The Macroeconomic Experience of Japan Since 1990: An Empirical Investigation

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ABSTRACT

This paper outlines the macroeconomic experience of the Japanese economy since 1990. The MSG2 multi-country model is used to determine the extent to which the strong yen and growth experience of Japan over this period was due to underlying trends in the Japanese economy and to what extent shocks such as changes in the settings of monetary and fiscal policies in Japan and overseas, as well as the Kobe earthquake, played a role. It is shown that many of the key features of the Japanese economy over this period can be attributed to inappropriate macroeconomic policy settings in Japan as well as reflecting long term trends due to population changes and a maturing of the Japanese economy. In particular, it is shown that announcing expansionary fiscal policy in advance of implementation and exaggerating the extent of actual stimulus, tended to appreciate the yen and raise long term real interest rates which further reduced real GDP growth over the period. The extent to which macroeconomic policy rather than entrenched structural problems can explain the experience suggests that future prospects for the Japanese economy are not as bleak as sometimes predicted. Growth is unlikely to return to the high levels experienced in previous decades because of the maturing of the Japanese economy and low future population growth in Japan. This paper projects growth to be sustainable at around 2.5% per year over the next decade and a continual appreciation of the yen in both real and nominal terms.

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I. Introduction

The Japanese economy in the 1990s has experienced a decline in macroeconomic performance distinctly different from previous business cycle downturns in Japan. A severe economic slowdown began in the second half of 1991 and it is only in the early part of 1996 that signs of a sustained recovery are appearing. This long recession contrasts with previous downturns of the Japanese economy where economic activity rebounded quickly. Another striking aspect of this period is that since 1990 the Japanese yen has appreciated in real effective terms by over 30 percent continuing the trend experienced between 1980 and 1988. What is behind the performance of the Japanese economy since 1990?

As with any economy, there are many factors at play in the Japanese economy although a few major factors are identified in this report. This report finds, using an empirically based global simulation model, that many of the key features of the Japanese experience since 1990 can be explained by a combination of underlying trend changes in productivity and population growth as well as the setting of macroeconomic policy in the Japanese economy. Other important factors include shocks from the global economy and the Kobe earthquake. The remaining aspects of Japanese macroeconomic experience not captured by the analysis in this report can most likely be attributed to the bursting of the "bubble economy" of the 1980s and the various banking and political crises over the period. It is important, however, to highlight that those factors appear to be of less importance than the factors dealt with directly in this study. An important implication of the results contained here is that the prospects for the Japanese economy over the next decade are not as bleak as commonly believed. Although continuing structural problems in the Japanese economy, particularly in the banking sector, may act to slow potential growth, the poor growth

performance experienced since 1990 does not imply that there has been some underlying long term crisis in Japanese economic performance. It is likely that as Japan has reached the technological frontier in some sectors and with low population growth, future trend growth in Japan is likely to be similar to other advanced OECD economies and well below the 4% to 5% growth experienced before the recent economic downturn.

This report is structured as follows. An overview of the macroeconomic experience of the world economy and Japan from 1980 to 1995 is presented in section 2. Section 3 presents an overview of the MSG2 multi-country model developed by McKibbin and Sachs (1991) that is used as a basis for the empirical part of the paper. Section 4 projects a baseline for the Japanese economy that ignores the shocks identified for the 1990s but which incorporates the underlying trends in population and productivity growth and the inherited dynamics from shocks in the 1980s. Section 5 contains policy multipliers for the effect of a number of alternative shocks in the model. In addition to underlying trends and inherited dynamics, these shocks are important for understanding the experience of the Japanese economy over the period. The shocks considered are: an unanticipated contraction in monetary policy and an anticipated relaxation of monetary policy; fiscal expansions, where a distinction is made between changes in fiscal policy that are either anticipated or unanticipated or temporary or permanent changes in government spending and also a distinction is made between government current spending and infrastructure investment; the Kobe earthquake; and non Japanese shocks such as changes in U.S. fiscal policies. The shocks explored in section 5 are then considered together with the shock free baseline in an attempt to explain part of the experience of Japan since 1990. A conclusion including speculation on the results for the Japanese economy over the remainder of the decade and an overview of

policy implications are presented in section 6.

2. The Japanese Macroeconomic Experience Since 1990

This section of the report presents an overview of the macroeconomic performance of the Japanese economy since 1990. Given the interdependence of the Japanese and foreign economies it is difficult to focus solely on the Japanese economy without considering important developments in the world economy during the period of interest. In addition, developments in the period from 1990 are dependent on lagged effects of developments in earlier periods. Where factors outside the period and outside the Japanese economy are important, they will be considered although the focus in this report is on the Japanese experience in the 1990s.

i. Setting the Stage: The 1980s

The 1980s was a period of large swings in macroeconomic variables in the world economy (see McKibbin and Sachs (1991) for an overview using an earlier version of the model used in this report). Figures 1 through 3 show a number of key variables from 1980 through 1995. The period began with the aftermath of the second oil shock. Monetary policy was tightened significantly in 1981 in the United States, Germany and Japan. At the same time large tax cuts were announced in 1981 to be implemented through 1983 in the United States. This significant anticipated relaxation of US fiscal policy combined with tight monetary policy dramatically raised long term and short term real interest rates in all economies with open capital markets. The emergence of the large US fiscal deficit and a subsequent significant contraction of Japanese and European fiscal policy led to the emergence of large current account deficits in the United States and surpluses in Japan and Germany. The US dollar appreciated in real and nominal terms substantially from 1981

through 1985 (although earlier relative to the yen compared to other currencies). The US dollar began to depreciate before the Plaza accord in September 1985 and by 1987 had in real effective terms fallen back to its level in 1981. The Japanese yen was the inverse of the US dollar from 1984 to 1987 although it tended to appreciate in effective terms from 1980.

