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INTERNATIONAL MONETARY FUND

JAPAN

Background Papers

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Approved by the Central Asia Department

August 25, 1995

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I. The Yen from a Long-Run Perspective

1. Introduction

After depreciating during 1989-90, the yen has appreciated considerably since 1991. The real effective appreciation (based on consumer price indices) was initially moderate, averaging 5 1/2 percent annually in 1991-92, before accelerating sharply to 16 percent in 1993, and a further 7 percent in 1994. Starting in late February this year, the yen began to strengthen rapidly again, jumping up by 6 percent in real effective terms during March and another 7 percent in April. Since the trough in 1990, there has been a cumulative increase in the real value of the yen of 60 percent, leaving it 33 percent above its previous peak in 1988.

This chapter analyzes the recent movements of the yen from a long-run perspective. It is organized as follows. Section 2 reviews the movements in the real value of the yen during the post-war period. Movements in the CPI- and WPI-based real exchange rate are shown to be characterized by transitory deviations around stable time trends, while the prices of Japanese exports relative to those of partner countries have fluctuated around a stable mean level since the mid-1960s.

Section 3 discusses potential explanations for the secular real appreciation of the yen. The evidence suggests that this appreciation can not be explained by Japan's trade surplus or the associated buildup of the stock of net foreign assets. Instead, the explanation lies in differential rates of productivity growth between the traded and non-traded sectors in Japan relative to trading partners. A framework based on these productivity growth differences is then used to explain how export competitiveness was maintained, or even improved, despite the secular real appreciation of the yen based on consumer and wholesale prices.

Section 4 assesses the potential contribution of several factors in the recent appreciation of the yen relative to trend: (i) the decline in aggregate demand that led to the recession since 1991; (ii) the stance of monetary policy; (iii) portfolio effects; and (iv) trade frictions and negotiations between the United States and Japan. While some of these factors may have contributed to short-term yen appreciation, they do not suggest a permanent shift in the long-run level of the real exchange rate.

Section 5 examines the implications of the current exchange rate and the market's forecast of its future movements for internal and external balance in the medium term. The exercise suggests that the current market forecast path for the exchange rate will yield a substantially lower current account surplus in the medium term than that indicated by projected savings and investment patterns. There is, therefore, an inherent tension between the medium-term achievement of internal and external balance on the one hand, and the market's forecast of the path of the yen on the other. The adjustment in the exchange rate necessary to attain internal and external balance in the medium term is estimated to be substantial.

2. Recent developments in a historical context

Chart I.1 displays annual data on the real value of the yen based on consumer prices, wholesale prices, and relative export unit values over the last 45 years.

Consider first the behavior of the real exchange rate based on consumer prices. The data clearly display a deterministic trend in that the real exchange rate fluctuates around a fixed trend line. The estimated trend real value of the yen has risen at an annual rate of 3.1 percent a year over the last 45 years. A notable feature of the trend in the CPI-based rate is its stability across the fixed- and floating-rate periods, even though the underlying behavior of nominal exchange rates and price levels has been quite different in the two periods (Chart I.2). During the fixed-rate period, the nominal effective exchange rate was essentially unchanged, while CPI inflation in Japan exceeded that in its major trading partners--averaging 5 percent a year during 1951-71, compared with 2.8 percent in the other major industrial countries. So the yen appreciated in real terms by the inflation differential. In the floating-rate period, the nominal effective exchange rate appreciated consistently, while the inflation differential between Japan and partner countries declined through 1977 and was subsequently reversed.

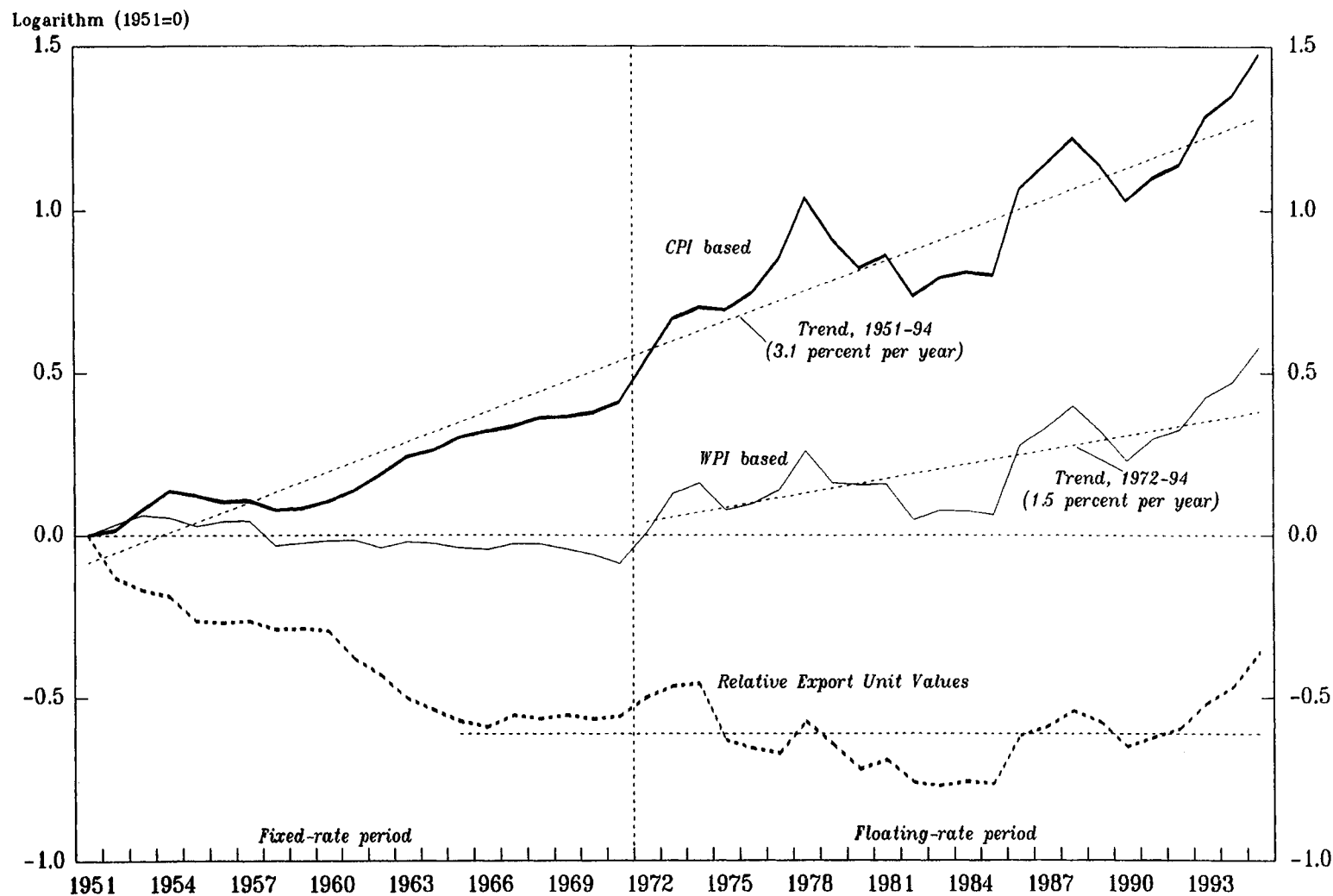
Chart I.1 shows that wholesale prices in Japan relative to those in other major industrial countries fluctuated in a very narrow band during the fixed-rate period of 1951-71. During the floating rate period the average WPI-based real exchange rate has trended upwards at 1.5 percent a year. The direction and extent by which the WPI-based real exchange rate has deviated from trend corresponds closely to deviations of the CPI-based real exchange rate from its trend.

Chart I.1 shows that the price of Japanese exports relative to those of its partners, as measured by relative export unit values, fell by over 60 percent during 1951-65. Since 1965, there is no apparent trend, with short-run fluctuations around a mean level corresponding closely to deviations of the CPI- and WPI-based real exchange rates from trend. Japanese exporters were, therefore, able to improve competitiveness during 1951-65 and subsequently to maintain competitiveness in the face of the substantial trend appreciation of the CPI- and WPI-based real exchange rates. The likely mechanism whereby this occurred is discussed in the next section. ^{1/}

The differential movements of the WPI in Japan and in other industrial countries have sometimes been interpreted as a measure of the deviations of

^{1/} A complete characterization of competitiveness, of course, requires a comparison of both prices and costs. A lack of long time series on unit labor costs prevents a comparison of costs, so the characterization of competitiveness is restricted to prices.

CHART 1.1
JAPAN
ALTERNATIVE MEASURES OF THE REAL EFFECTIVE EXCHANGE RATE, 1951-95^{1/ 2/}



Source: Staff estimates

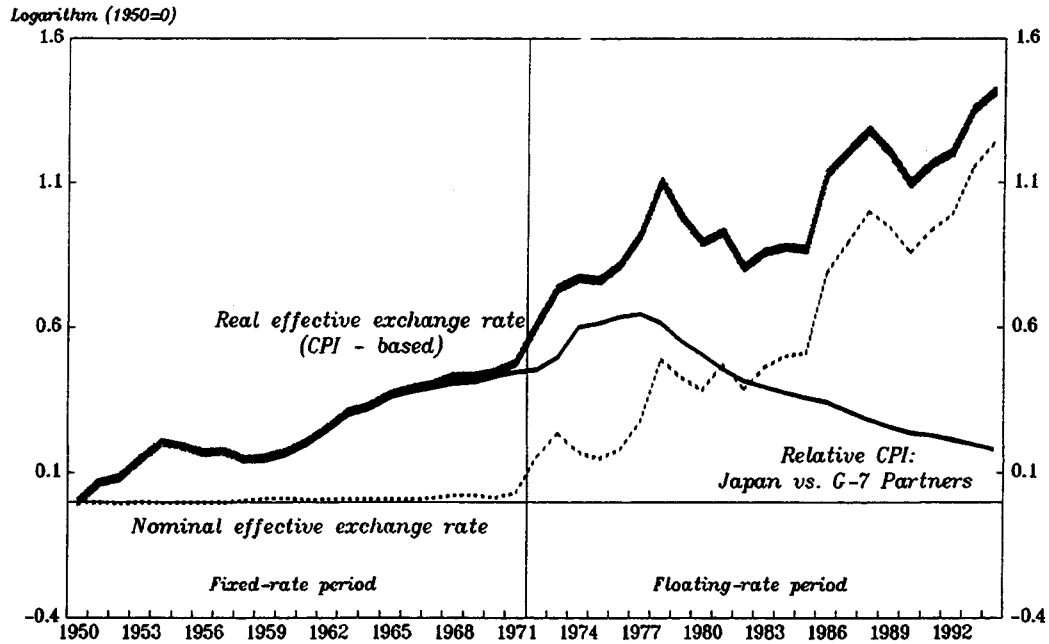
1/ CPI-based rate employs an average of G-7 partner countries; WPI-based rate employs an average of G-7 partner countries for which WPIs are available: US, GR, UK; relative export unit values are based on G-7 partner countries.

2/ 1995 data are staff estimates based on monthly exchange rates and prices for May.

CHART 1.2

JAPAN

DECOMPOSITION OF MOVEMENTS IN THE REAL EFFECTIVE EXCHANGE RATE



Source: Staff estimates.

the exchange rate from purchasing power parity. On this basis, using for example McKinnon's (1993) methodology, yields that the real exchange rate currently exceeds its long-run equilibrium by over 50 percent. As Chart I.1 indicates, however, there has been a systematic secular divergence between the WPI-based real exchange rate and relative export unit values. Since the WPI subsumes exportables, which represent about a third of the goods in the WPI, the systematic divergence between the two suggests that the remainder of the goods in the WPI represent products that are in fact differentiated from exports. To the extent that goods comprising the WPI are imperfect substitutes for tradeable goods in partner countries, there is no reason to expect that the prices of the two sets of goods would be equalized over time. This interpretation, which is the one adopted here, implies that the deviation of relative wholesale prices from long-run trend levels (22 percent) is substantially less than that implied by deviations from PPP.

3. Explaining long-term movements in the yen

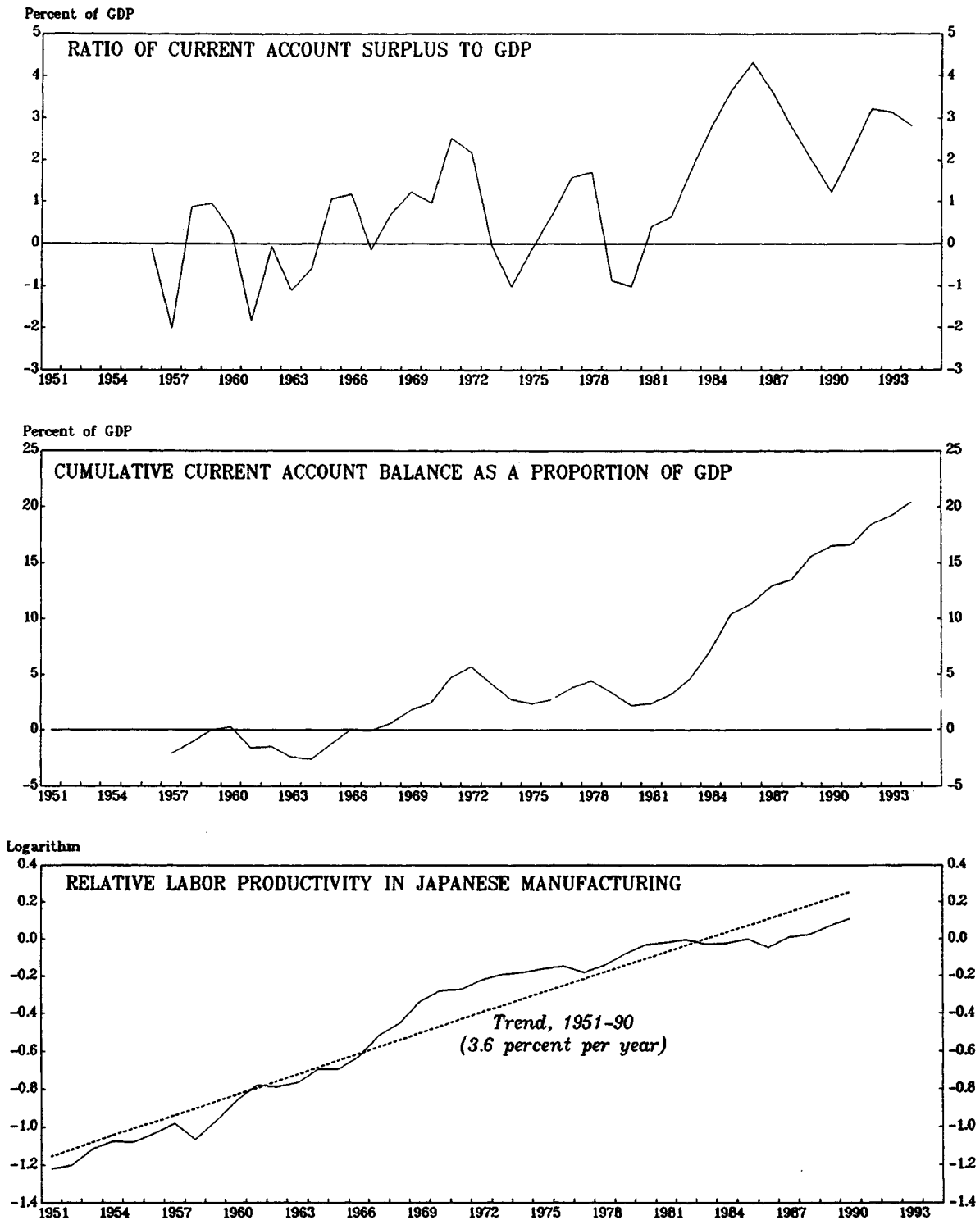
This section examines two potential explanations for the secular appreciation of the CPI- and WPI-based real exchange rates: the accumulation of net foreign assets by Japanese residents; and differential rates of productivity growth between the traded and non-traded goods sectors in Japan relative to its trading partners.

Chart I.3 displays data on the trade balance (top panel) and the cumulative current account balance (middle panel). It is evident that over the last 45 years, Japan's trade balance has shifted from periods of surplus to deficit independent of the long-run rise in the CPI-based or WPI-based real exchange rates. Thus, the secular appreciation of these real exchange rates can clearly not have been caused by the year-to-year developments in Japan's savings-investment balance. Similarly, note that the cumulative current account balance, which provides a measure of the build-up of the stock of net foreign assets (NFA) in the portfolios of Japanese residents, fluctuated around a relatively small average level of 3-4 percent of GDP until 1985. While the rapid rise of the stock of NFA after 1985 may have created systematic pressures for the yen to appreciate in real terms, the behavior of the stock of NFA is incapable of explaining the secular appreciation of the yen during 1951-85. Since the early 1980s, when capital controls in Japan were relaxed, it is possible that the stock of NFA has become a more important determinant of exchange rates because of portfolio balance effects. The behavior of NFA, however, is incapable of explaining the steady secular appreciation of the real exchange rate during the post-war period as a whole.

The classic framework for explaining secular movements of real exchange rates is a model of differential productivity growth across the traded and nontraded goods sectors in the tradition of Balassa (1964). The fact that there has been a secular appreciation of the CPI- and WPI-based real exchange rates, but not in relative export prices, implies that Japan's export prices have fallen relative to overall prices at a faster rate than

CHART 1.3

JAPAN
THE CURRENT ACCOUNT, NET FOREIGN ASSETS, AND PRODUCTIVITY



Source: Nikkei Telecom and staff estimates.

in partner countries (Chart I.4, first panel). For such a secular decline in the price of exports relative to overall prices to have been sustained, productivity growth in export industries must have exceeded that in other industries. This is a difficult proposition to test directly, however, because of a lack of availability of data on factor inputs into export industries as distinct from other industries.

The data on productivity that are available (and comparable) across countries relate to labor productivity in the manufacturing sector. The behavior of average labor productivity in the manufacturing sector of Japan relative to a trade-weighted measure of productivity levels in the other industrial countries is presented in Chart I.3 (bottom panel). There is a clear secular pattern, with productivity growth in Japanese manufacturing consistently outpacing that in other industrial countries by, on average, 3.6 percent per year during the post-war period. In the following, the observed differential in productivity growth across manufacturing sectors is taken as indicative of a greater differential of productivity growth between the traded and nontraded goods sectors in Japan than that in the other industrial countries.

As discussed previously, the relative price of Japanese exports declined until the early 1970s and then remained relatively stable--so export price competitiveness first improved and was then maintained. ^{1/}McKinnon (1993) shows that during the fixed-rate period, nominal wages in Japan and its trading partners tracked the relative productivity differential well. As a result, while nominal wages in Japanese traded-goods sectors grew faster than in partner countries, relative unit labor costs were stable. Competitiveness in traded goods was, therefore, maintained, both in terms of prices and costs. Higher nominal wage growth in Japanese traded-goods sectors that accompanied higher productivity growth, however, spilled over to the rest of the economy and, in particular, to the services and other nontraded goods sectors. Since services and other nontraded goods are a significant component of the CPI but a smaller component of the WPI, the Japanese CPI could be expected to rise relative to the WPI. If the productivity differential between traded and nontraded goods in Japan consistently exceeds that in its partner countries, a secular appreciation of the Japanese real exchange rate, as measured by either CPIs or WPIs, should be expected, with a higher trend in the CPI rate. This is exactly as occurred. Chart I.4 (second panel) shows that growth of the CPI in Japan has far outpaced that in the WPI.

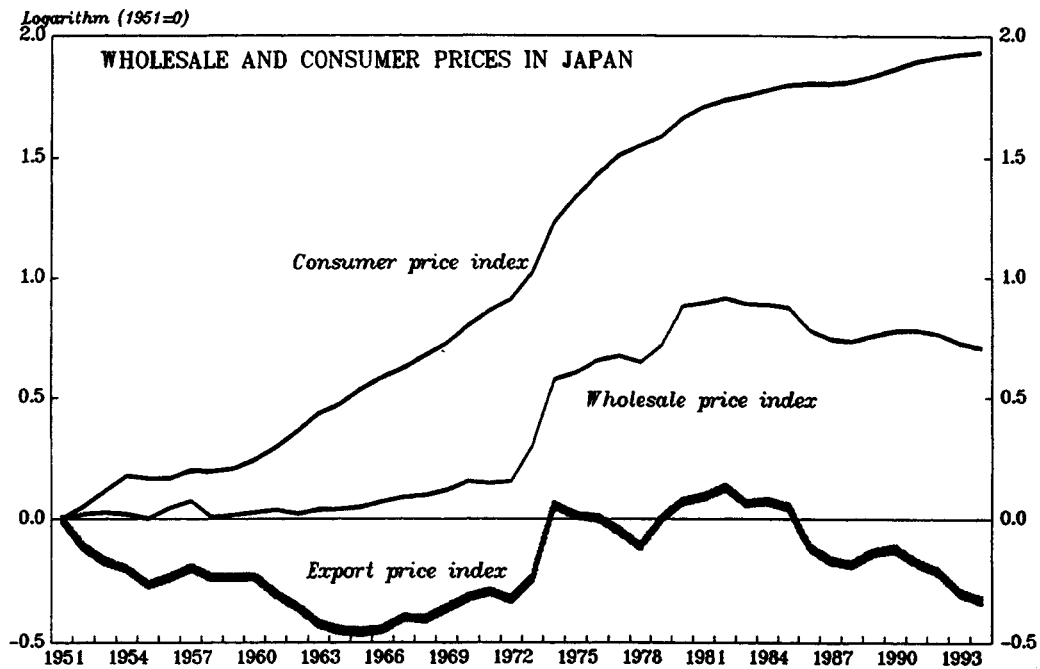
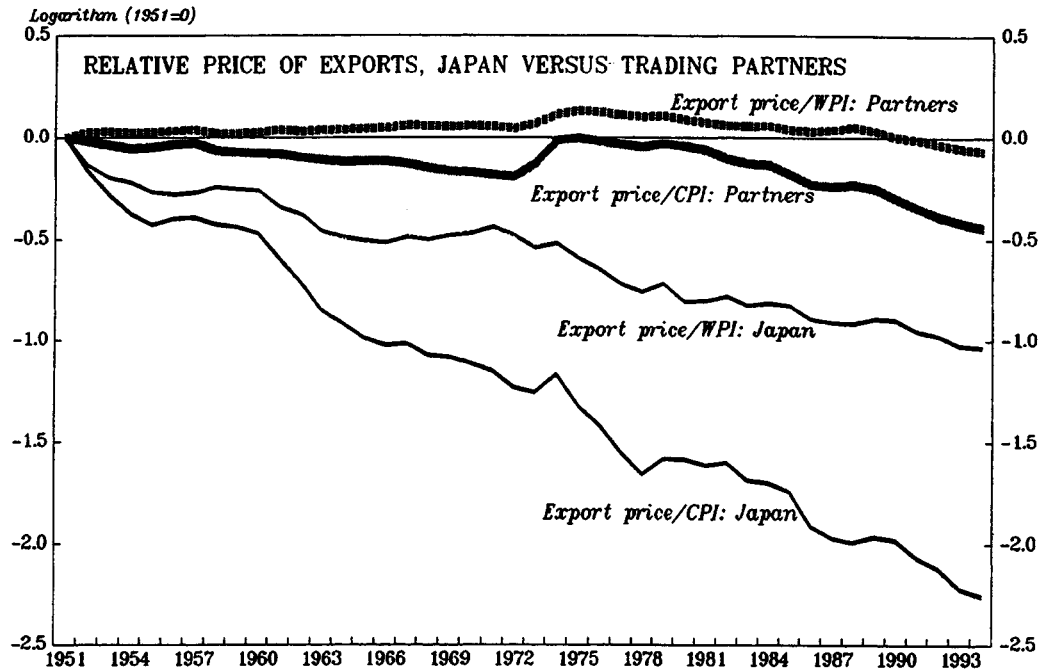
During the floating-rate period the mix between price and exchange rate movements was quite different. Under a regime of floating exchange rates,

^{1/} Chart I.3 also indicates that along with the worldwide productivity growth slowdown in the early 1970s, the differential between productivity growth in Japan and the other industrial countries also moderated. A narrowing of this differential is consistent with breaks in the trends in the alternative measures of the real exchange rate at around this time.

CHART 1.4

JAPAN

CONSUMER, WHOLESALE AND EXPORT PRICE MOVEMENTS, 1951 - 1994



Sources: Nikkei Telecom; and staff estimates.

this mix is determined by the relative stance of monetary policies, which varied considerably during this period. In addition, in examining the data, a number of special factors, such as the oil price shocks of the 1970s, the removal of capital controls in Japan in the early 1980s, and changes in the product mix, all affected price levels and exchange rates. In any event, the secular appreciation of the CPI-based real exchange rate has continued during this period, while the competitiveness of Japanese exporters, at least as measured by relative export unit values, appears to have been maintained.

4. The recent appreciation of the yen and possible explanations

While the real exchange rate, based on either the CPI or WPI, appreciated steadily since early 1990, it remained below trend during 1991 and 1992 (Chart I.5, first panel). It is only in 1993-94 that it appreciated above trend. The sharp appreciation of the yen during March and April of 1995 has brought both the CPI- and WPI-based rates to some 22 percent above their trends. 1/ The prices of Japanese exports relative to partner countries are 28 percent above their historical average level. 2/

This section appraises the role of several factors in influencing the recent behavior of the yen. These include: (i) the decline in aggregate demand associated with the recession; (ii) the stance of monetary policy; (iii) portfolio effects; and (iv) the trade frictions and negotiations between Japan and the United States. Of course, these factors are not mutually exclusive in their effects on the yen. It is likely that they all played some role, albeit to different degrees at various points in time, during the last four years. The question is whether they can singly or jointly explain the recent appreciation of the yen.

a. Aggregate demand and the recession

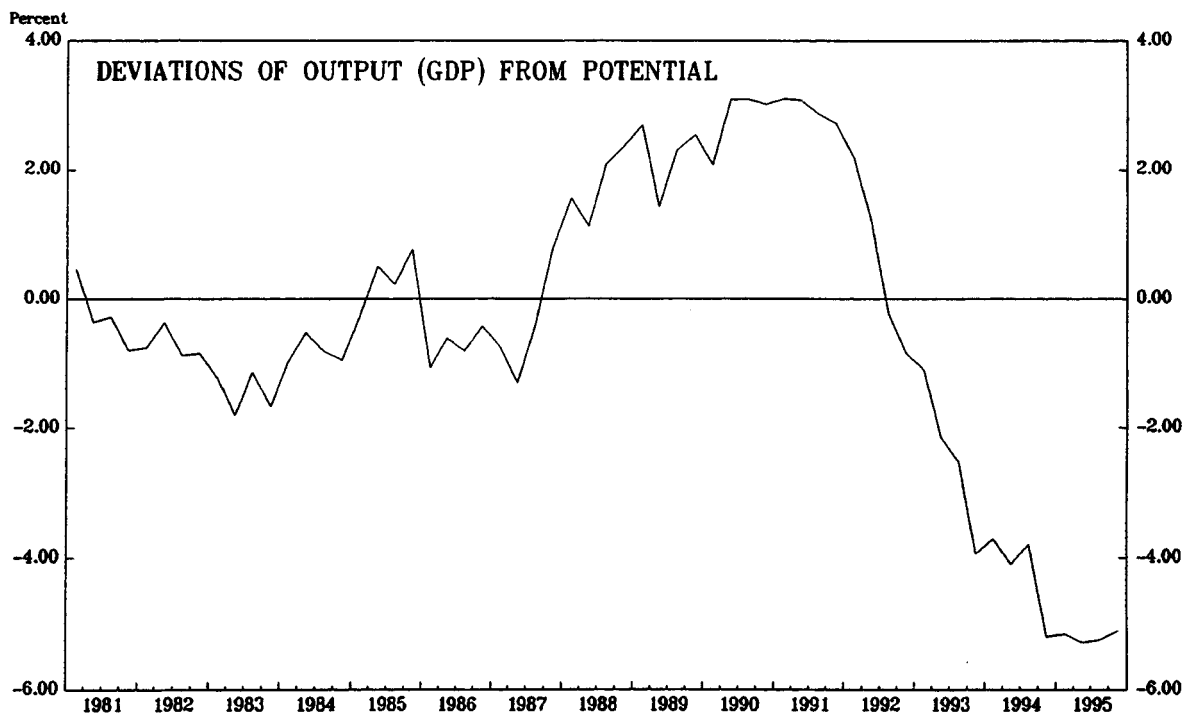
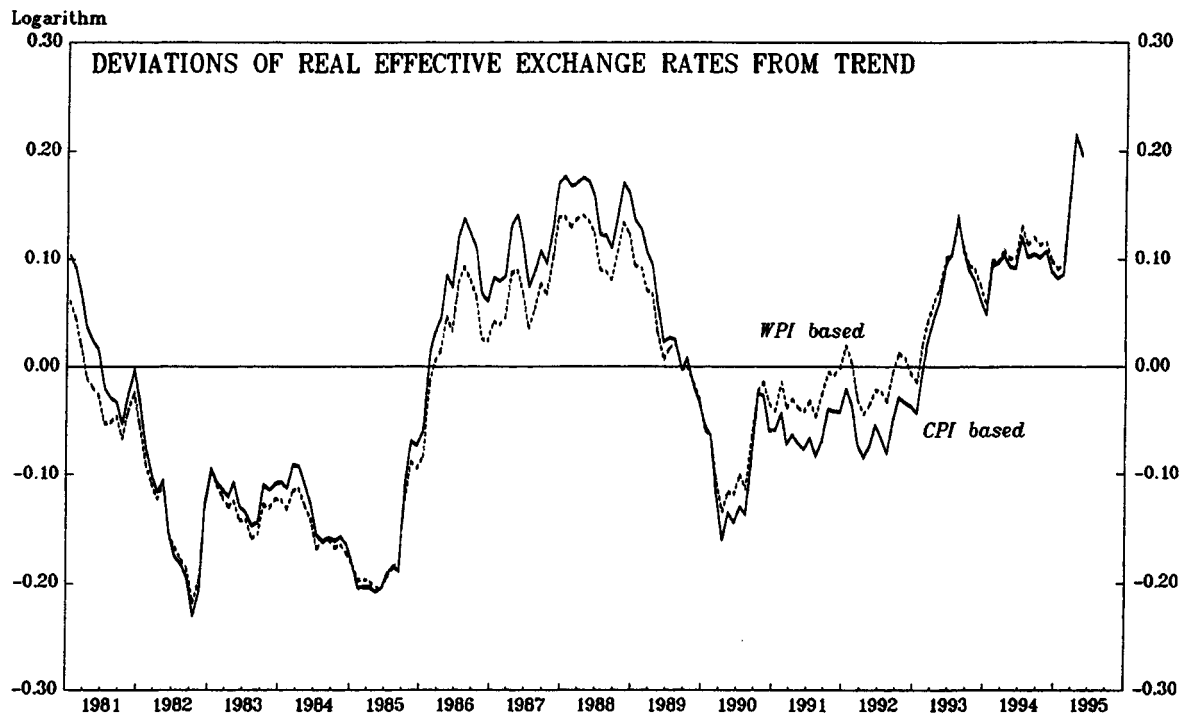
The current recession in Japan is the deepest and longest since the early 1970s. Until the third quarter of 1994, GDP had remained below its level at the end of 1991, while potential output is estimated to have grown at 2 3/4 percent a year, creating a large output gap (Chart I.5, second panel). There is a consensus that the recession was led by a contraction in

1/ It is perhaps worth noting that large as these deviations are, they are still less than estimates of the deviation of the real effective value of the U.S. dollar from its trend during 1985--of over 35 percent.

2/ In recent years there has been a shift in Japan's exports to higher-priced goods. This is most evident in the exports of automobiles where the proportion of luxury cars has increased. The magnitude of the recent increase in Japanese relative export unit values, therefore, may overstate the decline in competitiveness of Japanese exports. To minimize the possibility of such effects, the Bank of Japan export price index--which attempts to correct for such changes--was employed from 1972 onwards. For changes in the composition of Japanese exports see, for example, Ito (1992).

CHART 1.5

JAPAN
THE REAL EXCHANGE RATE AND THE BUSINESS CYCLE



Source: Staff estimates.

aggregate demand. 1/ The traditional Mundell-Fleming model in which capital is mobile predicts that contractions in private consumption and investment, due to declines in consumer and business confidence following the collapse of asset prices in Japan, should have led to a real depreciation of the yen in the short run. 2/ An autonomous temporary contraction in aggregate demand can be expected to lower domestic interest rates, leading to a capital outflow, and a depreciation of the real exchange rate on impact. Interest parity then implies that the decline in domestic interest rates translates to an expectation of future appreciation. That is, as aggregate demand recovers, and output returns to potential, the real exchange rate is expected to appreciate and return to trend. It is worth emphasizing that during the recession, the relatively depreciated exchange rate spurs net exports and ameliorates the decline in aggregate demand.

The real exchange rate fell below trend in 1990, even though output is not estimated to have fallen below potential until 1992. During 1991-92 the real exchange rate remained below trend, consistent with a contraction in aggregate demand. However, the subsequent sharp appreciation of the yen, which has raised it substantially above trend, is not consistent with output falling further below potential. In fact, the real appreciation since 1993 has made the recession deeper and longer than it would have been otherwise--becoming a cause rather than an effect of the output decline. The most recent round of appreciation in March-April 1995 has again threatened to stall the recovery.

b. The stance of monetary policy

The behavior of the real exchange rate during the business cycle depends importantly on the stance of monetary policy. As evidenced by the behavior of short-term nominal interest rates, monetary policy was tightened sharply in 1989 to contain the rapid rise in asset prices and economic activity (Chart I.6, first panel). Following the collapse of asset prices in 1990, as economic activity began to slow in early 1991, the Bank of Japan began to ease monetary conditions by mid-1991. As the recession deepened, monetary conditions were eased further. Short-term market interest rates fell from 8 percent in 1990 to little over 1 percent during April 1995. The decline in short-term rates was accompanied by a decline in long-term rates, though long-term rates declined by less. 3/ While the decline in nominal

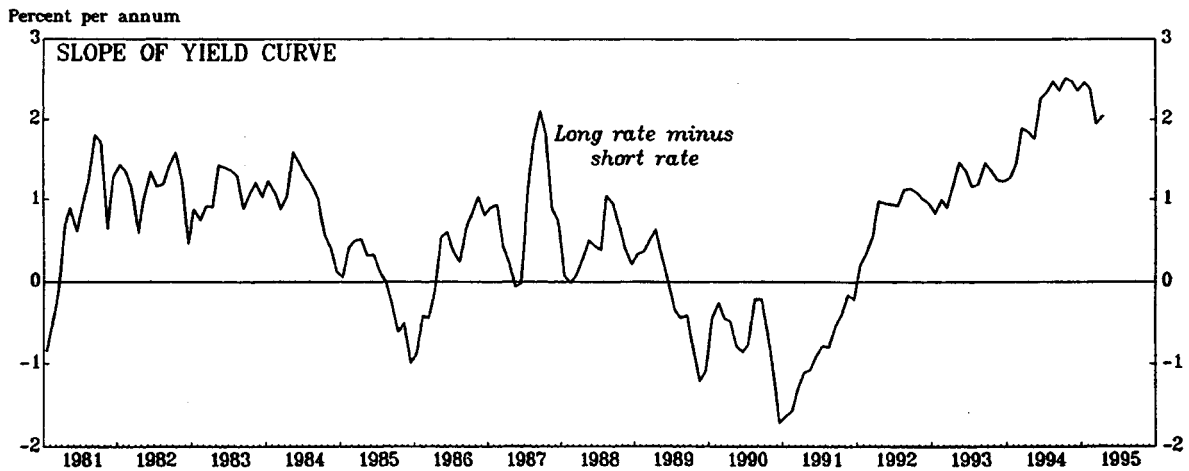
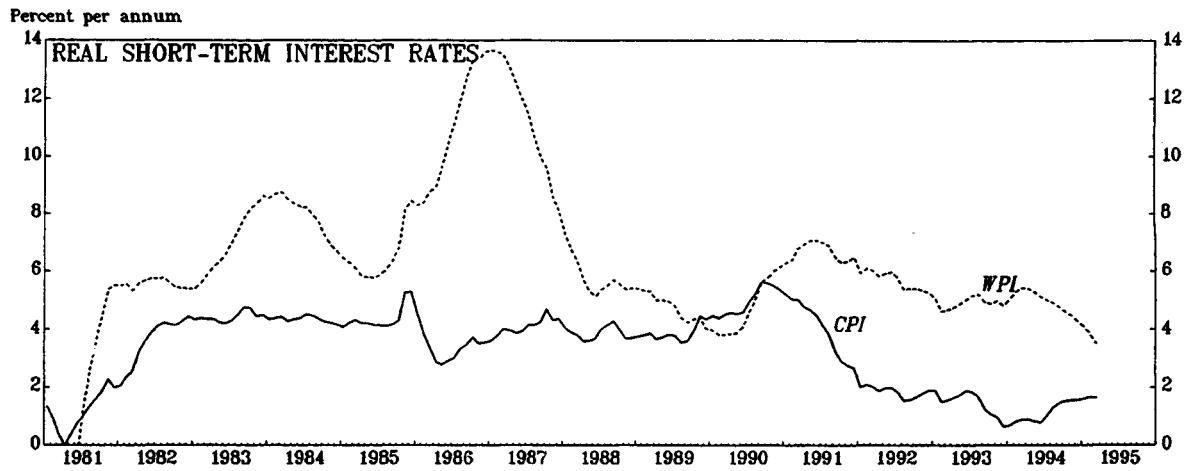
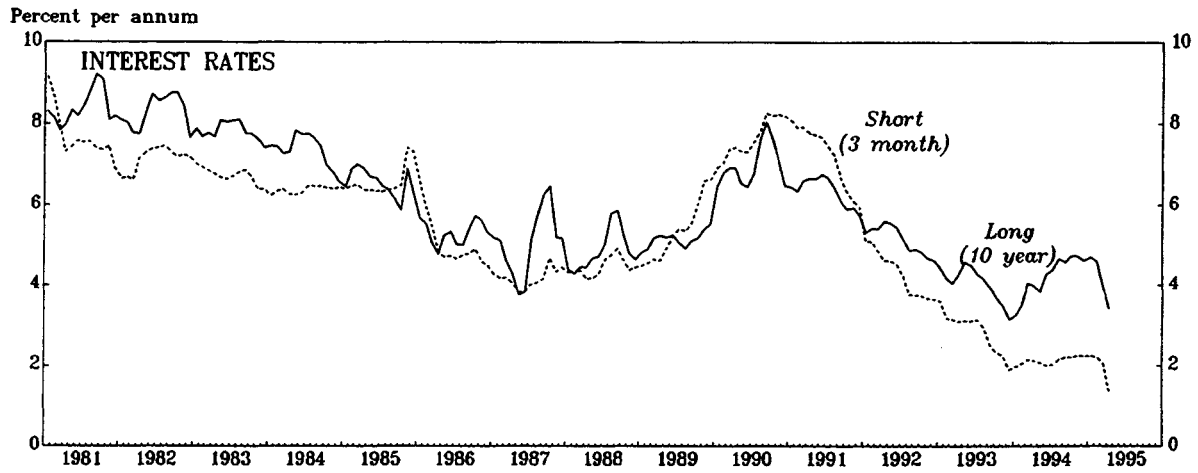
1/ An examination of the relative importance of various components of aggregate demand in a formal econometric model is provided by Brunner and Kamin (1994).

2/ A recession induced by monetary tightening--in contrast to an "autonomous" contraction in demand--would be expected to lead to a short-run appreciation of the real exchange rate.

3/ It should be noted that the increase in non-performing loans in bank portfolios following the collapse of the asset price bubble led to a widening of bank intermediation spreads, moderating the effective easing of monetary conditions.

CHART 1.6

JAPAN
INDICATORS OF MONETARY POLICY, 1981-95



Source: Nikkei Telecom.

interest rates was broadly reflected in declines in real interest rates based on CPI or WPI inflation, declines in inflation offset part of the decline in nominal rates, so real interest rates declined by less than nominal interest rates (Chart I.6, second panel). ^{1/} Moreover, based on WPI, real interest rates remain at relatively high levels.

Since monetary policy has operated primarily on short-term rates, one measure of the stance of monetary policy is provided by the slope of the yield curve. ^{2/} The slope of the yield curve remained negative in 1991, became positive at the beginning of 1992, and has risen steadily since (Chart I.6, third panel). This is consistent with the interpretation of a continued loosening of monetary policy in Japan during 1991-95.

While monetary policy in Japan may not have been loosened sufficiently to successfully counteract the recession, it would appear undebatable that monetary policy was loosened, and at the very least that there are no indications that a tightening occurred. The rise of the yen above trend since 1993, therefore, appears inconsistent with the stance of monetary policy in Japan.

Of course, the exchange rate depends not on the absolute stance of monetary policy in Japan, but on the stance relative to that in its trading partners. The relative stance of monetary policies is notoriously difficult to measure. Chart I.7 presents the indicators in Chart I.6 relative to those in G-7 partner countries. In line with the easing of monetary policy in Japan in 1991-92, short-term interest rates fell relative to those in partner countries (Chart I.7, first panel), albeit by noticeably less than the absolute decline in Japanese interest rates. Long-term interest rates hardly moved relative to those abroad during 1991-92. In mid-1993, both short and long-term rates moved up briefly relative to those abroad. Since late 1993, both rates again declined relative to those abroad. Real interest rates in Japan relative to those abroad fell during 1991, then rose in 1993, and have fallen since (Chart I.7, second panel). ^{3/}

The appreciation of the yen in 1993 may be partly attributable to a tightening of monetary policy in Japan relative to that abroad, but it is difficult to attach too much importance to this link once one considers the magnitudes involved. Short-term rates in Japan increased by 1/2 of a percentage point relative to those abroad, while the exchange rate appreciated by 16 percent during the year. Reasonable parameter estimates would suggest a far lower response, even after allowing for exchange rate overshooting of the type described by Dornbusch (1976). The relative

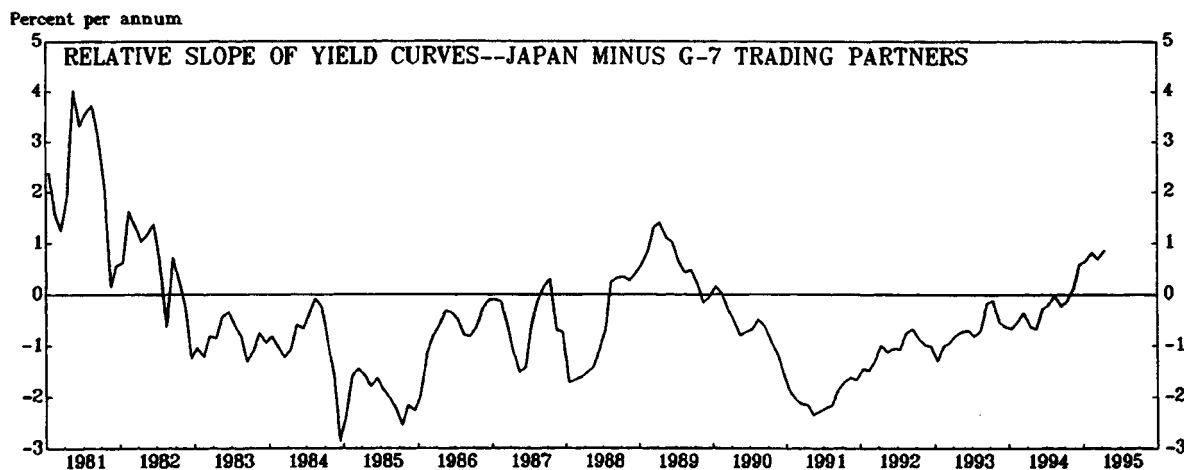
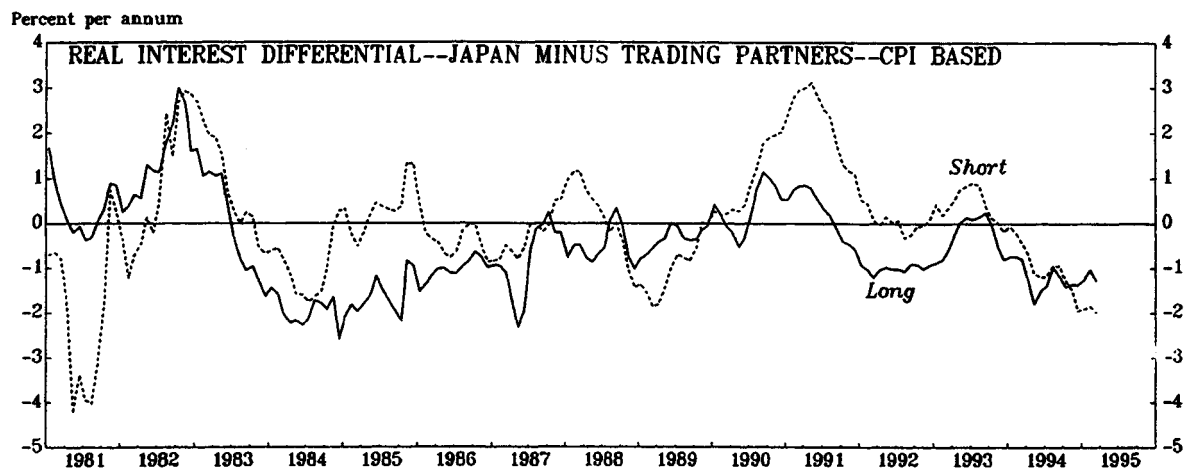
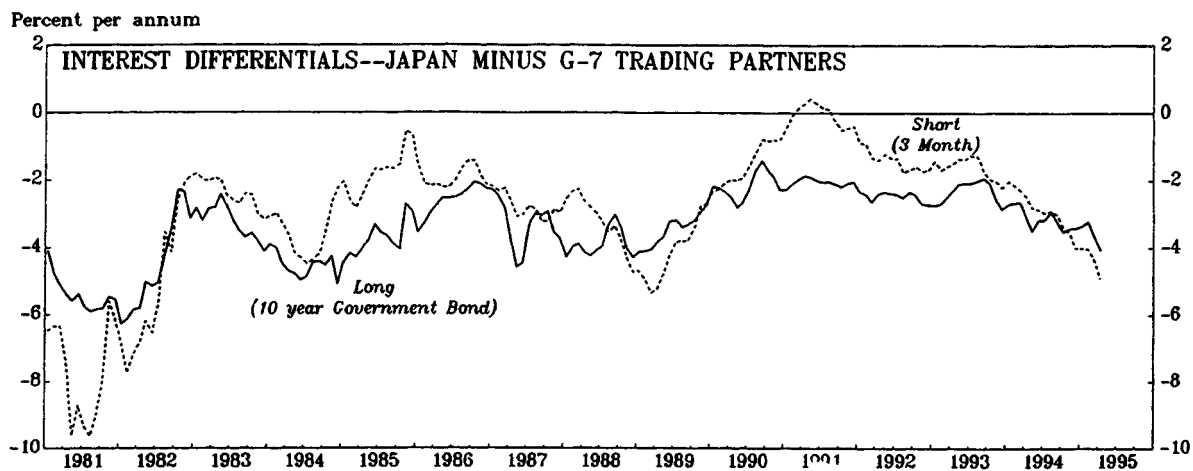
^{1/} Real interest rates are calculated using a moving average of realized inflation over the preceding 12 months.

^{2/} There are several caveats to this interpretation that are well-known so they are not repeated here.

^{3/} Again, real interest rates are calculated using realized inflation over the preceding 12 months.

CHART 1.7

JAPAN
INDICATORS OF RELATIVE MONETARY POLICY, 1981-94



Source: Nikkei Telecom and staff estimates.

tightening of monetary policy as measured by interest differentials cannot, therefore, explain the entire exchange rate appreciation in 1993. The subsequent appreciation of the yen during 1994 and 1995 are, of course, inconsistent with the behavior of relative monetary policies as measured by interest differentials.

The slope of the yield curve in Japan fell below that in the other G-7 countries in early 1990, remained below until late 1994, and subsequently rose above (Chart I.7, third panel). This factor suggests that from 1990 until late 1994, monetary policy in Japan was consistently tighter than that abroad. The sustained increase in the relative slope of the yield curves since early 1991, though, would imply that the degree of relative tightness was progressively reduced. By late-1994, the slopes had equalized, so that the stance of monetary policy in Japan was about the same as that abroad. The relative slope of the yield curve therefore implies that there should have been upward pressures on the yen during 1990-94. Further, these pressures should have been strongest in early 1991, and subsequently reduced. Therefore, while the appreciation of the yen during the period 1990-94 is consistent with this indicator of the relative stance of monetary policies, it is at odds with the timing of the appreciation, which accelerated sharply in 1993 and continued in 1994. Furthermore, the appreciation of the yen during 1995 is sharply at odds with this indicator of monetary policy since it suggests that monetary policy in Japan has been looser than that abroad.

c. Portfolio balance and capital flows

If assets denominated in different currencies are imperfect substitutes, and residents of each country have a preference at the margin for assets denominated in their own currencies, then the dynamics of asset accumulation associated with current account imbalances can be expected to result in systematic movements of nominal and real exchange rates. Current account surpluses, for example, should lead to a continually appreciating exchange rate due to the need to offset the incipient excess supply of foreign assets.

