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JAPAN

Selected Issues

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Approved by the Asia and Pacific Department

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A. Introduction[2]

1.   Summers (1991) predicted that the issue of the zero-interest-rate floor would become of central importance to monetary policy in an era of low inflation because low equilibrium rates of inflation would imply low equilibrium levels for nominal interest rates. Specifically, Summers was concerned that choosing an inflation target that was too low might significantly reduce the monetary authority's scope to reduce real interest rates when its output and inflation stabilization objectives were threatened by adverse shocks to the economy.

2.   Not surprisingly, given the events in Japan in the 1990s, considerable research effort has been devoted to the implications of the zero-interest-rate floor. This work has followed two different tracks. The first track has investigated how the design of the monetary policy framework (as summarized by policy rules and the choice of the target rate of inflation) can affect the probability that the zero floor on nominal interest rates will become a binding constraint on policy.[3] The second track has examined what other policy channels, besides the short-term nominal interest rate, are available to stimulate the economy once the zero constraint becomes binding.[4] The work presented in this paper follows along both of these two tracks. One major difference, however, is that rather than using a closed-economy model to investigate this issue, we use the Japan block of MULTIMOD, the IMF's multicountry macroeconomic model.[5]

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[1] Prepared by Benjamin Hunt (ext. 36361) and Douglas Laxton (ext. 35353) (Research Department).

[2] This paper uses the Japan block of the IMF's macroeconomic model MULTIMOD to examine the implications of the zero bound on nominal interest rates for the design of monetary policy in Japan. Similar to findings in other studies, targeting rates of inflation lower than 2.5 percent increases the likelihood of the zero bound on nominal interest rates becoming binding. Systematic monetary policy strategies that respond strongly to stabilize output and inflation, or incorporate some explicit price-level component can help to mitigate the implications of the zero bound on nominal interest rates.

[3] See Lebow (1993), Laxton and Prasad (1997, 2000), Fuhrer and Madigan (1997), Meredith (1999), Orphanides and Wieland (1998, 1999) and Reifschneider and Williams (1999).

[4] See Krugman (1998a,b), Buiter and Panigirtzoglou (1999), Clouse and others (2000) and Svensson (2000).

[5] Most of the research in this area has either relied upon simple closed-economy models or models that have been approximately closed.

3.   Following along the first research track like that in Orphanides and Wieland (1998, 1999) and Reifschneider and Williams (1999) we use the Japan block of MULTIMOD to investigate the implications of the zero bound on nominal interest rates for the design of systematic monetary policy in Japan. We first consider how the choice of the target rate of inflation influences the likelihood of the zero bound becoming binding and the magnitude of the resulting deterioration in macroeconomic performance that results. For this initial step we use a base-case inflation-targeting policy rule that is similar to the Taylor rule.[6] We then consider how the base-case policy rule can be modified to mitigate the implications of the zero bound on nominal interest rates. The modifications include the strength of the policy response to deviations of forecasts of inflation from target and output from potential output as well as adding a price-level component to the rule. Incorporating a price-level component into the policy rule is similar to the approaches suggested in Reifschneider and Williams (1999) for compensating for the time that interest rates are constrained at the zero bound.

4.   Following along the second research track, which focuses on one-off fiscal and monetary policy interventions, we consider interventions designed to help stimulate the economy after persistent negative shocks have pushed interest rates down to the zero floor. We consider an increase in government spending because expansionary fiscal policy is often argued to be a potentially effective means of stimulating the economy once monetary policy has become ineffective as a result of the zero bound. The first monetary policy intervention that we consider is a credible commitment on the part of the monetary authority to restore any decline in the price level that has occurred because the short-term nominal interest rate has been constrained by the zero interest rate floor. This monetary policy intervention can be thought of as a commitment to future inflation. This solution is suggested in Krugman (1998a,b) and is examined in Reifschneider and Williams (1999). The second monetary policy intervention involves a sharp depreciation in the nominal exchange rate coupled with a credible commitment to achieve a specified price-level target over the medium term. This monetary policy approach to the problem of the zero bound is proposed in Svensson (2000). Finally, we consider a permanent increase in the target rate of inflation.

5.   Consistent with the findings in other studies, the simulation analysis presented in the paper suggests that target rates of inflation below 2 percent significantly increase the probability that the zero constraint will become binding and that macroeconomic performance will suffer. For a given target rate of inflation, this probability increases further if the monetary authority's estimates of potential output embody persistent errors that are

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[6] For this initial step we use a more forward-looking rule than the original Taylor (1993) rule. Under this policy rule a forward-looking measure of the real short-term interest rate is a function of a measure of the equilibrium real interest rate, the output gap and the gap between core inflation and the assumed target. The original Taylor (1993) rule is significantly more backward-looking than our initial rule because it does not include any weights on the forecast values for inflation and interest rates. Because of the structure of MULTIMOD (the existence of nonlinearities and multiple sources of shocks) the Taylor rule is an extremely inefficient rule for generating low variability in both inflation and output.

correlated with the business cycle.[7] There are modifications to the systematic component of monetary policy that help to mitigate the implications of the zero bound. Responding more aggressively to estimates of the output gap and forecasts of inflation, and incorporating an explicit price-level dimension to a base-case inflation-forecast-targeting rule all help to mitigate the implications of the zero constraint. Of the modifications to the initial rule that have been considered, we find that the asymmetric rule whereby the policymaker commits to restoring declines in the price level is the most effective. However, the results clearly suggest that the most important component in the monetary policy framework for combating the deleterious implications of the zero bound is a sufficiently high target rate of inflation. This simulation analysis, the implications of potential output uncertainty and the possible biases in price indices suggest that for Japan an appropriate magnitude for the target rate of inflation could be as high as 2.5 percent.

6.   The one-off fiscal and monetary policy interventions that we consider are effective in stimulating the economy once the zero constraint has become binding. These interventions reduce the length of time that the constraint binds and reduce the output loss that is incurred. However, there are important differences that arise in the evolution of the government's debt-to-GDP ratio that may make monetary-policy-based interventions more attractive. This result arises because a monetary policy response works through inflation expectations, thereby stimulating private demand by reducing expected real interest rates. Consequently, not only is no additional government expenditure required, but also revenue increases because of rising private demand and service costs on the existing stock of government debt fall because of the reduction in real interest rates.

7.   The remainder of the paper is structured as follows. In section B, a brief overview of the structure of MULTIMOD is presented with particular focus on the inflation process and the transmission mechanism for monetary policy. Some simple stylized simulations are presented in section C to help develop some of the intuition for interpreting the results obtained from stochastic simulations. This section also presents the one-off policy interventions that have been designed to help stimulate the economy once the constraint has become binding. In section D, the results from the stochastic simulations are presented that illustrate the impact of different target rates of inflation and the design of the policy rule on the probability of the zero interest rate constraint becoming binding and the associated impact on macroeconomic performance. Section E provides some concluding remarks.

B. MULTIMOD

8.   MULTIMOD is a multi-regional macroeconomic model developed by the IMF staff for the primary purpose of analyzing alternative scenarios for the World Economic Outlook

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[7] There is a growing body of research that suggests errors about the level of potential output exhibiting these properties can arise from a wide variety of the estimation techniques used to identify unobservable supply-side concepts. See Drew and Hunt (2000), Gaiduch and Hunt (2000), Isard, Laxton and Eliasson (1998) and Orphanides and van Norden (1999).

(WEO). As such, it is based on annual data and takes the WEO forecast as an "exogenous" baseline.[8] Its construction has gone though several stages. The simulations presented in this paper are based on the current Mark IV version and focus on the Japan block.[9] Modern structural models like MULTIMOD have been designed to avoid first-order Lucas-critique problems and thereby provide insights on the key role of the monetary policy response in influencing the macroeconomic effects of various exogenous shocks.[10]

9.   MULTIMOD analysis of the implications of the non-negativity constraint on nominal interest rates hinges critically on the nature of wage/price behavior. MULTIMOD, like most macroeconomic policy models, relies on a reduced-form Phillips curve to characterize the behavior of inflation in the industrial countries.[11] The modeling of inflation and inflation expectations distinguishes between CPI inflation and core inflation. Core inflation is defined as the rate of change in the GDP deflator excluding oil and is taken to be the measure on which monetary policy decisions are based. Although MULTIMOD does not include explicit wage rates, the dynamics of inflation and inflation expectations are characterized in a manner that implicitly recognizes important features of wage-setting behavior (in particular, contracting lags and wage-push elements), and these equations are sometimes referred to as the wage/price nexus.

10.   The key equations in MULTIMOD's reduced-form wage/price structure are:

$$\pi_t^{CPI} = \delta_1 \pi_t^M + \delta_2 \pi_t^C + \delta_3 \pi_t^{POIL} + [1 - \delta_1 - \delta_2 - \delta_3] \pi_{t-1}^{CPI} ; \tag{1}$$

$$\pi_t^C = \psi \pi_{t+1}^e + [1 - \psi] \pi_{t-1}^C + \gamma [(u_t^* - u_t)/(u_t - \phi_t)] + \alpha [\pi_{t-1}^{CPI} - \pi_{t-1}^C]; \tag{2}$$

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[8] For the simulations presented in the paper, the equilibrium rates of inflation have been altered from that in the WEO baseline.

[9] Laxton and others (1998) describe the Mark III version of MULTIMOD; see also Isard (2000). The Mark IV version is described in Hunt and others (2001). Major changes from the Mark III version include: the incorporation of a Euro Area block; new base-case specifications of the behavior of monetary and fiscal policy; and a re-coding of the model that more easily permits solutions to the model in which countries choose different steady-state rates of inflation.

[10] MULTIMOD is by no means immune from Lucas Critique problems. The Phillips curve, for example, is a reduced-form equation, and there is potentially always the possibility that a major change in the pattern of monetary policy behavior could lead to significant changes in the nature of wage and price contracts and the dynamics of inflation expectations.

[11] Unlike many macroeconometric models, however, MULTIMOD's reduced-form Phillips curves are nonlinear with respect to labor market disequilibria. This feature allows for the possibility that large policy errors can have first-order welfare implications.

$$\pi_{t+1}^e = \Omega[\lambda \pi_{t+1}^{CPI} + (1-\lambda)\pi_{t+1}^C] + [1-\Omega][\lambda \pi_{t-1}^{CPI} + (1-\lambda)\pi_{t-1}^C]; \quad (3)$$

where π^{CPI} is CPI inflation; π^M is the rate of inflation of the domestic-currency price of manufactured imports; π^{POIL} is the rate of inflation of the domestic-currency price of oil; π^C is core inflation (non-oil GDP deflator); π^e is a measure of expected inflation; u^* is the non-accelerating-inflation rate of unemployment (the NAIRU); u is the unemployment rate; ϕ is the minimum absolute lower bound for the unemployment rate; and ψ, α, γ, Ω, λ, δ_1, δ_2, δ_3 are parameters.

11.   Table I.1 reports some of the parameter values from the model's wage/price block as well as some associated model properties that are helpful for understanding the inflation process in the model.[12] In particular, it reports estimates of the parameter values λ, α, ψ, Ω and γ for each country block, as well as average values for these parameters across all of the industrial country blocks. The table also presents the unemployment sacrifice and benefit ratios that result from a from an artificial experiment where the rate of inflation is permanently increased by 1 percentage point (benefit ratio) and permanently decreased by 1 percentage point (sacrifice ratio). The sacrifice ratio of 0.8 for Japan implies that to reduce inflation permanently by one percentage point, the cumulative increase in annual unemployment above the NAIRU must be 0.8 percentage points.[13] Having the lowest sacrifice and benefit ratios implies that inflation is more responsive to changes in unemployment in Japan than other industrialized countries. This arises primarily from the interaction of the slope parameter (γ) and the weight on the model-consistent lead of core inflation ($\Omega \cdot \psi \cdot (1-\lambda)$) in the Phillips curve.[14] All else equal, the larger the slope coefficient

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[12] Equations 2 and 3 have been estimated for each of MULTIMOD's major industrial countries/blocks as part of an unobserved components model that also includes equations for the deterministic NAIRU, the NAIRU, and an Okun's Law relationship between output and the unemployment rate. The estimation is done using the Kalman filter and a constrained-maximum-likelihood procedure. Equation (1) was estimated with OLS. More details regarding the model and its estimation can be found in Hunt and others (2001).

[13] Comparing the sacrifice and benefit ratios in each country illustrates the direction of the nonlinearity in MULTIMOD's inflation process; the cost incurred to reduce inflation is larger than the benefit that could be derived from increasing it. When the change in inflation is restricted to be only one percentage point, the difference between the sacrifice ratio and the benefit ratio is small. The simulation results presented in Hunt and others (2001) illustrate how the difference between the benefit and sacrifice ratios increases with larger changes in inflation target.

[14] The degree of persistence in CPI inflation also contributes to the sacrifice and benefit ratios. For example, the difference between the sacrifice ratios for Canada and the United States is a result of a larger weight on lagged CPI inflation in the Canadian price block (0.13 for Canada versus 0.03 for the United States).

	λ	α	Ω	ψ	$\Omega \cdot \psi \cdot$ $(1-\lambda)$	Γ	Sacrifice Ratio[1]	Benefit Ratio[2]
Average	0.48	0.26	0.57	0.54	0.16	2.15	NA	NA
United States	0.48	0.35	0.53	0.51	0.14	2.22	1.25	-1.12
Euro Area	0.60	0.12	0.58	0.51	0.12	2.15	1.86	-1.61
Japan	**0.31**	**0.09**	**0.60**	**0.59**	**0.25**	**2.29**	**0.80**	**-0.74**
United Kingdom	0.34	0.42	0.60	0.58	0.23	2.38	1.02	-0.93
Canada	0.41	0.16	0.50	0.51	0.15	2.38	1.31	-1.15
Other Industrial	0.74	0.42	0.60	0.55	0.09	1.45	4.10	-3.22

Table I.1. MULTIMOD Key Inflation Parameters

[1] The sacrifice ratio is the cumulative *increase* in the annual unemployment rate that is required to *reduce* inflation permanently by 1 percentage point.
[2] The benefit ratio is the cumulative *decrease* in the annual unemployment rate that is required to *increase* inflation permanently by 1 percentage point.

(or the larger the weight on the lead of core inflation) the more responsive inflation will be to demand conditions. It is also worth noting that the magnitudes of α and λ imply that in Japan there is the least scope for movements in the exchange rate and import prices to affect core inflation.[15]

12. The estimated sensitivity of inflation to demand conditions in Japan will play a key role in determining the implications of the zero bound on nominal interest. On the one hand, because of the high degree of responsiveness of inflation to demand conditions, negative shocks to aggregate demand can more easily push inflation below zero. In the face of the zero bound on nominal interest rates, this can quickly limit the monetary authority's ability to lower real interest rates, potentially leading to a deflationary spiral. On the other hand, because forward-looking expectations play a large role in determining the responsiveness of inflation to aggregate demand conditions, a well-designed monetary policy framework may also be able to exploit a potentially powerful transmission mechanism to overcome any deleterious implications of the zero bound.

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[15] There are several possible factors that may be contributing to this property. First, imports represent a relatively small portion of the consumption bundle. Second, there are a large (albeit declining) number of regulated prices. Finally, the wage setting process in Japan is possibly more cooperative than in other industrial countries. Company profitability tends to be the most important factor underlying the variability in wages.

13.   MULTIMOD's base-case monetary policy reaction function is a forward-looking inflation-forecast-based (IFB) rule. Specifically, the nominal short-term interest rate is adjusted—relative to an equilibrium nominal interest rate—in proportion to the deviation of current output from potential output and the deviation of the one-year-ahead *forecast* of core inflation from target.[16] The choice of IFB rules rather than conventional Taylor rules—which look similar to IFB rules in most respects, but focuses on the deviation from target of historical inflation rather than forecast inflation—reflects a view that central banks are indeed forward looking in their policy deliberations. For the simulations presented in this paper it is the deviation of the forecast of current inflation from target that enters the policy rule. Because of the pervasive use of current inflation in the policy rules employed in other research examining this issue, this modification to MULTIMOD's base-case policy rule facilitates the comparison of the results presented in this paper with those in the literature.

14.   In MULTIMOD, monetary policy stabilizes inflation through two main channels, direct price effects that operate through the exchange rate and import prices, and indirect effects that operate via aggregate demand. When the monetary authority adjusts the short-term nominal interest rate the real short-term interest rate moves because inflation is sticky. This movement in the real short-term interest rate affects the real exchange rate via uncovered interest parity. The expected movement in the real exchange rate is reflected in the gap between the real domestic and foreign short-term interest rates plus some degree of estimated persistence. Movements in the real exchange rate feed into domestic CPI inflation directly through import prices. CPI inflation, in turn, can feed into core inflation through expectations (λ) and the real-wage catch-up term (α). The movement in the real exchange rate also affects core inflation indirectly via aggregate demand because of its impact on the relative price of domestically- versus foreign-produced goods. The real interest rate affects core inflation indirectly by its influence on spending on private investment and consumption goods. Movements in the real interest rate alter consumers' valuation of their human wealth and influence the market value of capital relative to its replacement cost.

15.   An important point to note is that because of the forward-looking structure of all the channels through which real interest rates affect inflation, both current *and* future expected short-term real interest rates have an important role to play. This is an important feature when examining the implications of the zero floor on nominal interest rates. Once current nominal interest rates hit the zero bound, it is through future expected real interest rates that monetary policy must operate. The central role that this channel plays in MULTIMOD makes it a particularly useful tool for examining this issue.

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[16] The base-case reaction function used here sets the short-term nominal interest rate equal to an "equilibrium" nominal interest rate plus 0.5 times the output gap plus 1.0 times the deviation from target of the current year's core inflation. In the simulations that incorporate uncertainty about potential output, this is in fact a forecast of core inflation that will generally turn out *ex-post* to be incorrect. The equilibrium nominal interest rate is defined as an equilibrium real interest rate plus the expected rate of inflation (as given by equation 3 above).

16.   The value chosen for the equilibrium real interest rate will have an important impact on the implications of the zero bound on nominal interest rates. In the standard version of MULTIMOD the world equilibrium real interest rate is roughly 3 percent. However, an examination of the average real interest rate in Japan between 1970 and 2000 suggests a level closer to 2 percent would be more appropriate. For the simulations presented here the equilibrium real interest rate in Japan has been set equal to 2.2 percent and the equilibrium real growth rate has been set equal to 2 percent. This level for the equilibrium real interest rate is consistent with that used for the United States in Fuhrer and Madigan (1997) and Reifschneider and Williams (1999), although it is above the 1 percent level used in Orphanides and Wieland (1998).

C. Some Illustrative Simulation Experiments

17.   This section presents some simple stylized simulations that serve to develop some intuition that is helpful for understanding the results from the stochastic simulations presented in the next section. The simulation consists of a persistent shock to domestic aggregate demand in Japan. We first examine how starting from different baseline solutions that assume different target rates of inflation influences the impact of the zero bound.[17] Using this base-case stylized shock we also illustrate how errors about the level of potential output might influence the implications of the constraint. Under an inflation target of zero percent, we examine the policy options for stimulating the economy once nominal interest rates have hit the lower bound. We also use this base-case shock to illustrate how a more aggressive policy rule (that responds in a more aggressive way to measures of the output gap and the forecast of inflation) can alter the impact of the lower bound on nominal interest rates.

Calibrating the Base-Case Stylized Shock

18.   The shock that is used in this section of the paper was calibrated to increase in magnitude over the first three years and then to decay over the subsequent five years of the simulation horizon. It consists of negative exogenous impulses to the error terms in the investment and consumption functions.[18] Some details from the simulated response to the shock under an inflation target of 0 percent and the base-case policy rule are presented in Table I.2. The shock was calibrated with an eye to the experience in Japan over the late 1990s presented in Table I.3.[19] The declines in investment and consumption relative to

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[17] In each baseline solution all variables are assumed to be equal to their equilibrium values.

[18] We do not attempt to identify the structural factors underlying this shock. Several interesting hypotheses that have attempted to account for the weakness in aggregate demand in Japan can be found in Ando (2000), Morck and Nakamura (1999) and Ramaswamy and Rendu (2000).

[19] This data is from the World Economic Outlook database.

potential output are broadly similar to the historical experience. However, the shock unfolds more slowly and the resulting output gap troughs at about 65 percent of the magnitude that is suggested by the historical data. In the simulation experiments, the policymaker is aware of the current period disturbances hitting the economy, but the policymaker and private agents assume that there will be no additional disturbances in the future. In this sense, the policymaker is surprised by the shocks that arrive for each of the first 8 years of the simulation horizon.[20]

Table I.2: Simple Stylized Shock (With an Inflation Target of Zero)				
	0	1	2	3
Consumption in percent of potential output	70.1	69.5	68.7	68.1
Change since year 0	n.a.	-0.6	-1.4	-2.0
Investment in percent of potential output	15.1	14.4	13.8	13.1
Change since year 0	n.a.	-0.7	-1.3	-2.0
Output Gap	0.0	-1.0	-1.9	-2.6
Core inflation	0.0	-0.1	-0.4	-0.9

Table I.3: Japan Over the Late 1990s				
	1997	1998	1999	2000
Consumption in percent of potential output	65.2	63.1	62.6	62.7
Change since 1997	n.a.	-2.1	-2.6	-2.5
Investment as a share of potential output	16.5	14.4	13.6	14.3
Change since 1997	n.a.	-2.1	-2.9	-2.2
The output gap	0.0	-3.4	-4.5	-4.0
Core inflation	0.3	0.3	-0.9	-1.1

19.   The shock-minus-control paths of key macro variables that result from the exogenous disturbance to consumption and investment under the base-case policy rule and four values for the target rate of inflation are presented in Figure I.1.[21] The zero bound on nominal

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[20] These simulations are conducted with fiscal tax rates held fixed for the first 11 years. Starting in the 12th year, the tax rate is then allowed to adjust slowly to eventually stabilize the government-debt-to-GDP ratio at the values in the baseline. This process of convergence in the experiments is assumed to occur gradually and in some cases is not completed by the 20th year of the simulation horizon.

[21] To conduct this experiment we have generated four different baseline solutions corresponding to the four different target rates of inflation under consideration, 2 percent, 1 percent, 0.5 percent and 0 percent. The equilibrium nominal interest rate in each of the baselines will be equal to the equilibrium real interest rate (2.2 percent) plus the target rate of inflation.

