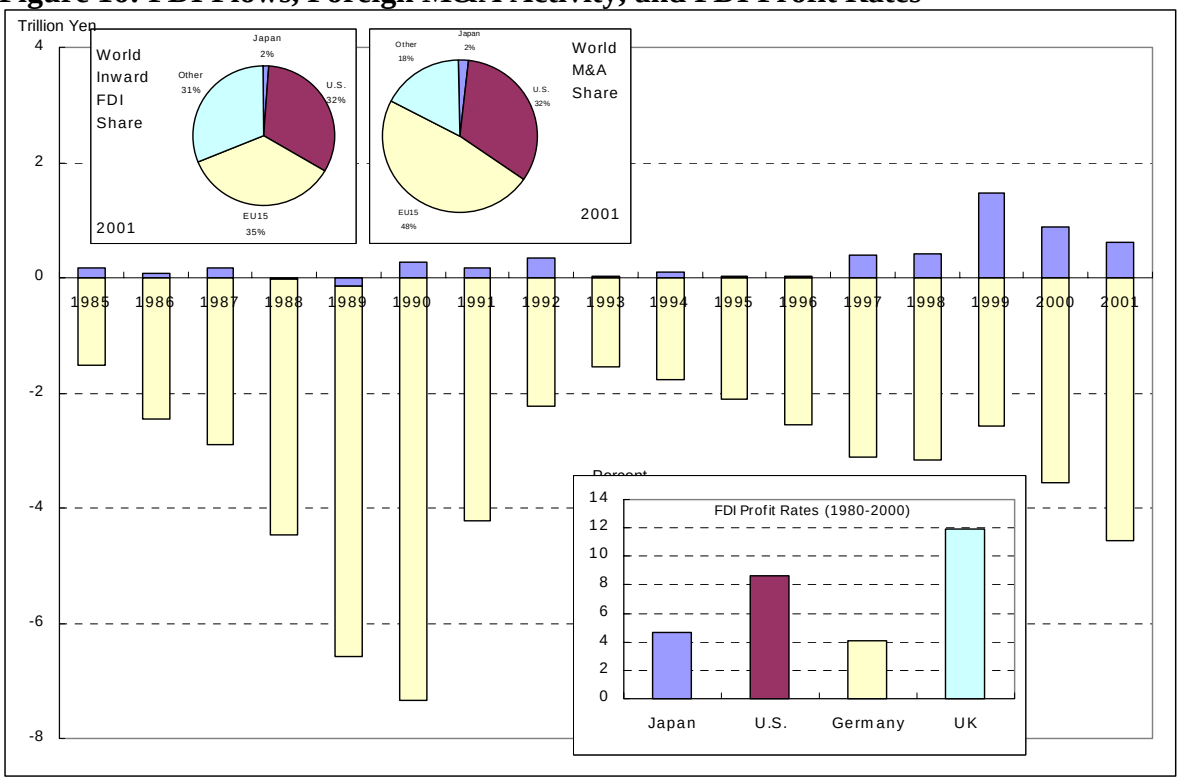
receive seniority-based incomes. At the same time (see the small lower chart in Figure 15), the "closed shop" mentality of Japanese corporations with a strong emphasis on in-house training reduces the chances of workers who have failed with their startup idea to become integrated into the workforce again – and this makes entrepreneurship in Japan an even more risky business. A last, but nevertheless important, factor is the unavailability of credit from private financial institutions, which provide loans to only 28% of startups (according to a recent survey of SME owners; see Figure 15).

This trend against entrepreneurship greatly diminishes Japan's chances to develop new ideas, products and markets. To improve this situation, it is often said in Japan that it is necessary to target a "cultural change." This, however, is surely over-pessimistic and only increases the barriers to effective change. Instead, it would be a good start if the government would revitalize the defunct financial system, and the corporations would adjust their wage structures and open up their employment schemes.

3.4 Globalization

A well-known and often criticized shortcoming in Japan's industry (and society) is the very slow advancement of globalization. Figure 16 shows this problem clearly. Although Japan invests a considerable share of GDP in the form of FDI outside the country (4.5% in 2001), this engagement did not lead to a full integration of the country into international production networks. The missing link is the very low level of inward-FDI, which, at less than 700 billion yen, is the lowest in any OECD country and represents only 2% of world inward FDI flows (in contrast to 32% in the U.S. and 35% in Europe).