As noted earlier, since there was no substantial accumulation of claims on the rest of the world by Japanese residents until the mid-1980s, the evolution of the stock of NFA is incapable of explaining the secular appreciation of the yen during a large part of the post-war period. Some of the systematic appreciation of the yen during the 1980s, however, could be related to the persistent surpluses in the 1980s which increased the supply of (net) foreign assets in the portfolios of Japanese residents. ^{1/}

More recently, there have been incidents when there appear to have been shifts in portfolio preferences that were unrelated to observed return

^{1/} Of course, what matters are relative supplies of assets rather than absolute supplies.

differentials, and these have likely influenced the path of the yen. It has been suggested, for example, that a shift in investor preferences away from dollar-denominated assets may have contributed to the yen appreciation in early 1993. Numerous observers have suggested that Japanese institutional investors--particularly life insurance companies--having suffered considerable losses from yen appreciation in the past became reluctant to expose themselves further to the risk of unanticipated dollar depreciation. As Chart I.8 shows, even though returns on Japanese bonds have been low since mid-1990--except for very brief episodes--ex-post they have tended to dominate returns on U.S. bonds as a result of yen appreciation. They have done so consistently for the last 2 1/2 years, sometimes by more than 10 percentage points a year.

Over a long horizon, ex post yen returns on Japanese bonds have on average substantially exceeded those on foreign bonds. Since the early 1980s when capital controls in Japan were removed, the interest rate on long-term Japanese bonds averaged 6.2 percent, while that in partner countries averaged 9.6 percent. However, during this period, the nominal effective exchange rate appreciated by, on average, 5.6 percent a year. ^{1/} The average return on Japanese bonds of 6.2 percent, therefore, far exceeded the average return in yen on foreign bonds of 4 percent. ^{2/} It is worth noting that while this excess return is in part due to the sharp appreciation above trend of the yen since 1993, excess returns on yen bonds would have occurred even with just the trend rate of appreciation. Looking forward, with a trend of 3 percent in the CPI-based real exchange rate, and inflation in Japan 2 percentage points below that in partner countries, a substantial nominal interest differential--of 5 percentage points a year--would be required for ex ante returns on Japanese and foreign bonds to be equalized. As Chart I.7 (first panel) showed, such an interest differential has not been observed since 1984, and interest differentials currently would need to increase by 1 percentage point for yields to be equalized.

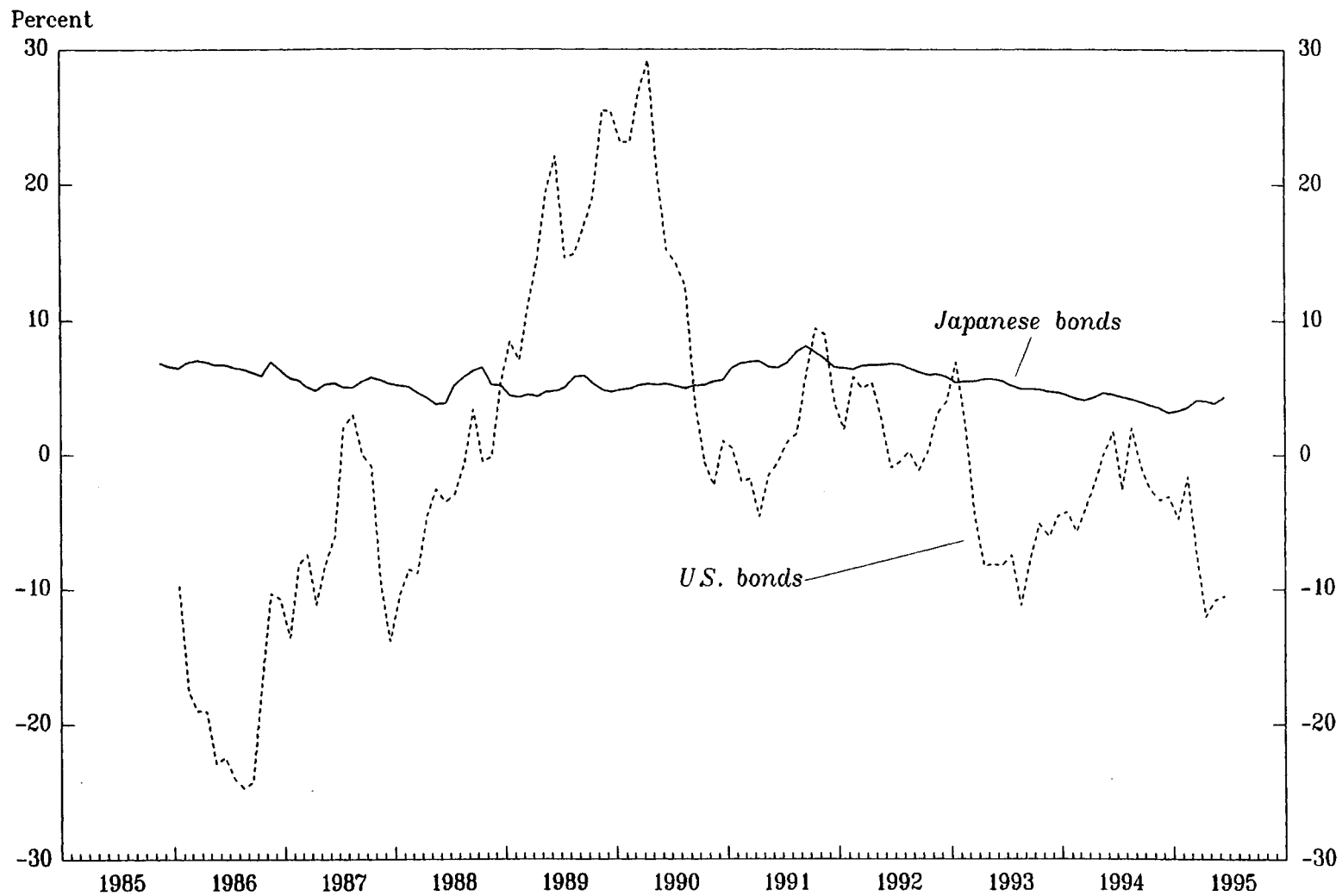
It has been pointed out that the bursting of the asset price bubble--by reducing the value of domestic assets--increased the relative proportion of foreign assets in the portfolios of Japanese residents. This effect may have led Japanese residents to attempt to re-balance their portfolios in favor of domestic assets. Also, the decline in domestic asset prices lowered the value of "hidden" reserves and capital of enterprises and financial institutions, and may have prompted more risk-averse behavior.

The shares of foreign securities in the total assets of the major categories of institutional investors are presented in Chart I.9. Several features are noteworthy. First, after a moderate buildup during 1981-85, the share of foreign securities in the total assets of banks has varied

^{1/} During this period inflation in Japan was 2.6 percent a year below that in partner countries and so the real exchange rate appreciated by 3.8 percent a year.

^{2/} Calculated as 9.6 less 5.6 percent a year.

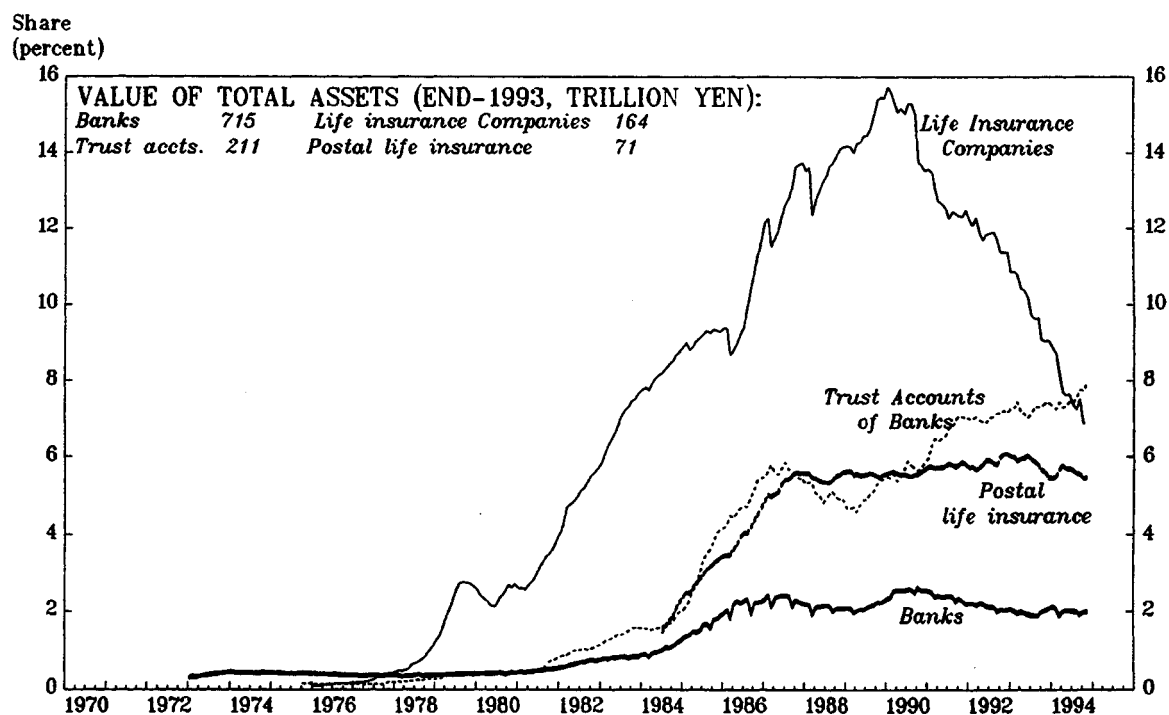
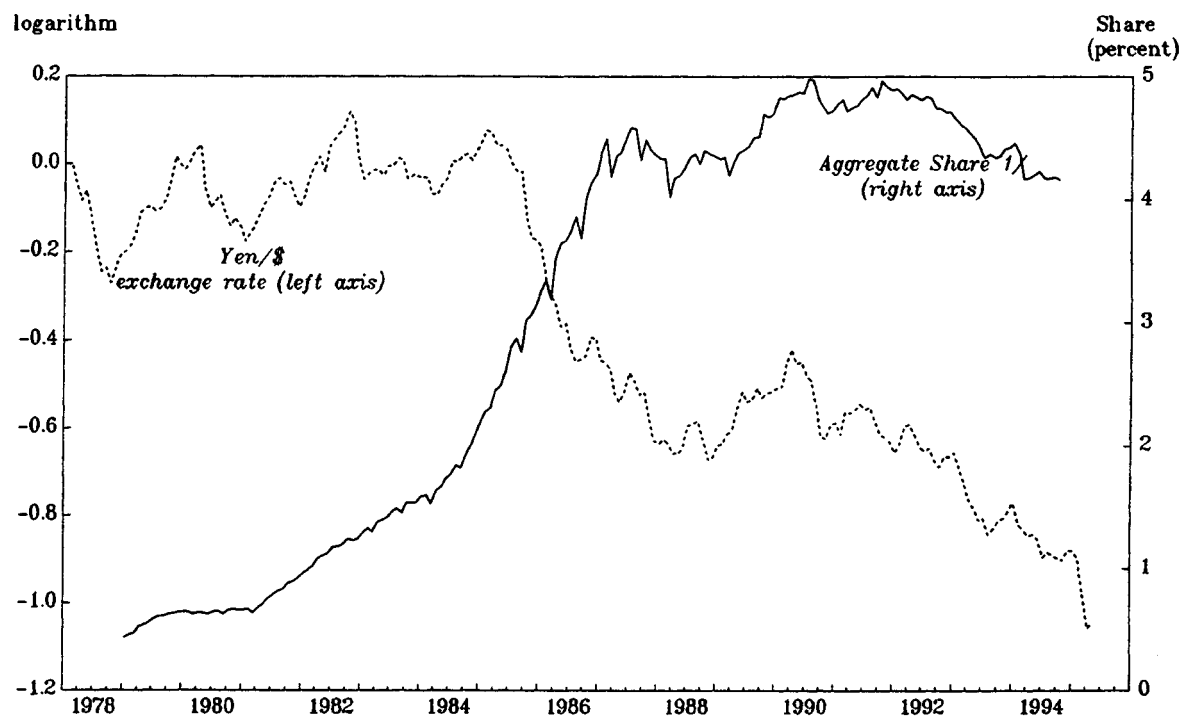
CHART 1.8
JAPAN
YEN RATES OF RETURN ON JAPANESE AND U.S. BONDS



Source: Nikkei Telecom.

Note: Ex post return on holding government bonds for previous 12 months.

CHART I.9
JAPAN
FOREIGN SECURITIES IN INSTITUTIONAL ASSET PORTFOLIOS



Source: Economic Statistics Monthly, Bank of Japan
1/ excludes postal life insurance, data for which begin only in 1984.

within a narrow margin, fluctuating around a modest average level of 2 percent. Second, the share of foreign securities in the asset portfolios of trust accounts of banks has increased steadily and in spite of the continued appreciation of the yen during 1990-94. Third, there has been a dramatic rise and fall in the share of foreign securities in the portfolios of life insurance companies. This share had risen to almost 16 percent in early 1990 and has been declining steadily since the collapse of the asset price bubble, falling below 7 percent by the end of 1994. Finally, since the collapse of the asset price bubble, the decline in the share of foreign securities in the aggregate institutional investor portfolio has been relatively modest, with the share falling from almost 5 percent in late 1989 to 4.2 percent by the end of 1994. ^{1/}

While the portfolio behavior of Japanese life insurance companies suggests a marked shift away from foreign securities, there was only a modest decline in the share of the aggregate Japanese institutional investor portfolio devoted to foreign securities. ^{2/} Under a floating exchange rate, net capital flows equal the current account (less any intervention), and can provide little information on aggregate investor preferences. Since Japan continued to run current account surpluses in the 1990s, it is a matter of arithmetic that the declines in Japanese life insurance companies holdings of foreign assets must have been taken up by other Japanese investors. The extent to which this change in the composition of holders of foreign assets affected aggregate market preferences and was reflected in changes in asset prices (the exchange rate) is, however, difficult to determine. It is also difficult to match such shifts to the timing of exchange rate movements over the last four years and, in particular, to ascertain the role these shifts played in the sharp appreciations during 1993 and 1995. Nevertheless, it is likely that these portfolio shifts played some role.

d. Trade tensions and "talking up the yen"

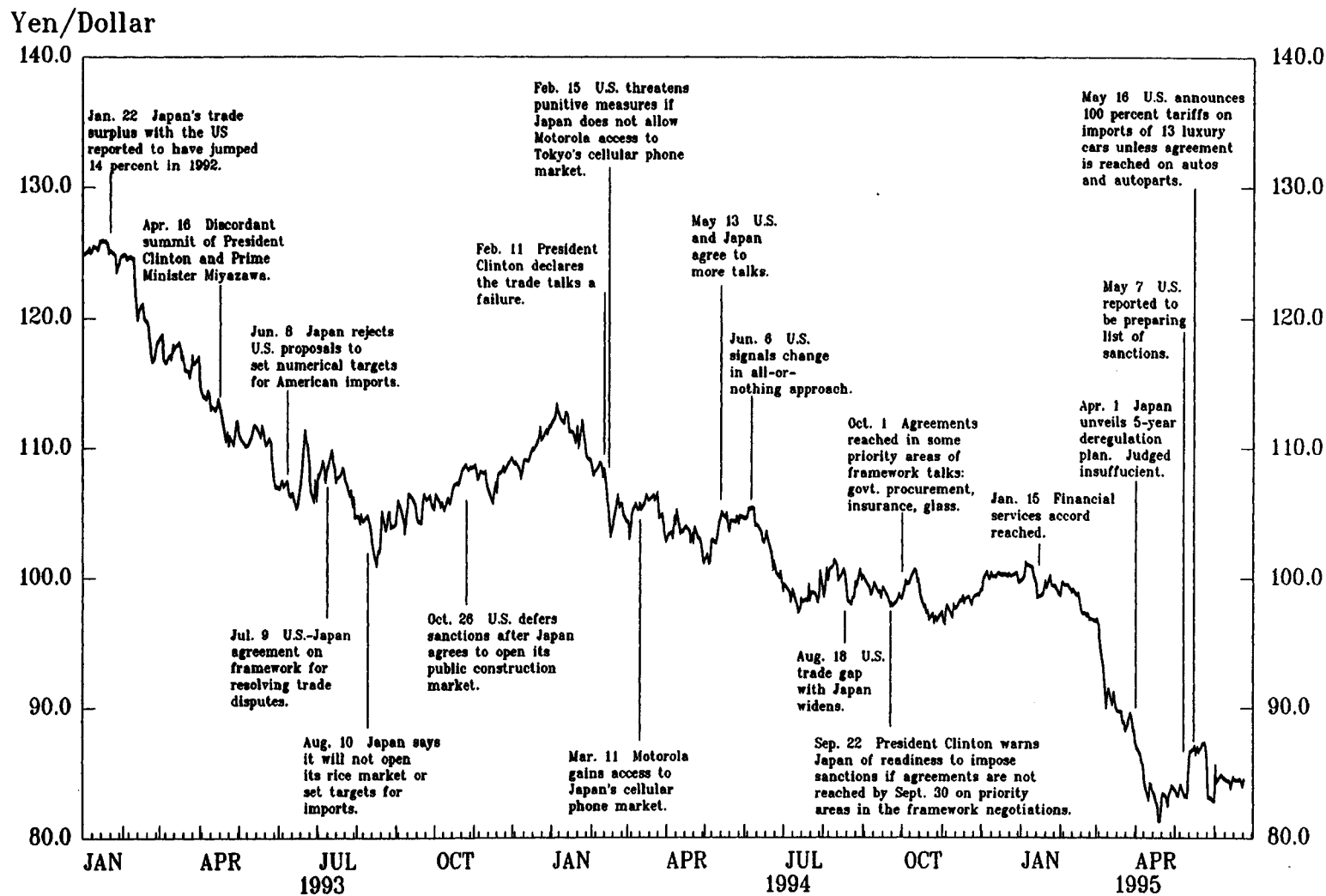
Since the exchange rate--in the absence of exchange controls--is a forward-looking asset price, it responds to news about the likely course of all variables that affect the future path of the exchange rate. Chart I.10 provides a chronology of developments in trade tensions and negotiations along with the yen/dollar exchange rate during 1993-95. While on several occasions break-downs of the talks, or threats of potential retaliation by

^{1/} The aggregate plotted in Chart I.1 includes banks, the trust accounts of banks, life insurance companies, the Norinchukin bank (an agricultural cooperative) and investment trusts. Postal life insurance is excluded since data are only reported from 1984 onwards.

^{2/} It is worth noting that, rather than reflecting a fundamental shift in attitudes to exchange rate risk, the shift away from foreign assets by life insurance companies may reflect changes in the regulatory environment facing these companies--in particular the imminent imposition of risk-based capital requirements.

CHART I.10

JAPAN
TRADE TENSIONS AND THE YEN/DOLLAR EXCHANGE RATE, 1993-95



the United States, were accompanied by an appreciation of the yen, most notably in the period surrounding the Clinton-Hosokawa summit in February-March 1994, a systematic pattern is hard to discern over the entire period.

There are several possible interpretations. Since the current exchange rate embodies a forecast path of all the variables that affect it, it is possible to tell several alternative stories depending on one's reading of market participants' expectations. For concreteness it is useful to discuss two interpretations.

First, it could simply be argued that, in an uncertain world, market participants' forecasts incorporate probabilities for various outcomes. As news becomes available, these probabilities and forecasts are updated. So, sometimes when the trade talks floundered, the market updated its forecast path for the future path of all variables affecting the exchange rate. It could have been perceived, for example, that a successful resolution of the talks would reduce barriers to trade and lower the equilibrium yen exchange rate. Then a failure could lead to an appreciation if a successful outcome had been built into market expectations. At other times, developments did not result in market participants updating their forecasts, and so there was no effect on the exchange rate.

Second, it has been argued that the appreciation of the yen in response to signals of failure in the trade negotiations is difficult to explain in terms of expected developments in trade alone--which was, on the face of it, all that was being negotiated. This interpretation would argue instead that, in fact, the appreciation represented participants' perceptions that the U.S. administration was not willing to accept the baseline path of current accounts and would act to depreciate the dollar if trade negotiations did not succeed. Market participants thus reacted to signals of failure in the trade talks by bidding up the yen. This has been referred to by several observers as "talking up the yen." It should be noted that if either or both governments succeed in changing today's market exchange rate by "talking", they are in part credibly convincing markets of the future course of relative monetary and fiscal policies. Market participants could, therefore, have been reacting to an anticipated loosening of United States monetary policy or an anticipated expansion of Japanese fiscal policy.

5. The yen and external adjustment

One method for assessing the appropriateness of the current level of the yen is provided by examining the implications of the market exchange rate for the future path of the current account and the associated stock of net foreign assets. The question can then be asked whether the projected path is sustainable. Such an approach was adopted by Krugman (1985) in examining the value of the dollar in the first half of 1985. If the projected path for the balance of payments, or the projected stock or net foreign assets (liabilities) in the portfolios of Japanese (foreign) residents appears implausible or explosive, then the exchange rate can be judged to be unsustainable in that a correction will be required at some

point in the future. Such stock considerations, however, are likely to be relevant only over a long horizon. We follow a procedure that concentrates on the implications for flow equilibrium rather than stock dynamics. ^{1/} In particular, we examine the implications of the market exchange rate for external adjustment and ask whether these are consistent with internal and external balance in the medium term.

There are three key ingredients to conducting such an exercise. First, since the evolution of the current account depends not only on today's exchange rate but also on the future path of the exchange rate, an assumption is required on the future path. Second, a judgment must be made on what constitutes the appropriate path of the current account, that is external balance, over the medium term. Third, an econometric model is necessary to determine the path of the current account.

a. The market's forecast of the exchange rate

What is the market's forecast of the exchange rate over the medium term? If investors are risk neutral and assets denominated in different currencies are close substitutes, then the market's forecast of the future change in the real exchange rate is provided by interest differentials. For a five-year maturity, nominal interest rates in Japan are currently about 4 percent below those in partner countries. This differential of 4 percent a year is used below as a point estimate of the market's expected rate of future nominal appreciation of the yen.

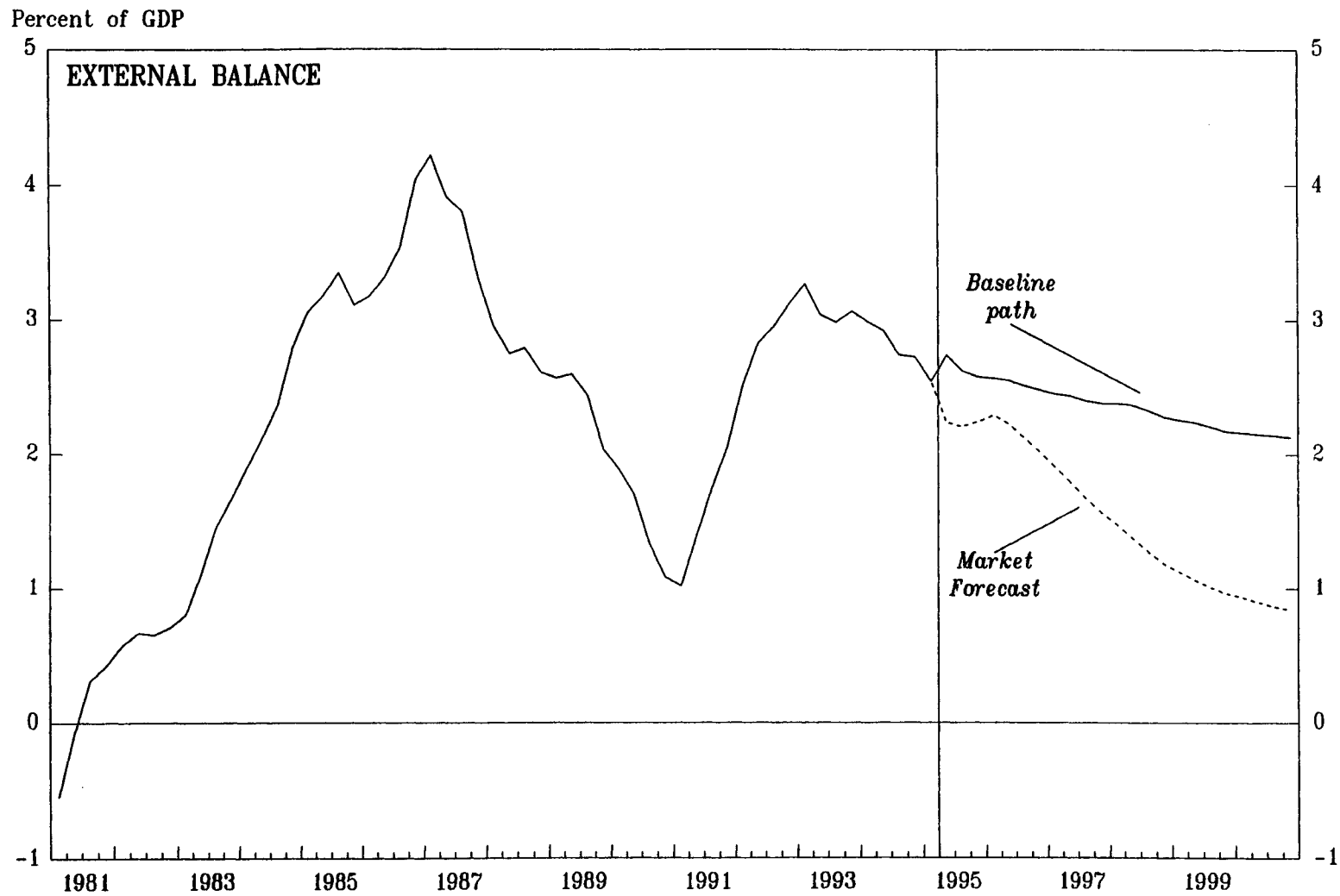
b. Medium-term external balance

What is the appropriate current account for Japan over the medium term? One approach is to project savings and investment individually and obtain the external balance residually. This is the approach adopted in Meredith (1994), which deals extensively with the medium- and long-term outlook for the Japanese economy under alternative scenarios. In the baseline scenario identified there, as output gradually returns to potential and internal balance is restored, the external surplus is projected to decline from 3 percent of GDP in 1993 to 2 1/4 percent of GDP by 2000 (Chart I.11). In what follows, external balance is defined as a surplus of 2 1/4 percent of GDP achieved in the medium term--by 2000--as internal balance is restored.

The behavior of savings and investment underlying this projection is as follows. Total savings declines as government savings deteriorate due to higher social security payments, while private savings is reduced by a rising share of the elderly in the population and increasing financial wealth. The drop in savings is partially offset by lower investment: the share of residential investment in GDP falls to a level consistent with trend growth in the housing stock; business investment falls because of a

^{1/} See also the discussion of calculations of Fundamental Equilibrium Exchange Rates (FEERs) by Bayoumi, Clark, Symansky and Taylor (1994).

CHART I.11
JAPAN
MARKET FORECAST OF EXTERNAL ADJUSTMENT



Source: Nikkei Telecom and staff estimates.

Note: 4-quarter moving averages of actual and projected data are plotted.

downward trend in its relative price; and government investment falls from a peak in 1994-95.

c. The market's forecast of external adjustment

The staff's current account model was used to project the current account under the assumption that the nominal exchange rate appreciates during the third quarter of 1995 into the medium term at the current five-year nominal interest differential of 4.1 percent a year. ^{1/} The WEO projections for output, domestic wholesale prices, external demand, and foreign prices were employed in the projection, reflecting the assumption that the market's forecast for these variables coincides with the WEO projections. Chart I.11 reports the results which should be compared to the baseline scenario in Meredith (1994). At the end of five years, that is in the last quarter of 2000, the market's forecast path for the exchange rate implies an external surplus of $3/4$ percent of GDP, $1\ 1/2$ percent below the baseline surplus of $2\ 1/4$ percent. Alternatively, we could ask what the level of the exchange rate would have to be today so that it would be consistent with external balance in the baseline scenario in the medium term (i.e., a current account surplus of $2\ 1/4$ percent of GDP). This calculation yields a required depreciation of the yen in excess of 20 percent.

This point estimate is quite sensitive to the estimate of medium-term external balance and the behavior of trade flows. For instance, a reduction in the definition of medium-term external balance by 1 percent of GDP raises the estimated required adjustment in the yen by about 15 percent. Similarly, the current account model embodies an estimated import price elasticity of 0.43. If the elasticity were instead 1.0, the estimated required change in the yen would increase by 5 percent.

While the imprecision of parameter estimates and the definition of external balance inevitably leads to a range of estimates, it is perhaps worth reiterating that the point estimate around which this range clusters points to substantial tensions in the medium term. These estimates suggest that either the exchange rate will have to adjust--relative to the market's present expectations--or internal and external balance will not be achieved in the medium term.

^{1/} This model is developed in Corker (1989). See also Meredith, (1993).

II. Tax Reform Issues in Japan

1. Introduction

Tax reform has been a long-standing policy objective in Japan. The most recent effort was initiated by the recommendations of the Tax Council in November 1993. While the discussion had not been completed, in view of the cyclical weakness in activity, a temporary 20 percent across-the-board reduction in personal income taxes was implemented in 1994 as a prelude to full-fledged reform. Following this development, the tax reform package was finalized in September 1994 and approved by the Diet in November 1994. The package includes two-tier cuts in income taxes--permanent (from 1995) and temporary (for 1995-96) portions--combined with an increase in the consumption tax in 1997. The staggered implementation is intended to provide demand support to the weak economy.

This chapter, extending last year's staff study, revisits tax reform in Japan in light of the final reform package. ^{1/} As the short-term stimulative effects of temporary tax cuts as well as the broad impact of the shift from direct to indirect taxes were discussed in last year's study, this chapter focuses on the permanent changes to the tax system in the context of medium-term tax policies. It reviews the objectives of reform, describes the content of the final reform package, and assesses the impact of the package in light of the objectives. Moreover, the chapter explores the scope for further reform, pointing to possible issues and directions for discussion.

The next section reviews the objectives of the latest reform initiatives. In view of the projected rapid population aging, they are aimed at distributing the tax burden more equally across generations and income levels. Before the reform, the burden of income taxes was heavy, particularly for middle-income salary earners, and horizontal equity was significantly impaired by evasion of income taxes and special treatment for small businesses in the consumption tax. ^{2/} These factors were regarded as having a detrimental effect on incentives to work. Moreover, it was initially intended to augment revenues to meet increasing expenditure requirements, although the final package ended up being revenue neutral.

Section 3 describes the reform package enacted in 1994. A reduction in income taxes has been realized by raising the tax threshold through an augmentation of various deductions, and widening the income brackets for each marginal tax rate. An increase in the consumption tax will be realized by raising the tax rate from 3 to 5 percent. The scope of existing special

^{1/} See Chapter I of "Japan--Recent Economic Developments--Supplementary Material" (SM/94/185, Supplement 1, 7/22/94).

^{2/} Horizontal equity calls for the equal tax treatment of equal individuals, while vertical equity calls for the unequal tax treatment of unequal individuals.

treatment will be reduced to improve horizontal equity, which will also increase consumption tax receipts. All the reform measures related to the consumption tax will take effect in April 1997.

Section 4 looks at the economic effects of the reform package. First, it alters the distribution of the tax burden across generations and income sources. The analysis of the reform's overall impact on the effective tax rate across income levels suggests that a taxpayer with labor income exceeding ¥10 million would be a net winner, while a taxpayer below that income level would be a net loser. As the elderly and "underreporting" taxpayers tend to be below that level in terms of their labor income, a shift of tax burdens from the working generation to the elderly and from salary earners to others will be realized. Second, the package raises after-tax real wage rates (i.e., the price of leisure relative to work) for most taxpayers whose labor income is over ¥10 million. However, as the wage elasticity of labor supply appears to be small, the overall effects on labor supply are likely to be insignificant. Third, as the package includes no measures on investment income, it does not alter the after-tax rate of return on saving. The package would increase aggregate saving, however, by boosting the after-tax income of the working generations at the expense of the elderly. Fourth, the reform plan would enhance horizontal equity. Whether it would improve vertical equity depends on judgements as to the optimal level of progressivity of the tax system. Finally, despite the initial intention to augment tax revenues, the final package would be revenue neutral.

Section 5 explores the scope for further reforms. First, increasing taxation on pension benefits could be a viable option to raise revenues. Second, the taxation of investment income was not addressed in the recent package; ^{1/} nevertheless, the differential tax treatment of various forms of investment income causes distortions, including a nonneutrality between debt and equity financing of corporations. This should be a priority issue in the next round of the tax reform. Third, to address the compliance problem and, thus, ensure greater horizontal equity, the introduction of a taxpayer identification number system deserves consideration. Finally, a review of the securities transaction tax is called for, while the issue of the land value tax needs to be discussed in conjunction with overall land policy management.

2. Review of reform objectives

The main goal of this round of tax reform was to make necessary changes to the tax system in preparation for the rapidly aging society. Japan's ratio of the aged to total population, which has been the lowest among the

^{1/} The tax reform in 1988 included fundamental changes to the taxation of investment income, including an abolition of tax exemption of interest income from small savings, and an introduction of taxes on capital gains on equities.

G-7 countries, is projected to increase rapidly to over 25 percent by 2020, becoming the highest among the G-7.

Specifically, the reform had three main objectives: to reduce the detrimental effects of taxes on the labor incentives of working generations; to achieve greater horizontal equity; and to secure sufficient and stable revenues to cover increasing expenditure requirements. The reform addressed these objectives by smoothing the progressive structure of personal income taxes and shifting part of the tax burden from income taxes to the consumption tax.

The burden of personal income taxes, particularly for middle-income salary earners, was viewed as having become unduly heavy and unequally progressive. Although the comprehensive tax reform in 1987-88 had substantially reduced the progressivity of the income tax system, 1/ progressivity subsequently increased as economic growth and inflation pushed up nominal incomes and caused taxpayers to face higher tax rates. 2/ While how to measure overall tax progressivity is not unanimously agreed, a widely accepted index developed by Kakwani compares a Lorenz curve with a tax concentration curve. 3/ 4/ By comparing the two curves, Chart II.1 indicates that the tax concentration curve became more concave in 1992 than in 1986, while the Lorenz curve remained unchanged. It suggests that the income tax in the early 1990s had become even more progressive than before the comprehensive reform in the late 1980s.

In addition to overall progressivity, concerns had grown that taxation was particularly heavy for middle-income salary earners. This group of taxpayers typically has annual earnings of about ¥10 million and, reflecting the seniority system in pay determination that prevails in Japan, ranges in age from the late 40s to the early 50s. Their domestic expenses tend to be at a peak in the life-cycle because of child education and housing costs. As the progressive structure of the tax schedule was particularly notable around an income level of ¥10 million, entry into higher tax brackets

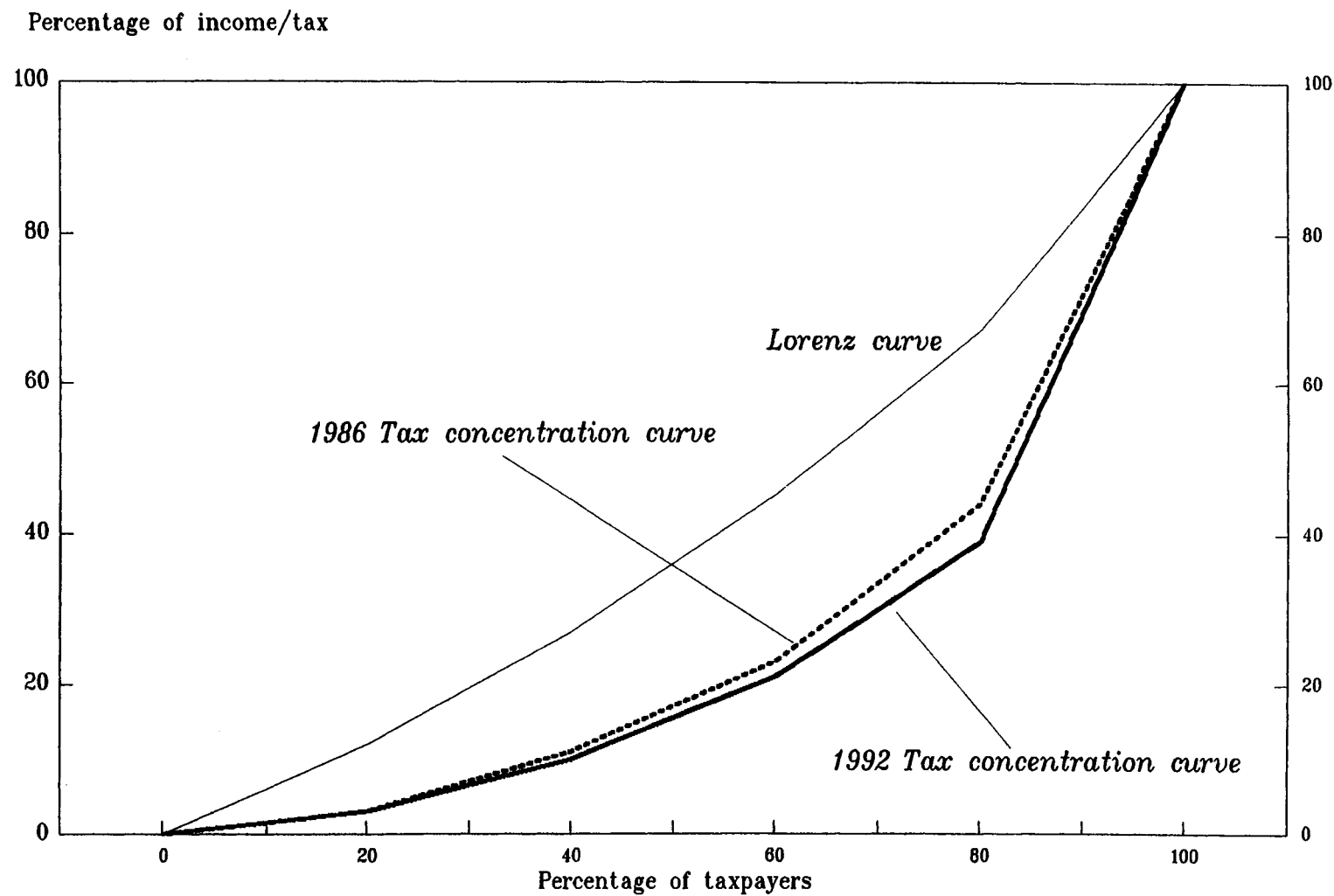
1/ See Chapter III of "Japan--Recent Economic Developments" (SM/89/84, Supplement 1, 5/24/89) for a description and an analysis of the tax reform in 1987-88.

2/ This bracket creep, however, contributed to fiscal consolidation in the 1980s.

3/ The progressivity index was defined as a difference between G_t and G_p , where G_t is the Gini coefficient of taxes, calculated on the basis of a tax concentration curve showing the cumulative proportion of taxes against the cumulative proportion of income-receiving units, and G_p is the Gini coefficient for pretax income. According to this measure, a tax is judged to be progressive if it is more unequally distributed among taxpayers than is pretax income, thus resulting in a tax concentration curve that is more concave than the Lorenz curve. See Kakwani (1976) for further discussion.

4/ For a specific application of the progressivity index to Japan, see Toyoda (1987).

CHART II.1
JAPAN
THE PROGRESSIVITY OF INCOME TAXES, 1986 AND 1992



Sources: Data provided by the authorities.

coincided with a peak in domestic expenses. Consequently, a call for wider distribution of tax burdens across generations--more evenly spread tax burdens over the life-cycle for an individual taxpayer--arose.

Horizontal equity is also an important motivation for reform. There is a widely held perception in Japan that the income-tax burden of salary earners is higher than that of the self-employed and farmers at the same income level. This is mainly because salary earners are subject to tax withholding, while the self-employed and farmers report their income based on "self-assessment." This phenomenon is known as the "9-6-4 (*Ku-ro-yon*)" or "10-5-3 (*To-go-san*)" problem, which refers to the proportion of income effectively subject to taxation: 90-100 percent for salary earners, 50-60 percent for the self-employed, and 30-40 percent for farmers. Although this compliance problem should be dealt with primarily through systemic and/or administrative reforms in income taxes, shifting part of the tax burden from income to consumption taxes contributes to greater horizontal equity by increasing the taxation of groups that can avoid the full burden of income taxes.

The consumption tax, which was introduced in 1989, employed special treatment for small-sized enterprises, such as simplified procedures and exemptions, in order to mitigate compliance costs. The special treatment was applicable to a large number of enterprises and caused distortions in tax burden shifting. One is known as the "*ekizei*" problem, meaning that part of the taxes paid by consumers was pocketed by enterprises. ^{1/} As the severity of the problem grows along with the size of consumption tax revenues, solving the *ekizei* problem was called for as a prerequisite for an increase in the consumption tax.

As population aging raises government expenditures, government revenues should be increased in the medium term to meet expenditure requirements. To this end, the reform (at least initially) was intended to augment government revenues. Moreover, it was also intended to create a more stable tax base over the business cycle. The latter goal appears to conflict with automatic stabilizers and other countercyclical functions of tax policy. In practice, however, given the asymmetric political pressures for raising and reducing taxes, discretionary actions to lower taxes are easier for the authorities to introduce than discretionary tax increases. A stable revenue source in periods of cyclical weakness thus allows the authorities to have greater flexibility in achieving an optimal level of taxation through discretionary cuts in taxes.

^{1/} The special treatment was officially estimated to reduce consumption tax receipts by about ¥500 billion in 1989, equivalent to about 9 percent of total receipts from the tax.

3. Reform package enacted in 1994

a. Personal income tax

Under the Japanese personal income tax system, individuals are generally subject to personal income taxes on taxable income--income after deducting applicable allowances, costs, and exemptions--at marginal tax rates depending upon income brackets. 1/ The most common deductions to arrive at taxable income include: a personal basic deduction for the taxpayer and each dependent family member; a special spouse deduction (provided the total income of the taxpayer is less than ¥10 million); and an employment income deduction. 2/ Since January 1989, there have been five income brackets for the national income tax with marginal rates ranging from 10 percent to 50 percent, and three brackets for the local inhabitants tax with rates ranging from 5 to 15 percent.

The package changed the structure of both deductions and rates. The personal basic deduction was increased considerably for both national and local taxes. The employment income deduction was also enlarged by widening the income brackets to which higher marginal deduction rates are applied (Table II.1). As a result of the changes in deduction structures, the tax threshold was raised substantially (for instance, by about 8 percent for a married salary earner with two dependent children). 3/ The changes in the tax rate structure were realized by widening income brackets for each marginal tax rate, with higher weights on lower brackets (Table II.2).

The above-mentioned changes to deduction and rate structures are illustrated in Chart II.2, which describes income tax schedules (national and local income taxes combined) both before and after the reform (see also Table II.3). The marginal income tax rate at a given income level has been significantly reduced; in particular, the previously observed rapid rise in marginal tax rates at income levels around ¥10 million was alleviated.

In addition to the permanent changes, the reform package includes a temporary cut in personal income taxes for 1995 and 1996, equivalent to ¥2 trillion per year. The temporary cut is realized through a 15 percent reduction in taxes for all income levels, with a ceiling of ¥70,000 (¥50,000

1/ Investment income (interest income, dividend income, and capital gains from the sales of portfolio stock investments) is taxed on a separate basis from other sources of personal income. Tax rates applied to investment income are generally independent of personal income tax rates.

2/ The employment income deduction applies to salary earners as a proxy for standardized costs. The amount of the deduction is determined depending upon the income level, with a declining marginal deduction rate as income grows.

3/ The tax threshold for a married employee with two children rose from ¥3.28 million to ¥3.54 million for the national income tax. For the local inhabitants tax, the threshold rose from ¥2.85 million to ¥3.03 million.

Table II.1. Japan: Reform of the Deduction Structure of Personal Income Taxes

(In thousands of yen)

	Before the Reform	After the Reform
<u>Individual income tax (national)</u>		
Basic deduction <u>1</u> /	350	380
Special deduction for spouse	350	380
<u>Individual inhabitants tax (local)</u>		
Basic deduction <u>1</u> /	310	330
Special deduction for spouse	310	330
<u>Employment income deduction</u>		
Marginal deduction rate	Employment income bracket	Employment income bracket
40%	0-1,650	0-1,800
30%	1,650-3,300	1,800-3,600
20%	3,300-6,000	3,600-6,600
10%	6,000-10,000	6,600-10,000

Source: Data provided by the authorities.

1/ For self, spouse, and each of the dependent children.

Table II.2. Japan: Reform of the Tax Rate (Income Bracket)
Structure of Personal Income Taxes

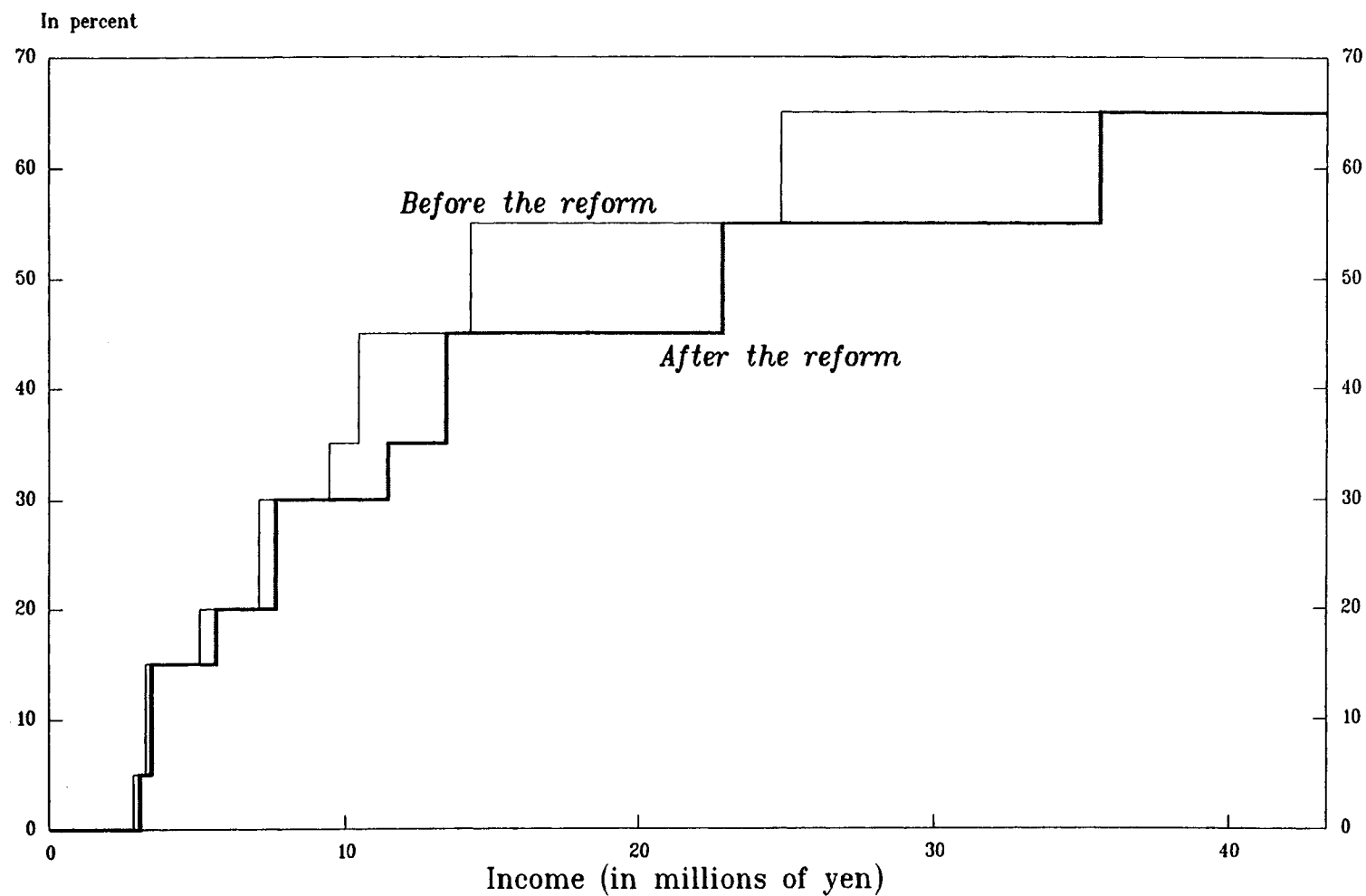
(In millions of yen)

	Before the Reform	After the Reform
<u>Individual income tax (national)</u>		
Marginal tax rate	Taxable income range	Taxable income range
10%	0-3	0-3.3
20%	3-6	3.3-9
30%	6-10	9-18
40%	10-20	18-30
50%	20-	30-
<u>Individual inhabitants tax (local 1/)</u>		
Marginal tax rate	Taxable income range	Taxable income range
5%	0-1.6	0-2
10%	1.6-5.5	2-7
15%	5.5-	7-

Source: Data provided by the authorities.

