Macroeconomic Policy in Japan*

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Abstract
This paper explores the composition of the macroeconomic pol-
icy packages that would be effective in stimulating the Japanese
economy. An empirical econometric model is used to predict the
consequences of a monetary stimulus consisting of an open-
market purchase of government bonds by the Bank of Japan com-
bined with the announcement and implementation of inflation
targeting in Japan. The paper also compares the impacts of per-
manent, temporary, and phased fiscal adjustments. The model pre-
dicts that monetary policy would be effective in stimulating the
Japanese economy through causing a depreciation of the yen. Sim-
ilarly, a substantial fiscal consolidation in Japan would be only
mildly contractionary for the first two years but then would yield
substantial long-term benefits to the Japanese economy. Com-
bining a credible fiscal contraction that is phased in over three
years with an inflation target would be likely to provide a power-
ful macroeconomic stimulus to the Japanese economy, through a
weaker exchange rate and lower long-term real interest rates, and
would sustain higher growth in Japan for a decade. Thus, a switch
in the macroeconomic policy mix toward a loose monetary policy
(e.g., setting inflation targets between 2 and 3 percent) and a tight
fiscal policy is likely to be an important part of a successful pack-
age of reforms to raise Japanese productivity growth over the
coming years.

1. Introduction

Japan has entered the twenty-first century mired in a
decade-long economic stagnation and troubled by predic-
tions of a looming recession. Macroeconomic policy op-
tions for Japan are becoming increasingly important both

because of the current state of the Japanese economy and because of the synchronized global economic slowdown. A wide range of policies across the economy is likely to be necessary in coming years. The goal of this paper is to assess the likely contributions of macroeconomic policies in revitalizing the Japanese economy. The paper also briefly explores the probable impacts of Japanese macroeconomic policy changes on other countries in the Asia Pacific region. It complements previous papers that have used the same modeling framework to explore the likely causes of current economic problems in Japan (McKibbin 1996; Callen and McKibbin 2001).

2. The macroeconomic experience of Japan since 1990

Economic growth slowed sharply in Japan during the 1990s after the bursting of the asset price bubble (figure 1). Economic reform has moved slowly, and very little has been done to address the excess capacity built up during the bubble period; because of this, in part, growth in total factor productivity (TFP) has slowed sharply. In addition, the collapse in TFP might have partly reflected a demand contraction resulting from a large negative effect on wealth, which would also have led to excess capacity and a fall in measured TFP. Hayashi and Prescott (2001) argue that the TFP shock was a result of legislated changes in the length of the work week in Japan. This argument is difficult to reconcile with evidence from other countries that experienced similarly declining work weeks but did not experience a similar collapse in TFP growth.

Monetary and fiscal policies in Japan were eased as policymakers sought to stimulate growth during the 1990s. The fiscal balance moved from a surplus of close to 3 percent of GDP in 1991 to a deficit that is estimated to have exceeded 8 percent of GDP in 2000. The public-sector debt has now risen to over 130 percent of GDP.

The primary causes of the growth slowdown are widely debated (see Boltho and Corbett 2000; see also Posen 1998). Some authors attribute the decade of slow growth to the banking system collapse (see Bayoumi 1999). Hayashi and Prescott (2001), however, convincingly show that this explanation is hard to reconcile with the large growth in internal financing by Japanese firms even while bank financing was falling sharply. Yoshino and Sakakibara (this issue) claim that the reasons the Japanese economy has failed to respond to fiscal and monetary policy are that investment is now interest insensitive and that government spending has been directed toward the creation of jobs with very low multipliers. However, Sakakibara and Yoshino need to appeal to large changes in the values of the parameters of their

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Figure 1. Selected economic indicators for Japan (1985–2000)
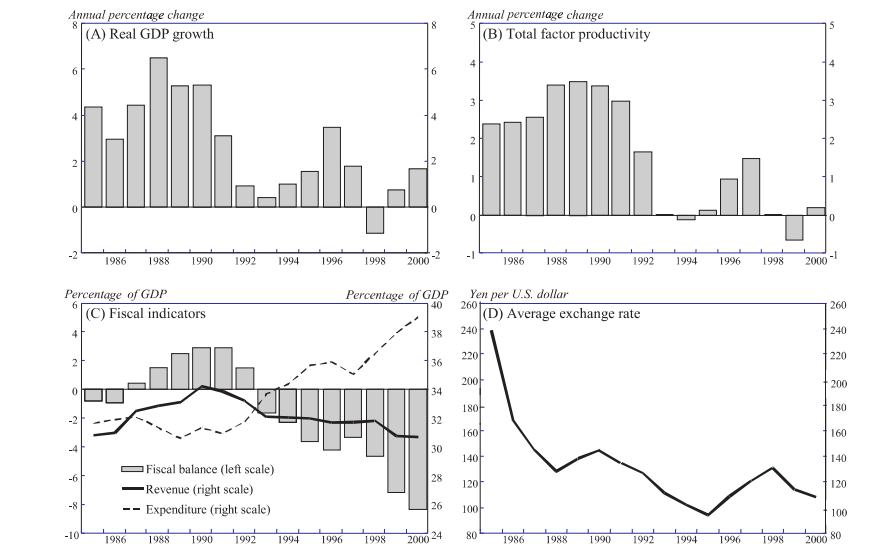
Sources: Nikkei Telecom and staff.

econometric model (from historical values) to explain the Japanese experience in the 1990s. One possible reason they must appeal to such changes is that their model does not capture the role of expectations, which would be included in an intertemporally consistent structural model (such as the model used in this paper).

3. The general equilibrium modeling framework

A general equilibrium framework is essential for an analysis of the Japanese economic experience because several different identifiable shocks hit Japan during the 1990s. The model must also allow for some sectoral disaggregation, because monetary and fiscal policies have different effects on different sectors. The G-Cubed (Asia Pacific) model, which is based on the structure of the G-Cubed model outlined in McKibbin and Wilcoxen (1998), is ideal for evaluating policy options in Japan because it features detailed coverage of the economic variables for the countries in the region and includes rich links among countries through goods and asset markets. A summary of the model's coverage is presented in table 1. Some of the principal features of the model are as follows:[1]

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1 Full details of the model, including a list of equations and parameters, can be found in McKibbin (2001) online at http://www.msgpl.com.au/msgpl/apgcubed46n/index.htm. The ability of the model to explain a number of features of the macroeconomic experience of the world during recent decades is assessed in McKibbin and Vines (2000).

- The model is based on explicit *intertemporal* optimization by the agents (consumers and firms) in each economy. In contrast to static computable general equilibrium (CGE) models, time and dynamics are of fundamental importance in the G-Cubed model.
- In order to track the macroeconomic time series, the behavior of agents is modified to allow for short-run deviations from optimal behavior. Deviations from intertemporal optimizing behavior take the form of rules of thumb that are chosen to generate the same steady-state behavior as optimizing agents, so that in the long run the model has only a single intertemporal optimizing equilibrium.
- Money is introduced into the model through a restriction that households require money to purchase goods.
- The model also allows for short-run nominal wage rigidity and this feature, combined with the explicit role for money, gives the model its "macroeconomic" characteristics and differentiates it from most CGE models.
- The model distinguishes between the stickiness of physical capital within sectors and within countries and the flexibility of financial capital, which immediately flows to where expected returns are highest. This important distinction leads to a critical difference between the *quantity of physical capital* that is available at any time to produce goods and services and the *valuation of that capital* as a result of decisions about the allocation of financial capital.

The interdependencies of the model are identified using a computer algorithm that solves for the rational-expectations equilibrium of the global economy. It is important to stress that the term "general equilibrium" is used to signify that all interactions are captured, not that all economies are in a full market-clearing equilibrium at each point in time. Although the model contains several arbitrary parameters, such as the shares of forward- and backward-looking agents, most parameters are the deep parameters of the utility and production technologies, and the policy regimes are modeled as structural equations. Thus the model is less susceptible to the Lucas (1976) critique than most large-scale models.

4. The impact of macroeconomic policy in Japan

The model is used to explore the implications for Japan (and for other countries) of certain changes in its monetary and fiscal policies. The changes to monetary policy that the paper considers are (1) an outright purchase of Japanese government debt by the Bank of Japan (BOJ) sufficient to raise the money supply by 5 percent, and (2) the credible announcement of a new inflation target of 1 percent in 2001, 2 percent in 2002, and 3 percent from 2003, etc. These two policies are quite different: the first policy causes a rise in the price level or a temporary rise in the inflation rate,

Table 1. A comparison of global dynamic intertemporal general equilibrium models

MSG2	G-Cubed	G-Cubed (Asia Pacific)
Countries		
United States	United States	United States
Japan	Japan	Japan
Canada	Canada	Canada
Germany	New Zealand	New Zealand
United Kingdom	Australia	Korea
France	Rest of OECD	Rest of OECD
Italy	China	China
Austria	EEFSU	India
Australia	OPEC	Thailand
Mexico	Rest of world	Malaysia
Korea		Singapore
High-income Asia		Indonesia
Low-income Asia		Hong Kong
Rest of EMS		Taiwan
Rest of OECD		Philippines
OPEC		OPEC
EEFSU		EEFSU
Rest of world		Rest of world
Sectors		
Single sector	Electric utilities	Energy
	Gas utilities	
	Petroleum refining	
	Coal mining	
	Crude oil and gas extraction	
	Other mining	Mining
	Agriculture, fishing	Agriculture
	Forestry and wood products	
	Durable manufacturing	Durable manufacturing
	Nondurable manufacturing	Nondurable manufacturing
	Transportation	Services
	Services	

whereas the second policy leads to a permanent rise in the inflation rate. The results to follow could also be interpreted as a purchase of foreign currency by the BOJ or indeed as a purchase of a range of assets in the Japanese economy (see Fukao, Hoshi, and Ito 2001).