Figure I.1. The Target Rate of Inflation
Deviations from Control

Output Gap
Percentage Points

Real Bilateral Exchange Rate
Percent

Short-Term Nominal Interest Rate
Percentage Points

Short-Term Real Interest Rate
Percentage Points

Core Inflation
Percentage Points

CPI Inflation
Percentage Points

Core Price Level
Percent

CPI Price Level
Percent

Government Debt-To-GDP Ratio
Percentage Points

Government Expenditure-To-GDP Ratio
Percentage Points

——— Target Inflation of 2 Percent
----- Target Inflation of 0.5 Percent
········ Target Inflation of 1 Percent
~~~~~ Target Inflation of 0 Percent

interest rates becomes binding when the target rate of inflation is 1 percent or less. The constraint binds for 3, 4, and 7 years when the inflation targets are 1, 0.5 and 0 percent. The short-term nominal interest rate troughs at roughly 50 basis points under the 2 percent inflation target. The impact of the constraint on real interest rates is striking. Under the 2 percent inflation target, the real short-term rate falls by 270 basis points over the first three years. The real rate then remains at that level in the fourth year, after which time it slowly returns towards control. When the zero bound binds on the nominal interest rate, the real interest rate troughs at 250 basis points below control with the 1 percent inflation target, 200 basis points with the 0.5 percent inflation target, and 175 basis points with the 0 percent inflation target.

20.   The higher real interest rates that result when the constraint on nominal interest rates binds mean that real output recovers more slowly from the shock, leading to larger and longer lived excess supply gaps. After 20 years the cumulative loss in output is roughly 2.1 percent, 2.2 percent, 2.5 percent and 3.4 percent under inflation targets from 2 to 0 percent. The additional excess supply in the economy results in larger declines in inflation and the price level. Under inflation targets of 1 and 2 percent, the decline in the price level relative to its control path is about 5 percent. However, the price level falls by 7 percent under the 0.5 percent inflation target and by 13 percent when the target rate of inflation is 0 percent. These results illustrate, as has other research, that the negative impact of the zero bound increases greatly as the inflation target is lowered to 0 percent.

21.   In these simulations, fiscal tax rates are held fixed at their initial equilibrium rates for the first 11 years. Starting in the 12th year, the aggregate tax rate is allowed to adjust slowly over the next 20 years to eventually restore the government's debt-to-GDP ratio to the values in the baseline.[22] As a result of tax rates being held fixed for the first 11 years, the effects on the government debt-to-GDP ratio increases as the target rate of inflation declines. With lower target rates of inflation, the deterioration in the fiscal position is greater because monetary policy's ability to reduce real interest rates declines. Indeed, in cases where the zero interest rate constraint is more binding, the government debt-to-GDP ratio increases significantly because economic activity and the tax base are lower and the higher real interest rates directly increase the servicing costs on the outstanding stock of government debt.

Uncertainty about Potential Output

22.   An important source of uncertainty facing monetary authorities is the underlying level of an economy's productive capacity. The significant lags between policy actions and their impact on prices means that, to achieve their inflation objectives, policymakers must base their actions on indicators of future inflation pressure. One indicator of future inflationary pressure that is often relied on is the output gap, defined here as the difference between current output and productive capacity. However, an economy's productive capacity is

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[22] In some cases this convergence process in the government-debt-to-GDP ratio is assumed to take longer than 20 years.

unobservable and estimates of its level must be extracted from observable data. A common feature of all methods designed to measure potential output is that there is considerable uncertainty in the derived estimates and this uncertainty is generally the greatest at the end of the sample where the estimates are the most crucial for the policymaker.[23] This uncertainty often leads to errors about the level of potential output that are serially correlated and, at times, correlated with the business cycle.[24] To illustrate some possible implications of relying on incorrect measures of potential output, we use the simple stylized simulation from the previous section to show how such errors about the level of potential output affect the impact of the zero bound on nominal interest rates.

23.   The simulations presented here include the identical exogenous disturbances to investment and consumption as used in the previous simulations. However, now the policymaker also makes an error about the true level of potential output. The errors are assumed to be proportional to the decline in aggregate demand. Essentially, as output is falling, the policymaker cannot fully determine how much of the change is due to aggregate demand and how much is due to aggregate supply. The policymaker is assumed to attribute too much of the decline in output to a change in potential output. This error not only affects the output gap that appears in the policy rule, but it also affects the policymaker's forecast of current inflation. In the next period, the policymaker realizes that an inflation-forecast error was made in the previous period, but it cannot determine its source. Consequently, her estimate of potential output is not revised in light of the error.[25] Once the aggregate demand shock has fully dissipated, the policymaker's estimate of potential output converges to the true level. Private agents on the other hand perceive the true level of potential output and are aware that the policymaker is making an error. The inflation process is driven by the true output gap and future policy settings that, for a period of time, are based on errors about the true level of potential output.

24.   The results from this simulation are presented in Figure I.2. The actual output gap and the policymaker's estimate of the output gap are contained in Table I.4. If the time-series properties of the policy errors about potential output match the errors considered here, potential output uncertainty could exacerbate the problem posed by the zero bound on nominal interest rates. The constraint binds at a higher level of target inflation and binds for longer at a given target rate of inflation. The constraint on nominal interest rates becomes

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[23] For a discussion of the uncertainty associated with output gap estimates see Laxton and Tetlow (1992), Kuttner (1994), Staiger, Stock and Watson (1997) and Orphanides (1997).

[24] For a discussion of the properties of real-time errors associated with estimates of potential output see Drew and Hunt (2000), Gaiduch and Hunt (2000), Isard, Laxton and Eliasson (1998) and Orphanides and van Norden (1999).

[25] This is a strong assumption and most multivariate estimation techniques for estimating potential output would lead to a partial revision in the light of forecast errors.

Figure I.2. Uncertainty About Potential Output
Deviations from Control

Output Gap
Percentage Points

Policymaker's Estimated Output Gap
Percentage Points

Short-Term Nominal Interest Rate
Percentage Points

Short-Term Real Interest Rate
Percentage Points

Core Inflation
Percentage Points

CPI Inflation
Percentage Points

Core Price Level
Percent

CPI Price Level
Percent

Government Debt-To-GDP Ratio
Percentage Points

Government Expenditure-To-GDP Ratio
Percentage Points

——— Target Inflation of 1.5 Percent
- - - - Target Inflation of 0.5 Percent
------- Target Inflation of 1 Percent
———— Target Inflation of 0.375 Percent

Table I.4: Actual and Perceived Output Gaps (π^* = 0.0)			
Year	Actual Output Gap	Estimated Gap	Error
0	0.00	0.00	0.00
1	-1.04	-0.84	0.20
2	-1.97	-1.61	0.26
3	-2.73	-2.22	0.51
4	-2.05	-1.52	0.53
5	-0.77	-0.36	0.41
6	-0.25	0.08	0.33
7	0.28	0.52	0.24
8	0.45	0.61	0.16
9	1.09	1.17	0.08
10	1.45	1.49	0.04

binding when the inflation target is as high as 1.5 percent. The constraint binds for 5 years versus 3 under the 1 percent target and 6 years versus 4 when the inflation target is 0.5 percent. When the inflation target is 0 percent, the economy gets tipped into a deflationary spiral and the algorithm can only find solutions that violate the zero bound on nominal interest rates. The lowest inflation target for which the algorithm can find a solution that does not violate the non-negativity constraint is 0.375 percent. Under this inflation target, the constraint binds for 9 years and the cumulative loss in output essentially doubles relative to the case where the inflation target is 2 percent—the case where constraint does not become binding. It is worth noting that this additional loss in output and the behavior of the real interest rate causes the government debt-to-GDP ratio to increase further.

25.   In these simulations, the impact of the constraint is worse because the errors about potential output lead the policymaker to ease less aggressively as the shock is unfolding. This leads to more deflationary pressure becoming entrenched in inflation expectations. This greater deflationary pressure requires a larger future reduction in the short-term nominal interest rate to be unwound. At each point in time, private agents understand the policymaker's underestimation of the magnitude of the excess supply gap, which further magnifies the extent of deflationary pressure in expectations.

One-Off Policy Interventions

26.   Using the base-case shock under an inflation target of 0 percent we now turn to consider the effectiveness of policy options designed to stimulate the economy given that nominal interest rates are constrained by the zero bound. The policy interventions will occur in the fourth year of the simulation once interest rates have been at the lower bound for a year. Three alternative interventions are considered: an increase in government expenditure; a credible commitment by the monetary authority to unwind the effect on the price level of the deflation; and a sharp depreciation in the currency combined with a credible commitment

to a temporary price-level target. The results from these three interventions are presented in Figure I.3 along with the outcome in the absence of any intervention.

27.   Again, in all cases the interventions occur in the fourth year of the simulation. The fiscal intervention consists of an increase in government expenditure of roughly one percent of GDP for four years. In each of the four years, the fiscal expansion is expected to last for that year alone; however, as new negative surprises to aggregate demand arrive, fiscal policy remains loose. Under the first intervention by monetary policy, the policymaker commits in the fourth year to restore all the declines in the price level that have occurred and will occur in the near future due to the negative aggregate demand shocks and the constraint on nominal interest rates. Private agents believe the policymaker will achieve this objective and the policymaker does. Under this particular shock, the calibration of this term in the policy rule results in the price level being fully restored ten years after the commitment to do so.[26] In the second intervention, the monetary policymaker is assumed to be able to engineer a 15 percent depreciation in the nominal exchange rate (13 percent in the real exchange rate) in the fourth year and commits to achieving a price level target that is 5 percent above where the price level was in the year preceding the commencement of the shock.[27]

28.   The interventions all prove to be successful. The fiscal intervention eliminates the additional loss in output that arises when the inflation target is zero. After 20 years, the cumulative output loss is 2.2 percent, virtually identical to the cumulative loss of 2.1 percent under the 2 percent inflation target. The nominal interest rate becomes positive after four years and the decline in the price level is cut roughly in half. When the policymaker commits to restoring the price level, the cumulative loss in output is reduced marginally from 3.4 to 3 percent. Interest rates remain at zero for 5 years (versus 7 years without the intervention) and the decline in the price level is fully reversed. When the exchange rate is depreciated and the short-term price-level target is achieved, the cumulative loss in output is more than recovered as the loss is reduced to 1.6 percent. Interest rates also remain at zero for 5 rather than 7 years.

29.   Although each of the strategies helps to mitigate the implications on the non-negativity constraint, there is an interesting difference that arises in the level of government

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[26] The time it takes to achieve the price-level objective is a function of the calibration of the response coefficient that appears in the policy rule on the price-level-objective term. Larger response coefficients, that imply nominal interest rates remain low for a longer period, can restore the price level over a shorter time horizon.

[27] The simulations assume that the monetary authority can achieve the depreciation that is desired. Svensson (2000) and McCallum (2001) argue that because the monetary authority can print money it can announce a rate of exchange and simply stand ready to sell the quantity of yen demanded at that price. Svensson argues that the value of the exchange rate would have to immediately converge to that rate for any market exchanges to occur because no one would pay a higher price than necessary for yen.

Figure I.3. One-Off Policy Interventions
Deviations from Control

Output Gap
Percentage Points

Real Bilateral Exchange Rate
Percent

Short-Term Nominal Interest Rate
Percentage Points

Short-Term Real Interest Rate
Percentage Points

Core Inflation
Percentage Points

CPI Inflation
Percentage Points

Core Price Level
Percent

CPI Price Level
Percent

Government Debt-To-GDP Ratio
Percentage Points

Government Expenditure-To-GDP Ratio
Percentage Points

——— No Intervention ------- Fiscal Intervention ––––– Svensson Intervention ········· Restore Price Level

debt during the period over which tax rates are fixed. In the fiscal intervention case, the government debt-to-GDP ratio rises by about 6 percentage points in the tenth year of the simulation—versus a 5-percentage point increase in the absence of an intervention. By contrast, under the monetary policy interventions, the government debt-to-GDP ratio is essentially reduced back to control after ten years without any change in tax rates. The additional inflation results in lower real interest rates that stimulate aggregate demand. Consequently, tax revenues rise and the cost of servicing the existing stock of government debt falls. It is interesting to note that the lower real interest rates and the reduction in the real value of the debt do not arise because the inflation surprises private agents. On the contrary, they occur because the policymaker successfully convinces private agents that it is going to generate some future inflation.

30.   The large difference between the cumulative loss under the Svensson intervention and the other monetary-policy-induced intervention arises because of the level that the policymaker commits to achieving for the price level. If the policymaker commits to achieving a level for the price level that is 5 percent above the level when the shock initially hits and does not engineer a depreciation in the exchange rate, then the loss in output is also reduced to roughly the same level achieved under the Svensson intervention.[28] Because of their effectiveness in these simulations at offsetting the negative macroeconomic implications of the zero bound, an important question becomes whether the policymaker can credibly commit to achieving its price-level objective. MULTIMOD's structure for expected inflation implicitly assumes that a significant proportion of private agents believe the policymaker's announced target for the price level. However, with nominal short-term interest rates constrained at zero at the time of the announcement, private agents may question the policymaker's *ability* to achieve the announced target. Further, the inflation fighting record of the Bank of Japan may also lead private agents to question the policymaker's *commitment* to achieve the announced target once the immediate deflationary danger diminishes.

31.   MULTIMOD's structure does not allow for an explicit examination of the types of non–interest rate policy actions considered in Clouse and others (2000) designed to enhance the credibility of the policymaker's commitment to keep interest rates low in the future. The more confident private agents are that the policymaker will deliver low nominal interest rates in the future, the more credible is the commitment to the future inflation necessary to lower expectations of real interest rates. However, one could interpret the depreciation of the exchange rate in the Svensson intervention as a non-interest rate policy action designed to enhance the credibility of the policymaker's announced price-level objective. In the simulation presented here, the depreciation does not play an important role; however, in practice it could be key to generating the required expected inflation.

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[28] For other industrial countries the difference between these two interventions could be greater because of the larger impact of movements in the prices of imported goods on core inflation.

32.   The one-off monetary policy interventions presented in Figure I.3 consisted of a commitment to temporarily increase inflation above the long-run target of 0. Another monetary policy option would be to announce a permanent increase in the target rate of inflation. Figure I.4 presents the simulation results when the policymaker announces, in the fourth year, that the target rate of inflation will be increased from 0 to 2 percent.[29] As occurs under the temporary increases in target inflation, real interest rates decline significantly relative to the case of no intervention. Lower real interest rates stimulate private demand and the output gap is rapidly closed. Again, the increase in the government debt-to-GDP ratio is quickly reversed and the government debt ratio approaches its target level from below once the aggregate tax rate is allowed to adjust.

Stronger Policy Responses

33.   This section presents the stylized shock under a modified monetary policy reaction function. The response coefficients on the policymaker's estimate of the output gap and forecast of current inflation are doubled (from 0.5 and 1 to 1 and 2 respectively). Increasing the strength of the policy response will have two opposite effects on the frequency with which the constraint becomes binding. In the first instance, simply responding more strongly to inflation and output gaps is going to increase the frequency with which the constraint becomes binding. For a given level of a negative output or inflation gap, the stronger the policy response, the greater is the probability that the unconstrained policy rule will call for a negative nominal interest rate. However, responding more strongly in the first instance to negative output and inflation gaps will decrease the probability of the constraint becoming binding in the future if additional negative shocks arrive. An important point worth noting is that as the target rate of inflation declines, the scope for large rapid reductions in interest rates to offset negative shocks to aggregate demand is limited by the presence of the zero bound. Because of the way this simple shock unfolds, the simulation results will be biased towards allowing the first round effect to dominate.

34.   To see these two opposite effects consider the simulation details provided in Table I.5 when the policymaker correctly perceives the level of potential output. Results are provided for the base-case response coefficients and a policy rule that doubles the magnitudes of these coefficients. When the inflation target is 2, 1 or 0.5 percent, the first effect dominates. The nominal short-term interest rate is constrained at zero in more years under the stronger response coefficients. The indicators of the second round effect are apparent in the smaller negative output gaps and the smaller decline in inflation. They are not in this instance, however, sufficient to offset the initial impact effect of responding more strongly. A comparison of the results under the 0 percent inflation target is more suggestive of the second effect. Interest rates are constrained at the floor for the same number of years under the

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[29] In practice it may be more practical to announce an upward sloping path for the target rate of inflation that converges to the long run value (2 percent in this example). This would be similar in spirit to the disinflation paths announce by several central banks when they initially adopted formal inflation targets.

Figure I.4. Increasing the Target Rate of Inflation
Deviations from Control

Output Gap
Percentage Points

Real Bilateral Exchange Rate
Percent

Short-Term Nominal Interest Rate
Percentage Points

Short-Term Real Interest Rate
Percentage Points

Core Inflation
Percentage Points

CPI Inflation
Percentage Points

Core Price Level
Percent

CPI Price Level
Percent

Government Debt-To-GDP Ratio
Percentage Points

Government Expenditure-To-GDP Ratio
Percentage Points

——— No Intervention   ------- Increasing the Target Rate of Inflation

stronger-response case, inflation doesn't decline as much and the negative output gaps are smaller. The second round effect is more pronounced in Table I.6, which presents similar statistics for the case where the policymaker misperceives the level of potential output. Under the 0.375 percent inflation target, interest rates are constrained at the lower bound for fewer periods when policy responds more strongly to inflation and output gaps.

Table I.5: Simulation Statistics—No Potential Output Uncertainty				
	Base-Case Response Coefficients			
	$\Pi^* = 2.0$	$\Pi^* = 1.0$	$\Pi^* = 0.5$	$\Pi^* = 0.0$
Number of years that the constraint binds	0	3	4	7
Trough in deviation of inflation from target	-1.4	-1.5	-1.7	-2.4
Trough in output gap	-2.4	-2.4	-2.5	-2.6
	Stronger Policy Response Coefficients			
	$\Pi^* = 2.0$	$\Pi^* = 1.0$	$\Pi^* = 0.5$	$\Pi^* = 0.0$
Number of years that the constraint binds	2	4	6	7
Trough in deviation of inflation from target	-1.1	-1.3	-1.4	-2.0
Trough in output gap	-1.9	-2.1	-2.2	-2.5

Table I.6: Simulation Statistics—Potential Output Uncertainty				
	Base-Case Policy Response Coefficients			
	$\Pi^* = 1.5$	$\Pi^* = 1.0$	$\Pi^* = 0.5$	$\Pi^* = 0.375$
Number of years that the constraint binds	2	5	6	9
Trough in deviation of inflation from target	-1.9	-2.1	-2.5	-3.4
Trough in output gap	-2.6	-2.6	-2.7	-2.7
	Stronger Policy Response Coefficients			
	$\Pi^* = 1.5$	$\Pi^* = 1.0$	$\Pi^* = 0.5$	$\Pi^* = 0.375$
Number of years that the constraint binds	4	5	7	8
Trough in deviation of inflation from target	-1.7	-1.0	-2.2	-2.4
Trough in output gap	-2.3	-2.3	-2.4	-2.5

D. Stochastic Simulations

35.   This section presents some statistics calculated from artificial data that is generated by performing stochastic simulations on MULTIMOD. Under stochastic simulations, the model is perturbed each period by unexpected shocks that directly affect the key behavioral equations in the model. In each period, agents are aware of the disturbances that are currently hitting the economy, but they expect that there will be no further disturbances in the future. Stochastic simulations are designed to capture an important dimension of the uncertainty

under which policymakers must take decisions; uncertainty about how the future will evolve. A large number of artificial data sets are generated so that statistical inferences can be made about the probability of certain events occurring and how different policy frameworks can alter those probabilities. For the summary statistics presented here, we generate 100 data sets (draws) that each covers a 100-year period. This provides 10,000 annual observations to use to calculate summary statistics.

36.   The standard deviations of the stochastic disturbances that are generally used for this exercise are based on the historical residuals from the associated estimated behavioral equations. However, for the results presented in the first part of this section, the stochastic disturbances are only 80 percent of the magnitude of our best measures of the actual stochastic shocks in our historical database. This reduction in the magnitudes of the shocks was necessary because there were too many solution failures under the 0 percent inflation target with the standard shocks.[30] Reducing the magnitudes of the shock terms means that the summary statistics will understate the absolute magnitude of the negative impact that the nominal interest rate constraint will have on economic performance.

The Base-Case Policy Rule

37.   Table I.7 presents some statistics summarizing the simulation results under the base-case policy reaction function. As the inflation target declines from 2 to 0 percent, the probability that the constraint will become binding increases nonlinearly. The impact of the increasing frequency with which the constraint binds shows up in an average deviation of inflation from target that is declining and an average level of the output gap that is also declining. In terms of macroeconomic variability, the increasing frequency of the constraint becoming binding leads to greater variability in core inflation, but not output. Compared to the results in Reifschneider and Williams (1999), the summary statistics presented in Table I.7 suggest that the constraint is binding less often in Japan than in the United States and the resulting impact on macroeconomic performance is more benign. This is not the case. One factor generating this result is the reduction in the magnitude of the shocks that was required

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[30] Theoretical work examining the implications of the zero bound on nominal interest rates, like that present in Uhlig (2000) and Benhabib (2001), considers that multiple equilibria are a possibility under the nonlinearity caused by the zero interest rate floor. However, the numerical solution technique employed here is only capable of finding solution paths under which the economy converges to a steady state with the policymaker's specified target rate of inflation without violating the non-negativity constraint. When deflationary spirals become entrenched, the solution algorithm fails because it cannot find such a path given these constraints and those of the model's structure. As we shall show, an important component of the model's structure that has a significant impact on the ability to find solution paths satisfying all of the constraints is the monetary policy rule.

Table I.7: The Base-Case Policy Rule				
	The Policymaker's Target Inflation Rate			
	$\Pi^* = 2.0$	$\Pi^* = 1.0$	$\Pi^* = 0.5$	$\Pi^* = 0.0$
Average deviation of core inflation from target	0.028	0.024	-0.002	-0.049
Average output gap	-0.03	-0.03	-0.03	-0.04
Percent of time that the constraint binds	1	2	5	9
Variance of core inflation	0.62	0.62	0.66	0.72
Variance of the output gap	1.31	1.31	1.31	1.31
Percent of draws that failed	0	3	6	24

under the base-case policy rule.[31] Another important factor is that the summary statistics presented in the table are biased.

38.   The statistics presented in Table I.7 are underestimating the true impact of the zero constraint because we are reporting the summary statistics for all the draws that did not fail under each target rate of inflation.[32] Even though the magnitudes of the stochastic disturbances are only 80 percent of their estimated historical magnitude, the algorithm was unable to find solutions in 24 of the 100 draws under the 0 percent inflation target. This compares to failures in only 6 of the 100 draws for the inflation target of 0.5 percent and 3 out of 100 draws for an inflation target of 1 percent. No draws failed under the inflation target of 2 percent. Splitting the data from the case where the inflation target is 0.5 percent

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[31] In Reifschneider and Williams (1999), deflationary spirals, and thus solutions failures, are more easily avoided under a very similar monetary policy rule for three reasons. First, the macroeconomic model that they use, FRB/US, has more inflation persistence than does the Japan block of MULTIMOD. Second, they incorporate a fiscal policy rule that automatically stimulates the economy if interest rates are constrained at the zero bound for long periods of time. Finally, the authors increase the actual target rates of inflation that appear in the policy rule to compensate for the decline in average inflation outcomes that will otherwise arise in the face of this nonlinearity. For example, to achieve an average outcome of 0 percent inflation, the actual target rate for inflation specified in the policy rule is 0.7 percent.

[32] Looking at only the set of draws that did not fail for all target rates of inflation would also bias the results towards underestimating the impact of the nonnegativity constraint. This occurs because all of the draws that embody the shocks that drive the economy into deflationary spirals under low target rates of inflation are then excluded.