Figure 16: FDI Flows, Foreign M&A Activity, and FDI Profit Rates



Note: FDI Profit Rates are calculated as: Profit on Direct Investment for current year / Average of Outstanding Direct Investment for the year and the previous year.

Source: © FRI. For FDI Data: BOJ - Balance of Payments Statistic. For FDI Profit Rates, FDI and M&A Activity as Percent of World Share: METI (2002) - WP on International Trade 2002.

These low levels of inward-FDI clearly draw a poor picture for the openness of Japan's industry. By not taking advantage of foreign skills and competition with different business practices at home, Japan clearly loses out in terms of possible competitiveness advancements.[7] And, as is evident in the rather low returns on outward-FDI that Japan's industry was able to realize during the last two decades, it also loses out in direct income. Although a profit rate of 4.4% on outward-FDI was considerably higher than on most domestic investments, this rate is by far lacking the possible returns of experienced international investors like the UK.[8].

---

7 Such globalization would provide the chance to considerably improve international business skills by practicing at home beyond the limits of Japan's major international corporations.

8 A consistently low profit rate would also not be sufficient to support the expectations of Japan's ageing workforce regarding their retirement incomes (which need to be earned to a considerable extent by foreign investments in younger economies).

Already today, major cases in Japan's finance, automobile, and banking industries have proven that the invitation of foreign capital, skills, and businesses is one of the best ways to break up defunct stakeholder relationships and governance deadlocks.

4 Conclusion

Japan is in a structural crisis that has its roots in the preservation of a postwar model of stakeholder governance. During the period of "high growth," governance in Japan was based on a system of contributions from different stakeholder groupings, closely interlinked as "insiders" of the corporate finance and production process. Workers traded low real incomes for lifetime employment, consumers accepted high current prices for future growth and income, financial institutions discounted group-based and implicit governmental guaranties for low risk premiums, and corporations took the risks for high-growth, low (current) yield investment and diversification.

From the early 70s, major changes in the market framework towards a liberal market model and internationalization were needed. It became necessary to allow for higher degrees of consumer sovereignty, high returns on different types of assets for an ageing society, and closer international market integration for future investment chances. To achieve this, corporations clearly needed more flexible labor and capital markets, competitively priced inputs, and the integration of high-grade outside skills (from universities, consulting, and internationalized financial intermediaries).

By now it is clear, however, that many stakeholder relationships (often called "vested interests" today) are hard to reform and will go on dragging the economy. A major problem is related to labor and capital markets. Corporations were not sufficiently able to readjust from seniority-based employment systems into more flexible schemes with a strong link to productivity. Because of undeveloped labor markets and a strong emphasis on in-house training they also struggled in shifting employees between corporations and industries when product demand changed. The same is true for capital that often remained bound in inefficient uses. The unsolved paralysis of the debt ridden banking system, and the traditionally low payouts of Japanese corporations to outsiders (like shareholders) hinder an efficient reallocation of capital during a time of strong changes in demand and fortunes.

A second, but nonetheless extremely important, problem is the "Dual Economy" between productive manufacturers in international competition and (relatively) unproductive non-manufacturing sectors that produce for a rather protected domestic market. This situation has been inherited from the time of "high growth" when Japan concentrated funds in the manufacturing sector to take advantage of strong (overseas) demand and increasing returns to scale. Lagging reforms during the last two decades, which struggled to overcome stake-

holder barriers between industries, preserved an industrial structure that became increasingly outmoded.

Our analysis clearly shows that it is necessary to solve these structural problems before further improvements in productivity can be turned into economic growth. Improvements in the allocation of capital require a revival of the financial system and capital markets. They also require, however, a strong focus on profitability and (dividend) payouts at the corporate level. Improvements in the allocation of labor require strong labor market reforms to improve flexibility, but such reforms would also necessitate transparent wage incentives and flexible employment systems with a strong focus on skill advancement beyond corporate borders. Last but not least, such reforms will only become successful in the long run if they are joined with strong progress in the international integration of the Japanese economy by inviting inward-FDI.