The results in the figures are calculated by using the model plus projections of sector-specific productivity growth rates, country-specific population growth rates, and a range of assumptions about tax rates to generate a projection of the global economy. This baseline projection is then perturbed by the various policy changes considered. The results shown in each figure are presented as deviations (either percentage, percentage point, or percentage of GDP) relative to what would have been the outcome if the policy change had not been implemented. Thus a zero observation represents a simulation in which the value of the variable in a given year is equal to its baseline value.

4.1 Relaxation of monetary policy

A quantitative monetary easing   Because nominal short-term interest rates in Japan have been at or near zero for several years, debate has focused on whether the BOJ should increase liquidity in the economy by undertaking quantitative easing,

including increased purchases of government securities. Although the viability of such a policy is debatable, the G-Cubed model is useful in providing insights into the likely transmission mechanisms of monetary easing both in Japan and across the region more broadly. Of course, the model's numerical results are subject to considerable uncertainty, but they point to the main mechanism that such a policy would likely set in motion. To argue that quantitative monetary easing will be ineffective requires one to focus on the various steps in the logical relationships between variables as embodied in the model and to explain why a particular aspect of the transmission mechanism might fail. This process alone makes a modeling approach to analyzing macroeconomic policy in Japan a useful exercise.

In the simulation, the BOJ is assumed to ease monetary policy by purchasing sufficient government bonds to bring about a permanent 5 percent increase in the money supply relative to the baseline. Figures 2a–2h show the results for Japan and for other countries. The monetary injection raises inflation expectations (figure 2d) in the near term and lowers short-term *real* interest rates (figure 2b). Long-term interest rates change very little (figure 2b), because monetary policy does not affect real interest rates in the medium to long term, and there is no change in the long-term rate of inflation in the policy under consideration. Despite the lack of an impact on long-term variables, the decline in real interest rates temporarily stimulates private investment (figure 2a), and the rise in expected inflation causes the yen to depreciate (figure 2e), which temporarily stimulates net exports (figure 2g). Sticky prices in the labor markets and a nominal depreciation imply that although wages do not adjust, the real exchange rate will also depreciate, making Japanese goods more competitive in world markets. Over time, wage increases will erode this temporary competitiveness gain. Lower real interest rates (figure 2b) and higher equity prices (figure 2c) also temporarily increase consumption (figure 2a) through a positive wealth effect. These temporary increases in demand put in motion a multiplier process through stronger consumption, stronger investment, and stronger net exports. The result is a temporary rise in real GDP (figure 2a) through standard Keynesian channels: a demand stimulus. On the supply side of the economy, the temporary fall in real wages and real interest rates temporarily increases aggregate supply so that real GDP rises for several years.

The hump-shaped pattern of adjustment is to be expected, given that eventually price adjustment removes the real effects of the monetary shock and the economy settles down to the original baseline with higher prices and a depreciated nominal exchange rate. Real variables remain unchanged in the medium to long term. Inflation is not permanently higher, however, because the shock is a rise in the level of money balances (a shock to the rate of growth of money results in not only a

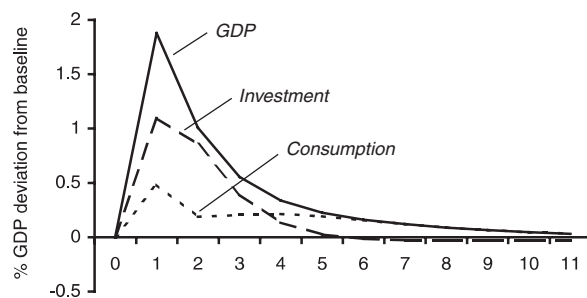**Figure 2a. Real effects on Japan of a 5 percent Japanese monetary expansion**

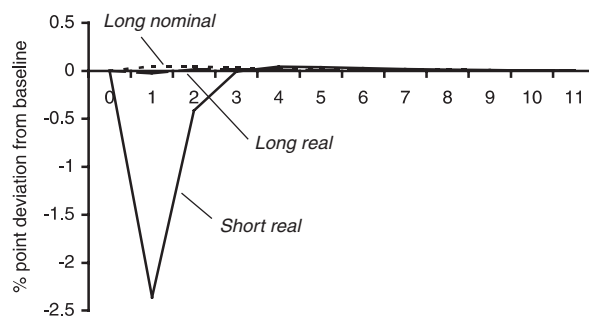**Figure 2b. Change in Japanese interest rates resulting from a 5 percent Japanese monetary expansion**

Figure 2c. Change in Japanese Tobin's *q* by sector resulting from a 5 percent Japanese monetary expansion
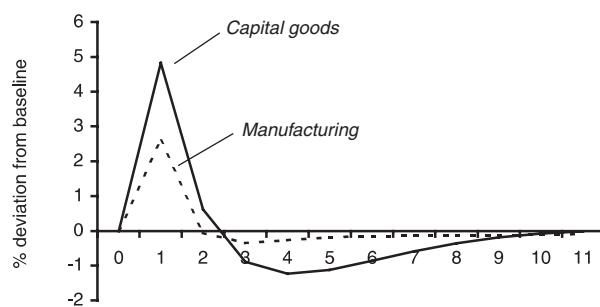
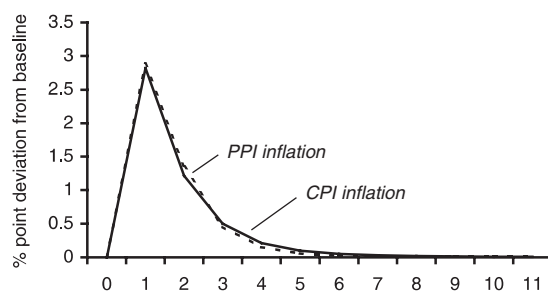**Figure 2d. Change in Japanese inflation resulting from a 5 percent Japanese monetary expansion**

Figure 2e. Change in exchange rates resulting from a 5 percent Japanese monetary expansion (a downward trend indicates an appreciation of the U.S. dollar)
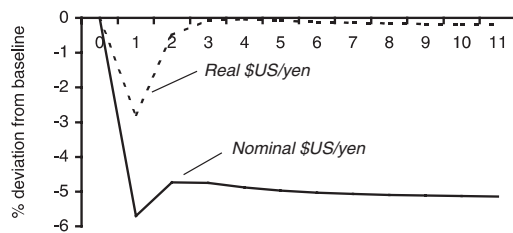
Figure 2f. Change in regional GDP resulting from a 5 percent Japanese monetary expansion
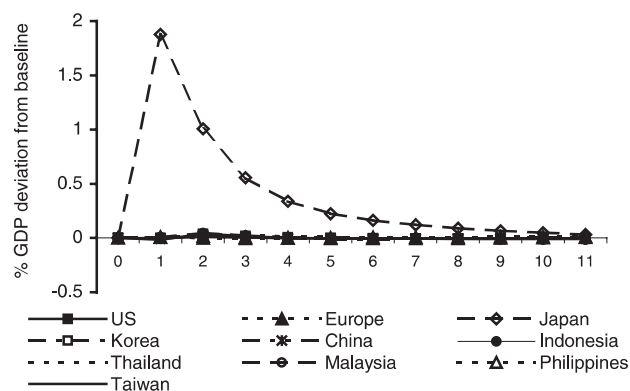
Figure 2g. Change in exports resulting from a 5 percent Japanese monetary expansion
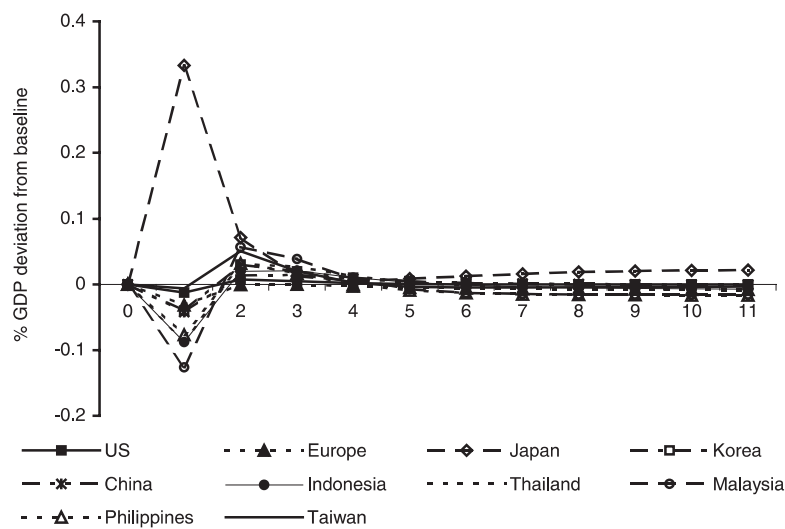
Figure 2h. Change in trade balances resulting from a 5 percent Japanese monetary expansion
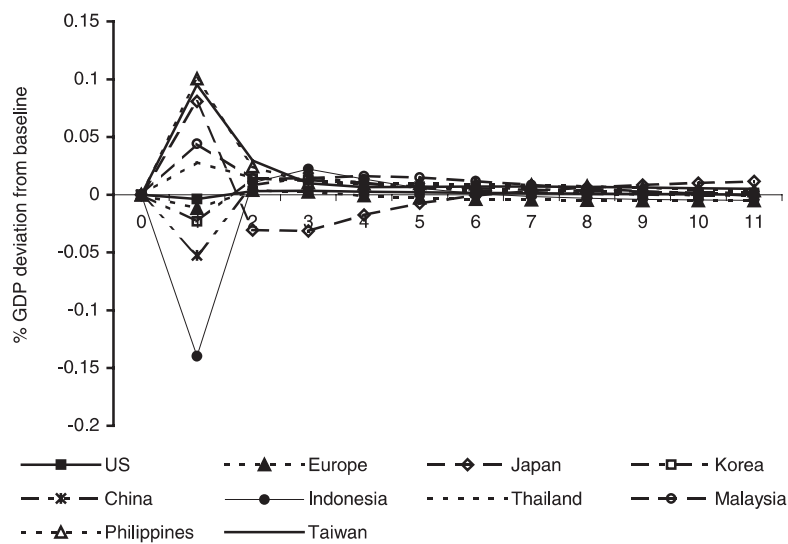
larger stimulus to demand, but also a permanent change in the underlying inflation rate in Japan). Long-term interest rates change very little because the inflationary impulse is only temporary (figure 2b), and the change in the real exchange rate that stimulates net exports is largely eroded by the second year (figure 2g).

