



**Discussion Paper Series**

No.39

**Overcoming economic stagnation in Japan:  
The importance of total factor productivity and  
the potential contribution of foreign direct investment**

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August 2004

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## **Overcoming economic stagnation in Japan:**

### **The importance of total factor productivity and the potential contribution of foreign direct investment**

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#### **ABSTRACT**

The 1990s have been a decade of minimal growth for the Japanese economy. Examining this record from a growth accounting perspective, this paper argues that a major factor underlying Japan's disappointing growth performance in recent years has been a marked slow-down in total factor productivity (TFP) growth. It is suggested that, given present population trends and low returns on capital, any sustained increase in overall economic growth will require an acceleration in TFP growth. In this context, foreign direct investment (FDI) can potentially make an important contribution by increasing the degree of competition in the economy and, if foreign firms are more productive than domestic ones, by raising average TFP levels in Japanese industry.

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## 1 Introduction

By any measure, Japan's economic performance over the past century and a half has been a huge success. Forced to open up to the outside world in 1859, the country embarked on wide-ranging institutional and economic reforms that set it on a path of rapid industrialization. Defeat in World War II was followed by even more spectacular progress, with the country registering sustained rates of economic growth unprecedented anywhere in the world. The acquisition of foreign technology played a central role in Japan's rapid development; yet, in contrast with more recent Asian success stories, such as Malaysia, Thailand or China, foreign direct investment (FDI) played no part in Japan's economic rise. Yet, in recent years, calls to promote foreign investment have been growing louder. This quite naturally raises the question: If the country's economy fared so well without foreign involvement until only quite recently, why should the low levels of inward direct investment matter now?

The reason, of course, is the dismal performance of the Japanese economy since the beginning of the 1990s and the deep-seated structural problems that the prolonged recession has exposed. Following the era of high-speed growth from 1955 to 1973, during which the economy expanded at an average annual rate of 9.3 percent, and a still respectable average annual growth rate of 3.8 percent during 1974–91, the economy almost came to a standstill, with average annual growth reaching barely 1 percent from 1992 to 2000 (see figure 1).<sup>1</sup> What has caused the Japanese economy to stagnate for more than a decade remains a hotly debated issue. A number of competing explanations have emerged, putting the blame either on macroeconomic factors such as a “classical liquidity trap” or mistaken monetary and fiscal monetary policies, or on a host of microeconomic factors ranging from depressed investment following the excesses of the bubble period via problems with financial intermediation to a decline in productivity growth.<sup>2</sup> Each of these explanations receives considerable support, suggesting that it is a combination of some or all of these factors that are responsible for the prolonged slump.<sup>3</sup> In fact, much of the debate is about what weight should be attached to the individual factors rather than the validity of competing explanations. Few economists today

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<sup>1</sup> Technically, a recession is typically defined as two subsequent quarters of negative growth. Using this definition, Japan suffered three periods of recession, in 1993, in 1998, and in 2001–2002 (based on the 93SNA series). However, another definition views as a recession any period in which a country's actual growth falls short of its long-run potential. Though economists disagree what Japan's long-run potential growth rate is, few would deny that actual growth since the early 1990s has fallen below this rate, so that the term “recession” is applied to the entire period.

<sup>2</sup> For a brief overview of Japan's economic crisis and the role played by different factors, see IMF (1998a), chapter IV. A prominent proponent of the “insufficient and mistaken macroeconomic policy response” school of thought is Posen (1998), while the liquidity trap argument is most closely associated with Krugman (e.g. Krugman 1998). More numerous than the advocates of macroeconomic explanations, however, are those putting forward microeconomic accounts. Underlying the prolonged slump is a large decline in private investment and much of the debate centers on whether this is a cyclical response to the overinvestment during the bubble period or the result of a “credit crunch.” Bayoumi (2001), for example, claims that the disruption of financial intermediation is the major explanation for Japan's poor economic performance during the 1990s. Most analysts, however, dismiss this explanation, arguing that only for 1997–98 is there any evidence of a link between the availability of bank credit (or lack thereof) and investment (e.g. Motonishi and Yoshikawa 1999; Krugman 1998; Hayashi and Prescott 2002). According to Motonishi and Yoshikawa (1999), the main cause for the decline in investment therefore simply has been the lack of profit opportunities following the bust of the bubble economy. Finally, prominent champions of the view that Japan's economic slowdown is primarily due to a decline in productivity growth (plus a reduction in the workweek length) are Hayashi and Prescott (2002).

<sup>3</sup> Given the extraordinary length and severity of the recession, it would be surprising to find that one single factor alone was responsible. Rather, cyclical and structural, financial and real factors have been reinforcing each other, explaining also why it has proven so difficult to find an adequate policy response.

would deny that Japan's economy is suffering from serious structural problems; and it is with respect to these that foreign direct investment can potentially make a significant difference.

Insert figure 1

In order to see why and how this should be the case, two separate aspects need to be considered: the nature of the structural problems that have been plaguing the Japanese economy and how they came about; and the way in which foreign companies can potentially contribute to overcoming these structural problems. This paper is primarily concerned with the first aspect, focusing on three related structural issues that have shaped economic developments in Japan: (1) trends in labor input and human capital accumulation; (2) consumer demand and private investment; and (3) trends in the growth rate of total factor productivity (TFP). Each of these three has contributed to the slowdown in economic growth in the 1990s: the working-age population and working hours have declined; private investment has dropped, and TFP growth has stalled. Regarding labor input, the outlook is bleak, as a reversal of prevailing population trends would require significant changes in social attitudes and government policies that are unlikely to be forthcoming. Of particular importance therefore is an acceleration of TFP growth, which would also help to sustain capital investment. Foreign companies could play an important role in this, especially if they are more productive than domestic firms.<sup>4</sup>

The analysis in this paper falls into three parts. The first deals with the three major structural issues in greater detail, looking not only at the 1990s, but also at earlier decades. Such a long-term view shows that many of Japan's present economic problems are in fact deep-rooted, presenting, in some respects, a hangover not only from the bubble period but even from the high-speed growth era which ended in the early 1970s. In particular, it will be suggested that Japan's structural excess savings problems goes a long way in explaining much of the country's recent economic developments and, moreover, that the impressive growth recorded during the immediate postwar era relied heavily on increases in factor inputs and therefore had to run out of steam quite naturally. That this indeed was the case, and that TFP growth has failed to make up for the slack – in fact has declined during the 1990s – will be shown in the second section, which provides growth accounting for the Japanese economy during the period 1973–98. The analysis of the country's growth record will show why the performance of TFP growth is such a crucial issue.

The third section, finally, looks at TFP trends in different sectors and industries, showing that generally TFP in the manufacturing sector has declined, while it has increased in the service sector. Nevertheless, Japan's TFP growth in these sectors still lagged behind that of other countries like the United States or Australia. While this helps to explain Japan's disappointing growth record in recent years, it also suggests that there is considerable potential for improving growth performance in the future. In order to illustrate this point, this section also introduces a few examples of sectors where Japan's productivity lags behind that of other countries and briefly discusses why this is so.

## 2 Structural problems

What has caused Japan's economy to grind to a halt in the 1990s? One way to address this question is to use a basic accounting identity that states that economic growth must derive

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<sup>4</sup> Whether foreign firms are indeed more productive than domestic ones will be the subject of a subsequent paper.

either from an increase in the factors of production – labor and capital – or an increase in the efficiency with which these are used. The analysis below looks at each of these potential sources of growth and the structural issues related to them.

### *Labor input and human capital accumulation*

Growth in labor input played a central role in underpinning Japan's economic growth until the early 1990s, though the nature of this labor input growth changed over the years. Initially, most of the increase was propelled by population growth thanks to the baby-boom during the early postwar period: during the 1950s and 1960s, Japan's working-age population expanded at annual rates of around 2 percent. This growth rate fell to around 1 percent during the 1970s and 1980s, but the slowdown was partly compensated by increases in the hours worked. Nevertheless, man-hour input growth overall started to dwindle.