Finally, on an industry-by-industry level, our analysis of Adjusted TFP Change Rates has shown that the manufacturing sector, and also utilities, transport and communications were able to improve their production systems and to increase their productivity. These industries clearly have strong growth potentials if they are able to cut their excessive use of capital and labor. Given their dynamics in efficiency advancements in production, these industries would also be able to make fast corrections to any new changes in demand if (but only if) they become integrated in more flexible factor markets.

This is not true for the service industry, however (and even worse for the construction and real estate sectors). The service sector is not as productive as it should be. The adjusted TFP change rates clearly show a declining pattern of production efficiency throughout the 1990s. This situation is very problematic because the service sector has been growing over the last decades, and is regarded as the solution to many employment problems that come from the “drain” of production sites to overseas countries. To establish the service industry not only as a pool for surplus labor, but also as an engine for growth for the entire economy, its production system therefore clearly needs to undergo serious reform after market restrictions have been abolished and competition increased.

Unfortunately, after the failed attempts of the 80s and 90s, the ongoing and promising reform process is now under additional pressure from debts of earlier (and current) misallocations, and from the fast progress of competitors in the U.S. and Asia who were able to build on their more flexible markets.

5 Literature

Barkmann, Volker, *Schulz*, Martin *(1998):* The Reform of the Italian Tax System, FU Berlin, FB 15 DP, Berlin.

Bloendal, et. al. (2001): Investment in Human Capital, OECD WP, Paris.

BOJ (various): Balance of Payments Statistics.

Cabinet Office (2002): Annual Report on Japan' s Economy and Public Finance, Tokyo.

Cabinet Office (2002a): Statistical Yearbook 2002, Tokyo.

Cabinet Office (various): National Accounts, Tokyo.

European Commission (2001): European Competitiveness Report, European Commission, Luxembourg.

Industrial Structure Council (2002): Service Economy/Employment Subcommittee Report - Toward the Establishment of a Diversified, Creative Work System Conforming to the Trend Toward a Service Economy, Tokyo.

Jensen, Michael C. (1991): Corporate control and the politics of finance. In: Journal of Applied Corporate Finance, Vol. 4/2, p. 24.

Jensen, Michael C. (1997): The modern industrial revolution, exit, and the failure of internal control systems. In: *Chew*, Donald H. (ed.), Studies in international corporate finance and governance systems – A comparison of the U.S., Japan, and Europe, New York/Oxford, p. 18 - 37.

Kaplan, Steven N. (1997): Corporate governance and corporate performance: A comparison of Germany, Japan, and the U.S. In: *Chew*, Donald H. (ed.), Studies in international corporate finance and governance systems – A comparison of the U.S., Japan, and Europe, New York/Oxford, p. 251 – 258.

Kester, Carl W. (1991): Japanese takeovers – The global contest for corporate control, Boston, Massachusetts, 1991.

Kester, Carl W. (2000): Governance, Globalization, and Forces of Change. Shanghai Stock Exchange Lecture (October 2000), Shanghai.

Kimura, Tatsuya (2002a): Structural Reform in the Trucking and Coastal Shipping Industries. An Analysis using Total Factor Productivity (TFP) Change Rates, Hakutou-shobo, Tokyo (in Japanese).

Kimura, Tatsuya (2002b): Economic and social reforms: Importance of the system to stimulate imaginative creation of businesses. Zeikei Tsushin, October 2002 (in Japanese).

Maddison, Angus (1995): Monitoring the World Economy 1920-1992, Paris.

Maddison, Angus (2001): The World Economy: A Millennium Perspective, Paris.

Ministry of Public Management, Home Affairs, Posts and Telecom (2001a): Labor Force Survey - Special Survey, Tokyo.

Ministry of Public Management, Home Affairs, Posts and Telecom (2002): Labor Force Survey 2002, Tokyo.

Ministry of Public Management, Home Affairs, Posts and Telecom (2002a): Input-Output Tables, Tokyo.

METI (2000) - Industry- Academia Liaison Promotion Subcommittee Report Material, Tokyo.

METI (2002): White Paper on International Trade, Tokyo.

METI (2002a) Input-Output Tables (Extended), Tokyo.

METI (2002b): White Paper on Small and Medium Size Enterprises in Japan, Tokyo.

MOF Printing Bureau (various): Annual Financial Statements of Corporations.