1/ Prefectural and municipal inhabitants taxes combined.

CHART II.2
JAPAN
MARGINAL RATE OF INCOME TAXES, BEFORE AND AFTER THE REFORM 1/



Sources: Data provided by the authorities.

1/ National and local taxes combined. A married employee with two dependent children

Table II.3. Japan: Combined (National and Local) Income Tax Schedule 1/

Marginal Tax Rate (in percent)	Income Bracket (in thousands of Yen)	
	Before the Reform	After the Reform
0	-2,850	-3,030
5	2,850-3,280	3,030-3,540
15	3,280-5,100	3,540-5,790
20	5,100-7,100	5,790-7,730
30	7,100-9,630	7,730-11,450
35	9,630-10,470	11,450-13,490
45	10,470-14,310	13,490-22,970
55	14,310-24,840	22,970-35,600
65	24,840-	35,600-

Source: Data provided by the authorities.

1/ A married employee with two dependent children.

for national and ¥20,000 for local tax) per taxpayer. 1/ As the ceiling became binding at an income level of as low as ¥8 million, the temporary cut favored low- and middle-income groups. In order to provide flexibility to respond to cyclical conditions, the extension of the temporary cut into 1996 is to be reviewed in late 1995. 2/

b. Consumption tax

The consumption tax in Japan is a value-added tax levied at the national level at a rate of 3 percent. It was introduced in April 1989, replacing the former commodity tax levied on selective goods and services at different rates. 3/ The base of the consumption tax is wide and is estimated to cover over 90 percent of household consumption. 4/ 5/ Goods and services supplied for use in Japan are subject to the tax; imported goods are also subject to the tax, while exports are exempt.

The consumption tax is levied through the credit method, which requires enterprises (corporations and individuals) to calculate and report their tax liability as the rate times their sales. Against this amount, enterprises deduct a credit equal to the amount of the tax that was paid on their inputs at earlier stages of production. 6/ Thus, enterprises must file the net amount of consumption tax receipts (on their sales) less consumption tax payments (on inputs).

1/ In contrast, the ceilings of the 1994 temporary cut were very high (¥2 million for national and ¥200,000 for local tax), which were binding for few taxpayers.

2/ The most recent package of measures announced in late June 1995 confirmed the extension of the temporary income tax cut into 1996 unless economic activity shows particular improvement.

3/ Besides the consumption tax, a number of other indirect taxes still apply, including liquor, tobacco and petroleum excises, securities transaction tax, and stamp duties.

4/ Only a limited number of items are exempted. Exempt items include sales and leases of land; rents on residences; sales of securities, currency and similar instruments; provision of money-changing services; interest on loans; insurance premiums; sales of postal stamps; provision of public services; provision of certain medical services; provision of certain social welfare services; tuition and entrance examination fees; and other (childbirth cost, cremation costs, and special equipment for handicapped persons).

5/ See, for example, OECD (1993) for the coverage of the tax base in total household consumption.

6/ The credit method is often termed a European-style VAT. This method usually requires enterprises to produce invoices for all sales showing the amount of the VAT paid. See Bickley (1994) for different ways to levy VAT. Under the Japanese system, invoices have not been strictly required before the reform; the reform would impose invoice requirements for claiming tax credits.

There are three types of special treatment to mitigate compliance costs for small enterprises: small enterprise exemption; marginal deduction system; and simplified taxation method. The reform package, while keeping the first treatment unchanged, will abolish the second and reduce the scope of the third.

Enterprises whose taxable sales are not more than ¥30 million are eligible for exemption from the consumption tax on their sales (small enterprise exemption), but would not be able to receive a credit for the tax paid on their inputs. As consumers are subject to 3 percent consumption tax payments regardless of the retailer's tax status, exempt enterprises could retain at least part of these tax receipts from consumers. While the practice of small enterprise exemptions is common among industrial countries, the exemption limit in Japan is rather high by international standards and is considered to be well above the level that can be justified by the assumption that the costs of administering the tax for small businesses would exceed the yield from the tax. ^{1/} It is estimated that, even if the limit were to be lowered to ¥10 million, about 40 percent of the total number of enterprises would be eligible for exemption. ^{2/} The package, however, includes virtually no changes to the small enterprise exemption.

Enterprises whose taxable sales are not more than ¥50 million are eligible for the marginal deduction system. This system bridges the gap in consumption tax burdens from exemption (sales less than ¥30 million) to full taxation (sales over ¥50 million) by employing a linearly diminishing tax deduction depending upon sales values. ^{3/} As consumers are subject to the 3 percent rate, the deducted amount can simply be pocketed by the eligible enterprises. The package will abolish the marginal deduction system.

Enterprises whose taxable sales are not more than ¥400 million may elect to meet their consumption tax obligations under a simplified taxation method. Under the simplified method, in order to arrive at credit for consumption taxes paid on inputs, a fixed rate ranging from 90 percent (wholesale trade) to 60 percent (service sector) can be applied to consumption tax receipts on sales. ^{4/} Thus, enterprises whose actual inputs-to-sales ratio is lower than the fixed rate can pocket the difference. The package will reduce the sales limit for eligible enterprises from ¥400 million to ¥200 million.

^{1/} See, for example, Tait (1991).

^{2/} See, for example, Iwata (1994).

^{3/} The amount of marginal deduction (in millions of yen) is given by the following formula, where T represents 3 percent of their value-added, and S represents sales: $T \cdot 1/20 \cdot (50 - S)$.

^{4/} Therefore, the net consumption tax liability can be derived by applying a fixed rate ranging from 0.3 percent (wholesale) to 1.2 percent (service) to sales, as opposed to 3 percent of the value-added.

The consumption tax rate will be increased from the current 3 percent to 5 percent. The new rate is comprised of 4 percent of national and 1 percent of local consumption tax. The local consumption tax will be newly introduced as a prefectural tax, replacing the existing consumption transfer tax that transfers 20 percent of consumption tax receipts to local governments. As the enforcement and implementation of the local consumption tax will be entrusted to the central government, little will change other than the level of intergovernmental transfers between central and local governments at this point. This could be viewed as the first step, however, toward an independent local consumption tax in the future, in keeping with on-going initiatives in the direction of fiscal decentralization.

Some conditionality is attached to the revision of the rate by a reexamination clause in the reform bill. The provision reads that "the Government, if necessary, will take any necessary actions by September 30, 1996, paying due consideration to such factors as financial resources to meet the expenditure requirements (including social welfare), the progress in administrative reforms, the proper review of the special tax measures and consumption tax system, and fiscal conditions." This conditionality will provide flexibility to respond to cyclical developments.

4. Economic effects of the reform

a. After-tax income distribution

The reform was designed to significantly alter the distribution of the tax burden and, therefore, after-tax income. How the reform affects the after-tax income distribution can be assessed by comparing overall changes--net of reductions due to lower income taxes less increases due to the higher consumption tax--in effective tax rates across income levels.

First, effective income tax rates can be calculated based on the before- and after-reform tax schedules. Table II.4 shows changes in the effective rates for a married employee with two dependent children for sample income levels. As the income level goes up, the reform lowers the effective tax rate by an increasing degree. Chart II.3 illustrates the changes: the slope of the curve, which was particularly steep at income levels of ¥10-15 million before the reform, has been flattened, and the pace of increase in effective rates is more equally distributed across income levels.

Secondly, the effect of the consumption tax increase on the effective tax rate (in relation to income level) depends on the relative size of the bases of the income and consumption taxes. Since household labor income and consumption in Japan differed by less than 1/2 percent in 1991-93, the two tax bases can be regarded as identical in terms of size. Hence, given the assumption that the increase in consumption tax affects all households proportionally, a 2 percent increase in the consumption tax rate raises tax burdens at all income levels by 2 percent of their income, resulting in a 2 percent rise in the effective tax rate.

Table II.4. Japan: Effective Rate of Personal Income Taxes 1/2/

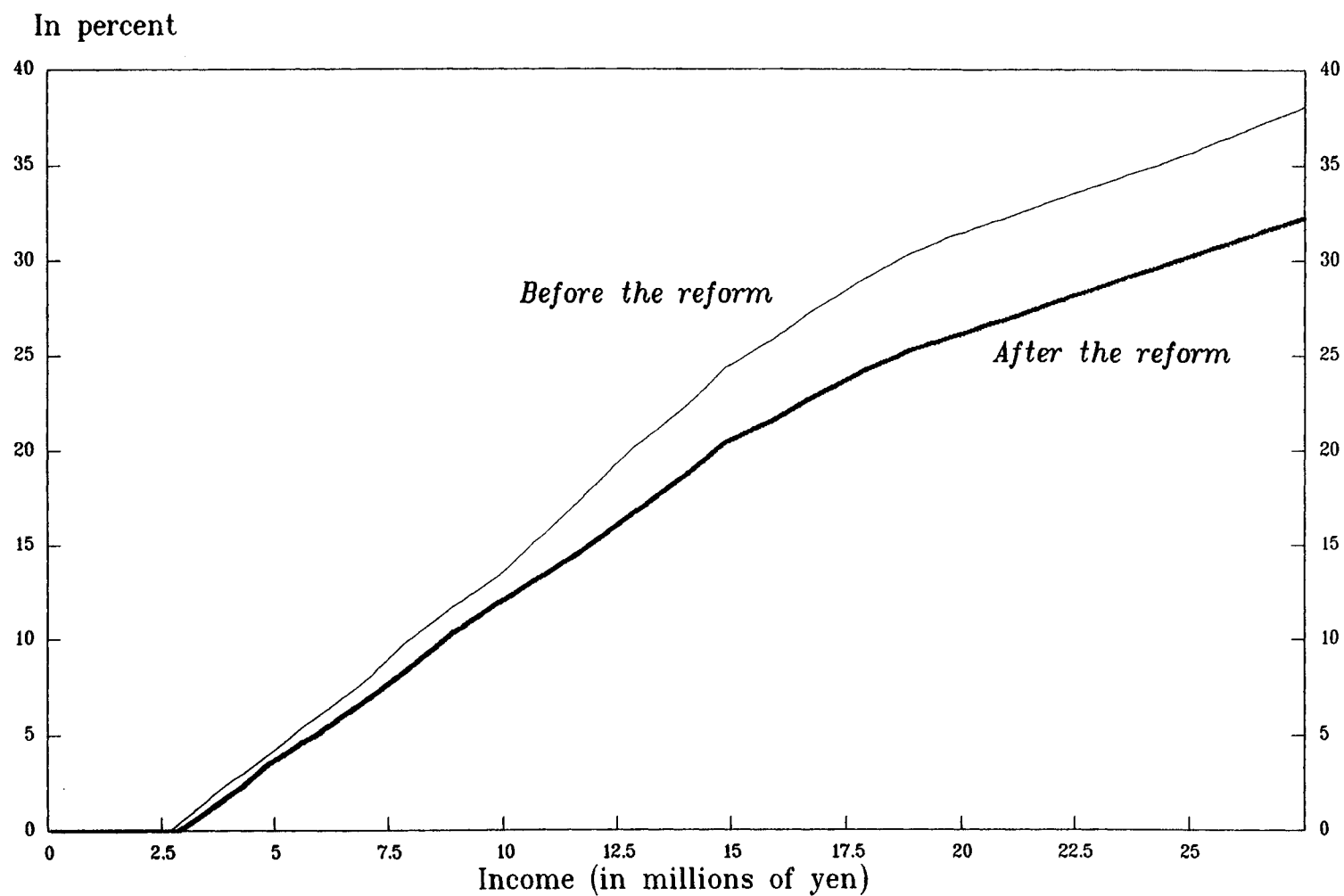
Income (In millions of yen)	Effective Rate (In percent)		
	Before the Reform	After the Reform	Change
4	2.3	1.6	0.7
5	4.0	3.5	0.5
6	5.9	5.0	0.9
7	7.6	6.6	1.0
8	9.8	8.3	1.5
9	11.7	10.3	1.4
10	13.3	11.9	1.4
11	15.6	13.4	2.2
12	17.8	14.9	2.9
13	20.9	17.3	3.6
14	22.5	18.8	3.7
15	24.3	20.4	3.9
20	31.3	26.0	5.3
25	35.5	30.1	5.4

Sources: Data provided by the authorities; and staff calculations.

1/ National and local taxes combined.

2/ A married employee with two dependent children.

CHART II.3
JAPAN
EFFECTIVE RATE OF INCOME TAXES, BEFORE AND AFTER THE REFORM 1/



Sources: Data provided by the authorities; and staff calculations.

1/ National and local taxes combined. A married employee with two dependent children

Comparing those two effects, the overall impact on the after-tax income of individual taxpayers varies depending on income levels and sources. As shown in Table II.4, the decline in effective rates from the income tax reduction exceeds 2 percent at an income level slightly above ¥10 million: the net effect of the reform on after-tax income is thus positive for those whose income is greater than ¥10 million, and negative for those whose income is below that level. Two factors should be noted here. First, the elderly tend to be classified as "low-income," as investment income is taxed on a separate basis. ^{1/} Second, given the existing practice of "underreporting" by the self-employed and farmers, income levels of these groups may be measured to be lower than their actual income, resulting in smaller actual gains from income tax cuts. Taking into account these factors, typical effects on after-tax income can be described as follows: (i) positive for middle- and upper-income individuals who rely mostly on labor income as income sources, such as middle-aged salary earners; (ii) negative for those who rely mostly on income sources other than labor, such as retirees; and (iii) negative for those who substantially benefit from underreporting of their income, including some of the self-employed and farmers. A shift of tax burdens from the working generation to the elderly, and from salary earners to broader groups of people will generally occur.

b. Labor supply

It is hoped that the reform will reduce the detrimental effect of taxes on incentives to work. The Government appears to assume that a slower rise in marginal income tax rates *a priori* has positive impacts on labor supply. However, careful examination is necessary in light of the measures in the reform package.

In analyzing the effects of the reform on labor supply, there are two key issues: how the reform alters after-tax real wages (the relative price of leisure); and how changes in after-tax real wages affect labor supply. After-tax real wages represent the opportunity cost of leisure, namely, the price at which leisure can be converted into work, income from which is to be used to buy consumption goods. In general, a reduction in income tax progressivity lowers applicable tax rates at the margin, and hence, raises after-tax real wages; an increase in the consumption tax raises the cost of consumption, which reduces after-tax real wages. Thus, whether the reform increases or decreases after-tax real wages depends on the relative size of these two effects.

As shown in Chart II.2, the reform lowers the marginal income tax rate by 10 percent for most taxpayers in middle- and upper-income classes (income over ¥10 million). In contrast, the increase in the consumption tax raises

^{1/} Investment income is taxed separately from other sources of personal income, and the applicable tax rates are independent of other personal income tax rates. See discussion below.

costs of consumption uniformly (including at the margin) by 2 percent for all income levels. Thus, for the majority of taxpayers whose applicable marginal income tax rates are reduced by 10 percent, the reform increases after-tax real wages, while for some taxpayers whose applicable marginal income tax rates remain unchanged, the reform decreases real wages.

Regarding how changes in after-tax real wages affect labor supply, economic theory is agnostic, with the income and substitution effects generally working in opposite directions. While higher income from higher wages increases the demand for leisure (the income effect), the higher relative price of leisure reduces the hours of leisure consumed (the substitution effect). The net effect can be empirically estimated and identified as the elasticity of labor supply with respect to after-tax real wages.

Although there are few econometric estimates of the wage elasticity of labor supply in Japan, it is generally thought to be small. There is a strong consensus among economists and tax specialists that male labor supply is little affected by changes in income taxation, in part because of the weight given to tenure and seniority in determining salary levels. ^{1/} For married women, who are typically the secondary income earner in a household, available estimates indicate that the labor supply elasticity with respect to household income is small and negative. ^{2/ 3/}

To summarize, the presumption that the reform package would improve incentives to work is true only if: (a) the focus is on middle- and upper-income taxpayers; and (b) the labor supply elasticity is positive for that group of taxpayers. In the event, as the labor supply elasticity appears to be small, the overall effects of the reform on labor supply are likely to be insignificant.

c. Savings

The staff study last year noted that a revenue-neutral shift from direct to indirect taxes in Japan would not alter savings incentives given the separate taxation on investment income, but would increase the aggregate savings rate to compensate for higher tax burden during retirement. ^{4/} As the final reform package includes virtually no measures to alter taxation on

^{1/} See, for example, Tachibanaki and Ichioka (1990).

^{2/} Higuchi (1984) presented estimates of labor supply elasticities for married women. The elasticity with respect to household income was estimated to be -0.24, while the elasticity with respect to their own wage was estimated to 1.1.

^{3/} For other industrial countries, most empirical studies suggest that the wage elasticity of labor supply is positive, and is greater for women than men (see Hagemann, et al., 1987).

^{4/} See Chapter I of "Japan--Recent Economic Developments--Supplementary Material" (SM/94/185, Supplement 1, 7/22/94).

investment income and corporate income, there is little need to update last year's study on this issue.

In short, the reform package has no effects on saving incentives, because it does not alter the after-tax rate of return on saving, and hence, the relative price of future to current consumption. The package, however, would increase aggregate savings, because it shifts tax burdens from working to elderly populations and boosts the after-tax income of working generations, who typically have a higher propensity to save than the elderly.

d. Equity

The horizontal equity of the tax system has been enhanced by the reform. The capacity of the self-employed and farmers to evade taxes through the underreporting of income, as compared with salary earners, has been reduced by the shift from the taxation of income to consumption. Also, the reduction in special treatment in the consumption tax enhances horizontal equity. 1/

At the same time, the package has reduced the degree of vertical equity of the tax system. However, the issue of whether this reduction represents a cost or benefit of reform is more controversial. 2/ The package can be described as sacrificing some vertical equity for the sake of horizontal equity. In contrast, the authorities' underlying stance--which is indicated in the reform objective of rectifying unduly heavy tax burdens on middle-income salary earners--is that the progressivity of income taxes before the reform was excessive, and hence, the reduction in progressivity serves to achieve a "better" degree of vertical equity. This idea seems to be widely shared and supported in Japan, where the distribution of income is already one of the most equal among the industrial countries. 3/

e. Revenue

The finalized reform package was designed to be neutral in terms of its overall impact on revenue. The effect of the permanent income tax cut on revenue is estimated to be ¥3.5 trillion yen (3/4 percent of GDP) in 1995, equivalent to about 10 percent of total revenues from personal income taxes before the reform. Combined with a temporary cut of ¥2 trillion (1/2 percent of GDP), the same size of income tax cut as in 1994

1/ The small businesses eligible for special treatment include many self-employed and most farmers.

2/ Iwata (1994), for instance, observed that reducing progressivity does not necessarily mean losses in vertical equity, as it depends on the judgement of the optimal level of vertical equity.

3/ Tachibanaki and Ichioka (1990) argued that a considerable number of Japanese do not prefer too much tax progressivity, and thus, too strong a degree of vertical equity.

(¥5.5 trillion, or 1 1/4 percent of GDP) is maintained during 1995-96. As other permanent tax reductions totaling ¥0.7 trillion were implemented in 1994, ^{1/} the size of the tax cut amounts to ¥6.2 trillion per year in 1994-96.

Each percentage point increase in the consumption tax rate is estimated to generate net additional revenue of ¥2.1 trillion (gross revenue increase less the increase in the Government's tax payments). Therefore, the increase in the consumption tax rate from 3 to 5 percent will raise revenues by ¥4.2 trillion in 1997. In addition, the reduction in special treatment for small enterprises is estimated to increase revenues by ¥0.3 trillion. As the temporary income tax cut will be discontinued in 1997, net effect of the reform on revenue will be slightly positive (¥0.3 trillion) in 1997 and thereafter (Table II.5). Offset by incremental debt service payments stemming from the bond-financing of the income tax cuts during the staggered period, the impact on overall revenue of the reform is broadly neutral.

5. Scope for further reform

Various issues have been left for future reform initiatives. Some of the major issues are noted below.

a. Taxation of social security benefits

As the final reform package ended up being revenue neutral, measures to raise tax revenue should continue to be sought in light of the large existing deficit and the fiscal strains that will result from future population aging. In this context, in addition to a further increase in the consumption tax rate, strengthening taxation of social security benefits could be a viable option for raising revenues.

The current taxation of public pensions is very light. At the contribution level, they are not taxed statutorily: an employer's contribution is deducted from its corporate income, while an employee's contribution is also deducted in full from personal income as a "social insurance premium deduction." At the benefit level, in principle, pension income is subject to the personal income tax schedule, aggregated with other sources of income. However, because of the generous deductions--special deductions for pension income and a personal elderly deduction ^{2/}--the

^{1/} These measures include: the abolition of the special corporate surtax (¥0.3 trillion), a reduction in the inheritance tax (¥0.3 trillion), and a reduction in the consumption tax rate on automobiles from 4.5 to 3 percent (¥0.1 trillion).

^{2/} In addition to a personal basic deduction, an individual over 65 years old is eligible for an elderly deduction of ¥500,000.

Table II.5. Japan: Revenue Effects of the Reform, 1994-97

(In trillions of 1995 yen)

	1994	1995	1996	1997
Permanent measures	-0.7	-4.2	-4.2	0.3
Income tax	--	-3.5	-3.5	-3.5
Consumption tax	--	--	--	4.5
Rate increase				4.2
Reduction in special treatments				0.3
Other measures	-0.7	-0.7	-0.7	-0.7
Temporary measures				
Income tax	-5.5	-2.0	-2.0	--
Net revenue effect	-6.2	-6.2	-6.2	0.3

Source: Data provided by the authorities; and staff estimates.

tax threshold is effectively raised, which makes most pensioner households tax-exempt. 1/

The generous deduction structure for the elderly has generally been justified by their weak financial situation. However, as statistics indicate that elderly households are not poor on average, 2/ there seems to be a case for increasing taxation of pension benefits. The revenue implications of this measure would be substantial, amounting to, for example, ¥5.2 trillion (over 1 percent of GDP) in 1995, based on a hypothetical average taxation rate of 20 percent.

b. Taxation of investment income

The package includes no measures to alter existing distortions in the taxation of investment income. Taxes on investment income in Japan are "schedular" in nature: separate systems are applied to each type of investment income independently of other sources of income. Almost all interest income is taxed at a flat withholding tax rate of 20 percent (combined 15 percent national tax and 5 percent local tax). On capital gains, taxpayers have the option of paying either a 26 percent--combined national (20 percent) and local (6 percent)--flat rate on realized capital gains, or a flat rate of 1 percent on gross proceeds (regardless of realized capital gains) by means of a withholding tax. Dividend income is in principle aggregated with other income and subject to taxes on the combined amount under the progressive schedule; however, taxpayers have an option to pay a flat rate withholding tax on dividend income less than ¥500,000 for each individual stock holding per year (20 percent for less than ¥100,000, and 35 percent for ¥100,000-500,000), which is chosen in almost all cases. The above-described differential tax treatment of various forms of savings typically leads to differential treatment of investment in various assets,

1/ For example, the tax threshold for a retired couple with a household head aged 65 or over is about ¥3.3 million, as opposed to ¥2.1 million for a working-aged couple. It should be noted that investment income is taxed separately.

2/ According to the Report on National Consumption Survey by the Management and Coordination Agency, total household assets and net savings are largest for elderly households (with a head aged 65 or over) of all generation groups. Even in flow terms, if compared on the basis of an average annual income divided by the number of people in a household, the average elderly household (¥1.92 million) is more affluent than the majority of households with a working-aged head (¥2.43 million, ¥1.88 million and ¥1.62 million for the head aged in the 50s, 40s and 30s, respectively).

implying an inefficient allocation of capital across activities. 1/ In particular, the differential treatment, coupled with the existing corporate income tax, creates a major distortion between debt and equity financing for corporations.

The current system significantly favors debt financing, which stems from two factors: the double taxation of dividend income, and the differential tax treatment for dividend and interest income. As a firm's income is measured for tax purposes from its owners' viewpoint, interest payments are deducted from the firm's taxable income; corporate income paid out as interest is taxed only once at the creditor level at a flat rate of 20 percent. In contrast, corporate income paid out as dividends is taxed twice, once at the corporate level and again at the shareholder level. On top of this double taxation, dividends are generally more heavily taxed than interest in the hands of the recipient. Consequently, as shown in Table II.6, total tax charged on dividends is much higher than on interest; the system favors the use of debt finance, where the return to the provider of funds takes the form of interest payments, over equity, where the return is provided in the form of dividends. Neutrality in treatment can be achieved by introducing a dividend deduction under the corporate income tax. Alternatively, removal of the present corporate deduction for interest payments could be considered. 2/ In either case, equal tax treatment between interest and dividend income is necessary to remove the distortion between debt and equity financing.

Another source of distortion is the different treatment of capital gains. However, this issue is more controversial. First, capital gains are practically impossible to measure as they accrue, since valuation of all the assets of each taxpayer at the appropriate market prices at the end of each period appears impracticable. Postponement of the tax liability until gains are realized provides a rationale for differential treatment of capital gains relative to income that is received in the form of cash. Second, the "turnover" option--1 percent of the sales value regardless of the realized capital gains--is currently chosen in most cases. As this option was adopted in view of the administrative difficulty in assessing capital gains even after their realization, a measure to allow authorities to capture realized capital gains for each taxpayer--such as a taxpayer identification

1/ More fundamentally, there is a discussion as to a comprehensive versus scheduler income--some have argued for the introduction of a comprehensive income tax, which aggregates all sources of income and applies a progressive income tax schedule. However, the separate taxation on investment income itself seems to be widely supported in Japan, in view of the fact that an income tax on investment returns involves double taxation of savings.

2/ This is one of the central features of the recent proposal for a "comprehensive business income tax" by the U.S. Treasury. See U.S. Department of the Treasury (1992).

Table II.6. Japan: Effective Tax Rate for Debt versus Equity Financing

	Debt Financing	Equity Financing
<u>Corporate level</u>		
Before-tax profits (A)	100	100
Interest payments (B)	50	--
Corporate income tax (C) <u>1/</u> [$((A) - (B)) * 50\%$]	25	50
Dividend payments	--	50
<u>Recipient (creditor/shareholder) level</u>		
Interest income (D)	50	
Personal income tax (E) [$(D) * 20\%$]	10	
Dividend income (F)		50
Personal income tax (G) [$(F) * 35\%$ <u>2/</u>]		17.5
Total tax [(C) + (E) or (G)]	35	67.5
Effective tax rate	35 percent	67.5 percent

Sources: Data provided by the authorities; and staff estimates.

1/ The effective rate of corporate income tax (national and local taxes combined) is about 50 percent.

2/ A 35 percent tax rate is used here, as it is most commonly applied.

number system--is required as a prerequisite to the equal treatment of the capital gains and other investment income.

c. Measures for greater horizontal equity

While a shift from income to consumption taxes enhances horizontal equity, compliance problems for income taxes would remain an important concern for horizontal equity as long as income taxes continue to be the largest source of tax revenue. As an administrative change that would significantly improve compliance of taxpayers outside the withholding system, a taxpayer identification number system could be considered. Such a system would also help reduce distortions in investment income taxation, as discussed above.

With regard to the consumption tax, as the weight of the tax increases, the special treatment of small enterprises threatens horizontal equity to a greater extent. Efforts to reduce the scope of the special treatment and to enforce invoice requirements in claiming tax credits more strictly should be continued. Moreover, given the fact that small businesses eligible for the special treatment are mostly the self-employed and farmers, a taxpayer identification number system and stricter enforcement of invoice requirements, reinforcing each other, would reduce the scope for tax evasion by these groups by making their income and business activities more transparent.

d. Securities transaction tax and the land value tax

In view of stagnant equity prices and declining land prices, calls for reducing the securities transaction tax and the land value tax have recently been heightened. Although both taxes are related to the value of assets, the two taxes are imposed on different types of activity--transactions and holdings, respectively--hence, a separate examination is needed.

The securities transaction tax, introduced in 1953, is levied on transfers of securities in Japan at a rate ranging from 0.01 to 0.3 percent depending upon types of securities and transfers. The taxable base is the actual price if the transfer is by sale, and the estimated market price if the transfer is by means other than sale (such as exchange). Gifts and bequests are excluded from the "transfers." Receipts from the tax were in the range of ¥300-500 billion in 1991-94. ^{1/}

The business community has called for the abolition of the tax to vitalize transactions in securities markets. Since a transaction itself is not directly related to ability-to-pay nor benefits from budgetary expenditures financed by tax revenues, the rationale for this tax appears unclear. It is currently under review.

^{1/} During the period of the bubble economy, the receipts were buoyant, once exceeding ¥2 trillion in 1988.

The land value tax was introduced in January 1992 to increase the costs of landholding by increasing the effective tax rate on landholding. 1/ The tax is levied on owners and lessees of land at a rate of 0.3 percent of the total value (under the inheritance tax assessment) of all the land held by a taxpayer. Land used by owners as the primary residence, land used for rental housing, land used for public interests (such as hospitals, railways, and water and electric supply), farm land, and land valued at less than ¥30,000 per square meter are exempt from the tax. A taxpayer is entitled to deduct either of the following from the value of the taxable base: ¥1 billion (¥1.5 billion for individuals and certain small businesses); or ¥30,000 times the area in square meters of land held. Receipts from the tax were ¥600 billion in 1993. 2/

By increasing costs of landholding, the tax has been intended to serve two primary purposes as a means of land policy: reducing the preference for land among various assets; and encouraging the more efficient use of land. Declines in land prices do not necessarily mean that those purposes are no longer valid. 3/ Moreover, the tax would promote transactions of little-utilized land. Therefore, the case for reducing this tax is not unambiguous, despite strong calls from the business community, which is an important land owner. How to deal with this tax needs further examination in conjunction with a discussion of overall land policy management.

1/ In contrast to taxes on transaction, taxes on asset holding can be justified on the grounds of both benefit and ability to pay principles of taxation.

2/ Reflecting declining land values, receipts in 1994 are officially estimated to be ¥500 billion. Receipts exceeded ¥500 billion in 1992, although the rate was 0.2 percent in 1992 (as opposed to 0.3 percent from 1993).

3/ OECD (1994), for instance, argued for increasing this tax to promote more efficient patterns of land use.

III. Japan's Agricultural Policies: Past and Present

Agriculture is one of the most regulated sectors in the Japanese economy. Because of government controls, the price mechanism plays only a minor role in the markets for many agricultural products. The structure of various agricultural regulations has changed slowly in the postwar period and government intervention in agriculture intensified over the years, resulting in a protection level among the highest in OECD countries. While the Uruguay Round agreements on agriculture may accelerate structural adjustment in agriculture by making the levels of protection more transparent, Japan's agricultural sector will remain relatively protected by international standards over the medium term.

This chapter provides an update on recent developments in Japanese agriculture (Section 1) and agricultural policies (Section 2). Japan's commitments under the Uruguay Round Agreement on Agriculture are reviewed in Section 3. Section 4 discusses estimates of the costs of agricultural protection in Japan, and Section 5 discusses the prospects for a more competitive agricultural sector in the medium term.

1. Recent trends in Japanese agriculture

The decline in the size of Japan's agricultural sector accelerated during the last two decades. The share of agriculture in GDP fell by two thirds between 1970 and 1993, and the share in total employment by one third. The growth of agricultural production was consistently below real GDP growth (Table III.1). The difference was especially pronounced in the last fifteen years, as real growth in agriculture declined successively from 2.3 percent in 1981-85 to minus 2.3 percent in 1990-93. The decline in agricultural employment--on average, by 2.8 percent per year since the mid-1980s--was also pronounced.

Partly reflecting the rapid decline in employment, productivity growth in agriculture was relatively high (about 3.3 percent) and unit labor costs declined faster than in overall economy in the second half of the 1980s (Table III.2). In the 1990s, however, agricultural output declined so rapidly that these favorable developments came to a halt, despite the stepped up exodus of the agricultural work force.

Given the stable or slightly rising rates of per capita food consumption, the decline in agricultural production has led to a widening imbalance between food supply and demand. The self-sufficiency rate for all food fell from 77 percent in 1975 to 65 percent in 1992 (Table III.3). ^{1/}

^{1/} On a calorie basis, the decline in the self-sufficiency rate was less pronounced--from 54 percent in 1975 to 46 percent in 1993. However, this ratio fell to 37 percent in 1993 owing to a poor rice harvest.

Table III.1. Japan: Agriculture, Forestry, and Fisheries Selected Economic Indicators, 1971-93

(In percent)

	1971-75	1976-80	1981-85	1986-89	1990-93
<u>Share in GDP</u>					
Agriculture	5.6	4.6	3.4	2.7	2.3
Manufacturing	33.8	27.6	27.4	28.7	28.2
Services	10.4	11.4	13.2	15.0	16.1
<u>Real growth rate</u>					
Agriculture	2.5	-3.2	2.3	0.3	-2.3
Overall economy	4.5	4.6	3.7	4.4	2.5
<u>Relative prices</u>					
Agriculture/Manufacturing	2.6	5.3	-0.2	0.0	2.3
Agriculture/Overall economy	-0.3	0.5	-2.1	-1.4	0.6
Manufacturing/Overall economy	-2.8	-3.8	-1.2	-1.4	-1.7

Source: Economic Planning Agency, Annual Report on National Accounts (various issues).

1/ Calculated as the relative change in deflators for agriculture, manufacturing, and overall economy.

Table III.2. Japan: Employment, Productivity, and Unit Labor Costs
in Agriculture, Forestry, and Fisheries, 1986-93

(In percent)

	1986-89	1990-93	1991	1992	1993
<u>Employment growth</u>					
Agriculture	2.8	-2.8	-3.1	-2.3	-4.5
Overall economy	1.2	1.4	2.1	1.1	0.4
<u>Productivity growth</u>					
Agriculture	3.3	0.4	-4.6	4.6	-0.04
Overall economy	3.2	1.0	2.2	-0.04	-0.6
<u>Unit labor costs</u>					
Agriculture	-4.2	0.2	4.8	-8.1	0.8
Overall economy	-2.4	-2.2	-2.8	-3.9	-0.6

Source: Economic Planning Agency, Annual Report on National Accounts (various issues).

Table III.3. Japan: Food Self-Sufficiency Rates, FY 1965-FY 1993

(In percent)

	1965	1975	1985	1990	1991	1992	1993
Main commodities							
Rice	95	110	107	100	100	101	75
Wheat	28	4	14	15	12	12	10
Pulses	25	9	8	8	7	6	4
Soy beans	11	4	5	5	4	4	2
Vegetables	100	99	95	91	90	90	89
Fruits and tree nuts	90	84	77	63	59	59	54
Meat	90	77	81	70	67	65	64
Beef	95	81	72	51	52	49	44
Eggs	100	97	98	98	97	97	96
Milk and milk products	86	81	85	78	77	81	80
Fish, crustaceans and mollusks	109	102	96	86	86	83	76
Sugar	31	15	33	33	36	35	33
Self-sufficiency rate on a calorie basis	73	54	52	47	46	46	37
Self-sufficiency rate of cereals	62	40	31	30	29	29	22

Source: Ministry of Agriculture, Forestry and Fisheries (1994).

Notes: 1. Self-sufficiency rate in main commodities and cereals is measured as the ratio of the quantity of domestic production to the quantity of domestic consumption.

2. Self-sufficiency rate on a calorie basis is measured as the ratio of the amount of calories supplied by domestic products to the total amount of calories supplied.

Food imports rose considerably during this period and Japan became the largest net importer of agricultural products in the world. ^{1/}

The decline and aging of the farming population accelerated in the past two decades. The agricultural population declined from 23 million in 1975 (21 percent of the total population) to 13 million in 1993 (11 percent of the total). In 1990, two thirds of active farmers were over 55 years of age, compared with one half in 1985.

As a result of the constant outflow of the agricultural work force, increasing areas of farmland have been abandoned, underutilized, or uncultivated. Between 1975 and 1993, the area of cultivated land declined by 8 percent while the number of agricultural households dropped by 25 percent. However, the average farm size remained small (1.4 hectares) and only 13 percent of commercial farm households cultivated areas larger than 2 hectares in 1993. The number of Japanese farms that are incorporated is very small, with the total growing from about 3,200 in 1986 to 3,900 by 1993. Productivity of farmland declined for some major crops. In particular, rice output fell from 4.8 metric tons per hectare in 1975, to 3.7 metric tons per hectare in 1993. Given the high price of land in Japan, the suboptimal use of farmland indicates that efficiency gains could be realized by improving the allocation of land within the sector, as well as between agriculture and other sectors.

2. Evolving agricultural policy framework

a. Basic characteristics

Japan's farm support policies were developed over the last 50 years for two basic purposes (Hillman and Rothenberg (1988)). One purpose was to maintain domestic production of food in amounts and diversity consistent with the interests of national security. The other purpose was to enable farmers to enjoy a standard of living comparable with that in faster growing sectors without extensive rural depopulation. While these purposes are similar to those used in other industrial countries to justify government intervention in agriculture, the emphasis given to them in Japan has been much greater, partly because of the uniqueness of Japan's history, geography, and economic development.

The range of instruments used to protect Japan's agriculture, including border measures, price and income support, direct subsidies, credit, and investment grants, is standard among industrial countries (Hillman (1991)). Some of the support is budgetary and taxpayers bear the cost, while most is built into the price system so that the bulk of the cost falls on consumers.

^{1/} The share of food imports in the total value of Japan's imports increased by 2 percentage points to 17 percent between 1975 and 1994, while the share of food exports in the total value of Japan's exports declined by 1 percentage point to 0.5 percent in 1975-94.

What is distinctive about the instruments used to protect agriculture in Japan in comparison with other industrial countries, is the extent of state involvement in the supply and distribution of agricultural products (OECD (1987)). External trade, distribution, storage, and pricing of staple foodstuffs such as rice and wheat are handled almost exclusively by the state Food Agency.

Another noteworthy feature of agricultural policies in Japan is their product-specific nature, with no general system covering the sector as a whole (GATT (1995)). The extent of government control also varies widely. Protection is focussed on the traditional staples, particularly rice. This emphasis had two consequences. On the demand side, it reinforced the Westernization of the Japanese diet. Per capita consumption of meat, edible oils, and dairy products increased considerably over the past 20 years, while that of rice and vegetables declined (Table III.4). On the supply side, government protection of rice distorted the composition of farm output and encouraged patterns of land tenure and utilization that obstructed the adoption of efficient farming techniques (Van der Meer and Yamada (1990)).

The last distinctive characteristic of Japan's agricultural policy framework is the presence of strict controls on agricultural land tenure. The basis of Japan's land tenure system was established by land reform during the 1945-50 period, which created a large number of owner-farmers out of the prewar's landlord-tenure system (OECD (1987)). The Agricultural Land Law of 1952 aimed to protect the position of owner-farmers and tenants by introducing many restrictions on the holding and transfers of farmland. 1/ Among them were the setting of an upper limit for possessions of farmland per farmer (1 hectare, except for Hokkaido), and state control of rents, which reduced incentives for part-time farmers to lease out their holdings. Transfers of farmland were subject to the authorization of public bodies. These restrictions were subsequently relaxed, but many stringent regulations remained in force. 2/ Together, these factors constrained the possibility for increasing the operational size of farms. Another disincentive for farmers to enlarge their farms through land purchase was the rapid increase in the price of farmland during the 1960s and 1970s. As the price of farmland rose faster than the return to land in its use for agricultural production, the price of agricultural land exceeded the present value of an agricultural income stream (Hayami (1988)).

1/ This system evolved from the regulations introduced during the War in order to protect the families of the soldiers who had to leave the farms.

2/ For example, permission of the agricultural commission or the government of the prefecture was necessary for setting up or transferring the legal right for possessions, leasehold, and other uses of land (OECD (1987)). The transfer of farmland to other uses required a permission of the governor of the prefecture or the MAFF. Landlords needed to demonstrate just cause in the civil court in order to claim a return of their land from tenants.

Table III.4. Japan: Annual Consumption of Food Per Capita, 1975-93

(In kilograms)

	1975	1980	1985	1990	1991	1992	1993
Cereals	121.5	112.9	107.9	103.5	103.3	103.0	...
Rice	88.0	78.9	74.6	70.0	69.9	69.7	69.2
Wheat	31.5	32.2	31.7	31.7	31.7	31.6	32.2
Vegetables	109.4	112.0	110.2	107.2	105.0	106.7	102.7
Fruits and nuts	42.5	38.8	36.8	37.4	35.1	38.7	38.5
Meat	17.9	22.5	25.1	28.5	28.9	29.5	29.9
Eggs	13.7	14.3	14.9	16.5	17.4	17.7	17.9
Milk and milk products	53.6	65.3	70.6	83.2	84.8	83.6	83.6
Fish and shellfish	34.9	34.8	35.8	37.1	35.9	36.3	36.7
Sugars	25.1	23.3	21.7	21.0	20.9	20.3	19.3
Edible oil	10.9	12.6	14.0	14.2	14.0	14.2	14.4

Source: Ministry of Agriculture, Forestry and Fisheries (1994).

b. Pre-Uruguay Round agricultural regime

Japan's existing agricultural policy framework has its origins in the rice-centered agricultural regime that evolved since the Second World War (Kawagoe (1993)). The food security doctrine, which is still one of the tenets of Japan's agricultural policies, is based on the importance of rice as the single largest product in terms of both food consumption and farm output. In FY 1989, rice accounted for 6.5 percent of the average family's spending on food and 26 percent of the average family's calorie supply (Food Agency (1991)). About 30 percent of gross agricultural output is accounted for by rice. To secure a stable supply of rice, the Government has taken the approach of intervening directly in both the production and distribution of rice (Food Agency (1992)).

Historically, measures affecting the distribution of rice were introduced before those affecting the supply of rice (Minami (1993)). Rice trading was unrestricted prior to the 1920s, but after the Rice Riots of 1918, the Government adopted measures to store surplus rice and eliminate speculation in the rice trade (Food Agency (1992)). These measures were bolstered by the Food Control Law of 1942, under which the Government established permanent and systematic control of the rice trade. The Food Control Law was designed to ration the distribution of all staple food items during the severe shortages of the War and its immediate aftermath. As the food supply recovered, the compulsory elements of the Law were gradually relaxed for most food items. In 1952, wheat and barley distribution was shifted from direct to indirect control based on government purchase at minimum guarantee prices to producers. ^{1/} Since 1952, rice has been the only commodity whose distribution remains under direct government control.

Initially, the Food Agency, an administrative arm of the Ministry of Agriculture, Forestry, and Fisheries (MAFF), directly controlled the whole process of marketing rice and other staple foodstuffs from producers to consumers, and regulated prices from the farm-gate to the retail level. The Food Agency also maintained (and effectively still maintains) a monopoly on imports and exports of rice. In an effort to reduce the deficit of the rice marketing program, the Government introduced the so-called "voluntary rice" channel in 1969, under which cooperatives could sell directly to wholesalers at a negotiated price. The quality and total quantity of rice that each producer could sell through either (or both) official channels was determined by the Food Agency (Food Agency (1993)). In 1972, the control on marketing channels from wholesalers to consumers was removed, and retail pricing became free. However, the continued control of the wholesale marketing gave rise to illegal marketing of rice, which was estimated at

^{1/} From 1955, however, most domestic wheat and barley was sold to the Government (Ministry of Agriculture, Forestry, and Fisheries (1993)). As with rice, all wheat and barley imports require Government permission and must be sold to the Government.

about 15 percent of rice distributed through the two official channels (Hayami (1988)).

The Government's more direct involvement in the production of rice, as well as the entire agricultural sector, began in the early 1960s (Hillman and Rothenberg (1988)). While in Western countries the decline in the agricultural population had raised substantially the productivity of farming relative to manufacturing, in Japan the manufacturing sector had achieved a decisive comparative advantage over agriculture (Hayami and Ruttan (1985)). Also, the costs of production of Japanese farmers had become very high relative to those in exporting countries because new, cost-effective farming techniques could not be applied on Japan's predominantly mountainous terrain, while efficient-size farms could not be formed under Japan's restrictive laws on the transfer and leasing of land. Given these disadvantages, if the allocation of resources and mobility of manpower had been left to market forces and trade were free, the result would probably have been socially unacceptable levels of farm production and farm income (Hillman and Rothenberg (1988)). In response to these disagreeable prospects, in 1961 the Government passed the Agricultural Basic Law, which was aimed at correcting the distribution of income and retarding the transfer of resources from agriculture.

The principal means for maintaining rural-urban income parity became price and income supports for rice and--since the mid-1960s--the prohibition of rice imports. 1/ Rice prices were set according to the Production Cost and Income Compensation Formula. In this formula, the price of rice was determined by the cost of production at the paddy field in which yield per hectare was lower than the national average by one standard deviation, while wages for family labor were valued by non-farm labor in order to guarantee fair return for the labor of rice producers (Hayami (1988)). 2/ These measures provided a stimulus to production, and by the mid-1960s rice surpluses appeared and mean levels of income of farmers began to rise.

As average per capita incomes doubled in real terms during the 1960s and rice consumption declined both absolutely and relative to total household consumption expenditure, the rice price increases were initially not strongly resisted. However, as domestic production expanded in excess of consumption, large surpluses of rice accumulated in government storage, pressing hard on current budgetary expenditures in the form of increased storage costs (Food Agency (1992)). In addition, as the inventory was carried over time, the quality of rice deteriorated and rice had to be

1/ In addition to these policies, border measures, price supports, and input subsidies for agricultural products other than rice were introduced or reinforced (Hayami (1988)).

2/ Since 1990, average production costs have been based on those prevailing on larger and more efficient farms.

disposed of for uses other than domestic food, resulting in large capital losses. 1/

Another unintended consequence of rice policies was structural adjustment in the agricultural labor market in the form of "partial disengagement" (Hillman and Rothenberg (1988)). Rather than selling the farm and moving to a new location to seek nonfarm work, many farmers had found outside employment on a temporary or full-time basis, while one or more members of the household remained on the land to maintain the farm. 2/ High price support for rice and the ease of marketing it through the Food Agency have induced these part-time farmers to specialize in rice farming. The rising trend in mean levels of income in farm households owed much to the comparative prosperity of part-time farmers. For those families who continued to depend wholly on agriculture for their livelihood (about one third of total farm households), income disparities remained. 3/ Part-time farmers thus felt no inducement to leave agriculture altogether, while professional farmers still had good reason to take outside jobs whenever the opportunity arose (Hillman and Rothenberg (1988)).

In 1969, after three consecutive large harvests, controls on rice acreage were introduced to prevent the accumulation of surplus rice and shift resources into production of other crops (MAFF (1992)). The early set-aside programs met with only limited success, and higher subsidies had to be provided to encourage farmers to diversify into crops other than rice (Coyle (1981)). 4/ Stimulus to rice production continued, however. The sharp increases in world food prices during 1973-75, coupled with the U.S. soybean embargo, stirred up public anxiety and reinforced food security arguments (Hillman and Rothenberg (1988)). As a result, rice prices rose by about 15 percent between the mid-1970s and early 1980s.

1/ Government losses from rice-trading operations increased from ¥67 billion in 1965 to about ¥200 billion in 1970, and ¥390 billion in 1975.

2/ Part-time farmers who derived the major part of their income from nonagricultural activities represented 70 percent of commercial farm households in 1993, compared with 20 percent in the mid-1950s (MAFF (1994)).

3/ The incomes of full-time farm households with no outside sources of income declined from about 93 percent of the average income of salaried workers in 1980, to about 88 percent in 1993. Farm households deriving only a minority of their income from agriculture (i.e., part-time farmers) remained in the most favorable position, with an average annual income over 16 percent higher than that of the average salaried worker in 1993 (GATT (1995)).

4/ In recent years, however, the diversion continued to exceed the target area (OECD (1995)). From 1990 to 1992, 830,000 hectares (about one third of Japan's total rice-paddy area) were converted to other crops or other agricultural uses. The new set-aside program ("Vitalization Program for Paddy Field Farming") is currently in operation for the period 1993-95; the target acreage of this program is 600,000 hectares in 1995.