The effects on the rest of Asia are relatively small. The temporary boost to aggregate demand leads to an increase in demand for Asian goods in Japan, but this is offset by a rise in the price of these goods when converted into yen within the Japanese economy. Indeed, in the first year the exchange rate effect dominates, resulting in a fall in exports from each Asian economy to Japan and to third markets in which they compete with Japanese goods (figure 2g). In the second year, the demand stimulus in Japan has not declined as quickly as the real exchange rate, and therefore Asian exports are higher than baseline for several more years. Despite the export response's being negative for growth in Asian economies in the first year (figure 2g), real GDP is broadly unchanged (figure 2f) because Asian equity prices rise in anticipation of the growth in years 2 through 5, which raises private wealth and consumption sufficiently to offset the export decline. The overall impact on Asian trade balances (figure 2h) is small and reflects changes in saving and investment balances. For example, Indonesia initially experiences a trade deficit, because the relaxation of monetary policy stimulates Japanese production, which leads to a capital inflow into Indonesian sectors that provide inputs for Japanese firms.

Adoption of a 3 percent inflation target   Some economists have advocated the adoption of an explicit inflation target by the BOJ. This section considers the impact of announcing and implementing explicit and credible inflation targets with increases (relative to the baseline) of 1 percent in 2001, 2 percent in 2002, 3 percent from 2003, etc. The measures used to implement such a policy specify the rate of consumer price inflation as the target and the money supply as the instrument. A time-consistent policy optimization routine is used to calculate a numerical feedback rule that exactly hits the target each year. The shock has two important aspects: first, the announcement is credible and changes inflationary expectations; and second, the policy is actually implemented to achieve the announced inflation target.

The results are presented in figures 3a–3h. Compared with the policy of a one-off increase in the money supply to purchase government debt, a policy that increases the rate of inflation is more stimulative, because it is a continual purchase of government debt over time. Real GDP (figure 3a) rises above the baseline by up to 0.9 percent by the third year of the policy and is sustained above baseline for over a decade. The announcement of the inflation target and the increase in liquidity in the economy stimulate the stock market through higher expected real activity (fig-

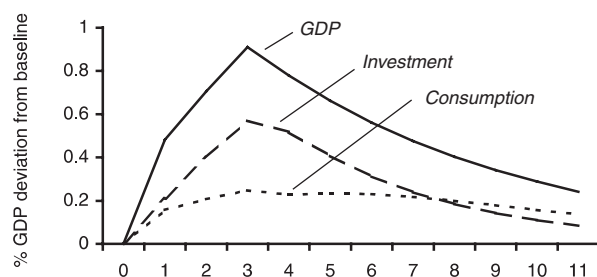**Figure 3a. Real effects on Japan of a credible 3 percent inflation target**

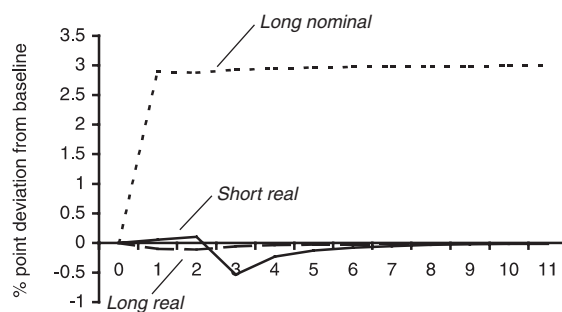**Figure 3b. Change in Japanese interest rates resulting from a credible 3 percent inflation target**

Figure 3c. Change in Japanese Tobin's *q* by sector resulting from a credible 3 percent inflation target
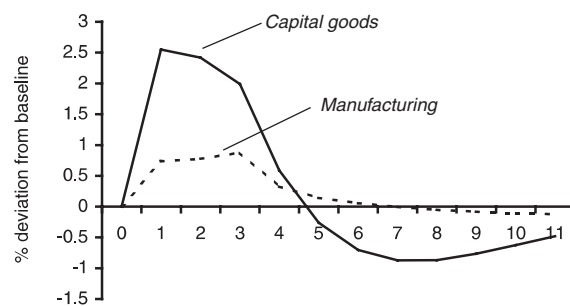
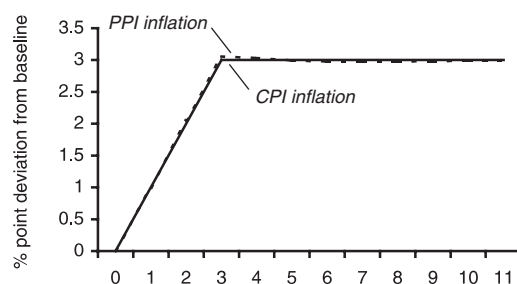**Figure 3d. Change in Japanese inflation resulting from a credible 3 percent inflation target**

Figure 3e. Change in exchange rates resulting from a credible 3 percent inflation target (a downward trend indicates appreciation of the U.S. dollar)
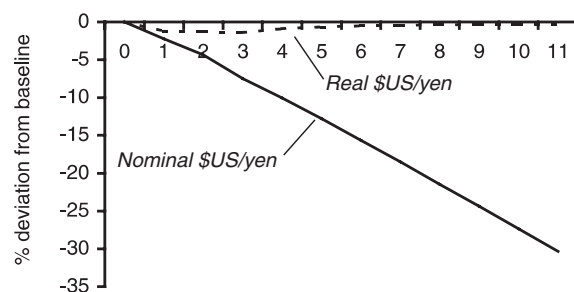

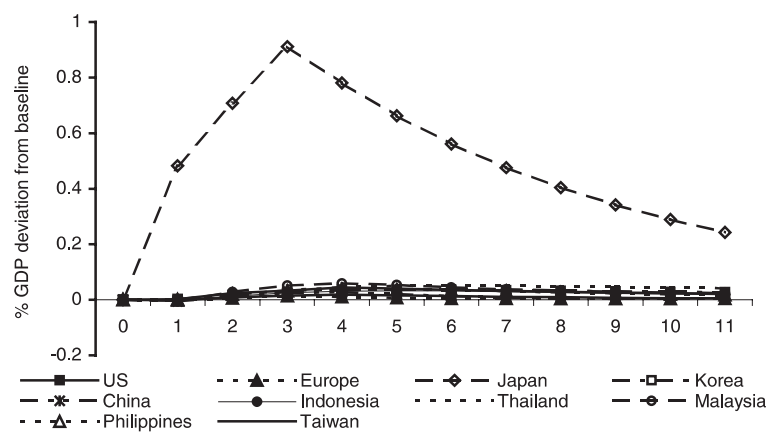**Figure 3f. Change in regional GDP resulting from a credible 3 percent inflation target**

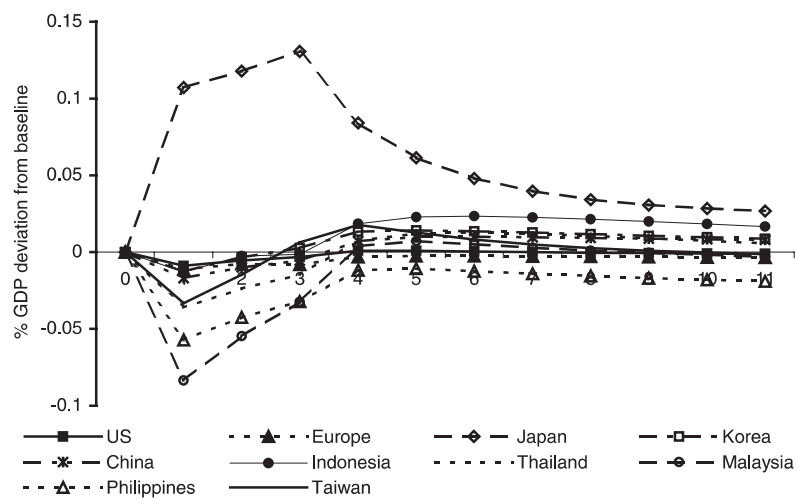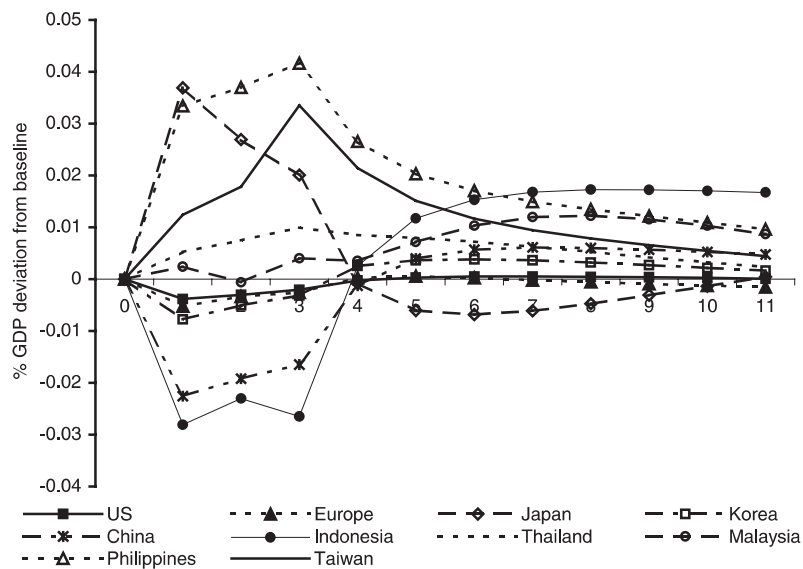**Figure 3g. Change in exports resulting from a credible 3 percent inflation target**