The quantity of labor input peaked in 1991 and since then actually has been in decline. A number of factors have contributed to this reversal. The first is the long-term demographic trend: in the early 1970s, Japan experienced a second, though smaller, baby-boom, so that the working-age population increased until the mid-1990s. Since then, however, due to low birthrates, the country's working-age population has actually been shrinking. The second factor contributing to the decline in labor input is cyclical: the collapse of the bubble economy in 1990/91 and the ensuing economic downturn has led to a sharp rise in the unemployment rate from 2.1 percent in 1990 to 5.4 percent in 2002 and a reduction in overtime work for those who remained in employment. The third factor, finally, were government policies: between 1988 and 1992, the government reduced the statutory workweek from 48 to 40 hours, i.e. from six workdays to five, and introduced three new national holidays. A further revision of the labor law added another day to paid vacation in 1998. Due to these changes and the cyclical reduction in overtime, the average monthly number of hours worked by regular employees fell from 171.0 hours per week in 1990 to a low of 153.1 in 2002.<sup>5</sup> Taken together, the three factors have meant that the actual labor input in terms of man-hours has been shrinking since 1991.

Another important factor contributing to economic growth apart from the sheer quantity of labor input is human capital accumulation, i.e. increases in the *quality* of labor through education and the acquisition of skills. The most commonly used, because most easily quantifiable, measure of human capital accumulation is the average years of schooling. Here, too, Japan made rapid advances during the high-speed growth era, raising average schooling from 7.6 years per person in 1950 to 9.8 years in 1970 – an annual increase of 1.3 per cent. Average schooling grew further to 11.5 years per person in 1990, which, however, represents a slowdown in the rate of increase to 0.8 per cent.<sup>6</sup> Of course, such a slowdown in the rate of human capital accumulation was only natural as primary and secondary education became universal and tertiary education widespread. Yet, what is remarkable is that though average tertiary schooling in Japan has continued to increase through to the 1990s, relative to the United States, it has actually been declining since the late 1970s.<sup>7</sup> Thus, following the rapid catch-up during the high-speed growth era, human capital accumulation also slowed in subsequent decades. What is more, though average schooling in the increasingly important

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<sup>5</sup> Figures from Statistics Bureau; online: <http://www.stat.go.jp/english/data/nenkan/zuhyou/y1639000.xls> (28 August 2004).

<sup>6</sup> Figures from Godo and Hayami (1999).

<sup>7</sup> In contrast, average schooling in primary and secondary education in Japan has continued to catch up with the United States. See Godo (2001).

area of tertiary education continued to rise, the gap relative to the United States has actually been widening. One possible explanation for the latter trend is that the wage premium for college graduates has declined as economic growth decelerated in the 1980s and the supply of college graduates grew faster than the number of suitable management positions.<sup>8</sup>

While the gap in tertiary education vis-à-vis the United States suggests that there remains scope for human capital upgrading, there is little prospect that the decline in labor input will be reversed in the future. On the contrary, whereas there is some scope for a cyclical upturn in labor input, long-term demographic trends mean that Japan's working-age population will continue to shrink, probably at an accelerating rate (see figure 2). In fact, the rapid aging and incipient decline of the population probably represents the most serious challenge facing the country at present, both in economic and in social terms. The implications are wide-ranging: For example, rapid population aging places growing strains on Japan's pension system and hence public finances; a population with a large share of pensioners is likely to be much less dynamic in terms of innovative and entrepreneurial energy; and the decline in the proportion of young people is bound to slow the rate at which human capital is accumulated. Thus, current population trends put a brake on Japan's potential growth rate through a variety of mechanisms, meaning that the economy as a whole is going to be much less vigorous than in the past.

Insert figure 2

#### *Private investment and the excess savings problem*

Rapid capital accumulation provided the second pillar of high-speed growth: during the period from 1956 to 1973, private investment expanded at an average annual rate of around 16 percent and, in 1970, for example, accounted for 31 percent of GDP. Such frenzied investment was brought to a sudden halt by the first oil shock in 1973, which was followed by a second one in 1979, and investment never regained the kind of momentum it had enjoyed in earlier decades. A brief exception was the bubble era during the second half of the 1980s, when private investment accelerated again, with growth rates reaching around 10 percent per year, and its share in GDP leaping to 27 percent. But by this time, of course, such heady investment rates were no longer sustainable and the economic stagnation of the 1990s to a large extent represents the necessary adjustment to the excesses of the bubble era. On average, private investment between 1992 and 2000 shrank by 0.3 percent per year, so that by 2003, it had fallen 19 percent of GDP (figure 3).

Insert figure 3

In many respects, the contraction of investment over the past decade or so represents a belated reaction to the end of the high-speed growth era rather than simply an adjustment to the excesses of the bubble period. One way to understand the problems that have plagued the Japanese economy over the past 20 years or so is to look at the national savings-investment balance. Although Japan enjoyed an unusually high savings rate during the high-speed growth era which provided the basis for high investment rates, domestic savings nevertheless still fell short of the voracious demand for capital. The shortfall manifested itself in a chronic current

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<sup>8</sup> See Genda (1998).

account *deficit*, which turned into the chronic surplus we are accustomed to today only after the two oil shocks in the 1970s brought an end to the investment drive.

The oil shocks, however, only provided the immediate trigger. Underlying the cyclical trends were long-term structural changes that were responsible for permanently lowering investment growth rates: as already seen, the 1970s were also the decade when the growth in Japan's working population started to slow, increasing labor costs and dragging down the returns on new investment. Similarly, returns on investment were lowered by the exhaustion of productivity gains ensuing from the technological catch-up with the West. As a result, Japan was beginning to reach the limits of growth based on simple capital deepening, i.e. additional units of capital per worker were no longer producing commensurate increases in productivity and hence output. The cumulative effect of these trends was to significantly lower the returns on capital: whereas until the 1970s, Japan had enjoyed considerably higher returns than other OECD countries, the gap rapidly narrowed during this decade and by the 1980s had virtually disappeared.<sup>9</sup> Lower returns meant that capital accumulation in Japan was bound to slow, even without the two oil shocks.

Yet, while investment in relation to GDP fell sharply during the 1970s and early 1980s, the level of savings declined much more slowly and to a lesser extent, leading to the excess savings problem that runs like a thread through recent economic developments in Japan: the reverse side of excess savings is depressed effective demand, which in turn, has contributed to the country's growing trade surplus, especially with the United States, leading to trade friction and eventually, in 1985, the Plaza Agreement, which triggered rapid appreciation of the yen. This prompted Japan's authorities to embark on a policy of loose money that gave rise to the asset bubble and an investment boom that channeled funds into projects yielding only low returns. Once the asset bubble collapsed, many of the loans extended for asset speculation and/or for fixed capital investment turned sour, saddling banks with a mountain of non-performing loans, eventually leading to the credit squeeze that further dampened private investment.<sup>10</sup> Finally, excess savings as a result of declining private investment have also been held responsible for the deflation and zero interest liquidity trap that have been plaguing the Japanese economy since the mid-1990s.<sup>11</sup>

From an accounting perspective, there are basically three outlets for private savings: they can be used for private investment, lent to the government, or lent/invested abroad. As already seen, private investment contracted during the 1990s, leaving only two possible outlets for increased private savings. Of these, lending abroad also provided little room for expansion: although the U.S. current account deficit ballooned during the 1990s, a number of factors – such as the fear of renewed trade friction with the U.S., yen appreciation, the relocation of production to the rest of Asia, competition from emerging Asia, etc. – put a cap on this use of Japan's excess savings.

The only remaining outlet thus consisted of lending to the government, and the government did indeed make efforts to use the excess savings to stimulate domestic demand. Unfortunately, though, the way this was done did little to solve the basic problem and in many respects exacerbated it. Rather than using excess savings to spur private consumption – e.g. via lowering taxes or raising welfare payments – the government instead chose to increase

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<sup>9</sup> Pyo and Nam (1999).

<sup>10</sup> While talk of a credit squeeze emerged much sooner, most economists think that problems in the banking sector began to have an effect on the real economy, i.e. private investment, only in 1997–98 (e.g., Krugman 1998; Motonishi and Yoshikawa 1999; Hayashi and Prescott 2002).

<sup>11</sup> See, e.g., McKinnon and Schnabl (2003) and Krugman (1998).

spending on public works projects, many of which were of questionable value, such as “roads and bridges to nowhere” or local airports in thinly-populated rural areas. Not only were such projects ineffective in spurring lasting demand, they also did little to raise the overall efficiency of the economy.<sup>12</sup>

In order for Japan to return to a sustainable growth path, it is therefore necessary to overcome the problem of excess savings. This can be achieved by a lowering of the savings rate through a rise in consumption, by an increase in private investment, or by a combination of the two. Contrary to popular perceptions, households have indeed lowered their savings.<sup>13</sup> At the same time, however, savings by the corporate sector have increased, presumably because investment opportunities have been limited and firms face little pressure to pay out unused funds to shareholders. As a result, total private savings (i.e. household and corporate savings together) have remained more or less unchanged during the 1990s, hovering around 10-11 percent of GDP. This suggests that once the economy recovers and firms start to invest again, Japan’s savings surplus should diminish. However, any increase in investment that could fuel sustained long-run growth – and avoid the excess investment and low returns observed in the past – would have to be based on an acceleration of TFP growth.