By the early 1990s, the public became aware of the substantial food cost differential between Japan and other countries. The business federations, which stood to benefit from the Uruguay Round, adopted a strongly antiprotectionist position on agriculture given that agricultural trade issues emerged as the key to the completion of the Uruguay Round (Rapkin and George (1993)). In addition, Japan's trading partners exerted strong and continuous pressure on Japan to open its agricultural markets. Under these diverse pressures, the Government developed a new set of agricultural policies in 1991-92, and subsequently accepted the Uruguay Round Agreement on Agriculture.

c. New policies for food, agriculture, and rural areas

A new concept of agricultural policies was presented in "The Basic Direction of New Policies for Food, Agriculture, and Rural Areas" (New Policies) (MAFF (1992)). The New Policies recognized that the gap between rural and urban incomes had not been closed, and that many inefficiencies remained in agriculture. Accordingly, the New Policies aimed to establish a more market-based agricultural regime. However, the rationale for the old regime was not completely renounced, but rather refined by introducing a number of public goods arguments. Thus, the New Policies argued that the Japanese-style dietary pattern, which had produced the world's longest life expectancy, had the characteristics of a public good and as such had to be preserved. ^{1/} The New Policies also argued that agriculture was contributing public goods such as protecting the environment, national land, and rural resources, the value of which could not be measured solely in economic terms. ^{2/} Given these special roles and characteristics of agriculture, a certain level of border measures and domestic agricultural support was deemed necessary to maintain agricultural production and secure domestic food supply.

The New Policies established a broad range of goals for Japanese agriculture by the year 2000. These goals included: ensuring the most efficient production possible and implementing measures to reduce the gaps between domestic and international prices; sustaining domestic production and food self-sufficiency rates at the highest possible level; improving the demographic structure of agricultural population; developing nonagricultural sectors in rural areas; and protecting consumers' interests in respect of food quality, safety, and the environment.

^{1/} The Japanese diet is the only one among major industrial countries that conforms with the ideal nutritional balance in terms of the calorie supply from proteins (12-13 percent), carbohydrates (57-68 percent), and fats (20-30 percent) (Food Agency (1991)).

^{2/} According to the Government, "Rice paddies contribute to the preservation of Japan's land and natural environment through such functions as purifying water by removing nitrogen, and preventing floods and soil erosion" (MAFF (1992), p. 10).

To implement these multiple and often conflicting objectives, the New Policies advocated that a new structure of agricultural production centered around the so-called farm management bodies be established. These bodies were defined as farm units consisting of one or more farm households that would be capable of setting up a scheme of working hours and ensuring an income comparable to that of workers in other industries. The New Policies set the number of the farm management bodies at about 390,000-450,000 in the year 2000. About 40 percent of the farm management bodies would be engaged exclusively in rice farming (compared with 45 percent in 1990); another 40 percent would grow single crops other than rice; and the rest would be engaged in multicrop farming. Since the New Policies were introduced before Japan agreed to lift the ban on rice imports in the Uruguay Round, the proposals with regard to rice control were aimed only at relaxing certain restrictions on the distribution of rice.

With regard to the efficient scale of farm management in the year 2000, the New Policies expected this scale to fall in the range of about 10-20 hectares. ^{1/} The New Policies specified a number of measures to promote the expansion of farms, including the leasing of farmland, the commissioning or entrusting of farm work, and establishing land-use rights on farmland cultivated by farm management bodies. However, the New Policies stopped short of recommending further review of the Agricultural Land Law.

3. Uruguay Round agreements on agriculture

a. Japan's negotiating position in the Uruguay Round

The principal objective of the agricultural negotiating agenda in the Uruguay Round was the reduction of trade-distorting domestic and export subsidies, especially those of the European Community and the United States (Hathaway and Ingco (1995)). As Japan has no appreciable agricultural exports, it supported the reduction of export subsidies, but opposed the elimination of quantitative import controls and significant reductions of tariffs on agricultural products.

Japan's key demand in the Uruguay Round negotiations on agriculture was to maintain its food security policy in respect of rice (Hemmi (1994)). As rice is a minor product in world agricultural trade (only 3 percent of total production is traded on world markets), Japanese negotiators argued that rice policies were less distorting for overall agricultural trade than the subsidization policies of the major exporting countries, especially those of the European Community and the United States (Rapkin and George (1993)). The negotiators also pointed out that Japan was already making a positive contribution to world farm trade as the world's largest and fastest growing market for imported agricultural products, and that Japan had taken a number

^{1/} The average size of the farms operated by the farm management bodies was expected to be about 6 hectares in 2000, compared with the average size of commercial farms of 2.4 hectares in 1990.

of market opening measures during the 1980s, including unilateral tariff reductions and the 1988 concessions on beef and citrus imports.

Japan's demand for special treatment of its rice import ban proved to be a difficult case to make in negotiations with other major protagonists in the Uruguay Round, in particular the United States and the Cairns Group, who had sought global solutions to overcome agricultural exceptionalism (Hathaway and Ingco (1995)). 1/ They rejected Japan's argument that food security required 100 percent self-sufficiency. However, the rice issue was not pushed to center stage in agricultural talks because the U.S.-EC dispute consumed most of the time and attention in negotiations (Greenaway (1994)). Japanese negotiators thus adopted a passive stance ("minimalist strategy"), waiting for the U.S. and EC representatives to settle their disputes before considering to make any concessions on the rice issue (Hemmi (1994)). 2/

As the United States and the European Community resolved their disputes, Japan was left relatively isolated in its demand for maintaining the rice import ban and was subjected to pressure to accept the compromise proposal on minimum access to its rice market (Rapkin and George (1993)). Meanwhile, pressure was also building inside Japan to accept this proposal. Given Japan's substantial interest in the success of the overall Uruguay Round, Japanese negotiators agreed to a quota-based opening of the rice market in December 1993.

b. Summary of the Agreement on Agriculture

The Uruguay Round Agreement on Agriculture encompasses several broad areas: market access; domestic support; export subsidies; special provisions for developing countries; and constraints on the use of anti-subsidy actions. The process of agricultural trade liberalization began in 1995 and will last six years for industrial countries and ten years for developing countries. The market opening measures will be implemented according to a pre-determined schedule. A new round of negotiations on agricultural trade is scheduled to take place in the year 2000. This section discusses the agreements on market access and domestic support, which are of greatest relevance for Japan. 3/

1/ The Cairns Group, named after the Australian city where its members first met, included Argentina, Australia, Canada, Chile, Columbia, Fiji, Hungary, Malaysia, New Zealand, Philippines, Uruguay, and Venezuela. The Group pushed for elimination of export subsidies and reduction or elimination of domestic support policies.

2/ The Japanese media and many observers in Japan criticized this passive approach. In particular, it was felt that, during the Brussels ministerial meeting in December 1990, the Japanese delegation could have made concessions on the rice issue in the hope of breaking the U.S.-EC stalemate (Rapkin and George (1993), p. 86).

3/ For other agreements on agriculture and assessments of their impact, see FAO (1995), Ingco (1995), and OECD (1995).

The most significant aspect of the Agreement on Agriculture was a change in the rules regarding market access. Commitments in this area include tariffication, tariff reductions, and acceptance of minimum access limits.

Under tariffication, virtually all non-tariff barriers--quotas, variable levies, minimum import prices, discretionary licensing, state trading measures, voluntary restraint agreements, and similar border measures--must be abolished and converted into an equivalent tariff. Removal of non-tariff barriers was delayed in a few "special treatment" cases such as rice in Japan, Korea, and the Philippines; however, these countries had to introduce minimum access levels for imports at 4 percent of domestic consumption, rising to 8 percent over the implementation period. ^{1/} Also, import quotas on fishery products, a sector not included in the Uruguay Round, will continue.

As part of the tariff reduction agreement, virtually all tariffs on agricultural products need to be bound. ^{2/} Before the Uruguay Round, bound tariffs covered about 80 percent of the total value of agricultural imports in industrial countries; the corresponding shares for developing countries and transition economies were 25 percent and 54 percent, respectively. The new bound tariffs, including those resulting from tariffication and those which had been bound in previous negotiations, are to be reduced by 36 percent on a simple (unweighted) average basis over six years by industrial countries, with a minimum rate of reduction of 15 percent for each tariff item; the corresponding tariff reduction targets for developing countries are 24 percent and 10 percent, respectively, over a period of ten years. Special safeguard provisions allow the imposition of additional duties when there are either import surges or particularly low prices (both compared with 1986-88 levels). ^{3/}

Under minimum access commitments, countries agreed to maintain or generate minimum access opportunities for imports of commodities subject to tariffication. These commitments were necessary to ensure a minimum degree

^{1/} Special treatment was allowed on commodities which met the following conditions: (i) commodities that are major staples in the diet; (ii) imports less than 3 percent of domestic consumption at the base period; (iii) no export subsidies have been provided. This exemption will be reviewed in the final year of the implementation period.

^{2/} A binding defines the maximum tariff that can be applied at the border. If a tariff is bound at, e.g., 30 percent, any duty at the border greater than 30 percent is prohibited whether it is a tax levied by the government or a mark-up charged by a state-trading enterprise. Fisheries is one of the few sectors where a number of tariff rates will remain unbound.

^{3/} The price trigger is related to 1986-88 average prices expressed in domestic currency. The volume trigger is related to base period import/consumption ratios and varies from 105-125 percent of imports in 1986-88.

of market opening in situations in which the tariffication of old quotas seemed likely to lead to prohibitively high tariffs. Where imports were less than 3 percent of base-period consumption, minimum access commitments were set at 3 percent in 1995, rising to 5 percent in 2000. ^{1/} Where current imports were greater than 5 percent in the base period, this level of access ("current access") must be maintained. One incentive for exporting countries to fill the minimum access levels is reduced tariff (maximum of about 32 percent of the bound tariff rate) on such imports. ^{2/} Another incentive is that, in cases where exporters enjoyed preferential market access (or had voluntary export restraints agreements) in the past, their access opportunities were maintained under a "current access" provision. For the importing countries, the main incentive to grant minimum access was that trade arrangements under the old quota system were allowed to count as meeting the minimum access requirements. ^{3/}

The second major area of agricultural trade reform was the binding of domestic support levels. As the proposal to reduce domestic support on a commodity basis was not accepted, the new rules and bindings were established on the level of total domestic agricultural support, called Aggregate Measure of Support (AMS). The AMS includes border price support through tariff and export subsidies and is based on fixed external prices in the base period (1986-88). The Agreement on Agriculture specified the determination of the AMS, and required that industrial countries reduce their total AMS by 20 percent over the implementation period (13.3 percent for developing countries). However, the Agreement exempted several categories of domestic support measures, including: (1) measures which transfer to producers less than 5 percent of the value of production (10 percent in developing countries); (2) measures which are deemed to have minimal or no distorting impact on production or trade; ^{4/} and (3) payments to producers under the production-limiting measures. ^{5/} Some of these measures are controversial because they are not fully neutral with

^{1/} These access commitments apply to industrial countries. For developing countries, the minimum access levels were set at 1 percent in 1995 and 4 percent in 2004.

^{2/} A higher tariff is applied to imports (if any) above the minimum access level.

^{3/} For example, the U.S. Meat Import Law was translated into a minimum access system with the access given to the same countries which held previous quota rights (e.g., Australia and New Zealand).

^{4/} These measures are listed in Annex II of the Agreement on Agriculture ("The Green Box") and include government service programs (research, pest and disease control, training, infrastructure services, etc.); food security stocks; domestic food aid; structural adjustment assistance (e.g., for regional and environmental programs); and certain decoupled transfers and social security payments to producers.

^{5/} To qualify for this exemption, payments must be based on fixed areas or yields, on a fixed number of livestock, or on 85 percent (or less) of the base level of production.

respect to production (Ingco (1995)). For example, the EU compensation payments and the U.S. deficiency payments qualify as decoupled income support under Green Box provisions.

c. Agricultural market access commitments made by Japan

Japan accepted tariffication of all import quotas and other nontariff barriers, except in the case of rice. Existing import quotas on agricultural products are all to be converted into tariff quotas. 1/ Tariffication schemes differ by product category and can be quite complicated because they are intertwined with minimum access and tariff reduction commitments (Box 1). In many cases very high tariffs will replace previous import restrictions (Table III.5). Thus, the main effect of the Uruguay Round will be that the above-quota imports of such products as wheat, barley, dairy products, and raw silk, will be unrestricted from 1995 on, provided the relevant tariffs and charges are paid. The in-quota imports will continue to be handled by state trading agencies.

The scope of Japan's tariff bindings in agriculture will rise from 58 percent to 99 percent after the Uruguay Round, with the remainder being rice and rice products. Japan will also implement the mutually agreed tariff reduction of 36 percent on average over six years, with a minimum reduction of 15 percent. 2/ Several major products will be affected by the tariff cuts (Table III.6).

1/ A tariff quota is a quantitative threshold (i.e., a quota) on imports during a given period beyond which a higher tariff is applied. The lower tariff applies to imports below the quota (i.e., the "in-quota" imports).

2/ The number of duty-free lines in agriculture will rise from 319 (23 percent) to 381 (27 percent), and the number of lines subject to special safeguard requirements will be 144 (10 percent of agricultural tariff lines) (GATT (1955)).

Box 1. Tariffication Scheme for Dairy Products

At present, seven dairy product items are designated as government import items and are imported exclusively by the Livestock Industry Promotion Corporation (LIPC). The LIPC imports such dairy products within a prescribed volume to stabilize their prices when the domestic market becomes tight and market prices rise above a certain level. From FY 1995, the import restriction is to be lifted under Japan's market access commitment for dairy products (137,000 tons of raw milk equivalent per year in 1995). This "current access" volume is based on actual imports for FY 1986-88. The current level of tariffs will be applied to government imports within this access volume. The domestic selling price will be equal to the tariff inclusive import price plus the LIPC markup on imports (Figure III.1).

Private imports beyond the minimum access volume will be allowed, but a surcharge in the form of a (specific) tariff equivalent will be imposed on private imports at a rate higher than the LIPC import markup. Under the tariff reduction commitments, both the import markup for state trading and tariff equivalents for private imports have to be reduced by 15 percent by the year 2000.

The tariff quota system will also apply to dairy products that are not state trading items and were imported under quantitative restrictions in the past. GATT estimates suggest that the ad valorem equivalents for the "above quota" imports of such items amount to several hundred percent. In most cases, these tariff levels will be reduced by 15 percent over the next six years, a minimum reduction in tariffs allowed under the Uruguay Round Agreement on Agriculture.

Table III.5. Japan: Tariffication of Major Agricultural Products in the Uruguay Round

Product	Tariff quota (^{'000 tonnes})		In-quota tariff rate (In percent)	Initial bound rate	Ad valorem equivalent ^{1/} (In percent)	Final bound rate
	Initial	Final				
Wheat	5,565	5,740	0-25	¥65-158/kg	413-482	¥55-134/kg
Barley	1,327	1,369	0-25	¥46-130/kg	306-357	¥39-111/kg
Maize, potatoes	157	157	25	¥140/kg	480	¥119/kg
Dairy products for general use	125	134	12-35	25%+¥63/kg- 35%+¥1,363/kg	373-614	21.3%+¥54/kg- 29.8%+¥1,159/kg
Dried leguminous vegetables	120	120	10	¥417/kg	531	¥354/kg
Raw silk	0.8	0.8	7.5	¥8,209/kg	212	¥6,978/kg

Source: GATT (1995).

^{1/} Based on base-period (1986-88) prices and initial bound rates.

Note: Tariff quota refers to current and/or minimum access commitments. In-quota tariff rate is applied to imports within these commitments. Imports above minimum commitments are subject to bound rates; shown here are the initial bound rate for 1995 and its ad valorem equivalent, and final bound rate in 2000.

Table III.6. Japan: Major Tariff Cuts in the
Uruguay Round, 1994-2000

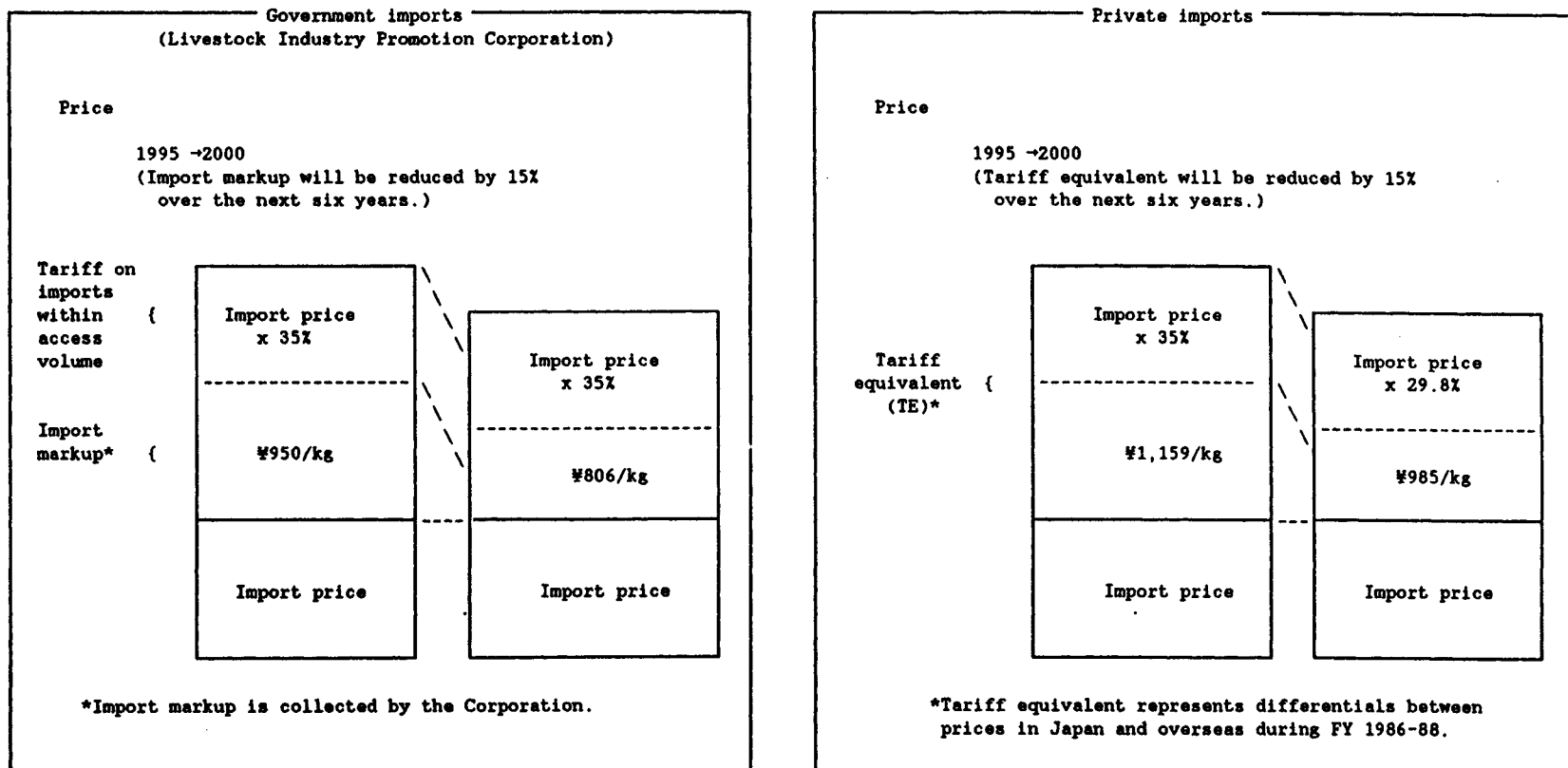
(In percent)

	Base Tariff (1994)	Final Tariff (2000)
Beef	50.0	38.5
Oranges		
December-May imports	40.0	32.0
June-November imports	20.0	16.0
Non-processed cheese	35.0	29.8
Ice cream	28.0	21.0
Candies	35.0	25.0
Agricultural products <u>1/</u>	14.5	9.3
Wood products	2.0	1.0
Fishery products	6.1	4.1

Source: GATT (1995).

1/ Simple tariff average on ISIC basis. Base rate refers to the 1988 bound rate; post-UR rate does not include tariffication.

Figure III.1. Japan: Tariffication Scheme Applicable to Dairy Products (Butter as an Example)



Sources: Industrial Bank of Japan, based on information from Ministry of Agriculture, Forestry and Fisheries.

With regard to rice, Japan did not accept tariffication, but permitted for the first time rice imports on a regular basis as part of its minimum access commitments. An initial tariff quota was established at 379,000 metric tons (4 percent of domestic consumption in 1986-88), growing to 758,000 metric tons (8 percent of base-year consumption) in the year 2000 (Table III.7). The Food Agency will assume responsibility for purchases and sales of imported rice, and trading companies will conduct the actual imports on the basis of contracts with the Agency. Imports will be conducted on a global basis, without setting quotas by country. In terms of distribution, imported rice will be treated the same way as domestic rice.

Table III.7. Japan: Rice Imports under the
Uruguay Round, 1995-2000

(In percent)

	<u>Share of Base-Year Consumption</u>	
	Total Imports	Free Imports ^{1/}
1995	4.0	0.05
1996	4.8	0.11
1997	5.6	0.22
1998	6.4	0.38
1999	7.2	0.58
2000	8.0	0.80

Source: Data provided by the Japanese authorities.

^{1/} Imports allowed under simultaneous buy-and-sell system.

As in the case of tariffied products, the Food Agency will impose an import mark-up on the difference between the purchase and selling prices of rice. Japan has bound the mark-up on rice at a maximum of ¥292/kg, otherwise equivalent to an ad valorem rate of several hundred percent (GATT (1995)). Rice is unique in that, of all products affected by the mark-up, it is the only one for which the mark-up will not be reduced each year.

A simultaneous buy and sell system (so-called free imports of rice) will be introduced for a very small portion of rice imports (Table III.7). Traders participating in this program will be able to turn a profit by undercutting the Food Agency's pricing system and importing rice from

countries of their choice. 1/ However, only 1.3 percent of permitted imports was designated for this trading system in 1995, rising to 10 percent of imports in 2000.

With regard to domestic support measures, by 1995 Japan had already fulfilled the Uruguay Round commitment by reducing the AMS by more than 20 percent from the 1986-88 base. It is not clear whether Japan will reduce the AMS further. The administrative prices of major commodities remained almost unchanged since 1991 (Table III.8). 2/ In 1994, the purchase price for rice, the most important support price for farmers, was frozen despite a decrease in indicative prices calculated on the basis of production costs (OECD (1995)). In addition, an agricultural reform package was passed in October 1994 that includes over ¥6 trillion in assistance to farmers affected by the Uruguay Round over the next six years (discussed below).

d. Impact of the Agreement on Agriculture

The main achievement of the Uruguay Round Agreement on Agriculture is increased transparency in the rules governing international trade and the levels of domestic protection (Hathaway and Ingco (1995)). Tariffication, binding of all tariffs on agricultural products, and minimum access commitments in products where imports were previously banned or restricted represent a significant step forward and in theory imply liberalization by prohibiting countries from arbitrarily raising tariffs to new and higher levels (Martin and Francois (1995)).

In practice, the Uruguay Round reforms may not result in significant liberalization. 3/ The newly established tariffs, while lower than the implied unbounded rate under the old system (e.g., in the case of rice), remain very high and are likely to obstruct agricultural trade. Moreover, the Uruguay Round left major distortions such as state trading in agricultural products outside its scope. As a result, even after the tariff reductions committed to in the Uruguay Round, the ad valorem measure of the final tariff bindings will remain higher in most countries than the rate of protection during 1982-93 (Ingco (1995)).

1/ Under the simultaneous buy and sell system, a trader will form a team with a distributor. The teams will submit advance bids to the Food Agency, which will determine how much of a margin a team can collect (up to a maximum of ¥292/kg), and which teams will be permitted to import rice (GATT (1995)).

2/ Before 1991, these prices had been on a declining trend for several years.

3/ Detailed estimates of the effects of the Uruguay Round are discussed in FAO (1995), Goldin and van der Mensbrugghe (1995), Harrison, Rutherford, and Tarr (1995), Hathaway and Ingco (1995), Ingco (1995), and Martin and Francois (1995),

Table III.8. Japan: Administrative Prices of Major Agricultural Products, FY 1990-94

(In yen, per kilogram)

	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994
Processing milk					
Standard market price	65.98	65.40	65.40	65.26	64.26
Guaranteed farm price	77.75	76.75	76.75	76.75	75.75
Rice					
Government purchase price	275	273	273	273	273
Government selling price	307	303	302	302	302
Wheat					
Government purchase price	154	152	152	152	152
Government selling price	51	49	49	44	44
Barley					
Government purchase price	132	131	131	131	131
Government selling price	45	43	43	39	39
Sugar					
Minimum producer price - beet	18	17	17	17	17
Beef					
Floor price	985	960	935	905	875
Upper price	1,285	1,250	1,210	1,175	1,140
Pork					
Floor price	400	400	400	400	400
Upper price	565	565	565	565	565

Source: Data provided by the Japanese authorities.

Compared with other countries, Japan will achieve significant reductions in protection in major commodities (Table III.9). In most other OECD countries, the extent of intended liberalization was eroded because the base period chosen in establishing tariff bindings (i.e., 1986-88) was a period with the highest border protection in recent decades. 1/ Most other OECD countries also resorted to so-called "dirty tariffication," as a result of which the new base tariffs would provide even higher protection than the level provided by the base-year non-tariff barriers they replaced. 2/ In contrast, in all the commodities considered, Japan offered base tariff equivalents significantly below the actual nominal rate of protection provided in 1986-88 (Chart III.1). Despite large tariff reductions, however, the final tariff levels in Japan will remain very high both in absolute terms and compared with other countries.

Japan's opening of the domestic rice market, although small relative to domestic consumption, is expected to lead to a relatively large expansion in world rice trade. Based on country schedules of over 40 major trading countries, it is estimated that the access commitments under the Uruguay Round will expand world trade in rice by 7.5 percent compared with the level of world trade in 1992 (Ingco (1995)). The only two other products that are expected to open new trade opportunities are beef (2.8 percent increase in world trade above the 1992 level) and poultry (2.5 percent increase in world trade).

One reason why the Uruguay Round Agreement on Agriculture is not expected to have a major impact on agricultural trade liberalization is that one of the most serious barriers to trade, i.e., the use of government or government-controlled monopoly importing agencies, will not be removed (Hathaway and Ingco (1995)). Even if tariffs are lowered, such agencies may not pass on the lower import prices to consumers, and suppliers may not be able effectively to compete for the market. As there are no restrictions on the resale price of imports, the state trading agencies can use low-cost imports to finance domestic subsidy programs.

1/ The years 1986-88 were chosen as the base years for tariffication because world prices for many agricultural commodities were the lowest in decades. Thus, when the world price in the base period was compared with the protected and supported internal price, the price gap--which was the measure of the tariff equivalent--was unusually wide (Ingco (1995) and Hathaway and Ingco (1995)).

2/ In establishing the tariffs to be applied in the first year of the implementation of the Agreement (i.e., the initial base tariffs), countries were required to apply a given Uruguay Round methodology (so-called Modalities from Annex 3 of the Agreement) based on prices and protection levels prevailing in the base period, 1986-88. The prices that many countries used to calculate their tariff equivalents were, however, manipulated, resulting in higher initial tariffs than more objective calculations might have produced (Josling et al. (1994); Ingco (1995)).

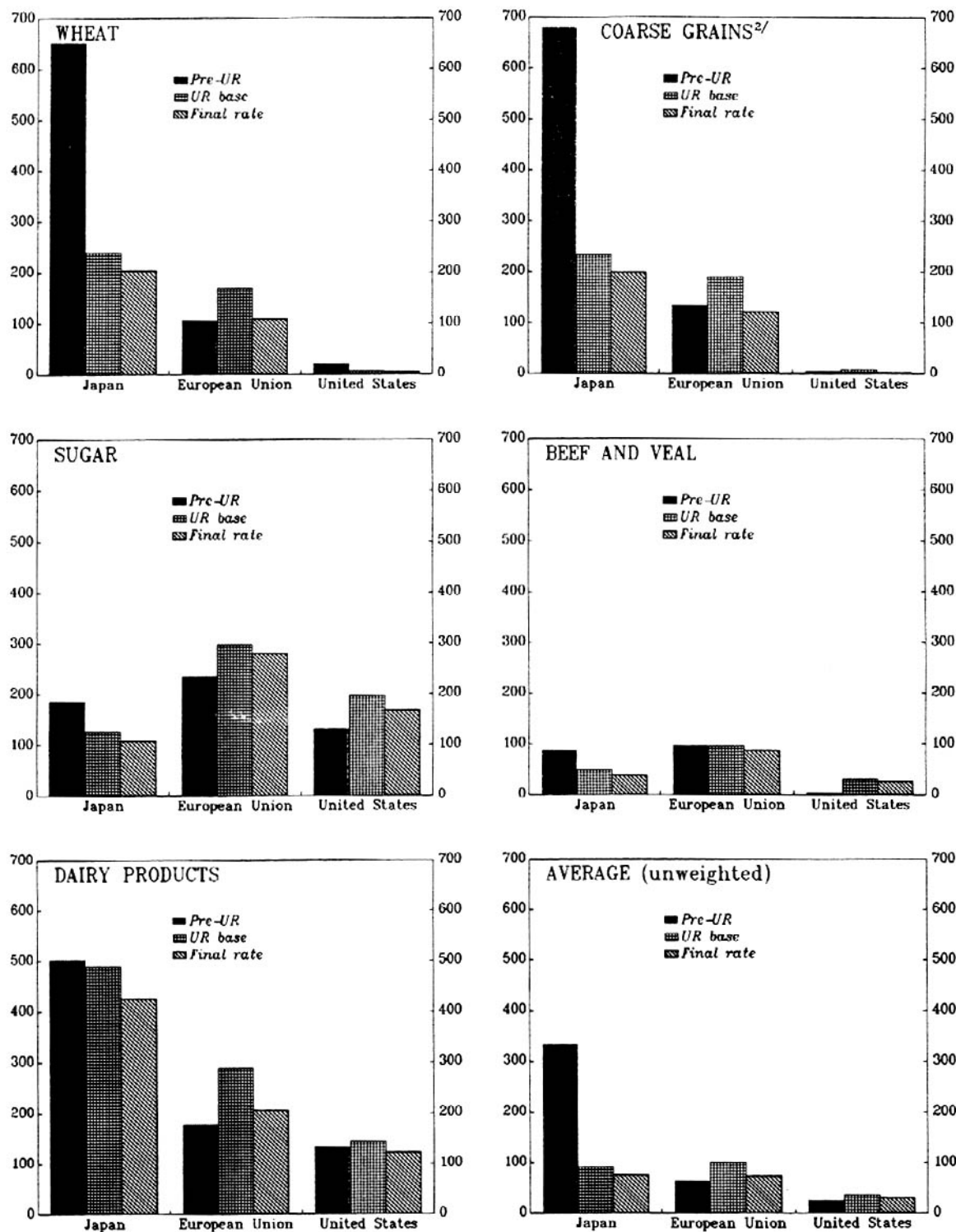
Table III.9. Japan: Uruguay Round: Estimates of Average Import Price Reductions from 1989-93 Average
(In percent)

	Wheat	Rice	Coarse grains	Sugar	Meat	Dairy products
Japan	-81	-138	-91	-47	-33	-14
European Union	--	--	--	--	-12	--
United States	-15	--	--	--	--	--
Australia	--	-4	--	--	--	-19
Canada	--	--	--	--	--	--
EFTA	--	--	-1	-14	--	--

Source: Ingco (1995).

CHART III.1

JAPAN
URUGUAY ROUND TARIFF CUTS:
PRE-UR AVERAGE, UR BASE, AND FINAL UR RATES ^{1/}



Source: Ingco (1995)

^{1/} Pre-UR rate refers to the estimated ad valorem tariff equivalent (ETE) for 1986-88; UR base rate refers to the ETE of base rates declared in country schedules (calculated using the 1986-88 prices); and the final UR rate refers to the ETE of the tariff rate in 2000.

^{2/} Barley, maize, a

e. Post-Uruguay Round developments

In August 1994, an interim report on long-term agricultural reforms was issued. ^{1/} The main objectives of policy development set out in the report are to reaffirm the role and importance of domestic agricultural production; to minimize negative effects arising from the acceptance of the Uruguay Round Agreement on Agriculture; to implement structural reforms proposed in the 1992 New Policies as soon as possible; to revitalize hilly and mountainous areas that may be hard hit by the Uruguay Round; and to reconsider current agricultural regulations with a view toward increasing competition.

Unlike the New Policies, the Direction of Policy Development explicitly recognized that food imports had become essential to secure a stable supply of foodstuffs. The report also acknowledged that government rice policies failed to improve the productivity of rice farming and meet consumer needs, and called for a "drastic revision" of the production adjustment and distribution systems established under the Food Control Law. Another important difference with the New Policies was greater emphasis on market principles, and lesser emphasis on public goods aspects of agriculture. Reflecting this policy orientation, the report advocated a review of the Agricultural Basic Law.

Following these initiatives, in December 1994 the Food Control Law was replaced by the Law Concerning Stabilization of Supply-Demand and Price of Staple Food. Under the new law, rice producers will no longer be obliged to make sales to the Government, and rice traders will no longer be designated by the Government. The implementation of the Direction of Policy Development has also raised some concerns, however. In late October 1994, the Government announced a package of agricultural support measures worth ¥6 trillion over six years. The package included both measures to offset the impact of the Uruguay Round agreements on farmers (especially those in mountainous areas), and long-term measures aimed at improving productivity in the farm sector.

4. Estimates of the costs of agricultural protection

This section considers four complementary measures of the costs of agricultural protection: budgetary transfers to agriculture, estimates of subsidy equivalents received by producers and paid by consumers of agricultural products, total transfers associated with agricultural support, and welfare costs of agricultural protection. Although there is some overlap in terms of the costs that are being covered by these measures, the four measures are progressively more comprehensive.

^{1/} See "The Direction of Policy Development in Japanese Agriculture in a New International Environment" (Direction of Policy Development) (MAFF (1994)).

a. Budgetary expenditure on agriculture

Given the small size of Japan's agricultural sector (about 2.3 percent of GDP in the 1990s), budgetary expenditure on agriculture is relatively high (about 0.7 percent of GDP) (Table III.10). Relative to other programs, spending on agriculture increased between 1980 and 1994 and stood at about 10 percent of general expenditure in 1994. Most of this increase was accounted for by public works projects aimed at improving agricultural productivity. Current expenditure on agriculture, in particular food control expenditures, declined sharply since the early 1980s. The funds earmarked for agriculture under the Fiscal Investment and Loan Program (FILP) were roughly equal to agriculture's share in GDP since the mid-1980s.

Local governments contributed additional funds to agriculture from their own budgets. Net of intergovernmental transfers, prefectures and municipalities spent about 0.8 percent of GDP to support various agricultural programs in 1980, and about 0.6 percent in 1990 (Table III.11). Total budgetary spending on agriculture by all levels of government (1.3 percent of GDP in 1990) was thus equivalent to one half of the value of agricultural output (2.5 percent of GDP in 1990).

Data compiled by the OECD indicate that, in terms of the budgetary expenditure on agriculture ("transfers from taxpayers"), Japan is on par with the European Community. In the United States, transfers from taxpayers to agricultural producers were higher and amounted to about 1.5 percent of GDP since the mid-1980s (Table III.12). In terms of the revenue from taxation of agricultural products, Japan is distinctly ahead of other OECD countries. The high yield of agricultural taxes reflects both Japan's high dependency on food imports, and the relatively high level of agricultural tariffs.

b. Subsidy equivalents of agricultural protection

In addition to direct budgetary transfers, agricultural producers also receive indirect transfers from the budget and from consumers. Measures of producer and consumer subsidy equivalents include these additional transfers. The producer subsidy equivalent (PSE) measures the subsidy that would be necessary to compensate producers for removing government support under existing programs, while the consumer subsidy equivalent (CSE) measures the implicit tax imposed on consumers under these programs. ^{1/}

Chart III.2 compares the PSE expressed as the ratio of the subsidy-inclusive price to the border price (the so-called nominal assistance

^{1/} The OECD compiles the PSE and CSE on an internationally comparable basis annually. The PSE and CSE can be expressed in several forms: as the total value of transfers (in yen or yen per metric ton), as a percentage of the total value of production or consumption, or as a ratio of the subsidy-inclusive price to the border price.

Table III.10. Japan: Central Government Expenditure on Agriculture, Forestry, and Fisheries, 1980-94 ^{1/}

	1980	1985	1989	1990	1991	1992	1993	1994
<u>(In billions of yen)</u>								
Total	2,413	2,198	3,159	3,122	3,266	3,312	3,386	3,928
Current	1,515	1,319	1,537	1,500	1,575	1,559	1,546	1,563
Of which: Food control account	956	695	418	395	373	342	311	274
Capital ^{2/}	898	879	1,622	1,622	1,691	1,753	1,840	2,365
<u>(In percent of general expenditure)</u>								
Total	7.9	6.7	9.3	8.8	8.8	8.6	8.5	9.6
Current	4.9	4.0	4.5	4.2	4.3	4.0	3.9	3.8
Of which: Food control account	3.1	2.1	1.2	1.1	1.0	0.9	0.8	0.7
Capital ^{2/}	2.9	2.7	4.8	4.6	4.6	4.5	4.6	5.8
Memorandum items:								
Total expenditure on agriculture, forestry and fisheries (in percent of GDP)	1.0	0.7	0.8	0.7	0.7	0.7	0.7	0.8
FILP expenditure on agriculture, forestry and fisheries (in billions of yen)	886	891	924	876	908	908	915	997
Share of agriculture in total FILP expenditure (in percent)	4.9	4.3	2.9	2.5	2.5	2.8	2.5	2.5

Sources: Budget Bureau, Ministry of Finance, The Japanese Budget in Brief (various issues); and staff estimates.

^{1/} Based on initial budgets.

^{2/} Public works expenditure on agriculture, forestry, and fisheries.

Table III.11. Japan: Central and Local Government Expenditure on Agriculture, Forestry, and Fisheries, 1980-90 1/

	1980	1985	1989	1990
<u>(In billions of yen)</u>				
Total	4,428	4,096	5,499	5,645
Central <u>2/</u>	2,413	2,198	3,159	3,122
Current		1,515	1,319	1,500
Capital <u>3/</u>	898	879	1,622	1,622
Local <u>4/</u>	2,015	1,898	2,340	2,523
Current <u>5/</u>	1,550	1,422	1,661	1,770
Capital <u>6/</u>	465	476	679	753
<u>(In percent of GDP)</u>				
Total	1.8	1.3	1.4	1.3
Central <u>2/</u>	1.0	0.7	0.8	0.7
Current	0.6	0.4	0.4	0.3
Capital <u>3/</u>	0.4	0.3	0.4	0.4
Local <u>4/</u>	0.8	0.6	0.6	0.6
Current <u>5/</u>	0.7	0.4	0.4	0.4
Capital <u>6/</u>	0.2	0.2	0.2	0.2

Sources: Budget Bureau, Ministry of Finance, The Japanese Budget in Brief (various issues); Jichi Sogo Center (1993); and staff estimates.

1/ Net of intergovernmental transfers.

2/ Based on initial budgets.

3/ Public works expenditure on agriculture, forestry, and fisheries.

4/ Based on actual outturn.

5/ Portion of current expenditure not financed by the central government; estimated from the share of central government transfers in local government expenditure.

6/ Portion of capital expenditure not subsidized or directly run by the central government.

Table III.12. Japan: Decomposition of Total Agricultural Transfers
in Selected OECD Countries, 1986-94

(In percent of GDP)

	1986-88	1989-91	1992	1993	1994
Japan	2.6	2.1	2.0	1.9	1.8
Transfers from taxpayers	0.7	0.6	0.5	0.7	0.5
Transfers from consumers	2.3	1.9	1.8	1.8	1.6
Budget revenue	-0.5	-0.4	-0.4	-0.6	-0.4
European Community	2.4	1.9	1.8	1.8	1.7
Transfers from taxpayers	0.8	0.7	0.7	0.8	0.8
Transfers from consumers	1.6	1.2	1.1	1.0	0.9
Budget revenue	--	--	--	--	--
United States	1.5	1.2	1.4	1.6	1.4
Transfers from taxpayers	1.1	0.9	1.1	1.3	1.2
Transfers from consumers	0.4	0.3	0.3	0.3	0.3
Budget revenue	--	--	--	--	-0.1

Source: OECD (1995).

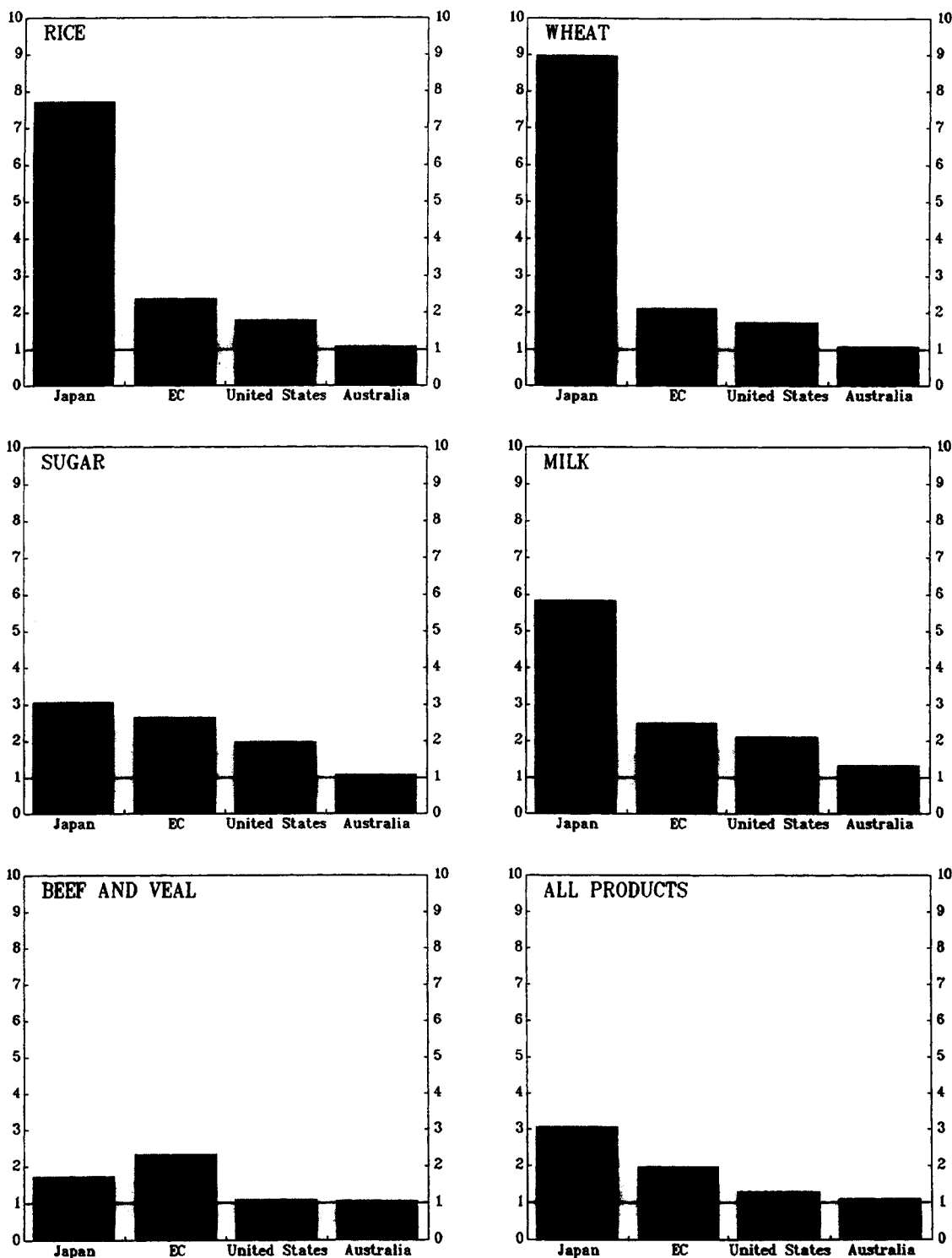
Note: Transfers from taxpayers are defined as budgetary expenditures on agriculture, minus administrative costs and social security. For the European Community and the United States, these transfers also include subnational expenditures on agriculture by member states and states, respectively.

Transfers from consumers are defined as the implicit tax on consumers due to market price support, including the effect of border policies.

Budget revenues are calculated as the product of the tariff (or the price differential) and the difference between the consumption and production levels for commodities concerned.

CHART III.2

JAPAN
NOMINAL ASSISTANCE COEFFICIENTS ON PRODUCTION
IN SELECTED OECD COUNTRIES, 1993 ^{1/}



SOURCE: OECD (1995)

^{1/} Nominal assistance coefficient (NAC) on production is defined as the ratio of the border price plus the unit producer subsidy equivalent (PSE) to the border price. NAC indicates the effective price wedge created by agricultural policies. A NAC equal to one indicates that the domestic producer price is equal to the world price at the border expressed in domestic currency

coefficient on production) in Japan and selected OECD countries. The wedge between Japan's domestic (subsidy-inclusive) price and the world price at the border expressed in yen was equivalent to about 800 percent for wheat, 670 percent for rice, and 550 percent for milk in 1993. ^{1/} Nominal assistance provided to sugar producers in Japan was on a par with that in the European Community, while the support to beef and veal producers was lower in Japan than in the European Community. For all agricultural products, Japan had one of the highest nominal assistance coefficients among the OECD countries (220 percent in 1993). The OECD data also indicate that the assistance to Japan's agricultural producers, as measured by the nominal assistance coefficient, had increased from about 120 percent in 1979-81 to 230 percent in 1994. Most of this increase can be accounted for by the effect of the yen appreciation. The measures of producer subsidy equivalents that do not depend on the exchange rate (e.g., the total PSE or the PSE as a percentage of production) indicate that the support for most livestock products and crops had declined or remained constant since the mid-1980s (Table III.13).

With regard to consumer subsidy equivalents, the price wedge between the domestic consumer price and the border price was about 100 percent for all agricultural products in 1993 (136 percent for crops and 42 percent for livestock products) (OECD (1995)). Domestic consumer prices of rice and milk had the highest nominal assistance coefficient (580 percent and 330 percent of the border price, respectively). The implicit tax on consumers represented about 50 percent of the total value of consumption of agricultural products since 1989. Unit CSE was highest for beef and veal (about ¥430 per kilogram in 1993), rice (¥250 per kilogram), and pork (¥220 per kilogram).

c. Total transfers associated with agricultural support

The market price support captured by the PSE measures the difference between the domestic producer price and an external reference price for each unit of the commodity produced. As such, the PSE is a good estimate of the transfers received by farmers due to policy measures, but not necessarily of the total transfers associated with agricultural policies that are effected within the economy as a whole. Namely, farmers receive only a portion of expenditure needed to implement agricultural policies. The expenditures incurred in the implementation of agricultural programs also include transfers to economic groups other than farmers. These groups include food processors and distributors, operators of public stockholding and commodity storage facilities, and recipients of grants for rural infrastructure development, food aid, and permanent withdrawal of resources from agriculture. The expenditures incurred in the implementation of such

^{1/} Total subsidies to producers accounted for 100 percent of the value of rice and wheat production, and 90 percent of the value of milk production in 1993.

Table III.13. Japan: Estimates of Producer Subsidy Equivalents, 1979-94 ^{1/}
(In billions of yen)

	1979-81	1986-88	1989-91	1992	1993	1994
Crops	2,734	3,525	2,931	3,082	2,497	3,263
Of which:						
Rice	2,433	3,137	2,625	2,835	2,274	3,064
Wheat	116	177	147	118	103	88
Livestock products	1,410	1,510	1,359	1,537	1,426	1,477
Of which:						
Milk	574	644	630	625	647	621
Beef and veal	265	404	290	372	343	320
All products	4,145	5,035	4,289	4,619	3,923	4,741
(In percent of GDP)	1.7	1.4	1.0	1.0	0.8	1.0

Source: OECD (1995).

^{1/} The producer subsidy equivalent (PSE) measures the value of the monetary transfers to agricultural producers from consumers of agricultural products and from taxpayers resulting from a given set of agricultural policies, in a given year.

programs may be much bigger than those estimated as being received by farmers (i.e., the PSE). 1/

Total transfers to agriculture are broadly defined as the sum of all transfers from taxpayers and all transfers from consumers resulting from agricultural policies, minus budget revenues from tariffs on imports. Total transfers thus include all the forms of support measured by the PSE and CSE calculations, plus the additional budgetary outlays discussed above.