Spurred by the demand stimulus in the US economy in the early 1980s, the period to 1989 was one of reasonably strong growth in the major economies from 1983, gradually falling inflation , the emergence of large current surpluses in Germany and Japan and a current account deficit in the United States. However, the current account swings tended to decline with the depreciation of the US dollar after 1985. The swings in global macroeconomic conditions also contributed to a few international crises including the developing country debt crisis of the early 1980s and the stock market crash of October 1987.

ii. The 1990s

The 1990s were heralded by a number of shocks to the global economy that have been quantified by this author elsewhere (see McKibbin (1992), McKibbin (1994b) and Manchester and McKibbin (1994)). The fall of the Soviet Union and the reunification of West and East Germany in 1989 had a major impact on the world economy. A global economic slowdown beginning in the second half of 1990 worsened through 1991. This was accentuated by the Gulf War and a temporary disruption of the world oil markets in 1991. The slowdown in economic activity was experienced by Japan in the second half of 1991 although this is not as clear from the annual data shown in figure 1. As Germany borrowed from the rest of the world to fund the large flow of capital into Eastern Germany and the significant fiscal expansion, the German current account surplus quickly disappeared (see panel 3 in figure 1). The slowdown in economic activity

in Japan worsened through 1992 (see panel 1, in figure 1).

In response to the worsening performance of Japanese growth, a series of five fiscal packages were announced from August 1992 through September 1995. These packages were aimed at stimulating the economy although they had little early effect for reasons explained below. The fiscal packages are summarized in Table 1 and the implications for the fiscal deficit under alternative definitions are shown in Table 2. Although apparently a series of significant fiscal stimulus packages, the figures in table 1 are misleading as a guide to the extent of actual fiscal stimulus applied to the Japanese economy. A significant part of these packages consisted of components that would not be expected to directly stimulate demand. The importance of the composition of the packages is referred to in the Japanese debate as the difference between "muddy water" versus "pure water" components (see Yashiro and Ito (1995) and Ueda (1995b). The measures which would not be expected to stimulate economic activity included payment to support land prices through land purchases, public loans to purchase private housing and funds available to undertake private investment at subsidized interest rates. In addition to these policies part of the announced spending was already included in the previous budgets but had not been spent and therefore was being carried forward in the fiscal packages. An additional problem with the lack of stimulus from the early fiscal packages was that the Ministry of Finance tended to raise revenue to finance the increased government spending and therefore reduced the actual extent of fiscal stimulus as measured by changes in the fiscal deficit. Serious expansionary fiscal

Table 1: Japan's Fiscal Packages

	August 1992		April 1993		September 1993		February 1994		September 1995	
Local Govt Public Works	1.80	(0.39)	3.50	(0.77)	0.50	(0.11)	0.30	(0.06)	1.00	(0.20)
Public Works	4.00	(0.86)	4.30	(0.95)	1.00	(0.22)	4.20	(0.88)	4.80	(0.98)
excluding land	2.80	(0.60)	3.60	(0.79)	0.80	(0.18)	2.70	(0.57)	3.90	(0.79)
Disaster Relief	0.50	(0.11)	0.50	(0.11)	0.50	(0.11)	0.00	(0.00)	2.10	(0.43)
Financing Expenditure	3.50	(0.76)	4.70	(1.04)	3.90	(0.86)	2.60	(0.55)	1.50	(0.31)
Total Size	10.70	(2.31)	13.20	(2.91)	6.20	(1.37)	9.40	(1.97)	14.20	(2.89)

Source: Yashiro and Ito (1995). All units are in trillion yen except those in parentheses which are expressed as percent of GDP.

Table 2: Alternative Definitions of Japanese General Government Budget Balances
(percent of GDP)

	1989	1990	1991	1992	1993	1994	1995
Financial Balance	2.5	2.9	3.0	1.5	-1.4	-3.5	-3.9
Structural	2.0	1.7	1.5	0.3	-1.6	-2.9	-2.2

Source: OECD Economic Outlook #58, December 1995.

policy really began with the 1994 package and continued in the 1995 package.

Monetary policy was also relaxed from 1991. Nominal interest rates fell from close to 8 percent in 1990 to close to 1 percent in 1995. The degree to which this was a relaxation of monetary policy in the earlier period is somewhat more controversial because even though short term nominal interest rates were cut by the Bank of Japan, these interest rates fell at the same time that the inflation rate was falling which implied a smaller fall in real interest rates (see figure 2). The crucial issue here is how to measure expected inflation since different price indexes and different assumptions lead to different measures of expected inflation. Long term nominal interest rates fell by less than short term interest rates and, according to figure 2, real long term interest rates fell from 1990 to 1993 but then rose again through 1994 and 1995. Again the assumption about the calculation of expected inflation is crucial here. Nonetheless, these results are similar to calculations by the OECD (1994). Despite the above qualifications about how to measure the stance of monetary policy when expected inflation is changing, it appears that there has been a significant monetary easing in Japan especially through 1994 and 1995.