#### *Total factor productivity and its importance for future growth*

Total factor productivity is that part of economic growth that is not explained by an increase in factor inputs but rather the result of gains in the efficiency with which these factors are used. This “residual” is typically referred to as the growth contribution made by technological progress, which should be interpreted in the broadest sense, including not only advances in technology but also changes in work organization, the accumulation of intangible assets such as management and marketing know-how, and many other factors, for example the degree of competition in the economy, that affect the efficiency with which factors of production are employed.<sup>14</sup>

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<sup>12</sup> Of course, the extent to which alternative policies would have stimulated private consumption remains a matter of debate. Assuming that consumers anticipate that lower taxes (or higher welfare payments) now imply higher taxes (or lower welfare payments) in the future, the impact of such policies on current consumption might have been minimal. On the other hand, though, if consumers do adopt such forward-looking behavior, then the increases in government debt incurred as a result of expenditures on public construction projects would similarly lead them to curtail consumption. (Indeed, it could be argued that the weakness of private consumption during much of the past decade has at least partly been induced by the growing level of government debt.) There seems to be no reason to assume that the reaction of a forward looking consumer to mounting government debt should differ depending on whether that debt is accumulated through public construction expenditure or lower taxes/higher welfare payments. The differences in the effects of the policies thus would depend on what the added public liabilities are spent on: construction projects chosen by the government in one case, or goods and services chosen by consumers in the other. While the former cemented existing economic structures, the latter would have contributed to structural changes already taking place.

<sup>13</sup> The most likely explanation for this development is demographic trends. According to the life-cycle hypothesis, people accumulate savings during their working years and draw down their savings as they retire. Thus, as the population ages and the ratio of retired to working people increases, so the household savings rate declines. This also suggests that the household savings rate is bound to decline further over the coming decade as the generation of baby-boomers reaches retirement age. However, what the effect on overall savings is going to be is less clear as this also depends on future trends in the government balance. Ito and Tsuru (2003), for example, argue that though the impact of population aging on household savings is important, this will be more than offset by smaller government deficits; Japan’s current accounts will thus “remain positive in the indefinite future.” (ibid.: 23).

<sup>14</sup> In the dominant neoclassical approach, this technological progress is considered to be exogenous. New growth models attempt to open this “black box” by endogenizing technical change, i.e. explaining it within the model.



Looking at Japan's historical experience, it seems clear that TFP grew rapidly and made a substantial contribution to overall economic growth during the 1950s and 1960s.<sup>15</sup> The underlying reason, of course, is the impressive technological catch-up achieved during this period, when Japan imported technologies from abroad, primarily through license agreement with American and European companies. However, most economists would agree that the process of technological catch-up was largely exhausted by the early 1970s.<sup>16</sup> This was the time when Japan was emerging as an industrial powerhouse in fields such as automobiles, electronics and precision instruments (e.g. cameras and watches), suggesting that in these sectors the technology gap had indeed largely been closed.

As a result, Japan's TFP growth performance during the following decades was less impressive – judged both against its own record and in international comparison – as the following section will show. However, the exhaustion of technological catch-up opportunities represents only part of the story. Another important reason seems to be rigidities in the economy such as regulation and other factors that have inhibited competition and the establishment of new firms which help to accelerate the adoption and spread of new technologies, business models, and products. As will be shown further below, TFP performance differs considerably across industries, and it is only by looking at these differences and the wider economic context that the overall weakness in Japan's TFP growth can be explained.

Before addressing these issues, however, it is useful to briefly look at why the drop in TFP growth is a serious problem for Japan. Growth in total factor productivity yields a number of closely related benefits. First, it is an important component of overall productivity and hence economic growth. Second, while economic growth based on the accumulation of physical or human capital is subject to diminishing returns, so that increases in these inputs sooner or later will cease to yield commensurate output gains, increases in TFP raise the return to physical and human capital, thereby leading to economic growth that is sustainable in the long-run. TFP growth also plays an important role in raising companies' profits, since TFP by definition is the residual that remains after the contribution of physical assets (capital costs) and labor inputs (labor costs) are subtracted from total output. And finally, TFP growth raises wages and the demand for higher educated and technologically skilled workers. This, in turn, boosts the incentive for worker to upgrade their skills. Improvements in the quality of labor spur further economic growth, thus creating a "virtuous cycle." Consequently, TFP represents the single most important engine of growth for advanced economies and is of particular significance in Japan's current circumstances, where neither labor (due to population trends) nor capital (due to low returns) can make a decisive impact on future growth.

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While neoclassical analysis is useful in examining *what* happened to productivity growth, new growth theory can help to explain *why* it happened. See Steindel and Stiroh (2001) for an excellent introduction to the issues surrounding the productivity debate and Stiroh (2001) on the differences between neoclassical and new growth theories.

<sup>15</sup> See, for example, Christensen *et al.* (1995).

<sup>16</sup> It should be noted, however, that TFP trends tend to be pro-cyclical as a result of changes in capacity utilization rates and labor hoarding. As the drop in the TFP growth rate observed in the early 1970s coincides with the first oil shock and the subsequent recession, it is likely that estimates overstate the extent of the slowdown in TFP growth rates. Estimates by Christensen *et al.* (1995), nevertheless, suggest that the slowdown already began in 1971, i.e. before the impact of the oil shock.

### 3 Accounting for Japan's growth

While the ideas underlying growth accounting and productivity measurements are straightforward, the actual measurement of the various components, and especially of total factor productivity are fraught with both conceptual and practical difficulties.<sup>17</sup> As a result, actual estimates of TFP growth arrive at differing results and cross-country comparisons, using a unified methodology and time span are difficult to come by. One of the broadest studies allowing some international comparison of growth rates and the sources of growth is the OECD growth study (OECD, 2003). The study highlights a number of features regarding Japan's growth performance over the past two decades. First, Japan is not alone among the world's largest economies making up the G-7 to have experienced a slowdown in growth (see table 1). While growth in the United States and Canada continued apace during the 1990s, it also slowed in the major European countries. However, nowhere has the slowdown been as pronounced as in Japan, especially when looking at the sub-period of 1996–2000. Second, the slowdown in overall GDP growth during 1996–2000 coincides with a marked deceleration in productivity growth. Unfortunately, the only data available for Japan in the OECD growth study are figures showing the combined contribution of human capital and technical change. These figures, however, clearly show not only that in Japan the contribution of these factors slowed markedly during the 1990s, but also that over the period 1996–2000 it had fallen to the lowest level among the G-7 nations.

Insert table 1

Greater detail is provided in studies focusing explicitly on Japan. The results of one such study (Fukao *et al.* 2003) are presented in table 2. The study divides the past three decades into three periods to coincide with distinct episodes in Japan's recent economic developments: the period 1973–83, marking the end of high-speed growth triggered by the two oil crises of 1973 and 1979; the period 1983–91, which was dominated by the rise of the bubble economy; and the period 1991–98, characterized by stagnation in the aftermath of the collapse of the speculative economy.

The table shows that average annual GDP growth accelerated from 3.6 percent to 3.9 percent, but then fell to only 1.3 percent in the most recent period. By far the most important reason for this slowdown is the sudden reversal in the contribution of man-hour growth. Accounting for about two-fifths of GDP growth during 1973–91, man-hours actually fell slightly during 1991–98, explaining more than two-thirds of the drop in overall growth. This means that the only source of growth during the last period were gains in labor productivity, but this also saw a marked decline, falling from 2.2 percent in 1983–91 to only 1.3 percent in 1991–98.

All three components underpinning labor productivity – human capital accumulation, physical capital accumulation, and total factor productivity – contributed to its decline: the growth contribution of both labor quality improvements and capital deepening saw a continued slide, illustrating that on their own, these engines of growth in earlier decades are running out of steam. Meanwhile, total factor productivity, which had seen a considerable improvement from

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<sup>17</sup> On a conceptual level, neoclassical growth accounting for example typically assumes that returns to scale are constant, while new growth theories question this assumption and allow for increasing returns to scale. Consequently, part of the TFP growth considered to be the result of technical change in neoclassical models could in fact be the result of increasing returns to scale, thus diminishing the growth contribution of technology. On a practical level, the choice of price deflators for capital inputs can have a considerable impact on the size of the residual that is considered to represent TFP growth. Thus, there is no consensus on the "correct" measurement of TFP growth and hence the exact magnitude of its contribution to overall growth.