Total agricultural transfers in Japan declined from about 2.6 percent of GDP in the mid-1980s to 1.8 percent of GDP in 1994 (Table III.14). These figures are comparable to both the OECD average and the average for the European Community, but they are higher than in the United States (by up to 1 percentage point of GDP), and much higher than in Australia (by up to 2 percentage points of GDP). However, in Finland, Norway, Switzerland, and Austria, total transfers to agricultural producers were higher than in Japan.

In terms of other comparative indicators of total agricultural transfers, Japan stands out in two categories. Total agricultural transfers per capita in Japan are the second highest among OECD countries (about US\$600 per year since 1986) (Chart III.3). Total transfers per hectare of agricultural land in Japan are by far the highest among OECD countries (about US\$14,400 per year since 1986). 2/ Total transfers per full-time farmer equivalent amounted to about US\$29,900 in 1994, compared with US\$37,000 in the United States and US\$19,200 in the European Community.

The decomposition of total agricultural transfers indicates that Japanese consumers bear the bulk of the burden of agricultural support measures (Table III.12). Total transfers from Japanese consumers to agricultural producers amounted to about 1.8 percent of GDP per year since 1989, compared with 1 percent in the European Community and 0.3 percent in the United States. Transfers from taxpayers to agricultural producers in Japan were almost offset by agricultural tariff revenues. Since the agricultural tariff revenue was negligible in the United States and the European Community, net budgetary transfers in these economies were considerably higher than in Japan.

1/ Another difference is that the subsidy equivalent calculations do not cover all agricultural commodities; the coverage of the PSE and CSE calculations for Japan was 56 percent of the total value of agricultural production (consumption) in 1994, compared with 66 percent in the United States and 63 percent in the European Community.

2/ The corresponding figures are US\$957 per hectare per year for the European Community, and US\$194 per hectare per year for the United States.

Table III.14. Japan: Total Agricultural Transfers in Selected OECD Countries, 1986-94 ^{1/}

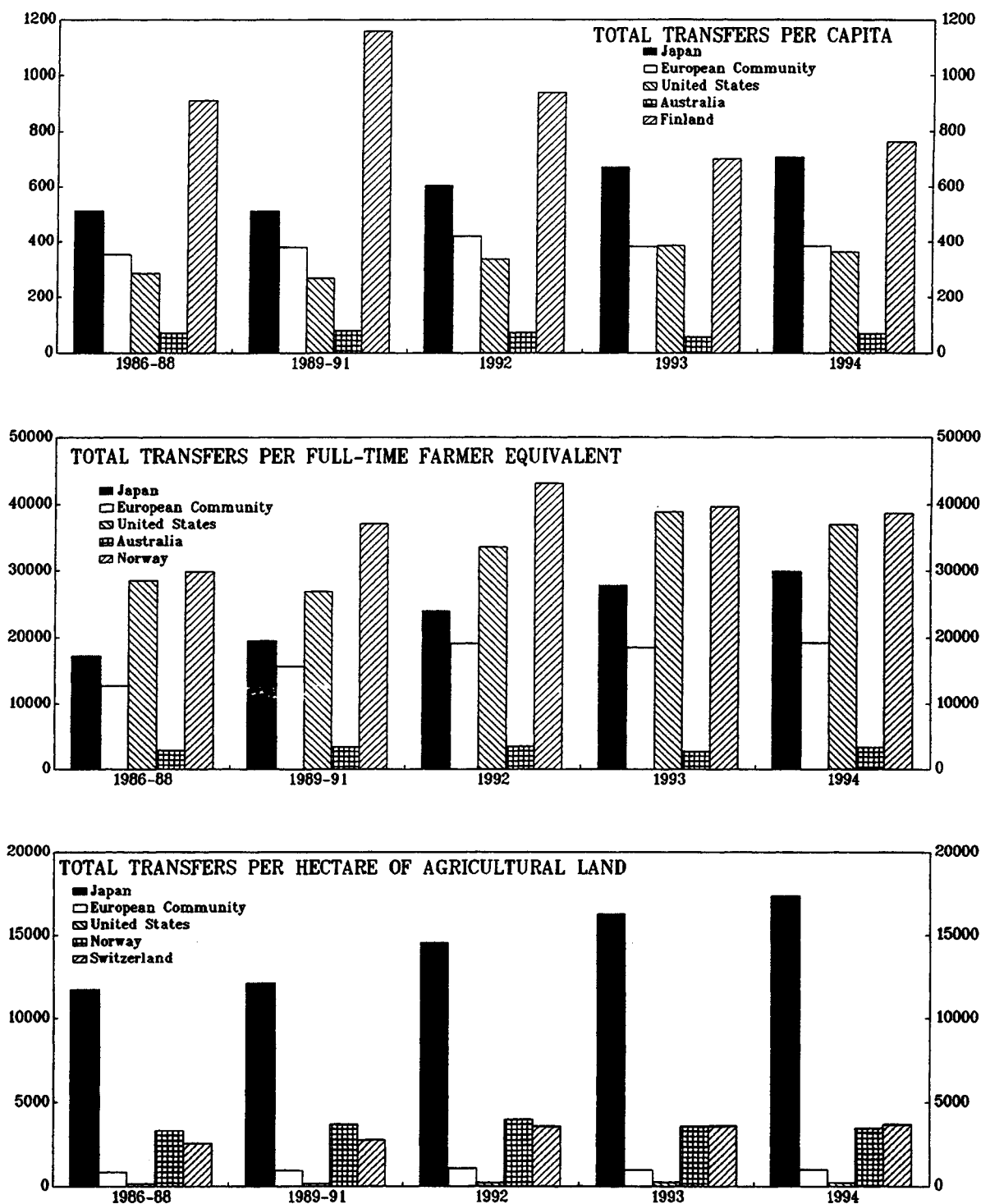
	1986-88	1989-91	1992	1993	1994
<u>(In billions of U.S. dollars)</u>					
Japan	62.5	63.3	74.9	84.1	89.4
European Community	114.1	126.4	145.1	132.9	134.7
United States	69.5	67.0	85.6	99.1	94.3
Australia	1.2	1.4	1.3	1.0	1.2
Canada	7.3	8.8	8.3	7.0	6.0
Nordic countries					
Finland	4.5	5.8	4.7	3.6	3.9
Norway	3.2	3.7	4.0	3.5	3.5
Alpine countries					
Austria	3.3	3.7	4.5	4.4	4.5
Switzerland	5.1	5.6	5.6	5.7	5.8
<u>(In percent of GDP)</u>					
Japan	2.6	2.1	2.0	1.9	1.8
European Community	2.4	1.9	1.8	1.8	1.7
United States	1.5	1.2	1.4	1.6	1.4
Australia	0.6	0.5	0.4	0.4	0.4
Canada	1.7	1.6	1.4	1.2	1.1
Nordic countries					
Finland	5.1	4.6	4.2	3.9	3.6
Norway	4.0	3.6	3.6	3.5	3.2
Alpine countries					
Austria	2.9	2.5	2.4	2.4	2.2
Switzerland	3.2	2.6	2.3	2.3	2.1

Source: OECD (1995).

^{1/} Total transfers are defined as the sum of all transfers from taxpayers and all transfers from consumers resulting from agricultural policies, less budget revenue from tariffs on imports.

CHART III.3

JAPAN
COMPARATIVE INDICATORS OF TOTAL AGRICULTURAL
TRANSFERS IN SELECTED OECD COUNTRIES, 1986-94 1/
(In US dollars)



Source: OECD (1995)

1/ Total transfers are defined as the sum of all transfers from taxpayers and all transfers from consumers resulting from agricultural policies, less budget revenues from tariffs on agricultural imports.

d. Welfare costs of agricultural protection

The measures of the costs of agricultural protection discussed above do not take account of the welfare losses suffered by consumers and the welfare gains to producers that result from various agricultural policies. According to standard trade theory, the changes in prices and quantities due to removal of domestic and international trade restrictions would result in a gain in consumer surplus. Part of this gain would be offset by a loss in producer surplus in the market for the domestic substitute, where prices and output would both fall, and another part would be offset by the tariff revenue lost by the Government. In the case of Japan, where many imports of agricultural products were subject to nontariff barriers such as import quotas, the removal of trade restrictions would also eliminate the rents that previously went to domestic importers. In the end, there would be an efficiency gain resulting from an improved allocation of resources. 1/

In an important recent study, Sazanami, Urata, and Kawai (1995) derived estimates of the welfare effects of removing protection on a range of highly protected Japanese imports, including most major agricultural products. 2/ Their study estimated that the gain in consumer surplus resulting from the lifting of trade barriers on agricultural products would amount to ¥8 trillion (2 percent of GDP) in 1989, with a net efficiency gain of ¥1 trillion (0.25 percent of GDP) in 1989 (Table III.15). The estimated gain in consumer surplus is equivalent to 38 percent of the value of consumption before the hypothetical liberalization. For individual items, large gains in consumer surplus would be realized for soybeans (an increase in consumer surplus of 77 percent compared with the 1989 value of consumption), milled rice (an increase of 74 percent), wheat (68 percent), and citrus fruits (30 percent).

Sazanami, Urata, and Kawai (1995) also estimated the effects of trade liberalization on imports, domestic production, and employment. The elimination of unit value differentials would have increased imports of agricultural products considered in the study by 146 percent

1/ The wedge between the domestic price of the import and the world price attracts resources into production of import substitutes and away from other sectors where those resources could be used more efficiently.

2/ These estimates were obtained from a computable partial equilibrium model. The demand and supply elasticities were estimated from a system of demand equations, and the labor-output ratios from the Japanese input-output table.

Table III.15. Japan: Estimated Welfare Effects of Removing Protection, 1989

	Consumer surplus gain	Producer surplus loss	Tariff revenue loss (In billions of yen)	Quota rents eliminated	Net Efficiency gain	Consumer surplus ratio ^{1/} (In percent)
Total food and beverages	8,059	5,963	150	954	992	37.8
Of which:						
Milled rice	2,236	2,233	--	2	1	73.5
Wheat	219	57	--	135	27	67.5
Meat	401	209	77	96	19	15.7
Dairy products	102	32	12	45	13	18.0
Soybeans	189	19	--	150	20	77.1
Citrus fruits	109	61	10	35	4	29.6
Memorandum item:						
Total food and beverages in percent of GDP	2.03	1.51	0.04	0.24	0.25	...

Sources: Sazanami, Urata, and Kawai (1995).

^{1/} The consumer surplus ratio is defined as the consumer surplus gain divided by the value of imports plus domestic production before liberalization.

(¥2 trillion). 1/ As a consequence of liberalization, the unit values realized by Japanese agricultural producers would decline by 33 percent, causing a fall in output. Production in certain sectors would have declined by more than 20 percent (wheat, soybeans, processed fruits and vegetables), and in all food and beverage sectors considered by 12 percent. Employment in these sectors would have declined by 15 percent (76,600 workers), most of it in citrus fruit, wheat, and soybeans production. 2/

One interesting conclusion of this study is that complete liberalization would increase Japanese exports nearly as much as Japanese imports because of a reallocation of resources within Japan and downward pressure on the yen. Japan's trade surplus would thus be reduced by much less than the estimated total increase in imports of ¥7.3 trillion (US\$50 billion).

5. Outlook for Japanese agriculture

Japan's agricultural policies are in a stage of transition. Following the implementation of the Uruguay Round Agreement on Agriculture, the extent of border protection will be reduced, but the protective impact of the remaining measures is likely to be significant. A set of consistent long-term policies for agriculture has yet to be elaborated. The direction of recent policy changes is generally clear--to promote competitive behavior and efficiency in agricultural production, and cost effectiveness and the public interest in implementing government regulation. However, some goals that are in conflict with these objectives, for example, the maintenance of high levels of self-sufficiency, remain high on the list of priorities for agricultural reform. Japanese policymakers are thus still struggling with an appropriate vision for agriculture. In this endeavor they are certainly not alone.

One major benefit of the Uruguay Round that may help to clarify the vision of agricultural reform is greater certainty and transparency of the agricultural regime, at least with respect to trade policies. The severe conflict between the external pressure for, and the internal resistance to, agricultural trade liberalization that has characterized much of the policy development in the post-war period has been lessened with the adoption of the Agreement on Agriculture. Most market participants now seem to agree

1/ Unit value differentials are calculated by comparing c.i.f. import unit values (i.e., the unit value in Japanese ports, before tariffs or any markup by domestic wholesalers) with domestic producers' unit values (i.e., the ex-factory or ex-farm unit value before markup by domestic wholesalers). Unit values are then obtained by dividing the declared value of imports, or the value of producers' shipments, by the number of discrete units or by the appropriate physical unit of measure (e.g., kilograms).

2/ The costs to the economy and to consumers of preserving agriculture related jobs through import protection were estimated at ¥105 million (US\$760,000) per job per year in 1989.

that the long-run solution to this conflict is to raise the productivity of domestic agriculture to become viable without trade barriers.

Judging by the past liberalization experience, there is ground to believe that agricultural markets in Japan will adjust rapidly in response to the Uruguay Round. In the three years following the liberalization of the beef market in 1991, for example, the number of cattle raisers dropped by 17 percent and wholesale prices of imported beef by 30-50 percent (GATT (1995)). The volume of imported beef fell temporarily as stockpiles accumulated before the liberalization were drawn down, but increased by over 30 percent subsequently. Increased supply pushed down domestic prices by up to 60 percent for certain grades of beef; there was a marked shift in consumption toward beef and away from pork and poultry; and a similar shift in production toward milk and dairy products and away from beef and veal. The effects of citrus liberalization were similar. Immediately following liberalization in 1992, orange juice imports rose by 90 percent. With overall consumption roughly unchanged, the demand for domestic citrus juice declined sharply; stocks of domestic juice increased; and import prices fell.

These experiences clearly illustrate that the price mechanism in Japanese agricultural markets can and does function well in some cases. The problem is that the remaining distortions limit the effectiveness of liberalization, and may induce new distortions in conjunction with the liberalization measures. There is no easy solution to this problem, but as more and more restrictions are lifted, there is greater probability that policies will move in the direction of improved efficiency and welfare.

IV. An Analysis of Voluntary Import Expansion Targets

1. Introduction

Domestic markets in Japan are generally perceived to be difficult to penetrate. Market barriers are believed to arise from a cumbersome regulatory and administrative framework as well as rigidities in the distribution system. While these barriers discourage the entry of both domestic and foreign firms into the market, they are particularly difficult to overcome for foreign firms who are not familiar with the complexities of domestic markets in Japan. Given the problems in identifying specific barriers that can be removed in order to open markets, there has been increasing pressure on Japan to accept voluntary import expansion (VIE) measures that include government sanctioned and binding targets for increasing market shares of foreign firms. It has been argued that, unlike voluntary export restraints (VERs), which are clearly trade restricting, VIEs expand trade and, therefore, raise welfare. Furthermore, once foreign firms are given access to the Japanese market, they would induce irreversible changes in supply and demand patterns in Japan, with the gains from trade benefiting both sides.

This chapter analyzes the potential impact of such VIEs on domestic production and consumer welfare. It is shown that, under general assumptions, VIEs could reduce domestic production by more than imports are raised. Consequently, the introduction of VIEs as an indirect means to overcome market barriers could, in fact, reduce the aggregate output of the industry and lower consumer welfare.

2. The framework

Following Irwin (1994), consider two firms, one domestic and one foreign, that compete to supply a homogeneous product, say a final consumer good, to the domestic market. ^{1/} Competition is assumed to occur in Cournot fashion, that is each firm chooses its output to maximize profits given the output of its rival. Aggregate demand for the industry's output is assumed to be a negative function of the price. This assumption implies that the consumer's welfare, measured by the consumer surplus, is proportional to the quantity of output sold by the industry, or equivalently, inversely with the price at which is sold.

While a wide set of assumptions would yield similar results, for concreteness and simplicity, it is assumed that the demand curve for the industry's product is linear and that firms' costs are quadratic in the quantity of output produced. The reaction functions of domestic and foreign firms, which represent the profit-maximizing level of output for each firm given the output level of the other, can be depicted by the lines R and R*

^{1/} Other discussions of the potential effects of VIEs can be found in Dinopoulos and Kreinin (1990), Bhagwati (1991), and Bjorksten (1994).

in Figure 1. 1/ Each firm's reaction function is downward sloping, indicating that as the output of one firm increases, the industry's price falls, reducing the other firm's profit-maximizing supply of output. Two other features of the reaction functions and firm profits are useful to note at the outset. First, given the assumptions on industry demand and firms' costs, it is straightforward to show that the absolute value of the slope of the domestic firm's reaction function is less than unity, and (symmetrically) that of the foreign firm's is greater than unity. 2/ This proves useful since any particular aggregate level of industry output, that is $X = x + x^*$, can be represented in Figure 1 by a negatively sloped line with a slope of unity. Second, the shape of firms' iso-profit curves and the direction in which they increase are depicted in Figure 1. The foreign firm's iso-profit curve, π_C^* , has the traditional convex shape, with, by definition, zero slope where it intersects its reaction function R^{**} at point C. As the domestic firm's output shrinks and the industry's price rises, the foreign firm's profits increase, as represented by an iso-profit curve such as π_D^* at each point on which profits exceed those along π_C^* .

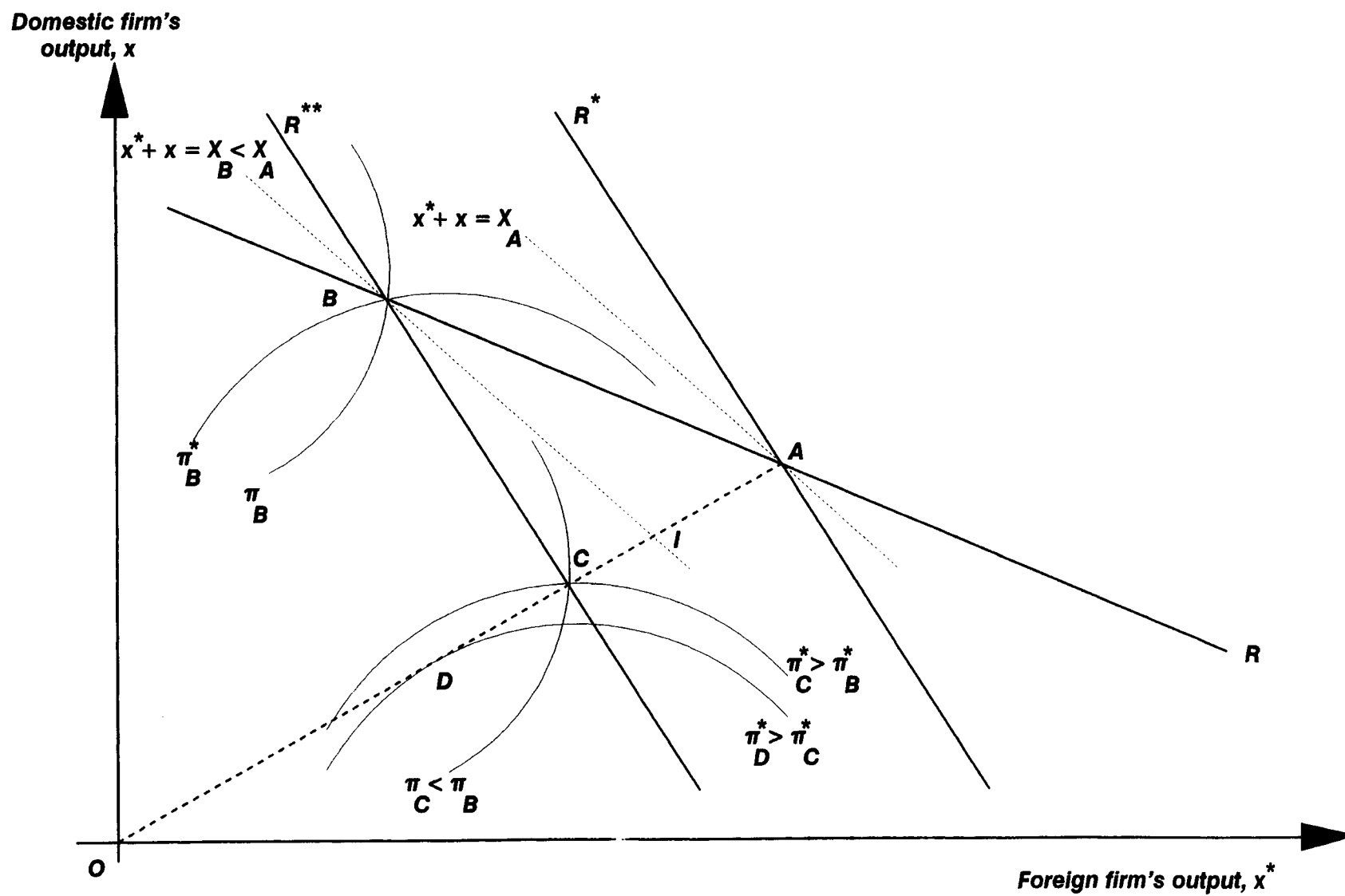
With no barriers to trade, the Cournot-Nash equilibrium occurs at point A, where the two reaction functions intersect. Consider the effects of barriers to trade in this framework. There are, of course, several potential types of barriers. In the following, in an attempt to capture the perception that the Japanese domestic market may be difficult to penetrate because of discriminatory barriers or preferences for Japanese goods, barriers to imports are modelled as adding proportionately to the costs of the foreign firm. That is, in order for the foreign firm to sell on the domestic market, it is required to expend resources over and above those required to produce the good. These resources could be viewed as representing, for example, the costs of dealing with domestic regulation or rigidities in the distribution system. The assumption is equivalent to an explicit tax on the entry of a new firm into the domestic market. 3/ The effect of such barriers is demonstrated in Figure 1 as a backward shift in the foreign firm's reaction function from R^* to R^{**} , i.e., for each output level of the domestic firm, the foreign firm supplies less output. Equilibrium occurs at point B and the domestic firm's output is higher and the foreign firm's output is lower than at point A. The domestic firm's profits are higher at B and the foreign firm's profits are lower. It is straightforward to show that, as industry equilibrium moves from point A to point B, since the domestic firm's reaction function has a slope less than unity, the increase in the domestic firm's output is less than the decline

1/ Irwin (1994) assumes that costs are constant, that is a linear function of output. This difference in assumptions is, however, of little consequence for the results.

2/ dX/dx^* along R , which is the slope of R , is less than unity. Symmetrically, since the firms are identical, dx^*/dX along R^* , which is the inverse of the slope of R^* , is less than unity.

3/ The foreign firm has to bear this cost completely in that it has to charge the same final price as the domestic firm.

Figure IV.1. Equilibrium with Competition, Import Barriers and Market Shares



in the foreign firm's output. Thus, the total output of the industry declines, while the price rises. It follows that the consumer is worse off when there are barriers to trade.

Next, consider the effects of a VIE market-share agreement in the absence of direct removal of market barriers, such that the foreign firm is guaranteed the same market share as that prevailing without barriers. Such a constant market share is defined by combination of outputs along the ray OA: to the left of the ray, the market share of the foreign firm is lower, and to the right it is higher. If the VIE market-share agreement is binding, then final equilibrium must occur along OA. While any point along OA qualifies in meeting the VIE, from the point of view of the consumer's welfare, these outcomes can be divided into two ranges separated by the point I, which is defined by the intersection of a 45 degree line passing through the point B with the ray OA. At Point I, aggregate industry output is the same as at point B and the consumer would be indifferent between industry equilibrium at point I or point B. Industry equilibrium at a point along IA would result in a higher level of output than at B. In this case, the VIE can increase consumer welfare, even in the continued presence of market barriers. ^{1/} Industry equilibrium at a point along OI, on the other hand, would result in a lower level of output than at point B, and the consumer would be worse off than in the absence of the VIE.

The implications of the VIE, therefore, depend critically on where the new equilibrium occurs. The position of the new equilibrium, in turn, is determined by the firms' reaction to the institution of the VIE. Since the VIE is negotiated with the intent of expanding the market share of the foreign firm, the burden of adjustment is naturally likely to fall on the domestic firm. Consider two cases.

The first possibility is that the foreign firm does not change its behavior in response to the VIE and its reaction function continues to be given by R^{**} . The domestic firm's profit-maximizing level of output subject to the market share constraint OA is then given by point C, where industry output is lower than at point B--without the VIE. At point C, the domestic firm's profits (given by the iso-profit curve π_C), are lower than its profits at point B, while the foreign firms profits are greater at C than at B. The VIE, therefore, results in redistributing profits towards the foreign firm, but it lowers industry output and raises prices.

The second possibility is that the foreign firm recognizes that the domestic firm must adjust its output to meet the VIE, and commits itself to an output level D. At D, profits of both firms are higher than at C, while

^{1/} This is one difference between the results presented here and those reported by Irwin (1994). In particular, he does not point to the existence of a region where the institution of VIEs can improve upon the industry equilibrium with import barriers even when they remain in place.

aggregate industry output and, therefore, consumer welfare is lower than at C.

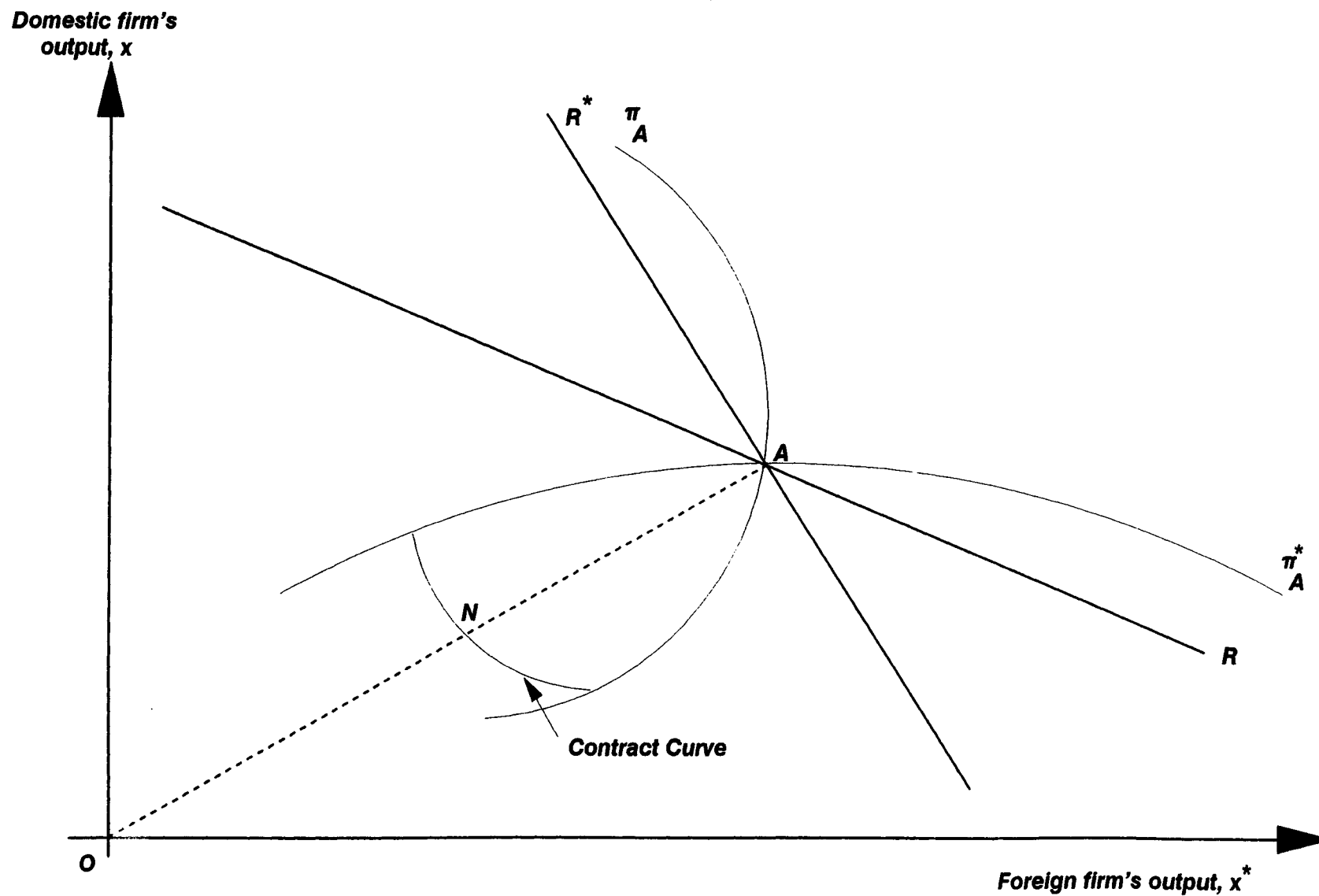
The second case illustrates how the institution of VIEs can fundamentally alter the strategic interaction between firms. The foreign firm, by taking into account the effect of the VIE on the domestic firm, moves the industry to an equilibrium where profits of both firms are higher, but aggregate output is lower. This pattern logically suggests that, on the announcement of the VIE, both firms may recognize that cooperation or collusion to maximize joint profits may be the best way to satisfy the import target. Of course, collusion is always a possibility and does not require the institution of VIEs. The point here, rather, is that the institution of a VIE can facilitate and mask a collusive outcome. This is illustrated more starkly in the following example.

Suppose that market barriers are successfully removed so that, in the absence of any change in behavior, the industry would move from equilibrium at point B to the no-barrier equilibrium at point A (in Figure 1). Suppose that liberalization measures to remove barriers are accompanied by a VIE agreement. It is possible to show that there exists a "contract curve" (Figure 2) along which profits of both firms are higher than at the no barrier equilibrium A. A cooperative or collusive outcome can be expected to occur on the contract curve. Imposition of a market-share agreement could in fact then facilitate a collusive outcome at a point such as N where it could be masked by both firms claiming that the equilibrium resulted from the VIE market-share arrangement. The imposition of a market share agreement to accompany market liberalization measures could, therefore, foster a collusive outcome.

3. Conclusion

This chapter has argued that the introduction of VIEs as indirect means to open markets can result in a "third-best" situation: the additional distortions could amplify, rather than correct for, the initial barriers in domestic markets. In general, VIEs are likely to result in a reduction in the aggregate supply of industry and thus lower welfare. Furthermore, binding market-sharing arrangements could encourage collusion, rather than competition, by domestic and foreign firms, particularly in an environment in which producers have more market power than consumers. To be sure, it is difficult to identify specific regulatory and administrative measures that restrict market access and to remove them in a timely manner. Nevertheless, there is no short cut to this admittedly cumbersome process. Ultimately, greater focus on specific deregulation measures, rather than on market-sharing targets, are the most effective means to increase economic efficiency and consumer welfare.

Figure IV.2. Equilibrium with Free Trade and Collusion with VIE Market Shares



V. Trends and Cycles in the Japanese Economy

1. Introduction

This chapter evaluates the current cyclical position of the Japanese economy and then discusses its medium-term growth prospects. First, a set of simple univariate filters are used to decompose output into its trend and cyclical components. Multivariate filters that incorporate information from movements in cyclical indicators such as the unemployment and inflation rates are then used to derive alternative measures of the output gap, defined as the difference between actual and trend (or potential) output. These measures of the output gap are compared with estimates derived from a more traditional production function approach. In addition, other measures of economic slack from the labor market, such as the employment-population ratio, are examined. The chapter then briefly discusses the medium-term growth prospects of the Japanese economy by examining the evolution of the fundamental determinants of output--the stock of physical capital, the labor force, and total factor productivity.

The output gap measures examined in this chapter indicate that, as is typical toward the end of a data sample, different techniques produce a broad range of relatively imprecise estimates. Nonetheless, all of the estimates indicate that a substantial output gap remains in the Japanese economy. Most of the estimates indicate that the current output gap is on the order of 3 to 6 percent of trend real GDP. ^{1/}

The next two sections of this chapter present a number of univariate and multivariate measures of the output gap. Section 4 examines alternative labor market indicators of the business cycle and Section 5 discusses the evolution of the determinants of potential output from a medium-term perspective. Section 6 concludes.

2. Univariate measures of the output gap

An important econometric issue that needs to be resolved in constructing univariate measures of potential output is the question of whether output can be best characterized as fluctuations around a deterministic or stochastic trend. Apart from the econometric aspects, this issue has economic significance since it indicates whether shocks to output are likely to have transitory or permanent effects. However, it is difficult to conclusively resolve this question with the relatively small sample of postwar data. Hence, the approach taken below is to present the output gaps implied by different assumptions regarding the univariate time-series properties of real GDP.

^{1/} For expository convenience, the term output gap as discussed in this note is to be interpreted as referring to negative deviations of output from trend (as reported in the charts and table).

The simplest form of a deterministic trend is a linear trend. However, it is well established that, in postwar data for G-7 countries, fluctuations around a linear trend display substantial persistence and appear nonstationary. Chart V.1, which plots the log of real GDP in the top panel, shows that there appears to be a distinct break in the rate of growth of real GDP in the early 1970s. Based on this observation, I adopt Perron's (1986) suggestion to consider a linear trend with a break in the slope around the time of the first OPEC oil shock. Following this oil price shock, all G-7 countries experienced a marked slowdown in productivity and output growth.

Following Takeuchi (1987) and Perron (1988), a break point of 1973:Q4 is imposed on the slope of real GDP and the sensitivity of the results to the choice of the break point is then examined. The estimated equation is as follows:

$$\log y_t = \alpha + \beta \text{TREND}_t + \gamma (\text{TREND}_t - T_0) + e_t \quad (1)$$

where $\log y_t$ is the logarithm of real GDP, TREND is a linear time trend, $T_0 = 1973:Q4$, and $\text{TREND} - T_0 = 0$ before 1974:Q1. Equation (1) was estimated by ordinary least squares using quarterly data for Japan over the period 1955:Q2-1995:Q1. The estimated slope coefficients indicate that annual trend output growth averaged about 9.0 percent over the period 1955:Q1-1973:Q4 and then declined to 3.6 percent over the period 1974:Q1-1995:Q1. The output gap calculations based on this procedure imply a gap in the first quarter of 1995 of 6.5 percent (Table V.1 and Chart V.2). ^{1/}

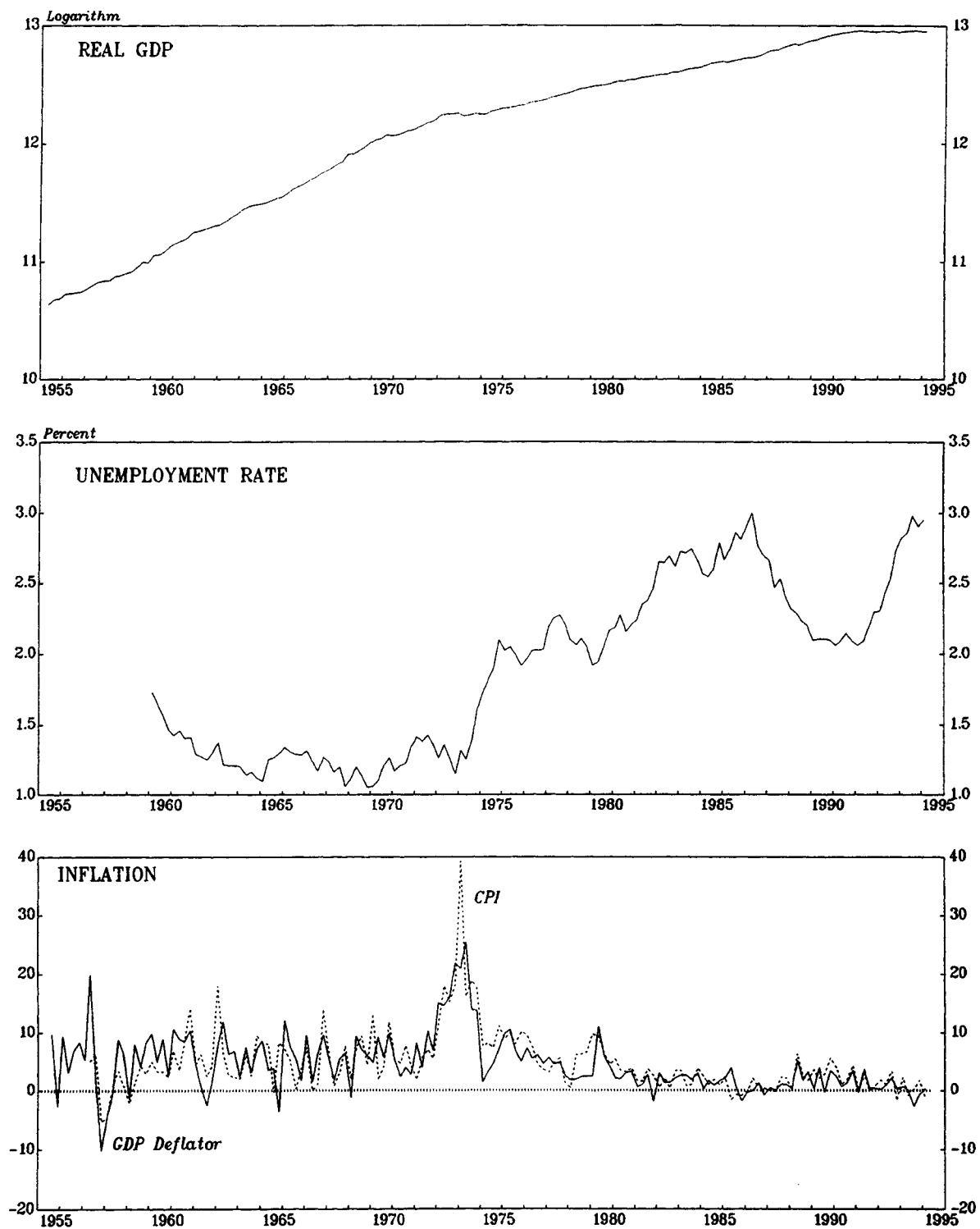
Iwamoto and Kobayashi (1992) argue that 1971 is a more appropriate break point since the change in the international monetary system (the "Nixon shock") precipitated a structural change in the Japanese economy. Allowing for a break in the slope of the trend in 1971:Q4 yields an estimated output gap of about 8 percent in the first quarter of 1995. Allowing for trend breaks in the last quarters of 1972 or 1974 yielded results quite similar to the results presented in the table. Thus, the choice of 1973:Q4 as the trend break point does not appear to lead to an overestimate of the current output gap based on this methodology.

An alternative univariate filter that is less restrictive than a deterministic linear trend is the Hodrick-Prescott (HP) filter (see Prescott (1986)). This filter has the advantage of transparency and has been used

^{1/} Note that the annual output gaps reported in Table 1 are annual averages. Since actual output growth was very weak in 1994, virtually all of the measures imply a much larger output gap in the last quarter of 1994 than in the first quarter of that year.

CHART V.1

JAPAN
OUTPUT, EMPLOYMENT AND INFLATION



Source: Bank of Japan, Economic Statistics Monthly; Monthly Labor Statistics; and staff calculations.

1/ Inflation is defined as the annualized quarterly percentage change in the price index. All data are seasonally adjusted.

Table V.1. Japan: Measures of Output Gaps and Trend Growth Rates of Real GDP

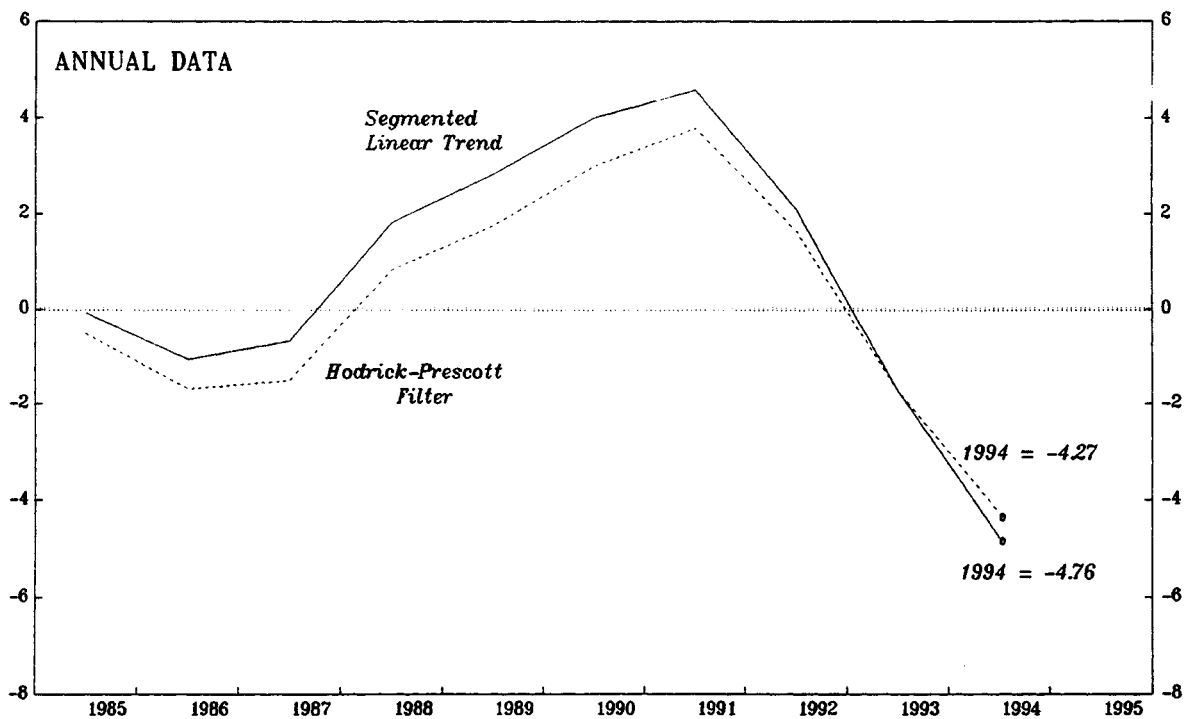
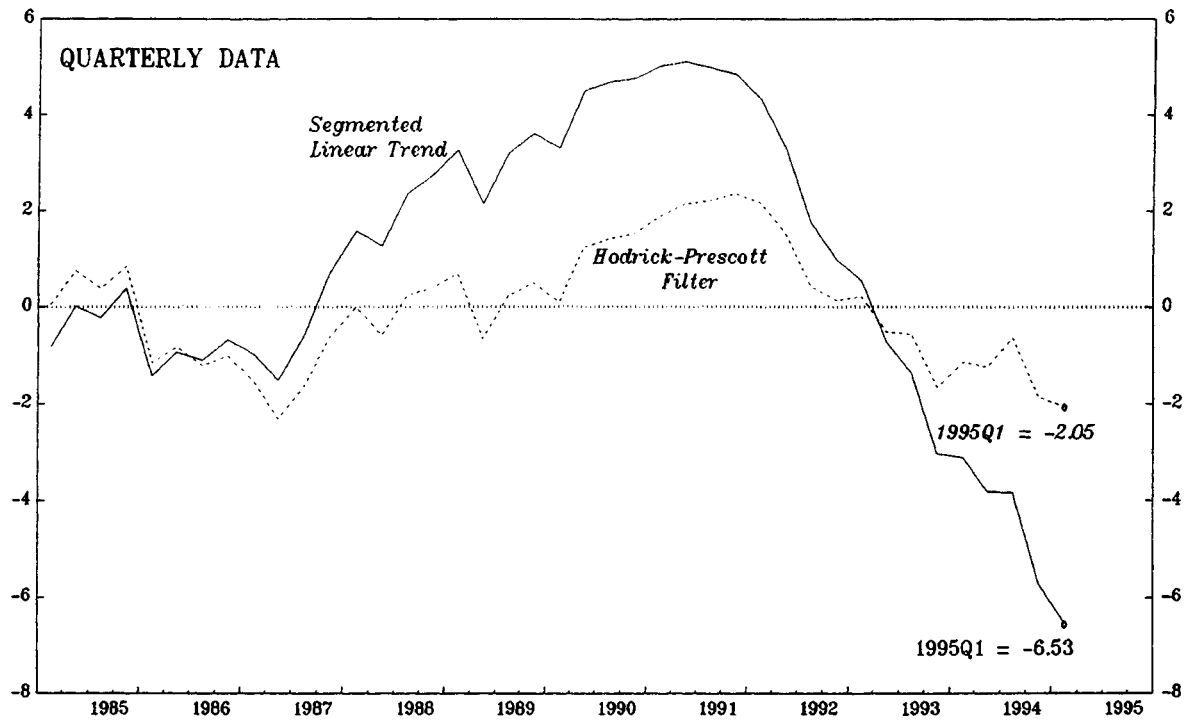
	Univariate Measures				Bivariate Blanchard-Quah Decompositions Using:			
	Quarterly Data		Annual Data		Percent change			
	Segmented Trend	HP Filter	Segmented Trend	HP Filter	Unemployment Rate	in GDP Deflator	CPI Inflation	Production Function
<u>Output Gaps</u> (Percent of trend GDP)								
1990	4.3	1.1	4.0	3.0	4.2	0.9	0.6	2.9
1991	5.0	2.2	4.6	3.8	4.8	0.0	0.3	3.0
1992	2.6	1.1	2.1	1.6	3.5	-0.7	-0.2	0.6
1993	-1.1	-0.6	-1.7	-1.7	0.3	-1.1	-1.0	-2.4
1994	-4.1	-1.2	-4.8	-4.3	-3.5	-4.1
<u>(Annual Growth Rates of Trend GDP)</u>								
1990	3.6	3.9	3.6	3.5	2.7	4.3	4.4	4.3
1991	3.6	3.1	3.6	3.4	3.6	5.2	4.4	4.1
1992	3.6	2.2	3.6	3.2	2.4	1.7	1.7	3.5
1993	3.6	1.5	3.6	3.1	3.0	1.8	0.5	2.8
1994	3.6	1.1	3.6	3.1	4.2	2.3

Sources: The Bank of Japan, Economic Statistics Monthly; Monthly Labor Statistics; and staff estimates.

Note: The data samples are as follows: Real GDP and GDP deflator: 1955Q2-95Q1; Unemployment rate: 1960Q1-95Q1; CPI: 1957Q1-91Q1. All quarterly data are seasonally adjusted.

CHART V.2

JAPAN
UNIVARIATE MEASURES OF THE OUTPUT GAP
(PERCENT OF TREND REAL GDP)



Source: Bank of Japan, Economic Statistics Monthly; and staff calculations

extensively in the recent business cycle literature. The HP filter has the property that the trend component of output calculated using this filter varies smoothly over time, thus reducing the amplitude of the implied output gaps relative to the measures discussed above. 1/ Using the HP filter, the estimate of the output gap in the first quarter of 1995 is 2.1 percent (Chart V.2). The reason that this filter yields a smaller output gap than the segmented trend is that, due to the recent recession, the rate of growth of potential output generated by this filter is very low towards the end of the sample. As shown in the lower panel of Table V.1, the growth rates of trend real GDP implied by this filter are below 2 percent in 1993 and 1994.

One possible way to reduce the end-of-sample sensitivity of the HP filter is to use annual data which tend to be smoother. The results from fitting a segmented linear trend and the HP filter to annual postwar data are shown in the lower panel of Chart V.2. 2/ Both of these techniques yield a larger output gap in 1994 relative to the estimates using quarterly data. In particular, the HP filter estimate of the output gap increases to 4.3 percent in 1994. It is also worth noting that using annual data makes these two univariate measures of the output gap very highly correlated.

Under the assumption that output has a stochastic trend, one could also decompose output into its permanent and cyclical components using the Beveridge-Nelson decomposition (see Beveridge and Nelson (1981)). This decomposition imposes the restriction that the permanent component of output is a random walk. To implement this decomposition, it is necessary to fit an autoregressive moving average (ARMA) model to the first difference of real GDP, possibly allowing for different drift terms before and after the structural break in the output series in 1973:Q4. However, this modelling strategy did not work well for the Japanese data. 3/ Hence, to carry forward the assumption that output has a stochastic trend, I now turn to a more general multivariate estimation strategy.

3. Multivariate measures of the output gap

This section uses a bivariate decomposition technique developed by Blanchard and Quah (1989) in order to derive output gap measures that are

1/ The smoothing parameter for the HP filter is set to 1600, which is the number used for quarterly data by Prescott (1986) and others in the business cycle literature. This number is not sacrosanct. Increasing the smoothing parameter increases the ratio of the variance of the cyclical component to the variance of the trend component.

2/ The segmented trend was estimated with a break in 1973. The smoothing parameter for the HP filter was set at 100 for annual data as is typical in the business cycle literature (see, e.g., Backus and Kehoe (1992)).