An important aspect of Japan's experience has been the rise in the value of the Yen. Figure 3 shows the experience of the real and nominal effective exchange rates for the United States and Japan from 1980 through 1995. The exchange rate variables are defined for both countries such that a rise is an appreciation. The series are calculated as a geometrically weighted average of each bilateral exchange rate of a given country against all trading partners (as defined in the MSG2 model database) where the weights are the shares of each trading partner in the exporting country's exports. Thus the effective exchange rate of Japan includes the United States

as an important component and the US effective exchange rate includes Japan.

The appreciation of the US dollar to 1985 and subsequent depreciation is clear from figure 3. The Japanese effective exchange rates are not simply the mirror image of the US rates. Between 1980 and 1985 the yen depreciated in real terms relative to the US dollar but appreciated relative to other trading partners so that the real effective exchange rate from 1980 to 1985 was relatively unchanged. The sharp appreciation of the yen through 1986 to 1988 is clear from the figure. In real terms, the yen fluctuated around the 1987 level until 1993 when it started to appreciate again in real terms. By 1995 it was on average 30% higher in real terms relative to 1990 and 70% higher in real terms relative to 1980. As explained in section 5, part of this experience is due to macroeconomic policies in Japan and the rest of the OECD. The underlying trend appreciation also reflects the rise in input costs, in particular unit labor costs. Real unit labor costs for both the United States and Japan, expressed as a log index equal to 0 in 1990, are shown in figure 4. Although the change in the index is not as large as the change in the real effective exchange rate, it does show a rise in the labor component of input costs of close to 30% from 1980 to 1995.

The first question that needs to be addressed is to what extent the experience since 1990 was a continuation of underlying trends in the Japanese economy and to what extent it was due to shocks to the Japanese economy during the 1990s. To disentangle the role of different factors during this period requires a framework that captures most of the key interdependencies in the economy. It is one thing to explain the evolution of one particular variable but it is much more difficult to explain the simultaneous evolution of a large number of variables. My focus in particular will be on the value of the Japanese yen and the growth rate of real GDP using a

general equilibrium framework. To distinguish between trends in the Japanese economy and shocks, the rest of this paper will use a multi-country dynamic intertemporal general equilibrium (DIGE) simulation model called the MSG2 model. Section 4 below will use this simulation model to predict the likely evolution of the Japanese economy given the inherited dynamics up to 1990, assuming a continuation of the trend of Japanese productivity during the 1980s as well as projections of population growth from 1990. Section 5 will then consider a range of economic shocks in an attempt to see how the types of shocks experienced by Japan during the 1990s may cause a deviation from this underlying trend. The next section gives an overview of this model.

3 An Overview of The MSG2 Model

The basis of this study is the MSG2 multi-country model. Full documentation of the model and an analysis of its properties and tracking performance can be found in McKibbin and Sachs (1991). A summary of its key features are presented in Table 3 and the coverage of the model is listed in Table 4. The version used in this paper is the "Asia model" version 43I (see McKibbin (1996)) which was updated for this study using the latest OECD Economic Outlook data for December 1995.

The MSG2 multi-country model is particularly well suited to analyzing the macroeconomic performance of Japan and for isolating the important shocks in the global and Japanese economies. The MSG2 model is a fully specified dynamic intertemporal general equilibrium (DIGE) model with careful treatment of stock-flow relations (such as the cumulation of investment into capital stocks and the cumulation of fiscal deficits into net asset stocks). Both

Table 3: Main Features of the MSG2 Model

- both the demand and supply side of the major economies are explicitly modelled;

- demand equations are based on a combination of intertemporal optimizing behavior and liquidity constrained behavior;

- the supply side takes explicit account of imported intermediate goods especially the role of imported capital goods in investment in economies;

- major flows such as physical investment, fiscal deficits and current account imbalances cumulate into stocks of capital, government debt and net external debt which in turn change the composition and level of national wealth over time.

- Wealth adjustment determines stock equilibrium in the long run but also feeds back into short-run economic conditions through forward-looking share markets, bond markets and foreign exchange markets.

- Asset markets are linked globally through the high international mobility of capital.

Table 4: Regional Coverage of the MSG2 Model Used in this Paper
(version 43I)

Regions

Structural

United States
Japan
Germany
United Kingdom
Rest of the EMS (denoted REMS)[2]
Australia
Rest of the OECD (denoted ROECD)[3]
High income Asia[4]
Other Asia[5],

Non-Structural

Oil exporting countries (denoted OPEC)[6]
Non-oil developing countries (denoted LDCs)[7]
Eastern European economies including the former Soviet Union (denoted EFSU)[8].

[2] This block consists of Belgium, Denmark, Ireland, Italy and Luxembourg.

[3] This group of countries consists of Austria, Canada, Finland, Iceland, New Zealand, Norway, Portugal, Spain, Sweden and Switzerland.

[4] This group consists of Hong Kong, Korea, Singapore, Taiwan.

[5] This group consists of China, Indonesia, Malaysia, Philippines and Thailand,

[6] Oil exporting countries are based on the grouping in the IMF Direction of Trade Statistics.