–0.3 percent in 1973–83 to 0.4 percent in 1983–91, stalled in 1991–98, seeing no increase at all.

Japan’s TFP performance during the 1990s is particularly disappointing when seen against that achieved by the United States. The growth decomposition provided in table 3, based on an approach comparable to that underlying table 2, shows that in contrast with the stagnation seen in Japan, TFP growth in the U.S. actually accelerated during the second half of the 1990s.<sup>18</sup> What is more, along with accelerating TFP growth, the United States also enjoyed an expansion in the growth contribution of capital deepening, suggesting that TFP has played a, potentially substantial, part in sustaining the rate of return to capital.

Insert tables 2 and 3

#### **4 Explaining Japan’s TFP performance**

Why has TFP growth in Japan stalled during the 1990s? Total factor productivity is primarily a microeconomic issue that depends on factors such as the adoption and spread of technologies and best practice that in turn depend on industry structures, the degree of competition, R&D efforts and innovative capabilities, etc. To get to the bottom of Japan’s disappointing performance, it is helpful to have a closer look at individual sectors and the factors that have inhibited TFP growth. The analysis shows that TFP performance has been quite uneven across industries and a key factor in holding back growth is the lack of competition found in a range of sectors across the economy. Yet, every cloud has a silver lining, and the good news is that if appropriate policies are put in place, Japan could embark on a catch up in the lagging sectors that could support sustained growth for years to come.

##### *Sectoral TFP performance*

The first aspect that stands out when examining sectoral TFP growth is the discrepancy between the performance of the manufacturing sector and the rest of the economy (see figure 4). The manufacturing sector achieved quite respectable rates of TFP growth during the 1970s and 1980s and its contribution far outweighed that of any of the other sectors. However, TFP growth in the manufacturing stalled during the 1990s. In contrast, the performance of the service sector throughout the entire period was rather mixed, though it was services, or rather a few select industries in the sector, that made a positive TFP contribution during the 1990s.

This positive contribution was almost entirely due to only two sectors (as well as imputed rent): communication & broadcasting and wholesale & retail, both of which saw accelerated TFP growth during the 1990s when compared with the 1980s. The performance of the communication & broadcasting sector comes as little surprise as this has in recent years been one of the most dynamic industries in Japan. In contrast, the sizeable contribution to TFP growth by the wholesale & retail sector is more astonishing, especially since this sector is often singled out as a key area in which productivity lags far behind that found in other

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<sup>18</sup> While not strictly comparable due to some differences in measurement, the two growth decompositions follow broadly similar methodologies. Details on the estimation procedures employed can be found in Fukao *et al.* (2003) for the Japanese case and in Jorgenson and Motohashi (2003) for the American case.

countries.<sup>19</sup> Another area that also enjoyed positive TFP growth, though on a considerably smaller scale, was the broad category of finance, insurance & real estate.

Looking at the industries that have been driving TFP growth in the manufacturing sector, it comes as no surprise to find the electrical machinery/electronics sector in the lead; yet even in this, arguably Japan's most competitive industry, TFP growth fell substantially during the 1990s (see figure 5). TFP growth in Japan's two other major export industries, transportation machinery and general & precision machinery, in contrast, was already comparatively low during the 1980s and in fact turned negative during the 1990s. TFP growth also slowed markedly in the chemical industries, which in the 1980s had trailed only the electrical machinery industry in terms of TFP growth. Most other manufacturing industries – such as food processing, textiles, petroleum & coal products – had registered hardly any or even negative TFP growth between 1973 and 1991 and saw a decline during 1991–98.

Insert figures 4 and 5

What explains the diverging patterns of TFP growth? An important determinant appears to be the degree to which firms in each sector are exposed to domestic and international competition. Historically, the sectors with the highest TFP growth rates have also been the most export-oriented ones such as the electrical machinery industry, the general and precision machinery industry, and the car industry (though TFP growth in the latter was already rather unimpressive during the 1980s). In contrast, industries serving primarily the domestic market – such as food processing or textiles in the manufacturing sector or utilities (electricity, gas & water), transportation, business services or public services in the service sector – over the past thirty years have seen virtually no TFP improvements and in many cases even a deterioration. The notable exceptions are telecommunications & broadcasting, wholesale & retail, and, to a lesser degree, finance & insurance, which saw positive TFP growth during the 1990s, and it is probably no coincidence that these sectors were at the center of the government's liberalization efforts during that decade.

In fact, the telecommunications, wholesale and finance & insurance sectors also performed quite strongly when viewed in an international context (table 4). Comparing average TFP growth in these sectors during the 1990s, Japan actually comes out ahead of the United States and Australia. Therefore, what is dragging down Japan's overall TFP are the “domestic” industries where government regulations continue to stifle competition, such as transportation, construction, entertainment, and utilities. All of these sectors showed marked decreases in productivity, so that the country's overall average TFP growth rate during the 1990s was only half of that of the United States or Australia.

Insert table 4

The upshot of low TFP growth is that Japan's labor productivity – i.e. the amount of output generated by a unit of labor input – has fallen considerably behind that of comparable countries. Though Japan does boast a number of highly competitive export industries, where labor productivity is about 20 percent higher than the average productivity level in the United States, these account for only 10 percent of Japanese employment. The remaining 90 percent of the workforce, in contrast, are employed in domestic manufacturing and services, where productivity is only 63 percent of the level recorded in the United States. As a result of this “dual structure,” where highly competitive export industries operate alongside uncompetitive

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<sup>19</sup> See, e.g., McKinsey Global Institute (2000) and Høj and Wise (2004).

domestic manufacturing and service industries, overall labor productivity in the Japanese economy is only 69 percent of the U.S. level.<sup>20</sup>

### *Explaining low productivity*

The dual structure of the Japanese economy is not a particularly new phenomenon. In fact, it has existed throughout the postwar period; but while the Japanese economy was still performing strongly, the low productivity of the domestic sector did not seem to matter much as long as the prowess of the export industries was raising living standards overall. However, since the economy stalled, and even showcase industries succumbed to faltering growth rates and/or moved production overseas, raising productivity in the domestic sectors has become a key factor in restoring Japan's economic growth. At the same time, even the export-oriented industries have lost some of their shine.

Reasons for the low productivity in many of the domestic industries are not difficult to find. First, by definition, these have been sheltered to varying degrees from international competition. In the food processing industry, for example, few Japanese firms export overseas, while imports are frequently stifled by tariff barriers, and exposure to global best practice is limited as food giants such as Nestlé have been confined to niche markets.<sup>21</sup> Exposure to international competition and best practice is also limited or non-existent in the service sector. For example, in the construction & civil engineering sector, the retail sector, and the wholesale sector, combined purchases from abroad and from foreign firms operating in Japan accounted for only 0.5 to 4.9 percent of overall sales in these sectors. In contrast, the corresponding figures for the United States range from 3.0 to 17.8 percent.<sup>22</sup>

The second reason for the low productivity of the domestic sectors is the low degree of competition more generally, of which the lack of foreign competition is only one manifestation. In many of these sectors, few companies enter or exit the market and the market shares of the leading companies remain comparatively stable over the years. Regulatory policies typically play a large role in blunting competition, leading to sub-scale operators and weak product offerings. A widely cited example is that of the retail sector, where the Large Scale Retail (Location) Law has limited the entry of large-scale retailers and protected traditional family-owned stores with only two or three employees.<sup>23</sup> As a result, the latter still account for 55 percent of retail employment, compared with 19 percent in the U.S. and 26 percent in France. The fragmentation of the retail sector, in turn, has been blamed as one of the factors holding back the food processing industry which, in the absence of national markets for many of its products, has seen little pressure to consolidate and increase the scale of operations. As a result, labor productivity in these two sectors, which together account for approximately 10 percent of GDP and 14 percent of the workforce in Japan, is dismal: in the retail sector, it is estimated to be only half of the U.S. level, while in the food processing industry it is little more than a third.<sup>24</sup>

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<sup>20</sup> The figures are from McKinsey Global Institute (2000).

<sup>21</sup> McKinsey Global Institute (2000).

<sup>22</sup> Fukao and Ito (2003).