into two sets can shed some light on how large this bias might be. First, consider the set of draws that didn't fail under the 0 percent target (76 draws). For this set of draws under the 0.5 percent inflation target, the average deviation of inflation from target is 0.026 and the constraint binds 4 percent of the time. The second set of draws includes those that failed under the 0 percent target, but not under the 0.5 percent target (18 draws). In this set of draws under the 0.5 percent inflation target, the average deviation of inflation from target is -0.12 and the constraint binds 9 percent of the time. This illustrates that the 18 draws that failed under the 0 percent inflation target, but not under the 0.5 percent target are those in which the shocks are pushing the economy more towards deflationary spirals. Clearly, not being able to include these draws in the summary statistics under the 0 percent inflation target is biasing the results reported in the table towards underestimating the deleterious implications of the zero bound.

A More Aggressive Monetary Policy Response

39.   Replicating the stochastic experiment presented above, but doubling the magnitude of the response coefficients that appear in the monetary policy rule, illustrates how a stronger policy response influences the impact of the non-negativity constraint. In the simulation results from this experiment there is evidence of both of the first and second round impacts of a stronger policy response discussed in the previous section. If we consider only the 76 draws for which a solution was found under the 0 percent inflation target, the first round effect (under the 0 percent inflation target) is to increase the frequency with which the non-negativity constraint binds from 8 to 13 percent. However, under the stronger policy response there are only 7 rather than 24 draws out of the 100 for which a solution cannot be the found. The stronger policy response does a better job of avoiding deflationary spirals.

40.   The results from all draws that did not fail under the more aggressive policy rule are summarized in Table 1.8.[33] The impact of the non-negativity constraint is illustrated in the average deviation of inflation from target declining as the inflation target declines and the average level of the output gap declining. The nonlinear impact of the constraint is evident in the change in the frequency with which the constraint becomes binding. As was the case under the base-case rule, the deterioration in macro variability shows up in inflation, but not in output variability. As the constraint becomes more binding, responding more strongly does not significantly mitigate the relative increase in inflation variability.

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[33] For this policy rule, in addition to the 7 failures under the 0 percent inflation target, 2 draws failed under the 0.5 percent inflation target. There were no failures under inflation targets of 1 percent or above.

Table I.8: A More Aggressive Policy Response				
	The Policymaker's Target Inflation Rate			
	$\Pi^* = 2.0$	$\Pi^* = 1.0$	$\Pi^* = 0.5$	$\Pi^* = 0.0$
Average deviation of core inflation from target	0.016	-0.009	-0.03	-0.07
Average output gap	-0.02	-0.03	-0.03	-0.04
Percent of time that the constraint binds	2	5	8	14
Variance of core inflation	0.71	0.73	0.76	0.80
Variance of the output gap	1.15	1.15	1.15	1.15
Percent of draws that failed	0	0	2	7

Committing to Unwinding Declines in the Price Level

41.   In the previous section we examined the implications of a one-off policy intervention in which the monetary authority committed to unwinding any declines in the price level that arose because of deflation. Here we consider the implications of incorporating such a commitment systematically into the monetary policy rule. The summary statistics of the results under the base-case policy rule coefficients with the addition of this price-level commitment are presented in Table I.9. The first point worth noting is that there is a dramatic reduction in the number of solution failures. Using this policy rule only a single draw fails under the 0 percent inflation target and there were no failures under any of the higher target inflation rates.

42.   There are several interesting points to note about the results in the table. First, even though virtually all of the draws that previously pushed the economy into deflationary spirals under the 0 percent inflation target can now be solved for, the proportion of the time that the constraint binds increases only marginally from 9 to 10 percent. It is lower than the 14 percent achieved under the more aggressive policy rule. Second, the average deviation of inflation from target rises now as the target inflation rate falls. This reflects the behavior of inflation that is required to unwind declines in the price level. Under a 0 percent inflation target all declines in inflation below target must be completely matched with periods of inflation above target. Third, even with this need to generate more inflation in response to deflationary impulses, the variability of inflation actually declines as the target inflation rate falls. Essentially the price-level commitment on the part of the monetary authority works to constrain the declines in inflation sufficiently to more than offset the additional variability that arises from the need to generate more periods of inflation above target. Fourth, both the average level of the output gap and its variability now rise as the inflation target falls.

Table I.9: Systematically Committing to Unwinding Declines in the Price Level				
	The Policymaker's Target Inflation Rate			
	$\Pi^* = 2.0$	$\Pi^* = 1.0$	$\Pi^* = 0.5$	$\Pi^* = 0.0$
Average deviation of core inflation from target	0.028	0.041	0.117	0.322
Average output gap	-0.03	-0.03	-0.02	-0.01
Percent of time that the constraint binds	1	4	7	10
Variance of core inflation	0.62	0.62	0.58	0.50
Variance of the output gap	1.31	1.34	1.39	1.49
Percent of draws that failed	0	0	0	1

Price-Level Targeting

43.   Rather than only committing to unwind declines in the price level, the policymaker could commit to a price-level target. Reifschneider and Williams (1999), show that price-level targeting is an effective means of mitigating the implications of the zero bound on nominal interest rates. Under such a rule, the policymaker commits to achieving a specified target path for the price level. That target path could have a constant growth rate, reflecting an average rate of underlying inflation or the path could be a constant with an underlying average inflation rate of zero. We replicate the stochastic experiment under a price-level monetary policy rule. The policymaker's target paths for the price level embody the four underlying target rates of inflation considered previously. Under such a rule, the policymaker is striving to set the integral of the deviations of inflation from target equal to zero. A search over horizons from contemporaneous to five years ahead for this price-level term indicated that that the optimal horizon was contemporaneous.

44.   The statistics summarizing the results obtained under price-level targeting are presented in Table I.10. The price-level rule does help mitigate the implications of the zero bound in the sense that there were fewer simulation failures than under inflation targeting. Under the constant-price-level target, 4 draws failed compared to 24 under an inflation target of 0 percent. Compared to inflation targeting, the price-level rule delivers lower inflation variability at the cost of greater output variability.

45.   The summary statistics in parentheses in Table I.10 are the results achieved under the policy rule that unwinds all the declines in the price level that occur from periods of deflation. Comparing the summary statistic in parentheses to those achieved under price-level targeting illustrates an interesting point. The asymmetric rule that responds only to restore price level declines, does a much better job at combating the negative implications of the zero floor on nominal interest rates. The case where the target rate of inflation is 0 percent

and the policymaker unwinds all price level declines is perfectly asymmetric relative to the constant-price-level-target case. Under the 0 percent inflation target and a commitment to unwind price level declines, the price level is perfectly bounded from below. Under the constant-price-level target, the price level is perfectly bounded from above and below. The first point to note is that the constraint binds a lower portion of the time under the asymmetric rule. It is also worth recalling that because there are slightly more failed draws under the constant-price-level target, the percentage of time that the constraint binds reported in the table is biased slightly downwards for that rule. Under the 0 percent inflation target with the asymmetric price-level component, the average level of the output gap is higher and the variances of both the output gap and inflation are considerably lower. The number of failed draws is also slightly lower under the asymmetric price-level commitment, suggesting that is does a little better job of avoiding deflationary spirals.

Table I.10: Price-Level Targeting and Restoring Declines in the Price Level[1]				
	Annual Rate of Change in Price-Level Target (Target Rate of Inflation)			
	$\Pi^* = 2.0$	$\Pi^* = 1.0$	$\Pi^* = 0.5$	$\Pi^* = 0.0$
Average deviation of core inflation from target	-0.012 (0.028)	-0.053 (0.041)	-0.069 (0.117)	-0.083 (0.322)
Average output gap	-0.06 (-0.03)	-0.06 -0.03	-0.07 (-0.02)	-0.08 (-0.01)
Percent of time that the constraint binds	1 (1)	5 (4)	8 (7)	14 (10)
Variance of core inflation	0.50 (0.62)	0.54 (0.62)	0.59 (0.58)	0.71 (0.50)
Variance of the output gap	2.22 (1.31)	2.25 (1.34)	2.30 (1.39)	2.40 (1.49)
Percent of draws that failed	0 (0)	0 (0)	1 (0)	4 (1)

[1] The statistics presented in parenthesis are the results when the policymaker commits to unwinding all the declines that occur in the price level from periods of deflation. These are the summary statistics from Table I.9.

46.   Given the fact that the lower bound on nominal interest rates introduces a significant nonlinearity into the monetary control problem, it is not surprising that a nonlinear monetary policy rule is the optimal way to respond. The improvements in the macroeconomic outcomes that result under the asymmetric-price-level commitment arise for two reasons. First, because the policymaker is bounding the price level only from below, policy is not overly concerned with overshooting when generating the required inflation to achieve the price-level objective. Consequently, such a commitment works very effectively to generate expectations of future inflation when required. Second, when the policymaker is bounding the price level from above as well, periods of inflation must be followed by periods of deflation. However, during those periods of required deflation, unexpected negative shocks

can more easily drive nominal interest rates down to their lower bound and possibly the economy into deflationary spirals.

47.   Given the fact that the lower bound on nominal interest rates introduces a significant nonlinearity into the monetary control problem, it is not surprising that a nonlinear monetary policy rule is the optimal way to respond. The improvements in the macroeconomic outcomes that result under the asymmetric-price-level commitment arise for two reasons. First, because the policymaker is bounding the price level only from below, policy is not concerned with overshooting when generating the required inflation to achieve the price-level objective. Consequently, such a commitment works very effectively to generate expectations of future inflation when required. Second, when the policymaker is bounding the price level from above as well, periods of inflation must be followed by periods of deflation. However, during those periods of required deflation, unexpected negative shocks can more easily drive nominal interest rates down to their lower bound and possibly the economy into deflationary spirals.

48.   In macroeconomic models like MULTIMOD, that have a nontrivial forward-looking component in inflation expectations, price-level-targeting rules work well because of the implicit credibility that monetary policy enjoys. Consequently, moving from an inflation-targeting rule to a rule with a price-level component works effectively at mitigating the implications of the zero bound on nominal interest rates. The commitments to generate future inflation are believed by private agents. This raises an important issue regarding how successful such policy may be in the real world. Some might argue that only by committing to a price-level target always and everywhere could a policymaker, through its performance, gain the credibility that it needs. Credibility comes from "putting runs on the board" so to speak. However, as these simulation results suggest, bounding the price level from below and above may entail both greater variability in output and a lower average level of output relative to the case of an asymmetric price-level target. Consequently, private agents may more easily believe the asymmetric price-level target if its is viewed as being more consistent with the underlying preferences of policymakers.

49.   In addition, both politically and institutionally, the will to generate inflation when required is probably much easier to find than the will to generate deflation.

Shocks Consistent with Japan's Historical Experience

50.   For the simulations results summarized in Table I.11, the magnitude of the stochastic disturbances that hit the economy are not reduced. Using the policy rule that embodies a commitment on the part of the monetary authority to unwind any declines that occur in the price level helps to dramatically reduce the number of solution failures under the 0 percent inflation target.[34] Compared to the results presented earlier, these results are less biased

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[34] We examined a policy rule that contained stronger response coefficients and the asymmetric price-level component. The addition of the stronger response coefficients

	The Policymaker's Target Inflation Rate			
	$\Pi^* = 2.0$	$\Pi^* = 1.0$	$\Pi^* = 0.5$	$\Pi^* = 0.0$
Average deviation of core Inflation from target	0.035	0.071	0.178	0.397
Average output gap	-0.04	-0.04	-0.05	-0.05
Percent of time that the constraint binds	2	7	12	16
Variance of core inflation	0.98	0.97	0.92	0.90
Variance of the output gap	2.07	2.14	2.25	2.40
Percent of draws that failed	0	3	4	5

Table I.11: Stochastic Disturbances Consistent with Japan's Historical Experience—Asymmetric Policy Rule Unwinding Price Level Declines

estimates of how the choice of the target rate of inflation influences the probability that the zero bound on nominal interest rates will become binding provided that the policymaker is behaving according to a good policy rule. The results achieved under stochastic shocks consistent with historical experience and the symmetric price-level rule are presented in Table I.12.

51.   Even with this policy rule, 5 of the 100 draws could not be solved under the 0 percent inflation target. Consequently, these results are still slightly biased towards underestimating the impact of the zero bound on nominal interest rates. However, one can say that under an inflation target of 0 percent and a very good monetary policy rule, the probability that the zero bound on nominal interest rates will become binding is greater than 16 percent. Even under an inflation target of 1 percent, there is at least a 7 percent probability that the constraint will bind. Under a good monetary policy rule, choosing an inflation target of 0 rather 2 percent leads to a lower average level of output, higher output variability and slightly lower inflation variability.

E. Conclusions

52.   Given the experience in Japan in the late 1990s, Larry Summers' comments in 1991 have turned out to be prescient. Because nominal interest rates cannot be driven below zero, achieving very low target rates of inflation can impede a monetary authority's ability to

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actually increased the number of solution failures and the proportion of time that the constraint was binding.

Table I.12 Stochastic Disturbances Consistent with Japan's Historical Experience Price-Level Targeting and Restoring Declines in the Price Level[1]	Annual Rate of Change in Price-Level Target (Target Rate of Inflation)			
	$\Pi^* = 2.0$	$\Pi^* = 1.0$	$\Pi^* = 0.5$	$\Pi^* = 0.0$
Average deviation of core Inflation from target	-0.012 (0.035)	-0.054 (0.071)	-0.070 (0.117)	-0.084 (0.397)
Average output gap	-0.09 (-0.04)	-0.10 (-0.04)	-0.10 (-0.05)	-0.10 (-0.05)
Percent of time that the constraint binds	4 (2)	9 (7)	14 (12)	20 (16)
Variance of core inflation	0.80 (0.98)	0.87 (0.97)	0.98 (0.92)	1.08 (0.90)
Variance of the output gap	3.46 (2.07)	3.51 (2.14)	3.57 (2.25)	3.53 (2.40)
Percent of draws that failed	0 (0)	2 (3)	6 (4)	30 (5)

[1] The statistics presented in parenthesis are the results when the policymaker commits to unwinding all the declines that occur in the price level from periods of deflation. These are the summary statistics from Table I.10.

lower real interest rates. The MULTIMOD analysis presented in this paper suggests that, for Japan, aiming at a target rate of inflation below 2 percent may often give rise to persistent periods where monetary policy finds itself unable to reduce real interest rates to the extent desired. In practice, the measurement bias in price indices and the difficulties associated with estimating the level of potential output would argue for a target rate of inflation above the 2 percent suggested by our stochastic simulation analysis. The analysis illustrates that although there are modifications to systematic monetary policy that can mitigate the impact of this constraint, a sufficiently high target rate of inflation appears to be the most effective component in the monetary policy framework for avoiding the problems associated with the lower bound on nominal interest rates.

53. Once nominal interest rates have become constrained at their lower bound, MULTIMOD simulations suggest that there are one-off policy actions that will stimulate aggregate demand and help avoid deflationary spirals. Although both monetary and fiscal policy actions can be effective, either monetary policy intervention or a combination of monetary and fiscal policy action will result in notably less deterioration in the government debt position.

54. The fundamental point emerging from this work is that there are cures available for the economic malaise that can arise because nominal interest rates cannot be reduced below zero. However, prevention, in the form of a sufficiently high rate of target inflation, may be the optimal strategy. One might question this policy advice if the optimal rate of inflation

being prescribed was 10 or 20 percent. However, most research examining the real output costs of inflation finds little or no evidence an inflation rate as high as 2 or 3 percent entails any significant output sacrifice.[35] In fact, in the face of nominal rigidities, there may be benefits associated with low positive rates of inflation if they facilitate the relative price changes that are required for efficient resource allocation.

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II. JAPAN AND ASIA: POLICIES AND PROSPECTS[1]

A. Introduction

1.   Economic and financial developments in Japan have important implications for the Asia-Pacific region. Japan is not only an important trading partner, but also a significant supplier of capital to the region. However, the nature of these relationships has changed over time with the rapid growth in Japan from the 1950s until the bursting of the bubble economy, the subsequent poor economic performance during the 1990s, the sharp appreciation of the yen, the rapid growth in the Asian economies, and the Asian financial crisis all playing an important part. This paper assesses the role Japan currently plays in the Asia-Pacific regional economy, and how policies and developments in Japan affect the region.

2.   The paper is structured as follows. Section B provides a brief overview of economic developments in Japan during the 1990s and examines the nature of the economic and financial relations between Japan and its regional neighbors. Section C outlines the G-Cubed (Asia-Pacific) model that is used to assess the transmission of shocks and policies between Japan and the region. Section D explores shocks that have, or currently are, impacting the Japanese economy (a decline in productivity growth, a sharp rise in government spending, and a decline in equity prices) to understand some of the factors underpinning the recent poor recent economic performance and the likely evolution of the economy in the near future.[2] Section E considers a number of the current policy issues facing Japan—fiscal consolidation, quantitative monetary easing, and yen depreciation—and assesses the potential implications of each of these for the Japanese and regional economies. Conclusions and policy implications are drawn in Section F.

B. Japan's Economic Performance and its Implications
for the Asia-Pacific Region

3.   Japan's economic performance during the 1990s was disappointing. Real GDP grew by only 1¾ percent per annum, down considerably from the 4 percent average during the 1980s, and below the average in other OECD countries. It also stands in contrast to the strong growth in the rest of the Asia-Pacific region during the decade. The roots of the economic problems in Japan lie at least as far back as the overheating of the economy in the late-1980s and the development of a major asset price bubble. The proximate cause of the initial slowdown in growth was the tightening of monetary policy in mid-1989 and the eventual pricking of the asset price bubble. Equity and land prices declined, and the resulting massive loss of wealth severely impacted corporate and household behavior (Figure II.1). In response, fiscal and monetary policies were eased substantially—the budget balance moved from a surplus of close to 3 percent of GDP in 1991 to an estimated deficit of 8 percent of GDP in

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[1] Prepared by Tim Callen (ext. 38873) and Warwick J. McKibbin (Consultant, OAP).

[2] See McKibbin (1996) for an earlier assessment of Japanese macroeconomic policy and the likely impacts on the economy.

Figure II.1. Japan: Selected Economic Indicators, 1985-2000

Annual percent change

Real GDP Growth

Annual percent change

Total Factor Productivity

Percent of GDP   *Percent of GDP*

Fiscal Indicators

■■■ *Fiscal balance (left scale)*
━━━ *Revenue (right scale)*
╍╍ *Expenditure (right scale)*

Yen per U.S. dollar

Average Exchange Rate

Annual averages, 1985=100

Equity and Land Prices

*Land prices:
six largest cities*

Nikkei 225

In percent

Interest Rates

—— *Three-month CD rate (nominal)*
• • • *Ten-year govt. bond yield (nominal)*
━━━ *Ten-year govt. bond yield (real 1/)*

Sources: Nikkei Telecom; and staff estimates.

1/ Deflated by the CPI adjusted for changes in indirect taxes and administered prices.

2000, while short-term interest rates have been reduced from 8 percent to zero—but without successfully reinvigorating growth.

4.   While the growth slowdown was initially viewed as a cyclical downturn in response to the decline in asset prices, the extended period of weak growth has led to a number of competing hypotheses being advanced to explain the poor performance (see Bayoumi and Collyns (1999) and Boltho and Corbett (2000) for concise summaries). Bayoumi (1999) highlights the central role played by financial institutions in magnifying the impact of the decline in asset prices on the economy. Increases in bank lending, operating both directly and through a self-reinforcing cycle with increases in land prices (the main source of collateral) and stock prices (an important component of bank capital), helped explain the strong growth in the second half of the 1980s. But, once asset prices began to fall, the reverse of this process operated as undercapitalized banks restrained lending to maintain capital adequacy standards. In turn, this blunted the impact of macroeconomic policies as households and corporates were unable to respond to monetary and fiscal stimulus because of the limited availability of funds from the banking system. Hayashi and Prescott (2001), however, argue that it is hard to reconcile this view with the large growth in internal financing by Japanese firms even while bank financing was falling sharply, and instead argue that the primary problem was a sharp fall in productivity over the decade, possibly stemming from the increasing failure of the traditional Japanese economic model to adapt to the requirements of a more deregulated and competitive world economy.

5.   Yoshikawa (2000) argues that the slowdown in productivity growth has been due to the decline in demand as the introduction of new technologies is strongly conditioned by the prospects for future demand. Krugman (1998) also believes there is an insufficiency of demand, and argues that Japan is in a "liquidity trap"—with nominal interest rates unable to fall below zero and prices declining, real interest rates are too high for the economy to recover. Posen (1998) argues that despite the numerous fiscal packages that were implemented during the 1990s, the measures that actually had a direct impact on activity were insufficient.

6.   These economic and financial developments have had important implications for the Asia-Pacific region as Japan is a large supplier of capital to the region and an important trading partner. Developments in the region also have increasingly had significant implications for the Japanese economy.

7.   Japanese FDI outflows accelerated following the liberalization of capital controls in the early 1980s, and surged during the second half of the decade to a peak of close to $50 billion in 1990 (Table II.1). This sharp rise reflected both the strong economic growth in Japan and in foreign markets, and the appreciation of the yen which encouraged companies to relocate production overseas to maintain cost competitiveness (Bayoumi and Lipworth, 1998). Initially, the U.S. attracted most of this capital, with much of the investment being concentrated in the real estate, service, and finance and insurance sectors. However, that going to the Asia-9 countries (Taiwan POC, Korea, Hong Kong SAR, Singapore, Thailand, Indonesia, Malaysia, Philippines and China) also picked-up—with Hong Kong SAR,

Table II.1: Foreign Direct Investment From Japan to Asia

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
						(In millions of U.S. dollars)							
Asia-9	3,199	5,691	5,328	2,997	2,535	2,336	5,233	8,307	9,187	12,045	7,200	1,574	1,970
NICs	2,071	3,427	2,640	1,000	617	293	1,614	1,766	3,031	5,235	2,309	869	-658
Taiwan	236	347	351	184	93	36	158	418	401	742	325	-4	-104
Korea	306	419	225	119	72	30	227	344	403	172	426	367	1,082
Hong Kong	1,055	1,312	1,402	419	238	151	636	332	1,099	1,760	797	-158	-123
Singapore	474	1,349	662	278	215	77	594	672	1,128	2,561	761	665	-1,512
ASEAN-4	617	1,578	2,282	1,766	1,392	1,229	1,832	3,334	3,832	4,949	3,585	341	1,691
Thailand	258	723	813	464	287	303	342	936	1,339	2,038	1,684	-126	593
Indonesia	204	357	774	682	724	424	825	945	1,498	1,568	930	200	588
Malaysia	115	383	511	504	310	397	352	376	518	996	453	-331	-1
Philippines	40	114	184	116	71	105	312	1,077	477	347	517	599	511
China	511	686	406	231	526	814	1,787	3,208	2,325	1,860	1,306	363	937
Memorandum items :													
World	34,210	44,130	48,024	30,726	17,222	13,714	17,938	22,630	23,428	25,993	24,151	22,743	31,547
U.S.	18,969	21,238	25,584	15,213	8,914	6,755	6,193	8,891	11,090	7,392	5,683	7,094	14,109
Europe	5,793	9,746	11,027	7,974	3,370	3,168	2,843	3,290	3,220	2,575	2,178	8,217	10,938

Source: Bank of Japan.

1/ Data prior to 1995 refer only to long-term capital flows. Country breakdown of NICs and ASEAN-4 prior to 1995 is based on notification data.

Thailand, Malaysia, and Indonesia seeing the largest increases—and was more concentrated in the industrial sector. This Japanese investment accounted for a significant proportion of the total FDI inflows received by the Asia-9 countries (for which data is available) during the second half of the 1980s (Table II.2).

8.   FDI flows moderated significantly in the first half of the 1990s with the sharp decline in asset prices in Japan and the subsequent slowdown in growth and balance sheet difficulties in the business sector, but recovered somewhat in the second half of the decade. These weaker FDI flows, however, were largely the result of lower investment in the U.S. and Europe, and investment to Asia increased—Japanese FDI to the Asia-9 countries increased from $3 billion (10 percent of the total) in 1991 to $12 billion (50 percent of the total) in 1997—until the financial crisis in the region. Investment continued to be focused in Hong Kong SAR, Thailand, and Indonesia, while from the mid-1990s investment into China also accelerated.[3] However, despite the greater concentration of Japanese FDI in the Asia region, the relative importance of Japanese investment to these countries declined during 1995–2000 (to around 18 percent of the total).

9.   Portfolio flows between Japan and the region have been more two way than FDI due to investments in Japan from the regional financial centers of Hong Kong SAR and Singapore (Table II.3). Indeed, stock data show that Japan was in a net portfolio liability position with the rest of Asia at end-2000. With respect to other countries, investments have generally been small, with the exception of Thailand, where significant investment took place during 1995–97.