[7] Non-Oil Developing countries are based on the grouping in the IMF Direction of Trade Statistics less countries explicitly modeled as noted elsewhere.

[8] These countries are Bulgaria, Czechoslovakia, Eastern Germany, Hungary, Poland, Romania, Yugoslavia, and the former USSR.

the short run demand and supply sides of the major economies are incorporated. In the long run, supply is determined by neoclassical growth theory. It also incorporates a number of financial markets such as share markets and markets for short and long bonds in each of the industrial regions where prices are determined by intertemporal arbitrage relations as well as long run sustainability conditions on fiscal deficits and current account positions. In addition, the assumption of rational expectations in these financial markets as well as forward looking behavior in real spending decisions means that the effects of anticipated policy changes are well handled by this model. Because the MSG2 model is a structural model with explicit expectations formation by agents and policy regimes are explicitly modeled, it is essentially immune from the Lucas (1974) Critique. The model version in this paper has regional/country coverage shown in Table 3.
It is important to note that investment and consumption behavior is modelled as a weighted average of intertemporal optimizing behavior (with rational expectations of the future path of the global economy), and rule of thumb behavior based on currently observed aggregate variable. For example a part of aggregate investment is based on current cash flow rather than expected future income. Part of aggregate consumption is undertaken by households who use current after tax income to decide consumption expenditure rather than evaluating expected future labor income or expected future tax changes. Thus expected changes in policy and future changes because of current policy shifts initially affects the behavior of forward looking households and firms. The response of aggregate investment and consumption will therefore be more damped than would be the case if all consumers and firms had rational expectations.

Investment is based on the cost of adjustment approach of Lucas (1967) and Treadway (1969), which yields a model with investment partially determined by Tobin's q, along the lines of

the work of Hayashi (1982). A full derivation of the model can be found in McKibbin and Sachs (1991).

The results in this paper depend not only on the shocks and underlying model structure, but also on the assumptions about fiscal and monetary regimes in Japan as well as overseas. In this paper plausible assumptions are made. For example fiscal policy is assumed to be implemented such that all economies maintain a fixed share of government spending to GDP and adjust taxes to service any changes in debt. The fiscal deficit adjusts endogenously to any changes in real activity or interest rates[9]. The details of policy regimes in Japan are discussed in the next section.

The final point to note, which is important for the results discussed in this report, is how exchange rates are determined in the model. Bilateral nominal exchange rates are determined by the uncovered interest parity condition on a bilateral basis. Thus the expected rate of return on Japanese government bonds is assumed to be equal to the expected rate of return on U.S. government bonds when expressed in a common currency (adjusted by an exogenous risk premium that is calculated from the general equilibrium solution of the model but is held fixed during the simulation experiments). For example the short term interest rate in Japan is equal to the short term interest rate in the United States plus the expected rate of depreciation of yen-dollar exchange rate. If the Japanese interest rate is below the US interest rate then the yen is expected to appreciate in nominal terms relative to the dollar over the period (taking into account the exogenous risk premium).

There is a large body of empirical evidence that suggests that the uncovered interest parity condition is not supported by the data. Several points can be raised here. The first is that no

[9]The importance of the assumptions about fiscal policy is shown in Bryant and Zhang(1996).

alternative explanation dominates this assumption empirically. Secondly there is an emerging literature (see McCallum (1994) and DeBrouwer (1996)) that suggests that the empirical tests are mis-specified and the apparent failure of uncovered interest parity may be explained by allowing for the endogenous behavior of governments in affecting the exchange rate. Indeed McCallum argues that using uncovered interest parity in structural models that also deal with government behavior is a valid exercise. Thirdly, the empirical results against interest parity become weaker as the time period is extended, so that at an annual frequency the hypothesis is less inadequate than at a daily frequency.

As mentioned above the uncovered interest rate parity condition in the model determines the relation between the expected change in the exchange rate between periods relative to the interest rate differential, but it does not obviously determine the level of exchange rate in any period. This point can be understood by rewriting the uncovered interest parity condition as the exchange rate in period t, equal to the differential in interest rates in period t plus the expected exchange rate in period t+1. Thus we cannot say anything about the value of the exchange rate in period t without saying something about the expected exchange rate in period t+1. Similarly the expected exchange rate in period t+1 can be shown to be the interest rate differential in period t+1 plus the expected exchange rate in period t+2. As this process of substitution reveals, the uncovered interest rate parity assumption can be expressed as an equation setting the current exchange rate in period t equal to the sum of all expected interest rate differentials between period t and some longer run future period T, plus the equilibrium exchange rate expected in period T. This way of interpreting the current exchange rate is important because in a general equilibrium model like the MSG2 model, the long run exchange rate (in period T) is determined endogenously

by the model. In fact the long run nominal exchange rate will be a function of the price differentials between countries in the long run, plus the real exchange rate (defined as the relative price of the goods of the countries) in the long run. The real exchange rate will be determined by a range of factors in the model such as technological differences between countries, productivity growth differences, population growth differences, changing tastes, and long run stock equilibria (determining the long run desired stock of external debt in different economies). Thus changes in the exchange rate over time will be determined not only by the path of interest rate differentials between Japan and the rest of the world but also changes in the long run exchange rate.

The effective exchange rates discussed below are calculated as a geometric weighting of each bilateral Japanese exchange rate where the weights are based on the 1992 value of each country's share in Japanese exports.