Figure 3h. Change in trade balances resulting from a credible 3 percent inflation target

ure 3a) and through a slight fall in long-term real interest rates (figure 3b). This stimulates investment through a rise in Tobin's *q* (figure 3c) and stimulates consumption (figure 3a) through a rise in real wealth. The long-term nominal bond rate jumps by 2.8 percent initially (figure 3b) and gradually rises to 3 percent relative to the baseline, because participants in the bond market factor the permanently higher inflation rates into bond prices. The perception that the BOJ is monetizing part of the fiscal deficit causes the nominal exchange rate (figure 3e) to depreciate on impact. With sticky wage adjustment, this also causes a depreciation of the real exchange rate on the announcement and this stimulates net exports. The Keynesian demand multiplier then causes a sustained increase in demand. Although prices are rising continually, wages do not keep up: real wages fall for a more sustained period than they did under the simulation of the one-off purchase of government debt. On the supply side, the investment stimulus raises capacity output (only temporarily), and the rise in inflation and lagged response of nominal wages cause a fall in real wages, which is sustained for several years. Thus both the supply and demand sides of the economy are stimulated for at least a decade.

Such a policy has a larger impact on GDP in Japan than in other countries. The spillover to the rest of the region (figure 3f) is negligible, because the larger output effects of the monetary stimulus are offset by a larger real depreciation of the Japanese exchange rate.

From this simulation it is also possible to see why a rise in expected deflation, as currently being experienced in Japan, can be depressing for economic activity. The main problem for the BOJ is how to make such an inflation policy credible, because credibility is a critical part of the policy's effectiveness. This is where the aggressive purchase of a range of assets by the BOJ, as advocated by Fukao, Hoshi, and Ito (2001), would be an important ingredient in establishing the policy regime shift.

4.2 Japanese fiscal policy

A key characteristic of the Japanese experience in the 1990s is that the real economy did not respond to the large, sustained fiscal stimulus. Yoshino and Sakakibara (this issue) attribute this to the nonresponsiveness of investment to real interest rate changes and to the specific nature of the government spending undertaken, which in their view effectively had little multiplier value in the economy. The simulation used here, however, provides another interpretation of the observed link between fiscal policy and real economic activity: the Japanese economy failed to respond because of the role of expectations of future taxes and a decrease in private expenditure resulting from changes in real exchange rates and real interest rates. My claim is not that investment is unresponsive to real interest rates (indeed, the truth is quite

the opposite), but that the interest rate effects are offset by important channels of transmission dependent on expectations.

This hypothesis is explored further using three fiscal policy simulations. Before presenting the results, it is worth briefly reviewing the nature of Japanese fiscal policy in the 1990s. The nature of the Japanese fiscal expansion during this period is open to some interpretation (see McKibbin 1996 for a detailed discussion). The initial increase in the deficit was likely to have been viewed by analysts as a temporary response to a perceived cyclical downturn in the economy. Given Japan's relatively strong fiscal position at the beginning of the decade, the deficit may have been regarded as having little impact on future financing costs (this view is consistent with the decline in real long-term bond yields during the first half of the 1990s). As the deficit continued to widen, however, particularly during 1997–2000, it is likely to have been increasingly considered a permanent fiscal expansion, particularly in the absence of a credible policy to bring about medium-term fiscal consolidation. This interpretation is consistent with the increase in long-term bond yields since 1998. At the same time, many analysts were aware of the future fiscal consequences of the significant aging of the Japanese population, which required a robust fiscal position rather than a substantial move toward deficits. Consequently, three different fiscal simulations are considered in this section: a permanent expansion, a temporary expansion, and a phased-in fiscal consolidation.[2]

Permanent increase in government spending   The first fiscal simulation is a permanent long-term increase in government spending on goods and services amounting to 5 percent of GDP, financed by issuing government debt. Over time, the fiscal closure rule in the model ensures that lump sum taxes on households rise to cover the servicing costs of the additional debt issued. Because of the sectoral disaggregation in the model, we need to specify how the government expenditure is distributed across various sectors.[3]

The additional 5 percent government spending is assumed to be distributed across sectors as follows: 0.5 percent of GDP to the durable manufacturing sector, 1 percent of GDP to the non-durable manufacturing sector, and 3.5 percent of GDP to services. The results are shown in figures 4a to 4e for Japan and figures 4f to 4h for the other regions in the model.

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2 Although the issue of the mix between spending and tax changes is important, it is not included in this analysis; see McKibbin and Callen (2001) for details.

3 In addition to the standard macroeconomic effects of fiscal policy in the G-Cubed model, there are relative price effects caused by the initial spending pattern of the government. These impacts are not discussed in this paper.

The impact of the fiscal expansion on the economy involves several offsetting factors. First, the additional spending on goods and services raises aggregate demand through conventional Keynesian channels in the short run. As a result of stickiness in wages, real wages fall as producer prices rise, and the labor force expands to satisfy temporarily the additional demand. The financial effects of the future fiscal deficits are also important. Expected future deficits lead to increased saving and reduced consumption by Japanese households because they anticipate higher taxes (figure 4a). These effects are relatively small, however, and the additional resources required to finance the future fiscal deficits are understood to require higher future real interest rates because the government will be competing with the private sector for domestic and foreign savings. The higher expected future real interest rates cause long-term real interest rates to rise (figure 4b), and as foreign investment is attracted by the higher real interest rates (either the repatriation of Japanese capital from abroad or new foreign capital inflows), the exchange rate also appreciates (figure 4e). These financial adjustments hurt equity market confidence (figure 4c) and crowd out private investment (figure 4a) and exports (figure 4g). Thus, the short-term stimulus from the higher government spending lasts only a year, and then GDP falls below the baseline as the debt burden rises and crowds out economic activity (figure 4a). From year 2 onward, growth is roughly 0.5 percent per year lower for a decade. (The growth rate effects can be calculated from the slope of the GDP line in figure 4a.)

Unlike in the case of the monetary policy simulations, the real variables in the fiscal policy simulations do not remain unchanged in the medium to long run. Changes in real interest rates and real exchange rates do not reflect temporary nominal rigidities; they follow from changes in the real economy. The model exhibits some Ricardian-type behavior through the internalization of government fiscal positions into private budget constraints, but the assumption of various risk premia and backward-looking behavior imply that real asset prices need to adjust in order for all intertemporal budget constraints to be binding. The longer term financing implications of the permanent fiscal deficits are particularly important in the transmission mechanism.

In other countries, the financing effects of higher global real interest rates and the relative trade reliance on Japan determine the transmission of the shock. In the short run, there is a slight positive effect on some Asian economies (figure 4f), because the temporary stimulus to demand in Japan raises the demand for inputs from these countries. The impact quickly turns negative, however, because of the rise in real interest rates and the fall in equity prices in Asia, which affect private consumption and investment. The long-run negative effects on Asia reflect the long-run negative

Figure 4a. Real effects on Japan of a permanent increase in Japanese government spending of 5 percent of GDP
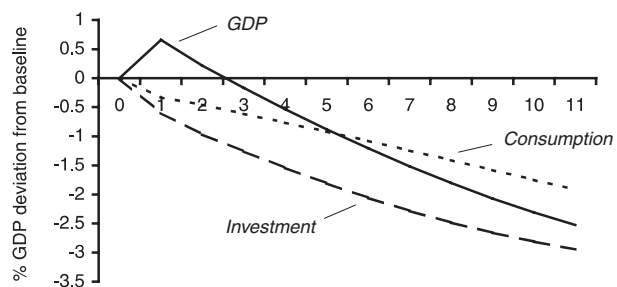

Figure 4b. Change in Japanese interest rates resulting from a permanent increase in Japanese government spending of 5 percent of GDP
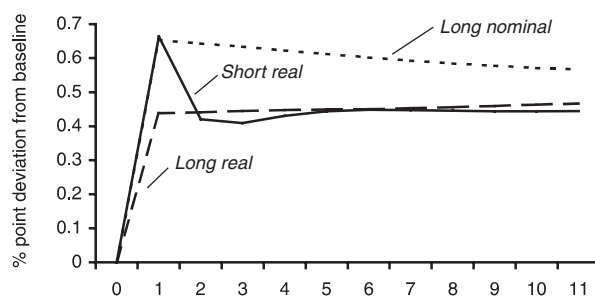