<sup>23</sup> McKinsey Global Institute (2000); Høj and Wise (2004). However, it should be noted that not all observers are disparaging of Japan's high retail density. Flath (2003), for example, cites a number of good economic reasons for the proliferation of retail outlets, though he, too, stresses the distorting effects of regulations limiting large-scale retail stores.

<sup>24</sup> McKinsey Global Institute (2000).

Further examples abound of sectors where government regulations either directly inhibit competition or fail to provide the necessary framework to stimulate it. While health care is a domestic sector in all countries, most other advanced economies allow at least some degree of competition in the markets for health insurance (i.e. between consumers and payers) and healthcare provision (between payers and providers and between consumers and providers). In Japan, competition is banned by law with the exception of the market between consumers and providers (i.e. clinics and hospitals), which, however, is distorted by government subsidies.<sup>25</sup> Government policies have also thwarted competition in the energy sector. In the electricity market, for example, at present no direct competition between utilities exists, though deregulation measures are now under way.<sup>26</sup> The list of sectors, in which government policies have been blamed for either stunting or failing to foster competition, continues, including residential construction, professional services, energy, and transportation, demonstrating the pervasiveness of the problem.<sup>27</sup>

What is more, the output of many of these sectors serves as an input for other sectors, meaning that low-productivity industries hold back the competitive parts of the economy. Thus, while labor costs certainly are one major factor why Japanese manufacturing firms have transferred production capacity overseas, another reason are the high overhead costs in Japan. These range from high transportation costs – important especially in the assembly industries which rely on just-in-time delivery – to high energy prices.<sup>28</sup> To provide one last example: in 2001 (the last year for which comparable international figures are available), electricity prices for industrial users in Japan were twice the OECD average.<sup>29</sup>

The third major reason for Japan's disappointing productivity performance is the low "metabolism" of the economy. This may be defined as the pace with which successful companies enjoying high productivity growth expand their market share, new firms enter the market, and uncompetitive existing ones exit. The dynamics driving productivity growth in a particular industry (or the economy as a whole) can be separated into five mechanisms or "effects":

- (1) the *within effect*, which occurs when increases in productivity within individual companies raise the productivity of the sector as a whole;
- (2) the *between effect*, which results when companies with above-average productivity levels increase their market share, thus raising the overall level of that industry's productivity;

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<sup>25</sup> McKinsey Global Institute (2000).

<sup>26</sup> First steps towards liberalization in the sector have already been taken, allowing, for example, manufacturers to generate electricity on-site. However, as the industry continues to be dominated by vertically integrated utilities controlling generation, transmission, distribution and retail supply and enjoying near monopolies in their respective regions, no genuine competition between different suppliers in the various segments has so far arisen. See Høj and Wise (2004).

<sup>27</sup> McKinsey Global Institute (2000); Høj and Wise (2004).

<sup>28</sup> According to METI (2000), Japanese overseas affiliates' labor costs in relation to sales in Europe were less than 70 per cent of those in Japan, and in Asia only 40 per cent. But what is more, in all major areas (i.e. North America, Asia, and Europe) transportation costs as well as R&D costs to sales were half of those in Japan or less.

<sup>29</sup> International Energy Agency, *Energy Prices & Taxes*, 4<sup>th</sup> Quarter 2003. Whereas industrial users in Japan paid 12.7 US cents/kWh, the OECD average was 6.3 cents. Electricity prices in major competitor countries were even lower: United States – 5.0 cents (excluding taxes, however); Germany – 4.4 cents; France – 3.5 cents; United Kingdom – 5.1 cents. Of course, there are other factors, apart from industry efficiency, that determine electricity price levels. Such factors may include the mix of energy sources (nuclear, coal, oil, etc.), import duties on fuels, and other government policies. However, it seems unlikely that these factors alone account for the substantially higher electricity prices in Japan.

- (3) the *covariance effect* refers to situations when companies with increasing productivity at the same time also raise their market share;
- (4) the *entry effect*, which occurs when firms with a productivity level that is higher than the industry average enter the market; and
- (5) the *exit effect*, which refers to the rise in the average productivity level of an industry resulting from the exit of firms with below-average productivity.

One indication of the low “metabolism” is that the market shares of leading companies in many Japanese sectors have remained relatively unchanged over the years. Looking, for example, at the retail market, there has been little change in the ranking of the top ten competitors in Japan over the fifteen-year period 1983–98 (table 5). Four of the top five retailers were the same in 1998 as in 1983, while only one company that was among the top ten in 1998 had not already been so in 1983. Compare this with the case of the United States, where in the shorter period 1983–93, the ranking changed quite dramatically. The top spot in 1993 was taken by a company (Wal-Mart) that had ranked only 17<sup>th</sup> ten years before, and two of the top ten had not been ranked at all in 1983. One possible interpretation of stable market shares such as these is that productivity growth must have been quite uniform across competitors. A more plausible explanation, however, is that more productive firms have found it difficult to expand market share and/or less productive ones have been able to hold on to theirs. In either case, the likely reason is a lack of competition as a result of regulatory or structural features of the economy.

Insert table 5

Stable market shares, moreover, are an indication of another, related problem: the low start-up rate of new businesses. Defined as the number of new establishments divided by the number of existing ones, Japan’s start-up rate has experienced a steady decline since the early postwar period,<sup>30</sup> so that by the early 1990s, at around 4 percent, it was less than half of the roughly 10 percent registered not only in the United States, but also in the European Union.<sup>31</sup> The gap between Japan and the United States widened even further during the 1990s, as did the closure rate (similarly defined as the number of closed establishments divided by the number of existing ones) (figure 6). The low rate of entry and exit of companies matters because it determines the speed with which healthy, successful businesses are separated from ailing ones, and hence the overall competitiveness and productivity of an industry and of the economy overall.

Insert figure 6

The problem of low and falling start-up rates is most pronounced in manufacturing industry, where from previously 6 percent they gradually declined to 3 percent during the 1970s and 1980s and then dropped further to less than 2 percent during the 1990s. This decline provides one important reason why TFP growth in this sector stalled during the 1990s. Examining TFP growth in Japan’s manufacturing sector during 1994–98 in terms of the five mechanisms outlined above shows that while the entry effect of new firms on TFP growth was indeed positive, its overall impact was in fact very small because the rate of new entries was so low. What is more, the exit effect – which normally raises average productivity because of the exit of non-productive firms – was actually negative, suggesting that non-productive firms were staying in the market, while those with higher productivity were exiting – the exact opposite

<sup>30</sup> Japan Small Business Research Institute (2003: 87, fig. 2-2-6).

<sup>31</sup> Executive summary of the 4th Report of the European Observatory for SMEs (1996) p.6, Figure 3. Available: [http://europa.eu.int/comm/enterprise/enterprise\\_policy/analysis/doc/eurob4en.pdf](http://europa.eu.int/comm/enterprise/enterprise_policy/analysis/doc/eurob4en.pdf) (18 August 2004).

of what should be happening under normal competitive circumstances. The other effects were as expected, though the reallocation effect (which is the sum of the between effect and the covariance effect described above) in Japan was much smaller than in the United States during the same period, while the within effect, which had made the largest contribution to TFP growth during 1994–96 turned negative during the subsequent recession.<sup>32</sup>

Though this is unlikely to be only the reason, one important factor contributing to the declining start-up rate and the negative exit effect seems to have been the problems in the banking sector. Settled with huge amounts of non-performing loans (NPLs), banks have been reluctant to extend loans to new start-ups, while at the same time keeping uncompetitive firms afloat. Given the lack of alternative sources of finance, such as American-style venture capital firms, potential entrepreneurs in Japan thus faced large difficulties in obtaining the funding necessary to set up new businesses.