4. The Japanese Economy from 1990 Without Shocks

Before considering the impact of a range of shocks on the Japanese economy during the 1990s, it is worth exploring what the Japanese economic experience might have been without a number of the shocks identified below. To calculate this hypothetical evolution of the economy, the model is solved from 1990 to 2050 under an information set for all agents which is assumed to be the information available in 1990. This information includes the actual dynamics from 1989 and previous years, plus assumptions about expected future exogenous variables such as population and productivity growth and policy settings throughout the world economy. Thus for the exercise in this section, it is assumed no shocks occur from 1990 and that nobody expected any shocks. The information that is used for expectation formation is not the actual data from 1990 but the data

generated from the model in the hypothetical scenario without shocks. The main assumption ruling out shocks include an assumption of no change in macroeconomic policies in any countries. No change in policy is modeled as steady targeted nominal income growth rates in each region and constant government spending to GDP and fiscal deficits to GDP with lump sum taxation on households being used to maintain this assumption. World Bank population projections are used for each country from 1990 and the rate of labor augmenting technical change from 1990 is assumed to be the same values as that estimated to have been experienced by each country in the 1980s[10]. The World Bank projection for population growth in Japan are shown in Table 5. A key point to note is the gradual slowdown in growth from 0.27 percent in the 1990-95 period to negative population growth by 2010-15. This future slowdown is important because the model assumes that agents know this and therefore will adjust consumption and production patterns taking this information into account. On the supply side the expectation of a shrinking labor force will tend to slow the rate of investment since a smaller capital stock is required for a given capital labor ratio in future years. On the demand side, households realizing a need for future consumption with less labor income will begin to lower consumption today in order to smooth consumption over future periods including the period of demographic transition.

[10] Based on the survey in Bagnoli, McKibbin and Wilcoxen (1996).

Table 5: Population Growth Rate Assumptions 1990-2030
(average annual growth rate per period)

1990-95	1995-2000	2000-05	2005-10	2010-15	2015-20	2020-2025	2025-30
0.27	0.26	0.14	0.03	-0.10	-0.20	-0.28	-0.35

Source: World Bank(1994) (Standard Fertility case)

The behavior of key variables in this baseline solution is shown in figures 5 through 7. In 1991 growth drops from 5% to 3% and gradually declines to 2.5% by the year 2000 (see figure 5, panel 1). The slowdown of economic growth reflects the dynamics from previous years as well as slowing population growth. Inflation (defined in terms of the consumer price index) also falls gradually to converge at 1% per year. The current account surplus gradually declines reflecting a gradually falling saving rate, as consumption per capita is smoothed over time. It is also assumed that the fiscal stance in Japan from 1990 (figure 5, panel 4) does change in response to the gradual economic slowdown. There are also relatively flat future profiles for interest rates shown in figure 6. Perhaps more dramatic is the change in the real and nominal effective exchange rates in figure 7. Even in the baseline there is a built in real and nominal appreciation of the Yen. By 1995 the real exchange rate has appreciated by around 11 percent relative to 1990 and the nominal exchange rate is projected to by appreciated by 35 percent relative to 1990. The real appreciation reflects the real interest rate differential that is partly determined by the underlying adjustment in the current account surplus. The adjustment in the current account surplus reflects changes in

underlying investment and saving and is required for sustainability. In addition to the long run changes in relative prices, the persistent of low inflation rate in Japan relative to other trading partners implies a continual appreciation of the nominal exchange rate. In summary, the trend appreciation of the Japanese nominal effective exchange rate reflects underlying determinants of the real exchange rate such as trend differences in population growth, productivity growth (both affecting income growth) as well as adjustments to existing and desired stocks of net foreign assets as they affect consumption in different economies. Japanese households over time run down their stocks of foreign assets in order to sustain a desired consumption level over time which implies a flow of capital into Japan that contributes to the gradually appreciating real exchange rate.

This section shows that, even without considering any shocks, a trend slowdown in growth and appreciation of the real exchange rate are reflected in the baseline simulation. Several key points arise from this baseline, particularly focussing on the exchange rate and real growth. By 1995 the counterfactual baseline of the model predicts a real appreciation of around 11 percent relative to 1990 and a nominal appreciation of 45% relative to 1990. The actual outcomes were an appreciation of the real exchange rate 30% and a nominal exchange rate appreciation of 42%. Much of the difference between the actual outcomes and the counterfactual baseline projection for the real exchange rate can be explained by the shocks discussed below. The difference in nominal exchange rates reflects lower actual inflation rates in Japan's trading partners than generated in the model baseline because of the monetary contraction in these economies in the early 1990s that is not incorporated in the baseline. It is useful for most of the following discussion to focus on the real exchange rate because its behavior is more interesting than the nominal exchange rate which mainly reflects the real exchange rate differences plus the difference in inflation outcomes between

economies. Comparing the baseline for GDP in Figure 5 with the actual outcome for GDP growth in Figure 5 it can be seen that there is also quite a large difference between the actual experience and the baseline projection for GDP growth. Real GDP growth in the baseline is shown to be slowing through the 1990s but to just under 3 percent per year rather than the very low growth rates experienced since 1992 in Japan.

In order to understand the difference between the projections presented in this section and the actual outcomes, the next section will focus on the impacts of a number of shocks that can be identified during the 1990s.