10.   Japanese banks were large lenders to Asian countries during the second half of the 1980s and early 1990s.[4] According to BIS data, the outstanding stock of lending by Japanese banks to the Asia-9 countries rose from $140 billion in 1985 to a peak of $333 billion in 1994 (Table II.4). The largest recipients were the regional financial centers of Hong Kong and Singapore, although all countries except Taiwan POC, Malaysia, and the Philippines experienced significant growth in lending. In the early 1990s, Japanese banks are estimated to have supplied between 60 and 70 percent of the total outstanding international bank lending to Hong Kong SAR, Singapore, Thailand, and Indonesia. It is likely that at least part of this increase was associated with financing Japanese subsidiaries operating in these countries. With the onset of their financial difficulties and the emergence of a significant Japan premium, however, Japanese banks have withdrawn from Asian markets since 1995, a

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[3] At end-2000, 18 percent of the outstanding stock of Japanese FDI (at market prices) was in the Asia-9, compared to 47 percent in the U.S. and 20 percent in Europe. Within Asia, Japanese FDI is largely concentrated in Singapore, China, and Hong Kong SAR.

[4] This discussion is based on BIS data. As noted by Kohsaka (1996), there are significant two-way financial flows between Japan, Hong Kong, and Singapore in their roles as international and regional financial centers. The data for Singapore and Hong Kong therefore likely overestimate the impact on domestic resource use in these countries.

Table II.2: Share of Japanese Foreign Direct Investment in Host Country

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
							(In percent of total FDI inflow)									
Taiwan	...	...	30.5	37.6	27.6	36.4	30.1	28.8	22.9	24.3	19.6	22.2	20.0	16.4	12.3	9.6
Korea	68.4	39.1	46.4	54.2	42.7	29.3	16.2	17.3	27.4	32.5	21.8	8.0	3.8	5.7	11.3	15.6
Singapore	...	15.7	16.5	19.8	22.9	24.7	24.8	27.0	25.3	26.0	24.8	24.7	22.9	23.1	...	...
Thailand	34.5	44.1	36.1	52.2	41.1	43.2	30.3	16.2	17.7	9.3	27.8	23.1	36.0	28.8	13.8	24.5
Indonesia	36.7	9.2	35.2	7.7	16.6	23.9	10.4	14.8	10.3	6.6	9.5	25.6	16.0	9.8	5.9	12.7
Malaysia	...	...	...	...	...	...	36.8	19.6	17.2	13.2	22.8	10.0	18.5	17.7	12.4	14.0
Philippines	...	...	...	...	...	...	46.2	51.5	12.2	7.9	30.0	36.8	31.4	17.0	16.0	7.2
China	...	...	...	...	...	...	...	...	...	6.1	8.2	8.8	9.6	7.5	7.4	7.2

Source: CEIC Database.

Table II.3: Net Portfolio Investment Flows Between Japan and Asia

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
						(In millions of U.S. dollars)							
Asia-9	4,798	4,346	-15	-11,011	-1,284	332	-6,002	2,811	-2,751	-10,818	20,361	-19,745	-11,757
NICs	5,037	4,887	1,314	-10,716	2,363	1,815	-6,035	-14,279	-8,701	-22,485	15,473	-28,708	-12,417
Taiwan	...	...	...	...	...	...	...	-380	2,054	673	-783	-166	765
Korea	...	...	...	...	...	...	...	1,463	2,812	-760	-1,067	-2,196	-3,428
Hong Kong	...	...	...	...	...	...	...	-17,142	-8,822	-14,390	16,689	-21,933	-9,174
Singapore	...	...	...	...	...	...	...	1,780	-4,744	-8,008	634	-4,412	-581
ASEAN-4	303	-448	-622	-489	-3,101	-537	-438	17,256	6,817	8,649	2,845	7,541	-470
Thailand	...	...	...	...	...	...	...	14,180	3,729	4,985	1,689	1,679	184
Indonesia	...	...	...	...	...	...	...	-79	312	2,592	1,797	145	520
Malaysia	...	...	...	...	...	...	...	168	395	-65	-728	6,256	698
Philippines	...	...	...	...	...	...	...	2,986	2,382	1,137	87	-539	-1,872
China	-542	-93	-707	194	-546	-946	471	-166	-868	3,018	2,043	1,421	1,131
Memorandum items:													
World	66,651	28,034	5,028	-40,978	26,191	62,748	48,944	32,717	41,497	-30,755	45,468	21,545	37,633
U.S.	33,320	22,074	12,495	-1,045	14,289	47,419	5,612	-10,191	9,070	11,851	19,521	-21,129	33,852
Europe	21,229	-24,562	9,409	-45,273	10,112	12,827	31,687	32,855	-39,231	-91,722	-30,168	-8,642	-25,568

Source: Bank of Japan.

1/ Data prior to 1995 refer only to long-term capital flows.

Table II.4: Stock of Outstanding Lending by Japanese Banks to the Asia-9 Countries

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
							(In millions of U.S. dollars)								
Asia-9	140,056	173,313	174,797	194,625	221,584	235,930	255,483	280,122	333,021	318,525	260,398	244,677	150,537	119,341	114,247
NICs	115,820	141,976	140,308	157,166	179,617	188,203	207,613	228,598	267,288	234,765	173,278	158,715	87,612	73,002	75,240
Taiwan	1,758	5,996	6,709	3,735	2,884	4,110	3,449	4,075	5,407	3,236	2,683	3,516	2,182	2,723	2,994
Korea	11,032	10,688	8,277	8,436	9,144	11,070	12,004	12,039	17,428	21,454	24,324	20,278	17,179	12,677	10,306
Hong Kong	59,188	75,177	73,678	83,261	88,278	99,489	102,184	123,510	150,445	133,146	87,462	76,272	38,742	36,430	35,259
Singapore	43,842	50,115	51,644	61,734	79,311	73,534	89,976	88,974	94,008	76,929	58,809	58,649	29,509	21,172	26,681
ASEAN-4	19,965	23,223	24,100	26,093	29,877	34,224	35,145	38,603	51,586	66,124	69,328	66,373	47,808	34,548	28,684
Thailand	3,716	4,614	5,041	6,768	7,403	10,726	12,561	16,089	26,452	36,845	37,525	33,180	22,445	13,087	9,840
Indonesia	7,424	9,184	10,151	11,072	15,124	16,730	16,890	16,401	18,351	20,974	22,035	22,018	16,403	12,494	10,225
Malaysia	5,778	5,841	5,276	5,224	4,398	4,354	4,473	5,179	5,831	7,321	8,210	8,551	6,633	6,038	5,600
Philippines	3,047	3,584	3,632	3,029	2,952	2,414	1,221	934	952	984	1,558	2,624	2,327	2,929	3,019
China	4,271	8,114	10,389	11,366	12,090	13,503	12,725	12,921	14,147	17,636	17,792	19,589	15,117	11,791	10,323
							(In percent of total bank lending to the country) 1/								
Asia-9	54.2	56.3	58.6	60.3	59.2	61.1	61.2	57.9	57.2	49.1	39.5	36.1	31.6	30.4	33.1
NICs	55.7	56.4	58.5	60.1	58.7	61.4	62.2	59.2	58.5	48.4	37.5	33.8	27.9	28.5	33.8
Taiwan	26.0	40.9	50.0	33.1	31.2	33.0	26.4	25.8	27.6	15.4	12.8	14.5	11.2	14.4	20.4
Korea	45.8	51.6	45.2	42.4	39.7	41.3	41.2	41.3	44.0	39.3	34.5	29.7	32.8	26.5	24.6
Hong Kong	62.6	61.3	62.4	64.5	62.8	67.5	66.1	64.8	65.2	58.2	45.2	39.2	31.5	35.0	37.6
Singapore	53.0	53.5	57.3	60.8	59.6	61.4	65.5	59.0	56.2	42.5	33.3	32.1	24.9	24.9	36.8
ASEAN-4	44.9	51.0	55.6	59.5	60.3	59.5	57.9	54.5	56.2	54.1	46.6	43.8	41.3	35.6	33.4
Thailand	60.9	68.0	66.3	69.5	61.9	62.1	62.2	60.7	65.7	63.1	57.8	60.1	56.9	48.9	45.6
Indonesia	48.6	54.5	60.0	62.9	68.3	67.7	65.0	59.3	57.3	52.1	43.5	42.1	39.4	32.4	29.5
Malaysia	59.0	63.6	68.9	72.6	68.2	62.2	58.0	47.3	45.6	47.4	40.3	33.8	34.8	36.8	35.5
Philippines	23.0	28.3	32.5	32.5	32.8	28.3	18.0	16.3	14.2	12.2	12.3	13.9	14.8	19.2	21.6
China	70.3	74.8	68.6	66.5	63.6	61.1	56.7	48.6	42.7	42.4	36.2	34.4	31.7	29.7	28.7
Memo item:															
Using total lending 2/	50.9	52.7	54.3	56.2	54.6	55.8	55.5	52.7	52.4	44.6	35.4	30.4	26.3	24.8	25.4

Source: Consolidated Banking Statistics, Bank for International Settlements.

1/ Based on a constant sample of 17 lending countries.
2/ Based on the full BIS data which does not use a constant sample during the time period covered.

process accelerated by the Asian financial crisis. The outstanding stock of lending to the Asia-9 declined to $114 billion in 2000. While this has been part of the trend toward a lower exposure to bank finance by the Asian countries since the financial crisis, Japanese banks have withdrawn at a faster pace than banks of other nationalities, and the share of Japanese bank lending to the region has declined to around 30 percent, although they are still estimated to be the largest (identified) lender to eight of the nine countries.[5]

11.   Japanese FDI to Asia has been focused in the industrial sector—particularly the electrical machinery sector in the second half of the 1990s—and has implied a movement of productive capacity out of Japan to the recipient countries. Consequently, these investments are likely to have had important implications for the pattern of trade between these countries. Indeed, Bayoumi and Lipworth (1998) find evidence that both FDI flows and stocks have a significant impact on imports from the recipient country to Japan, but that only FDI flows have an impact on exports from Japan to the recipient country. They argue this is consistent with the view that while FDI permanently raises imports from the recipient country to Japan, it only temporarily raises Japanese exports largely through the short-term need to equip new factories. Kawai (1998), however, argues that FDI has a permanent impact on both imports and exports, although the impact on imports is larger.

12.   Trade flows between Japan and the Asia region have indeed undergone significant change over the past fifteen years. Japan has become increasingly reliant on Asia as a market for its exports and as a source of imports. The growth of Japanese exports to the Asia-9 averaged close to 11 percent per annum (in U.S. dollar terms) during 1985–2000, compared to aggregate growth of only 7 percent per annum, and the share of exports to these nine economies increased from 24 percent in 1985 to 40 percent in 2000 (Table II.5). Asia is now the largest destination for Japanese exports, with Taiwan POC, Korea, and China being the most important countries, while the U.S. and Europe have both declined in importance as export destinations.

13.   Nearly 40 percent of Japan's imports also now come from Asia, compared to 26 percent in the mid-1980s (Table II.6). Imports from China, in particular, have shown remarkable growth, rising by an average of 15 percent per annum—twice the rate of growth of aggregate imports—and their share has risen from 5 percent to 14½ percent of the total. Korea and Taiwan POC are other important, and growing, sources of imports, while the ASEAN-4 countries have generally seen much weaker growth. The share of imports from the U.S. and Europe have both declined.

14.   There have also been substantial changes in the composition of trade between Japan and Asia. Japan's imports of machinery and transport equipment from the Asia-9 have

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[5] This conclusion needs to be qualified, however, for China, Singapore, and Korea where there is a large unidentified component (larger than the exposure of Japanese banks) in the country breakdown of outstanding lending. For China, and possibly Singapore, these are related to Hong Kong banks which, while included in the aggregate data, are not separately identified for confidentiality reasons.

Table II.5: Japanese Exports to the Asian Region

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
							(In percent of total exports)									
Asia-9	24.2	22.6	24.9	27.3	28.3	29.6	32.1	33.0	36.1	38.6	42.1	42.4	40.6	33.2	35.8	39.7
NICs	12.8	14.3	17.2	18.8	19.2	19.7	21.3	21.4	22.3	23.6	25.0	24.7	24.0	20.2	21.5	23.9
Taiwan	2.9	3.7	4.9	5.4	5.6	5.4	5.8	6.2	6.1	6.0	6.5	6.3	6.5	6.6	6.9	7.5
Korea	4.0	5.0	5.8	5.8	6.0	6.1	6.4	5.2	5.3	6.1	7.0	7.1	6.2	4.0	5.5	6.4
Hong Kong	3.7	3.4	3.9	4.4	4.2	4.6	5.2	6.1	6.3	6.5	6.3	6.2	6.5	5.8	5.3	5.7
Singapore	2.2	2.2	2.6	3.1	3.4	3.7	3.9	3.8	4.6	5.0	5.2	5.1	4.8	3.8	3.9	4.3
ASEAN-4	4.2	3.6	4.1	4.9	6.1	7.7	8.1	8.1	9.0	10.3	12.1	12.4	11.4	7.8	8.6	9.5
Thailand	1.2	1.0	1.3	1.9	2.5	3.2	3.0	3.1	3.4	3.7	4.5	4.4	3.5	2.4	2.7	2.8
Indonesia	1.2	1.3	1.3	1.2	1.2	1.7	1.8	1.6	1.7	1.9	2.3	2.2	2.4	1.1	1.2	1.6
Malaysia	1.2	0.8	0.9	1.2	1.5	1.9	2.4	2.4	2.7	3.1	3.8	3.7	3.4	2.4	2.7	2.9
Philippines	0.5	0.5	0.6	0.7	0.9	0.9	0.8	1.0	1.3	1.5	1.6	2.0	2.1	1.9	2.1	2.1
China	7.1	4.7	3.6	3.6	3.1	2.1	2.7	3.5	4.8	4.7	5.0	5.3	5.2	5.2	5.6	6.3
Memorandum items :																
U.S.	37.1	38.4	36.5	33.8	33.9	31.5	29.1	28.2	29.2	29.7	27.3	27.2	27.8	30.5	30.7	29.7
Europe	16.3	19.9	21.4	22.8	22.0	23.5	23.1	21.9	18.8	17.1	17.4	17.0	16.6	19.4	18.3	15.9

Source: Bank of Japan.

Table II.6: Japanese Imports from Asian Countries

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
							(In percent of total imports)									
Asia-9	25.5	25.2	28.4	28.8	28.5	26.6	28.9	30.1	31.7	32.9	34.4	35.2	34.7	34.9	37.6	39.6
NICs	7.6	9.8	12.5	13.4	12.9	11.1	11.5	11.2	11.2	11.3	12.3	11.7	10.4	10.2	11.6	12.2
Taiwan	2.6	3.7	4.8	4.7	4.2	3.6	4.0	4.1	4.0	3.9	4.3	4.3	3.7	3.6	4.1	4.7
Korea	3.1	4.1	5.4	6.3	6.2	5.0	5.2	5.0	4.8	4.9	5.1	4.6	4.3	4.3	5.2	5.4
Hong Kong	0.6	0.8	1.0	1.1	1.1	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.4
Singapore	1.2	1.2	1.4	1.2	1.4	1.5	1.4	1.3	1.5	1.7	2.0	2.1	1.7	1.7	1.8	1.7
ASEAN-4	12.9	11.0	10.9	10.1	10.3	10.4	11.3	11.6	12.1	11.6	11.4	11.9	12.0	11.4	12.1	12.8
Thailand	0.8	1.1	1.2	1.5	1.7	1.8	2.2	2.6	2.7	3.0	3.0	2.9	2.8	2.9	2.9	2.8
Indonesia	7.8	5.9	5.6	5.1	5.2	5.4	5.4	5.2	5.2	4.7	4.2	4.4	4.3	3.9	4.1	4.3
Malaysia	3.3	3.1	3.2	2.5	2.4	2.3	2.7	2.8	3.2	3.0	3.1	3.4	3.4	3.1	3.5	3.8
Philippines	1.0	1.0	0.9	1.1	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.3	1.5	1.6	1.7	1.9
China	5.0	4.5	4.9	5.3	5.3	5.1	6.0	7.3	8.5	10.0	10.7	11.6	12.4	13.2	13.8	14.5
Memorandum items:																
U.S.	20.0	22.8	21.1	22.4	22.9	22.4	22.5	22.4	23.0	22.9	22.4	22.7	22.3	23.9	21.7	19.0
Europe	10.9	16.2	17.0	18.2	18.5	19.9	18.3	17.6	16.7	17.2	17.9	17.0	15.8	16.3	16.3	13.1

Source: Bank of Japan.

increased from less than 5 percent of total imports in 1985 to nearly 35 percent currently, while other manufactured goods increased from less than 20 percent to 35 percent.[6] Imports of fuel and other crude materials, on the other hand, have fallen substantially. While imports from most countries are heavily weighted toward machinery and transport equipment, those from China and Indonesia are mainly in the form of low-end consumer goods and raw materials respectively. On-the-other-hand, the composition of Japanese exports to Asia has remained largely unchanged with machinery and transport equipment accounting for a little under 60 percent of the total and other manufactured goods most of the remainder.

15.   While Japan remains a very significant trading partner, Asia has actually become relatively less reliant on Japan (although given the significant increase in the importance of trade in the Asian countries in recent years the absolute reliance has still increased).[7] The share of Asian exports going to Japan has declined markedly (Table II.7). While in 1985, 18 percent of exports from the Asia-9 went to Japan, this share had fallen to 12 percent by 2000. The U.S. (22 percent) and Europe (15 percent) are both more important export destinations than Japan. The rise in importance of the U.S. as an export destination since the mid-1990s is closely related to Asia's role in the supply of IT-related goods (see Isogai and Shibanuma, 2000). Indonesia, Malaysia, and China have all greatly reduced their reliance on Japan, although for the ASEAN-4, particularly Indonesia, China, Korea, and Taiwan, Japan remains a very important destination.[8] The importance of Japan as a supplier of goods has also declined, although it remains the single most important supplier to the region (Table II.8). While in 1985, around one-quarter of the Asia-9's imports came from Japan, this had declined to 20 percent in 2000.

16.   The discussion above has highlighted that while the trade and financial links between Japan and the Asian region have declined, they remain very important, and economic developments in Japan continue to have significant implications for other countries in the region. Thailand, Philippines, and Indonesia are at the high end of relative reliance on Japan, while Singapore and Hong Kong SAR are at the low end. Japan has also become more reliant on trade with Asia.

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[6] Nakamura and Matsuzaki (1997) find that Asian companies have been very successful at penetrating the Japanese market for electrical machinery and other manufactured goods, partly at the expense of the U.S. and European companies.

[7] These developments have taken place within the context of a near doubling between 1985 and 1999 in the share of world trade that is accounted for by Asian countries, and a decline in Japan's share of world trade.

[8] The country breakdown of Chinese trade data needs to be treated with caution, particularly for industrial countries, as trade with these countries is classified as trade with Hong Kong if it passes through Hong Kong ports.

Table II.7: Asian Country Exports to Japan

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	(In percent of total exports from Asian country)															
Asia-9	18.1	14.9	15.0	15.4	15.4	14.5	13.7	12.3	12.3	12.3	12.9	13.1	11.8	10.5	11.5	11.9
NICs	9.6	10.3	11.6	12.5	12.5	11.3	10.5	9.3	8.7	8.9	9.5	9.4	8.2	7.2	8.3	8.3
Taiwan	...	11.6	13.2	14.6	13.8	12.6	12.3	11.1	10.7	11.2	12.0	12.0	9.8	8.6	10.0	10.0
Korea	15.0	15.6	17.8	19.8	21.8	18.6	17.1	15.0	13.5	14.0	13.6	12.2	10.8	9.2	11.0	11.1
Hong Kong	4.2	4.7	5.1	5.8	6.2	5.7	5.4	5.2	5.2	5.6	6.1	6.6	6.1	5.3	5.4	5.6
Singapore	9.4	8.6	9.1	8.6	8.6	8.8	8.7	7.6	7.5	7.0	7.8	8.2	7.1	6.6	7.4	7.4
ASEAN-4	31.1	28.3	26.0	24.6	24.4	24.3	22.8	20.2	19.2	17.5	17.4	17.8	16.5	13.8	14.6	15.8
Thailand	13.4	14.2	15.0	16.0	17.0	17.2	17.8	17.5	17.0	17.0	16.6	16.8	15.2	13.7	14.5	15.7
Indonesia	46.2	44.9	43.1	41.7	42.2	42.5	36.9	31.7	30.3	27.3	27.1	25.8	23.4	18.7	20.0	21.7
Malaysia	24.6	23.3	19.5	17.0	16.0	15.3	15.9	13.3	13.0	11.9	12.5	13.4	12.7	10.5	11.6	12.6
Philippines	19.0	17.7	17.2	20.1	20.4	19.8	20.0	17.8	16.1	15.0	15.8	17.9	16.6	14.4	13.1	14.4
China	22.3	16.2	16.2	16.9	15.9	14.7	14.2	13.7	17.2	17.8	19.1	20.4	17.4	16.2	16.6	15.6
Memorandum items:																
U.S.	23.2	29.4	28.3	25.7	25.0	22.5	20.9	21.1	21.9	21.3	19.9	19.3	19.6	21.7	22.1	22.0
Europe	14.7	13.9	13.9	14.0	13.7	14.9	15.0	14.5	14.7	13.8	14.0	13.9	14.3	16.6	15.8	15.4

Source: Direction of Trade Statistics, International Monetary Fund.

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Table II.8. Asian Country Imports from Japan

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
						(In percent of total imports into the Asian country)										
Asia-9	25.6	26.8	25.4	24.0	23.2	21.9	22.5	22.2	23.1	23.1	22.6	20.5	19.4	18.4	19.2	20.2
NICs	21.7	26.9	26.4	25.0	23.8	22.1	22.7	22.2	21.9	21.7	21.2	18.8	18.1	17.4	18.1	18.4
Taiwan	...	34.4	34.1	29.9	30.7	29.3	30.0	30.3	30.1	29.1	29.3	26.9	25.4	25.8	27.7	27.6
Korea	24.3	34.3	33.3	30.6	28.5	25.0	25.8	23.5	23.1	24.8	24.1	20.8	19.2	18.0	20.2	21.9
Hong Kong	23.1	20.4	19.0	18.6	16.6	16.1	16.4	17.4	16.6	15.6	14.8	13.6	13.7	12.6	11.7	12.0
Singapore	17.1	19.9	20.5	22.0	21.4	20.1	21.3	21.1	21.9	21.9	21.1	18.2	17.6	16.7	16.7	17.3
ASEAN-4	23.3	24.1	23.9	24.1	25.4	25.7	25.9	25.6	26.7	27.0	26.5	24.3	22.3	20.2	21.4	22.1
Thailand	26.5	26.4	26.0	27.1	30.5	30.4	29.1	29.3	30.3	30.2	29.3	27.9	25.7	23.6	24.8	25.9
Indonesia	25.7	29.2	28.0	25.4	23.3	24.8	24.4	22.0	22.1	24.2	22.7	19.8	19.8	15.7	18.6	21.4
Malaysia	23.0	20.5	21.7	23.0	24.1	24.2	26.1	26.0	27.5	26.7	27.3	24.5	22.0	19.7	20.8	20.6
Philippines	14.0	17.0	16.6	17.4	19.5	18.4	19.4	21.2	22.8	24.2	22.3	21.8	20.3	20.3	19.6	20.8
China	35.7	28.8	23.3	20.0	17.8	14.2	15.7	16.7	22.5	22.7	21.9	21.0	20.4	20.2	20.4	19.0
Memorandum items:																
U.S.	14.7	15.1	15.1	16.6	16.5	15.6	15.3	14.7	14.2	14.2	14.5	14.7	14.8	15.0	14.1	13.7
Europe	16.8	16.4	15.2	14.4	14.2	14.5	13.9	13.8	14.6	14.7	14.8	15.0	14.1	13.2	12.8	12.4

Source: Direction of Trade Statistics, International Monetary Fund.

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C. Modeling Economic Interdependence in the Asia-Pacific Region

17.   Given the important trade and financial linkages, an analysis of the implications of developments and policies in Japan on the Asia-Pacific region needs to be undertaken with a model that adequately captures these interrelationships. The G-Cubed (Asia-Pacific) model—based on the theoretical structure of the G-Cubed model outlined in McKibbin and Wilcoxen (1999)—is well suited for such analysis, having both a detailed country coverage of the region and rich links between the countries through goods and asset markets.[9] The principal features of the model are:

- It is based on explicit intertemporal optimization by agents (households and firms) in each economy.

- In order to track the macro time series, however, the behavior of agents is modified to allow for short-run deviations from such behavior either due to myopia or to restrictions on the ability of households and firms to borrow at the risk free rate on government bonds. For both households and firms, these deviations take the form of rules of thumb which are consistent with an optimizing agent that does not update predictions based on new information about future events. These rules of thumb are chosen to generate the same steady state behavior as optimizing agents so that in the long run there is only a single intertemporal optimizing equilibrium of the model. In the short run, actual behavior is assumed to be a weighted average of the optimizing and rule of thumb assumptions. Thus aggregate consumption is a weighted average of consumption based on wealth (current asset valuation and expected future after tax labor income) and consumption based on current disposable income. This is consistent with the econometric results in Campbell and Mankiw (1987) and Hayashi (1982). Similarly, investment is a weighted average of investment based on Tobin's q (a market valuation of the expected future change in the marginal product of capital relative to the cost) and investment based on a backward looking version of q.

- There is an explicit treatment of financial assets, including money. Money is introduced through a restriction that households require money to purchase goods.

- There is short run nominal wage rigidity (by different degrees across countries), and the model therefore allows for significant periods of unemployment depending on the labor market institutions in each country. This assumption, together with the explicit role for money, is what gives the model its "macroeconomic" characteristics.

- 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

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[9] A number of studies—summarized in McKibbin and Vines (2000)—have shown that the G-cubed model has been useful in assessing a range of issues across a number of countries since the mid-1980s. Full details of the model, including a listing of equations and parameters, can be found at: http://www.msgpl.com.au/msgpl/apgcubed46n/index.htm

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.

18.   As a result of this structure, the G-Cubed model contains rich dynamic behavior, driven on the one hand by asset accumulation and on the other by wage adjustment to a neoclassical steady state. It embodies a wide range of assumptions about individual behavior and empirical regularities in a general equilibrium framework. The interdependencies are solved out using a computer algorithm that solves for the rational expectations equilibrium of the global economy. It is important to stress that economies are not in a full market clearing equilibrium at each point in time, and unemployment does emerge for long periods due to wage stickiness (which differs between countries due to differences in labor market institutions), but it is assumed that market forces eventually drive the world economy to a neoclassical steady state growth equilibrium.

D. The Impact of Recent Shocks in Japan on Asia

19.   In this section, the G-cubed (Asia-Pacific) model is used to assess the implications of three developments in the Japan during the 1990s—the slowdown in productivity growth, the increase in government expenditure, and the decline in equity prices—for the domestic and regional economies. In all the simulations, the Bank of Japan (BoJ) and other central banks are assumed to follow a fixed money stock rule.

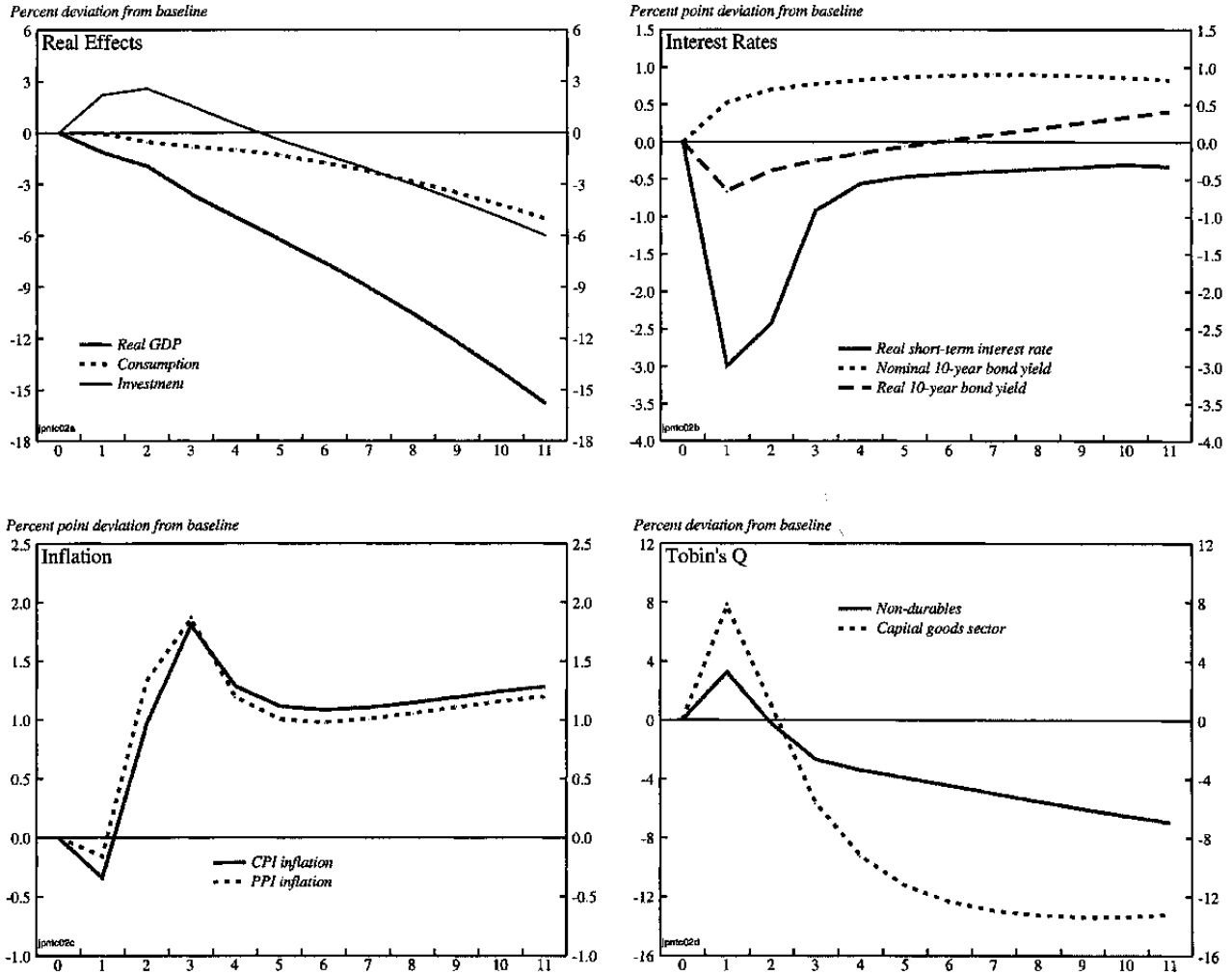### A Decline in Productivity Growth in Japan

20.   The decline in productivity growth in Japan is modeled as a decline (relative to baseline) in the expected growth rate of labor augmenting technical change of 3 percent per annum for 3 years, 1 percent per annum for another 8 years, and then returning to trend after 11 years. The results of the simulation are shown in Figure II.2 for Japan and Figure II.3 for the other countries.

21.   Following the negative shock to productivity, real GDP in Japan immediately falls relative to the baseline, although the impact on growth is initially dampened by two factors.[10] First, because there will be less Japanese goods available globally in the longer run, the relative price of these goods rises, i.e., the long run real exchange rate (the relative price of Japanese goods) appreciates. Forward-looking financial markets understand this outcome, and the exchange rate actually appreciates in the short-run, lowering inflation and inducing a relaxation of monetary policy. Second, because of the expected fall in future labor productivity, there is a substitution in the production process away from labor towards capital and other inputs which, in the short-run, causes investment to increase. This rise is reinforced by the price effect from the exchange rate appreciation which makes imported capital goods less expensive. However, as the initial rise in investment peters out in the second year after
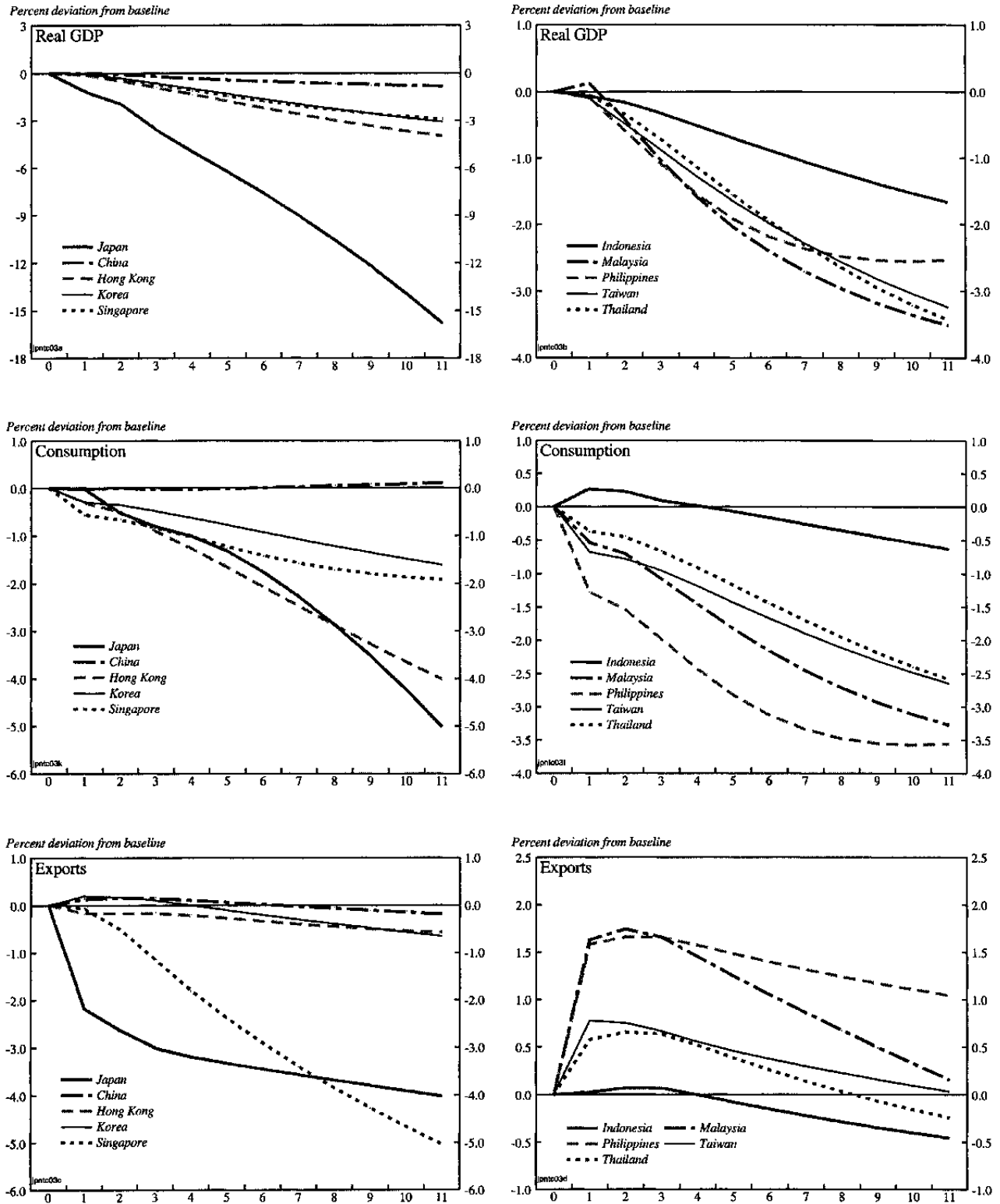
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[10] With the productivity slowdown in Japan argued by many to have begun in the early 1990s, Japan could be considered to be around year 10 in the simulation figures.

Figure II.2. Japan: Effects of a Decline in Productivity Growth

Percent deviation from baseline

Real Effects

- Real GDP
- Consumption
- Investment

jpntc02a

Percent point deviation from baseline

Interest Rates

- Real short-term interest rate
- Nominal 10-year bond yield
- Real 10-year bond yield

jpntc02b

Percent point deviation from baseline

Inflation

- CPI inflation
- PPI inflation

jpntc02c

Percent deviation from baseline

Tobin's Q

- Non-durables
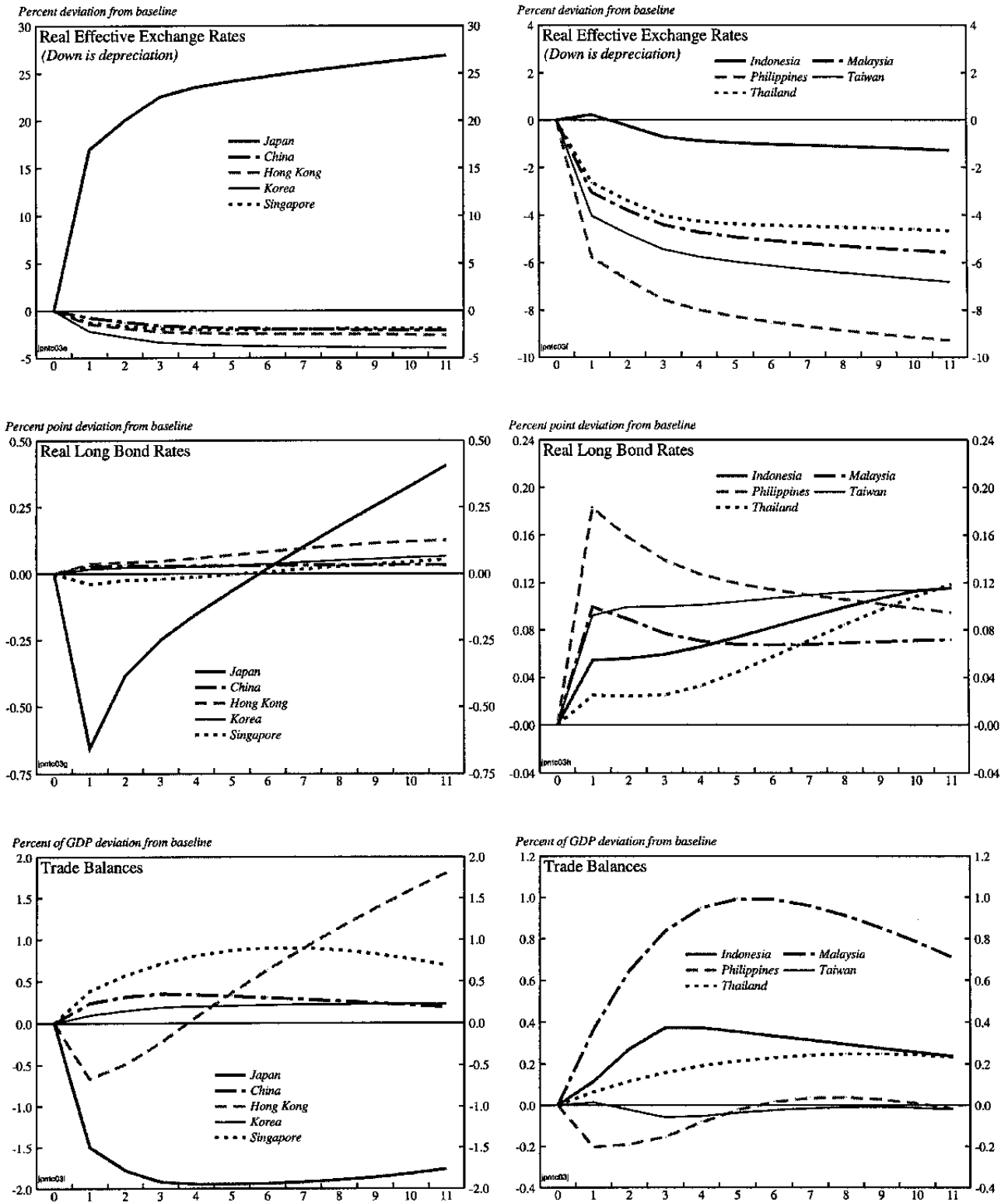- Capital goods sector

jpntc02d

Source: Staff estimates.

Figure II.3. Asia: Effects of a Decline in Japanese Productivity Growth

Source: Staff estimates.

Figure II.3. Asia: Effects of a Decline in Japanese Productivity Growth (Cont'd)

Percent deviation from baseline

Real Effective Exchange Rates
(Down is depreciation)

Japan
China
Hong Kong
Korea
Singapore

Percent deviation from baseline

Real Effective Exchange Rates
(Down is depreciation)

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Percent point deviation from baseline

Real Long Bond Rates

Japan
China
Hong Kong
Korea
Singapore

Percent point deviation from baseline

Real Long Bond Rates

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Percent of GDP deviation from baseline

Trade Balances

Japan
China
Hong Kong
Korea
Singapore

Percent of GDP deviation from baseline

Trade Balances

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Source: Staff estimates.

the shock, the impact of the decline in productivity is fully felt and real GDP begins to decline sharply, falling 15 percent below the baseline after 10 years.

22.   The productivity slowdown in Japan has a negligible impact on the regional economies in the short-term. The appreciation of the yen boosts their competitiveness, offsetting the decline in production in Japan, which reduces the demand for intermediate inputs, and the lower real income, which reduces the demand for final goods. However, over time, the decline in activity in Japan dominates the impact of the lower real exchange rate, and real GDP in the regional economies falls below baseline, although there is some reallocation of capital away from Japan which acts to reduce the negative spillovers. The largest impact is felt in the Philippines, Taiwan, and Malaysia.

A Rise in Government Expenditure

23.   The nature of the Japanese fiscal expansion during the 1990s is open to some interpretation. The increase in expenditure and rise in the deficit may initially have been viewed as temporary in nature, responding to a perceived cyclical downturn in the economy. Given Japan's relatively strong fiscal position at the time, this move into deficit may have been viewed as having few implications for future financing costs, a view consistent with the decline in real long-term bond yields during the first half of the 1990s. However, as the deficit continued to widen, particularly over the past three years, it is likely to increasingly have been viewed as a permanent fiscal expansion, particularly in the absence of a credible policy to bring about medium-term fiscal consolidation. Again, this view appears consistent with the increase in real long-term bond yields since 1998. Consequently, while in this section the implications of a permanent increase in government expenditure are the main focus of the analysis, a discussion is also included of the impact of a temporary fiscal expansion (detailed results from a simulation of a temporary rise in government expenditure can be found in McKibbin and Callen, 2001).
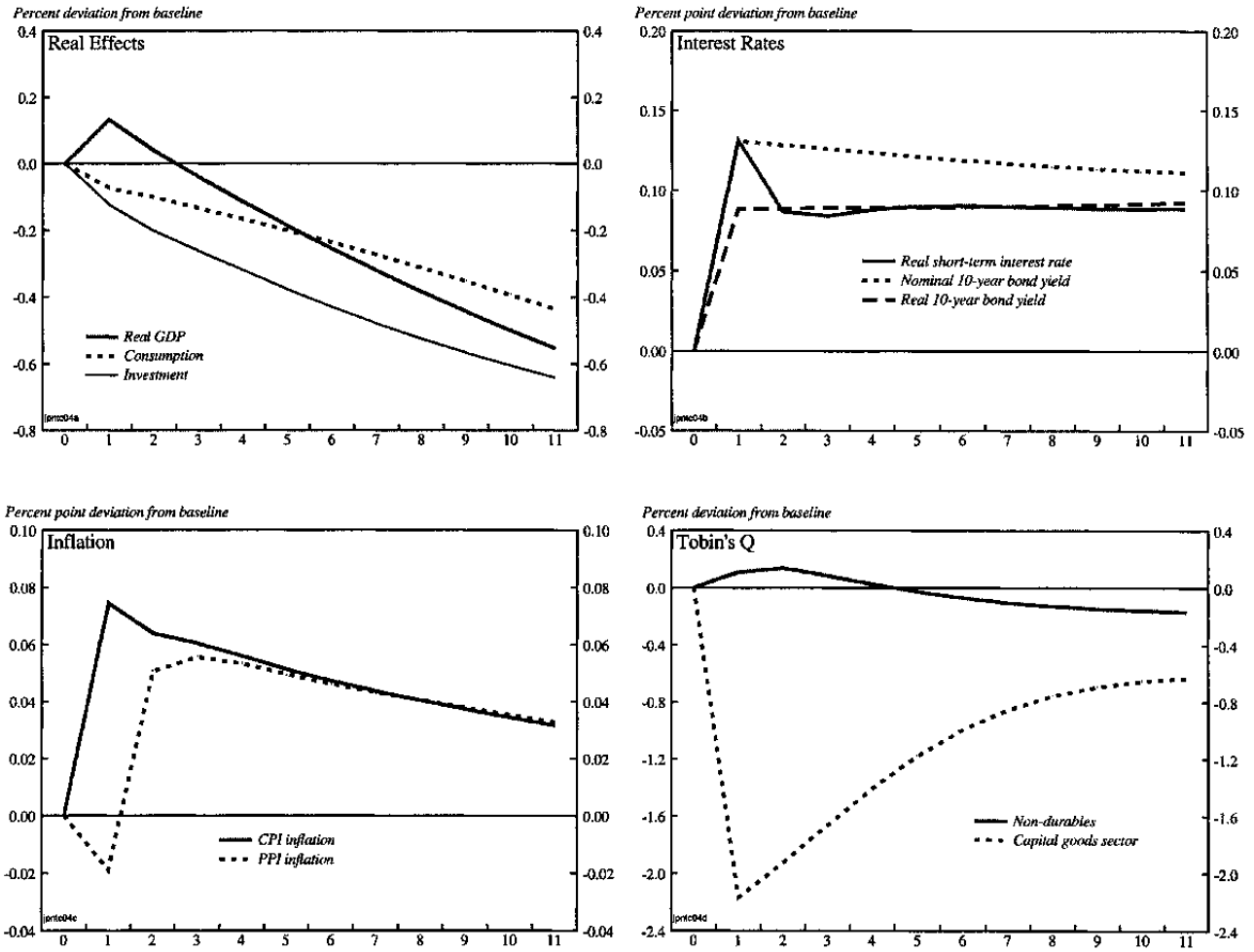
24.   A permanent rise in government spending on goods and services of 1 percent of GDP (relative to baseline), financed by the issuance of government debt, is considered. The additional spending is assumed to be distributed as: 0.1 percent of GDP on durable manufacturing; 0.2 percent of GDP on non-durable manufacturing; and 0.7 percent of GDP on services. 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. The results are shown in Figure II.4 for Japan and Figures II.5 for the other countries.

25.   The results suggest that a permanent fiscal expansion offers only a very short term stimulus to the Japanese economy, and has a negative effect over time. The fiscal expansion has a positive impact on activity in the first year, although this is not as large as the direct stimulus itself due to the negative impact on consumption and investment. The additional government spending on goods and services raises aggregate demand through conventional Keynesian channels in the short run. As there is some stickiness in wages, real wages fall, and additional labor is forthcoming to temporarily satisfy the additional demand.
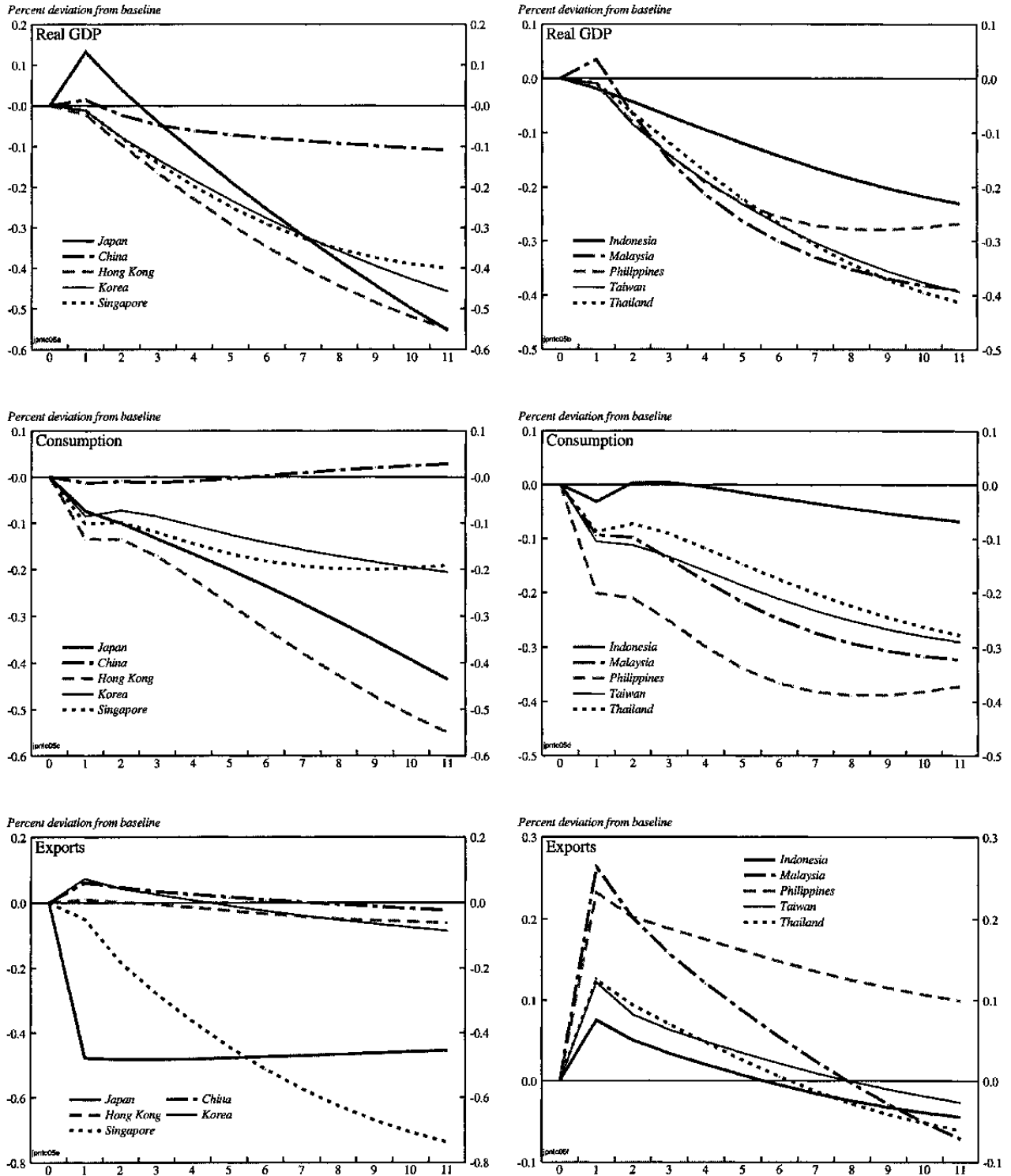
Figure II.4. Japan: Effects of a Permanent Increase in Government Spending
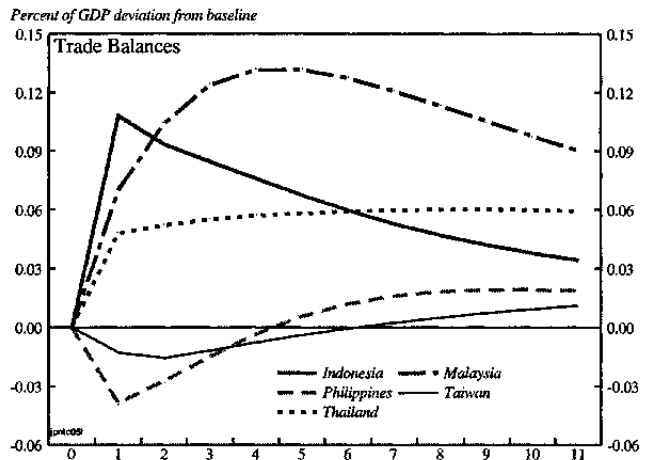
(Increase = 1 percent of GDP)

Percent deviation from baseline

Real Effects

Real GDP
Consumption
Investment

Percent point deviation from baseline

Interest Rates

Real short-term interest rate