3/ The Akaike information criterion was minimized by the ARIMA(0,1,0) model fitted to real GDP, indicating that the residuals from a random walk model could not be well characterized using a parsimonious ARMA model. Iwamoto and Kobayashi (1992) report a similar result.

not based solely on the univariate time series properties of real GDP. A useful feature of this decomposition is that it incorporates information derived from other variables that are related to the business cycle. Further, in an econometric sense, it is flexible since it allows for a stochastic trend in output without forcing this trend component to be modelled in a restricted manner. ^{1/}

The technical details of the implementation of the Blanchard-Quah (BQ) decomposition technique may be summarized as follows. An unrestricted bivariate vector autoregression is estimated and then inverted to obtain a moving average representation. The autoregressive (AR) representation is written as follows:

$$A(L) \begin{bmatrix} d \log y_t \\ ur_t \end{bmatrix} = \begin{bmatrix} e_{1t} \\ e_{2t} \end{bmatrix} \quad \text{Var}(e) = \Omega \quad (2)$$

where $d \log y_t$ is the growth rate of real GDP, ur_t is the unemployment rate, and $A(L)$ is a matrix of polynomial lag coefficients. A standard procedure in VAR analysis is to invert the AR model to obtain a moving average (MA) representation of the form

$$\begin{bmatrix} d \log y_t \\ ur_t \end{bmatrix} = B(L) \begin{bmatrix} \omega_{1t} \\ \omega_{2t} \end{bmatrix}; \quad B(L) = \begin{bmatrix} b_{11}(L) & b_{12}(L) \\ b_{21}(L) & b_{22}(L) \end{bmatrix} \quad \text{Var}(\omega) = I \quad (3)$$

where $B(L)$ is a matrix of polynomial lag coefficients and the VAR innovations are uncorrelated. The conventional procedure used to make the model identified is to orthogonalize the VAR innovations by assuming a particular causal ordering of the variables. This procedure would be inappropriate here since one would want both types of shocks ω_1 and ω_2 , which BQ interpret as demand and supply shocks, to affect the two variables at all horizons. Hence, an additional identifying restriction needs to be imposed in order to make the model identified. Following Blanchard and Quah (1988), the restriction imposed here is that the long-run effect of a "demand" shock on the level of output is zero. In other words, the lag coefficients $b_{11}(L)$ in equation (3) are restricted to sum to zero. It is, of course, not necessary to interpret the shocks as demand and supply shocks, and this decomposition could be viewed merely as a technical device for separating permanent and transitory movements in output.

The BQ decomposition for Japan was first implemented using quarterly data on GDP growth and the residuals from the unemployment rate detrended

^{1/} The BQ decomposition is more general than the univariate Beveridge-Nelson decomposition in that it does not restrict the permanent component of output to be a random walk.

using the HP filter. ^{1/} Mean output growth rates were calculated separately for the periods before and after 1973:Q4 and these means were subtracted from the actual output growth rates. Eight lags of each variable were included in the VAR. The output gaps from this decomposition, presented in Chart V.3, are strongly positively correlated with the univariate measures derived earlier. However, the level of the implied output gap in the first quarter of 1995 is 4.8 percent, larger than the gaps from most of the univariate procedures. Moreover, the increase in the unemployment rate in the second quarter of 1995 suggests that this estimate of the gap is likely to increase further.

In principle, the BQ decomposition can also be implemented using GDP growth and any other variable (instead of the unemployment rate) that is correlated with the cycle and is not permanently affected by "demand" shocks. The inflation rate is an obvious candidate, especially for the purposes of the exercise in this chapter. Since the output gap is likely to have a lagged effect on the inflation rate, the variables used in the decomposition are the contemporaneous growth rate of output and the logarithmic change in the price level between the current period and four quarters ahead, i.e., the fourth lead of the four-quarter inflation rate.

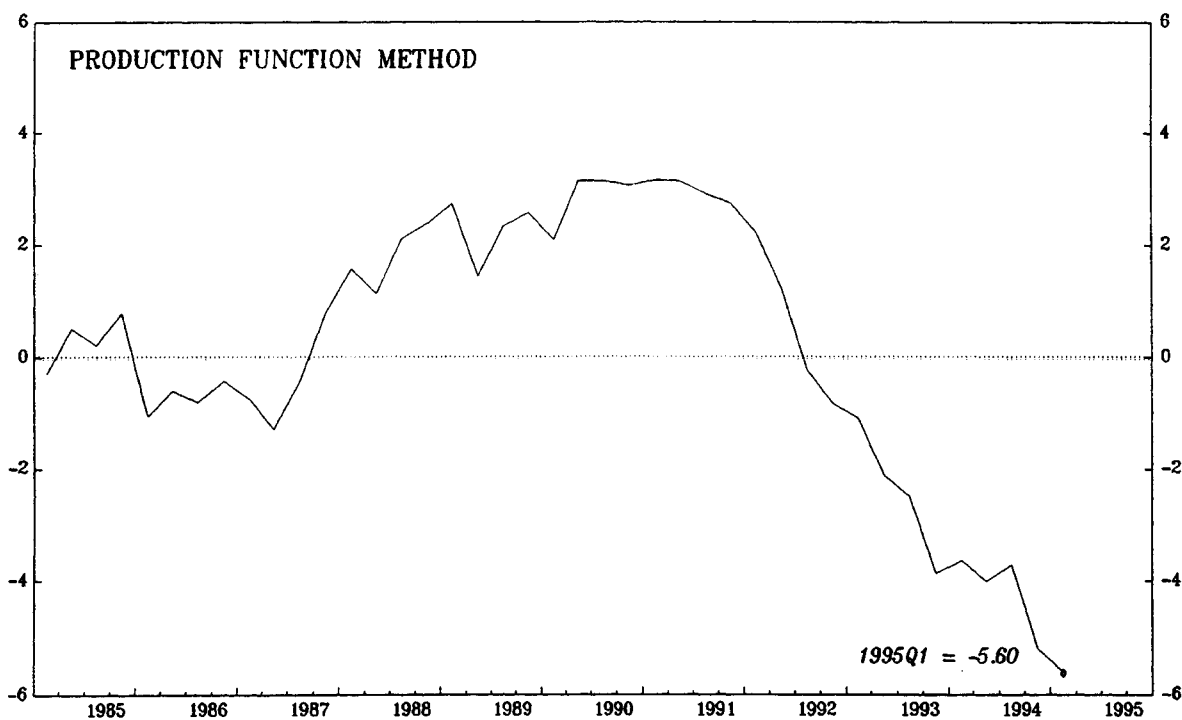
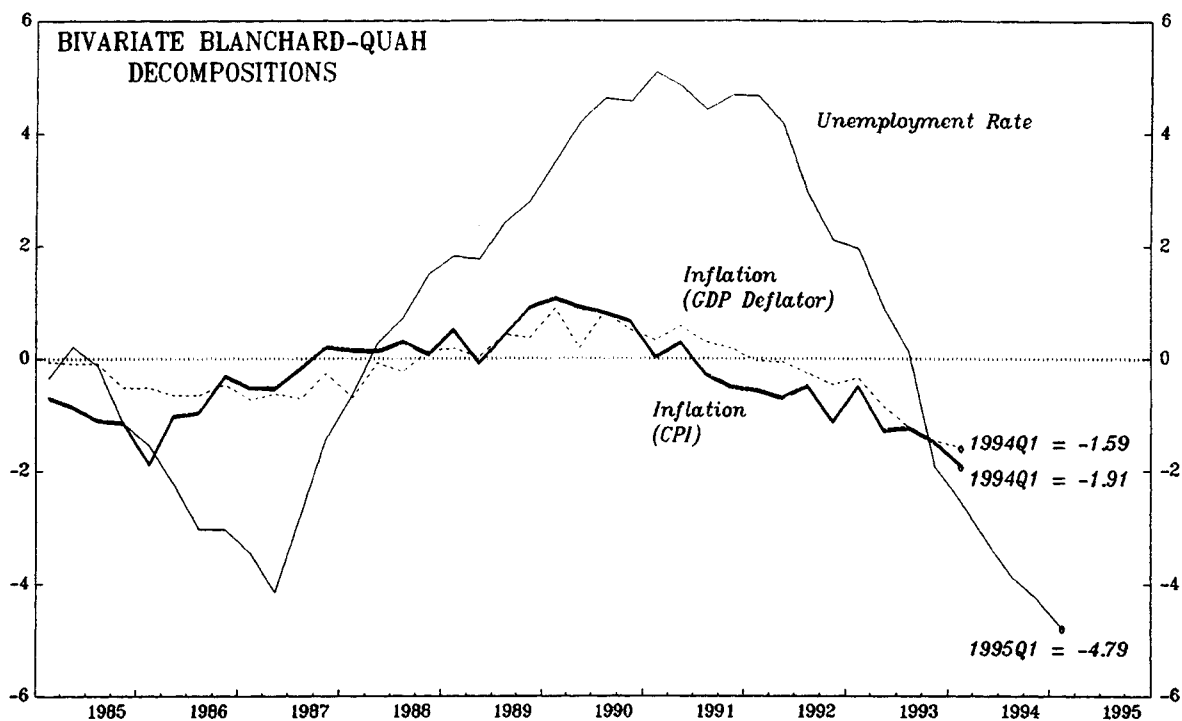
This decomposition was implemented with inflation measured as the four-quarter percentage change in the GDP deflator. One concern with the BQ decomposition using inflation was immediately apparent. The results were clearly influenced by the increase in inflation following the first oil price shock in 1974. To control for this effect, the inflation rate was regressed on money supply growth and the change in oil prices and the residuals from this regression were used in the decomposition. However, even this approach did not fully account for the sharp increase in inflation in 1974. Consequently, excess demand is estimated to be positive for a brief period around 1974 since inflation rose sharply in the period following the oil price shock. On the other hand, the decomposition implies a very large negative supply shock in this period. This is consistent with other evidence that the first oil shock period was characterized by monetary accommodation, interpretable as an aggregate demand shock, that increased inflation although output growth declined because of the large supply shock. ^{2/}

Note that, since the decomposition uses the fourth lead of inflation, the output gap can be calculated only until the first quarter of 1994, when

^{1/} Ignoring the trend in the unemployment rate leads to an inappropriate measurement of cyclical unemployment. The smoothing parameter for the HP filter was set to 40,000 to calculate the trend unemployment rate, which is estimated to be about 2.5 percent in the first quarter of 1995. This is almost identical to the estimate obtained by fitting a linear trend.

^{2/} In future work, it would be useful to use a larger system of equations that would allow for the dynamic effects of oil price and monetary shocks, along the lines of the Shapiro-Watson (1988) extension of the BQ methodology.

JAPAN
MULTIVARIATE MEASURES OF THE OUTPUT GAP
(PERCENT OF TREND REAL GDP)



Source: Bank of Japan, Economic Statistics Monthly; and staff calculations.

it is estimated to be about 1.6 percent (Chart V.3). This decomposition was repeated using CPI inflation. The results were similar, yielding an output gap of about 1.9 percent in 1994:Q1. 1/

An alternative multivariate approach for estimating the output gap is to directly estimate an aggregate production function. This approach has the advantage of reflecting movements in the fundamental determinants of output. However, the implementation of this approach also involves a few judgmental decisions regarding the choice of parametric specification, the procedure for smoothing factor inputs etc. Thus, even though the same basic approach is followed in the estimates prepared by the staff, the OECD, and the Japanese Economic Planning Agency (EPA), the resulting output gaps differ because of differences in the implementation.

The staff's baseline estimate of potential output is based on a Cobb-Douglas production function with constant share parameters, with the factor inputs being smoothed using the Hodrick-Prescott filter. 2/ The output gap implied by this approach is 4.1 percent in 1994 (Table V.1 and Chart V.3, lower panel). This estimate is in fact lower than the EPA estimate, derived from a similar methodology. The EPA estimates indicate that an output gap of over 6 percent had opened up as early as the last quarter of 1993. On the other hand, the OECD, using a CES production function, derives output gap estimates of only 0.4 percent in 1993 and 2.6 percent in 1994. 3/

In summary, as is common towards the end of a sample, the estimates of the output gap derived using various econometric procedures differ by a considerable margin. The estimates for the current output gap in Japan range from about 3 percent to 6 percent of potential output. To shed

1/ The BQ decomposition with inflation yields a somewhat smaller measure of the output gap than the other measures discussed above because both inflation and actual output growth remained low during 1992-94--thus the estimates of the annual growth rate of the stochastic trend component of output are correspondingly estimated to be quite low, below 2 percent. Using more realistic estimates of potential GDP growth, even these output gaps would be expected to be on the order of 4 percent by the first quarter of 1995.

2/ For details on the staff's production function approach to estimating potential output, see Chapter II in Supplement 1 to SM/94/167. This chapter also examines the sensitivity of the estimates to the procedure used for smoothing trend productivity.

3/ The smaller OECD estimate of the current output gap is largely driven by the assumption that trend average hours per worker declined by 1.5 percent per annum during the period 1988-93. This assumption, combined with a decline in the growth rate of "potential employment," results in a relatively slow rate of growth of the trend labor input, thereby generating an implied growth rate of potential output of only 2.3 percent in 1992 and 1993.

further light on the extent of slack in the economy, it is useful to look at alternative business cycle indicators.

4. Alternative measures of economic slack

This section examines alternative indicators of economic slack from the labor market. Apart from the unemployment rate, there exists an additional labor market indicator of the business cycle that is more robust to cyclical and secular variations in labor force participation rates. This is the ratio of aggregate employment to the total working-age population in the economy. The employment-population ratio for Japan is plotted in the upper panel of Chart V.4. A remarkable feature of the recent recession is that this ratio, after rising sharply from 1988 through 1992, has remained essentially flat since then despite the recession. This is consistent with the notion that there is a large amount of excess employment in the economy, although it is unclear why this ratio has responded much less than in the previous two recessions covered by these data.

The notion of excess employment becomes more clear when one examines the ratio of total hours, defined as total employment multiplied by average monthly hours worked, to the working age population (Chart V.4). This ratio was highly correlated with the employment-population ratio until 1987. Since then, the two series have diverged. But note that, since 1981, there has been a discernible downward trend in the ratio of total hours to the working age population that was exacerbated by the recession. Thus, it appears that employers have kept the same number of workers on their payrolls despite a fall in aggregate demand and have primarily adjusted labor input by reducing hours worked. The sharp decline of over 5 percent in this ratio between the 1991:Q4 and 1994:Q4 is indicative of the large margin of economic slack that remains. 1/

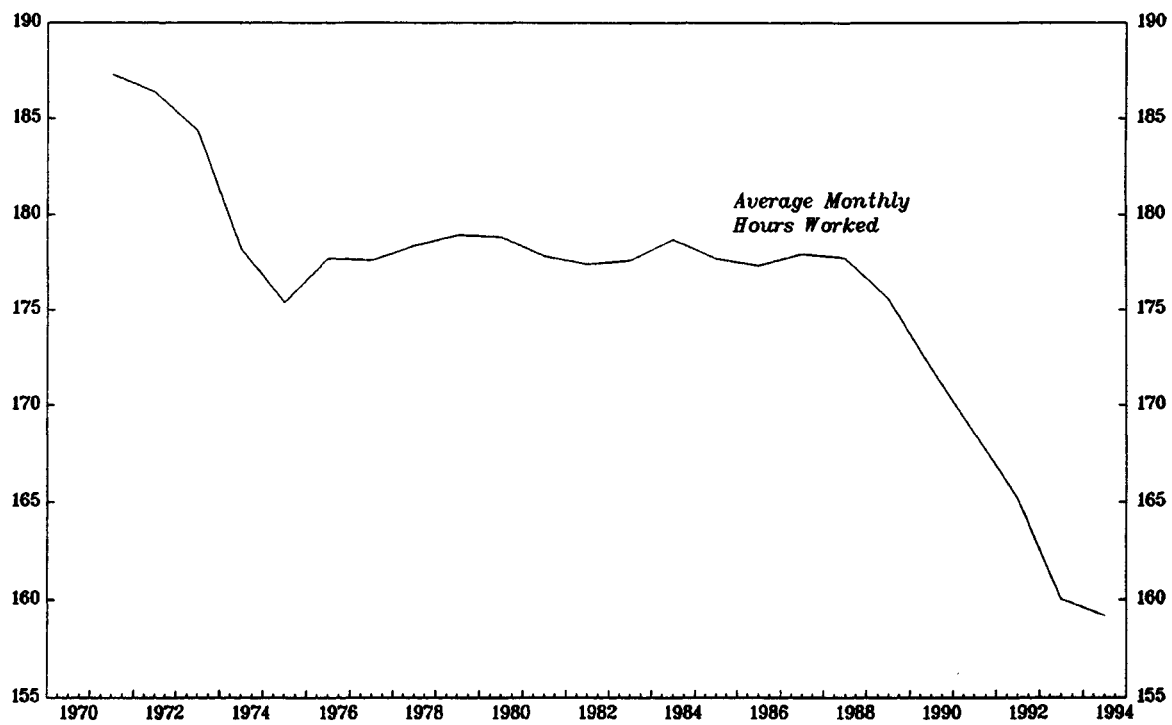
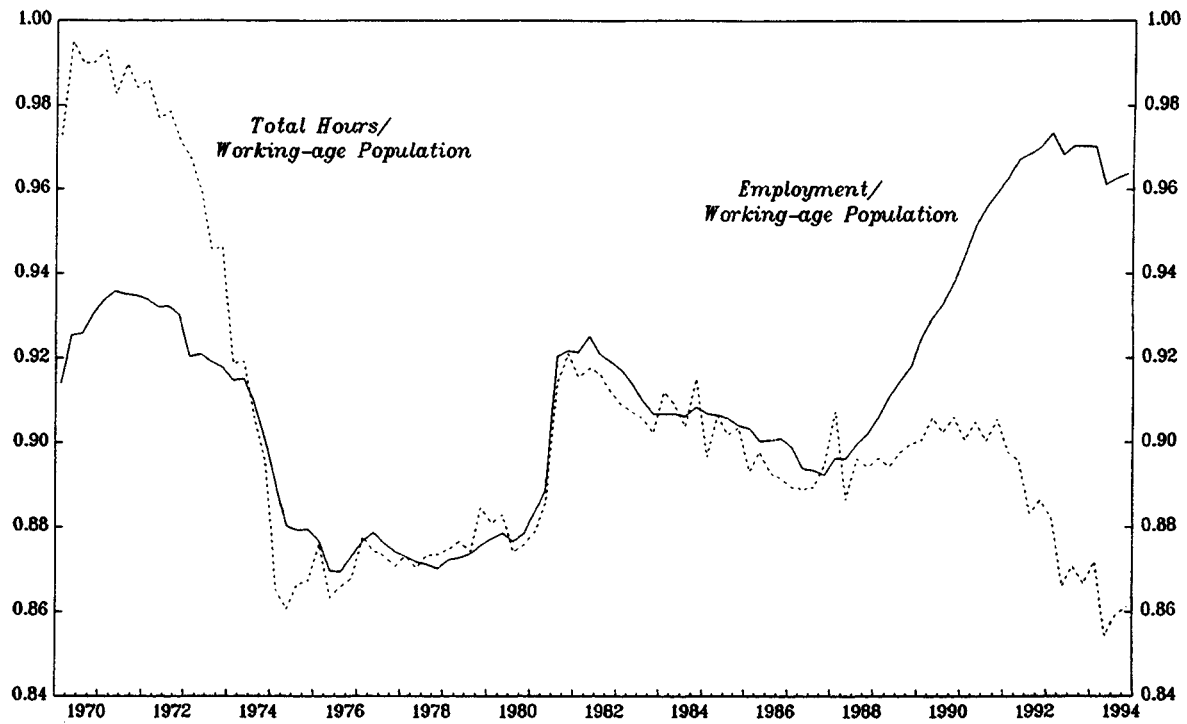
A similar picture is revealed when one examines the labor input per unit of real GDP. Using total employment and total hours worked as alternative measures of labor input, Chart V.5 shows that the amount of labor input per unit of real GDP been trending downward since 1975. 2/ However, the employment to GDP ratio is now considerably higher than its trend level, suggesting the possibility of substantial "excess employment." The deviation from trend of the ratio of total hours to GDP is also positive but somewhat smaller, consistent with the notion that the adjustment of labor input in this recession has occurred more at the margin of hours worked per employee rather than the number of workers employed. The

1/ Other labor market indicators such as the ratio of job offers to seekers have also fallen sharply since the recession began and are yet to recover from their cyclical troughs, providing further evidence of the large margin of slack.

2/ Note that this ratio is simply the inverse of labor productivity. This is based on a chart in Robert Feldman et al., "Japanese Macroeconomic Chartbook," Salomon Brothers, Tokyo, May 1995.

CHART V.4

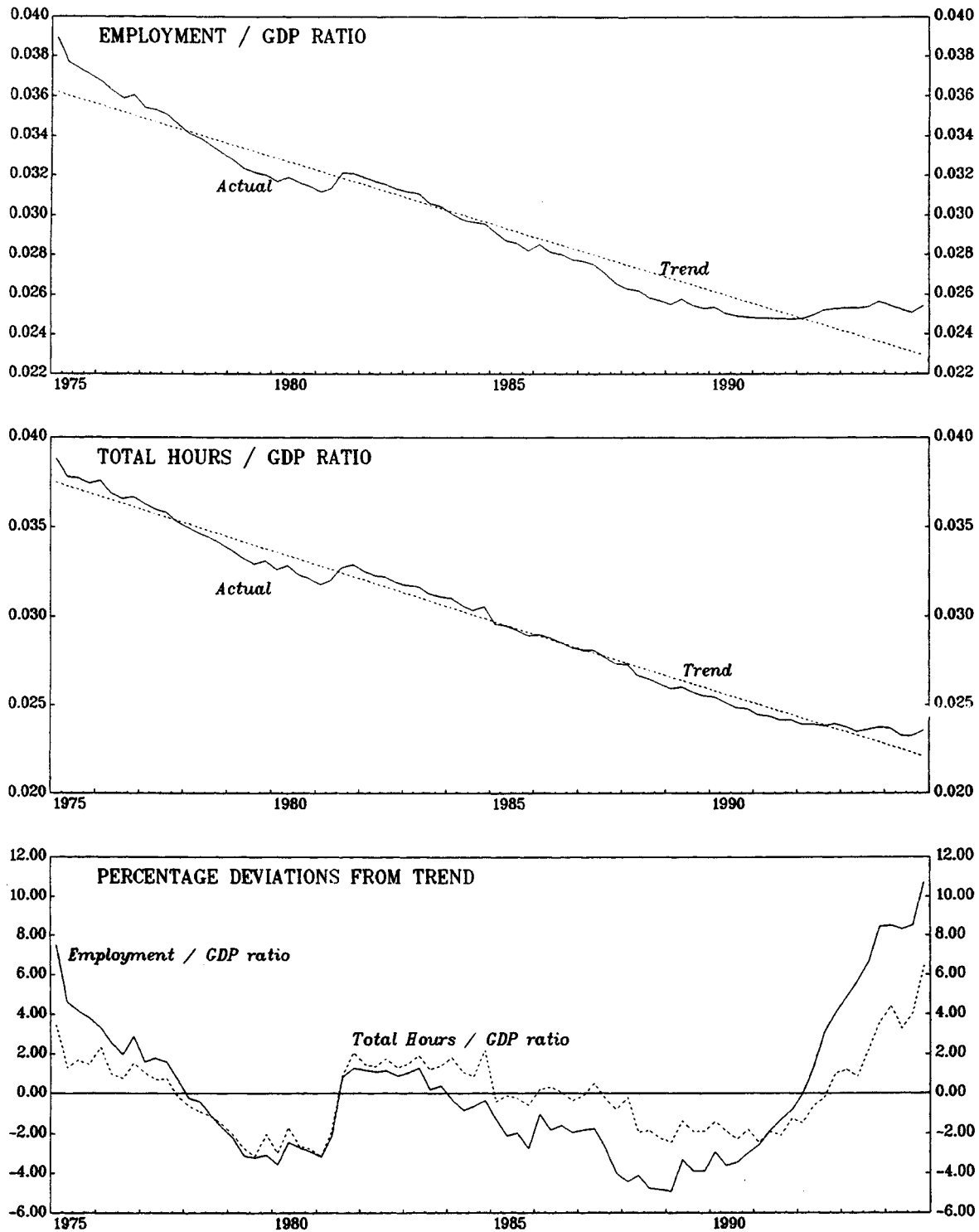
JAPAN
LABOR MARKET INDICATORS



Sources: Bank of Japan, Economic Statistics Monthly; Monthly Labor Statistics; and staff estimates.

CHART V.5

JAPAN
RATIOS OF LABOR INPUT TO REAL GDP



Sources: Salomon Brothers; Monthly Labor Statistics; and staff estimates.

deviations from trend of both these ratios are at historical highs and confirm the large margin of slack in the economy.

The decline in monthly hours worked, although partly a cyclical phenomenon, also appears to reflect a more fundamental shift in Japanese labor markets towards reducing working time. The gradual decline in average monthly working hours since the 1980s is apparent at the aggregate level as well as in virtually every sector of the economy. Along with other determinants of labor force growth, this has important implications for the medium-term growth prospects of the Japanese economy.

5. Potential output growth over the medium term

An aggregate production function provides a useful way of assessing historical and future growth rates of potential output by decomposing it into its basic determinants--labor input, the capital stock, and total factor productivity (TFP). The specification used by the staff (and also by the Economic Planning Agency) is a Cobb-Douglas production function with constant share parameters for labor and capital. Based on the share of labor income in national income, the labor share parameter for Japan is estimated to about 0.65, implying a capital share parameter of 0.35. Using this parameterization, it is straightforward to compute total factor productivity and, using a smoothing procedure such as the HP filter, to then derive the trend components of labor input, the capital stock, and TFP. Projections of the trend values of these three variables can then be used directly to forecast potential output growth in the medium term.

The labor input in the aggregate production function is determined by a number of variables including average hours worked, labor force participation rates, the rate of increase of the working age population etc. As discussed above, average monthly hours worked have declined since the early 1980s. From 1985 to 1994, average monthly hours for the total economy declined from 178 to 159. The Government's aim of attempting to reduce average working hours to about 150 per month for each worker suggests that average hours could show a further moderate decline. Total labor force participation rates, on the other hand, have declined only marginally, largely because the trend decline in the participation rate for males has been almost fully offset by the increase in the participation rate for females. Balancing these factors and extrapolating the trend growth rate of the working age population, the annual trend increase in the labor input is currently estimated to be slightly below 1/2 percent, although it is expected to rise gradually over the medium term as the decline in working hours tapers off.

The investment boom that began in the late 1980s led to a rapid increase in the capital stock over the period 1988-92. The adjustment following this investment boom, combined with the slow pace of economic recovery, could reduce the rate of growth of the capital stock in the near term. Using staff projections of private business fixed investment and

residential investment, the capital stock is estimated to grow at an annual rate of about 2 1/2 to 3 percent over the medium term.

Trend TFP growth is estimated to have averaged 1.1 percent per annum from 1980 to 1991 and, since the recession began in 1992, slowed to 0.9 percent per annum. This is similar to the estimates obtained by the EPA. An average growth rate of about 1 percent for TFP is assumed over the medium term. Using this assumption and the labor and capital share parameters discussed above, the rate of growth of potential real GDP is estimated to average about 2 1/2 percent over the medium term.

Given potential output growth of this magnitude, the staff's medium term forecast of GDP growth implies that the current output gap will be closed only around the year 2000. Note that the trend growth rates in 1994 implied by many of the trend-cycle decompositions shown in Table V.1 are higher than this production function estimate. If extrapolated into the medium term, these measures of potential output growth suggest that the Japanese economy may not return to full capacity even by the year 2000.

6. Conclusions

This chapter examined a number of univariate and multivariate measures of the output gap. Although the estimates are subject to the usual large margin of end-of-sample uncertainty, most of the estimates are broadly consistent with an output gap, at the end of 1994, in the range of about 3 to 6 percent of potential GDP. The staff approach to measuring potential output, which is based on a standard production function, yields an estimate of the output gap that is well within this range of estimates.

The longer-term growth prospects of the Japanese economy are difficult to ascertain clearly at this stage of the business cycle. Based on trends in the basic determinants of output, medium-term potential output growth is likely to be around 2 1/2 percent. The medium-term growth prospects could be affected by structural change in the Japanese economy, including the tendency for the economy to shift from manufacturing to being a more services-oriented economy. These issues are explored in more detail in the next chapter.

VI. Structural Change in the Japanese Economy

1. Introduction

This chapter examines long-term trends in the sectoral composition of the Japanese economy. Employment and output data disaggregated at a broadly defined one-digit sectoral level are used to examine trends in the relative importance of different sectors in the aggregate economy. The possible long-term growth effects of changes in the structure of production in the Japanese economy are also discussed. In addition, this chapter looks at some measures of inter-sectoral labor reallocation to examine if there has been an increase in the pace of structural change in recent years.

2. Sectoral developments

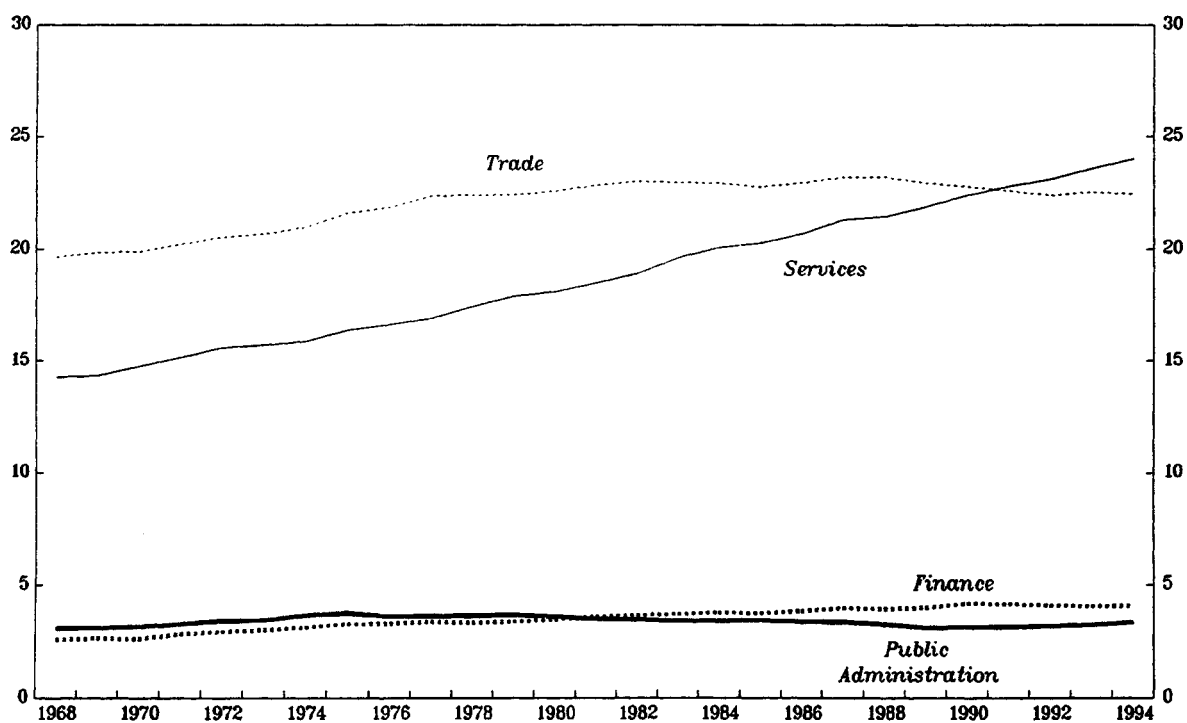
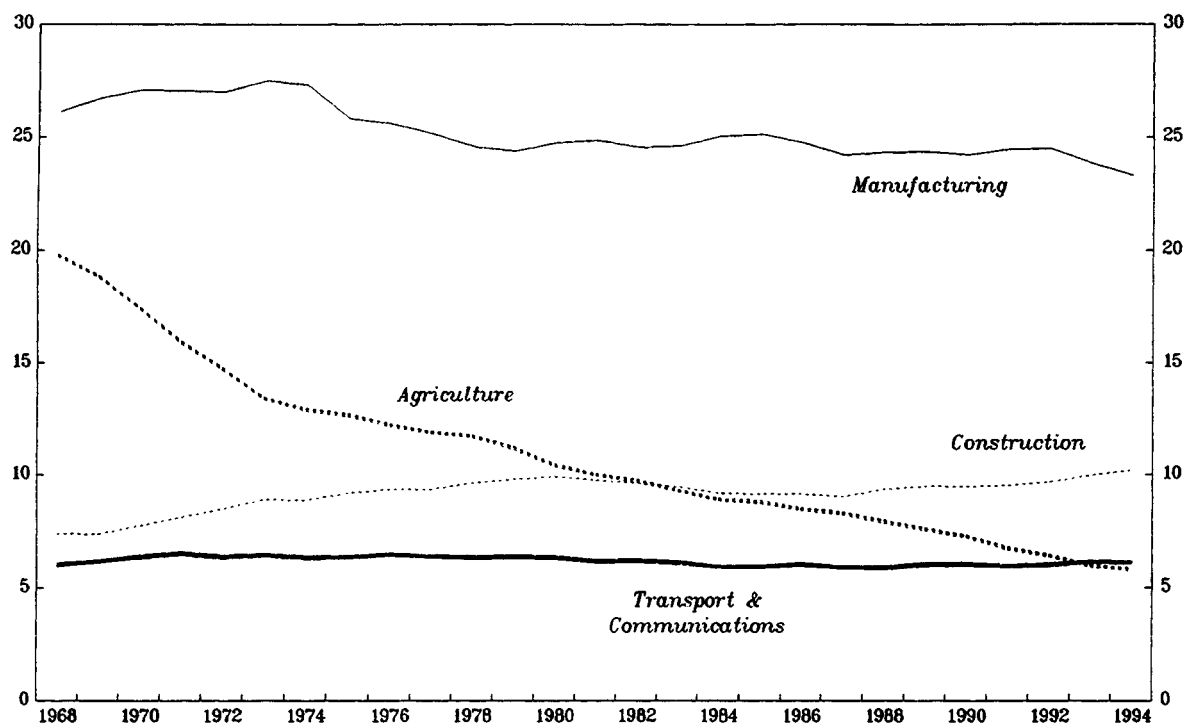
This section explores trends in the composition of activity by examining developments in output, employment, and labor productivity growth at the sectoral level. Chart VI.1 presents the employment shares of each broadly defined one-digit sector from 1969 to 1993. The most striking features in the upper panel are the sharp decline in the share of agriculture (including forestry and fisheries) in total employment and a gradual decline in the share of manufacturing sector employment. Offsetting these declines, as shown in the lower panel, are a marked increase in the share of services sector employment and more gradual increases in trade and finance. ^{1/} These secular changes in employment shares are consistent with the notion that the Japanese economy is becoming a more services-oriented economy.

Chart VI.2 shows the share of each sector in aggregate (real) output. This is a striking picture. It shows that, despite a declining employment share, the output share of the manufacturing sector continued to increase steadily during the last two decades, although at a slower pace than before the early 1970s. Since 1990, the share of manufacturing in the aggregate economy has remained close to 30 percent. This stands in contrast to the experience of many other industrialized countries that have experienced steady declines in both the output and employment shares of the manufacturing sector since the early 1970s.

To reconcile this finding with the notion that the importance of the manufacturing sector in the Japanese economy is declining, it is useful to also examine nominal quantities and prices. Chart VI.3 plots sectoral shares in aggregate nominal output. This chart shows that there has indeed been a steady decline in the share of the manufacturing sector in nominal

^{1/} At the one-digit level of disaggregation, the services sector refers to community, business, and personal services. The utilities sector, which has had a relatively stable employment share of around 0.5 percent, is not shown in this chart.

CHART VI.1
JAPAN
INDUSTRY EMPLOYMENT SHARES 1/

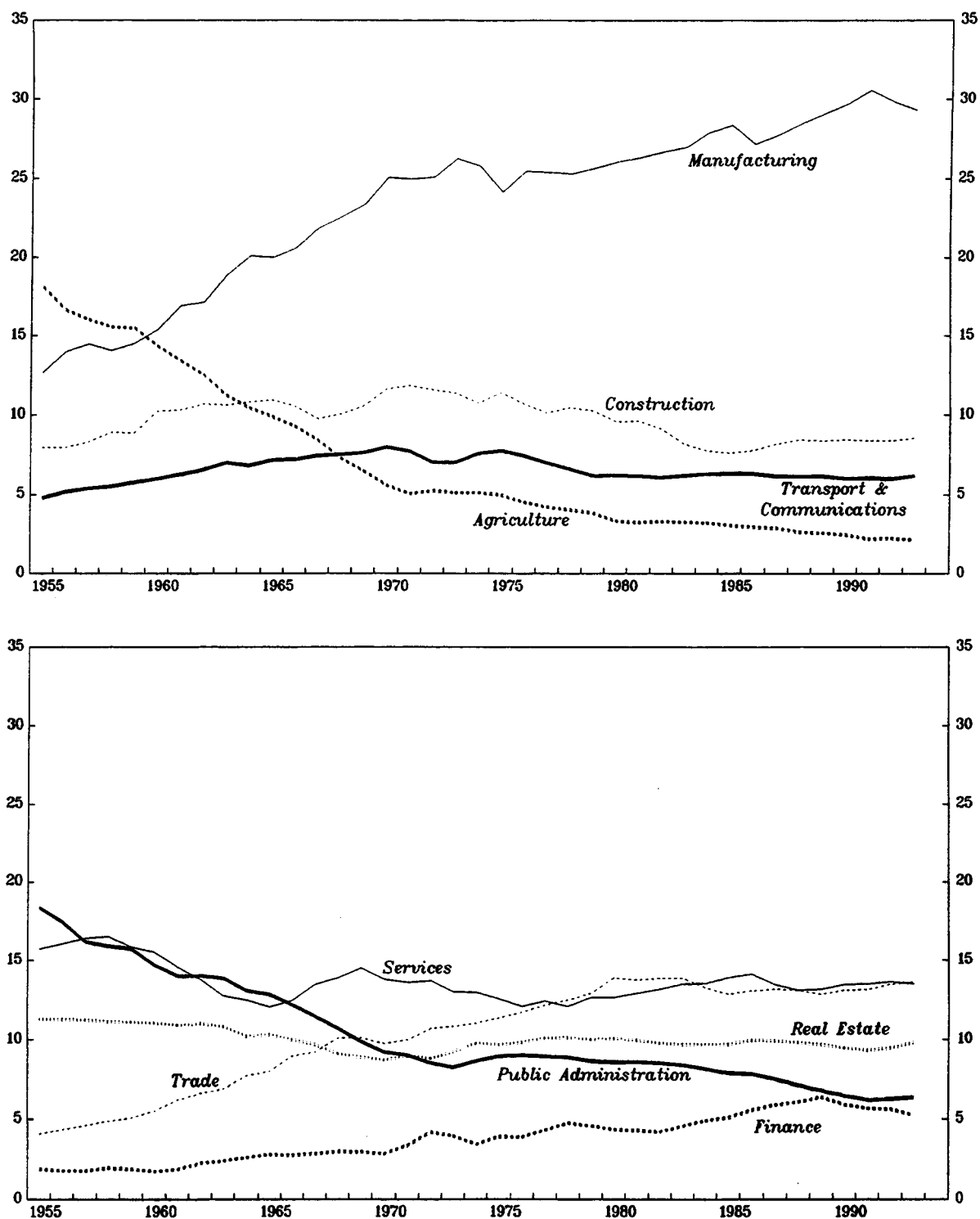


Source: Monthly Labor Statistics and staff calculations.

1/ Services refers to community, personal, and business services. Trade refers to wholesale and retail trade.

CHART VI.2

JAPAN
INDUSTRY SHARES OF AGGREGATE REAL OUTPUT 1/

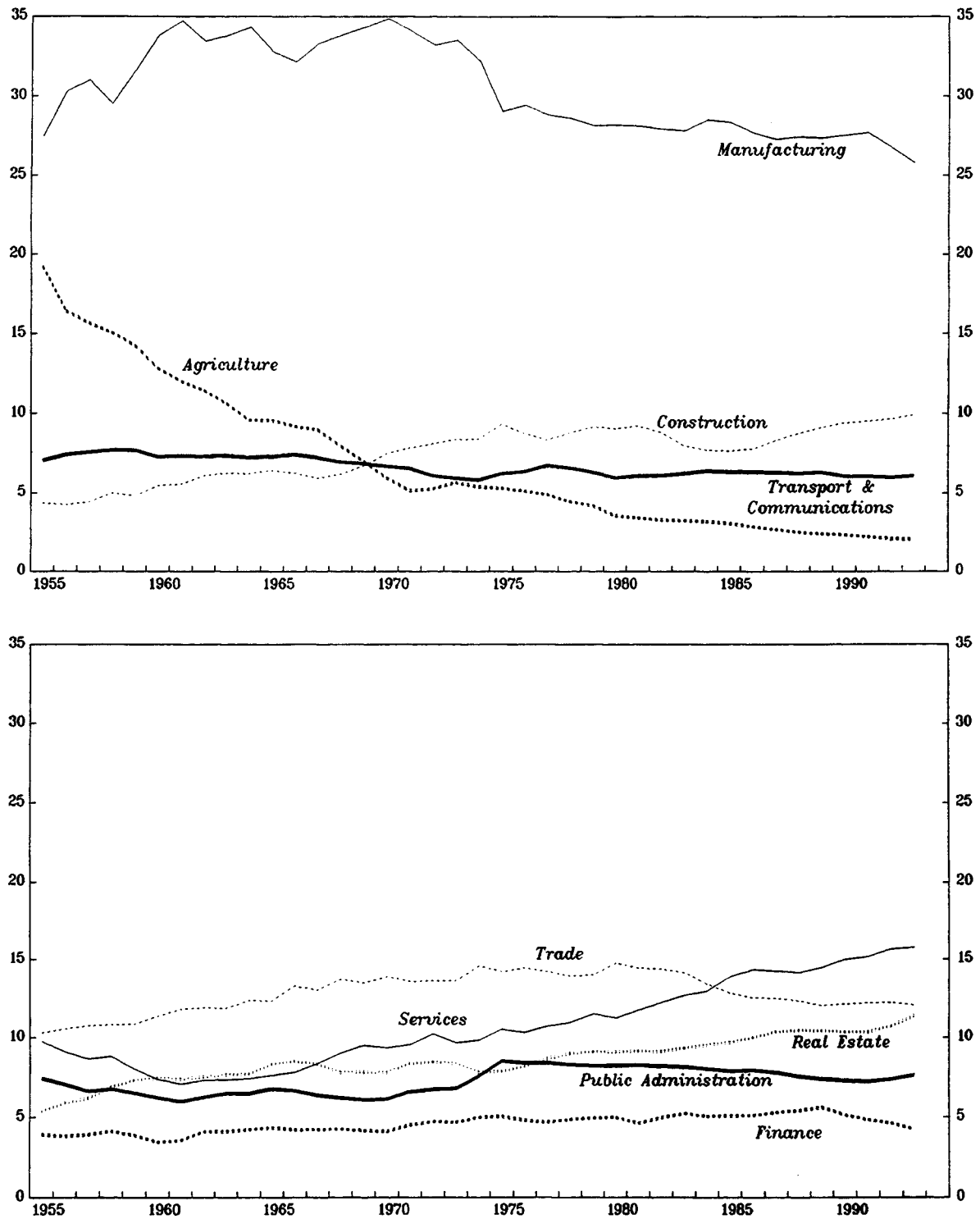


Source: Bank of Japan, Economic Statistics Monthly; Nikkei Telecom; and staff calculations.

1/ Services refers to community, personal, and business services. Trade refers to wholesale and retail trade.

CHART VI.3

JAPAN
INDUSTRY SHARES OF AGGREGATE NOMINAL OUTPUT 1/



Source: Bank of Japan, Economic Statistics Monthly; Nikkei Telecom; and staff calculations.

1/ Services refers to community, personal, and business services. Trade refers to wholesale and retail trade.

output, from a peak of 35 percent in 1970 to 26 percent in 1993. Consistent with the different patterns of evolution of the real and nominal output shares, an examination of the price deflator for the manufacturing sector shows a marked and steady relative price decline for this sector. For instance, the manufacturing price deflator grew by only 0.1 percent per annum over the period 1975-93. In contrast, the annual increase in the aggregate price deflator averaged 2.7 percent over this period. The absolute decline of more than 6 percent since 1986 in the manufacturing price deflator appears to be attributable in large part to the sharply falling prices in metals, machinery, and equipment, an industry that includes information processing equipment such as computers. The apparent stability of the share of the manufacturing sector in aggregate real output thus appears to be associated with large relative price declines and could reflect index number problems in the measurement of the real output of computers, electronics, and machinery.

Some of the other patterns are very similar across Charts VI.2 and VI.3. The share of agriculture in aggregate real and nominal output has fallen considerably while that of financial services has risen. On the other hand, despite an increase in the employment and nominal output shares of services, the share of this sector in real output has barely changed since the 1960s.

The fact that the employment share of the manufacturing sector has been declining provides some grounds for concern if one examines labor productivity growth at the sectoral level (Table VI.1). Labor productivity growth in virtually all sectors of the economy has moderated since the 1970s. Annual productivity growth in the manufacturing sector has averaged only 3.8 percent since 1974, well below the average of 9.7 percent in the period 1956-73. Further, the trade and services sectors, which have witnessed rapid employment growth in recent years, have much lower rates of productivity growth than manufacturing. The changing sectoral composition of employment in the Japanese economy away from high productivity growth sectors such as manufacturing towards low productivity growth sectors such as services could affect aggregate labor productivity growth in the future. However, quantifying the effects of these factors on prospects for medium-term potential output growth is difficult, particularly since labor productivity growth rates could in large part be endogenously determined along with sectoral employment growth rates.

3. Measures of structural change

Although there are clearly important secular changes underway in the Japanese economy, it is also of interest to examine whether recent macroeconomic conditions, including the recession, have increased the pace of structural change. It is plausible, in fact, that an increase in the pace of structural change could be one of the reasons why the current recovery has gathered momentum very slowly.

Table VI.1. Japan: Labor Productivity Growth

	Average Annual Growth Rates		
	1956-93	1956-73	1974-93
Aggregate Economy	4.6	7.3	2.5
Agriculture	3.9	5.9	2.3
Mining	8.6	14.5	3.7
Manufacturing	6.2	9.7	3.8
Construction	2.9	5.4	0.6
Transport and Communications	2.7	5.1	2.1
Utilities	3.7	1.8	4.2
Finance	4.0	10.4	2.4
Trade	4.7	9.4	3.2
Services	2.3	4.1	0.7
Government	1.8	2.3	1.5

Sources: Nikkei Telecom; and staff estimates.

Notes: Labor productivity is defined as output per employee. The data start only in the mid-1960s for four sectors: finance, transport and communications, trade, and utilities.

One formal way to investigate whether there have been recent substantial shifts in the structure of the Japanese economy is to examine net inter-sectoral flows of labor. A simple statistical measure that captures this phenomenon without examining actual data on labor flows was developed by Lilien (1982, 1990), who uses the following measure of the dispersion of employment growth rates across sectors:

$$\sigma_t^2 = \sum_{i=1}^N \left(\frac{x_{it}}{X_t} \right) (\Delta x_{it} - \Delta X_t)^2 \quad (1)$$

where x_{it} is employment in sector i at time t , X_t is aggregate employment at time t , and the operator Δ represents the growth rate of a variable. Each industry's weight was divided by the variance over time of that industry's employment growth in order to adjust for the effects of different cyclical sensitivities of employment growth rates across industries. Typically, this measure of employment growth dispersion tends to rise during periods of major structural change and also during recessions when there are large net flows of labor across sectors. Since annual data are used here in constructing this variable, some of the higher frequency movements in employment growth dispersion that are related to the business cycle are smoothed over in this analysis. ^{1/} The upper panel of Chart VI.4 shows that this measure of employment growth dispersion has been relatively low over the last few years and well below its peak in the early 1970s when the economy was clearly undergoing considerable structural change. Thus, at first glance, there is little evidence of an increase in the pace of structural change in the Japanese economy at this broad level of disaggregation.