In sum, it seems that productivity growth in Japan has been impeded by three major factors: the low or non-existent exposure to international competition in many sectors of the economy; insufficient domestic competition, often in the same “sheltered” sectors; and the low start-up rate of new business. As a result, productivity growth has considerably lagged behind that in other countries, especially the United States. But this productivity gap also holds a promise: If Japan were able to unleash competitive forces in the lagging sectors, the country could embark on a second catch-up, this time in the domestic sectors of the economy, that could be the source of another growth spurt

## **5 Raising Japan’s long-run rate of growth**

Having outlined the reasons for Japan’s disappointing growth performance in recent years, it is now possible to ask what role foreign direct investment can play in raising the country’s long-run rate of growth. It was suggested that given current population trends and low returns on capital, growth prospects crucially hinge on the ability to raise TFP growth. Moreover, it was argued that what is holding back TFP growth is a lack of competition and exposure to global best practice. The obvious way to raise TFP growth thus is to deregulate and to encourage more domestic and international competition. This, in fact, is what the Japanese government has started to do, for example, by liberalizing the financial and telecommunications sectors, and by encouraging foreign direct investment. Though many observers think that Japan’s deregulation record is at best mixed, the sectoral TFP estimates reported above indicate that where the government did deregulate, the results were substantial.<sup>33</sup>

The gains that could be achieved if Japan embarked on comprehensive deregulation are large. Studies trying to quantify the potential gain arrive at GDP increases of between 2.3 and 18.7 percent, with the OECD, MITI, and the Economic Planning Agency (EPA) all putting the figure at around 6 percent.<sup>34</sup> And McKinsey Global Institute (2000) estimates that if barriers to competition are removed, productivity can grow by 4.7 percent a year and per capita GDP by 4.0 a year for the next ten years. The EPA (1998) study is particularly revealing, because it shows how half of the productivity increase in telecoms and aviation during the period 1987–95 resulted from increased competition following the entry of a single new competitor in each industry.

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<sup>32</sup> The examination of the different effects can be found in Fukao and Kwon (2003).

<sup>33</sup> For a brief assessment of Japan’s deregulation program, see, e.g., Bergsten, Ito, and Noland (2001).

<sup>34</sup> The studies are reported in IMF (1998b: 161).



Foreign direct investment could contribute to an acceleration of growth in broadly two ways. The first is simply by creating or increasing competition in sectors that so far have seen little of it. In this context, the relative productivity level of foreign competitors would be of secondary importance – what matters is the erosion of monopoly rents. The second way in which foreign firms could contribute is through higher productivity. If foreign firms indeed enjoy higher TFP levels and growth than their Japanese counterparts, then the entry of foreign firms would contribute to a rise in overall productivity in Japan. Whether this is the case, and how foreign firms have contributed to TFP and TFP growth in Japan will be the subject of a subsequent paper.

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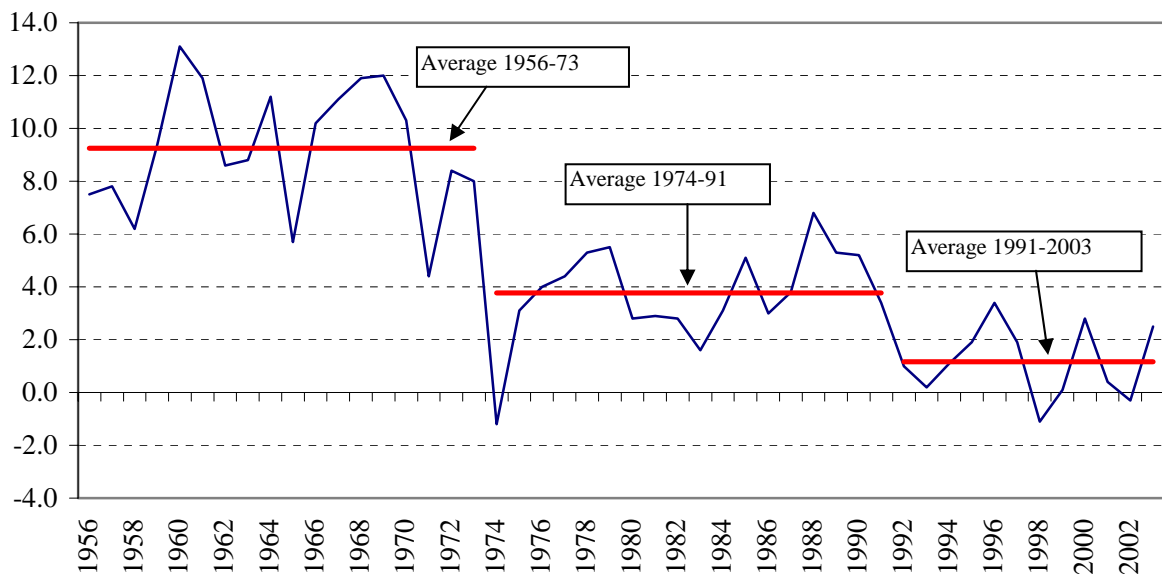
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## Figures and tables

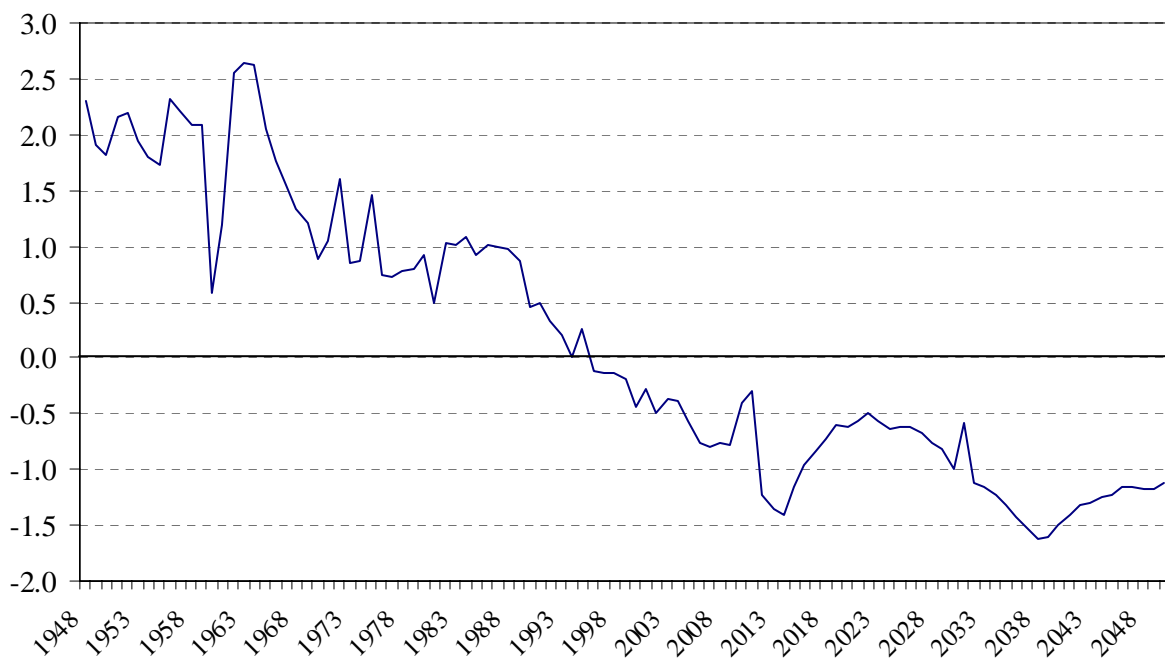
**Figure 1: Japan's real GDP growth, 1956–2003**



Source: National Accounts.

Note: The growth rates for 1956-1980 are based on 68SNA, while those for 1981-2003 are based on 93SNA.