Nominal 10-year bond yield
Real 10-year bond yield

Percent point deviation from baseline

Inflation

CPI inflation
PPI inflation

Percent deviation from baseline

Tobin's Q

Non-durables
Capital goods sector

Source: Staff estimates.

Figure II.5. Asia: Effects of a Permanent Increase in Japanese Government Spending

(Increase = 1 percent of GDP)

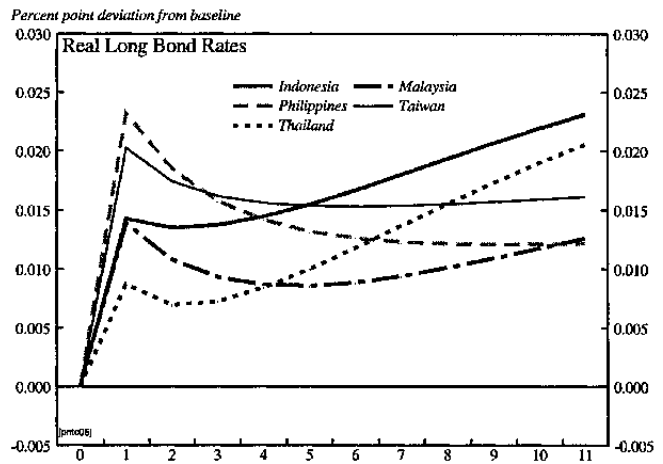*Percent deviation from baseline* — Real GDP (Japan, China, Hong Kong, Korea, Singapore)

Percent deviation from baseline — Real GDP (Indonesia, Malaysia, Philippines, Taiwan, Thailand)

Percent deviation from baseline — Consumption (Japan, China, Hong Kong, Korea, Singapore)

Percent deviation from baseline — Consumption (Indonesia, Malaysia, Philippines, Taiwan, Thailand)

Percent deviation from baseline — Exports (Japan, China, Hong Kong, Korea, Singapore)

Percent deviation from baseline — Exports (Indonesia, Malaysia, Philippines, Taiwan, Thailand)
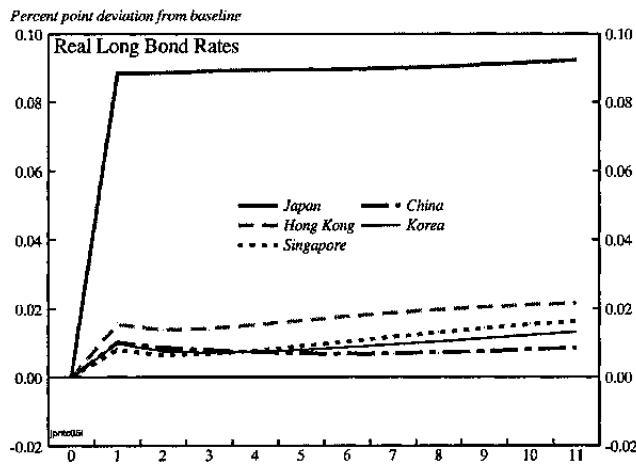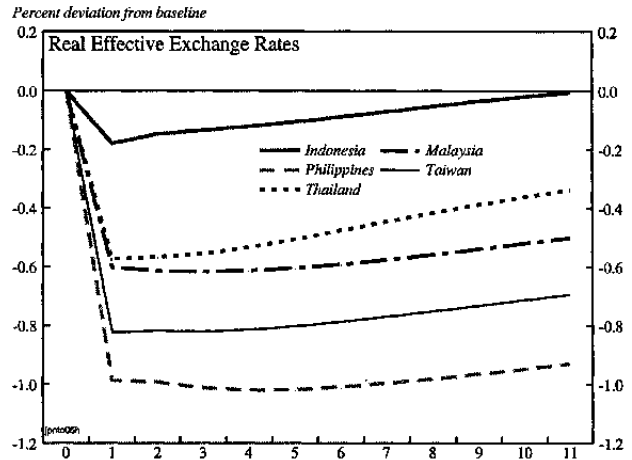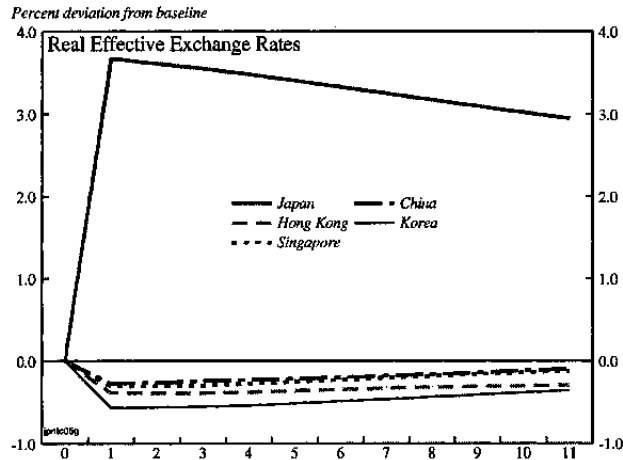
Source: Staff estimates.

Figure II.5. Asia: Effects of a Permanent Increase in Japanese Government Spending (Cont'd)

(Increase = 1 percent of GDP)

Percent deviation from baseline

Real Effective Exchange Rates

Japan — China
Hong Kong — Korea
Singapore

Percent deviation from baseline

Real Effective Exchange Rates

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Percent point deviation from baseline

Real Long Bond Rates

Japan — China
Hong Kong — Korea
Singapore

Percent point deviation from baseline

Real Long Bond Rates

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Percent of GDP deviation from baseline

Trade Balances

Japan
China
Hong Kong
Korea
Singapore

Percent of GDP deviation from baseline

Trade Balances

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Source: Staff estimates.

26.   However, the effects of the anticipated future fiscal deficits are also important. In anticipation of higher future taxes, households increase their saving and consumption therefore falls. But this effect is relatively small, and the additional resources required to finance the future deficits requires higher future real interest rates as the government competes with the private sector for domestic and foreign savings. The higher expected future real interest rates cause real long-term interest rates to rise, which attracts capital from overseas (either the repatriation of Japanese capital from abroad or new foreign capital inflows) and appreciates the exchange rate. In turn, these developments hurt equity prices, result in a decline in Tobin's q, and a fall in private investment, while exports are negatively impacted by the more appreciated exchange rate. Thus, real GDP rises slightly above the baseline in the first year, but by the third year is below the baseline as the debt burden rises and crowds out private activity (growth is roughly 0.1 percent per annum lower than in the baseline over the medium-term—the impact on the growth rate can be calculated from the slope of the GDP line in Figure II.4). As government expenditure has risen by around 8 percent of GDP over the past decade, the results suggest that real GDP growth will be a little under 1 percent lower over the medium-term (relative to the baseline).

27.   The relative trade reliance on Japan and the size of the external debt stock determines the transmission of the rise in government expenditure in Japan to other countries in the region. While in some countries there is a very small positive impact in the short run as the temporary demand stimulus in Japan raises the demand for their exports, the impact quickly turns negative both directly through higher real interest rates and because equity prices in Asia fall, affecting private consumption and investment, and in the longer run the negative effects on Asia reflect those in Japan. The smallest impact is estimated to be in China and the largest in Hong Kong.

28.   In contrast to the permanent increase in government expenditure, the economic implications of a temporary fiscal stimulus are more favorable. The key difference is the impact on real interest rates and future tax liabilities. Because the stimulus is only temporary, it has a minimal impact on real interest rates and household expectations of future tax liabilities, and in contrast to the permanent expansion, private consumption and investment are not therefore significantly affected. Consequently, the additional government expenditure boosts the economy in the short-run without having significant negative consequences for other components of demand.

A Decline in Japanese Equity Prices

29.   A decline in Japanese equity prices is modeled as a permanent 3 percent rise in the equity risk premium (implying that Japanese equities require a rate of return 3 percent higher

relative to government bonds compared to the baseline).[11] The results are shown in Figure II.6 for Japan and Figure II.7 for other countries.

30.   The immediate impact of a rise in the equity risk premium is a sharp drop in equity prices. The resulting decline in Tobin's q causes investment to fall, while consumption is also adversely affected by the decline in private wealth. However, as capital flows out of Japan, the yen weakens, which boosts net exports, improves the current account balance, and dampens the initial negative impact on real GDP. Long term interest rates also decline, although there is a spike in short-term nominal interest rates because of a tightening of monetary policy in response to the rise in inflation (this reflects the assumed monetary policy reaction function—an alternative reaction function could change this short run outcome, but would not affect the medium to long term adjustment path). However, as consumption and investment weaken over the medium-term, real GDP falls sharply relative to the baseline.

31.   A slowdown due to a rise in equity risk (i.e., a loss of confidence) in Japan is transmitted positively to the rest of the world. Again there are a number of things happening. The capital outflow from Japan lowers real interest rates outside Japan, which raises investment and helps economies with high foreign debt levels. However, exports are negatively affected, although because the slowdown in Japan is asymmetric within the economy—exporting firms gain from the weaker yen whereas firms focused on the domestic economy suffer—countries that sell goods to the domestic Japanese market are more affected than those that sell inputs for exports. In addition, countries that compete with Japan in third markets will lose competitiveness because of the yen depreciation. Adding these effects together, all Asian countries gain in terms of GDP (although not necessarily in terms of income) because ultimately Japanese production is partially relocated to countries with lower financing costs.
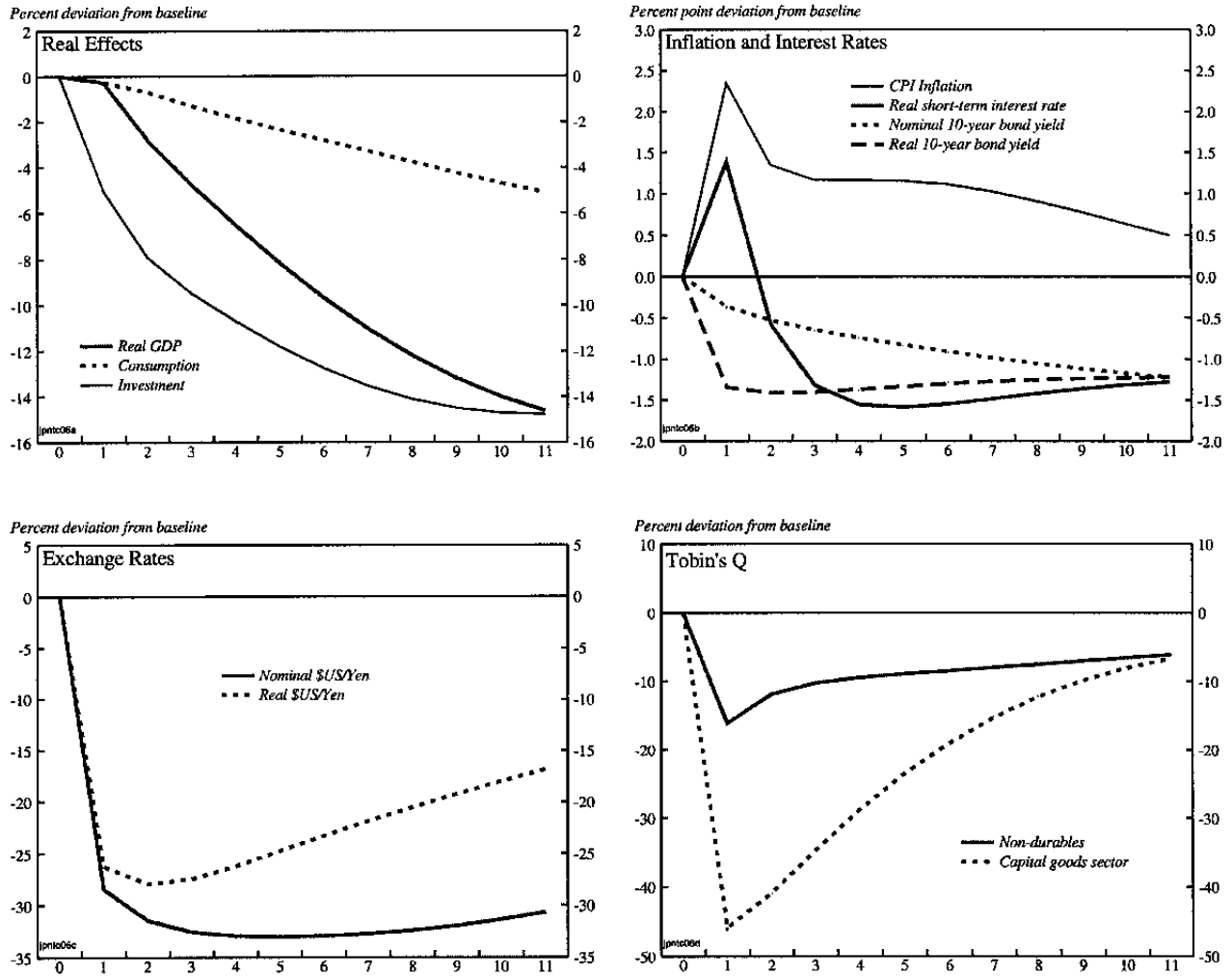
E. The Impact of Future Shocks and Policy Changes in Japan on Asia

32.   With the economy having again faltered since the middle of 2000, there has been a renewed focus on the policies needed to bring about a sustained economic recovery in Japan over the medium-term. The new Prime Minister, Mr. Koizumi, has advocated measures to address the NPL problem in the banking sector, bring about fiscal consolidation, and accelerate structural reforms to raise productivity growth, while there has been an active debate about the scope for further monetary easing and the impact this may have on the economy and the region, including through a depreciation of the yen. This section explores a number of these issues.
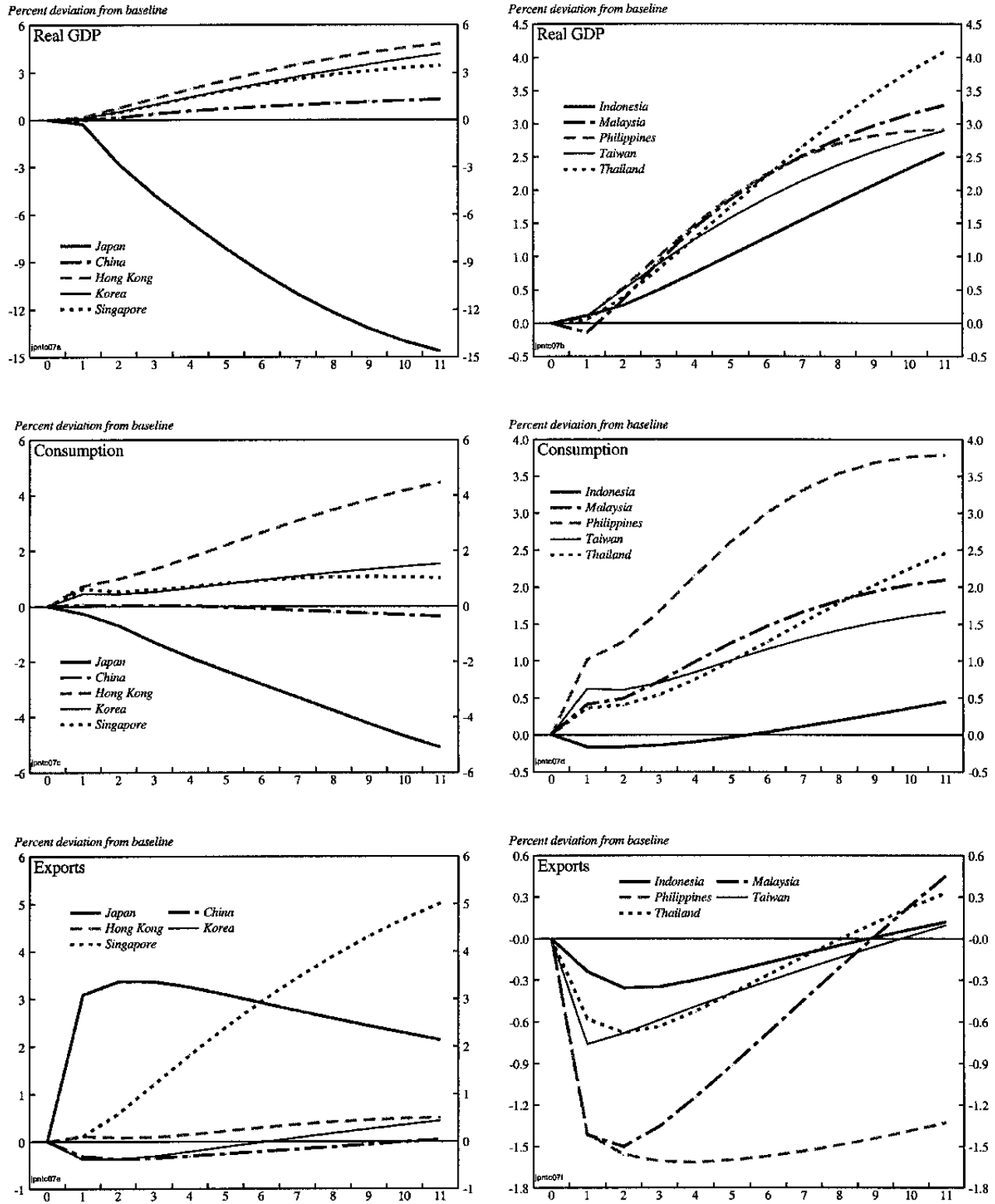
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[11] The model includes risk premia on certain assets calibrated to be equal to whatever is required to make the model-generated asset returns equal to the observed returns in the base year (1999). These risk premia are held constant during the simulations unless they are exogenously changed (as in the current simulation).

Figure II.6. Japan: Effects of an Increase in the Risk of Holding Japanese Equity
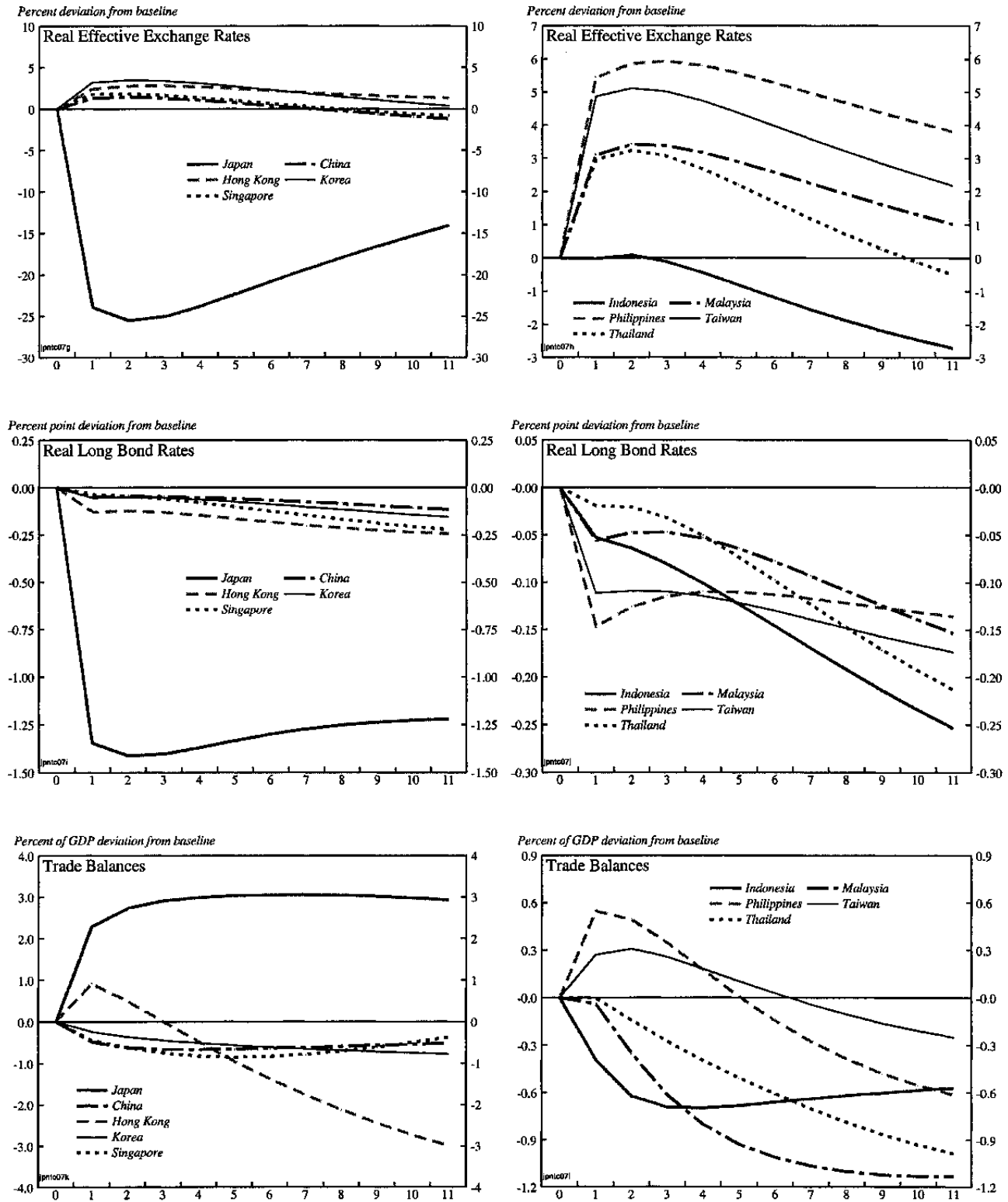
Percent deviation from baseline

Real Effects

Real GDP
Consumption
Investment

Percent point deviation from baseline

Inflation and Interest Rates

CPI Inflation
Real short-term interest rate
Nominal 10-year bond yield
Real 10-year bond yield

Percent deviation from baseline

Exchange Rates

Nominal $US/Yen
Real $US/Yen

Percent deviation from baseline

Tobin's Q

Non-durables
Capital goods sector

Source: Staff estimates.

Figure II.7. Asia: Effects of an Increase in the Risk of Holding Japanese Equity

Source: Staff estimates.

Figure II.7. Asia: Effects of an Increase in the Risk of Holding Japanese Equity (Cont'd)

Percent deviation from baseline

Real Effective Exchange Rates

Japan — China
Hong Kong — Korea
Singapore

Percent deviation from baseline

Real Effective Exchange Rates

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Percent point deviation from baseline

Real Long Bond Rates

Japan — China
Hong Kong — Korea
Singapore

Percent point deviation from baseline

Real Long Bond Rates

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Percent of GDP deviation from baseline

Trade Balances

Japan
China
Hong Kong
Korea
Singapore

Percent of GDP deviation from baseline

Trade Balances

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Source: Staff estimates.

Fiscal Consolidation

33.   Prime Minister Koizumi has indicated his intention to move toward fiscal
consolidation, committing to limit net issuance of JGBs to ¥30 trillion in FY2002, and
suggesting a medium-term objective of achieving primary budgetary balance. In this
simulation, the impact of a phased, fully credible, fiscal consolidation is considered, where
government expenditure is reduced by 1.7 percent of GDP in the first year, 3.4 percent of
GDP in the second year, and 5 percent of GDP from the third year onwards (relative to
baseline).[12] The results are presented in Figure II.8 for Japan and Figure II.9 for other
countries (the impact of a permanent, one-off, reduction in government expenditure can be
seen by inverting the results in Figures II.4 and II.5).

34.   In response to the announcement of the fiscal consolidation plan, the model predicts
that real interest rates would fall as financial markets react to the lower expected future
deficits. At the same time, the yen would depreciate by around 15 percent. As households
anticipate the lower future tax obligations, consumption would rise, while the exchange rate
depreciation would boost net exports. These factors would more than offset the declines in
government expenditure and private investment, the latter due to the lower expected growth
during years 2-4 which would push down equity prices, and real GDP rises in the first year.
Because inflation rises in response to the depreciation and the pick-up in growth, short-term
interest rates rise (if the BoJ did not raise interest rates, the initial output response would be
even more positive). However, real GDP would fall below baseline in the second and third
years as the positive impact from the financing gains is more than offset by the actual decline
in government expenditure, and it is only from the fifth year that it once again moves above
the baseline as the positive impact of the decline in real interest rates and the real exchange
rate on consumption, investment, and net exports is fully felt.
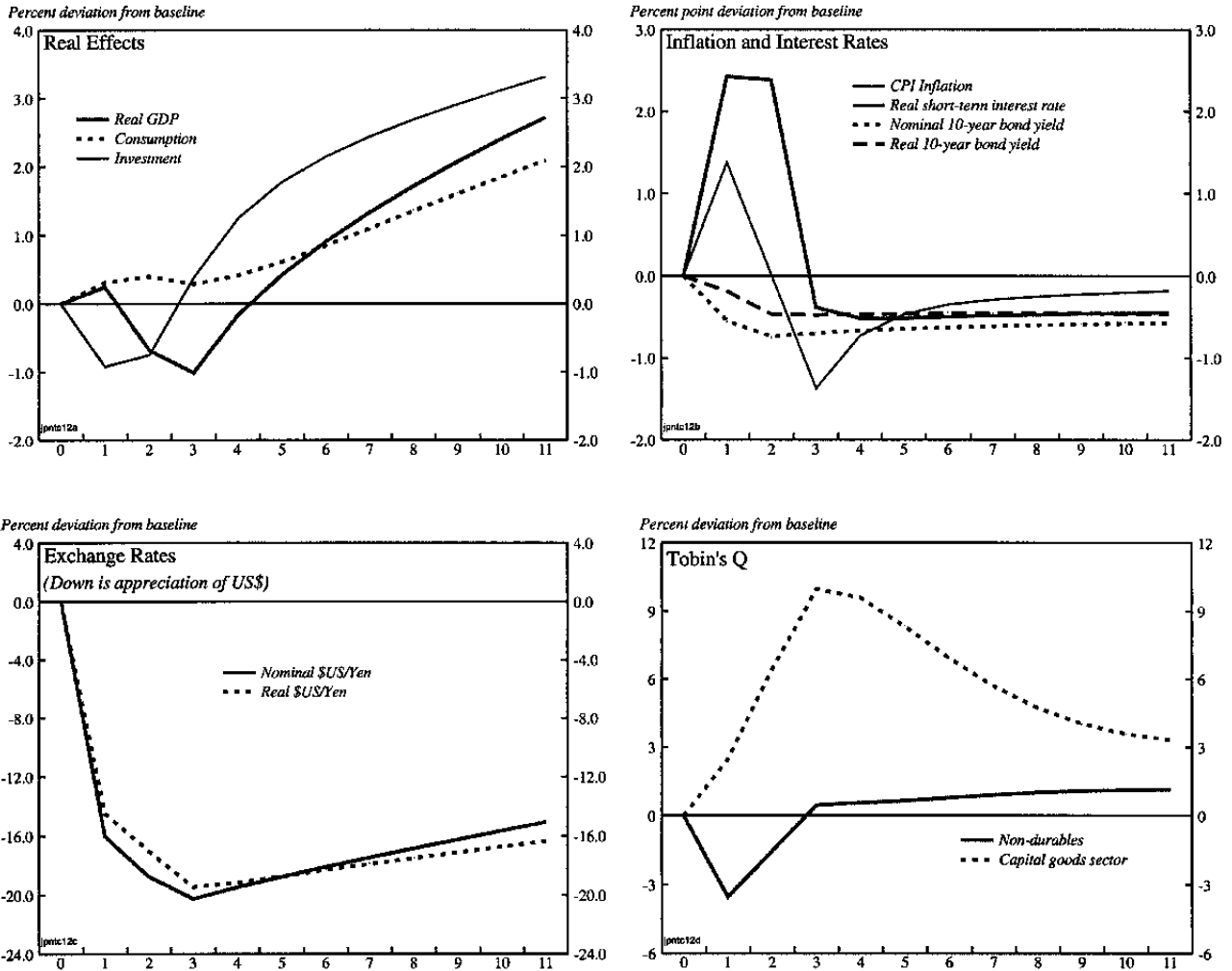
35.   When compared to the (inverse) of the temporary fiscal expansion considered in the
previous section, this simulation shows the potential benefits of announcing a fully credible
fiscal consolidation strategy as against one that is not believed. While even in the case of a
credible consolidation there are short-run costs to output as government demand is withdrawn
from the economy, these are partly mitigated by the positive announcement effect on
consumption and investment brought about by the rise in equity prices, decline in long-term
interest rates, and the lower future tax liabilities of households. In the case of the temporary
consolidation, none of these offsetting factors are apparent.

36.   The impact on the other Asian economies is similar (but opposite in sign) to the
results discussed earlier for a fiscal expansion in Japan. In the first year, the impact depends
on the relative importance of trade and financial links, but is small. While the depreciation of
the yen offsets the rise in demand in Japan, countries with high debt levels (such as
Indonesia) actual see an increase in real GDP. In the second year, all the Asian economies are
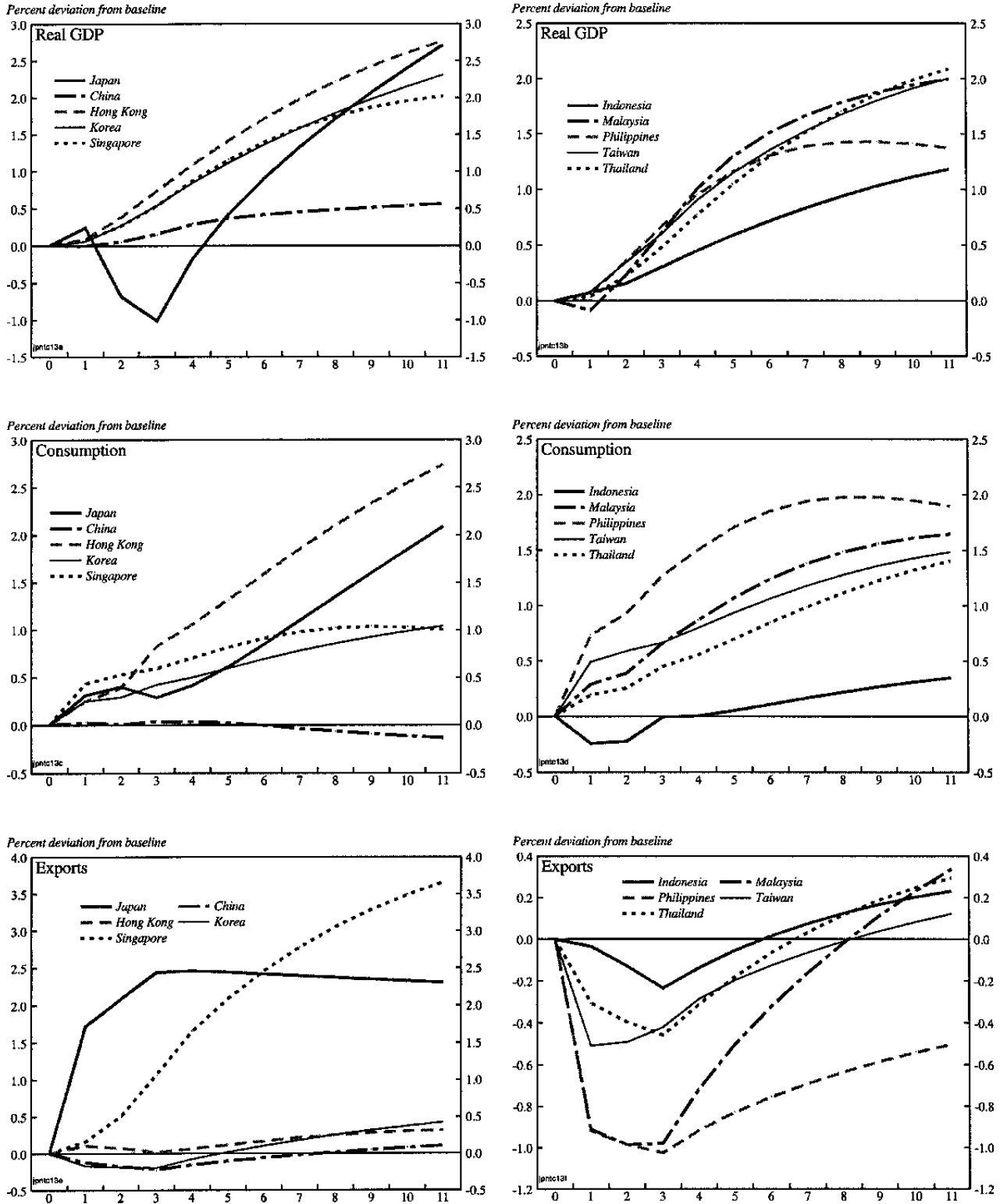
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[12] While it is unlikely that any consolidation would happen this quickly, for the purposes of
the simulations it is useful to have it occurring in a relatively short period of time so that the
competing effects of the policy become more clearly visible.

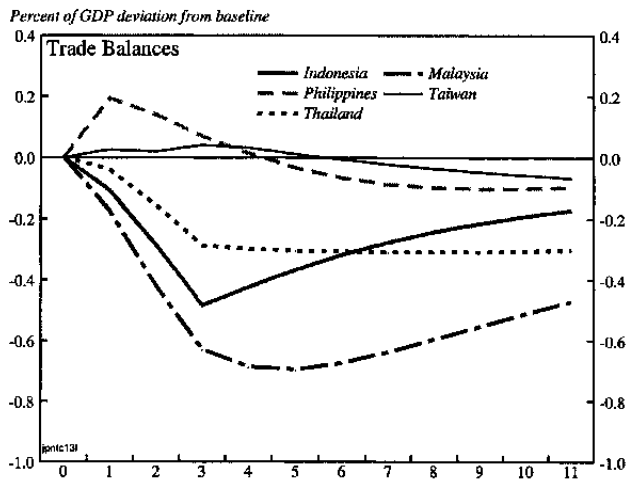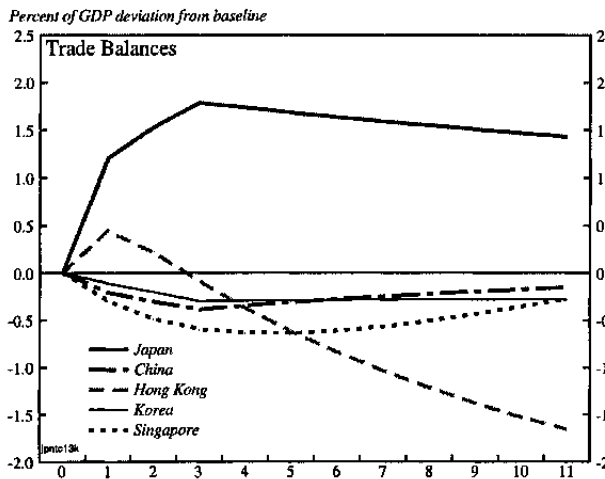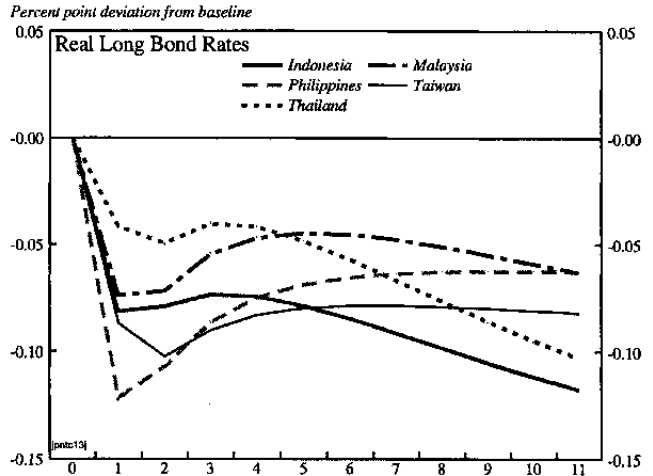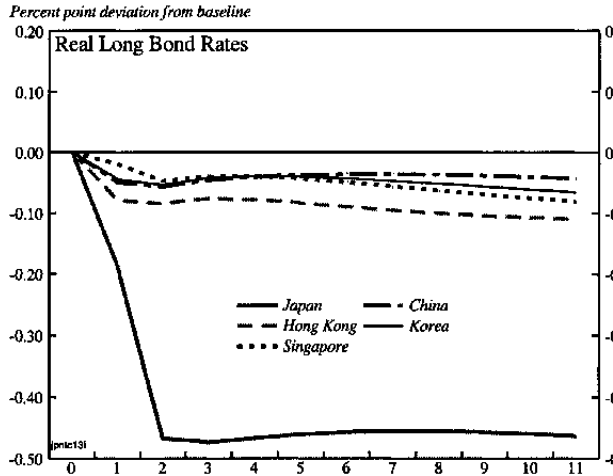# Figure II.8. Japan: Effects of a Phased Fiscal Consolidation

Percent deviation from baseline

Real Effects

— Real GDP
··· Consumption
— Investment

jpnic12a

Percent point deviation from baseline

Inflation and Interest Rates

— CPI Inflation
— Real short-term interest rate
··· Nominal 10-year bond yield
– – Real 10-year bond yield

jpnic12b

Percent deviation from baseline

Exchange Rates
(Down is appreciation of US$)

— Nominal $US/Yen
··· Real $US/Yen

jpnic12c

Percent deviation from baseline

Tobin's Q

— Non-durables
··· Capital goods sector

jpnic12d

Source: Staff estimates.

Figure II.9. Asia: Effects of a Phased Fiscal Consolidation in Japan

Percent deviation from baseline

Real GDP

— Japan
— China
— Hong Kong
— Korea
··· Singapore

Percent deviation from baseline

Real GDP

— Indonesia
— Malaysia
— Philippines
— Taiwan
··· Thailand

Percent deviation from baseline

Consumption

— Japan
— China
— Hong Kong
— Korea
··· Singapore

Percent deviation from baseline

Consumption

— Indonesia
— Malaysia
— Philippines
— Taiwan
··· Thailand

Percent deviation from baseline

Exports

— Japan   — China
— Hong Kong — Korea
··· Singapore

Percent deviation from baseline

Exports

— Indonesia   — Malaysia
— Philippines — Taiwan
··· Thailand

Source: Staff estimates.

Figure II.9. Asia: Effects of a Phased Fiscal Consolidation in Japan (Cont'd)

Percent deviation from baseline

Real Effective Exchange Rates

Japan — China
Hong Kong — Korea
Singapore

Percent deviation from baseline

Real Effective Exchange Rates

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Percent point deviation from baseline

Real Long Bond Rates

Japan — China
Hong Kong — Korea
Singapore

Percent point deviation from baseline

Real Long Bond Rates

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Percent of GDP deviation from baseline

Trade Balances

Japan
China
Hong Kong
Korea
Singapore

Percent of GDP deviation from baseline

Trade Balances

Indonesia — Malaysia
Philippines — Taiwan
Thailand

Source: Staff estimates.

gaining more from lower capital costs than they are losing from a temporary slowdown in Japan and the weaker yen, and the benefits over the medium term are estimated to be considerable.
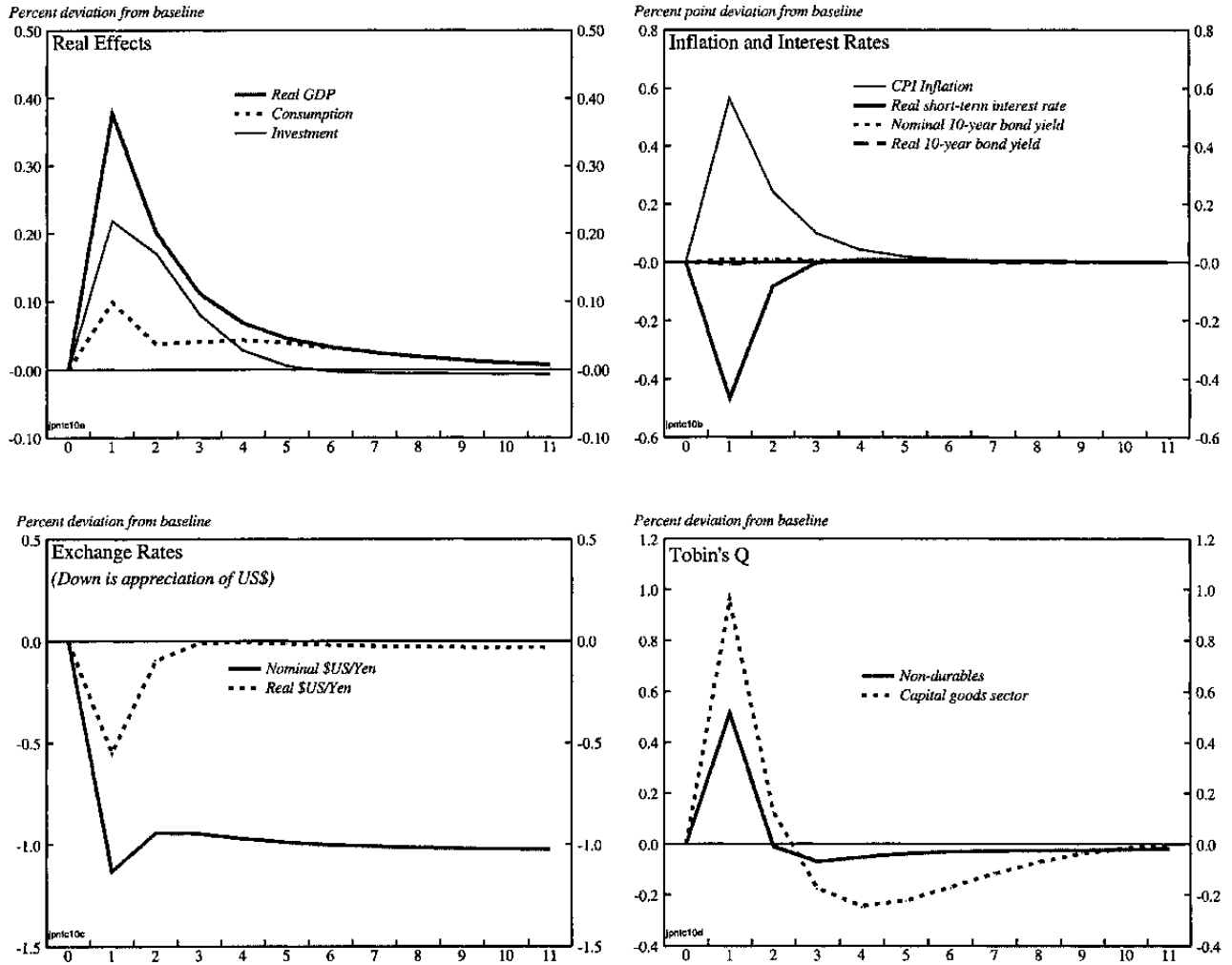
Quantitative Monetary Easing

37.   With nominal short-term interest rates in Japan having been at, or near zero, for a number of years, debate has focused on whether the BoJ should seek to undertake quantitative easing, including through increased *rinban* operations, to provide additional liquidity to the economy. While such a policy would be moving into uncharted waters, and consequently is difficult to quantify, the G-cubed model provides an insight into the possible transmission mechanism of such a policy both in Japan and across the region more broadly. In the simulation, the BoJ is assumed to purchase government bonds sufficient to bring about a permanent 1 percent increase in the money supply relative to the baseline. The results are shown in Figure II.10 for Japan and Figure II.11 for the other countries.

38.   The monetary injection raises inflation expectations and consequently lowers short-term real interest rates (nominal interest rates, of course, are constrained by the zero-bound) and depreciates the exchange rate. The decline in real interest rates and rise in equity prices temporarily stimulates private consumption and investment and the yen depreciation temporarily boosts net exports. The result is a temporary rise in real GDP through standard Keynesian channels—a demand stimulus accompanied by a fall in real wages and real interest rates temporarily increasing aggregate supply. Over time, however, price adjustment removes the real effects of the monetary shock and the economy settles down to the original baseline with higher prices, but not higher inflation due to the shock being a rise in the level of money balances (a shock to the rate of growth of money results in a larger stimulus to demand, but also a permanent change in the underlying inflation rate in Japan). Long-term interest rates change little because the inflationary impulse is temporary, while the change in the real exchange rate that stimulates net exports is largely eroded by the second year.

39.   The effects on the rest of Asia are small. The temporary boost to aggregate demand leads to an increase in the demand for Asian goods in Japan, but this is offset by the 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, and exports from each Asian economy to Japan, and into third markets in which they compete with Japanese goods, falls. 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 in the baseline for several more years. Despite the export response being negative for growth in Asian economies in the first year, real GDP is broadly unchanged as equity prices rise in anticipation of the growth in periods 2 through 5, which raises private wealth and consumption sufficiently to offset the export decline.
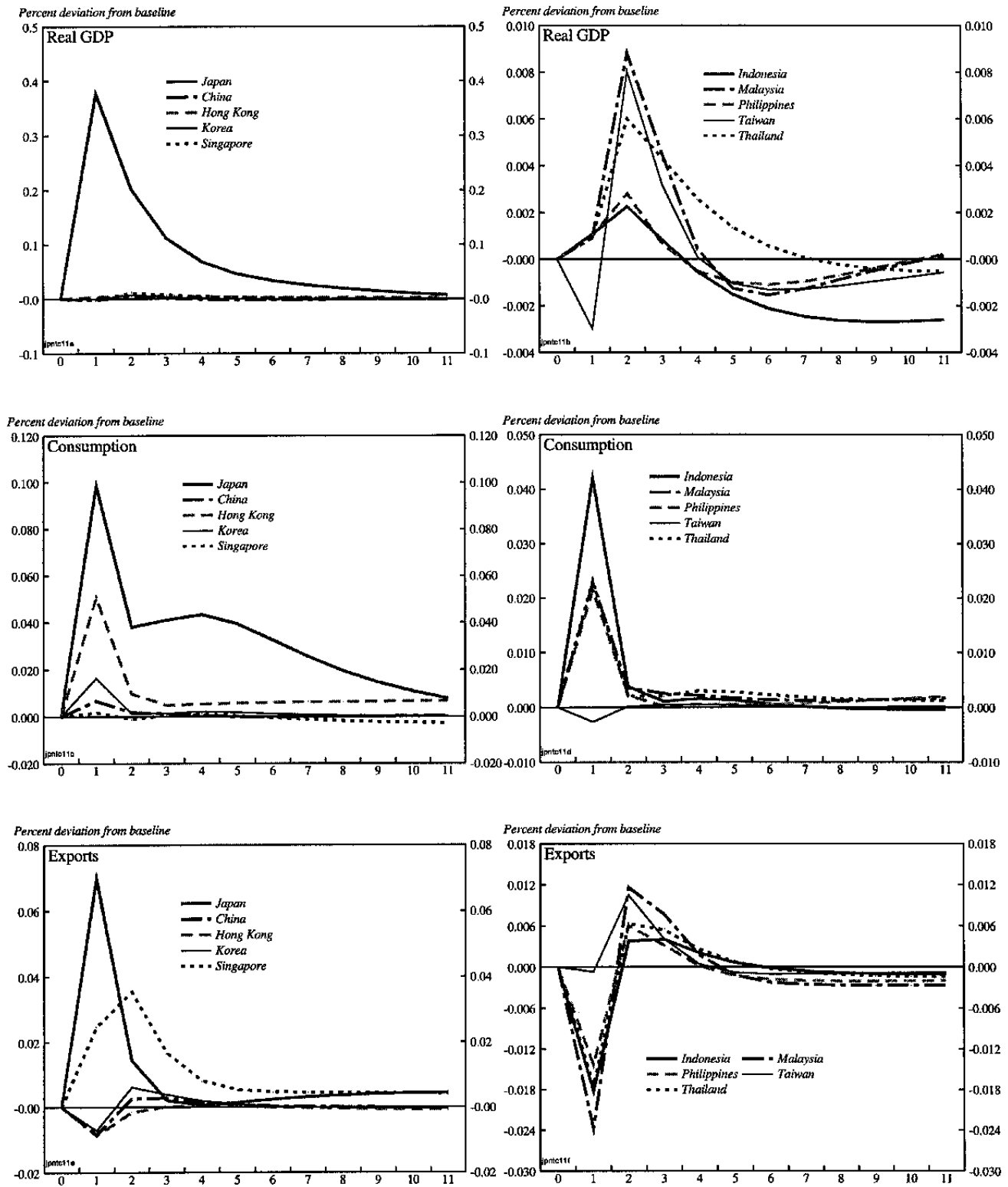
40.   Of course, the numerical results from the simulations are subject to considerable uncertainty in the current economic environment (for example, the behavior of velocity, which is assumed to remain constant in the simulation, is very difficult to predict under such a quantitative easing scenario), while the model is obviously unable to address the questions of whether an increase in the BoJ's quantitative target could actually be achieved through

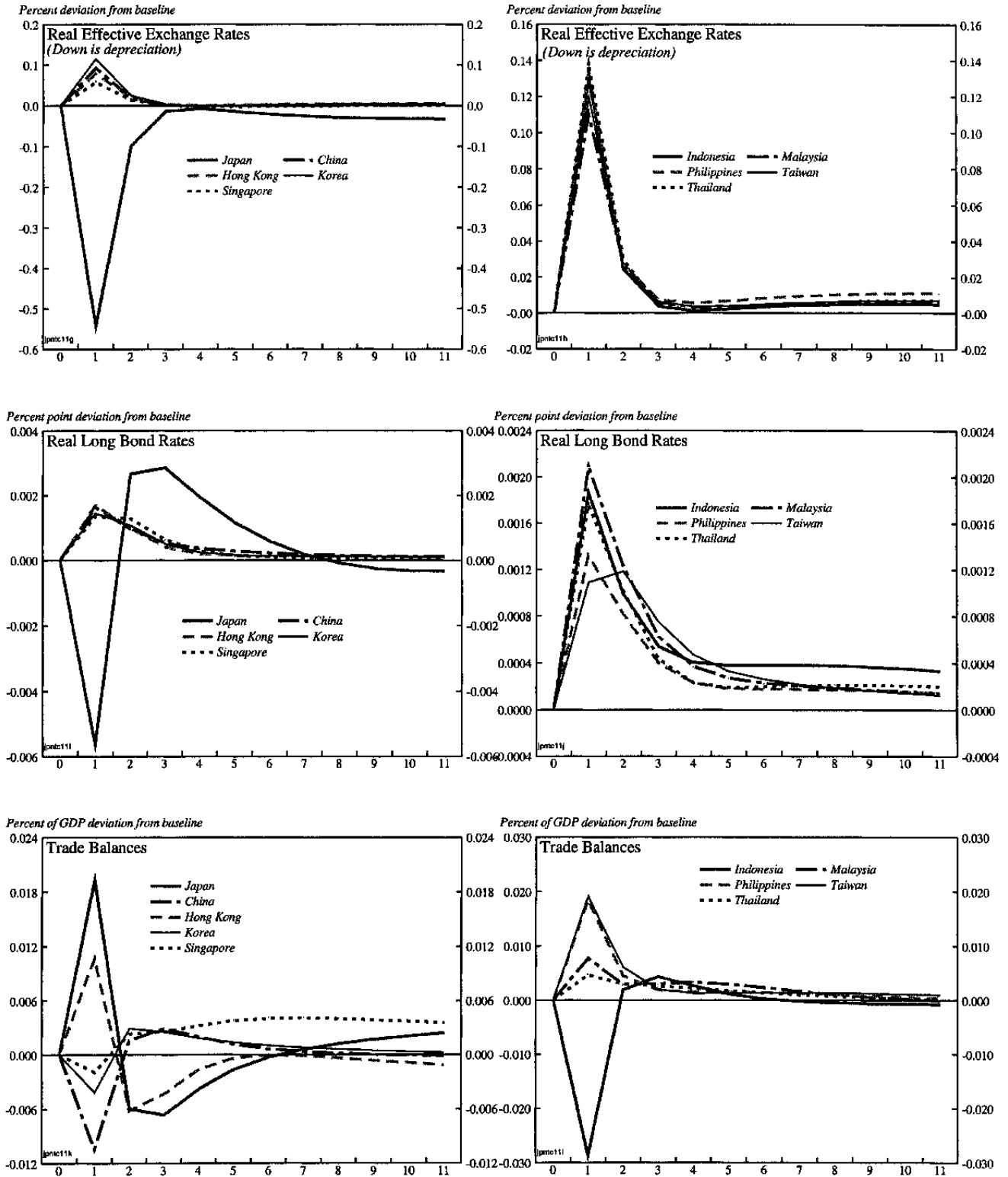# Figure II.10. Japan: Effects of a 1 Percent Monetary Expansion

Percent deviation from baseline

Real Effects

- Real GDP
- Consumption
- Investment

jpntc10a

Percent point deviation from baseline

Inflation and Interest Rates

- CPI Inflation
- Real short-term interest rate
- Nominal 10-year bond yield
- Real 10-year bond yield

jpntc10b

Percent deviation from baseline

Exchange Rates
(Down is appreciation of US$)

- Nominal $US/Yen
- Real $US/Yen

jpntc10c

Percent deviation from baseline

Tobin's Q

- Non-durables
- Capital goods sector

jpntc10d

Source: Staff estimates.

Figure II.11. Asia: Effects of a 1 Percent Japanese Monetary Expansion

Percent deviation from baseline

Real GDP

Japan
China
Hong Kong
Korea
Singapore

jpntc11a

Percent deviation from baseline

Real GDP

Indonesia
Malaysia
Philippines
Taiwan
Thailand

jpntc11b

Percent deviation from baseline

Consumption

Japan
China
Hong Kong
Korea
Singapore

jpntc11c

Percent deviation from baseline

Consumption

Indonesia
Malaysia
Philippines
Taiwan
Thailand

jpntc11d

Percent deviation from baseline

Exports

Japan
China
Hong Kong
Korea
Singapore

jpntc11e

Percent deviation from baseline

Exports

Indonesia   Malaysia
Philippines   Taiwan
Thailand

jpntc11f

Source: Staff estimates.

Figure II.11. Asia: Effects of a 1 Percent Japanese Monetary Expansion (Cont'd)

Source: Staff estimates.

stepped-up purchases of government bonds and whether, in the presence of a weak banking system, a higher quantitative target would impact on the real economy. However, the simulation suggests that the primary transmission channels of such a bond purchase would be through inflation expectations, the exchange rate, and equity prices. Further, it suggests that if part of an overall monetary easing that was successful in boosting the Japanese economy, a depreciation of the yen would have a minimal impact on other regional economies.

A Loss of Confidence in the Yen

41.   If investors perceive that the reforms needed to restore healthy growth in Japan over the medium-term are not being implemented, thus increasing the risk of a further round of financial difficulties in the banking sector and raising questions about the sustainability of public debt, a significant outflow of capital is possible. In this simulation, this is modeled as a 3 percentage point increase in the risk premium on all Japanese assets in the interest parity condition between yen and U.S. dollar denominated government bonds (the simulation is similar to the loss of confidence in Japanese equities discussed earlier, but in this case the risk shock is applied to the entire Japanese economy reflecting the loss of confidence in the yen). The results are shown in Figure II.12 for Japan and Figure II.13 for the other countries.

42.   The results are similar to those for the rise in the equity risk premium. The major difference is that whereas in that simulation there was a shift into Japanese government bonds, which pushed down long-term real interest rates in Japan, in this simulation the asset substitution is solely into foreign assets and therefore long-term real interest rates rise. The depreciation of the yen is larger—around 45 percent—and the domestic output loss in Japan is more significant. The impact on other countries in the region is broadly neutral in the first year, but positive thereafter as the benefits of the lower capital costs caused by the additional inflow of capital (the mirror of the outflows from Japan) push down real interest rates and stimulate investment which more than offsets the decline in exports that result from the weaker growth in Japan and the loss of competitiveness due to the depreciation of the yen.

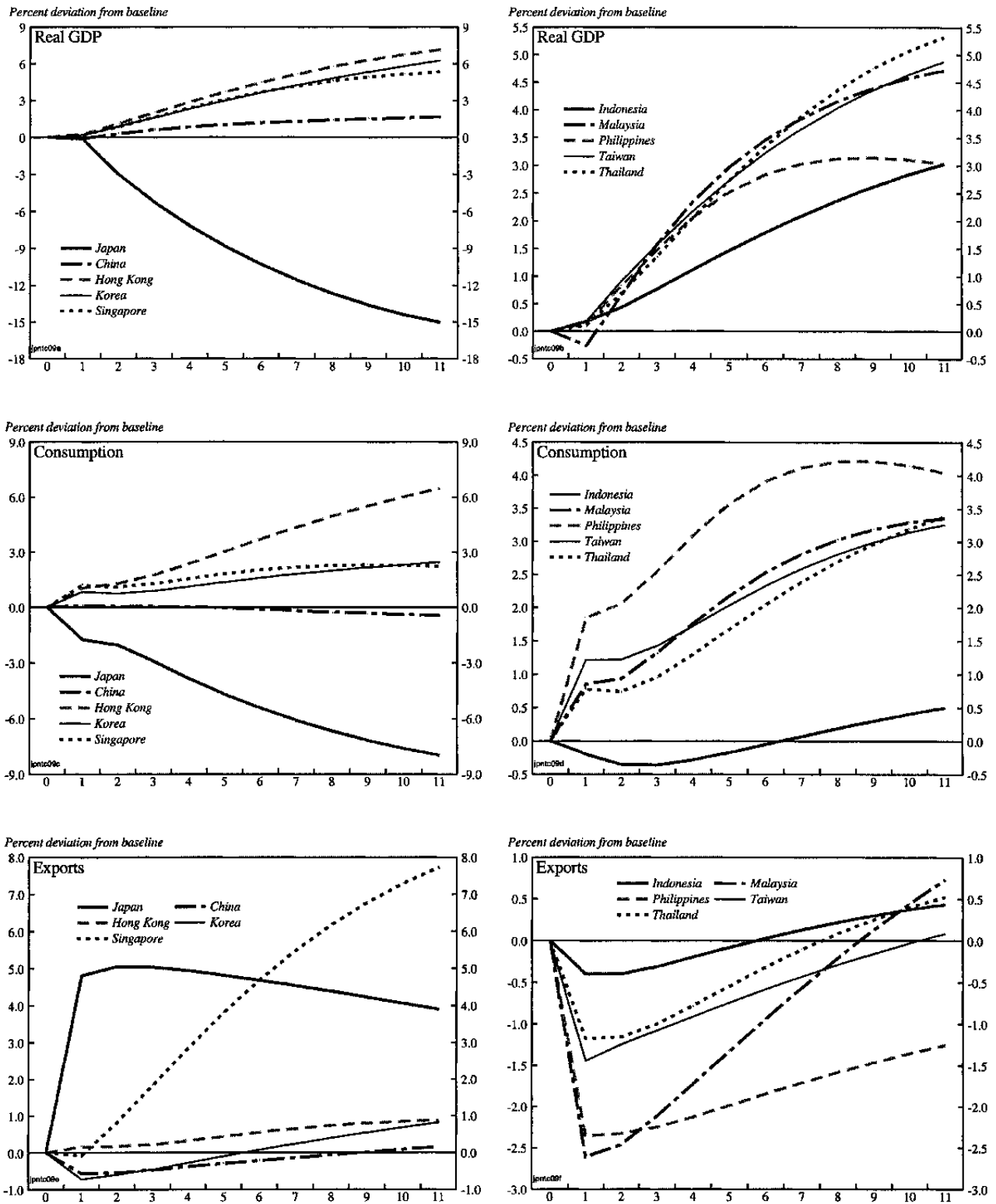## F. Conclusions and Policy Implications

43.   This paper has highlighted a number of important issues in understanding the transmission of shocks between Japan and the Asia-Pacific region. Because trade and financial linkages are significant, shocks are transmitted across countries through goods and asset markets, and the adequate modeling of these links is important if a complete assessment of the impact of the shocks is to be made. While the actual magnitude of the impact of the shocks considered will likely be different to the precise numerical predictions of the model, the insights provided about the transmission mechanism are important. For example, the results suggest that trade linkages often work in the opposite direction to financial linkages, and that there is often a tradeoff between the positive effects from a shock through one channel and the negative effects through the other. Indeed, financial flows act as automatic stabilizers in many of the simulations considered. It also appears to matter whether the trade linkages are for final consumption goods or for intermediate goods to be used in production. The relative importance of each channel determines the overall impact of the shocks.

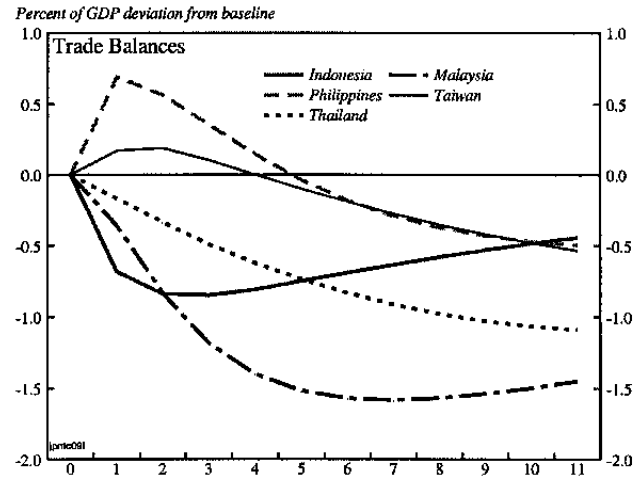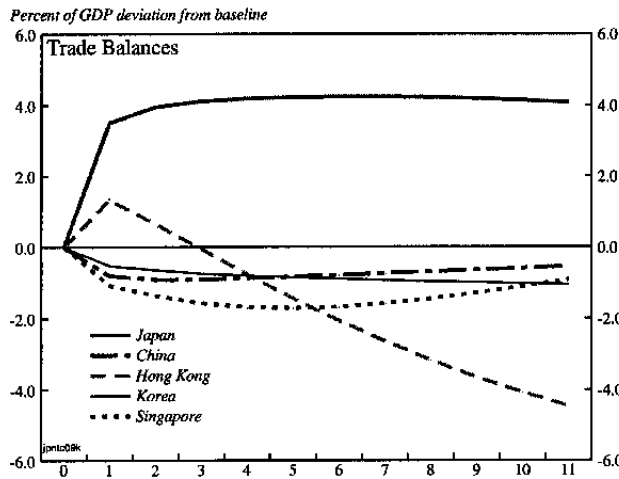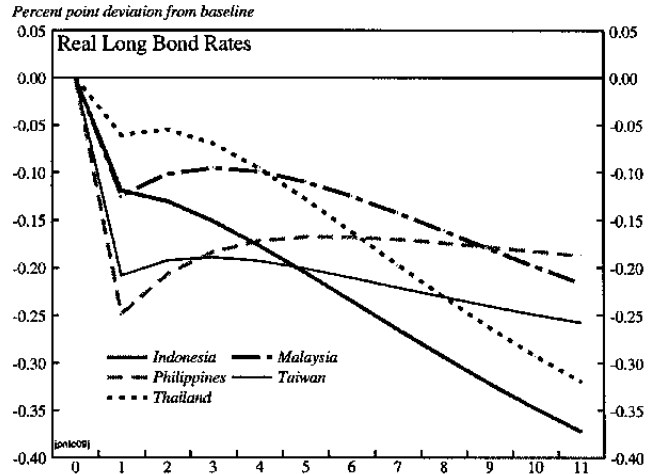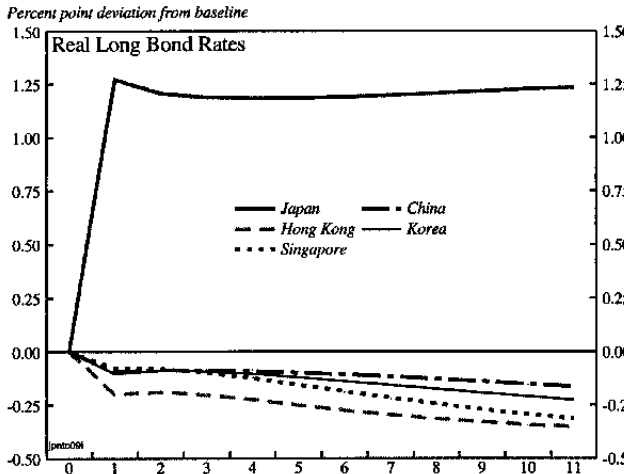# Figure II.12. Japan: Effects of a Loss in Confidence in the Yen

Percent deviation from baseline

Real Effects

Real GDP
Consumption
Investment

jpntc08a

Percent point deviation from baseline

Inflation and Interest Rates

CPI Inflation
Real short-term interest rate
Nominal 10-year bond yield
Real 10-year bond yield

jpntc08b

Percent deviation from baseline

Exchange Rates
(Down is appreciation of US$)

Nominal $US/Yen
Real $US/Yen

jpntc08c

Percent deviation from baseline

Tobin's Q

Non-durables
Capital goods sector

jpntc08d

Source: Staff estimates.

Figure II.13. Asia: Effects of a Loss of Confidence in the Yen

Percent deviation from baseline

Real GDP

Legend:
- Japan
- China
- Hong Kong
- Korea
- Singapore

Percent deviation from baseline

Real GDP

Legend:
- Indonesia
- Malaysia
- Philippines
- Taiwan
- Thailand

Percent deviation from baseline

Consumption

Legend:
- Japan
- China
- Hong Kong
- Korea
- Singapore

Percent deviation from baseline

Consumption

Legend:
- Indonesia
- Malaysia
- Philippines
- Taiwan
- Thailand

Percent deviation from baseline

Exports

Legend:
- Japan
- China
- Hong Kong
- Korea
- Singapore

Percent deviation from baseline

Exports

Legend:
- Indonesia
- Malaysia
- Philippines
- Taiwan
- Thailand

Source: Staff estimates.

Figure II.13. Asia: Effects of a Loss of Confidence in the Yen (Cont'd)

Percent deviation from baseline

Real Effective Exchange Rates

Japan ——— China
Hong Kong —— Korea
Singapore · · · ·

Percent deviation from baseline

Real Effective Exchange Rates

Indonesia —— Malaysia
Philippines —— Taiwan
Thailand · · · ·

Percent point deviation from baseline

Real Long Bond Rates

Japan ——— China
Hong Kong —— Korea
Singapore · · · ·

Percent point deviation from baseline

Real Long Bond Rates

Indonesia —— Malaysia
Philippines —— Taiwan
Thailand · · · ·

Percent of GDP deviation from baseline

Trade Balances

Japan
China
Hong Kong
Korea
Singapore

Percent of GDP deviation from baseline

Trade Balances

Indonesia —— Malaysia
Philippines —— Taiwan
Thailand · · · ·

Source: Staff estimates.

Impact on Real GDP: Summary of Selected Simulation Results								
(Percent Deviation of GDP from Baseline)								
	Phased Fiscal Consolidation [1]			Monetary Easing [2]		Decline in Productivity Growth [3]		A loss of confidence in the Yen [4]	
Impact After:	1 year	3 years	5 years	1 year	5 years	1 year	5 years	1 year	5 years
Japan	0.2	-1.0	0.4	0.4	0.0	-1.2	-6.3	-0.1	-8.8
Taiwan	0.1	0.6	1.1	0.0	0.0	-0.1	-1.6	0.2	2.7
Korea	0.1	0.5	1.1	0.0	0.0	-0.1	-1.3	0.2	3.0
Hong Kong	0.1	0.7	1.4	0.0	0.0	-0.1	-1.8	0.2	3.7
Singapore	0.1	0.5	1.2	0.0	0.0	-0.1	-1.4	0.2	3.1
Thailand	0.0	0.5	1.0	0.0	0.0	-0.1	-1.5	0.1	2.7
Indonesia	0.1	0.3	0.6	0.0	0.1	-0.1	-0.7	0.2	1.5
Malaysia	-0.1	0.6	1.3	0.0	0.0	0.1	-2.0	-0.3	3.0
Philippines	0.1	0.7	1.2	0.0	0.0	-0.1	-1.9	0.1	2.5
China	0.0	0.2	0.4	0.0	0.0	0.0	-0.4	-0.1	1.0

[1] Reduction in government expenditure of 1.7 percent of GDP in the first year, 3.4 percent in the second year, and 5 percent from the third year onward.
[2] BoJ purchase of government bonds sufficient to bring about a permanent 1 percent increase in the money supply.
[3] Decline in growth rate of labor augmenting technical change of 3 percent per annum for 3 years, 1 percent per annum for another 8 years, and then returning to trend.
[4] A 3 percentage point increase in the risk premia on all Japanese assets.

44.   The simulation results have a number of implications for the ongoing policy debate in Japan, and for policymakers in other Asian countries as they assess the potential impact of any policy changes in Japan on their own economies:

● As Japan moves toward fiscal consolidation over the medium-term, the results give some grounds for optimism that the economic impact can be limited. While undoubtedly there will be a negative short-term impact on activity, this could be fairly limited if the announcement were credible—perhaps legislated in a fiscal responsibility act which specified a long-term public debt target and the tax, expenditure, and social security policies to back-up that target—and would be quite quickly replaced by the positive impact from the decline in real interest rates and rise in equity prices. The negative short-run impact could also be offset by a more expansionary monetary policy through the central bank's purchase of government debt. The existence of financial as well as trade linkages means that the effects of the fiscal consolidation in Japan is broadly neutral for the region in the short-run, but beneficial over the medium term.

● The results suggest that a quantitative easing of monetary policy through the BoJ's 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. However, it needs to be recognized that in the current situation the impact of such a monetary stimulus is highly uncertain, and the results should be taken more as indicating the transmission channels through which a policy relaxation could work, rather than the actual size of the impact it would have.

- Trends in Japanese productivity growth have important implications for the domestic economy and the region. Therefore structural reforms that boost productivity growth over the medium-term will provide a boost to growth domestically and in the region (the results can be seen as the inverse of the first simulation presented in Section D).

- In terms of the exchange rate, an important point that emerges from the results is that the implications of a depreciation of the yen depend importantly on the reasons for the depreciation.[13] For example, a depreciation due to a loss of confidence in Japan has a large negative effect on Japan, but could actually be positive for the region because of the increase in capital inflows they would receive. If the depreciation is due to monetary easing, however, this has a positive impact on the Japanese economy, but is broadly neutral for the region because the positive effect on growth in Japan offsets the loss of competitiveness from the yen's depreciation.

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[13] This is stressed in Chapter 6 of McKibbin and Sachs (1991) with respect to the debate in the mid-1980s on policies to force down the strong U.S. dollar.