Figure 4c. Change in Japanese Tobin's *q* by sector resulting from a permanent increase in Japanese government spending of 5 percent of GDP
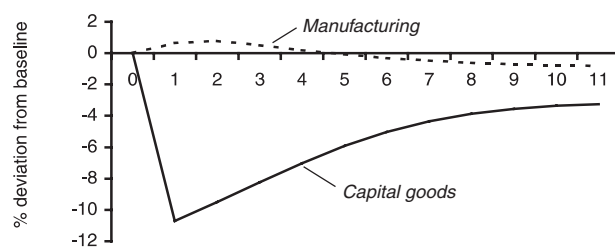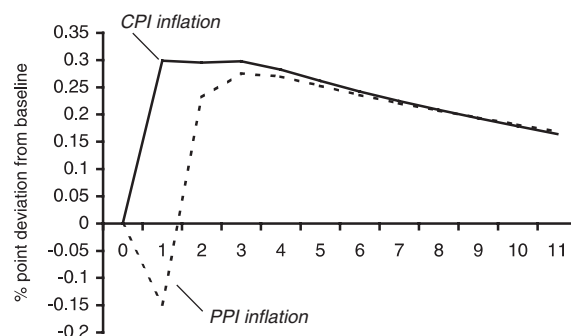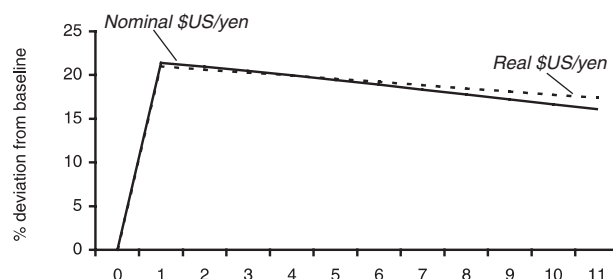
Figure 4d. Change in Japanese inflation resulting from a permanent increase in Japanese government spending of 5 percent of GDP

Figure 4e. Change in exchange rates resulting from a permanent increase in Japanese government spending of 5 percent of GDP (a downward trend indicates an appreciation of the U.S. dollar)

effects on Japan. The move toward trade surpluses in most countries (figure 4h) reflects a capital outflow from these economies toward Japan so as to finance the Japanese fiscal deficit. Thus the fiscal expansion in Japan causes a strong yen and improved exports from Asian economies into Japan, yet simultaneously output growth falls in these economies as the supply sides contract in response to higher real interest rates. The model shows that the assertion that a strong yen is good for Asia is in error when the yen's strength results from fiscal deficits in Japan.

The United States, Europe, and China are the least affected over time by the Japanese fiscal policy of increased government spending (figure 4f), but most Asian economies experience significant negative effects on real GDP. In contrast to popular opinion, the model suggests that the permanent fiscal expansion offers only a very short-run stimulus to the Japanese economy and the other economies in the region

Figure 4f. Change in regional real GDP resulting from a permanent increase in Japanese government spending of 5 percent of GDP
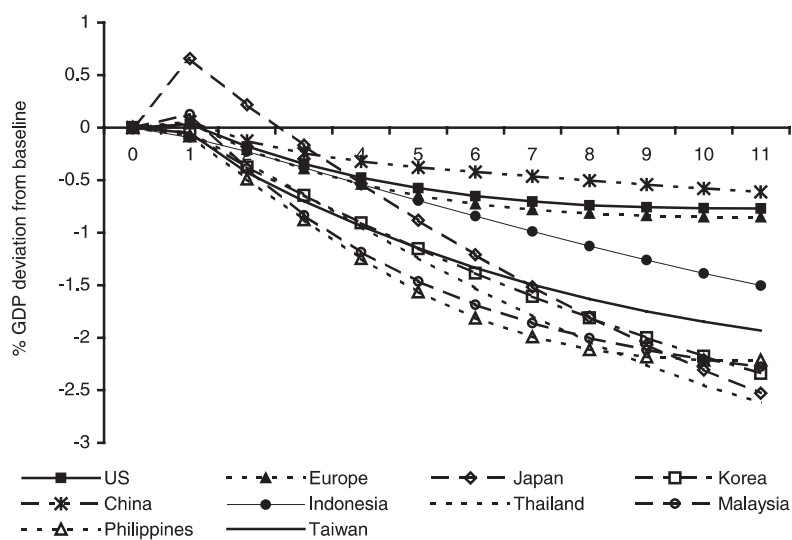

Figure 4g. Change in exports resulting from a permanent increase in Japanese government spending of 5 percent of GDP
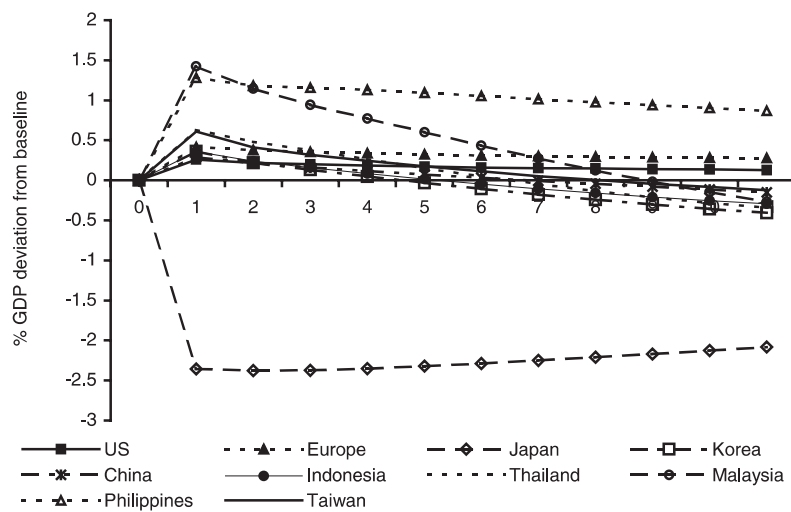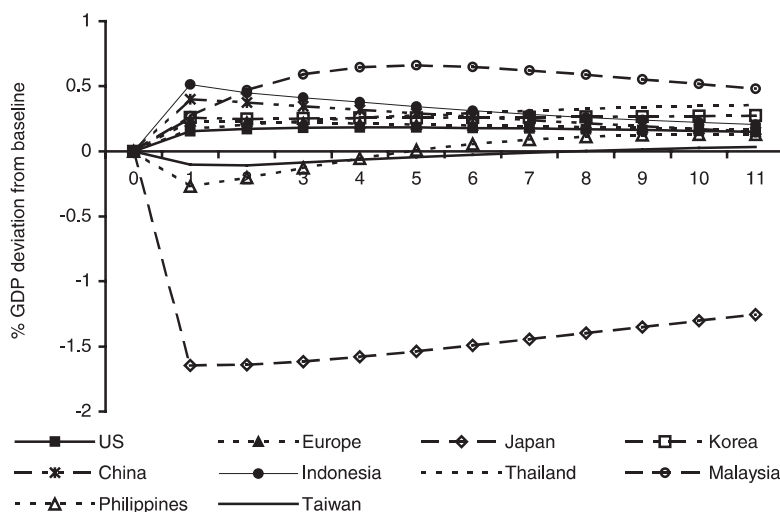
Figure 4h. Change in trade balances resulting from a permanent increase in Japanese government spending of 5 percent of GDP

and negatively affects all economies in the long run because it extracts needed savings from the world economy.

Temporary increase in government spending   Now consider a temporary fiscal stimulus in which the increase in government spending is the same in the first year as for the case of the permanent shock, but then returns to the baseline in subsequent years. This scenario is clearly a simplifying assumption, but it allows a useful comparison with the permanent shock and offers important insights about how the Japanese government might respond to the currently emerging economic crisis. Results are presented in figures 5a to 5h. Given that the change in government spending in the first year is the same for the temporary shock as for the permanent shock, the key differences in the results in the first year result from the impacts of the long-term financing effects of the permanent versus the temporary shock (viz., in the permanent shock there are expected future fiscal deficits, whereas in the temporary shock there are none). The rise in Japanese GDP (figure 5a) is close to 1.8 percent relative to baseline, more than double the 0.7 percent rise for the permanent fiscal expansion (figure 4a). Thus, the impact on long-term interest rates (figure 5b) and the real exchange rate appreciation (figure 5e) are substantially reduced under the temporary fiscal stimulus compared with the permanent stimulus. Note also that the medium- to long-term effects are negligible, because the fiscal policy change is transitory.