Prahalad, C.K. (1997): Corporate governance or corporate value added? Rethinking the primacy of shareholder value. In: Chew, Donald H. (ed.), Studies in international corporate finance and governance systems – A comparison of the U.S., Japan, and Europe, New York/Oxford, p. 46 - 56.

Schulz, Martin (1997): Monetary Policy and Investment Financing During Structural Change: The Japanese Financial Crisis of the 1990s. Rikkyo Economic Journal Vol. 51, No. 2, 71-75.

Schulz, Martin (2001): The Reform of (Corporate) Governance in Japan. German Institute of Economic Research Quarterly, Vol. 70, No.4, p. 527-545.

Schulz, Martin (2002): Shareholder vs. Stakeholder Values – Finance and Economic Change. Japanese German Center Berlin Conference Volume - Shareholder vs. Stakeholder Value – The Case of Japan, Berlin.

Schulz, Martin (2002): A Framework for the Activation of Japanese Regions in a Globalizing World. FRI Discussion Paper 02-12, Tokyo.

Sheard, Paul (1994): Interlocking shareholdings and corporate governance. In: *Aoki*, Masahiko, Ronald *Dore* (ed.), The Japanese firm - The Sources of competitive strength, Oxford/New York, p. 310-344.

Tokyo Stock Exchange (various): Compact Databook.

6 Appendix

2.4 Adjustments for the TFP Change Rate Indicator

Most existing TFP change rate analyses are misleading – especially in an economy that is undergoing fast structural changes. To construct a more appropriate "Adjusted TFP Rate Indicator," the following five main problems need to be addressed:

- First, unrealistic assumptions about production functions and the market environment are to be avoided. In conventional models, goods and service markets are assumed to be under perfect competition, with none of the companies having price dominance. It is also assumed that the volume of production changes proportionately to variations in inputs, and that changes occur proportionately across industries and the industry as a whole. Furthermore, the hypothesis of perfect competition does not account for the existence of price leaders, and is not consistent with the widespread price formation by simple mark-up practices. To avoid the likely mis-measurement and bias, the adjusted TFP indicator is based on the method of gross accounting and therefore assumes a general production function only implicitly instead (and not a specific one like Cobb-Douglas with perfect competition and constant returns to scale), and takes changes in the market environment into account.
- Second, the use of net capital stock data for tangible assets (in contrast to gross data) is necessary. The use of gross asset data does not take into account the depletion of fixed assets – it only allows for retirement of stock. Capital stock data will therefore be too high. This problem can be diminished by using a benchmark year method with net tangible depreciable capital stock data from the *Annual Financial Statements of Corporation Industry* (and other sources).
- Third, real estate assets need to be included. Only tangible fixed assets that can be depreciated are included in the capital stock data for industry as a whole. This is an unnatural way of treating land, and essentially excludes real estate from input factors. Especially in Japan, where concentration made real estate an important input factor, the allocation of land related rents and profits needs to be accounted as value-added factors. Fortunately, real estate can be included as an input factor by use of the same data sources and benchmark year methods as in the capital stock adjustments before.
- Fourth, adjustments for the utilization rates of capital stock for industry as a whole and in the non-manufacturing sector need to be included. Conventional TFP measures ad-

just only the utilization rate of capital stock in manufacturing. Given the inefficiencies and often low utilization rates in the non-manufacturing industries, an appropriate TFP measure needs to include such adjustments for all sectors by using the Bank of Japan's *Short-Term Economic Survey of Enterprises in Japan (TANKAN)* (and other statistical data).

- Fifth, estimated shortages and surpluses in labor need to be adjusted. When companies' optimum employment levels change, it takes time for companies to make the appropriate adjustments in employment – especially in an economy with strong market regulations and long-term contracts as in Japan. This implies that employees may remain employed without contributing to productive activities and/or work overtime without receiving higher wages. As in the case for capital services, these changes in the utilization rates of labor need to be accounted for. To do so, shortages or surpluses of labor inputs in production are estimated by using the Carlson-Parkin method with data from the Bank of Japan's *Short-Term Economic Survey of Enterprises in Japan* (TANKAN) (and other statistical data).

6.1 Methodological Comments to Adjusted TFP Change Rate

The following is an outline of the methodology used for measuring the adjusted TFP change rate.