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III. Structural Reforms, Information Technology, and Medium-Term Growth Prospects[1]

"Based on the belief that the top priority of the Koizumi Cabinet is the revitalization of the economy and that 'without structural reform, there can be no rebirth for Japan,' we will tackle structural reforms, leaving no sacred areas exempt from these reforms."

[Extract from Prime Minister Koizumi's speech at the Eighth Meeting of the Council on Economic and Fiscal Policy, May 18, 2001.]

A. Introduction

1.   The new government of Prime Minister Koizumi has stated its intention to implement a bold reform agenda to return Japan to strong, sustained growth over the medium term. While the details of this policy are still being worked out, it is clear from the reform blueprint of the Council on Economic and Fiscal Policy (CEFP) that addressing the bad loan problems in the banking sector, fiscal reforms, and structural reforms that boost productivity are at the top of the agenda.[2] The experience in a number of faster growing industrial countries in recent years certainly underlines the importance of implementing a far-reaching structural reform agenda in Japan.

2.   Given that productivity levels in many sectors of the Japanese economy are well below international best standards, there appears to be considerable scope for raising productivity over the medium term. Indeed, Economic and Fiscal Policy Minister Takenaka has suggested that full implementation of the CEFP reform blueprint could raise potential growth to 2–3 percent over the medium-term, compared to staff estimates of around 1½ percent at present. A number of empirical studies have also estimated that considerable output gains would result from the implementation of structural reforms. While the reform program will need to be broad-ranging to maximize its economic benefits, this paper focuses on four areas that are particularly important: the labor market; entrepreneurship; the regulatory structure and competition policy; and the information technology (IT) sector. The chapter is structured as follows. The benefits of structural reform in Japan are discussed in Section B. Section C assesses reforms to boost productivity and growth, while Section D looks at the potential of the IT sector to underpin stronger growth over the medium-term. Section E concludes.

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[1] Prepared by Tim Callen (ext. 38873) and Takashi Nagaoka (ext. 37613).

[2] See Council on Economic and Fiscal Policy, "Structural Reform of the Japanese Economy: Basic Policies for Macroeconomic Management." The report was endorsed by the Cabinet on June 26.

B.   The Benefits of Structural Reforms in Japan

3.   A number of competing hypotheses have been advanced to explain the extended period of subpar growth in Japan during the 1990s (see Bayoumi and Collyns (1999) and Boltho and Corbett (2000) for concise summaries). Among recent contributions, Hayashi and Prescott (2001) argue that the primary reason for weak growth has been a sharp decline in productivity growth, possibly because of the increasing failure of the traditional Japanese model to adapt to the requirements of a more deregulated and competitive world economy.

4.   It is clear that the decline in productivity growth during the 1990s was significant. Total-factor productivity (TFP) growth in the business sector is estimated to have been around ¾ percent per annum, about one-half of the rate experienced in the 1980s, while labor productivity growth slumped from 2¾ percent in the 1980s to 1¾ percent in the 1990s (Table III.1). Scarpetta, Bassanini, Pilat, and Schreyer (2000) found that the decline in labor productivity growth in the nonfarm business sector during the 1990s was largely the result of lower productivity growth in the manufacturing, construction, wholesale and retail, and finance sectors (although, during the decade, the manufacturing sector accounted for almost all of the productivity growth that took place). The decline in labor productivity growth in Japan is in contrast to most other countries in their study where it increased during the 1990s due to modest improvements in the service sector.

5.   Scarpetta et al (2000) disaggregated labor productivity growth into three components: changes in within industry productivity performance; the impact of the shift of resources between different industries; and residual effects. They estimate that during the 1990s most of the change in labor productivity growth in OECD countries was due to productivity performance within industries, rather than employment shifts across industries. The role of resource shifts between sectors was found to be more important during the 1970s and 1980s. These broad results are true for Japan, although resource shifts between sectors have been less important historically in Japan than in most other countries.

6.   Looking at aggregate labor productivity levels, Scarpetta et al (2000) found that Japan lags significantly behind most other OECD countries (Table III.2). In the manufacturing sector, this differential is somewhat smaller, although still significant. The McKinsey Global Institute (2000) found that while productivity levels among Japan's manufacturing exporters—particularly in the automobile, steel, machine tools, and consumer electronics sectors—exceed those in the U.S. by around 20 percent, in the domestic manufacturing and service sectors productivity is significantly below U.S. levels.

7.   Assessing the potential impact of structural reforms on productivity and economic growth is difficult because of the problems of measuring the impact of current regulations on economic performance and of establishing appropriate benchmarks for the post-reform economic structure. However, a number of attempts have been made to quantify such impacts on the Japanese economy, although the results are very sensitive to the underlying assumptions made. Shimpo and Nishizaki (1997) reported that most studies found that reforms would have a significantly positive impact on real GDP, although the size of the estimated gains varied considerably from 2¼ to 18¾ percent of GDP. The estimate made by

Table III.1. Summary of Business Sector GDP Growth and Its Components

	GDP			Employment			Labor productivity 1/			Capital deepening 2/			TFP		
	1980–90	1990–98 3/	1995–98 4/	1980–90	1990–98 3/	1995–98 4/	1980–90	1990–98 3/	1995–98 4/	1980–90	1990–98 5/	1995–98 6/	1980–90	1990–98 5/	1995–98 6/
							(Percent change at annual rate)								
United States	3.1	3.3	3.8	2.0	1.9	2.2	1.1	1.4	1.6	1.1	0.6	1.0	0.8	1.1	1.1
Japan	4.0	2.5	2.2	1.3	0.6	0.3	2.7	1.8	1.9	4.9	4.7	4.4	1.6	0.7	0.8
Germany 7/	2.3	1.6	1.7	0.5	-0.5	-0.3	1.8	2.1	2.0	2.9	3.7	3.1	1.1	1.0	1.1
France	2.3	1.7	1.8	-0.2	0.0	0.2	2.4	1.7	1.6	2.3	2.3	2.3	1.6	0.9	0.8
Italy	2.5	1.7	1.7	0.5	-0.6	-0.6	2.0	2.3	2.3	2.7	3.5	3.4	1.2	1.1	0.9
United Kingdom	3.0	2.1	2.3	0.6	0.6	0.7	2.3	1.5	1.6	1.8	1.2	1.0	...	1.2	1.3
Canada	2.8	2.5	3.1	1.7	1.4	2.0	1.1	1.1	1.1	1.8	0.9	1.4	0.3	0.7	0.7

Source: Scarpetta, *et al* (2000).

1/ GDP per employee.
2/ Growth of capital/labor ratio, adjusted for hours worked.
3/ 1990–97 for Italy and Japan, 1990–96 for the United Kingdom, and 1991–98 for Germany.
4/ 1995–97 for Italy and Japan, and 1995–96 for the United Kingdom.
5/ 1990–97 for Canada, Italy, Japan and the United States, 1990–96 for United Kingdom, and 1991–98 for Germany.
6/ 1995–97 for Canada, Italy, Japan and the United States, and 1995–96 for the United Kingdom.
7/ West Germany for 1980–90.

Table III.2. Productivity Levels in OECD Countries, 1950–98

	1950	1960	1973	1987	1992	1998
	(GDP per man-hour relative to the United States)					
United States	100	100	100	100	100	100
Japan	15	20	45	60	67	68
West Germany	34	52	73	91	100	106
Germany	...	...	...	...	87	90
France	42	51	74	99	101	102
Italy	38	46	78	96	97	100
United Kingdom	58	57	68	81	79	82
Canada	68	72	75	83	82	80
Australia	66	68	69	77	75	78
Belgium	50	53	76	102	108	109
Denmark	54	58	79	85	85	89
Finland	32	37	59	69	74	82
Greece	19	n.a.	43	55	54	54
Ireland	32	n.a.	46	66	77	86
Korea	11	n.a.	15	25	32	36
Mexico	35	n.a.	47	n.a.	41	34
Netherlands	49	57	82	98	107	98
Norway	51	n.a.	71	96	104	109
Portugal	20	n.a.	42	44	48	50
Spain	24	n.a.	53	79	80	79
Sweden	50	55	78	84	82	84
Switzerland	70	74	84	85	87	85

Source: Scarpetta, *et al* (2000).

the Economic Planning Agency (EPA) (1994) was in the middle of this range at 8 percent. A more recent study by the Ministry of International Trade and Industry (MITI) and the Sanwa Research Institute (2000), however, found a much larger impact, with real GDP growth estimated to be 2½ percent per annum higher for ten years. This larger estimate of the potential gains is due to the authors' attempt to include the impact of IT diffusion and the creation of new markets on the economy, which accounts for 1½ percent of the estimated annual increase.

8.   In a study of major industrial countries, the OECD (1997) estimated the impact of reforms on a broad range of economic variables based both on the aggregation of the estimated gains in a number of key sectors and from simulations of a dynamic macroeconomic model based on the Interlink model. The results suggest that the long-run potential output gains (over a period of 15 to 20 years) in Japan are of the order of 5–6 percent, broadly in line with those in France, Germany, and Spain, and well above the 1 percent estimate for the United States. A significant part of the potential productivity gains in Japan were found to come from reform of the distribution sector.

9.   An alternative approach to the simulations used in the studies cited above is to relate broad indicators of regulation to economic performance. Porter (1998) used a survey of business leaders and government officials to construct a microeconomic competitiveness index and found that this index was a significant explanatory factor in standard cross-country growth regressions. Similarly, Dutz and Hayri (2000) used a wide range of variables that attempt to capture competition policy, market structure, and enterprise mobility (entry and exit of firms) in different countries, and again found that such variables are significant explanatory factors in standard cross-country growth regressions.

10.   In terms of the indices that have been constructed to measure structural rigidities or competitiveness, Japan tends to fair relatively poorly. These indicators generally suggest that structural rigidities in the Japanese economy significantly exceed those in the faster growing industrial countries, although they are in line with many of the Euro area countries (Table III.3 and Figure III.1). For example, in Porter's Microeconomic Competitiveness Index, Japan ranks eighteenth out of the fifty-two countries considered (sixth out of the G-7 countries, ahead of only Italy), while in the Lehman Brothers Structural Policy Index, Japan ranks twelfth out of the 21 OECD countries (see Edwards and Schanz, 2001). Broader indicators of world competitiveness published by the International Institute for Management Development and the World Economic Forum that combine a wide range of macroeconomic and microeconomic variables with the results of surveys of businesses yield similar conclusions.
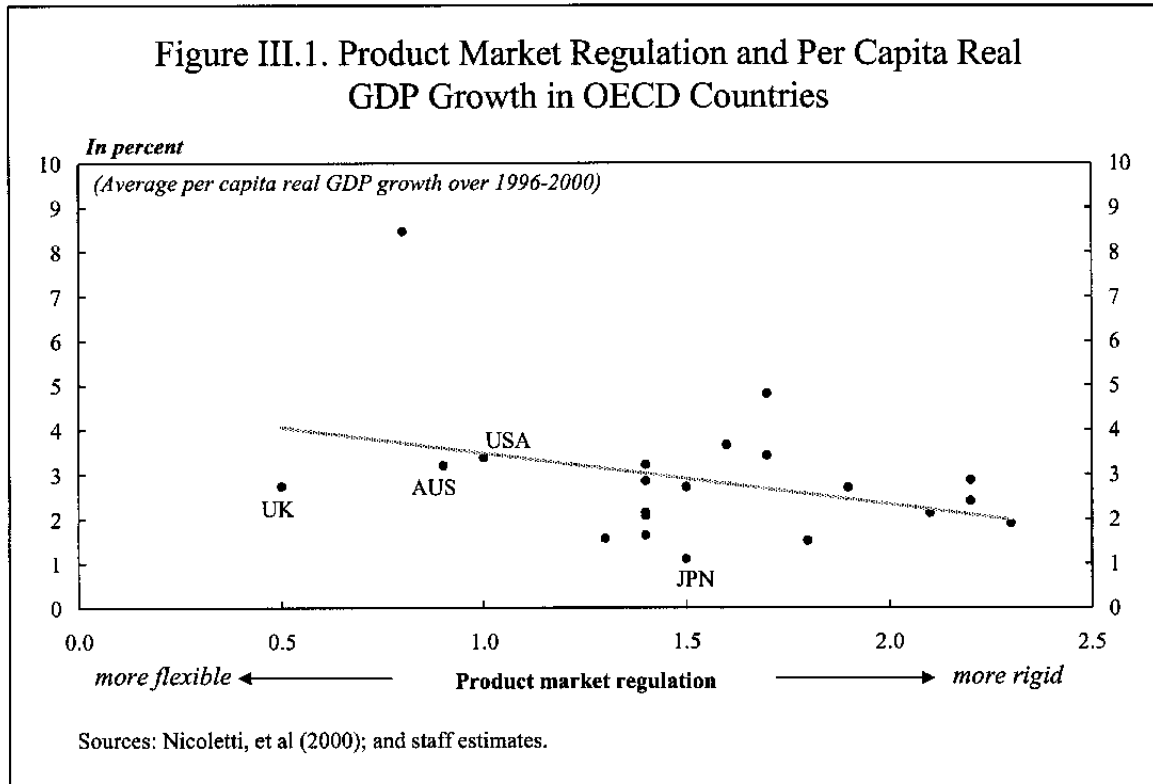
C. Structural Reforms to Raise Productivity Growth

11.   The results of these empirical studies and the analysis of cross-country productivity data suggest that considerable benefits could accrue to the Japanese economy from the implementation of a bold and broad-ranging structural reform program. This section looks in more detail at a number of areas where reforms could yield particularly significant benefits.

Table III.3. Surveys of Global Competitiveness

	Microeconomic Competitiveness	Structural Policy	Global Competitiveness			Entrepreneurship	FDI	Transparency
	Porter's Microeconomic Competitiveness Index	Lehman Brothers Structural Policy Index	World Economic Forum	International Institute for Management Development	Japan Center for Economic Research	Babson College Global Entrepreneurship Monitor	A.T. Kearney Foreign Direct Investment Confidence Index	Price Waterhouse Coopers Opacity Index
Year	1999	1999	2000	2001	...	2000	...	...
Countries surveyed	52	22	...	49	...	21	25	...
Ranking								
1	U.S.	U.S.	U.S.	U.S.	U.S.	Brazil	U.S.	Singapore
2	Finland	Canada	Singapore	Singapore	Singapore	Korea	China	U.S.
3	Netherlands	New Zealand	Luxemburg	Finland	Netherlands	U.S.	Brazil	Chile
4	Germany	U.K.	Netherlands	Luxemburg	Finland	Australia	U.K.	U.K.
5	U.K.	Australia	Ireland	Netherlands	Hong Kong	Norway	Mexico	Hong Kong
6	Canada	Sweden	Finland	Hong Kong	Norway	Canada	Germany	Mexico
7	Sweden	Switzerland	Canada	Ireland	Sweden	Argentina	India	Italy
8	Denmark	Ireland	Hong Kong	Sweden	Australia	India	Italy	Hungary
9	Switzerland	Finland	U.K.	Canada	U.K.	Italy	Spain	Israel
10	Singapore	Netherlands	Switzerland	Switzerland	Switzerland	U.K.	France	Uruguay
11	France	Denmark	Taiwan	Australia	Canada	Germany	Poland	Greece
12	Hong Kong	Japan	Australia	Germany	Germany	Denmark	Canada	Peru
13	Ireland	France	Sweden	Iceland	New Zealand	Spain	Singapore	Egypt
14	Norway	Norway	Denmark	Austria	Belgium	Israel	Thailand	Lithuania
15	Australia	Germany	Germany	Denmark	Denmark	Finland	Australia	South Africa
16	Austria	Belgium	Norway	Israel	Japan	Sweden	Czech Rep.	Japan
17	New Zealand	Euro-area	Belgium	Belgium	Iceland	Belgium	Korea	Colombia
18	Japan	Spain	Austria	Taiwan	Ireland	Frame	Netherlands	Argentina
19	Belgium	Austria	Israel	U.K.	Taiwan	Singapore	Taiwan	Taiwan
20	Taiwan	Portugal	New Zealand	Norway	Austria	Japan	Japan	Brazil
21	Israel	Italy	Japan	New Zealand	France	Ireland	Hungary	Pakistan
22	Spain	Greece	...	Estonia	...	...	...	...
23	Chile	...	...	Spain	...	...	...	...
24	Iceland	...	...	Chile	...	...	...	...
25	South Africa	...	...	France	...	...	...	...
26	Italy	...	...	Japan	...	...	...	...

Source: International Institute for Management Development; Babson College; and partly reproduced from Deutsche Bank Foreign Exchange Research, April 2001.
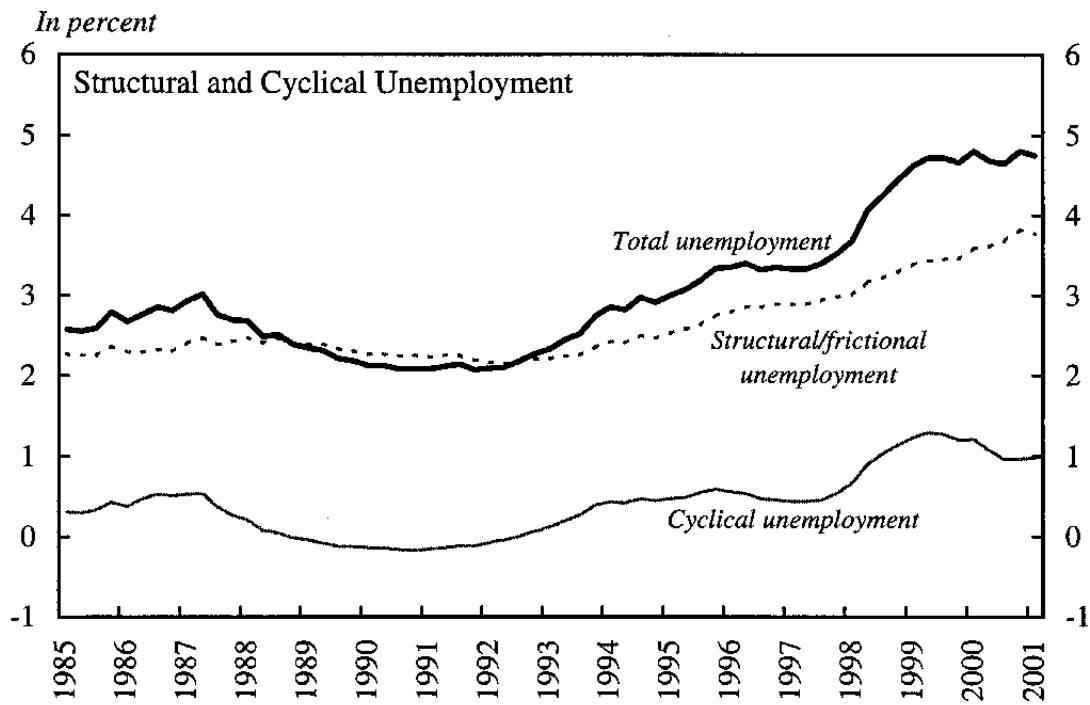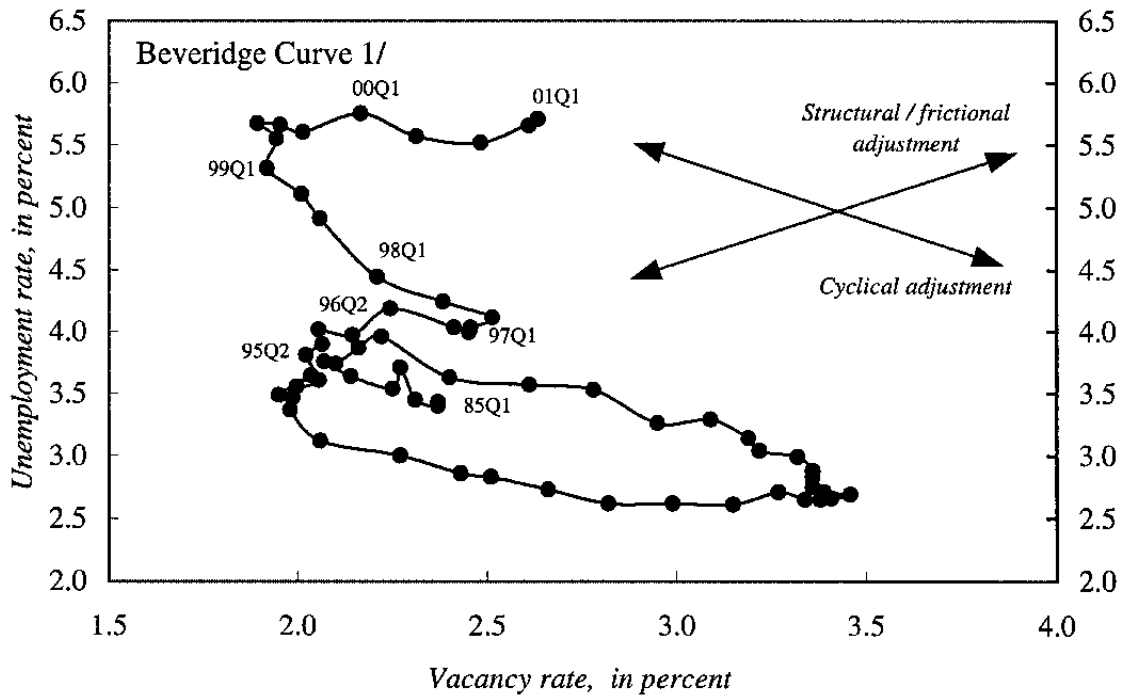
Figure III.1. Product Market Regulation and Per Capita Real
GDP Growth in OECD Countries

In percent

(Average per capita real GDP growth over 1996-2000)

more flexible ◄——— Product market regulation ———► more rigid

Sources: Nicoletti, et al (2000); and staff estimates.

Labor market

12.   The flexible labor market in the United States has been an important aspect of its strong economic performance during the 1990s and the rapid spread of new technologies and production techniques (Council of Economic Advisors, 2001). Labor market flexibility encompasses both workers with desirable skills being able to switch to more rewarding jobs and firms being able to adapt their work force to changing economic conditions. It is particularly important in high-technology industries where the pace of innovation and industry evolution is especially rapid.

13.   However, a number of indicators suggest that while labor compensation is quite flexible over the business cycle, the Japanese labor market is not very efficient at reallocating labor between firms and across sectors. The inability or reluctance of firms to adjust their labor force appears to have been an important factor behind the decline in productivity growth during the 1990s. The concurrent increase in the unemployment and vacancy rates since the mid-1990s, as seen in the outward movement of the Beveridge Curve, and the rise in the structural unemployment rate indicate an increasing mismatch in the labor market (Figure III.2).[3] The proportion of those unemployed for over one year in total unemployment has also risen from 15 percent in 1993 to 26 percent in early 2001. Significant mismatches between the supply and demand for labor in key industries also underscores the failure of the market to reallocate labor (Figure III.3).

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[3] The structural unemployment rate is estimated to have risen from around 2 percent in the early 1990s to 3½–4 percent in 2000 (Ministry of Health, Labour, and Welfare).
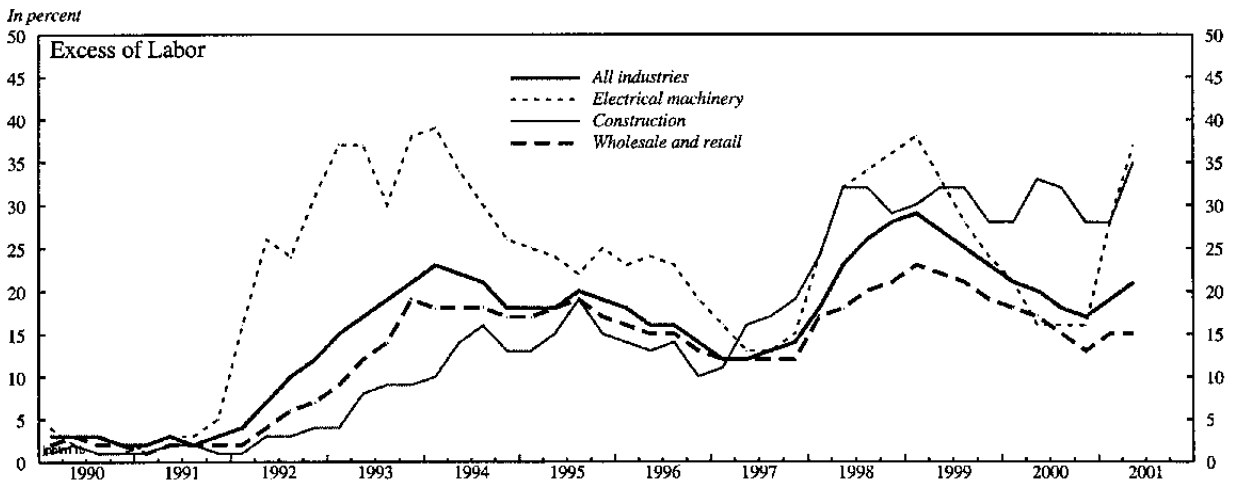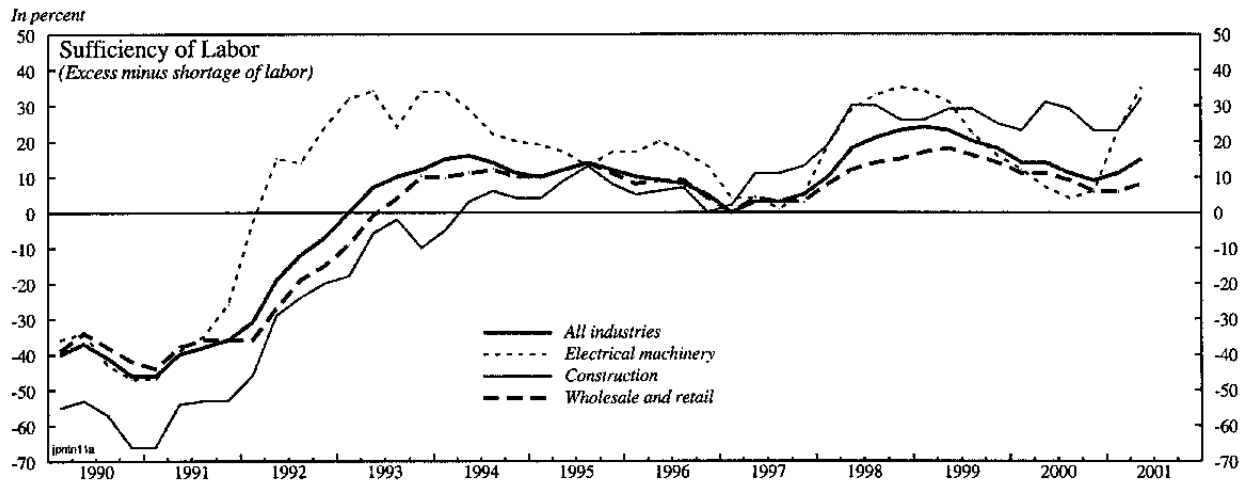
Figure III.2. Japan: Developments in Structural Unemployment

Beveridge Curve 1/

Unemployment rate, in percent

Vacancy rate, in percent

Structural / frictional adjustment

Cyclical adjustment

In percent

Structural and Cyclical Unemployment

Total unemployment

Structural/frictional unemployment

Cyclical unemployment

Sources: Ministry of Public Management, Home Affairs, Posts and Telecommunications; Ministry of Health, Labour and Welfare; and staff estimates.

1/ Definition of the unemployment rate here excludes the self-employed from the workforce.

Figure III.3. Japan: Labor Sufficiency 1/

In percent

Sufficiency of Labor
(Excess minus shortage of labor)

All industries
Electrical machinery
Construction
Wholesale and retail

In percent

Excess of Labor

All industries
Electrical machinery
Construction
Wholesale and retail

In percent

Shortage of Labor

All industries
Electrical machinery
Construction
Wholesale and retail

Source: Bank of Japan, Tankan Survey.

1/ Indices indicate the proportion of firms that responded that they had excess (insufficient) labor.

14.   From an international perspective, Japan has one of the least mobile workforces in the OECD. For example, labor turnover (which measures the movement of individuals into and out of the workforce) in Japan is about half that in France and Germany and about one-fifth that in the U.S., while the average job tenure of men in Japan is the longest among large OECD countries (job tenure of all employees is slightly below Italy because of the shorter average tenure of women) (OECD, 1997) (Table III.4). Genda and Rebick (2000) find that there is a high rate of job-changing among Japanese under the age of 30, but then the proportion who settle into long term jobs is very high.

Table III.4. Average Tenure, 1995			
	Total	Men	Women
Italy	11.6	12.1	10.6
Japan	11.3	12.9	7.9
France	10.7	11	10.3
Sweden	10.5	10.7	10.4
Germany	9.7	10.6	8.5
Spain	8.9	9.8	7.2
U.K.	7.8	8.9	6.7
U.S.	7.4	7.9	6.8
Korea	5.2	5.9	3.4
Source: OECD Employment Outlook (1997).			

15.   A number of features of the Japanese employment system help explain the relatively low degree of labor mobility. Among the most important are the practices of "lifetime employment" and seniority-based wages which act as disincentives for workers to change jobs (underpayment in early years of work is expected to be compensated for in the future, and workers are therefore inclined to stay with a firm until their intertemporal wages are balanced) and for firms to hire older workers.[4] Firm-specific knowledge acquired through on-the-job-training—another feature of the lifetime employment system—has also tended to make skills less transferable to other firms. Widely shared social stigma towards losing jobs and/or being jobless has also induced incumbents to remain in their positions and not risk changing jobs, while pension schemes designed for traditional employment practices have lacked portability (although the recent enactment of 401-k style private pension legislation should help to begin to address this).

16.   However, other institutional factors have also been important in impeding labor market flexibility. Japanese employees enjoy high levels of protection from dismissal, both because trade unions have put employment protection ahead of wage gains and because labor laws are strictly interpreted. While the employment protection legislation itself is relatively liberal, and dismissing employees is a basic right of employers, case law has strengthened employee protection by introducing strict conditions under which employers may dismiss workers other than for malfeasance. Specifically, before an employer can dismiss workers it needs to be able to show that it has excess labor, that it has tried every other alternative, that it has an objective way of choosing its target, and that it has reached an agreement with the union. The OECD (1999a) find that Japan ranks among the stricter OECD countries in terms of employment protection legislation. Yashiro (1999) finds that in the majority of cases

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[4] The term "lifetime employment," which describes the "implicit long-term employment contract for the regular workforce" (Kato, 2001a), may be misleading as most workers leave firms before reaching legal retirement age (Genda and Rebick, 2000).

where large firms have tried to dismiss workers, case law has found their dismissals to be invalid.

17. A number of changes have taken place in the labor market in recent years. Some evolution away from the "lifetime employment" and seniority-based wage systems has occurred, although views differ on how widespread this is, and the government has not actively targeted the issue.[5] The government has, however, introduced a number of measures to improve the functioning of the labor market. For example, the professions that can be handled by private job placement and temporary employment service ("job dispatching") agencies were expanded in late 1999 to give the private sector a greater role in the job search and temporary employment markets. Further, the social safety net was enhanced in April 2001 by extending the maximum term of unemployment benefit payments for middle- and old-aged workers who were involuntarily separated from their previous jobs from 300 to 330 days.

18. However, significant impediments to a flexible labor market remain. There has been little progress in easing existing employment protection legislation, while government policies to address the increasing skills mismatch have not yet been successful. Important sectors such as construction and medical services are on the negative lists that preclude private job placement and dispatching agencies from operating in these areas. Publicly supported retraining programs to help the unemployed obtain the skills needed to re-enter the workforce have often been ineffective due to their lack of customization and specialization, and international experience suggests that greater private sector involvement is needed to make programs more effective (OECD, 2000b). Further, while the new private (401-k style) pension legislation could ease the process of switching jobs for employees, it is not clear to what extent these pensions will develop under the existing tax system. Lastly, despite the recent lengthening of the duration of unemployment benefits, this may still not be enough to provide an adequate safety net for the unemployed.

Barriers to entrepreneurship

19. The formation of new businesses plays a crucial role in the growth process, being a manifestation of new ideas and products and an important part of the resource reallocation process in response to a changing economic environment. However, the rate of new business start-ups in Japan is low by international standards, and has declined over time compared to the broadly stable rate of start-ups in the U.S. (Table III.5 and

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[5]Genda and Rebick (2000) argue that change has been gradual and that the traditional employment system will endure, while, Kato (2001b) endorses the notion that an increasing number of firms are introducing performance-based wage system to replace parts of the seniority-based system.

Table III.5. Indicators Related to Entrepreneurship

	Start-up rate (in percent)		Formalities for establishing a business		Venture capital investment	Under-pricing at IPO
	Company-based	Population-based	Time needed (weeks)	Estimated costs (in ECU)		
					(in percent of GDP)	(in percent)
Japan	4.6	1.6	2–4	2,100–6,000	0.036	32.5
Sweden	5.6	...	2–4	1,130	0.131	39.0
Finland	5.8	1.4	...	...	0.089	9.6
Italy	5.8	3.4	22	7,700	0.059	27.1
Switzerland	6.3	...	...	...	0.048	35.8
Belgium	7.2	...	...	...	0.076	10.2
Norway	8.0	...	...	...	0.107	...
Austria	8.6	...	...	...	0.010	...
Greece	9.0	...	...	...	0.019	48.5
Denmark	9.8	2.0	...	...	0.022	...
Netherlands	10.0	...	12	900	0.218	7.2
Portugal	10.8	...	...	...	0.057	54.4
France	11.1	1.8	4–8	1,900–4,600	0.095	4.2
U.S.	11.4	8.4	1–2	200–800+	0.141	15.3
Spain	11.6	...	19–28	330+	0.051	35.0
Ireland	11.7	...	...	...	0.062	...
Germany	11.7	4.1	8–24	750–2,000	0.062	11.1
U.K.	13.2	3.3	1	900	0.408	12.0
Israel	...	5.4	...	...	...	...
Canada	...	6.8	...	...	...	5.4

Source: Partial reproduction of Imai and Kawagoe (2000).

Figure III.4).[6] While the low level of new business formation was not a constraint to the high growth rates that were achieved until the late 1980s, when growth relied heavily on intra-firm expansion, there are a number of reasons why the decline may be a concern now (Imai and Kawagoe, 2000). First, the end of the growth process relying on technological catch-up has made it necessary for companies to be more innovative, and deregulation and globalization have opened up new opportunities and competitive challenges. In this environment, large, established, companies may lack the flexible organizational structures and entrepreneurial abilities to respond quickly to changing market circumstances. Second, evidence from Japan suggests that, despite the past reliance on existing companies to drive the growth process, younger and smaller companies still tended to grow faster, implying in turn that a key source of growth momentum could be deteriorating with the decline in the rate of start-ups.

20.   A number of factors are generally believed to affect the incentives for new business start-ups, including the availability of risk capital, the legal infrastructure, the administrative processes that need to be met, flexibility of the labor market, and demographic factors (young people are likely to be more entrepreneurial). In Japan, cultural factors that attach a social stigma to those who fail in their attempt to start a new business could also be added.

21.   The availability of finance, including venture capital finance—a form of private equity that targets startup firms primarily in emerging industries—is essential for new business formation and the development of new technologies. Venture capital firms also provide guidance and other forms of support to operations that are needed by small start-up companies. However, given the domination of bank intermediated finance and the relatively underdeveloped nature of the securities markets, the availability of equity capital to early stage start-ups has generally been lacking in Japan. Venture capital is supplied primarily through the financing arms of banks and other financial corporations, and has tended to focus on the later stages of firm development or the financing of leveraged buyouts of existing firms rather than funding the creation of new ones. Imai and Kawagoe (2000) estimate that 38 percent of new venture capital investment went to companies that were over 20 years old in FY1996, a further 20 percent to those between 10 and 19 years old, and less than 25 percent went to those less than 5 years old. Venture capital has also been deterred by tight listing requirements that make it difficult to take young companies public and may explain the emphasis on investment in later stage companies.

22.   The administrative burdens placed on a prospective entrepreneur are also an important factor. Nicoletti, Scarpetta and Boylaud (2000) ranked Japan thirteenth out of 21 countries in terms of the administrative burdens for start-ups, based on the number of procedures, the number of services, delays in the procedures, and direct and indirect costs.

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[6] The rate of business failure is also lower in Japan than in the U.S., although it has picked-up in recent years reflecting the change in the economic environment and the introduction of the Civil Rehabilitation Law in April 2000 which provided a court led debtor-in-possession corporate reorganization process similar to the U.S. Chapter 11 procedure. However, while in the U.S. the rate of new business formation has always exceeded the rate of business failures, in Japan the opposite has been the case in the 1990s.

Figure III.4. Business Formation and Dissolution 1/

Percent per annum

Business Formation and Dissolution in Japan

—— *Ratio of business formation*
------ *Ratio of business dissolution*

jpntn12a

1966-69   69-72   72-75   75-78   78-81   81-86   86-89   89-91   91-94   94-96   96-99

Percent per annum

Business Formation and Dissolution in U.S.

—— *Ratio of business formation*
------ *Ratio of business dissolution*

jpntn12b

1983   1984   1985   1986   1987   1988   1989   1990   1991   1992   1993   1994   1995   1996   1997

Sources: Cabinet Office; and U.S. Small Business Administration.

1/ Data for business formation and dissolution in Japan and the United States are not directly comparable due to differences in definition and intervals.

Imai and Kawagoe (2000) suggest that it takes twice as long and costs about ten times as much to start a business in Japan compared to the U.S.

23. The government has taken a number of measures to stimulate business start-ups. The Basic Law on Small and Medium-sized Enterprises was revised in 1999 to shift policy away from protecting these enterprises toward providing support for new business creation. The New Business Creation Promotion Law, originally introduced in late 1998, was expanded in 1999 to provide partial exemption from the provisions of the Commercial Code and greater financial support to create a more conducive environment for starting new businesses.[7] The Industrial Revitalization Law of 1999 also offered tax incentives to promote start-ups, while the so-called "Angel Tax," expanded in 2000, introduced preferred treatment on both realized gains and losses from investment in nascent firms to attract investors. The recent seven point plan has also suggested that additional tax incentives will be considered for new companies. A series of new capital markets have been established to facilitate the transaction of shares of new firms, including the New Market, NASDAQ Japan, and the Market of High-growth and Emerging Stocks (MOTHERS). The financial "big bang", by easing entry into the securities business, has also reduced the cost of IPOs. However, the still limited availability of venture capital, substantial administrative burdens, and rigidities elsewhere in the economy remain disincentives to business formation.