Figure 5a. Real effects on Japan of a temporary increase in Japanese government spending of 5 percent of GDP
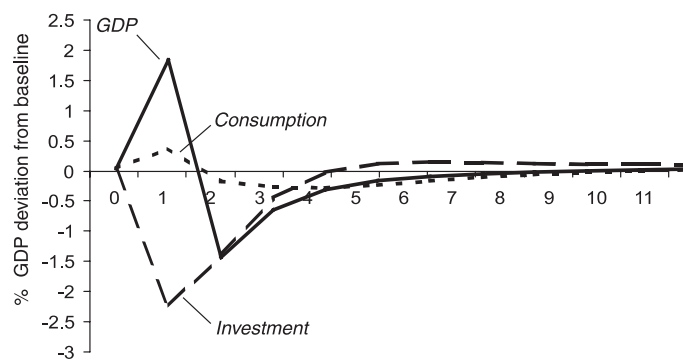

Figure 5b. Change in Japanese interest rates resulting from a temporary increase in Japanese government spending of 5 percent of GDP
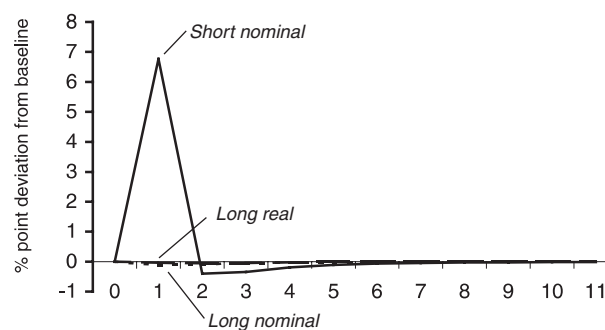

Figure 5c. Change in Japanese Tobin's *q* by sector resulting from a temporary increase in Japanese government spending of 5 percent of GDP
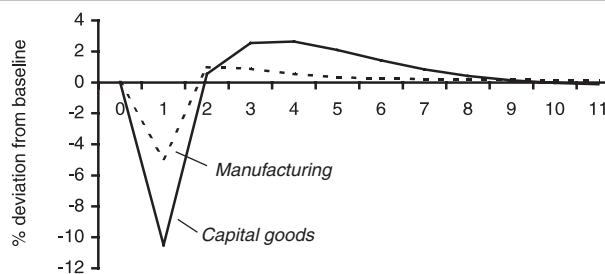
Figure 5d. Change in Japanese inflation resulting from a temporary increase in Japanese government spending of 5 percent of GDP
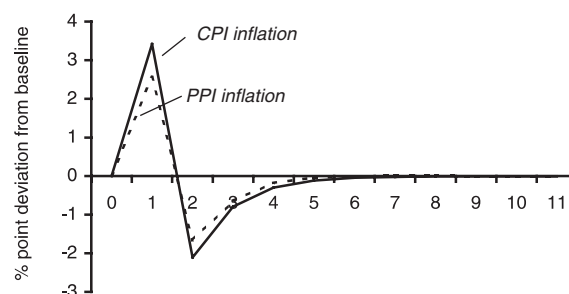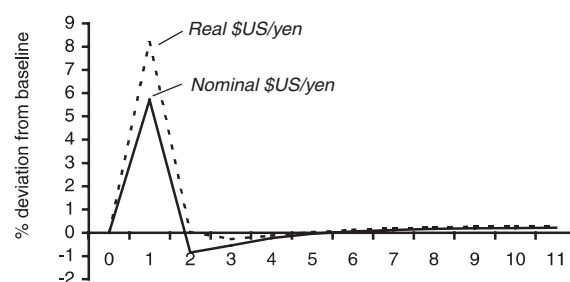

Figure 5e. Change in exchange rates resulting from a temporary increase in Japanese government spending of 5 percent of GDP (a downward trend indicates an appreciation of the U.S. dollar)


The spillover effects on other countries in the region are also much more positive in the first year: Malaysia and Indonesia experience GDP increases of 0.6 percent relative to baseline (figure 5f). These countries rely on the Japanese market for their exports and receive a positive boost from a stronger Japanese economy. Most Asian economies are also negatively affected by higher real interest rates under the permanent-spending case, so a much smaller financing impact on global asset markets means impacts are less negative.

The results for the temporary fiscal stimulus look more Keynesian than those of the permanent fiscal policy change. This is because of the role of asset markets in internalizing future financing costs of sustained fiscal deficits and the role of rational expectations in determining asset prices in the short term.

Phased-in credible fiscal consolidation   Japan's new prime minister, Mr. Koizumi, intends to move the country toward fiscal consolidation. He has stated a commit-

Figure 5f. Change in regional real GDP resulting from a temporary increase in Japanese government spending of 5 percent of GDP
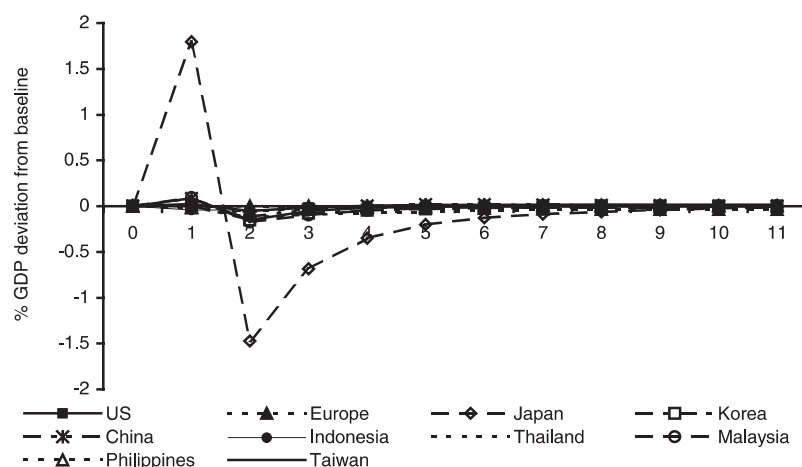
ment to limiting the budget deficit to 30 trillion yen in FY2002 and has suggested that over the medium term it would be appropriate to eliminate the central government's primary deficit in the general account. As of April 2002, no time frame had been set for these measures. An additional simulation was run to determine the impacts of a phased, fully credible fiscal consolidation whereby government spending is reduced by 1.67 percent of GDP in year 1, 3.33 percent of GDP in year 2, and 5 percent of GDP from year 3 onward (all relative to the baseline).[4] The results are presented in figures 6a to 6h. To compare the difference between phased-in fiscal cuts and sharp unannounced cuts, the reader need only invert the lines in figures 3a to 3g (which represent the results of the permanent fiscal spending increase), because both shocks are scaled to 5 percent of GDP changes in the long run, and the model can be considered linear around increases and decreases in the exogenous variables.

The initial impact of the announcement of fiscal consolidation is primarily on asset markets. In anticipation of future lower fiscal deficits and therefore future lower real interest rates, long-term real interest rates fall (figure 6b). Through arbitrage this causes a substantial depreciation of the yen of approximately 15 percent (figure 6e). The weaker yen leads to a rise in net exports (figure 6g) and an improvement in

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4 Although it is unlikely that any consolidation would happen this quickly, the relatively short period of time used in the simulation allows the competing effects of the policy to be more clearly visible.

Figure 5g. Change in exports resulting from a temporary increase in Japanese government spending of 5 percent of GDP
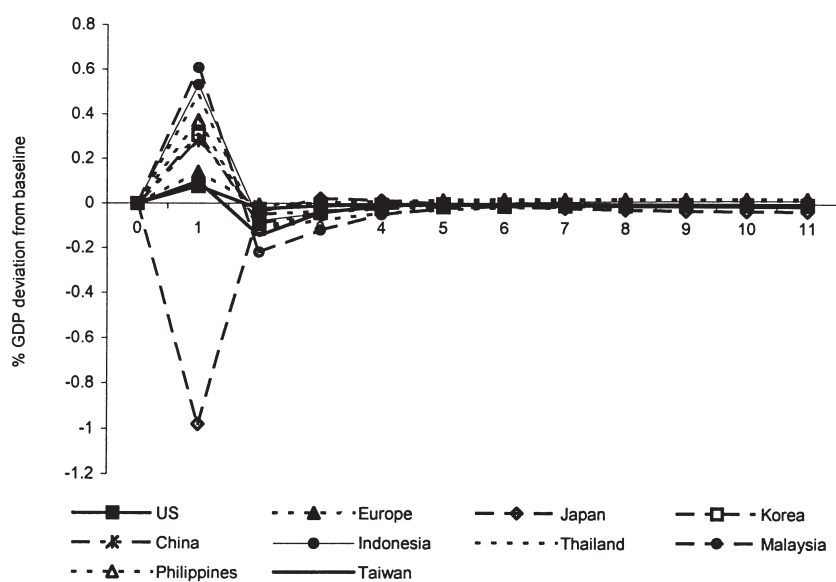

Figure 5h. Change in trade balances resulting from a temporary increase in Japanese government spending of 5 percent of GDP
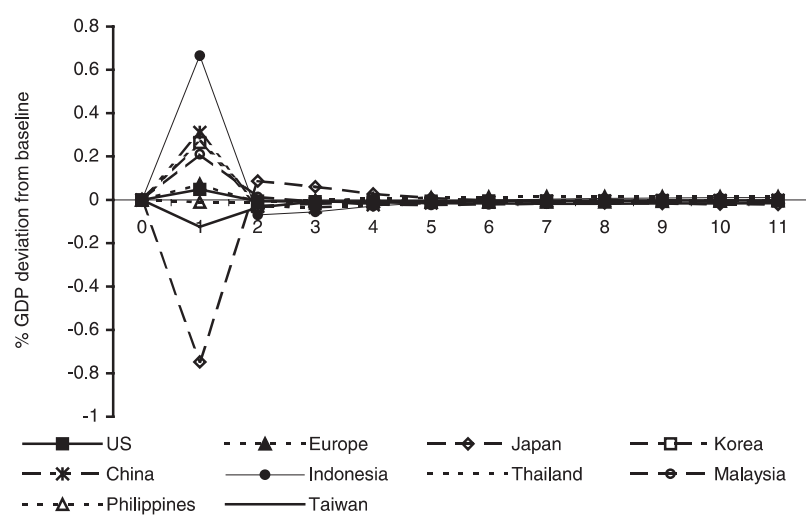
Figure 6a. Real effects on Japan of a phased fiscal consolidation of 5 percent of GDP in Japan
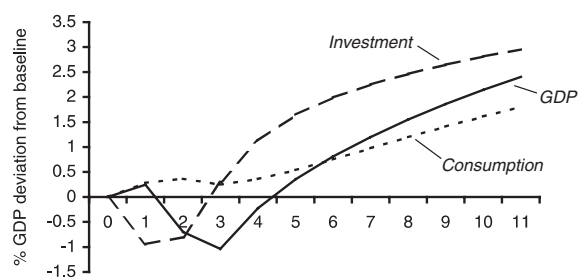