1. Generalizing the Production Function and Market Conditions

The following method generalizes the production function and the market environment without constant returns to scale, and perfect competition in goods and service markets.

(1) Assumptions for Production Function

In this study, the production function is defined as real value-added as a a continuous function of real capital input, real labor input and production efficiency. Capital input and intermediate inputs are proportional. No other conditions are specified.

Let the domestic production given in the input-output tables be NS, the price of the *i*th input element P_i, the input volume of the input element to which value-added distributed v_j, and the input volume of the intermediate input m_k and assume that the numbers of *j* and *k* are g and h respectively and the value-added amount is NZ. This gives:

$$\mathrm{NS} = \sum_{j=1}^{g} P_j v_j + \sum_{k=1}^{h} P_k m_k$$

$$\text{Hence, } \mathrm{NS} - \sum_{k=1}^{h} P_k m_k = \mathrm{NZ} = \sum_{j=1}^{g} P_j v_j$$

Let us take into account the fixed-price data in the linked input-output tables. If we now define the real sales as S, the real value-added as Z, and the price of the *i*th input element in real amounts as P^*_i, we can now rewrite the above equation as:

$$\mathrm{S} - \sum_{k=1}^{h} P^*_k m_k = \mathrm{Z} = \sum_{j=1}^{g} P^*_j v_j \quad \cdots\cdots (1)$$

The relation expressed by equation (1) shows constant returns because an m-fold increase in all *vj* also entails an m-fold increase in Z. It is realized, however, that equation (1) only denotes an ex-post equality relation, without presupposing the effective utilization of the input elements. It can therefore be applied even if capital is not fully utilized, and if a surplus of labor exists. Equation (1) does therefore not express a production function describing the technical conditions between input elements and production.[9] It also does not assume constant returns to scale in this study.

We can calculate a TFP change rate without assuming a specified production function because we argue as follows.

If TFP is defined as ψ, the real value-added as Z, and the index for the aggregate input volume of the input elements as V, TFP can then be defined as:

$$\psi \equiv \frac{\mathrm{Z}}{\mathrm{V}} \quad \cdots\cdots (2)$$

If we take the logarithmic values of the terms on either side of equation (2) and differentiate over time we have:

$$\frac{\mathrm{d}\psi}{\psi} = \frac{\mathrm{dZ}}{\mathrm{Z}} - \frac{\mathrm{dV}}{\mathrm{V}}$$

Where dψ, dZ, and dV are the differentials of ψ, Z, and V with respect to time.
We can write:

$$\frac{dV}{V} = \sum_{j=1}^{g} u_j \frac{dv_j}{v_j} \quad \cdots\cdots (3)$$

We define Z as the real value-added, L and K as the labor input and capital input respectively, u_L as the weight for the rate of increase of labor input and u_k as the weight for the rate of increase of capital input. This gives us:

$$\frac{d\psi}{\psi} = \frac{dZ}{Z} - u_L \times \frac{dL}{L} - u_k \times \frac{dK}{K} \quad \cdots\cdots (4)$$

If u_L and u_k are defined as cost weights that will be described in the following section, it will be possible to measure the TFP change rate as an index of improvement in production efficiency. For this measurement, it is not necessary to assume constant returns to scale, and perfect competition in goods and service market.

(2) Cost Weighting Applied to the Measurement of the TFP Change Rate

The weights for the rate of increase of labor and capital used for measuring the TFP change rate can be given as follows. Let us first define the value-added production function as:

$$Z(t) = f(\alpha(t) L^e(t), \beta(t) K^e(t), H(t))$$

Where t expresses the time, H the production efficiency, α the labor utilization rate (100 - percentage of labor shortage/surplus, %) and β the amount of capital utilization rate (being the maximum amount of labor and capital capable as input, respectively; given that $L = \alpha L^e$ and $K = \beta K^e$.)