5. The Impact of Specific Policy Changes and Shocks

The previous section explored changes in the underlying trends in the Japanese economy whereas this section makes use of the model to analyze the consequences of a number of alternative policy shocks :

(a) A change in Japanese monetary policy focussing on

(i) an unanticipated tightening (relevant for the period from 1990 through 1992) and

(ii) an anticipated loosening of monetary policy (relevant for the period from 1993 through 1995) ;

(b) An increase in Japanese fiscal spending focusing on the differences between

(i) unanticipated versus anticipated policy changes and

(ii) permanent versus temporary policy changes (relevant for the period from 1992 through 1995);

(iii) current spending and infrastructure spending by the government;

(c) The Kobe Earthquake (relevant for 1995) ; and

(d) Impacts of changes in U.S. fiscal policy on Japan (relevant for the period from 1994 through 1995).

The results for these simulations are contained in figures 8 through 19. For each simulation there is a set of figures containing 4 panels each. All variables shown are expressed as deviation from what otherwise would have occurred along the baseline. Recall that the baseline outlined above incorporates underlying changes in trends but does not contain any of the shocks identified here. The deviation units differ across variables. GDP, share market value, nominal effective exchange rate and real effective exchange rate are expressed as percentage deviation from baseline. Inflation, short term nominal interest rates, short term real interest rate and real and nominal rates of return on ten year bonds are all expressed as percentage point deviation from baseline; thus for these variables a value of 1 is a 100 basis point rise in the variable. The fiscal deficit and current account balance are all expressed as deviation from baseline as a percent of baseline GDP.

Before considering the results in detail it is important to note an assumption in the MSG2 that crucial to the results contained in the following simulations. Labor markets in different economies are modeled so as to reflect, as much as possible, the actual institutional features of the labor markets in each economy. In the case of Japan it is assumed that nominal wages are set one year in advance, so that given the information available in the year in which the contract is set, there will be full employment in the following year if there are no unexpected shocks in the economy. This yearly wage cycle implies that the dynamic features of the Japanese economy are very different from the features of other economies represented in the model in which are wages

are much more sticky than in Japan. Thus in the case of Japan, there is relatively rapid adjustment of nominal wages and prices to changes in economic conditions. This is particularly important for the impact of monetary policy.

(a) A Change in Japanese Monetary Policy

This section considers two issues related to monetary policy. The first is a tightening of monetary policy that is implemented without warning. This is relevant for the period of tight Japanese monetary policy in 1990 and 1991. It is followed by a simulation of an anticipation of a loosening of monetary policy. This is relevant for the period from 1993 through 1995 where it became clear that monetary policy was loosened and was expected to perhaps loosen further.

(i) An Unanticipated Monetary Contraction

The first policy to be considered is a tightening of Japanese monetary policy defined as a reduction in the target for inflation of 1 percent per year. The policy is implemented through a monetary rule (see McKibbin (1996b)) in which the short term nominal interest rate is varied to target the stock of money that is consistent with a lower inflation target.

The results are contained in figures 8 and 9. As noted above labor markets in Japan are assumed to adjust within a year to shocks. This is clear from figure 8. The government announces a credible reduction in targeted inflation. This leads to a rise in real short term interest rates (figure 9) of 190 basis points. Note, however, that nominal short term interest rates decline because the expected inflation reduction dominates the rise in real interest rates. Inflation falls by 0.6 percent in year 1 and then overshoots to a fall of almost 2 percent in year 2 before recovering to 1 percent

below baseline by year 3. This pattern for inflation reflects the jump in the exchange rate in year 1 (figure 9, bottom left panel) and then the jump in nominal wages in year 2 in order to clear the labor market (not shown).

The sharp rise in real interest rates appreciates the yen in real and nominal terms by over 2 percent in the first year (figure 9, bottom left panel). The appreciation of the yen crowds out net exports. The rise in short interest rates tightens liquidity constraints on households and firms which reduces aggregate demand in the economy. The fall in demand leads to a fall in the share market of 2.5 percent. There is a short sharp shock to the real economy (figure 8, upper left panel) as a result of the monetary tightening. After the first year, however, the economy quickly recovers due primarily to the adjustment of wages. Note also that long term real interest rates barely change although long term nominal interest rates fall by the 1 percent fall in long run expected inflation.

The effect of a monetary contraction on the balance of payments is theoretically ambiguous. The reason is that the income/absorption effects from the income decline offset the expenditure switching effects of the appreciation of the real exchange rate. The fall in aggregate demand in Japan should reduce the demand for imports directly. On the other hand the stronger real exchange rate should raise the demand for imports since imported goods become relatively cheaper in Yen. On the export side the effect is clearer. The stronger real exchange rate (i.e the higher the relative price of Japanese goods to foreign goods) tends to lower the demand for exports and there are only small foreign income effects from the Japanese policy change. Thus exports should fall. These factors taken together imply that the results for the trade balance are ambiguous in theory. In the results shown in figure 8, there is a very small improvement then worsening of the current account.

These results demonstrate that a contractionary monetary policy that is aimed at reducing inflation rather than the price level tends to reduce economic activity in the short term, lower nominal interest rates and appreciate the exchange rate immediately and then continually over time (in nominal terms) since the relative inflation rate of Japan to other countries is permanently lowered.