Davis (1987) has argued that Lilien's measure of the sectoral dispersion of employment growth rates may be inadequate for capturing longer-term flows of labor. He constructed the following labor reallocation measure that attempts to measure whether net inter-sectoral flows of labor in one period are reinforced or reversed by subsequent flows of labor:

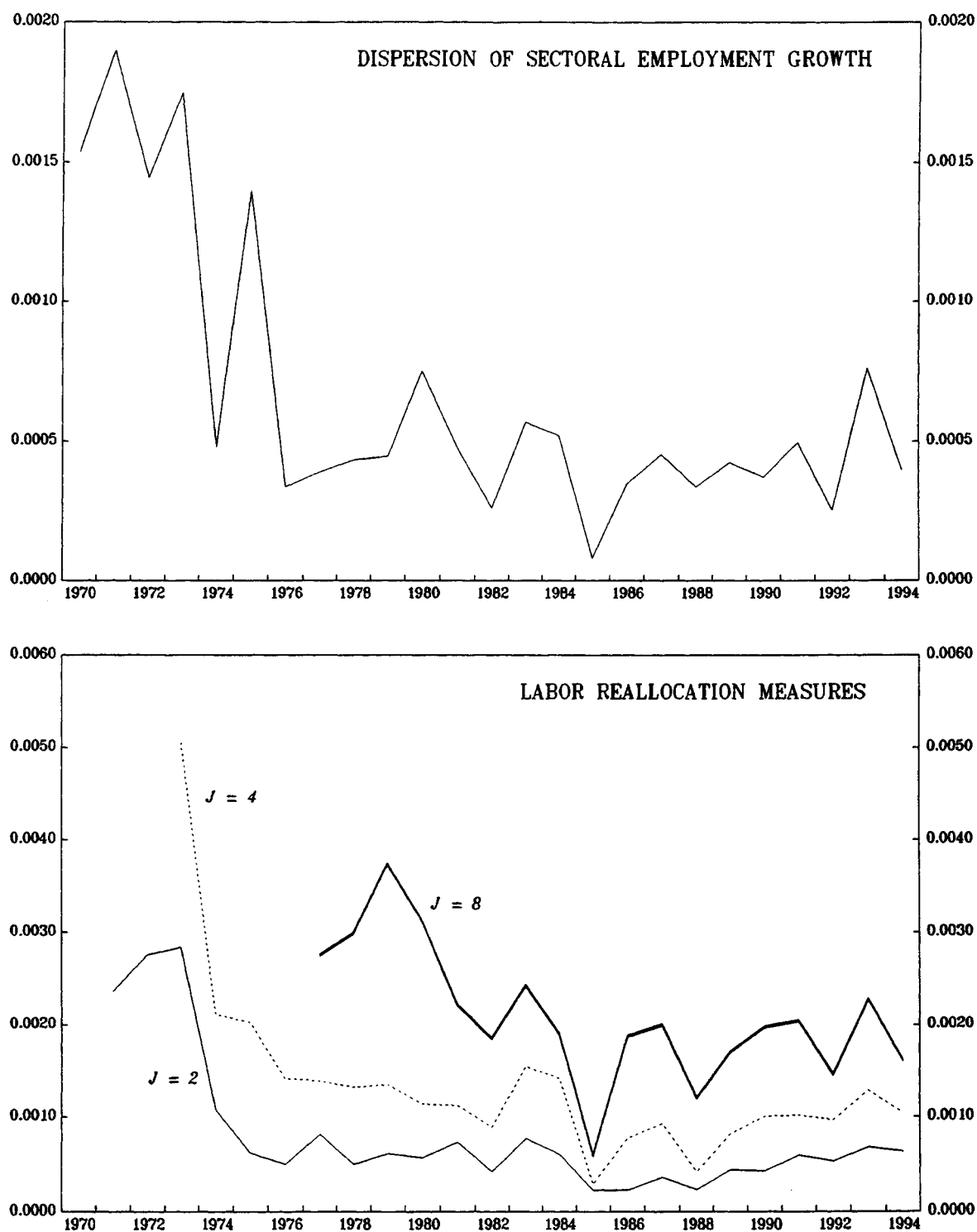
$$\sigma_{t,j}^2 = \sum_{i=1}^N \left(\frac{x_{it}}{X_t} \right) (\Delta x_{it} - \Delta X_t) (\Delta_j x_{it-1} - \Delta_j X_{t-1}) \quad (2)$$

where Δ_j represents the percentage change in a variable over j periods. Relatively large (small) values for $\sigma_{t,j}^2$ indicate that the time t direction

^{1/} Gross flows of labor across sectors typically dominate net flows. In recessions and periods of major structural change, however, the ratio of net flows to gross flows tends to rise. Lilien (1982, 1990) has argued that a significant fraction of cyclical unemployment in the United States is attributable to such sectoral shifts. The empirical validity of this hypothesis is not important for the purposes of the analysis in this note.

CHART VI.4

JAPAN
MEASURES OF LABOR REALLOCATION



Source: Monthly Labor Statistics and staff calculations.

of labor reallocation reinforces (reverses) the time $t-1$ reallocation over the preceding j -period horizon. This measure is designed to examine whether, over different horizons, labor flows are consistent with patterns of structural change in the economy, where structural change is to be interpreted as reflecting changes in the one-digit sectoral composition of total employment in the economy.

The labor reallocation measure, computed with j equal to 2, 4, and 8 is displayed in the lower panel of Chart VI.4. Although all of these measures of labor reallocation do show a gradual increase since 1985 and a sharper increase during the recent recession, they are well below the levels reached in the mid-1970s. In summary, although there are distinct trends in the employment and output shares of different sectors, there is no strong evidence of a recent substantial increase in the pace of structural change in the Japanese economy.

4. Conclusions

This chapter examined long-term trends in the sectoral composition of aggregate employment and output in the Japanese economy. Based on the evolution of sectoral employment shares, the economy appears to be gradually decreasing its manufacturing base and moving towards becoming a more services-oriented economy. However, although recent developments such as increases in foreign direct investment by Japanese companies abroad suggest the possibility of the increased hollowing out of the Japanese manufacturing sector, the share of the manufacturing sector in aggregate real output has remained stable. But the share of this sector in nominal output has fallen steadily, similar to the decline in its employment share.

The analysis of inter-sectoral labor flows using employment growth dispersion and labor reallocation measures did not reveal any clear evidence of a recent increase in the pace of structural change as measured by sustained net flows of labor across sectors. However, the tendency towards a gradual increase in the employment shares of sectors such as services that have relatively lower productivity growth than declining sectors such as manufacturing could portend a moderation in the medium- and long-term growth rate of aggregate labor productivity.

VII. Developments in Inflation and International Price Differentials

1. Introduction

Japan has recently experienced one of the largest cycles in the post-war period, as economic activity grew well above potential in the late 1980s followed by an extended downturn. Growth in prices of most goods and services has varied with these movements in activity, rising during the "bubble period" and decelerating since 1991. More recently, the levels of most prices indices have shown outright declines, as disinflation has turned into (mild) deflation. This chapter first examines recent changes in goods and services prices against the background of the business cycle and recent exchange rate behavior. ^{1/} It then looks at recent evidence on Japan's price levels compared with those in other industrial countries.

2. Developments in inflation

a. Historical perspective

Compared with the 1970s, inflation in the 1980s and early 1990s in major industrial countries has been relatively subdued (Chart VII.1). The difference in performance has been even more pronounced in Japan: during the 1970s, Japanese inflation was close to the average for industrial countries, while since the early 1980s, inflation has averaged less than half that for other G-7 countries. ^{2/}

Over this period, there have been substantial differences in the behavior of alternative measures of inflation for Japan (Chart VII.2). Consumer prices have, on average, risen more quickly than wholesale prices or the GDP deflator since 1970. In part, this reflects faster productivity growth in goods-producing industries than in services, as well as the secular downward trend in the price of investment goods. ^{3/} With the reduction in general inflation rates in the 1980s and early 1990s, the level of wholesale prices in Japan began to decline, as domestic wholesale prices fell by about 6 percent from 1981 to 1990, and by a further 4 percent through end-1994.

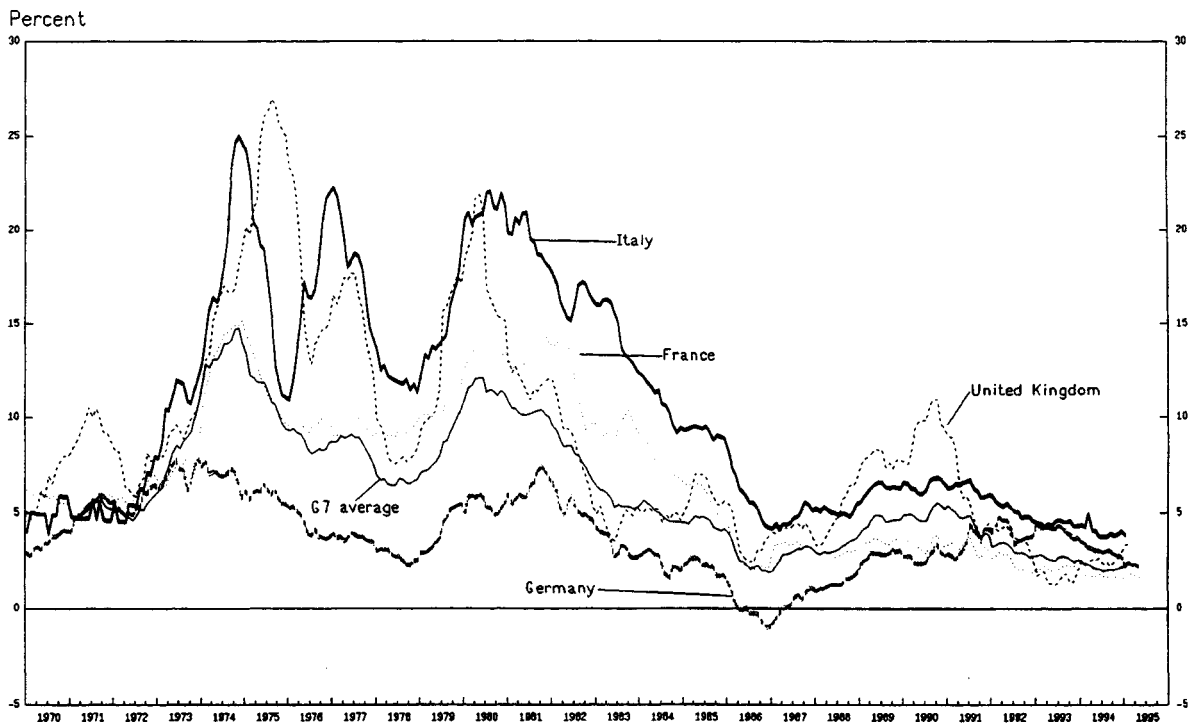
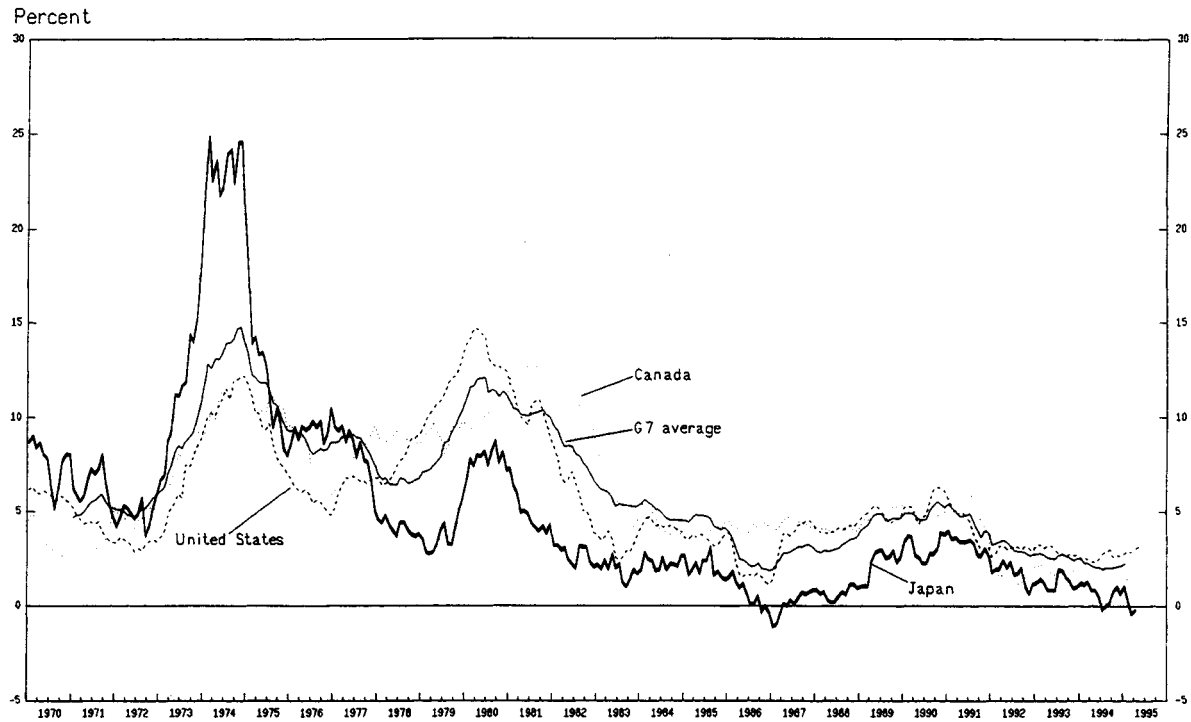
^{1/} Asset prices have been more volatile than goods prices over the cycle. Kähkönen (1995) provides a detailed analysis of movements in asset prices from the mid-1980s through 1992. Hoffmaister and Schinasi (1994) and Samiei and Schinasi (1994) also examine asset price developments in Japan over this period.

^{2/} Consumer prices in G-7 countries increased at an 8 1/2 percent average annual rate in the 1970s and at a 5 1/2 percent rate in the 1980s, compared with Japanese inflation rates of 8 3/4 percent and 2 1/4 percent, respectively.

^{3/} As in other countries, this largely reflects falling prices for computers and other electronic equipment. See Chapters I and VI for discussions of inter-sectoral productivity growth differentials in Japan.

CHART VII.1

GROUP OF SEVEN COUNTRIES
INFLATION PERFORMANCE, 1970-95
(CPI inflation; year-on-year rates)

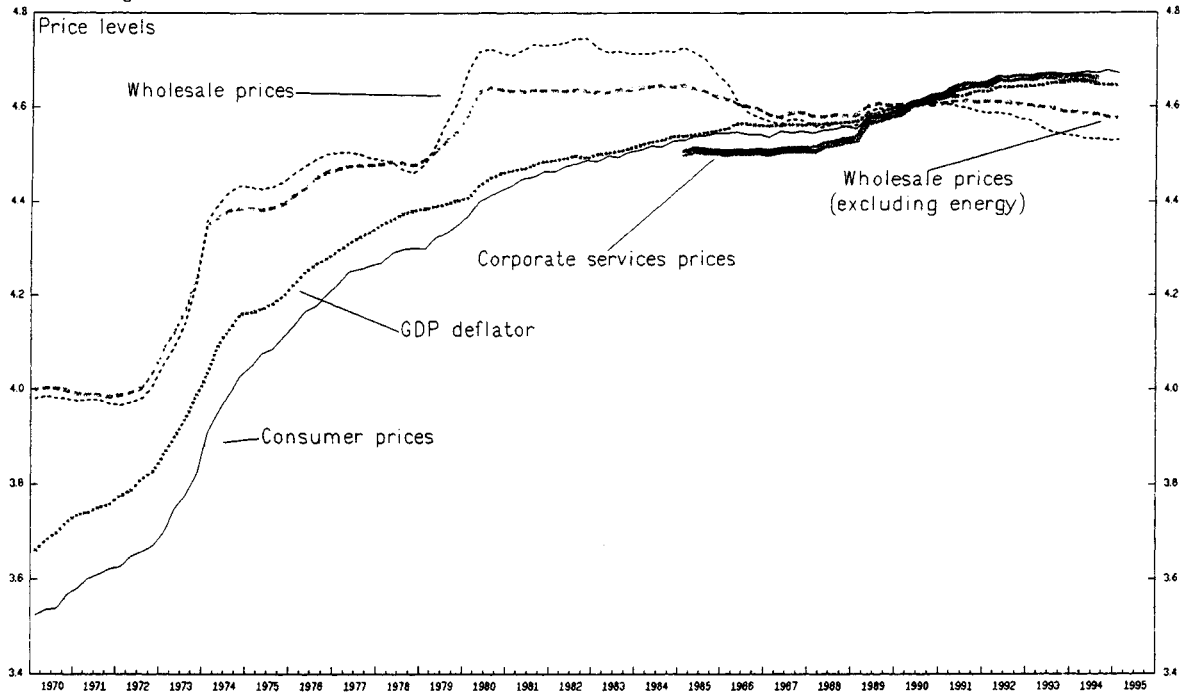


Source: IMF, International Financial Statistics

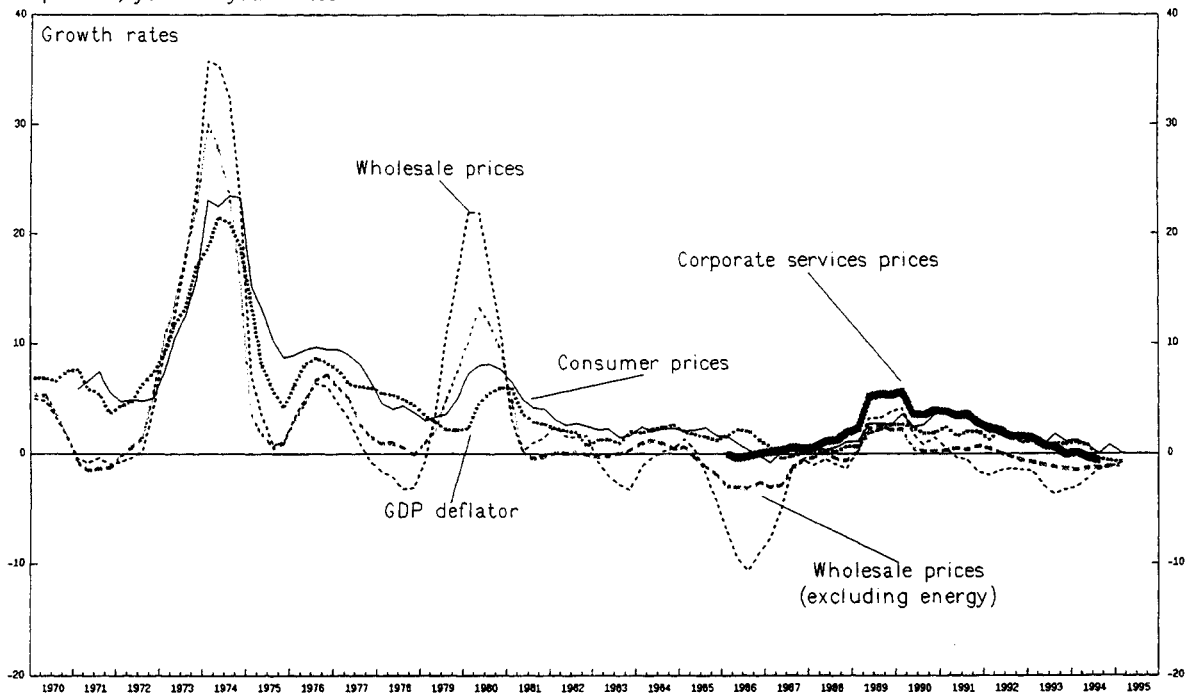
CHART VII.2

JAPAN
PRICE AND INFLATION PERFORMANCE, 1970-95

Natural logarithms



In percent; year-on-year rates



Sources: Management and Coordination Agency; Economic Planning Agency; Bank of Japan; and staff calculations.

b. Developments over the recent cycle

All measures of inflation in Japan accelerated from 1988 through 1990, reflecting strong economic activity, the relatively easy monetary stance up to 1989, and the temporary jump in world energy prices in 1990. The recession, however, has fully reversed this rise, and most measures of inflation have returned to near their previous troughs in 1986. Indeed, more recently, the levels of several broad indices have declined over the past year--in the case of the GDP deflator, the decline over the past three quarters is unprecedented. 1/ In addition to cyclical influences, large changes in external prices have had an important effect on inflation. In particular, the sharp appreciation of the yen since 1992 has resulted in declining export and import prices, with the latter's fall reinforced by reductions in world energy prices (Chart VII.3). 2/ To the degree that lower international prices have passed through to domestic markets, inflation has been further restrained. 3/

To assess the impact of recent movements in activity and import prices on inflation, an equation was estimated relating current CPI growth to its lagged values, current and lagged growth in import prices, and the lagged gap between actual and potential output. 4/ (The upper panel of Chart VII.4 shows the estimated output gap along with the four-quarter growth rate of the CPI.) The equation was initially estimated using quarterly data over the period 1971-94, yielding the results shown in Line 1 of the following tabulation (t-statistics in parentheses): 5/

1/ While quarterly changes in the GDP deflator were negative from 1957:Q4 to 1958:Q2, and also from 1986:Q4 to 1987:Q2, the first time that the year-on-year change in the deflator (a more indicative measure of underlying inflation) has declined for three straight quarters was in the period ending in the first quarter of 1995.

2/ Recent movements in the yen are discussed in Chapter I.

3/ The question of price pass-through is examined in Chapter VIII.

4/ Import prices are measured as the GDP deflator for imported goods and services, while potential output is the staff's estimate derived from a production function approach. Alternative output gap estimates are examined in Chapter V.

5/ Instrumental variables were used to control for the potential endogeneity of the contemporaneous value of import price inflation.

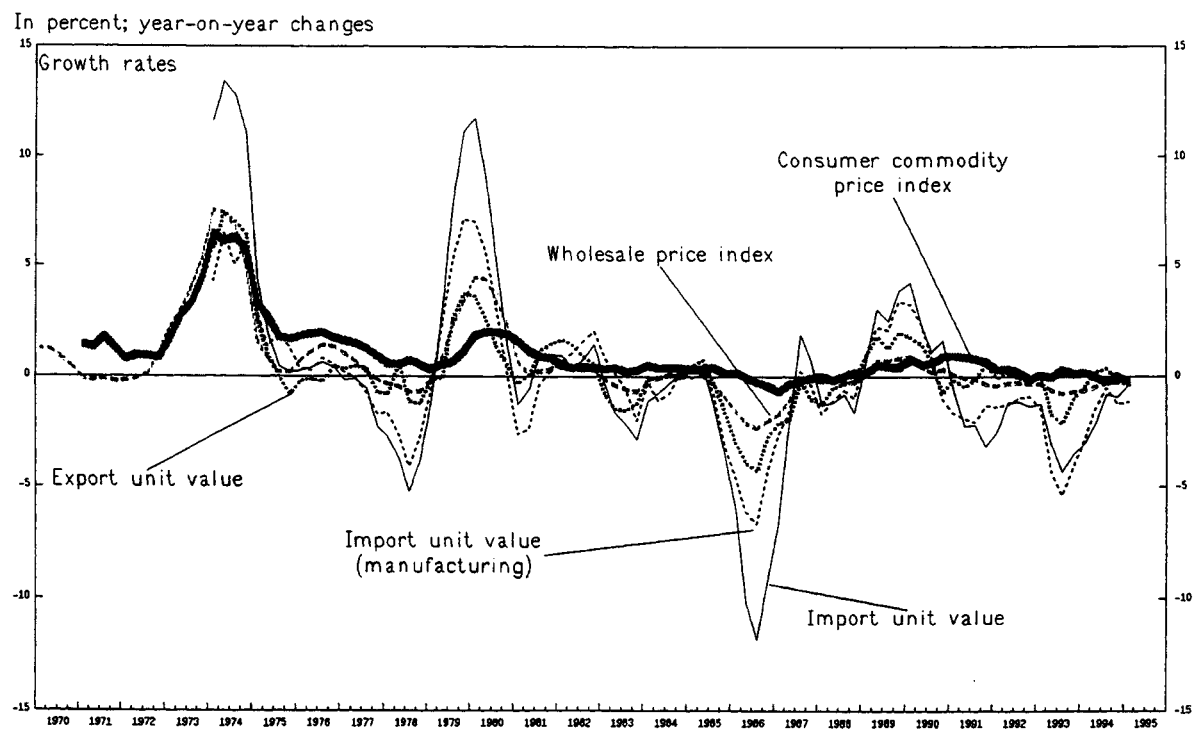
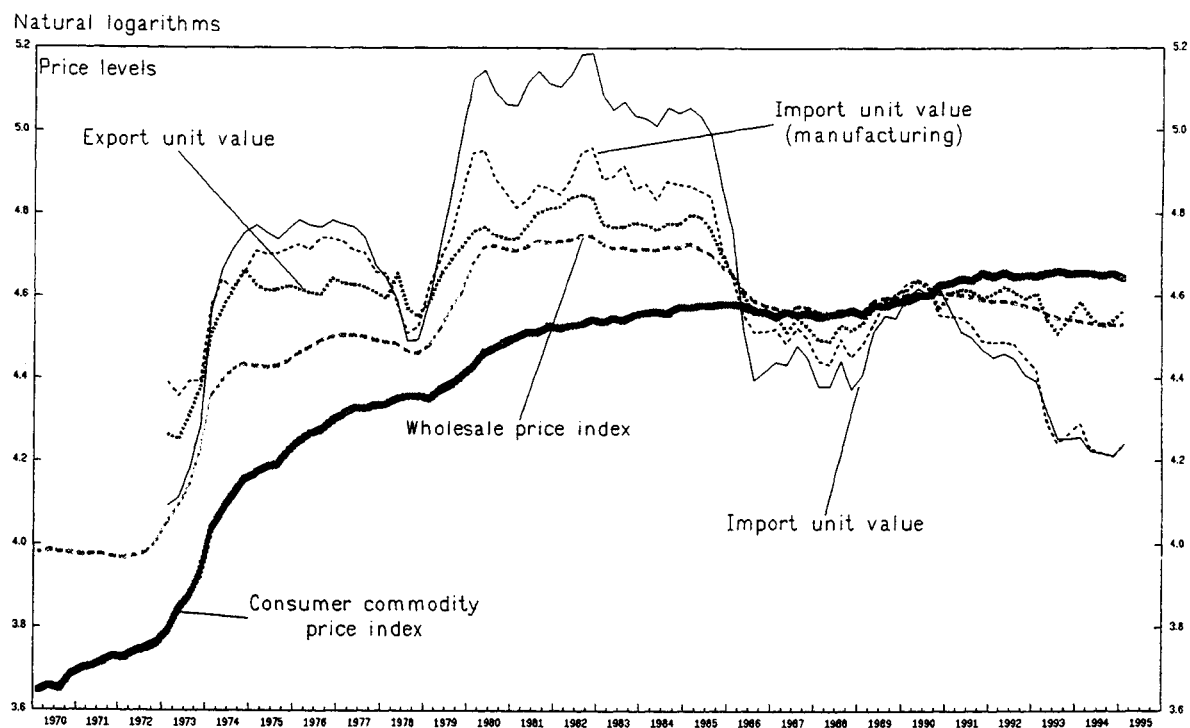
Estimation period	CPI growth			Import price growth			Lagged output	Constant
	Lags:			Lags:			gap	
	1	2	3	0	1	2		
1. 1971Q1-94Q4	0.265 (2.7)	0.225 (2.3)	0.312 (3.3)	0.076 (2.6)	0.021 (0.6)	-0.039 (1.3)	0.098 (2.6)	0.002 (1.4)
2. 1982Q1-94Q4	-0.192 (1.3)	0.017 (0.1)	0.157 (1.1)	0.035 (1.3)	0.016 (0.5)	0.018 (0.6)	0.042 (1.2)	0.005 (3.5)

The parameters on the lagged rates of CPI growth, contemporaneous import price inflation, and the lagged output gap are all highly significant. In terms of magnitude, the parameters on lagged inflation sum to about 0.8. That on contemporaneous import price inflation is similar to the share of imports in final consumption, suggesting a relatively large and fast pass-through of import prices to final prices. The parameter on the output gap indicates that a 1 percentage point rise in the output gap would raise inflation by about 0.1 percentage point in the following quarter, or by about 0.4 percentage points over a full year.

Actual four-quarter growth in CPI inflation along with the results of a dynamic simulation of this equation are presented in the lower panel of Chart VII.4. While the equation tracks inflation well in the 1970s, there are notable errors in the period since 1989, with a particularly large over-prediction of the rise in inflation during 1989-91. The rate of deceleration of inflation during 1992-94 is also over-predicted (although the level of inflation remained below its predicted value due to the large initial error in 1991).

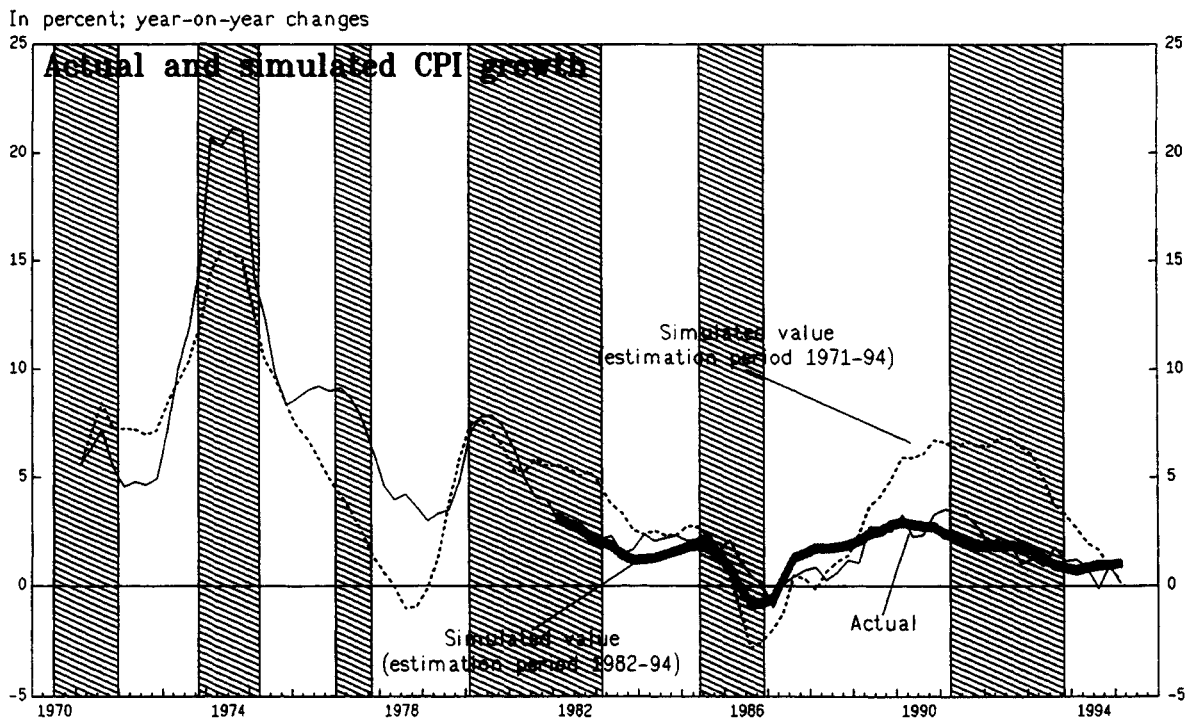
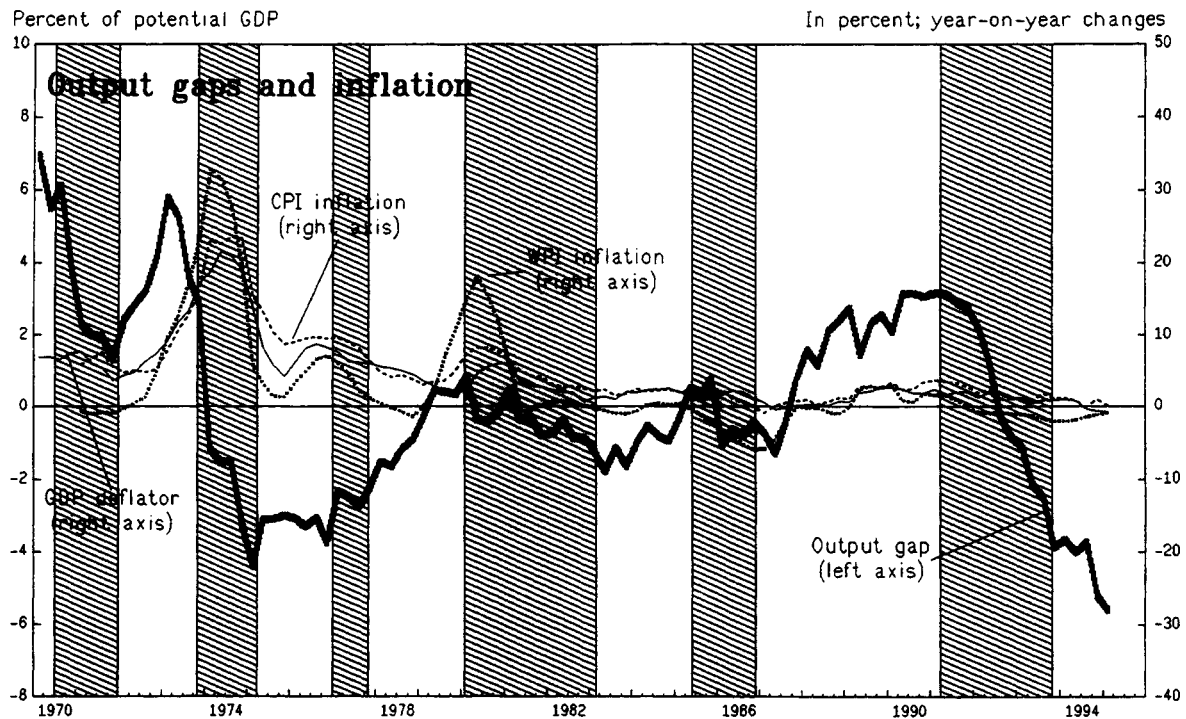
To test for the presence of a possible structural break in inflation behavior, the equation was reestimated over the latter half of the sample (i.e., 1982-94), when both the average inflation rate and the volatility of inflation were much lower than in the 1970s. The results are shown in Line 2 of the above tabulation. Interestingly, the coefficients on lagged inflation are much smaller than in Line 1, while the constant term is both larger and more significant. These results can be interpreted as indicating that inflation "inertia" has fallen since the early 1980s relative to the 1970s, in the sense that inflation depends more on an underlying constant than on its own lagged values. This, in turn, could reflect expectations of a more constant underlying level of inflation during the more recent period. The parameter on the output gap during 1982-94 is also less than half its level over the longer sample, which would also be consistent with expectations that are more firmly anchored to a stable long-term inflation rate. On import prices, the contemporaneous parameter is smaller over the 1982-94 sample, but those on its lags are larger, with the sum of the

EXTERNAL & DOMESTIC PRICE AND INFLATION PERFORMANCE, 1970-95



Sources: Management and Coordination Agency; Economic Planning Agency; Bank of Japan; Ministry of Finance; and staff calculations.

JAPAN
OUTPUT GAP AND INFLATION DEVELOPMENTS, 1970-95 1/



Sources: Management and Coordination Agency; Economic Planning Agency; Bank of Japan; Ministry of Finance; and staff calculations.

1/ Shaded areas denote recessions, as defined by the EPA.

parameters exceeding that in Line 1. 1/ Thus, it appears that the ultimate degree of import price pass-through may have increased since the 1970s, although its speed may have declined.

Simulating the equation estimated over the 1982-94 period yields a much better fit for the recent data, as shown in Chart VII.4. To decompose the role of the output gap and imported prices in explaining disinflation since 1991, each was held constant in turn at its 1991 level and the equation was re-simulated to derive the counter-factual outturn. These results indicate that, of the total decline in inflation of slightly over 3 percentage points from 1991 to early 1995, about 1 1/4 percentage points are explained by the drop in output relative to potential, while another 1 1/4 percentage points are explained by falling import prices. The remaining 1/2 percentage point decline in CPI inflation is due to factors beyond those captured on the right-hand side of the equation. 2/ These results, then, confirm the importance of cyclical developments and the pass-through to domestic prices of yen appreciation in reducing inflation since 1991.

While there is no doubt that inflation has slowed sharply in Japan in recent years, it is commonly thought that some price indices, notably the CPI, do not reflect the true scale of deflation (or "price destruction") due to changing consumption patterns. Such changes could result from three causes: relative price movements; changes in the distribution system; and shifts in spending over the economic cycle. Little information is available on the degree to which consumption patterns have been affected by relative price changes, and, therefore, the upward bias in fixed-weight price indices. Anecdotal evidence on the rising influence of discount stores in recent years--which are under-represented in the 1990-based survey--suggests that actual inflation may have fallen more rapidly than measured by the CPI. 3/ This bias has been reinforced by the emergence of private-label brands for many products, which are also not captured in the fixed-weight basket. Regarding changes in consumption patterns over the business cycle, the EPA (1994) has estimated that the difference between the measured CPI and "perceived" prices, based on unit prices from the Family Income and Expenditure Survey, was about 5 percent in 1993. However, they note that

1/ While the individual parameters on imported prices are not statistically significant, this is due to multicollinearity between the contemporaneous and lagged values--an F-test indicates that the coefficients on imported inflation as a group are highly significant.

2/ Such as a faster and/or larger response to falling imported prices than that captured by the estimated equation, or a possible underestimation of the recent size of the output gap or its effect on inflation. Another possibility is that perceptions of the trend rate of inflation have been altered by the extended period of economic slack.

3/ The EPA (1994, page 243) reports that sales by discount stores grew during 1988-92 at a 10 percent annual average rate, compared with growth of 5 3/4 percent and 5 1/2 percent of sales at department stores and supermarkets, respectively.

similar discrepancies have emerged in previous recessions and were subsequently reversed.

3. International price level comparisons

While domestic inflation in Japan has been below that in most other industrial countries in recent years, the appreciation of the yen versus other currencies has led to widening gaps between Japanese prices and those abroad measured in a common currency. Differences in national price levels can be attributed to a number of factors. Balassa (1964) argued that economic development, led by relatively rapid increases in productivity in tradable goods, would result in a secular decline in the price of tradables relative to nontradables. Assuming that arbitrage equalizes the price of tradables over time, then countries with higher productivity and income levels would be expected to have higher overall price levels (Kravis and Lipsey (1983)). The data contained in the top panel of Chart VII.5, which show the relationship between per capita GDP and price levels for OECD countries, are consistent with this hypothesis. ^{1/} A cross-section regression of these observations suggests that a 1 percent increase in per capita income vis-à-vis the United States raises a nation's price level by 0.9 percent.

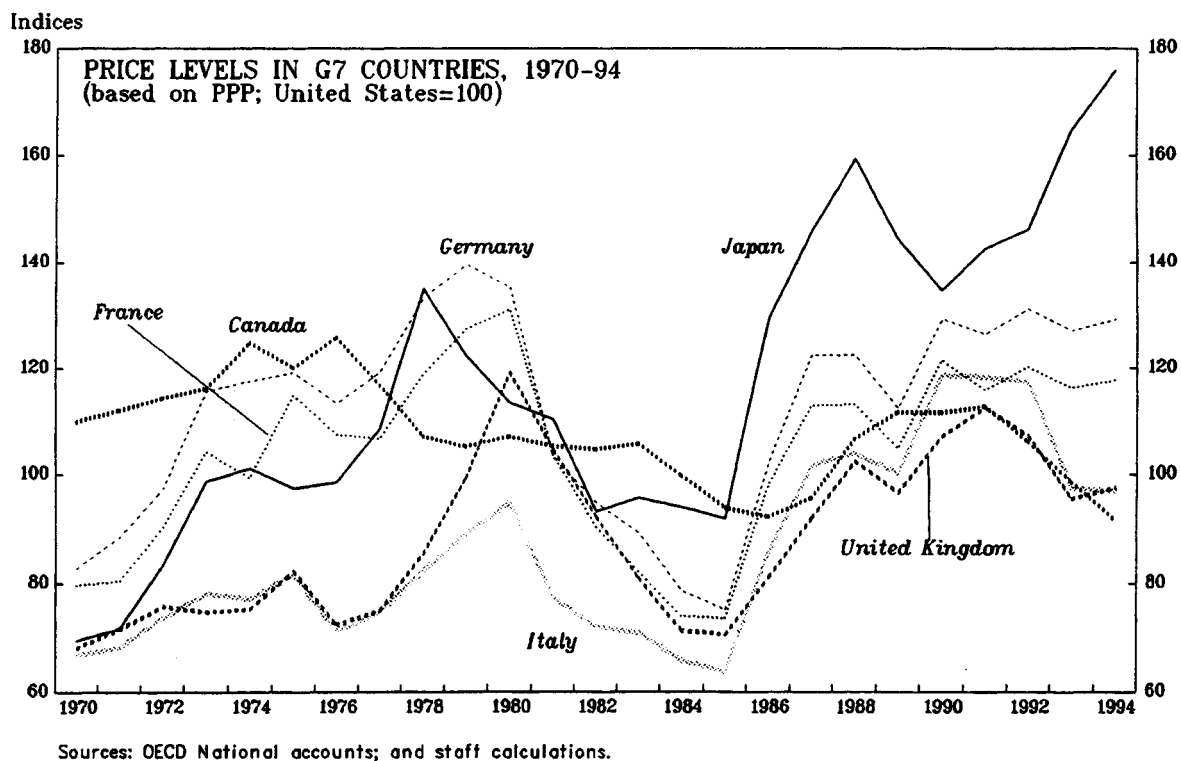
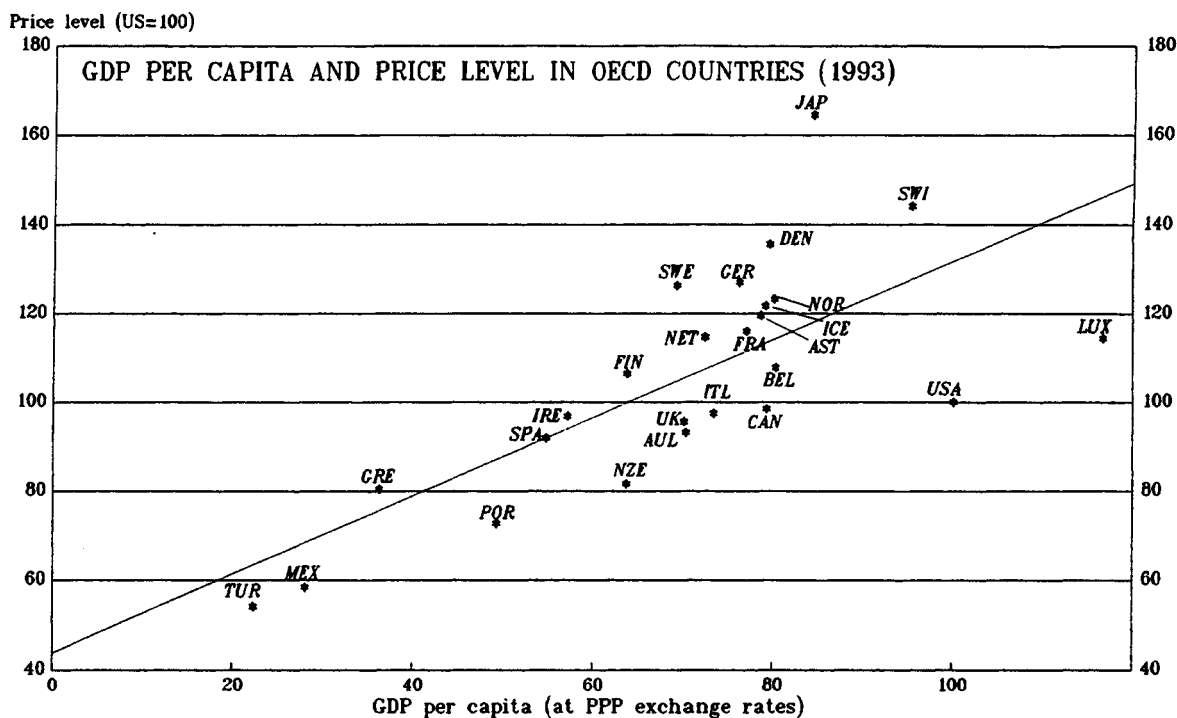
While the "Balassa effect" may help to explain Japan's high price level, Chart VII.5 indicates that other countries with similar incomes had substantially lower prices. Indeed, Japan's price index of 164 is 39 percent above its predicted value of 118, while the U.S. index is 24 percent below its predicted value of 131. Moreover, the bottom panel of Chart VII.5 indicates that Japan's high prices are a relatively recent phenomenon--as late as 1986, Japanese prices were lower than those in the United States. This suggests a second reason why, at least in the short to medium run, national price levels may differ: exchange rates may be misaligned from the perspective of PPP for tradables. In the late 1970s, the weakness of the dollar was associated with increases in price levels in other major countries relative to the United States. While these movements were reversed by the surge in the dollar in the early 1980s, renewed dollar weakness in the second half of the 1980s again caused U.S. prices to fall vis-à-vis those in other countries, with the rise in Japanese prices being particularly pronounced. To the degree that these differentials are self-correcting over time, then relative price level differentials should narrow as PPP in tradeable goods is restored.

Even if PPP were to hold for tradable goods, however, two countries with identical income levels may have different price levels due to differences in productivity levels for nontradables versus tradables. In particular, there are no arbitrage pressures to bring nontradable

^{1/} Per capita GDP is measured at purchasing power parity (PPP) exchange rates relative to the United States, and price levels are calculated as the ratios of market to PPP exchange rates.

CHART VII.5

JAPAN
GDP PER CAPITA AND PRICE LEVEL IN OECD COUNTRIES



prices--and thus the aggregate price level--into line with world prices. Data for Japan and the United States suggest that this factor accounts for a significant amount of the overall price differential. In particular, Table VII.1 compares price differentials for specific categories of goods in Tokyo with those in other major cities. The overall differentials are similar to those implied in the bottom panel of Chart VII.5. Across specific categories of expenditures, rent, utilities, food, and clothing show the largest consistent price differentials. Durable commodities and other goods, which presumably contain the greatest shares of tradables, display lower differentials.

Looking more directly at relative productivity differentials, Pilat (1993) compares labor productivity in Japan and the United States. The top panel of Chart VII.6, based on his data, shows a clear negative correlation between labor productivity and price levels. The latter appear to broadly correspond with the data in Table VII.1, with agriculture and utilities having the lowest relative productivity levels and the highest price differentials. In addition, van Ark and Pilat (1993) examine relative labor productivity within manufacturing, finding that food/beverages/tobacco and textiles/apparel/leather are the two sectors in which Japan's productivity lags the most (bottom panel of Chart VII.6)--these sectors also display relatively large price differentials.

The implication of these patterns between price and productivity differentials is that, even if tradable prices in Japan return to their PPP levels, relatively low productivity in nontradable sectors would result in higher overall prices in Japan. It would appear that microeconomic measures would be needed to address these divergences. For "potentially tradable" goods--agriculture and clothing, for example--reducing trade barriers could increase external competition, rationalize domestic production, and lower domestic prices. 1/ Reductions in price differentials in nontradables could be facilitated through deregulation; for example, tax and regulatory reform regarding land use could increase the supply of housing and reduce rents. 2/ Reform of the large-scale retail store law, which restricts the activities of larger and more discount-oriented stores, could reduce distribution costs and increase price competition. Also, deregulation of

1/ The OECD (1995a) estimates that, as a result of tariff and nontariff barriers, prices for agricultural products are over 200 percent above border prices (and up to 800 percent higher for some grains). Sazanami, Urata and Kawai (1995) compare domestic and import prices for 47 categories of industrial goods, arriving at a differential in terms of unit values of 178 percent. See Chapter III for a discussion of Japan's agricultural sector.

2/ See OECD (1995b) for a discussion of land-use reforms.