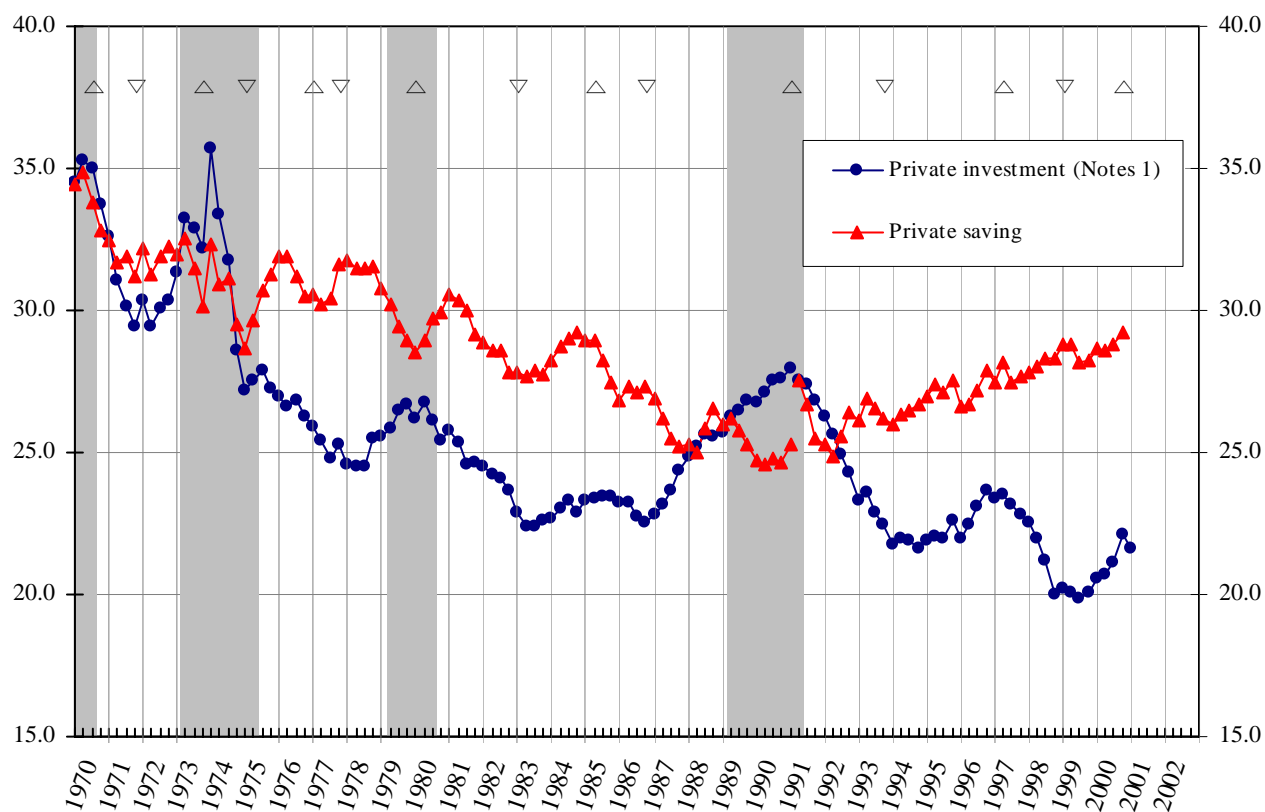
**Figure 2: Annual change in Japan's working age population, 1948-2050**



Sources: For 1948–2000: Statistics Bureau, 'Population Estimates of Japan 1920-2000,' online: <http://www.stat.go.jp/english/data/jinsui/wagakuni/index.htm>; for 2001–2003: Statistics Bureau, 'Current Population Estimates,' (2002; 2003), online: <http://www.stat.go.jp/english/data/jinsui/2.htm>; for 2004–2050: National Institute of Population and Social Security Research, 'Population Projections for Japan,' online: [http://www.ipss.go.jp/English/ppfj02/t\\_3\\_e.html](http://www.ipss.go.jp/English/ppfj02/t_3_e.html).

Note: The working age population is defined as those aged between 15 and 64.

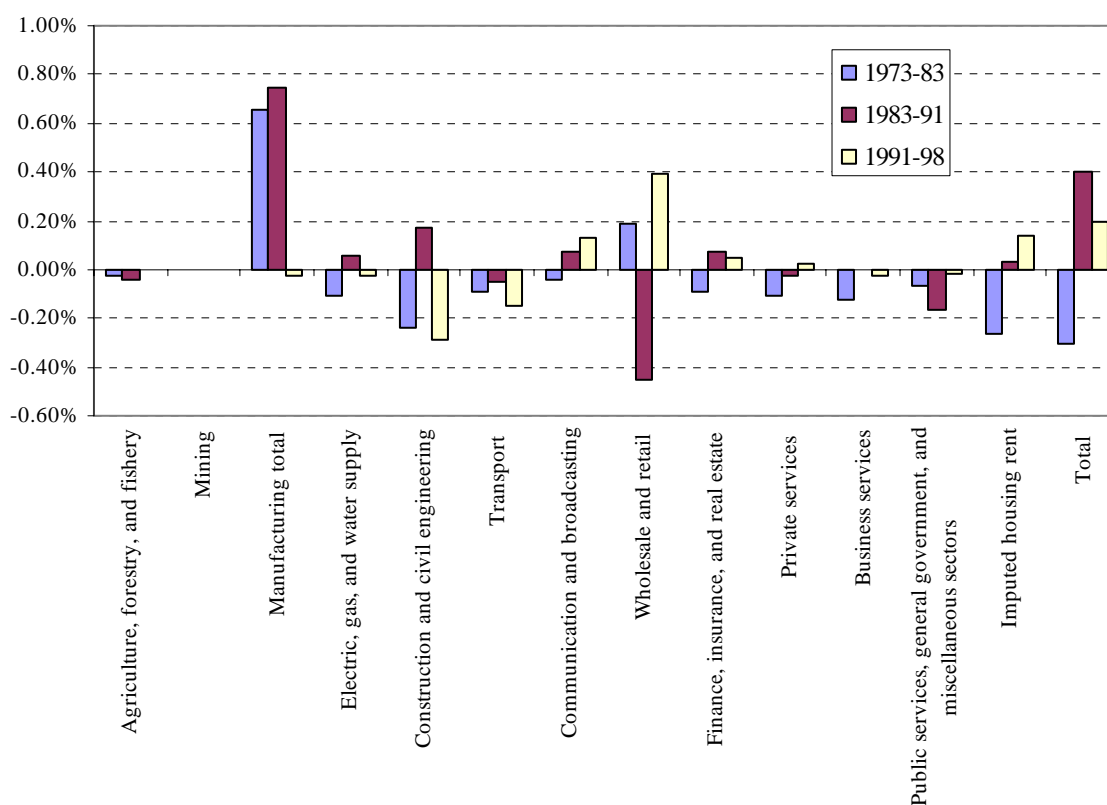
**Figure 3: Private investment and saving as a percentage of GDP, 1970–2000**



Source: 'Major Economic and Financial Statistics CD-ROM, 2003 Data Published by the Bank of Japan,' Tokiwa General Service, 2004.

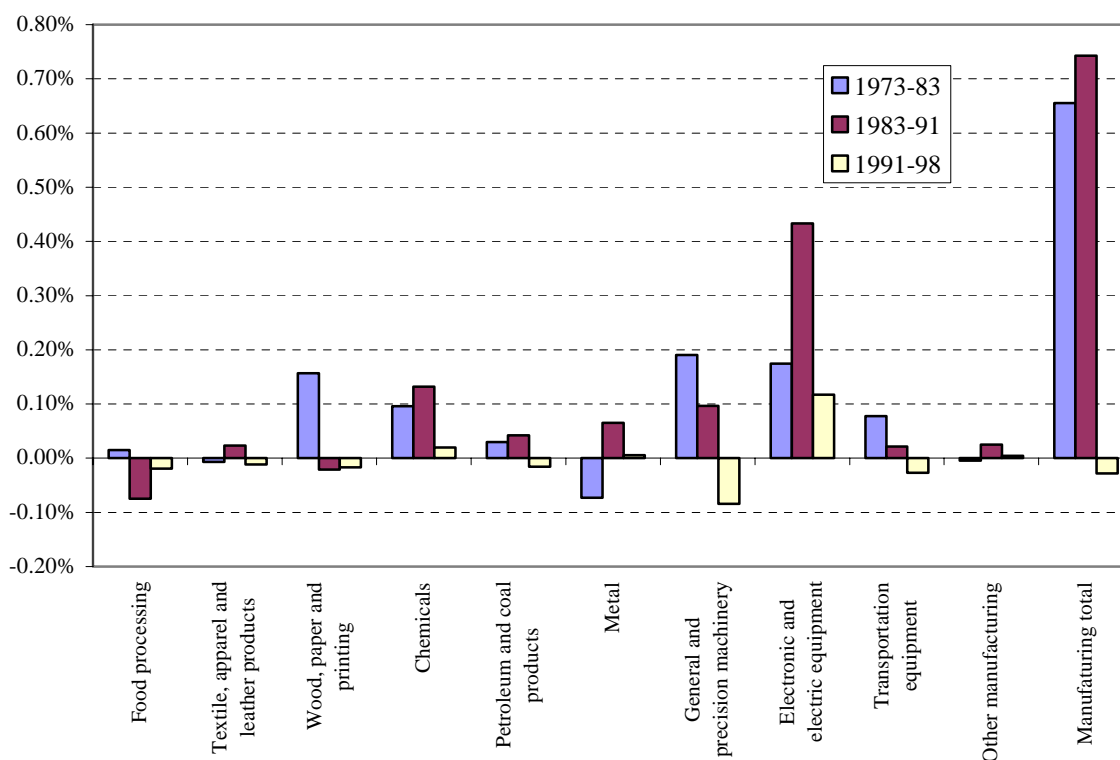
- Notes:
1. Private investment (including public corporations) = Fixed capital formation + Changes in inventories (excluding general government).
  2. Private savings = Private investment + Private surplus, where Private surplus = Net exports of goods and services + General govt. deficit.
  3. General government deficit and private savings in 1998 exclude the capital transfer from the general government to the nonfinancial sector, which is generated by taking over the debt from the Special Account for National Forest Service (about 24,163 billion yen), and the Japan National Railways Settlement (about 2,842 billion yen) to General Accounts. For reference, the nominal GDP for fiscal 1998 was 513.2 trillion yen (93SNA basis).
  4. Data until 91/1Q = 68SNA basis, data from 91/2Q = 93SNA basis