(ii) An Anticipated Monetary Easing

In this section instead of a surprise tightening of monetary policy, an anticipated loosening of monetary policy is considered. This is the same simulation as above in terms of magnitude but with the opposite sign, except that the change in policy is anticipated a year in advance. The extent of monetary easing from that year onwards is the same as the extent of loosening analysed above.

These results are shown in figures 10 and 11. Comparing these results with figures 8 and 9, it is clear that the real impacts of the policy change are substantially reduced even though the simulation is the same order of magnitude (but with opposite sign) to the monetary tightening. The key difference is that the anticipation of the loosening of policy reduces the real stimulus of the shock substantially (indeed to as little as 30% of an unanticipated shock). Apart from the real effects after the first year, the loosening of policy tends to raise inflation and therefore long term nominal interest rates as well as stimulate the stock market.

This shock is relevant to the period from 1993 when it became clear that the slowdown in economic activity would result in a relaxation of monetary policy by the Bank of Japan. With the relaxation of monetary policy already anticipated, these results indicate that the real effects of the monetary stimulus would be small.

(b) Expansionary Fiscal Policy

The effects of fiscal policy depend on the type of spending and tax change as well as the timing of these changes. In addition, the long run fiscal closure rule[11] can have important implications for the outcomes of the policy change (see Bryant and Zhang (1996) and McKibbin (1996b)).

In order to isolate some of the main issues a number of simulations are examined in this section. For each simulations it is assumed that "incremental interest payments rule" is operative. This rule assumes that a lump sum tax is levied on households so as to cover any changes in debt servicing costs that result from the policy change. This assumption imposes the long run constraint of solvency on the government but allows the budget deficit to permanently change in the long run as a result of short run changes in fiscal policy. In the following simulations this assumption is crucial although the distinction between permanent and temporary spending changes capture much of the differences caused by the fiscal closure rule, since a temporary spending change is like a permanent change with a very tight debt target that actually unwinds the permanent fiscal change. Nonetheless the difference between spending and taxes will still make the exact comparison of fiscal closure rules through comparison of temporary versus permanent spending changes difficult.

The benchmark fiscal simulation used as a basis for comparison with other simulations is an anticipated, permanent increase in real government spending on goods and services of 2 percent of baseline GDP. The policy is assumed to be implemented when announced. We then consider the issue of permanent versus temporary policy changes where the exact timing of the policy is

[11] i.e. the way in which government change policy to satisfy the intertemporal budget constraint and thus remain solvent.

understood by the private sector. Third we compare the benchmark simulation with a permanent expansion of government spending that is announced but not implemented until a year after the announcement. Finally the distinction between current government spending on goods and services and infrastructure spending is examined.

(i) A Permanent Unanticipated Fiscal Expansion

The results for a permanent increase in government spending on goods and services are contained in figure 12 through 14 together with results for the temporary and anticipated changes in fiscal policy.

First consider the results for the permanent, unanticipated change in government spending on goods and services (the solid lines with circles labeled "permanent"). The role of the rapid labor market adjustment in Japan is also clear from these results. The increase in government spending increases aggregate demand in the Japanese economy in the year of the shock. The expected permanent fall in public saving (figure 12, bottom right panel) increases real interest rates by around 60 basis points at the short end and 45 basis points at the long end (figure 13), and appreciates the real and nominal effective exchange rates (figure 14). The movement in financial prices acts to reduce private investment and net exports but this is insufficient in the short run to offset the direct positive effects of the spending increase on GDP. The rise in 10 year bond rates is smaller than the rise for a comparable (defined in terms of GDP) increase in US fiscal deficits (see Bagnoli and McKibbin (1993)) because Japan is not as large as the United States in global capital markets and the fall in government saving has less effect on world interest rates. Nonetheless because Japan is a large economy, the decline in government saving is big enough to permanently

raise global interest rates. Given the assumption of an open capital market, the real interest rate in Japan although rising above rates in other economies and dragging those rates up, eventually returns to a higher world real interest rate.

The rise in aggregate demand in Japan tends to raise domestic prices. The exchange rate appreciation, however, tends to lower the price of imported intermediate inputs as well as imported final goods so that consumer prices fall (relative to the baseline). After the first year, wages rise quickly which, together with the change in interest rates and the real exchange rate appreciation, reduces GDP back to baseline. The fiscal expansion is therefore short lived in Japan because of crowding out through financial markets and the labor market. Indeed the permanently higher Japanese and world interest rates slightly but gradually reduces the level of GDP because of the permanent fall in Japanese saving.

The fiscal expansion of 2 percent of GDP initially appreciates the yen relative to other currencies by 9 percent in real terms because the rise in interest rates attracts capital into the Japanese economy. The rise in interest rates also depresses the share market by 3.2% on impact because the opportunity cost of investing in Japanese shares rises. Japanese fiscal policy in this model has significant consequences for financial markets and is far less stimulatory than older style Keynesian models of the Japanese economy. This partly reflects the important role of international capital flows and asset price adjustment in the MSG2 model relative to older style models. The role of international capital flows also shows in the adjustment to the current account shown in figure 12 (bottom left panel). The large movement in financial capital into Japan that appreciates the exchange rate is reflected in a deterioration in the current account balance of 1.3% of GDP in the first year.