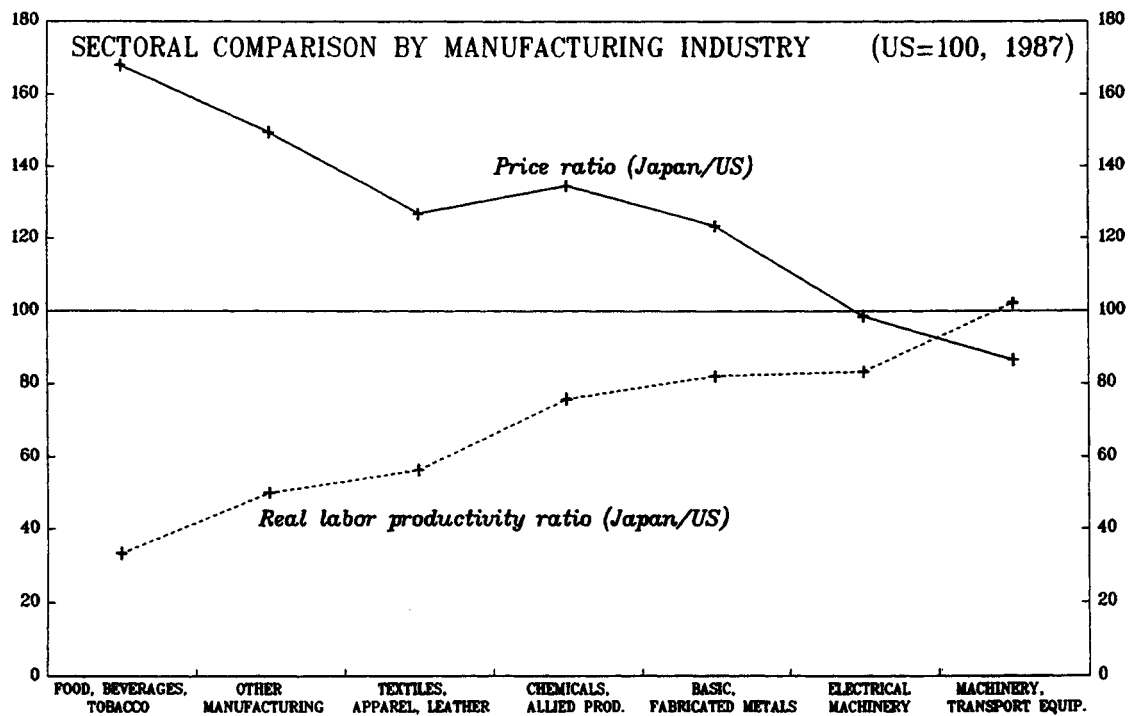
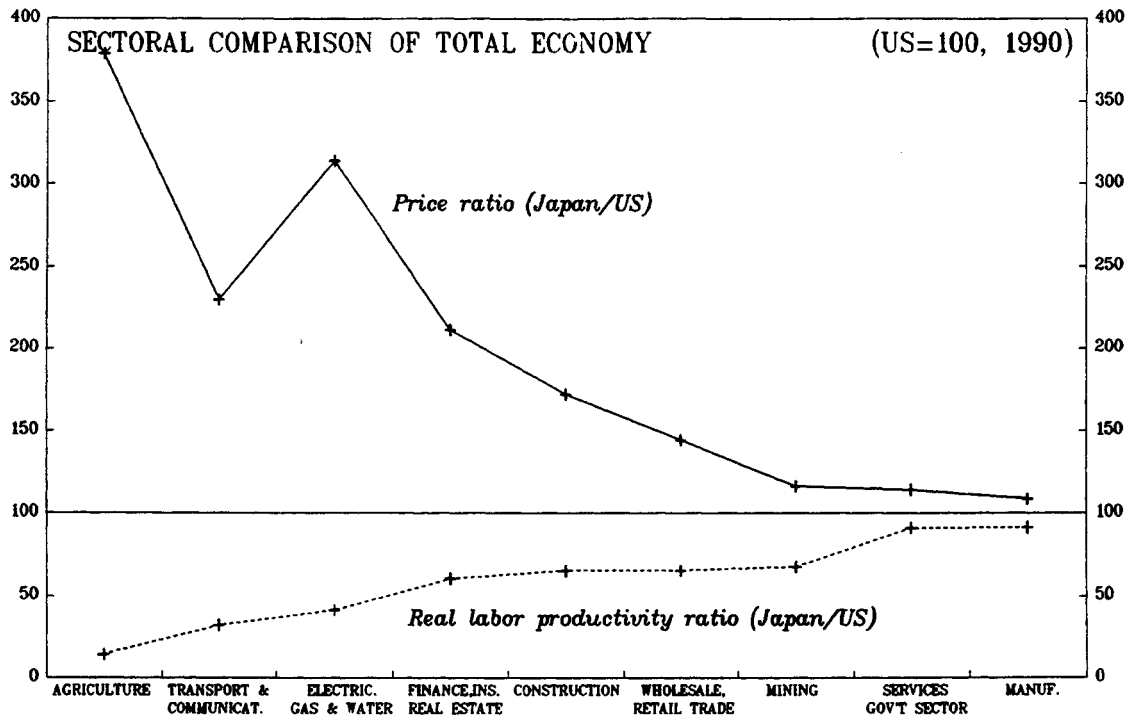
Table VII.1. Japan: Price Differentials with Selected Major Foreign Cities,
September 1994

Item	<u>Price Differentials of Tokyo Vis-à-Vis Other Cities</u>			
	New York	London	Paris	Berlin
Overall	1.57	1.54	1.42	1.42
Foodstuffs	1.83	2.32	1.98	2.00
Durable commodities	1.48	1.12	1.03	0.99
Clothing and footwear	1.84	1.77	1.29	1.39
Other goods	1.53	1.42	1.23	1.22
Energy and water/sewerage	2.06	1.77	1.30	1.03
Transportation and communication	1.42	1.23	1.28	1.18
Health and medical care	0.88	1.95	1.79	3.64
Education	1.00	0.78	2.36	1.21
Rent	2.07	1.27	1.40	1.36
General services	1.21	1.34	1.02	1.13

Sources: Economic Planning Agency; Price Structure Policy Committee.

CHART VII.6

JAPAN
SECTORAL COMPARISON OF PRICE LEVELS AND
REAL PRODUCTIVITY IN JAPAN AND THE UNITED STATES



Sources: Pilat (1993); van Ark and Pilat (1993).

telecommunications could not only reduce consumer costs and increase choices, but also boost productivity in other sectors. 1/

4. Conclusions

Inflation has slowed dramatically in Japan in recent years and, in some cases, price levels have recently fallen. This performance has been influenced by current large margins of excess capacity and yen appreciation, which has led to falling import prices. Despite slowing inflation, however, Japan's price level has increased significantly in recent years vis-à-vis other industrial countries. This is in part a result of the yen's rapid real appreciation. In addition, high prices in Japan reflect lower productivity levels in nontraded sectors compared with partner countries. Structural reforms offer a means by which Japan's price level can be brought more closely in line with those of other countries.

1/ The government recognizes the role structural policies play in affecting price differentials for the nontradable and "potentially tradable" sectors (see, for example, EPA (1994)). Moreover, an interim report by the Price Structure Policy Committee (1994) has made recommendations concerning the housing sector, and the Government's recently adopted "Emergency High Yen Appreciation Economic Policy" (April, 1995) also contains measures to raise productivity and reduce costs in the construction sector.

VIII. Exchange Rate Movements: The Role of Openness,
Trade Responsiveness, and Pass-Through

1. Introduction and summary

Exchange rate changes represent an important endogenous channel whereby cyclical developments, changes in economic policies, or shifts in intertemporal preferences are transmitted to the external balance of a country. Movements in exchange rates affect external balances by altering relative prices, thereby shifting the allocations of expenditure and production between domestic and foreign goods. The magnitude of the exchange rate change necessitated by a shift in any of the above mentioned variables depends on a variety of factors: (i) the openness of an economy (i.e. the importance of international trade in national output); (ii) the responsiveness of trade volumes to changes in relative prices; and (iii) the extent to which changes in the exchange rate are reflected in relative prices--the extent of "pass-through."

The recent sharp appreciation of the yen has once again brought questions of the mechanisms of external adjustment to the forefront of discussions on movements in exchange rates. Suggested explanations for the large recent movements in the value of the yen include: (i) the relatively closed nature of the Japanese economy; (ii) Japan's low trade elasticities with respect to relative prices; and (iii) the limited pass-through of exchange rate changes into relative prices, both in terms of changes in (dollar) Japanese export prices, and (yen) domestic prices of imports in Japan. The argument is that if the response of relative prices and trade volumes to exchange rate changes is limited, and if trade flows represent a relatively small proportion of output, then large changes in exchange rates will be required to bring about any desired or required changes in external balances.

This chapter reviews the empirical evidence available for each of these factors. Section 2 documents the shares of trade in the output of the major industrial countries and discusses the implications of the extent of openness for the magnitude of exchange rate changes. It shows that--as is well known--the shares of imports and exports in GDP for both Japan and the United States are substantially lower than in the other major industrial countries. Estimates suggest that increased openness could have a notable effect in reducing the potential magnitude of exchange rate movements. Section 3 shows that, notwithstanding the low shares of trade in output, the elasticities of Japan's trade volumes do not appear to be outliers in a sample of other major industrial countries.

Section 4 focuses on the pass-through of exchange rate changes into export prices. The extent of exchange rate pass-through into the dollar price of Japanese exports has long been a controversial issue. When the yen appreciated sharply during 1987-88, various observers argued that only about half of the changes in the exchange rate were passed through to Japanese export prices. Rather than raising dollar prices in response to increased

costs in dollars, exporters were alleged to be absorbing losses by cutting yen prices in an attempt to maintain foreign market shares. Prices of Japanese goods exported abroad were consequently reported to be below those on the domestic market, and Japanese exporters were described as "pricing-to-market." The section first discusses how the extent of pass-through is likely to depend on the domestic and global market structure of the export industry, arguing that complete pass-through should only be expected in very special situations. Estimates of pass-through for Japan are then compared to those for other countries. The estimates suggest that, in the short run, the pass-through of exchange rate changes into export prices in Japan is comparable to that in some European countries, but well below that in the United States. In the long run, however, pass-through is almost complete, comparable to that in the United States, and well above that for several European countries.

Microeconomic retail price survey data suggest that the prices of Japanese export goods sold on foreign (U.S.) markets have not deviated systematically from those sold on domestic markets--while some have been below, some have been above. ^{1/} At the microeconomic level, therefore, there is little systematic evidence of pricing-to-market by Japanese exporters. Aggregate and sectoral price indices, however, indicate that export price increases have lagged increases in domestic prices. This observed decline in the price of Japanese exports relative to domestic prices in the face of a sustained appreciation of the yen is consistent with higher productivity growth in the exportables sector relative to the remainder of the manufacturing sector.

Section 5 examines the widely perceived notion that changes in the exchange rate and foreign currency prices of imports are not fully passed through to domestic prices in Japan. There are two distinct ways in which this hypothesis can be examined. First, low pass-through implies that relative prices of imported to domestic goods that are based on border prices of imports exaggerate the actual movement of relative prices faced by final purchasers. Consequently, the elasticity of imports with respect to the measured (border) relative prices should be expected to be low. The estimates of the elasticity of import volumes with respect to relative prices for Japan, however, is well within (albeit on the low side of) the range of estimated elasticities for the other industrial countries. Second, the pass-through of exchange rate changes into domestic prices can be examined directly and compared with what would be expected under full pass-through. Estimates suggest that actual pass-through into aggregate wholesale and consumer prices has been broadly in line with the share of imported goods.

^{1/} A comparison of wholesale prices would be preferable because of the nontraded local services element embodied in retail prices. Note, however, that, if anything, the use of retail price data should have led to systematically lower prices of Japanese products abroad because of the higher costs of services in Japan.

2. Openness

a. Shares of trade

Table VIII.1 shows that ratios of both export and import volumes to output are significantly lower for both the United States and Japan than for the other G-7 countries. ^{1/} There are several ways in which the extent of openness affects the magnitude of the exchange rate response to a given shock. One way to see the importance of openness is to consider the effect of an increase in the money supply. In the traditional framework where goods markets adjust more slowly than assets markets, an increase in the nominal money stock translates into an increase in real money balances because of the stickiness of domestic goods prices. The resulting downward pressure on interest rates depreciates the exchange rate, raises the domestic price of imported goods, and raises the domestic price level. The increase in the domestic price level, in turn, lowers the extent of the initial increase in real money balances, which moderates the interest rate decline and the extent of exchange rate depreciation. In addition to effects through the domestic price of imported goods, the exchange rate depreciation, by spurring exports and restraining imports, increases output and raises the demand for money, which also acts to moderate the decline in interest rates and the extent of exchange rate depreciation. For a given responsiveness of trade flows to relative prices, the larger the share of trade in output, the larger will be the response of output to the given change in the exchange rate. It follows that the larger the importance of trade flows in domestic absorption and output, the smaller will be the exchange rate movement necessary to offset a given shock to the money market.

If increased openness can be expected to reduce the exchange rate response to a given disturbance in the money market, the next question is by how much. Using typical parameter values for a sticky-price monetary model of the exchange rate, it is possible to estimate the implications of raising Japan's share of trade in GDP to that of the most open G-7 economy-- Canada. ^{2/} With the same parameter values, but shares of trade corresponding to those for Japan, a 1 percent increase in the money supply is estimated to lead to a depreciation of the nominal exchange rate of over 5 percent on impact, while a share of imports equal to that of Canada's

^{1/} The reasons for Japan's low import-to-GDP ratio have been a subject of considerable discussion. See, for example, Bergsten and Noland (1993), Lawrence (1993), and Saxonhouse (1993).

^{2/} The influential sticky-price monetary model is that of Dornbusch (1976). A time-period is defined as a quarter. The "impact" effect is, therefore, defined as the change in the exchange rate during a quarter. For typical parameter values see Chadha (1990).

Table VIII.1. Industrial Countries: Importance of Trade, 1994 1/
(Shares of GDP in percent)

	<u>Exports</u>	<u>Imports</u>
United States	12	14
Japan	12	10
Germany	25	26
United Kingdom	27	28
France	25	23
Italy	23	21
Canada	33	32

Source: World Economic Outlook database.

1/ Trade volumes are on a national income accounts basis--measured in 1990 prices.

would lead to a 3 1/2 percent depreciation. ^{1/} While these estimates are inevitably subject to a considerable degree of uncertainty due to the imprecision with which parameters are estimated, these two extreme degrees of openness suggest in fact a surprisingly small difference in implied exchange rate changes. If the importance of trade in Japan were increased to an intermediate level--to those of countries such as Italy or France--the reduction in the exchange rate movement would be more modest.

b. Composition of trade

The ratio of trade volumes to domestic output represents one measure of openness. The extent of integration of an economy with the rest of the world is also determined by the composition of trade flows, since different commodities are substitutable to different degrees for domestic goods. Because of Japan's poor natural resource endowment, for example, Japan imports almost all its raw materials and mineral fuels. Fluctuations in imports of these commodities are determined primarily by fluctuations in domestic production. Since there are no domestic substitutes, the responsiveness of imports of these commodities to relative price changes should be expected to be limited.

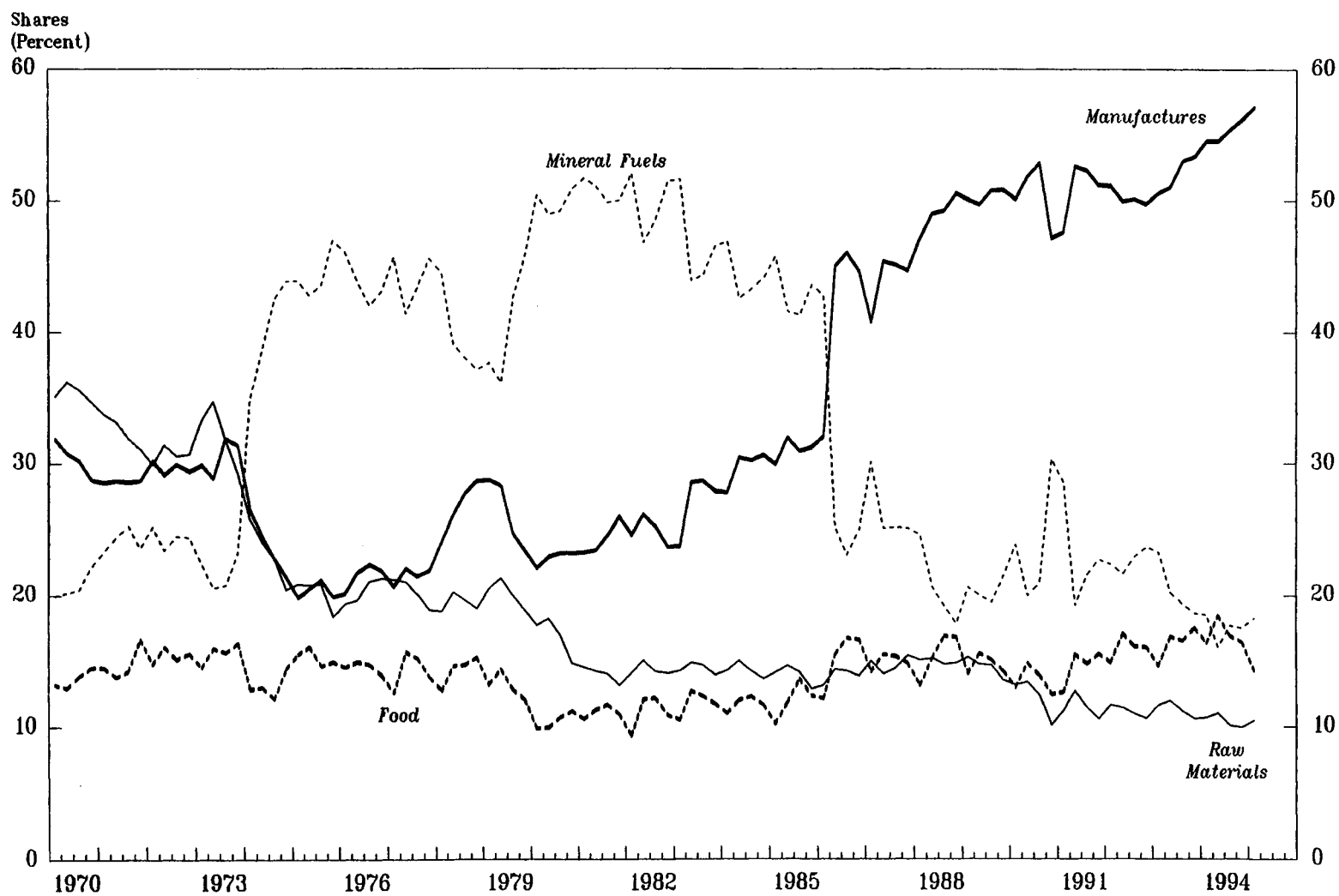
Import shares in Japan have undergone sustained changes over time. The (nominal) shares of the components in the total value of imports are shown in Chart VIII.1. Several features are noteworthy. First, the share of mineral fuels, after rising to a peak of over 50 percent following the second oil shock in 1979, has fallen to about 15 percent currently. Second, the share of raw materials has declined steadily from around 35 percent in 1970 to around 10 percent at present. Third, the share of food imports has fluctuated around 15 percent during the period. Finally, the share of manufactures in imports, after fluctuating around a level of 30 percent between 1970 and 1985, shot up sharply in 1986, and has been trending steadily upward since, reaching almost 60 percent.

3. A cross-country comparison of relative price elasticities

Many empirical studies have estimated relative price elasticities in trade. These studies have encompassed a wide variety of theoretical models, estimation techniques, commodity coverages, frequencies, and sample periods. A wide-ranging survey of the literature can be found in Goldstein and Khan (1985). Rather than attempting to review the vast literature here, Table VIII.2 presents a selection of estimates from a more recent survey of estimates provided by Hooper and Marquez (1993) that focuses on industrial

^{1/} The larger than proportional impact is due to the well-known overshooting effect. In comparing this to other estimates of overshooting it is important to keep in mind the frequency at which the comparison is made. Since a considerable proportion of the overshooting is reversed in four quarters, annual models will typically produce substantially less overshooting on impact.

CHART VIII.1
JAPAN
COMPOSITION OF IMPORTS, 1970-95



Source: Bank of Japan, Balance of Payments Monthly.

Table VIII.2. Japan: Estimated Price Elasticities: Selected Studies
for Industrial Countries

Study, Coverage, Sample	Deppler and Ripley (1978), Non-oil, 1964-76	Warner and Kreinin (1983), Non-oil, 1970-80	Cline (1989), Non-oil, 1973-87	Krugman (1989), Non-oil, 1971-86	Marquez (1990), Non-oil, 1973-85	Unweighted Mean	Staff <u>1/</u>
<u>Exports</u>							
United States	-1.05	-0.55	-1.09	-1.42	-0.99	-1.02	
United Kingdom	-0.47	-0.86	-0.67	-0.54	-0.44	-0.59	
Japan	-1.66	-0.30	-0.90	-0.88	-0.93	-0.93	-1.05
Germany	-0.60	-4.98	-0.66	-0.55	-0.66	-0.62 <u>2/</u>	
Canada	0.00	-1.37	-1.01	+0.80	-0.83	-1.07 <u>3/</u>	
<u>Imports</u>							
United States	-1.45	-2.53	-1.36	-0.93	-0.92	-1.44	
United Kingdom	-0.30	-1.42	-1.04	+0.99	-0.47	-0.81 <u>4/</u>	
Japan	-0.66	-0.72	-0.69	-0.42	-0.93	-0.68	-0.43
Germany	-0.67	-0.27	-0.48	-0.09	-0.60	-0.42	
Canada	-0.75	-1.00	-2.35	-1.45	-1.02	-1.31	

Source: Hooper and Marquez (1993)

1/ Estimates employed in the staff's econometric current account model. The model is based on Corker (1989) and Meredith (1993). Estimates have, however, been updated since. The model includes disaggregated import equations for manufactures, mineral fuels, raw materials, and food. These disaggregate elasticities are reported below. The estimate reported for aggregate imports is that for an aggregate import volume index, and obtained by simulating the model.

2/ Excludes the outlier of -4.98 estimated by Warner and Kreinin (1983).

3/ Excludes the zero estimate of Deppler and Ripley (1978), and the positive estimate of Krugman (1989).

4/ Excludes the positive estimate by Krugman (1989).

countries. While they present several estimates from other studies for individual countries and earlier sample periods, the studies presented in Table VIII.2 all report estimates for both export and import price elasticities for the United States, the United Kingdom, Japan, Germany, and Canada.

The average export relative price elasticities for the United States, Japan, and Canada all cluster around unity, while those for the United Kingdom and Germany cluster around 0.6 (second to last column of Table VIII.2). The average import price elasticities for the United States and Canada significantly exceed unity, while those for the United Kingdom, Japan, and Germany fall well short of unity (second to last column of Table VIII.2). Among the low-elasticity group, Germany exhibits the lowest elasticity, with the estimates unanimously on the low side. Estimates for Japan are in a relatively narrow range, though the recent estimate of Marquez (1990) places it at almost unity. While the average elasticity for the United Kingdom is higher, the estimates have a high variance. Table VIII.3 reports the staff's estimates of relative price elasticities for Japan's imports disaggregated into four categories. It reveals that the relatively low aggregate price elasticity is in part due to the commodity composition. As expected, the elasticity of raw materials is well below the average, while that of mineral fuels is close to zero.

In summary, the price elasticity of Japan's exports appears to be on the high side and, while its import price elasticity is on the low side, it is in a group along with the United Kingdom and Germany. Thus, neither appears to be an outlier.

4. Exchange rate pass-through into export prices

a. Theory

Export prices are determined by a variety of factors including, on the demand side, the market structure of the domestic and global export industry, and, on the supply side, productivity and the costs of imported raw materials and other intermediate goods. Thus, exchange rate changes affect export prices through the various channels affecting the supply and demand for the exported good. The profit-maximizing price response to changes in the exchange rate should differ widely between industries depending on their particular structure. It is useful to focus on some specific examples.

First, suppose that the export industry of a country collectively forms only a very small part of world production in a product that buyers regard as relatively homogeneous. Then, the fact that domestic producers' costs rise (in dollars) when the exchange rate appreciates would have little influence on world prices. If domestic firms were to try to raise their (dollar) prices they would simply lose all their sales. If "excess" profit margins existed to start with, then domestic firms could absorb the increased dollar cost (or, equivalently, the lower domestic currency price)

Table VIII.3. Japan: Estimated Disaggregate Import Price Elasticities

	<u>Share in Imports, 1994</u>	<u>Long run Elasticity</u>
	(Percent)	
Aggregate	100.0	-0.43
Manufactures	55.2	-0.55
Food	17.0	-0.41
Raw Materials	10.4	-0.22
Mineral Fuels	17.4	-0.08

Source: Estimates are those employed in the staff's econometric model of current account based on Corker (1989) and Meredith (1993). Estimates have been updated since.

in reduced profit margins. If they were unable to absorb lower profit margins they would, of course, eventually go out of business. In any event, the observed pass-through of exchange rate changes would be zero.

Second, suppose that the export industry of a country is comprised of domestic producers who compete vigorously with each other but collectively dominate the world market for a particular product. In this case, there would be no excess profit margins to start with. Market forces dictate that in response to an appreciation of the exchange rate, a domestic firm would either have to raise prices or leave the industry. To the extent that domestic firms left the industry, this would make it easier for the remaining firms to raise prices. In this case, the pass-through ratio should approach one. So far, changes in costs resulting from changes in exchange rates have been excluded from the discussion. Continuing with the example, suppose that imported raw materials or other intermediate inputs are used in production. Then, as long as the domestic industry is competitive, an exchange rate appreciation will, by lowering costs, put downward pressure on export prices. When these cost effects are combined with the effects already discussed, the final pass-through should be less than unity, depending on the importance of imports in the production of exports.

Third, consider the case where the domestic export industry produces a good that is differentiated from, but is a substitute for, goods produced by the rest of the world's producers. In this case domestic export firms will have some, but not complete market power. Raising prices in the face of an exchange rate appreciation will entail losing some--but not all--customers to competing suppliers. Depending on a variety of firm and industry-specific factors, pass-through ratios can be expected to vary between zero and one.

In summary, theory suggests that the profit-maximizing response of exporting firms to an appreciation of the exchange rate is likely to be less than a commensurate increase in the foreign currency price of their product, and that the pass-through ratio is likely to differ by industry.

b. Empirical evidence on pass-through for Japan

There is a large literature that has attempted to estimate the extent of exchange-rate pass-through for a variety of products, countries, and time periods. While a comprehensive survey is beyond the scope of this chapter, the following provides a range of estimates of pass-through based on the empirical results. ^{1/}

Khosla (1991) examined the pass-through of exchange rate changes into export prices for 14 Japanese industries. He found that the average pass-

^{1/} Hooper and Marquez (1993) provide a useful survey of some of the literature.

through was 43 percent during 1975-87. Once allowance was made for the cost effects of cheaper imported inputs, the average pass-through ratio rose to 59 percent. The ratio varied considerably across industries. Two industries, iron and steel, and precision instruments, showed full pass-through. Among the others, materials industries, such as pulp, paper, ceramics, and nonferrous metals, which were characterized by a high degree of product homogeneity, had low pass-through ratios, while final goods industries, with high degrees of product differentiation, generally exhibited high pass-through ratios.

Ohno (1989) explicitly allowed for the lower average inflation rate in Japan than in partner countries and found that pass-through varied among different industries, with an average pass-through ratio of 78 percent during 1977-87.

Hooper and Marquez (1993) estimated exchange rate pass-through into export prices in Japan to be 55 percent. They estimated that 30 percentage points of the remaining lack of pass-through was due to the effects of exchange rate changes on the price of imported raw materials and intermediate inputs, and 15 percentage points was due to demand effects or strategic pricing behavior.

c. International comparisons

Many international comparisons of exchange rate pass-through have involved the United States and Japan with various authors arguing that the pass-through of exchange rate changes into export prices for Japan is lower than for the United States. Ohno (1989) estimated that pass-through in the United States during 1977-87 was 95 percent against the 78 percent estimated for Japan. Hooper and Marquez (1993) estimated that the pass-through ratio for U.S. exports was 84 percent compared with 55 percent for Japan. Marston (1990) argued that U.S. firms price-to-market less than Japanese firms do. ^{1/}

While there is a large literature that has estimated the extent of exchange-rate pass-through for various countries, few of these studies are comparable because of differences in the products examined, the techniques employed, and the time periods covered. An exception is the work of Khosla and Teranishi (1989), who present comparable estimates for a large set of countries. Table VIII.4 presents a selection of these estimates for the G-7 countries. It is notable that, in the short run, exchange rate pass-through is on the low side in Japan, France, and Italy, with estimates ranging from 0.5 to 0.66. By contrast, in the United States, Germany, the United Kingdom, and Canada, pass-through estimates range from 0.85 to 0.93. There is a tremendous change in the estimate for pass-through in Japan when a

^{1/} Marston's measure of pass-through--discussed below in the subsection on pricing-to-market--is not directly comparable to these other estimates and so is not mentioned here.

Table VIII.4. Industrial Countries: A Comparison of Exchange Rate
Pass-Through into Export-Prices

(Estimated pass-through, proportion)

	<u>Short-run 1/</u>	<u>Long run 1/</u>
United States	0.93	0.87
Japan	0.50	0.92
Germany	0.86	0.86
United Kingdom	0.85	0.74
France	0.66	0.45
Italy	0.50	0.58
Canada	0.86	0.88

Source: Derived from estimates of Khosla and Teranishi (1989).

1/ The short-run pass-through coefficient represents (one minus) Khosla and Teranishi's (1989) estimate of the coefficient on the contemporaneous nominal exchange rate in an export price equation that also includes the domestic wholesale price index, while the long-run coefficient represents (one minus) the sum of the coefficients on a distributed lag of the nominal exchange rate. The sample period is 1975-1987.

longer horizon is considered. Japan in fact moves to the top of the sample, displaying the highest degree of pass-through with a coefficient of 0.93.

d. Pricing to market

While the terms "pricing-to-market" and "incomplete pass-through" have sometimes been used interchangeably, it is worth emphasizing that pricing-to-market is a special case of incomplete pass-through, with distinct implications. As was discussed above, there is no reason to expect that pass-through should in general be complete. This prediction of incomplete pass-through does not in any way rely on assumptions of market segmentation. Pricing-to-market, on the other hand, refers to firms setting different prices in home and foreign markets. ^{1/} For firms to be able to price-to-market for any sustained period of time requires some degree of market segmentation that prevents purchasers in the market with a lower price from re-selling the good in the other market at the higher price.

The evidence on pricing-to-market by Japanese exporters is controversial. Marston (1990) finds that, during the yen appreciation from February 1985 to December 1988, export price indices fell systematically relative to primary wholesale prices for the same sector. He concluded that pricing-to-market played a major role in Japanese manufacturing. His estimates of "pricing-to-market elasticities" ranged from 0.41 to 0.63 in the three major export sectors (general machinery, electrical machinery, and transport equipment) which represent 70 percent of exports. The yen's appreciation during the period was, by his estimate, accompanied by an average of 50 percent decline in export prices relative to domestic prices in these sectors.

If goods comprising the output of each sector represent a set of differentiated products, some of which are exported and some of which are sold on the domestic market, then there is no reason to expect that prices of exported goods should equal those sold on domestic markets, as they represent prices of similar but distinct products. To determine whether Japanese exporters priced to market it would be necessary to compare the prices of the same products. As Yoshitomi (1994) notes, the results of two official microeconomic retail-price surveys, conducted jointly by the U.S. Department of Commerce and Japan's Ministry of International Trade and Industry, in 1989 and 1991, indicate that products of Japanese origin (Japanese exports) showed little or no price disparity between Japanese and U.S. markets and in fact showed, if anything, slightly higher prices in the United States. ^{2/}

^{1/} Or, for that matter, different prices in two foreign markets.

^{2/} The results are reported in Ministry of International Trade and Industry (1991).

e. Productivity differentials and incomplete exchange rate pass-through

Chart VIII.2 compares the behavior of dollar export prices with the nominal exchange rate and domestic wholesale prices (also measured in dollars). Several features are notable. It is apparent that from 1975 to date, export prices have increased by less than the exchange rate--so there has been incomplete pass-through of exchange rate changes in a definitional sense. The deviation between movements in export prices and the exchange rate is pronounced and sustained only in the period following the rapid appreciation of the yen in 1985.

As has been argued earlier, given the importance of a host of factors in determining prices, the lack of perfect co-movement between export prices and the exchange rate by itself means little. To condition movements in export prices on changes in domestic costs, it is more useful to focus on changes in export prices relative to domestic prices to examine pass-through. Chart VIII.2 shows that, since 1985, export prices have risen by less than domestic wholesale prices (the vertical distance between the two series in 1995 exceeds considerably the distance in 1985). In this sense, even after adjusting for costs, pass-through appears to be incomplete.

An important point to note, however, is that while export and domestic wholesale prices have diverged considerably since the sharp appreciation of the yen in 1985, this is not a new phenomenon. As Chart VIII.2 shows, the two have been diverging steadily since 1975. A simple explanation for this divergence is a higher rate of productivity growth in the exportables sector than in the rest of domestic manufacturing--in line with the Balassa (1964) effect. This is the interpretation adopted in the staff's current account model, which assumes that (dollar) export prices are a mark-up over costs, measured in part by the domestic wholesale price index, so that there is complete "pass-through" of exchange rate changes into export prices. In addition, a time trend is used to capture the productivity differential in the exportables sector relative to that in the rest of the manufacturing sector. This formulation implies that while pass-through of exchange rate changes to export prices is complete, over any period of time during which the yen appreciated consistently, there would be a secular divergence between export prices and the exchange rate such that export prices would rise by less than domestic prices.

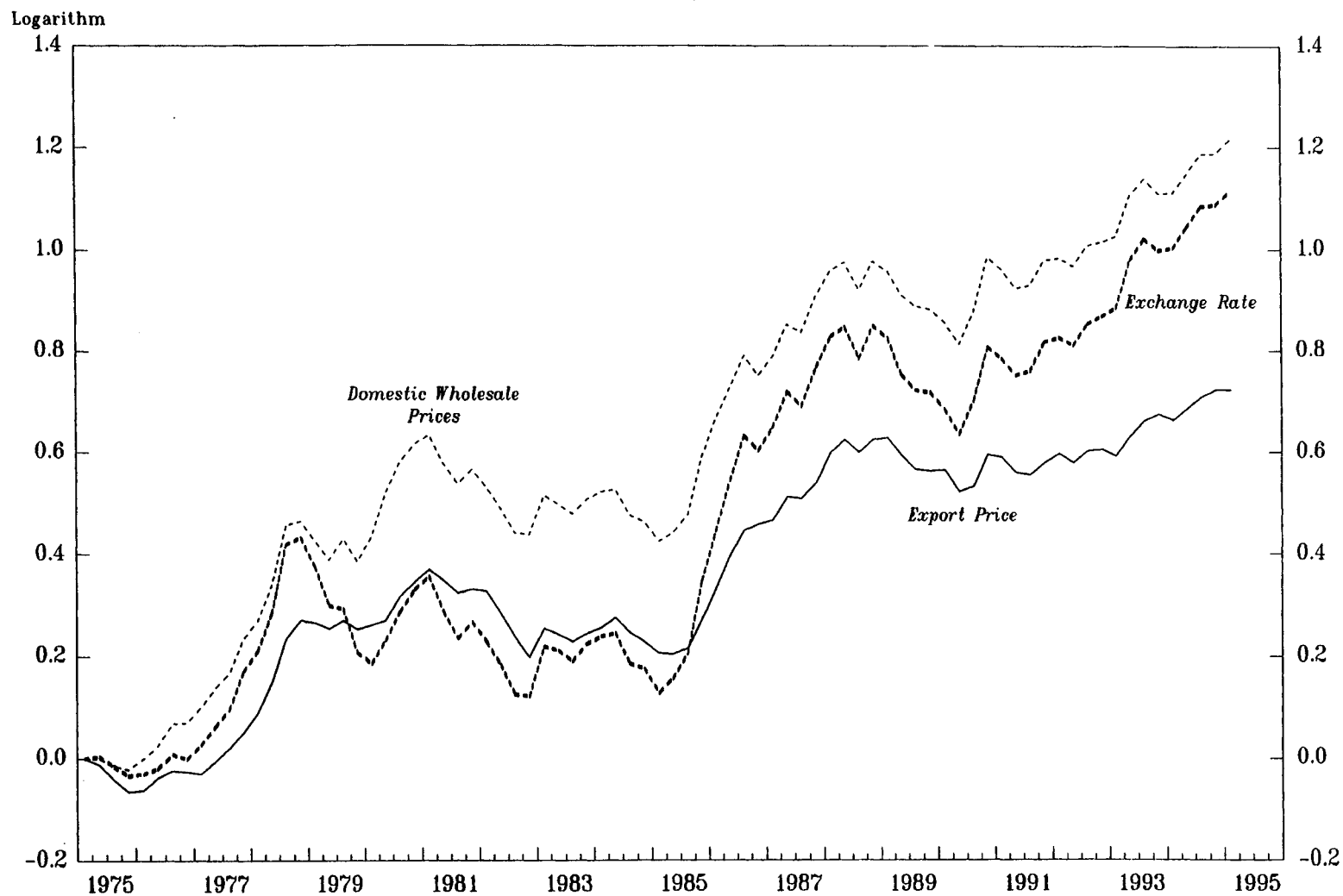
5. Exchange rate pass-through into domestic prices

It is widely argued that the pass-through of exchange rate and import price changes into domestic prices in Japan is "low," and that, consequently, the benefits of exchange rate appreciation to Japanese consumers in terms of lower prices of imports has been limited. There are, however, few empirical studies that have directly examined this link. Symmetric with the above discussion of exchange rate pass-through into Japanese export prices, there is, of course, the possibility that foreign exporters price to market--maintaining yen prices--and increase mark ups in response to yen appreciation. The cross-country empirical evidence

CHART VIII.2

JAPAN

EXPORT PRICES, THE EXCHANGE RATE, AND DOMESTIC PRICES, 1975-95 1/



Source: Bank of Japan, Balance of Payments monthly, and Staff estimates.

1/ The export price index is the Bank of Japan's (dollar) index. The exchange rate is an index of the dollar-yen rate. The reported wholesale price index is the domestic wholesale price index converted to dollars.

presented in Section 4 above, however, suggested that exchange rate pass-through into the export prices of the United States and Germany--Japan's largest industrial trading partners was substantial. In line with this evidence, Chart VIII.3 (second panel) shows that--once allowance is made for changes in the price of oil--the yen prices of Japan's imports have moved closely with changes in the exchange rate--falling sharply during 1985-87, rising during 1988-90, and then falling persistently during 1991-95.

The fact that retail prices of goods in Japan are high--higher than almost anywhere else in the world--has often been cited as evidence of a lack of exchange-rate pass-through into domestic prices. ^{1/} It is important to emphasize, though, that by itself the high level of domestic prices does not imply anything about changes in the level of domestic prices in response to changes in the exchange rate or foreign currency prices of imported goods. Consider the behavior of retail prices in Japan.

Chart VIII.3 (first panel) plots the CPI, the services (44 percent) and goods (labelled commodities) (56 percent) components of the CPI, and the WPI. The services component of the CPI has increased steadily throughout the period, and has done so at a faster rate than the goods component, so that there has been a steady and sustained divergence between the two. The goods component, while increasing on average through the period, has shown periods of relative stability and modest decline during 1985-87, and again in 1991-95. These two periods, of course, correspond to periods of rapid yen appreciation. The WPI, after rising sharply following the second oil price shock in 1979, remained relatively stable--or perhaps on a slight negative trend--until 1985. Following the sharp appreciation of the yen in 1985-86, the WPI fell sharply, and since 1991 has been falling gradually but steadily.

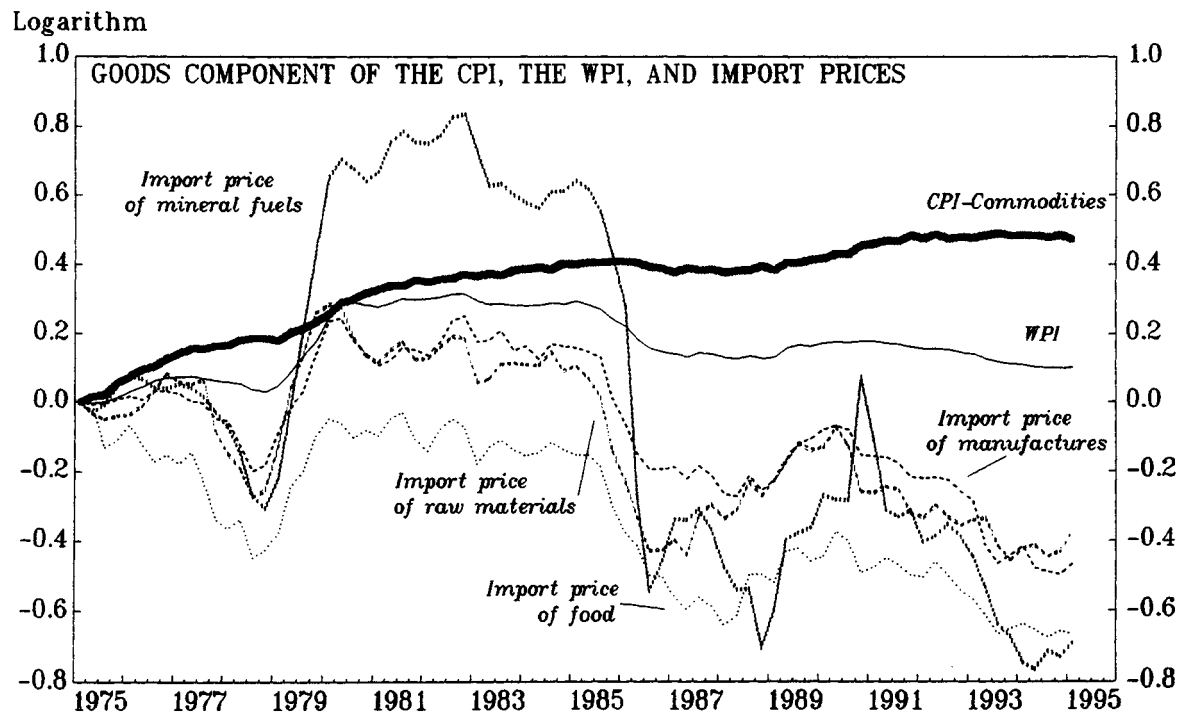
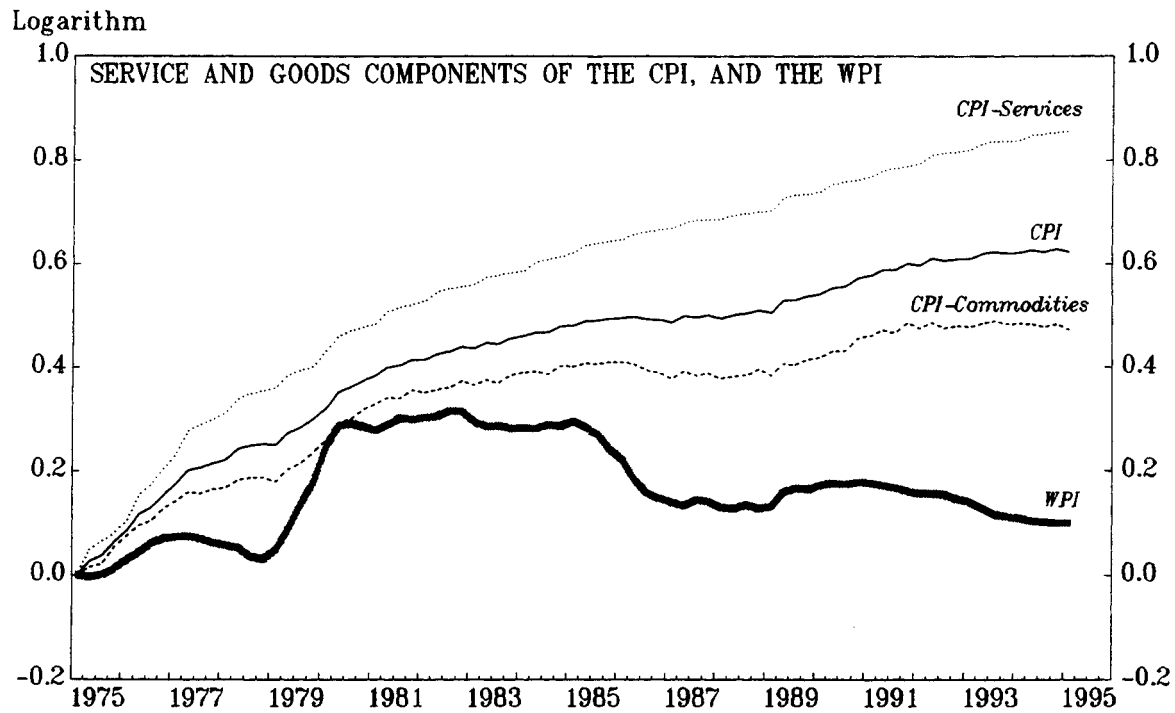
The reasons for the secular divergence between the service and goods components of the CPI, or for that matter between the goods component of the CPI and the WPI, are important for understanding the behavior of domestic prices in Japan, and for discerning the potential pass-through of import price changes into domestic prices. As already noted above, productivity growth in Japan appears to have been most rapid in the exportables subsector of manufacturing, followed by the remainder of manufacturing, with productivity growth in services lagging well behind. High wage growth in the high-productivity sectors, however, spilt over to the lower productivity growth sectors. ^{2/} Services prices, therefore, rose relative to goods prices--resulting in the secular divergence between the goods and service components of the CPI. At the time of final sale, the prices of goods embody, in addition to the direct costs of the good, the costs of various services--transportation, intermediation, and retail--prior to sale. The

^{1/} The difference in the level of retail prices in Japan with that in other major industrial countries is discussed in Chapter VII.

^{2/} McKinnon (1993) and Chapter I also discuss this transmission mechanism.

CHART VIII.3

JAPAN
CONSUMER, WHOLESALE AND IMPORT PRICES, 1975-95



Source: Bank of Japan, Balance of Payments Monthly, and Nikkei Telecom.

importance of these service costs in the goods component of the CPI is responsible for the secular divergence between the goods component of the CPI and the WPI. When the prices of imported goods fall--as they have done since 1991, the final effect on the goods component of the CPI depends on the combined effects of the decline in imported prices, the decline in domestic goods (as captured by, for example, movements in the WPI), and the rise in the domestic price of services.

How much should changes in import prices effect domestic wholesale and consumer prices? Since goods go through various intermediate stages before final sale, the extent of pass-through of changes in import prices into final retail prices depends on the market structure at each intermediate stage. A benchmark calculation is provided by assuming that pass-through is complete at each stage. Using input-output tables for the Japanese economy, the Economic Planning Agency (1995) estimated that a 1 percent decline in the price of imported goods should result in a 0.08 percent decline in consumer prices. For wholesale prices a benchmark is provided by the share of imported goods sold at the wholesale level.

How much have domestic prices actually responded to changes in import prices? While there are a number of issues in estimating inflation equations, as a simple way to assess the extent of pass-through of import price changes into domestic prices, the following equations were estimated relating (the change in the logarithm of) consumer (CPDOT) and domestic wholesale (WPDOT) prices to their lagged values, the aggregate (national accounts) import price index (PMDOT), the lagged output gap (GAP), and a constant. Using quarterly data for the period 1972-94, the results were as follows (t-statistics are in parentheses): 1/

1/ Regressions were also carried out using instrumental variables and restricting the coefficients on the lags to equal unity. The use of instrumental variables had little effect on the coefficients. For consumer prices, the restriction that the coefficients on lagged inflation summed to unity could not be rejected. The restriction raised the coefficients on lagged inflation and lowered somewhat the coefficient on import prices from 0.07 to 0.055.

$$\text{CPDOT} = 0.26735 * \text{CPDOT}[-1] + 0.22637 * \text{CPDOT}[-2] + 0.27843 * \text{CPDOT}[-3]$$

(3.02492) (2.49063) (3.20833)

$$+ 0.07150 * \text{PMDOT} + 0.10216 * \text{GAP}[-1] + 0.00221$$

(5.34784) (3.02842) (2.19456)

R Sq 0.7602 R Bar Sq 0.7463 D.W.(1) 1.8802

$$\text{WPDOT} = 0.50880 * \text{WPDOT}[-1] - 0.10827 * \text{WPDOT}[-2] + 0.07443 * \text{WPDOT}[-3]$$

(5.32626) (0.98764) (0.86189)

$$+ 0.14476 * \text{PMDOT} + 0.14342 * \text{GAP}[-1] + 0.00304$$

(6.07044) (2.68303) (2.40163)

R Sq 0.7113 R Bar Sq 0.6945 D.W.(1) 1.9052

These equations indicate that import prices have had a significant effect on both consumer and wholesale prices--with a 1 percent decline in import prices having been reflected in a 0.07 percent decline in domestic consumer prices, and a 0.14 percent decline in domestic wholesale prices. In line with these estimates--though employing a somewhat richer specification--the Economic Planning Agency (1994) estimated that during 1985-93, a 1 percent drop in import prices had led to a 0.07 percent drop in consumer prices over a period of about a year, and a 0.12 percent reduction in domestic wholesale prices.

Comparing the actual estimates with the benchmark case reveals that the actual estimated effect of changes in import prices is in line with what should be expected for consumer prices--0.07 versus 0.08. For wholesale prices, the estimated pass-through coefficients of 0.12 to 0.14 percent exceeds what would be expected from the share of imports in wholesale prices of 0.086. These comparisons, then, do not suggest that the pass-through of import-price changes into domestic prices has been notably smaller than would be expected based on import shares.

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