Figure 6b. Change in Japanese interest rates resulting from a phased fiscal consolidation of 5 percent of GDP in Japan
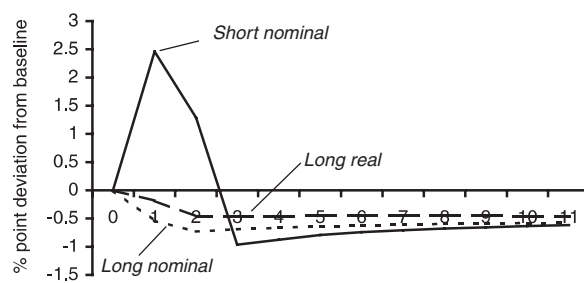

Figure 6c. Change in Japanese Tobin's *q* by sector resulting from a phased fiscal consolidation of 5 percent of GDP in Japan
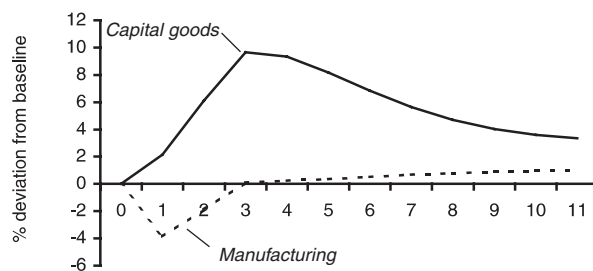
Figure 6d. Change in Japanese inflation resulting from a phased fiscal consolidation of 5 percent of GDP in Japan
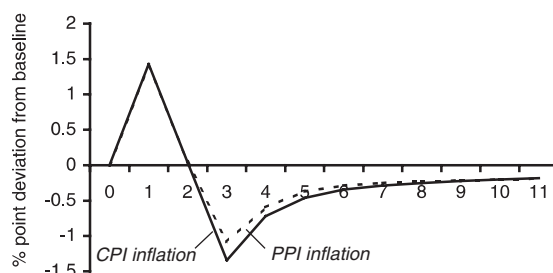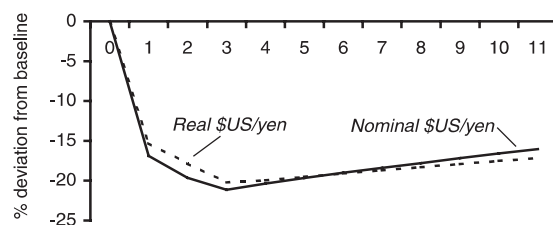

Figure 6e. Change in exchange rates resulting from a phased fiscal consolidation of 5 percent of GDP in Japan (a downward trend indicates an appreciation of the U.S. dollar)

future trade accounts (figure 6h). The improvement in the Japanese trade balance reflects the lower net capital inflow that would otherwise have been required to finance future fiscal deficits.

As households anticipate the lower future tax obligations they will face as a result of lower fiscal deficits, consumption rises (figure 6a). The increases in consumption and net exports (figure 6h) more than offset the decline in government expenditure. Equity markets fall in the first year, reflecting the initial year of economic weakness caused by the fiscal adjustment, but equity prices quickly rebound thereafter. It takes longer for private investment to rise, but it does so from the third year (figure 6a). The key point for economic growth in the first year is that the impact of the financing gains expected in future years (and reflected in current asset markets) has a larger impact on first-year GDP than the cut in government spending, which has a small effect in the first year but the effect becomes greater over time. Given the policy reaction function in which the central bank targets the stock of money, interest rates spike upward in response to the large depreciation of the yen. If the BOJ had prevented interest rates from rising (e.g., if it injected money into the economy, similar to the scenario of figures 2a to 2h), the initial output response would be even

Figure 6f. Change in regional real GDP resulting from a phased fiscal consolidation of 5 percent of GDP in Japan
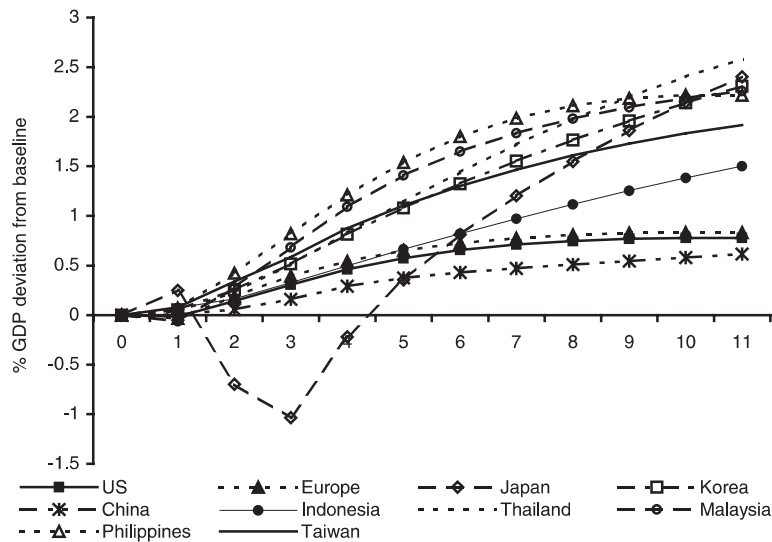
more positive. In the second and third years, however, the positive impact from the financing gains is more than offset by the impact of the actual decline in government expenditure, pushing real GDP below the baseline. It is only from the fifth year that real GDP again moves above the baseline as the positive impacts of the decline in real interest rates and the decline in the real exchange rate on consumption, investment, and net exports are fully felt. The growth rate of GDP begins to rise from year 3.

The simulation shows the potential benefits of announcing a fully credible fiscal consolidation strategy compared to the effects of an announcement of the "inverse" policy that is not believed (viz., the temporary fiscal expansion considered in the previous section). In the case of a credible fiscal consolidation, there are short-run costs to output as government demand is withdrawn from the economy, but these costs are partly mitigated by the positive expected effects on consumption and investment brought about by the rise in equity prices, the decline in long-term interest rates, and the lower future tax liabilities of households. None of these offsetting factors is apparent in the case of the temporary increase in government spending.

The impacts of the phased-in consolidation on the other Asian economies are similar (but opposite in sign) to the results discussed earlier for a fiscal expansion in Japan.

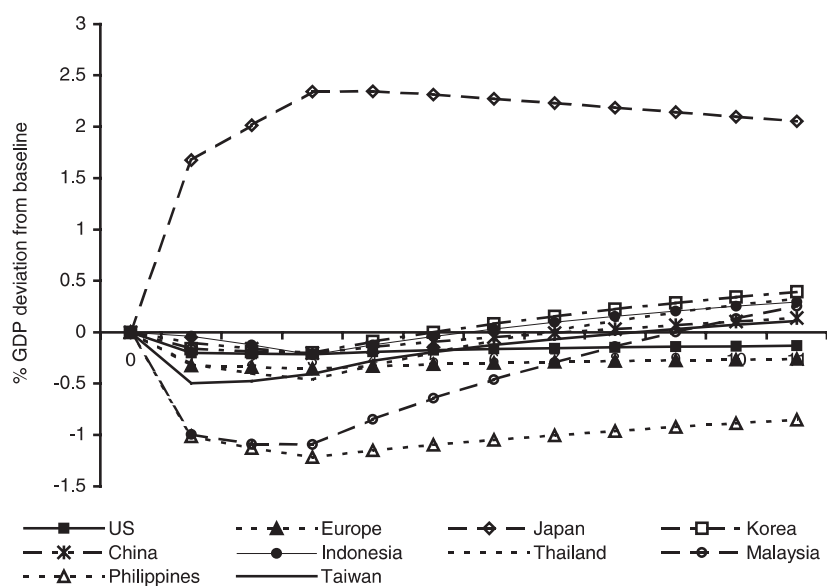**Figure 6g. Change in exports resulting from a phased fiscal consolidation of 5 percent of GDP in Japan**
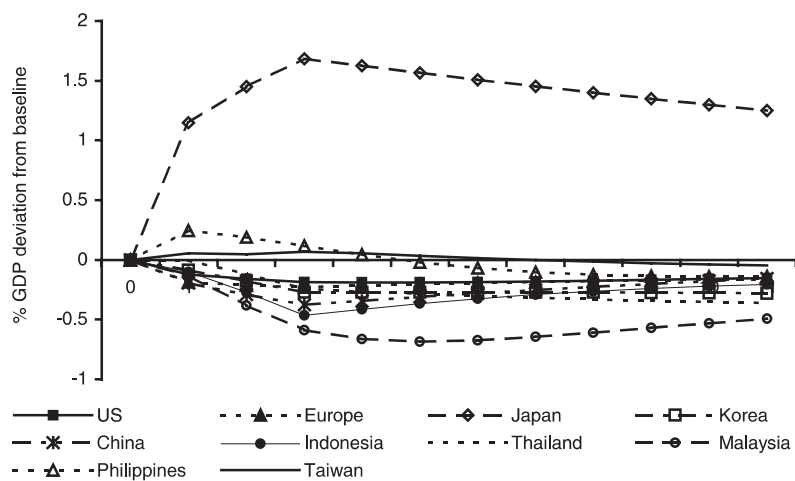

Figure 6h. Change in trade balances resulting from a phased fiscal consolidation of 5 percent of GDP in Japan
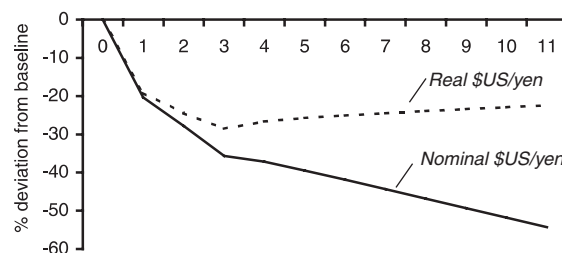
In the first year, the impact on real GDP (figure 6f) again depends on the relative importance of trade and financial links between each economy and Japan. Those countries with important trade links (such as Malaysia) suffer a modest initial decline in real GDP as the depreciation of the yen offsets the rise in demand in Japan, but countries with high debt levels (such as Indonesia) actually see an increase in real GDP because of the lower real interest rates. In the second year, all the Asian economies are gaining more from lower capital costs than they are losing from a temporary slowdown in Japan and from the weaker yen.