**Figure 4: Contribution to TFP growth, by industry**



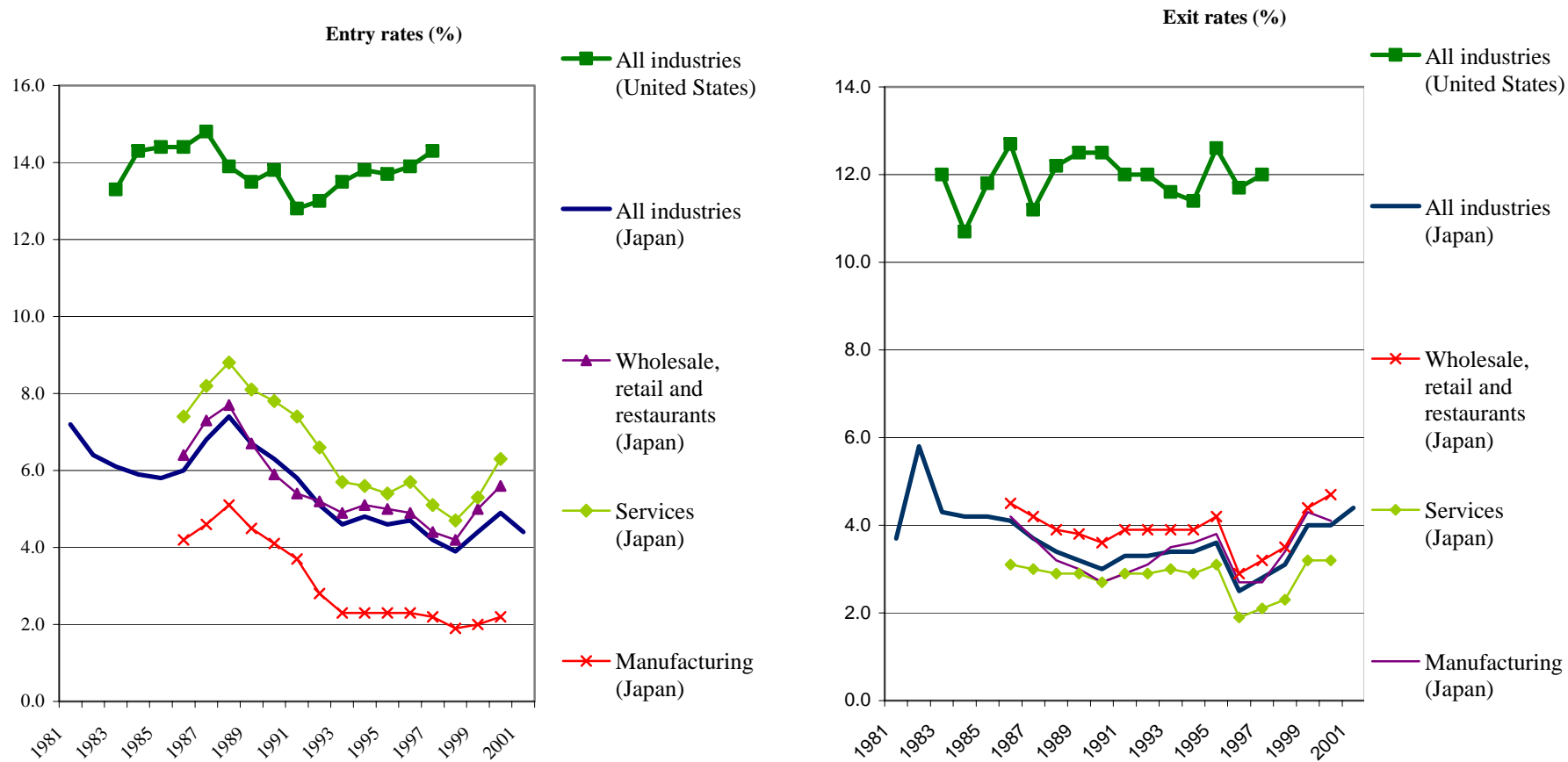
Source: Fukao and Kwon (2003).

**Figure 5: Contribution to TFP growth in the manufacturing sector, by industry**



Source: Fukao and Kwon (2003).

**Figure 6: Contribution to TFP growth in the manufacturing sector, by industry**



Source: Fukao et al. (2003).



**Table 1: GDP growth and the contribution of technical change and human capital**  
(Average annual growth rates, in percent)

		United States	Japan	Germany	France	United Kingdom
GDP	1970-1980	3.2	4.4	2.7	3.3	1.9
	1980-1990	3.2	4.1	2.2	2.4	2.7
	1990-2000	3.2	1.3	1.6	1.8	2.3
	1996-2000	4.2	0.7	2	2.9	2.9
GDP per capita	1970-1980	2.1	3.3	2.6	2.7	1.8
	1980-1990	2.2	3.5	2	1.8	2.5
	1990-2000	2.2	1.1	1.3	1.4	1.9
	1996-2000	3.3	0.5	2	2.6	2.4
Technical change & human capital	1980-1985	0.82	1.92	1.16	2.02	...
	1985-1990	1.03	2.38	1.82	1.71	1.01
	1990-1995	0.96	1.24	1.05	0.93	0.66
	1995-2000	1.31	0.74	0.84	1.09	0.96

Source: OECD (2003), *The Sources of Economic Growth in OECD Countries*, tables 1.1 and 1.3.

**Table 2: Japan's growth performance, 1973-98 (in percent)**

	1973-83	1983-91	1991-98
Real GDP Growth	3.6	3.9	1.3
Man-hour growth	1.5	1.8	-0.1
Labor productivity	2	2.2	1.3
Contribution of labor quality	0.7	0.5	0.2
Contribution of capital deepening	1.7	1.3	1.1
Contribution of TFP	-0.3	0.4	0.0

Source: Fukao *et al.* (2003).

Note: Figures do not add up due to rounding.

**Table 3: U.S. growth performance, 1973-2000 (in percent)**

	1973-95	1995-2000
Real GDP Growth	2.8	4.1
Man-hour growth	1.4	2
Labor productivity	1.3	2.1
Contribution of labor quality	0.3	0.2
Contribution of capital deepening	0.8	1.2
Contribution of TFP	0.3	0.6

Source: : Jorgenson *et al.* (2003).

Note: Figures do not add up due to rounding.

**Table 4: International comparison of TFP growth in the service sector**  
(Average annual rate, in percent)

	Australia 1993-2000	U.S. 1990-1999	Japan 1990-98
Electricity, gas and water	1.6	1.0	-0.1
Construction	1.1	-0.7	-3.8
Wholesale	5.2	3.6	5.1
Retail	1.1	2.0	0.4
Restaurants	0.3	n.a.	1.6
Transportation	1.8	2.3	-3.0
Communication	4.0	2.4	6.0
Finance and insurance	1.2	1.5	1.8
Entertainment	-3.7	0.5	-4.5
Service sector average	2.2	1.8	0.9

*Source:* Fukao *et al.* (2003). The original data are from McLachlan, Clark and Monday (2002) for Australia, Yoshikawa and Matsumoto (2001) for the U.S., and Fukao *et al.* (2003) for Japan.

*Note:* TFP is calculated on a value-added basis. The service sector averages are calculated using the industry TFP growth rates in the table weighted by the value-added share of each industry in Japan.

**Table 5: Ranking of top retailers in Japan and the United States**

Japan			United States		
1983	1998		1983	1993	
1	1	Daiei	17	1	Wal-Mart Stores
2	2	Ito-Yokado	1	2	Sears Roebuck
4	3	Jusco	2	3	K-Mart
5	4	Mycal	12	4	Dayton Hudson
7	5	Takashimaya	5	5	J.C. Penney
3	6	Seiyu	-	6	Home Depot
10	7	Uni	4	7	Kroger
6	8	Mitsukoshi	3	8	Safeway
9	9	Seibu	-	9	Costco
13	10	Marui	9	10	American Stores

*Source:* McKinsey Global Institute (2000).