Regulatory structure and competition policy enforcement

24. Controls on entry act as important impediments to market competition in a number of key sectors of the economy. For example, in the retail sector, the Large Scale Retail Law (LSRL) (in effect until mid-2000) tightly regulated the entry of stores larger than 1,000 square meters, a relatively low threshold by international standards. In June 2000, the LSRL was replaced by the Large Scale Retail Location Law (LSRLL). Under this law, new stores over 1,000 square meters need to obtain the approval of prefecture governments subject to their meeting social screening criteria, and, in practice, this legislation still appears to impede the entry of large retail stores into the market. The statutory period in which an application to establish such a store must be processed, at eight months, is also long. As a consequence of the restrictions placed on the entry and operations of establishments in the retail sector, Boylaud (2000) ranked Japan as having one of the most restricted retail distribution sectors among OECD countries.

25. Restrictions on large stores have been designed to protect small shops from competition, with the aim of safeguarding the employment and amenities they provide. As a consequence, the retail sector in Japan is dominated by small establishments ("mom-and-

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[7] The exemptions include: the relaxation of restrictions on the distribution of stock options (the ceiling was raised from 10 percent to 33 1/3 percent of outstanding shares) and the potential recipients expanded to include outsiders such as consultants and programmers in addition to company executives and employees; and greater flexibility for issuing non-voting equity (the ceiling for such issues was raised from 1/3 to 1/2 of outstanding shares) and the grace period during which the absence of a dividend payment does not result in the conversion of the shares to common stock was extended from 1 year to 3 years.

pop" stores) which account for 55 percent of retail employment, while the market share of the national retailers has remained almost unchanged since the mid-1980s compared to the significant increase that has been seen in the U.S. (McKinsey Global Institute, 2000). The restrictions placed on large-scale stores have a number of negative consequences: they limit the services that new retail formats can offer consumers; they slow down consolidation and modernization in the retail sector; and they reduce firms' market power over suppliers and consequently have implications for efficiency further up the supply chain (Boylaud, 2000). As large retail firms, or firms with co-operative arrangements, are generally found to be more innovative than small independent firms (OECD, 1997) this market structure leads to a lack of investment in technology and advertising and weak merchandizing, which in turn hampers productivity. Indeed, McKinsey Global Institute (2000) estimate that productivity in the retail sector in Japan is only about one-half that in the U.S.

26.   Another area is telecommunications, which has become one of the most important infrastructures for business operations in the modern economy, particularly given the increasing role of the IT sector. Telecommunications liberalization in Japan began quite early (in 1985), but the degree of competition that has been introduced varies significantly across different segments of the industry (Box III.1). While the cost of long distance and international calls and mobile phone services have declined rapidly since the liberalization in the respective sectors, competition in the local telephone remains limited. Despite the split of NTT into regional firms (and a long distance service provider) under a holding company in 1999, its size and large network have continued to sustain its dominance in the domestic local call market, and the cost of local telephone services, which include high connection fees and charges based on the duration of the call, are high by international standards. In turn, this affects the spread of new services, including internet access. A number of factors have constrained competition in this important sector of the market including: the lack of clear information to applicants on the minimum requirements to receive licenses, high interconnection charges, the lack of transferability of telephone numbers (which confers an advantage to the incumbent), and fragmented regulations on rights of way and facility sharing (OECD, 2000b).

27.   To promote greater competition, recent legislation has, for example, prohibited dominant operators from unreasonably discriminating against other operators and required them to create firewalls between companies within their corporate group. NTT companies have also been permitted to expand their operations into other sectors of the tele-communications market.[8] A carrier pre-selection system was also introduced in May

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[8] The maximum foreign ownership of NTT stocks was also increased from 20 percent to 33 percent. An advisory board to the former Ministry of Post and Telecommunications recommended in late 2000 that consideration be given to reducing the NTT holding company's stake in the NTT group of companies (100 percent of NTT Communications, 64 percent of NTT DoCoMo, and 54 percent of NTT Data, as of end March 2001) if greater competition was not seen after two years following the enforcement of the law. While this provision was not included in the legislation, the Minister in charge has requested that NTT reduce its ownership of these companies, improve its efficiency, and open up its networks to competitors who do not have their own lines.

Box III.1. Developments in Japan's Telecommunications Industry

Japan was among the first countries to take steps toward deregulating its telecommunications industry. After over 30 years of segmented monopoly in domestic and international calls, competition in the Japanese telecommunications market was first introduced in 1985, with the entry of new common carriers (NCCs) in long-distance and international services, followed by the privatization of Nippon Telegraph and Telephone (NTT) in 1985. By comparison, in the United States, the liberalization of inter-state services took place in 1980, separation of regional operators from AT&T into regional monopolies in 1985, and liberalization of local

Regulation of Entry, 1998					
Legal conditions of entry			Year of liberalization		
Trunk	Intl.	Mobile (digital)	Trunk	Intl.	Mobile (digital)
Australia	Open	Open	Limited by spectrum	1991 1/	1991 1/	1992
Germany	Open	Open	Limited by spectrum	1998	1998	1991
Japan	Open	Open	Limited by spectrum	1985	1987	1988
United Kingdom	Open	Open	Limited by spectrum	1985	1986	1984 2/
United States	Open	Open	Limited by spectrum	1984	1984	1983

Source: Boylaud and Nicoletti, 2000.
1/ Initially a duopoly.
2/ Duopoly 1984–91.

markets in 1996. Liberalization in Japan's mobile phone market took place in 1988. Boylaud and Nicoletti (2000) classify Japan under the most liberal group of countries in terms of the telecommunication regulation, along with Canada, the U.K., the U.S., Sweden and Australia.

Deregulation has led to significant competition in some markets, and has resulted in a reduction in telephone service charges. Competition has been most notable in the mobile phone sector as a result of the deregulation, with the new carriers accounting for over 40 percent of mobile phone contracts by early 2001. The market share of the NCCs has also expanded substantially in the international and long distance sectors, to about 40 and 50 percent, respectively. Telephone charges in these markets have declined substantially during the 1990s, with cellular

Telephone Charges in Japan
(1995=100)
CPI, excluding fresh food
CSPI, domestic, fixed
CSPI, international, fixed
CSPI, cellular

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications; Bank of Japan; and staff calculations.

phone charges falling by over 60 percent and tariffs for international calls by one half.

Competition in local telephone services is, however, still very limited as deregulation has fallen far short of that in other markets. NTT has retained its virtual dominance in the local telephone market even after it was split into two regional and one long distance operators in 1999.[1] While network connection charges have fallen by over one third since 1995, the price of local phone calls (mostly charged on the duration of calls) have not fallen as fast as for cellular and other services—in Tokyo, the price remained some 50 percent higher than that in other major foreign cities in 1999 (MOPT, 2000)—and the setup costs to acquire a telephone number have stayed high. Consequently, the number of mobile phone subscriptions exceeded that of fixed phone lines in late 2000.

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[1] Although varying in extent, this feature of the local market lagging behind other markets in the development of competition is shared in other countries—in the U.S., the local market was liberalized in 1996, but new entrants' sales remained below 4 percent of the total in 1998.

2001. Although the network connection charges to NTT will be reduced by 22½ percent by 2003 (from the 2000 level), the resulting costs will remain high by international standards. In addition, further regulatory reform to keep pace with industry developments (such as interconnection with the CATV network and innovations in the IT sector) will be needed.

28.   Vigorous enforcement of the competition policy framework is also required. The basic competition law in Japan—the Antimonopoly Act (AMA)—prohibits unreasonable restraints of trade, monopolies, unfair practices, and anti-competitive mergers, and provides a generally sound legal basis for competition policy. Exemptions to the Act have, however, undermined its role, although these have been greatly reduced in recent years (for example, exemptions previously given to the electricity, gas, and railway industries were removed in June 2000). However, although legal enforcement by the Fair Trade Commission (FTC)— which is attached to the Ministry of Public Management, Home Affairs, Posts, and Telecommunications (MPHPT)—is becoming more vigorous, it remains limited (OECD, 1999b). The CEFP's reform blueprint emphasizes that a more effective competition policy is needed to advance the role of market forces in the economy, and highlights the importance of strengthening the role of the FTC, including by expediting investigations and improving transparency. To do this, the FTC needs to have adequate resources and the appropriate structure to give it the independence and neutrality to carry out its mandate.

29.   In some key sectors—including telecommunications, electricity, and gas—there is no clear separation of the government's regulatory and policy functions. For example, MPHPT is the regulator and policy maker in the communications field, while the Ministry of Economy, Trade, and Industry (METI) plays a similar role in the gas and electricity sectors. This is in contrast to many other OECD countries where independent regulators have been established.

D. The Role of the Information Technology Sector

30.   The significant contribution that the IT sector has made to growth in a number of industrial countries in recent years has been well documented. The IT sector has also been an important engine of growth in Japan during the second half of the 1990s, contributing significantly to exports, production, and investment. Japan is the second largest IT producer in the world, accounting for around one-quarter of total production in 1997 (OECD, 2000a), with a particular concentration in consumer audio/video and office equipment, electronic components, and mobile phones. Investment in IT-related goods has increased significantly in recent years. Shinozaki (2000a, 2000b) estimates that the share of IT investment in business capital expenditure was 15 percent in 1997—broadly in line with estimates by Daveri (2000)—almost double the level in 1993. METI, using a broader definition of IT investment, estimate that the share of IT expenditure in business investment doubled between 1993 and 2000 to 28¾ percent.[9] The share of expenditure on IT-related goods and services in

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[9] Calculations by the Research and Statistics Department of METI.

private consumption rose from 5–5½ percent before 1994 to 6½ percent in 1999 (DBJ, 2000), while the penetration of PCs and the number of people with access to the internet increased sharply during 1998–2000, the latter partly due to increased access via mobile phone.

31.   Recent studies have found that the contribution of IT capital deepening to labor productivity growth has increased in recent years. EPA (2000) find that the contribution during 1996–99 was ¾ of a percentage point per annum, compared to zero during the first half of the 1990s, while METI (2001) estimate the contribution at ½ a percentage point during 1995–2000. Goldman Sachs (2000) estimate a larger impact of 1 percentage point during 1996–99, compared to ½ percentage point during 1990–95. They also find a significant spillover from IT capital to TFP, although the contribution has not increased in recent years. Further, Shinozaki (2000a) estimates that IT investment has raised potential growth in Japan by ¼ of a percentage point (although this is less than half of the estimated impact in the U.S.).

32.   Despite this growth in IT usage and its increasing importance to productivity growth, there are grounds for believing that the role of the IT sector could increase further in the future. On most measures, IT usage in Japan remains lower than in the U.S., U.K., and Australia, although above that in the Euro area (Table III.6). For example, despite the near doubling of IT expenditure as a share of business investment in Japan between 1993 and 1997, it remained below the rates in the U.S., U.K., and Australia (Daveri, 2000). Further, the share of IT capital in the total private capital stock in Japan was only 8 percent in 1996, compared to 19 percent in the U.S. in 1994 (Shinozaki, 2000a). IT usage by consumers is also still comparatively low. Despite the strong rise in recent years, internet penetration and access to PCs considerably lags that in the U.S. and Australia, while internet access for educational purposes remains low. The use of electronic commerce in Japan is also minimal, whereas in the U.S. it has become a significant alternative means of shopping. Further, despite the increased contribution of IT capital deepening to labor productivity growth in Japan in recent years, this contribution remains somewhat below that in the U.S. and Australia (although on par with the U.K. and Europe) (Table III.7).

33.   A number of studies have reached similar conclusions on the factors that are preventing the further spread of IT. These include:

- The limitations of the existing network, with the relatively high cost of IT usage and slow data transmission speeds. While internet access costs in Japan are similar to those in the U.S., high telecommunications charges push total access costs to 2–3 times the level in the U.S. (Figure III.5). Meanwhile, Japan's internet is commonly built on ordinary voice lines, and the penetration of high-speed internet connection services using CATV lines, DSL, or optical fiber cables, is minimal (Figure III.6).

- Acceptance of the benefits of IT may only be slowly developing. An international corporate survey conducted by METI (2001) found that IT investment in Japan tends to be targeted at improving the efficiency of existing operations and transactions, rather than at more far-reaching changes in the corporate structure and operations. For example, while Japanese firms were found to invest more in software that helps product design than their counterparts in other industrial countries, their investments

Table III.6. Selected Indicators on IT Production and Penetration

	Japan	U.S.	Australia	U.K.	Germany	France
	(In percent unless otherwise indicated)					
Production 1/	24.5	30.0	0.4	4.2	3.9	3.5
IT related investment 2/	16 (15)	19 (18)	17	26	11	11
IT investment stock 3/	8.6	19.0	...	...	...	...
Executives with access to Internet 4/	78	98	...	...	...	...
Executives comfortable/familiar with Internet 4/	15	64	...	...	...	...
Population with access to PCs 5/	31.5 (23.7)	58.5 (45.6)	46.5 (41.1)	33.8 (27.0)	33.6 (27.9)	30.5 (18.9)
Population with access to Internet 6/	37.1 (13.2)	55.8 (22.1)	43.9 (16.0)	33.6 (13.6)	15.0 (12.8)	12.9 (5.9)
Elementary schools with access to Internet 7/	49	95	100	86	100	50
Junior-high schools with access to Internet 7/	68	95	100	98	100	91
High schools with access to Internet 7/	80	95	100	...	100	98
Penetration of e-commerce: B2B 8/	3.8	4.9	...	...	...	...
Penetration of e-commerce: B2C 8/	0.25	1.37	...	...	...	...
(Nominal amount in billions of national currency 9/)	32	142	...	...	...	...
(In percent of GDP 9/)	0.1	1.5	...	...	...	...

Source: OECD; International Telecommunication Union; Lehman Brothers ; and Japanese authorities.

1/ In percent of world production, as of 1997 (OECD, 2000).

2/ In percent of total business investment, as of 1997 (Daveri, 2000). Figures in brackets are estimates by Shinozaki (2000a) as of 1997.

3/ In percent of total private capital stock (Shinozaki, 2000a). 1996 for Japan and 1994 for the U.S.

4/ As of 1998 (Shinozaki, 2000b).

5/ As of 2000 (ITU). Figures in brackets indicate percentages in 1998.

6/ As of 2000 (Japanese authorities for Japan, U.S., Australia and U.K., and ITU for Germany and France). Figures in brackets indicate percentages in 1998.

7/ As of 1999 (Japanese authorities).

8/ In percent of total transactions, as of 2000.

9/ As of 2000 (Lehman Brothers, 2000).

Table III.7. Contribution of IT Sector to Labor Productivity Growth

	Japan 1/			U.S. 2/		Australia 3/		U.K. 4/		Euro Area 5/	
	1990–95	1996–99	1995–2000	1991–95	1996–99	1990–95	1996–2000	1991–96	1997–99	1990–95	1996–99
Labor productivity growth (percent)	2.0	2.0	1.6	1.5	2.6	2.3	2.8	2.7	2.3	2.1	1.4
Capital deepening (contribution)	2.4	1.9	1.0	0.6	1.1	1.2	1.3	0.9	1.2	1.3	0.7
Of which:											
ICT Contribution	0.0	0.7	0.4	0.5	1.0	0.6	0.9	0.2	0.6	0.3	0.4
Other (contribution)	-0.4	0.1	0.5	0.9	1.5	1.0	1.5	1.8	1.1	0.8	0.7
Of which:											
TFP	...	...	0.3	0.5	1.2	1.0	1.5	1.8	1.1	0.8	0.7
Labor quality	...	...	...	0.4	0.3	...	...	...	...	...	...

Sources: Japanese authorities; Oliner and Sichel; Goldman Sachs; and IMF.

1/ EPA (2000) for 1990–95 and 1996–99, and METI (2001) for 1995–2000.
2/ Oliner and Sichel (2000).
3/ Cardarelli (2001).
4/ Kodres (2001).
5/ Goldman Sachs (2000).

Figure III.5. Internet Utilization Charges 1/

In U.S. dollars

□ *Communications charges (20 hrs/mth 2/)*
▨ *Communications charges (40 hrs/mth 2/)*
▨ *Access charges*

Countries (left to right): Japan, Indonesia, Germany 3/, Korea, France, Taiwan, U.S., Malaysia, Australia, U.K. 3/, Hong Kong, Singapore, China, Finland

Source: Ministry of Economy, Trade and Industry (2001).
1/ Charges for connecting through dial-ups.
2/ Figures for countries charging by the number of calls (U.S., Australia, and Finland) are calculated by assuming 30 calls in 20 hours per month and 50 calls in 40 hours per month.
3/ Flat-rate Internet services for Germany and the U.K.

Figure III.6. High-Speed Internet Connection Dissemination Rates 1/

In percent

▨ *Other 2/*
■ *CATV*
□ *DSL*

Countries (left to right): Korea, Hong Kong, Singapore, US, Taiwan, Japan, China, France

Source: Ministry of Economy, Trade and Industry (2001).
1/ The ratio of high-speed Internet users to total Internet users.
2/ Includes nascent high-speed media--i.e., wireless, satellite and fiber-optic cable systems--wherever data are available.

in the areas of resource planning, supply chain management, and customer relations were less. The METI report also identified a lack of awareness of the potential benefits of IT among top management as a factor holding back greater usage. In Japan, more firms use private lines than the internet for business-to-business e-commerce, suggesting that a significant proportion of transactions are taking place within corporate groups rather than with external clients.

- Structural rigidities may also constrain companies from realizing the full benefits of IT. The lack of competitive pressures in some segments of the economy are likely to reduce the need for companies to innovate and become more efficient, while inflexible labor markets constrain the productivity benefits of introducing new technology. Meanwhile, impediments to new business start-ups may limit technological innovation. Social infrastructure, including education, the judicial system, and the government's own operations may also be constraints. For example, the lack of IT education programs has resulted in a shortfall of IT professionals. Further, the small number of judicial professionals has limited the ability to deal with legal issues related to e-commerce, while the continued reliance of the government on paper-based operations discourage firms from changing their way of business administration.

34.   If such impediments were removed, IT investment could have a substantial impact on the medium term performance of the economy. Shinozaki (2001b) estimates that IT investment in Japan stimulates production by a factor of 2.3, compared to 1.9 for total private nonresidential investment, while ¥1 trillion of IT investment creates—both directly and indirectly—an additional 80,000 new jobs. Assuming IT investment of ¥10 trillion over the next ten years, broadly in line with that in the U.S. during 1992–2000, 800,000 new jobs would be created, sufficient to reduce the unemployment rate by 1 percentage point.

35.   Recognizing the critical role of the IT sector in the economy, the government formulated the "e-Japan Priority Policy Program" in March 2001. The goals of the program are to create an international best standard information and communications network, upgrade education and training in IT-related fields, promote e-commerce, establish an "e-government," and secure safety and public confidence in the network. The program also identifies the policies to meet these goals, including greater competition in the telecommunications industry and the reform of e-commerce regulations.

E. Conclusions

36.   The decline in productivity growth has been an important factor behind Japan's poor economic performance during the 1990s. Further, productivity growth in Japan has lagged that in faster growing industrial countries, while estimates suggest that productivity levels in the domestically-oriented sectors of the economy are well below those in the U.S. Consequently, there would appear to be substantial scope for structural reforms to raise productivity and boost growth potential over the medium-term.

37.   The blueprint of the CEFP contains a bold and broad-ranging reform agenda that will need to be implemented if the full potential of the economy is to be unlocked. However, there are a number of areas where the payoffs to reform could be particularly significant:

- **Labor market**. A flexible labor market is an important component of a dynamic economy, being necessary to aid the reallocation of resources from declining sectors to the new areas of the economy on which Japan's future growth will increasingly depend. However, at present, there are a number of impediments to the movement of labor, including the strict interpretation of existing employment legislation and the continued prevalence of the "lifetime employment" and seniority-based wage systems. Reforms in these areas, as well as other measures to improve the functioning of the labor market, will be important to increase labor mobility.

- **New business formation**. Creating the climate and conditions whereby new firms are able to enter existing markets and establish new ones is an important aspect of a more competitive and efficient economy. However, the rate of new business formation in Japan has declined and is low by international standards, suggesting that this aspect of the growth process is lacking. Reforms have already been undertaken to encourage new start-ups, including the development of equity markets for new firms, but the limited availability of venture capital, substantial administrative burdens, and rigidities elsewhere in the economy remain important disincentives.

- **The regulatory environment**. Impediments to competition remain in a number of key sectors. Regulations governing large scale stores limit the scope for economies of scale and efficiency gains in the retail sector, while in the telecommunications sector the lack of competition in the local market means that call charges remain high by international standards. The enforcement of existing competition policy also needs to be strengthened to advance the role of market forces in the economy.

38.   The further development of the information technology sector over the medium-term will be important. While IT usage in Japan has expanded quite rapidly in recent years, there appears to be scope for further increases, although this will both depend on addressing some of the structural impediments highlighted above—including more flexible labor markets to encourage firms to introduce labor saving technical innovations and greater competition in telecommunications to lower connection costs and improve data transmission speeds—and developing a greater acceptance of the benefits of IT among corporate management. The government's recently released "e-Japan Priority Policy Program" is an important step toward the further development of the IT sector.

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IV. REAL ESTATE AND THE MACROECONOMY IN JAPAN[1]

A. Introduction

1.   The sharp and prolonged decline in land prices and values in Japan during the 1990s shattered the post-war "land myth" (*Tochi Shinwa*). Except in 1975, land prices rose almost continuously for 3½ decades starting in 1955. During the heady half decade of the so-called "bubble" years beginning in 1985, land prices in the six largest cities rose by about 200 percent, contributing around 75 percent of the ¥1,000 trillion increase in household wealth

Japan: Land Values by Sector

(three times annual disposable income). However, with average annual declines of 10 percent for a decade, by 2000, prices had fallen back to their 1985 levels, wiping out an estimated ¥450 trillion in household wealth.

2.   Such real estate boom-and-bust cycles have also occurred in other industrial and emerging market economies. Herring and Wachter (1999) note that these cycles have contributed in many cases to banking sector weakness and crisis episodes. Most recently, weaknesses in banking systems in the aftermath of property market booms and busts were precursors to full blown crises in the East Asian economies. Indeed, the property price swings in the East Asian economies have been more pronounced compared to industrial countries, with real property price increases generally exceeding 20 percent a year compared to about 10 percent a year in the US or the larger European economies (BIS, 1997). More generally, property price movements have been closely related to the business cycle, and recessions in the European Union countries since the early 1980s have been associated with falling property prices (IMF, 2000). Case (2000) provides a useful recent discussion of the impact of real estate developments on the US economy.
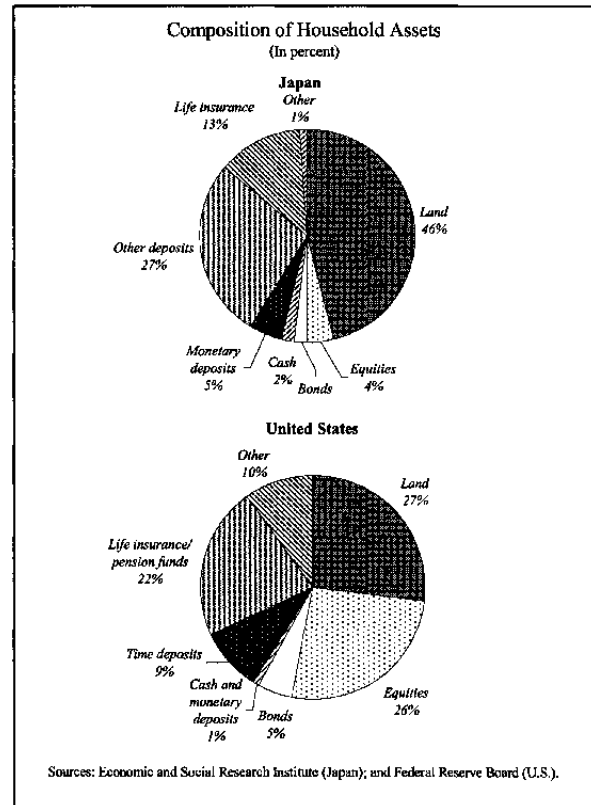
3.   This chapter examines the links between land prices, real estate, and the macroeconomy in Japan. It is organized as follows: Section B highlights the importance of land and real estate in the Japanese economy. Section C provides an account of real estate price developments in Japan during the 1980s and the 1990s. Section D examines the factors that have been used in the literature to explain price movements in Japan. The main focus of this section is on factors that drove price changes during the 1980s and the 1990s. Against the background of a continued depressed state of the real estate sector in Japan, Section E proposes steps to revitalize the market. Section F concludes.

B. Land and Property Prices in Japan[2]

4.   Land is overwhelmingly the household sector's largest store of wealth in Japan. While the share of land in total wealth has fluctuated with changes in asset prices and developments in the stock market, the share of land in household wealth has remained high. Even after the significant decline in land prices during the 1990s, the share of land in wealth in Japan remains relatively high compared to other major industrialized countries.

5.   The ratio of land value to other economic aggregates is also relatively high. The ratio of land value to GDP and household income in Japan is higher than in other industrialized countries. Thus, while the land value-to-GDP ratio in the US fluctuated between ¾ and 1 during 1970–2000, the ratio in Japan rose from around 2½ in 1970, and peaked at about 5½ in 1990 before declining to 3¼ in 1999. This ratio—at about 4—remains especially high in the Tokyo region. The high land prices are also reflected in the higher ratio of acquisition cost to annual incomes. While new housing prices in the US average around 3½ times annual income, the comparable ratio in Japan is about 4½ (Kanemoto, 1997). This overall ratio is roughly the same as in the UK, Germany and France. But the ratio in Tokyo, at 7½, is high.