The freeing up of future capital that would otherwise have financed Japanese fiscal deficits causes trade deficits in most of the Asian economies because of increased capital flows into these economies. The supply effects of rising investment through lower world interest rates benefit these economies in the medium term. The temporary demand effects through exports to Japan are far less important.

4.3 Change in policy mix
The consequences of changing the overall policy mix in Japan toward fiscal tightening and monetary loosening are examined in this section. I construct a scenario in which the announced fiscal consolidation is combined with the credible inflation target. This is not simply a linear combination of the fiscal and inflation target simulations presented above, because the inflation rate is affected by the fiscal policy change; thus monetary policy settings are adjusted to incorporate this effect.

A subset of results is shown in figures 7a–7c for the effects on GDP, consumption, and investment in Japan; exchange rates; and regional GDP. In many respects the key insights have been already discussed in the results above. Japanese GDP falls below the baseline by less than 0.5 percent of GDP in the first year of the new policy mix, before rising above the baseline from year 3 (figure 7a). The move to a relaxation of monetary policy and tightening of fiscal policy (primarily over future years) stimulates the Japanese economy through a large depreciation in the real and nominal exchange rates. Figure 7b shows that the yen depreciates by 20 percent in the first year of the policy switch and by the third year is 30 percent below the baseline. The gradual implementation of the inflation target and phasing in of the fiscal adjustment lead to a persistent exchange rate depreciation. The depreciation in both real and nominal terms is critical to stimulating the Japanese economy initially through higher net exports. Private consumption rises gradually as consumers factor in lower future taxes, and after the initial years the stronger economy causes higher private investment. The critical impact in the short term is the exchange rate adjustment.

Figure 7a. Real effects on Japan of a change in the macroeconomic policy mix in Japan
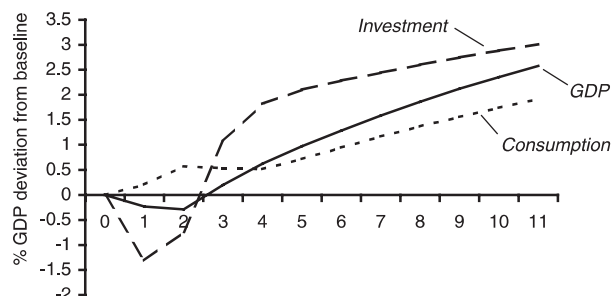
Figure 7b. Change in exchange rates resulting from a change in the macroeconomic policy mix in Japan (a downward trend indicates an appreciation of the U.S. dollar)

Despite the large yen depreciation, the impact on the rest of the Asian region (figure 7c) is stimulative after the first year. The positive impact on the rest of Asia is dominated by the freeing up of capital that otherwise would have financed wasteful government deficits in Japan. This capital lowers long-term real interest rates and stimulates investment and consumption throughout Asia. Although the yen weakens relative to all countries, the real adjustment in Japan resulting from the fiscal adjustment over time and the freeing up of capital raises growth in the rest of Asia for a substantial period.

5. Conclusions and policy implications

The results presented in this paper highlight a number of important issues pertaining to the impacts of macroeconomic policy in Japan. First, the proposals for macroeconomic policy outlined by Fukao, Hoshi, and Ito (2001) and others for a monetary stimulus in Japan are strongly supported by the empirical model presented. The key

Figure 7c. Change in regional real GDP resulting from a change in the macroeconomic policy mix in Japan
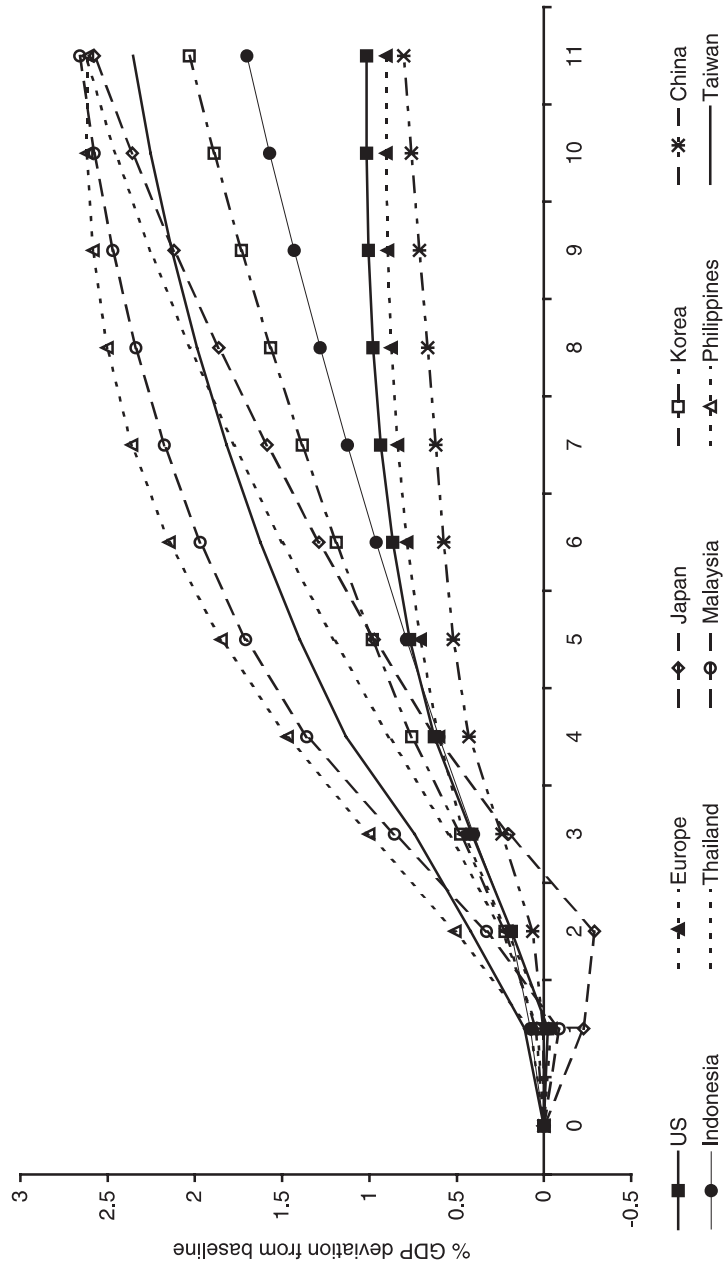
to a short-term macroeconomic stimulus is a substantial depreciation of the exchange rate. A common argument is that such a change in monetary policy will not work because of special factors such as the liquidity trap or the financial sector loan problems in Japan; however, the results of this simulation suggest that it will be effective. If a monetary expansion does not work, then nothing is lost from trying. However, even if a monetary adjustment does stimulate the economy, the gains are expected to be only short run, and more substantial policy adjustments will be required to sustain the real impacts.

Second, as Japan moves toward fiscal consolidation over the medium term, the results provide some grounds for optimism that the negative economic impact will be fairly limited if the announcement is credible—perhaps in the form of an announced and detailed medium-term strategy. The negative short-run impact could be offset by a more expansionary monetary policy through the central bank's purchase of government debt, or even better, the announcement of a credible inflation target. This paper shows that, as argued in detail in McKibbin and Callen (2001), the existence of financial as well as trade linkages means that the negative effects of the demand contraction in Japan will be transmitted less negatively to the region, making any fiscal consolidation in Japan less problematic for the other countries in Asia, unless the capital market linkages are constrained because of other policy objectives.

The model suggests that a quantitative easing of monetary policy by the BOJ through the outright purchase of government bonds would stimulate the economy in the short run and from a position of insufficient demand would help close the output gap. It is clear that a serious change in the policy mix in Japan would be highly desirable, namely, the implementation of a credible phased fiscal consolidation and an inflation target of 2–3 percent. Despite this relatively optimistic assessment of the impacts of macroeconomic policy in Japan, however, other problems need to be addressed, such as bank loan problems and structural reforms to the Japanese economy that are needed to raise productivity growth back toward pre-1990 levels. Furthermore, the likely future impacts of the aging of the Japanese population on potential growth and fiscal balances[5] require that Japanese policymakers act sooner rather than later to address the serious economic problems now facing the Japanese economy.

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5 See McKibbin and Nguyen (2001) for some results using a framework similar to the model used in this paper.

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