Let us substitute w for the wage rate, r for the unit capital costs, P for the implicit value-added deflator either for industry as a whole or for the each individual industry and e for the price elasticity of demand. If we now assume profit maximization behavior of producers, constant wage rate and unit capital costs, the following equations can be derived as the primary condition of profit maximization.

$$\frac{\partial f}{\partial L^e} = \frac{w}{P\left(\frac{\partial P/P}{\partial Z/Z} + 1\right)} = \frac{W}{P\left(1 - \frac{1}{e}\right)} \quad \cdots\cdots (5)$$

$$\frac{\partial f}{\partial K^e} = \frac{r}{P\left(\frac{\partial P/P}{\partial Z/Z} + 1\right)} = \frac{r}{P\left(1 - \frac{1}{e}\right)} \quad \cdots\cdots (6)$$

Let us now take the logarithmic values of the terms on either side of the production function and consider $\alpha(t) L^e(t)$ and $\beta(t) K^e(t)$ as a single variable with respect to time. If we now differentiate these terms over time and rearrange the equation (dH, $d(\alpha L^e)$ and $d(\beta K^e)$ the differentials of H, (αL^e) and (βK^e) with respect to time, we get.

$$\frac{\partial f / \partial H}{f} \times dH = \frac{dZ}{Z} - \frac{\partial f / \partial L^e}{\alpha f} \times d(\alpha L^e) - \frac{\partial f / \partial K^e}{\beta f} \times d(\beta K^e)$$

9 Equation (1) based on the input-output tables becomes a Leontief type production function when assuming that all input elements are used effectively. In this study, however, we do not assume the effective utilization of the input elements.

From (5) and (6) we get:

$$\frac{\partial f / \partial H}{f} \times dH = \frac{dZ}{Z} - \frac{w L^e}{\left(1 - \frac{1}{e}\right) P Z} \times \frac{d(\alpha L^e)}{\alpha L^e} - \frac{r K^e}{\left(1 - \frac{1}{e}\right) P Z} \times \frac{d(\beta K^e)}{\beta K^e}$$

Furthermore, let us take u_L and u_k in equation (4) given in the previous section as $u_L = \frac{w L^e}{\left(1 - \frac{1}{e}\right) P Z}$, $u_k = \frac{r K^e}{\left(1 - \frac{1}{e}\right) P Z}$. From the relation; $L = \alpha L^e$ and $K = \beta K^e$ we have:

$$\frac{d\psi}{\psi} = \frac{\partial f / \partial H}{f} \times dH = \frac{dZ}{Z} - \frac{w L^e}{\left(1 - \frac{1}{e}\right) P Z} \times \frac{dL}{L} - \frac{r K^e}{\left(1 - \frac{1}{e}\right) P Z} \times \frac{dK}{K} \quad \cdots\cdots\cdots\cdots (6)$$

Based on equation (6) it is possible to measure the TFP change rate in terms of the rate of change of the real production value associated with a change in production efficiency occurring as a result of the transition to the next-phase-combination from the previous-phase-combination of labor input volume (disposable labor input volume), capital input volume (disposable capital service input volume) and real production volume – if we assume zero inefficiency of labor and capital. The measurement of the TFP can now be accomplished by the gross accounting method using equation (6).

As can be seen in equation (6), the weights for the change rate of the labor input volume and for the change rate of the capital service input volume can be obtained by dividing the cost related to labor input and capital service input by the multiple (1-1e) of the nominal value-added amount.

2. Use of the Net Asset Series for Tangible Assets and Inclusion of Land in Capital Assets

We have established the real capital assets value series by using the Benchmark Year Method for both (1) the tangible assets by excluding the construction-in-process account and land from the tangible fixed assets according to the financial statements and we have done the same for land (2). We have then defined the change rate of capital input as the growth rate in sum of the two, that is, of (2) and (1) adjusted in terms of its utilization factor. The capital input volume is essentially not the capital stock volume being used but rather the capital service volume provided with the capital stock. Given the difficulty of measuring the capital service volume, however, we will make the assumption that the capital service volume is proportional to real capital stock value being used (K_t) and that a single unit of K_t can provide s unit of capital services. On this hypothesis, the rate of change of the capital service volume $\left(\frac{s K_t - s K_{t-1}}{s K_{t-1}}\right)$ becomes equal to the rate of change of the real capital stock value $\left(\frac{K_t - K_{t-1}}{K_{t-1}}\right)$.

Consequently, we were able to calculate the change rate of the capital input volume from the change rate of the capital stock volume.[10]

---

10 The input volume of capital services from borrowed capital stock has been assumed to be proportional to the capital service input volume based on the capital stock calculated from the financial statement.