Composition of Household Assets (In percent)

6.   Given its large share in household wealth and corporate financial position, land values play a pervasive role in economic decision-making. Fluctuations in land values generate changes in household and corporate balance sheets, income streams, profitability, and stock market valuations. Furthermore, given the extensive use of land as collateral for bank loans, changes in land prices strongly affect bank balance sheets and behavior.
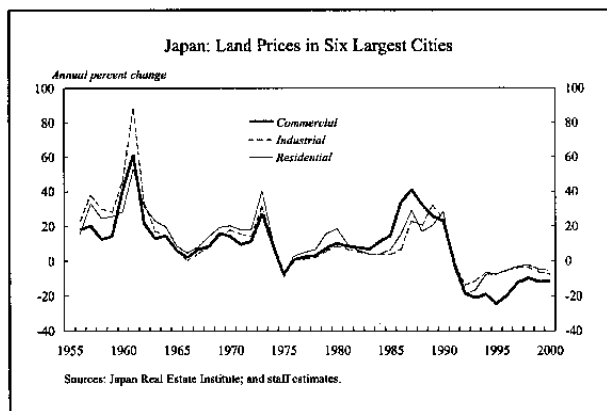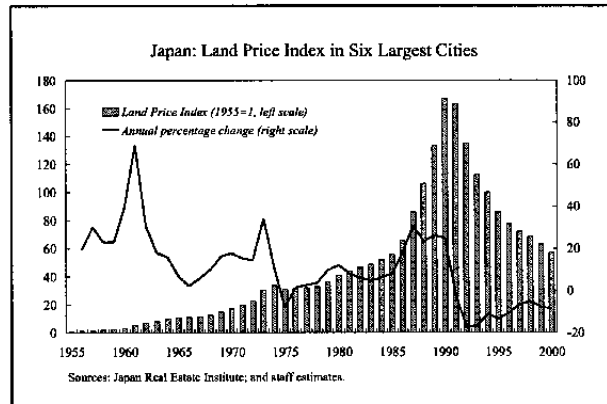
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[2] The land and property systems in Japan are somewhat different from those in other countries. While in most other countries the land price is a residual of the property price, in Japan the land and the building are priced separately. Land prices are normally determined by market comparisons using official land price indices (OLPI) prepared by the National Land Agency. The Japan Real Estate Institute (JREI) also complies a number of land price indices. For a description of the OLPI and JREI indices, see Stone and Ziemba (1993) and Okamura (2000).

C. Land Price Developments

7.   Excluding 1975, land prices in Japan rose continuously during the post-war period until 1991. Within this overall trend increase, real estate prices exhibited growth cycles. These growth cycles can be associated with factors such as differing speeds of economic growth, pace of urbanization and regional development, and the stance of economic policies (Yamada, 1993).

Japan: Land Price Index in Six Largest Cities

Land Price Index (1955=1, left scale)
— Annual percentage change (right scale)

Sources: Japan Real Estate Institute; and staff estimates.

8.   Land prices boomed during the latter half of the 1980s. During this dramatic boom, the earliest and largest price increases were for commercial property. Rising incomes in the financial sector generated demand for urban housing closer to the commercial districts. The sharp increase in land prices began in the commercial district of central Tokyo, and then fanned out to the residential suburbs of Tokyo, the commercial areas of Osaka and Nagoya, and to the other major cities and local areas. In all these areas as well, commercial land price increases preceded residential land price increases. Compared to its level in early 1985, the national price index rose by about 60 percent to peak in late 1991. The increase in regional land price indices varied across prefectures, and ranged widely between 20 percent for the more distant prefectures and over 200 percent for the Osaka metropolitan area.

Japan: Land Prices in Six Largest Cities

Annual percent change

— Commercial
- - - Industrial
— Residential

Sources: Japan Real Estate Institute; and staff estimates.

9.   The subsequent decline in land prices, which started in the early 1990s, was historically unprecedented for Japan. Land prices have fallen in every year since 1991, and in all prefectures—with those prefectures that experienced the largest upswings generally witnessing the largest falls. The price declines were as dramatic as the increases. By late 2000, the national land price index and the prefectural land prices indices had fallen back to their mid-1985 levels. The decline has spanned all segments of the market, with the largest annual declines in the commercial segment.

10.   In some respects, the decline in property prices in Japan was similar to other countries. A cross-country comparison of property price changes suggests that the magnitude of the property price swings in Japan was not significantly out of line with that experienced by other countries. Indeed, a number of other countries appear to have had larger price swings. The comparison also establishes the greater volatility of the commercial property prices relative to residential property prices.

Property Price Cycles: A Cross-Country Comparison [1]						
	Residential property prices[2]			Commercial property prices[2, 3]		
	Trough To peak	Peak to trough	1995Q4– 2000Q4	Trough To peak	Peak to trough	1995Q4– 2000Q4
	Early 1980s to Late 1990s			Early 1980s to Late 1990s		
Japan [4]	115	−22 [5]	−12	132	−51 [5]	−35
United States	...	...	30	39	−50	35
Germany	59	−17 [5]	−16	233	−43	51
France	87	− 8	24	407	−52	88
United Kingdom	215	−12	68	125	−27	22
Spain	230	− 6	43	601	−70	210
Netherlands	...	...	88	113	−20	69
Belgium	...	...	22	136	−26	32
Sweden	121	−16	49	1,027	−83	123
Switzerland	101	−25	− 6	131	−31	1
Norway	175	−26	68	245	−44	12
Finland	286	−58	57	912	−49	24
Ireland	....	...	124	48	−17	153

Source: Bank for International Settlements, 71st Annual Report, 2001.

[1] Cycles defined by peaks and troughs of property prices.
[2] Percentage changes over the relevant period.
[3] Data typically refer to major cities.
[4] Property prices refer to land only.
[5] No trough identifiable; calculated to end-2000.

11.   On other counts, however, the real estate market evolved quite differently. For one, the duration of the price decline has been much longer. Land prices in Japan have declined continuously for about a decade, and appear to be have bottomed out only recently in a few wards of the Tokyo metropolitan area. Moreover, these price declines have been accompanied by a stagnation in the level of market activity. This impression of stagnation is confirmed by a number of indicators, including the number of land transactions. Relative to the earlier decades, the volume of real estate transactions fell, nationally and in all major metropolitan areas.

Number of Land Transactions (average annual, thousands)			
	1971-80	1981-90	1991-2000
Total	2,812	2,255	1,820
Of which:			
Tokyo Metropolitan	503	453	373
Osaka Metropolitan	278	240	190
Nagoya Metropolitan	169	124	99
Others	1,862	1,438	1,179

Source: Ministry of Justice.

D. Explaining Land Prices in Japan

12.   The empirical literature uses demographic and physical characteristics to explain, in part, the high level of land prices in Japan. Relative to its GDP and population, the habitable area in Japan is very limited. For comparison, while Japan's population is about half that of the United States, the land area is only about 4 percent. The habitable area is smaller still, about 1/60th the size of that in the United States—an area about the size of South Carolina. Japan's population per unit of habitable land is, therefore, about 30 times that of the US, while its GDP per unit of habitable land is around 20 times as large.

13.   High land prices may also be rationalized in terms of economic fundamentals. Boone and Sachs (1989) and Kanemoto (1997), for example, suggest that land prices would be high in a country with a higher growth rate, as the land rent in this country would grow more quickly. This result is along the lines of a standard growth model, according to which economies with some combination of low time preference, high productivity growth, and low property tax rates should be expected to have high land values relative to national income and output aggregates. In the context of a simple growth model, the value of land can be related to GDP as follows:

$$Land\ value = \frac{\alpha}{i + \eta - \theta} GDP$$

assuming that that land rent is a constant fraction, α, of GDP and grows at the steady state growth rate; i is the interest rate; η is the property tax rate; and θ is the rate of increase of land rent (and the steady state growth rate). To compare Japan and the US, Boone and Sachs suggested the following parameter values: real interest at 5 percent in both countries; expected growth rates of 4 percent and 2 percent, respectively; and effective property rates of 0 percent and 2 percent, respectively. With these parameter values, land value in Japan could be expected to be about 4 times that in the US. These estimates are, of course, very sensitive to the assumed parameter values, in particular, to the difference between the assumed real interest rate and growth rate.

14.   Still other explanations of the high land prices relate to policy distortions. These distortions discourage a more efficient use of the available land, thus contributing to high land prices. These distortions relate to features of the tax system which create low holding and high selling cost of land, aspects of the regulatory regime such as zoning and building code restrictions which lead to underutilization of existing land, and tenancy and land lease laws which thwart market turnover especially in the residential housing market. These factors are discussed more extensively in Section E.
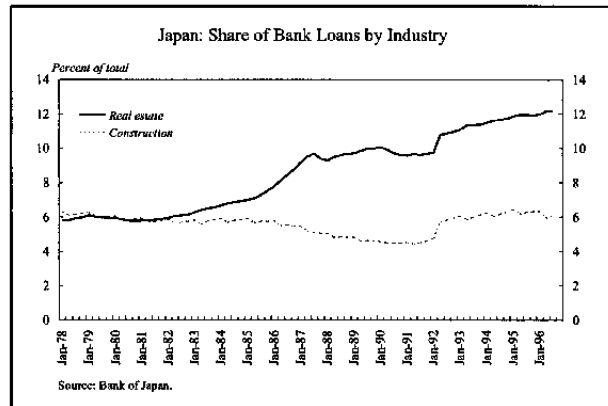
15.   The factors which are used in the empirical literature to explain price trends are similar to those that help explain the high level of land prices. Movements in land prices have been explained using monetary aggregates including bank lending; income and expenditure aggregates; demographic factors; stock prices and bond yields; and rental values.[3] Additional variables such as the business creation rates are often included for commercial real estate prices. Along these lines, Ito and Iwaisako (1995) estimate models in which the real GDP growth rate, inflation, interest rates, and the growth of outstanding real bank loans to the real estate sector explain over 80 percent of the variations in real land prices. A number of recent studies also focus on whether land price movements have deviated from fundamental values—especially during the 1980s and the 1990s—with differing conclusions. Stone and Ziemba (1993) argue that these movements were consistent with fundamentals. They suggest that movements in short and long-term interest rates can account for both the land price
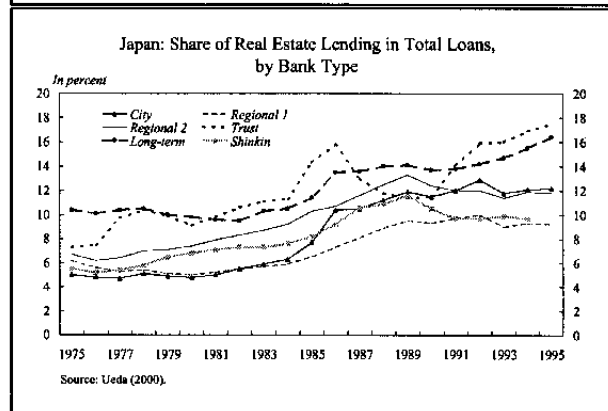
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[3] Recent studies include Bank of Japan (1990), Ito and Iwaisako (1995), and Okamura (2000).

boom of the late 1980s and the subsequent bust. In contrast, Ito and Iwaisako (1995) argue that the price cycle cannot be explained by fundamentals alone.

16.   To explain price developments during the 1980s, recent analyses examine more closely the links between land prices, the real estate sector, and the banking sector. These studies suggest that financial liberalization and easier monetary conditions contributed to the land price boom of the 1980s (Hoshi, 2001; Ueda, 2000; and Hoshi and Kashyap, 1999). The deregulation of financial markets in the mid-1980s generated the perception that Tokyo would soon develop into a major international financial center and prompted the entry of a number of foreign companies, especially securities firms. The increased demand for real estate was boosted by easier monetary conditions. These easier conditions materialized as the Bank of Japan, concerned over the likely adverse effects of the yen appreciation in the aftermath of the Plaza Accord of September 1985, lowered its discount rate to historically low levels in a series of monetary easing steps. The low interest rates fueled a sharp increase in private sector credit growth.

Japan: Share of Bank Loans by Industry

Source: Bank of Japan.

17.   Changing financial market conditions sparked a change in banks' lending behavior. With capital account liberalization and the entry of foreign financial institutions, banks lost a number of their traditional, large corporate customers to alternative financing sources. In response, the banks increasingly directed their lending activity towards smaller firms and the real estate sector. While all financial institutions increased their exposure to real estate, the share of real estate lending in total loans became especially high at the long-term and trust banks and continued to increase during the 1990s

Japan: Share of Real Estate Lending in Total Loans, by Bank Type

Source: Ueda (2000).

even after land prices had begun to fall. However, as economic conditions deteriorated and land prices continued to fall, a substantial volume of these loans turned sour. For example, at end-March 2001, of the total disclosed nonperforming loans (NPLs) at 16 major banks, one-third were to the real estate sector.

18.   Recent empirical work confirms the existence of a strong correlation between land prices, the composition of banks' portfolios, and the ratio of bad loans. For example, using panel data for city, regional, long-term, and trust banks, Hoshi (2001) finds that the annual increase in the ratio of lending to the real estate sector to total loans was positively related to land price inflation and rose as the opportunities to lend to large corporate borrowers diminished. The analysis also finds that banks which were diversified into overseas markets fared better in maintaining sound loan portfolios. Ueda (2000) presents evidence to suggest

that the bad loan ratio was higher for banks in regions with greater swings in land prices, with more use of land as collateral, lower capitalization ratios, and a more limited branch network.

19.   A number of factors contributed to prolonging the period of price decline. In the initial years of the downswing, there was considerable optimism that the downturn would be temporary. Even after this view came under pressure from the persistent price declines, a quick adjustment in real estate prices, including through increased sales—which in other country episodes of boom-and-bust cycles helped the market bottom out quickly—did not take place. In other such episodes, the quicker adjustment in real estate prices was often precipitated by the banks which, as creditors, took the initiative against their weak borrowers. In the event that the banks were unable, or unwilling, to cope with the situation, bank regulators, aided with public resources, stepped in to move forward the process of attaching and liquidating collateral. These processes did not materialize in Japan at an early stage.

20.   Regulatory forbearance prolonged the real estate downturn. More stringent regulatory standards and their strict enforcement would likely have forced banks much earlier in the decade to recognize the deterioration in their balance sheets. This would have caused a greater volume of land collateral appearing on the market for liquidation, stimulated market transactions, and generated downward pressure on real estate prices. The prompt corrective action clause was introduced through an amendment of the banking law to make the regulatory approach more transparent and rule based only in April 1998 to remedy the situation. Regulatory supervision of the banks may also have been lax because the regulators' options were circumscribed by the nonavailability of public resources to resolve banking sector problems until a much later stage. In this context, Ueda (2000) suggests that, initially, there was considerable public opposition to the use of budgetary resources to assist the banks. Even after it was acknowledged that the use of public resources was inevitable, it was initially expected that only the credit cooperatives and the housing finance companies (*jusen*) needed capital injections, and that the major banks could deal with the situation with their own resources. It was not until the collapse of large banks and securities companies in late 1997 that the problem was recognized as being more systemic and as requiring more public support.

21.   The banks did not accelerate the adjustment process for a variety of reasons. Their heightened exposure to the real estate sector after the lending spree of the 1980s meant that aggressive action against borrowers would have weakened their own loan portfolios and balance sheets. This reluctance to take action was exacerbated by banks' substantial cross-shareholdings. Had the banks moved to expose the weak financial positions of their borrowers, it would have affected the stock market valuation of these borrowers which, in turn, could have undermined the banks' own financial position. Faced with this situation, the banks often engaged in "evergreening" of loans to otherwise bankrupt borrowers. This lack of early recourse to liquidation of land collateral also contributed to a thin volume of market transactions and obviated a key source of downward pressure on real estate prices. Even in the current state of the market, a number of banks appear to be taking a wait-and-watch attitude.

22.   The institutional setup to deal with distressed borrowers was also unhelpful for generating early results. Against the historical background of persistent price increases, the resolution mechanisms were not geared to facilitate the adjustment process. Even if the banks had been willing to take action against bankrupt borrowers, foreclosure procedures could be expected to be prolonged and unwieldy. The situation required a speedier, Chapter 11-style resolution mechanism, which was finally set in motion with the adoption of the Civil Rehabilitation Law in April 2000.

E. Revitalizing the Real Estate Market: Some Policy Considerations

23.   The continued moribund state of the real estate market has generated extensive comment and policy concerns. We examine four areas in which policy action could help rejuvenate the real estate market in Japan.

Resolving nonperforming loans

24.   The resolution of nonperforming loans is critical to the restoration of robust market conditions in the real estate sector. The recent reform blueprint of the Council on Economic and Fiscal Policy, with its emphasis on the "definite and final" disposal of NPLs over a two-year period, is a welcome policy commitment of the new government. Over the long run, an accelerated pace of corporate restructuring and banking sector reform would contribute to improving liquidity conditions in the real estate market. Stricter loan classification by the banks, including through forward looking provisioning, would help identify weak and unviable firms that need to be targeted for restructuring or bankruptcy so that credit lines to the viable entities can be reactivated. In the short run, it is likely that a resolution of these NPLs and the associated unloading of real estate on the market would further depress prices. However, this may be unavoidable if the market is to witness a turnaround. The experience of other countries has been encouraging in this regard. In the case of the US, for example, sales through competitive auctions of the failed savings and loan associations' assets by the Resolution Trust Corporation began quickly, and the disposal of distressed assets peaked in 1991 (BIS, 1997). Although, these sales contributed to a weakening of the real estate market initially, the market picked up relatively soon, in part because of the Federal Reserve's low interest rate policy.

25.   The recent efforts of the Financial Services Agency to coordinate the resolution of the banks' bad loan problem with corporate restructuring agreements fills an important gap in the process. The Civil Rehabilitation Law should also provide greater hope of survival to companies after entering bankruptcy and strengthen incentives for voluntary entry into the proceedings. Recent reports that an increasingly larger number of companies with substantial bad debt at major banks are likely to seek bankruptcy protection is an encouraging sign. This process would also benefit from a close examination of the bankruptcy and collateral laws to remove obstacles to speedy acquisition and liquidation, and recovery of fair value, of loan collateral. The introduction of institutional mechanisms such as the Private Servicer System (PSS), which was introduced in October 1998, would also help. By extending the function of loan collection activities to private companies, the PSS broke the monopoly that lawyers held in this area and eliminated a key bottleneck to loan collection posed by the limited number of lawyers in Japan.

Broadening the real estate market

26.   There is considerable scope to increase investor participation in the real estate market. The market has traditionally been dominated by large, integrated companies which overlook all aspects of the business and are closely related to the banking system through client relationships and cross-shareholdings. This dominance could be reduced, including through allowing participation by new entities and issuance of new financial instruments.

27.   Some recent steps to expand resource flows into the real estate sector include:

- The establishment of Special Purpose Companies (SPCs) was permitted under the Land Liquidation Law passed in September 1998. The SPCs can be set up specifically for the disposal of land collateral. These companies have lower minimum capital requirements and are exempt from corporate income tax as they are required to pay out more than 90 percent of profits in the form of dividends. The shares of SPCs are regarded as securities and are generally better received than shares of real estate companies on account of favorable tax treatment of capital gains. The SPCs can also issue commercial paper against the anticipated income streams from properties that they hold. This commercial paper can be held by financial institutions, thus facilitating resource flows into the real estate sector.

- Corporate-type investment trusts were introduced in December 1998. These instruments are an improvement over the features of the contract-type investment trusts in that they constitute direct investment in trust companies and are tradable on the stock exchange. Purchase of shares of SPCs or listed real estate companies through corporate investment trusts is similar to a US real estate investment trust (REIT).

- The REIT law became effective in November 2000. The development of a Japan-REIT market is expected to help deliver much needed liquidity to the sector from equity markets. It is also intended to encourage the separation of development, ownership, and management functions—all of which are currently handled by the comprehensive real estate companies. The REIT market developments have been encouraging. With the start of the market on April 1, 2001, most major real estate companies have announced plans to establish REITs. However, further improvements in the tax and regulatory structures, including reduction in real estate transactions taxes and strengthening of disclosure rules for asset-backed securities may still be required to foster market development.

- Recent moves by the Resolution and Collection Corporation (RCC) would help expand the market for real estate securitization. In early 2001, the RCC moved to securitize the headquarters of the Long-Term Credit Bank—its first move to repackage real estate collateral. This option improves upon sales by auctions or through foreclosure by making the assets under liquidation more accessible to small and medium-sized investors.

Regulatory regime

28.   Regulatory limitations on land use have restricted habitable land and livable space in Japan. Tokyo is a striking example of the impact of these restrictions where, despite high land prices, there is a considerable amount of undeveloped and inadequately used land. Moreover, the legally allowed capacity is not utilized fully. Thus, compared to the legally allowed floor-to-land area ratio of over 240 percent, the actual use is under 100 percent.

29.   Zoning regulations and building codes, especially in the larger cities, could be further liberalized. Such liberalization—subject to safety requirements—would permit the consolidation of small and vacant lots and make it possible to plan large-scale housing or commercial development projects. Notwithstanding some steps to liberalize restrictions in 1997, real estate developers have continued to argue that restrictions placed by the Building Standard Law on the position, height, and shapes of buildings need to be reconsidered to permit the construction of more profitable structures in city centers. The newly created Urban Rejuvenation Headquarters—to be led by the Prime Minister—could play a useful role in this area if the guiding principles could be articulated clearly and converted into concrete action plans at an early date.
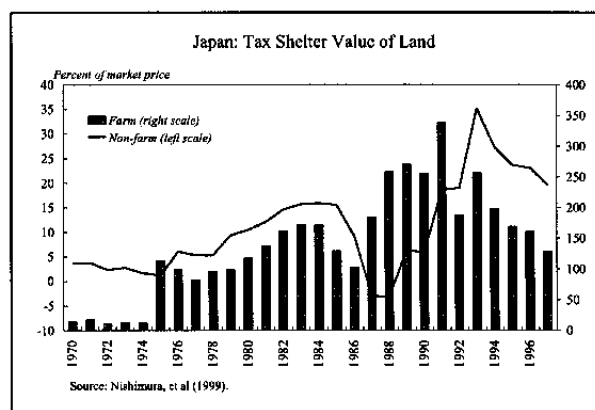
30.   Another key area for action is the law on rentals and land-leases. Until their replacement by the Land and House Lease Law in 1991, the Land Lease Law and the House Lease Law gave heavy precedence to tenants' rights and made it extremely difficult for landlords to reclaim the use of their property except for "rightful cause"—an event that has been interpreted very narrowly by the courts (Ito, 1997). This has discouraged more active investment in residential housing and made arduous the process of converting old structures into new, more efficient housing. The tenancy laws have also discouraged a more active property rental market. The introduction of the fixed-term land lease in September 1991 and the fixed-term house lease in December 1999—which permits the landlord to terminate a lease at the end of the stipulated period—is a welcome development. However, the law is applicable only to new leases.

Land taxation system

31.   Various elements of the land taxation system were changed in the 1991 land tax reform. Following the sharp land prices increases in the late 1980s, the Land Tax Law was enacted to increase the tax burden on real estate. Among other changes to the tax rates and provisions, a national tax on landholding called the Land Value Tax was introduced. In view of the depressed conditions in the real estate market, the tax has been suspended since April 1, 1998. The 1991 tax reform notwithstanding, the current land taxation system continues to generate distortions in land use and prices and is a significant source of tax-induced non-neutralities (Dalsgaard and Kawagoe, 2000). Further reform of the land tax regime would help improve land use efficiency.

32.   Phasing out the asymmetry between the inheritance tax rate on land and other assets would help eliminate a key distortion. Distortions in the inheritance and capital gains tax systems provide "tax shelter value" (*TSV*) to land in wealth portfolios (Nishimura, *et al*,

1999).[4] This *TSV* of land for farm families
is estimated to have peaked at about
340 percent in 1991—a level that leads to
a reservation price on land 4½ times the
market price. With the decline in land
prices and tax changes, the reservation
price is estimated to have fallen, but is still
high relative to the market price.
Removing this asymmetry would
contribute to a faster conversion of
agricultural land to other uses.

Japan: Tax Shelter Value of Land

Percent of market price

Source: Nishimura, et al (1999).

33.   Streamlining capital gains tax rates on land would help reduce the long holding-
period bias. While the structure of the capital gains tax for land has been changed during the
1980s and the 1990s, the structure of the tax schedule still encourages long-term holding,
especially for individuals. Specifically, the tax rate for "ultra" short-term holding period
(defined as less than 2 years) is higher than the rate for short-term holding (2–5 years). With
prices falling and speculative activity much less of a concern, consideration could be given to
making the tax rates neutral to the holding period.

34.   Transactions taxes could be further reduced. In Japan, real estate purchases are
subject to three types of transaction taxes: acquisition taxes levied by the prefectures, the
national registration tax, and the stamp duty. In the case of residential housing, these taxes
are levied on new purchases as well as used homes. The amount of these taxes depends on
the value of the house, and is typically around 2 percent of the value of the house. But, the
tax rate can be higher in the case of more expensive properties (upwards of 5 percent), and
tends to dampen market transactions. In addition to these transaction taxes, households which
move homes have to pay a capital gains tax even if the value of the new house exceeds that
of old property. These tax rates are on the high side: for houses owned for less than five years,
for example, these rates are upwards of 50 percent. The high transactions and capital gains
taxes have contributed to infrequent moving and used home purchases, leading to a thin
secondary market in residential housing. While the registration tax was reduced during 1998–
99, there may be scope for further reductions. The capital gains taxes could also be reviewed
for possible reduction and could be deferred if the sales proceeds are reinvested, as is the
case of some other countries.

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[4] While inheritance taxes on financial assets are levied at market prices, taxes on land are
assessed at 40–60 percent of market value. Farm property is subject to more favorable
treatment. The assessed value of farmland in the Tokyo metropolitan area, for example, is
estimated at less than 1 percent of the market value. Moreover, if inherited land is used as
farmland for more than 20 years, inheritance tax payment is waived.

F. Conclusions

35.   The current problems of the Japanese economy are intricately linked to the prolonged decline in real estate prices during the 1990s. This chapter traced some of the links between land prices and the financial sector, and economic activity more generally. The continued depressed state of real estate prices and market conditions in Japan has focused attention on steps to arrest the decline in prices and help bolster the financial position of corporations and banks, including measures to resolve nonperforming bank loans and to improve the flow of resources into the sector through securitization of real estate. From a somewhat longer term perspective, the regulatory and land taxation regime have also come to the fore as structural impediments to efficient land use. Policy reform in these areas would help create a vigorous and efficient real estate market in Japan.

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