3. Method of Estimating the Capital Utilization Rate for Industry as a Whole and for the Each Non-Manufacturing Industry

(1) Assumptions of the Production Function

For the adjustment of the capital utilization rate for industry as a whole and for each of the non-manufacturing industries, we measure the capital utilization rate for industry as a whole and for each individual non-manufacturing industry. Then we multiply the real capital stock value Kt, calculated in the previous section, by the capital utilization rate that gives us the real capital stock input. Specifying the production function of 1-(2) for measuring the capital utilization rate gives us the following equation:

$$Z(t) = q(\alpha(t)L^e(t), \min(E(t)/b(t), K^e(t)), H(t)) - P_m(t)E(t) \quad \cdots\cdots\cdots (7);$$

Where b is a parameter indicative of the production technology, E(t) the intermediate input volume, and $P_m(t)$ the real intermediate input value.

Let us make the further assumption that the following relationship applies for the capital utilization rate $\beta(t)$:[11]

$$\beta(t) = E(t)/(b(t)\ K^e(t)) \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots (8)$$

Equation (8) can be rearranged in the form $b = E(t)/(\beta(t)\ Ke(t))$ when $\beta(t) \neq 0$. From this equation it is possible to assume that the utilization-rate-adjusted capital stock value, which is the capital service volume proportional to the actually used capital stock value, is proportional to the intermediate input volume.

(2) Method of Estimating the Capital Utilization Rate

For estimating the capital utilization rate, the following two procedures are followed: (i) First, we take the dependent variable as being the intermediate input/capital stock ratio and the independent variable as the variable indicating the fluctuations in the intermediate input/capital stock ratio associated with the fluctuations of the economy. This independent variable is defined as the variable that is made by the Carlson-Parkin method using the percentage-share-breakdown data about surplus and deficit from the Bank of Japan's *Short-term Economic Survey of Enterprises*. This variable referred to below as the capacity excess/shortage index.

We take the other independent variable as a ratio of intermediate product prices to the deflator of the domestic gross fixed capital formation of private enterprises (SNA), which indicate the fluctuation of the production technology parameter b (with the intermediate input price in the numerator). We can now perform a regression analysis using these variables with the values the square of the time trend (*i*th year = i^2) in the case of industry as a whole, and with the electricity tariff dummy associated with the introduction of the fuel-cost-adjustment system for the electricity tariff (with the pre-FY 1996 value for the utility

---

11 From equation (8) we have $\beta(t)\,K(t) = E(t)/b(t)$ so that equation (8) can be written as follows:

$$Z = q(\alpha(t)L^e(t), \beta(t)K^e(t), H(t)) - Pm(t)\beta(t)b(t)K^e(t) \quad \cdots\cdots (8)'$$

where $\beta(t) = 1$ when $E(t)/b(t) > K^e(t)$.

As b(t) in this equation is the technology-related parameter it may be considered as a part of H(t) which expresses the production efficiency. When (the materials price factor) Pm is defined an external production factor equation (8)' can be rewritten thus:

$$Z = f(\alpha(t)L^e(t), \beta(t)K^e(t), H(t)).$$

This represents the production function given in 1-(2) so that equation (8) is a specified instance thereof.

industry being 0 and the post-FY 1996 value being 1) as independent variables. (ii) Second, we calculated the intermediate input/capital stock ratio obtained from substituting quarterly peak values of the capacity excess/shortage index (instead of the annual capacity excess/shortage index). Also, we used real values for the other variables, which had obtained as a result of the regression analysis. We consider this intermediate input/capital stock ratio as being equal to the intermediate input/capital stock ratio at the time of full capital utilization. Based on this, we took the quotient obtained by dividing the real intermediate input/capital stock ratio with the calculated intermediate input/capital stock ratio as the capital utilization rate β (t).

4. Adjustment to Excess and Deficient of Labor Force

(1) Conversion of the Data in the Bank of Japan's *Short-term Economic Survey of Enterprises* to a Quantitative Index

We converted the percentage share breakdown of answers about excess and shortage given by the surveyed companies in the Bank of Japan's *Short-term Economic Survey of Enterprises* to a construct a quantitative index for the excess/shortage of labor by using the Carlson-Parkin method and estimated the excess/shortage ratio, accordingly.