Thus an unanticipated rise in government spending on goods and services temporarily stimulates the Japanese economy, but causes a decline in the share market, a fall in bond prices (i.e. a rise in interest rates), a large appreciation of the yen and a deterioration in the current account.

(ii) Unanticipated versus Anticipated

Now compare the difference between permanent changes in fiscal policy that are anticipated versus changes that are not anticipated in advance. This distinction between anticipated and unanticipated policy changes is important because many of the announcements of fiscal programs in 1992 through 1994 were programs of future spending rather than current spending increases. Even in the 1994 and 1995 packages, the types of spending included tended to be slow to be implemented.

The results for an anticipated change in government spending are contained in the same figures already examined, figures 12 through 14. The anticipated fiscal expansion is shown by the dashed line with open square symbols. Figures 12 through 14 also contain the results for a temporary fiscal expansion (to be discussed in the next section).

The unanticipated permanent fiscal expansion (labeled "permanent" in figures 12 through 14) is the benchmark simulation discussed above in which the increase in government spending is implemented when announced. The anticipated increase in government spending is assumed to be an increase in government spending of 2 percent of GDP announced at the beginning of year 1 but implemented only from year 2 of the simulation. After year 2 both policies are identical.

Comparing the permanent unanticipated change with the anticipated change in Japan’s fiscal policy shows some interesting differences. When the shock is anticipated in advance, real

GDP actually falls in period 1! This occurs because the crowding out of the spending shock through an appreciated exchange rate and higher real long term interest rates occurs in period 1 but the extra stimulus to aggregate demand is not delivered until period 2. In the case of Japan, the assumption of flexible labor markets after one year implies that by the time the demand stimulus is injected from period 2 onwards, the wage adjustment plus the asset price adjustment completely negates any short run stimulus to the economy. The outcomes for inflation are similar in both cases primarily because of the role of the appreciating exchange rate in lowering import prices both for final goods and intermediate inputs. The real effective exchange rate appreciates by 7 percent in year 1 and a further 2 percent in year 2 before following a similar gradual depreciation as for the unanticipated fiscal shock (figure 14).

The other major difference between the anticipated and unanticipated fiscal shocks is in the change in short term interest rates (figure 13). The nominal and real short term interest rates actually fall in the first period when the shock is anticipated because of the initial decline in economic activity. This simulation demonstrates that it is quite plausible for Japanese short interest rates to fall and yet have the exchange rate appreciate in real and nominal terms. The key is that the long term interest rate rises (i.e. there is a steepening of the yield curve) reflecting future expected rises in short term interest rates. Despite the apparently contradictory movement in asset prices observed in this simulation, there are no arbitrage opportunities available for economic agents in the model.

In summary, anticipated changes in fiscal policy -- of the type we have seen in Japan during the 1990s in which policies are announced but then either not implemented as announced, or delayed -- can have the effect of lowering GDP, appreciating the exchange rate, lowering short

interest rates and raising long term interest rates and depressing the share market. These results appear to be very similar to the experience of the Japanese economy since 1990. The combination of forward looking financial markets and a relatively flexible labor market (albeit with a lag) are the crucial ingredients for these results. Thus the factors that allowed Japan to adjust relatively quickly to the second oil shock in the late 1970s are problematic for fiscal policies that are announced in advanced of implementation.

(iii) Permanent Versus Temporary Fiscal spending

A comparison between permanent unanticipated changes versus temporary unanticipated changes in spending is another highly relevant comparison in an analysis of Japanese fiscal policy. Results for a change in government spending of 2% of GDP that occurs only in year 1, and is known to be temporary, are the third set of lines shown in figures 12 through 14 (plotted with short dashes and crosses). In year 1, the difference between the temporary shock and the benchmark simulation of a permanent unanticipated change in fiscal spending is the knowledge that the permanent spending shock will continue from year 2 onwards in the benchmark case but no future spending changes will occur for the temporary shock. In this case several interesting results stand out. First, note that the effect of a temporary change in fiscal policy on real GDP (figure 12, upper left) is much larger for the temporary policy than for a permanent change in spending. In the case of the temporary policy change, GDP rises by 1.8 percent versus only 0.35 percent for the permanent change. This difference is because long term real interest rate do not change when the policy is temporary and thus the crowding out of investment is less. In addition the real effective exchange rate only appreciates by 3.7 percent when the policy is temporary compared to 9 percent

for the permanent case and then returns to baseline in year 2. Thus there is little effect on net exports.

The sharp rise in real GDP in year 1 implies a very sharp rise in short term interest rates. Given that a change in short term interest rates of the magnitude calculated in the model for this example is unlikely to be allowed by the Bank of Japan, an alternative policy assumption that dampened the rise in interest rates would lead to a very loose monetary policy which would further raise aggregate demand. Thus the multiplier for real GDP would be even larger in that case, and the exchange rate might even depreciate rather than appreciate.

In summary, a temporary fiscal expansion is far more stimulatory than a permanent fiscal expansion primarily because the crowding out through higher real long term interest rate and a stronger exchange rate are reduced substantially.

(iv) Current versus Capital Expenditure

As well as the issue of the timing of fiscal policy, it is important to consider that some of the Japanese fiscal packages included substantial changes in capital expenditure rather than only current spending on goods and services. This section will show that the distinction between capital and current spending does not matter so much for the short run impact of the policy change but is potentially important for medium to longer term considerations. In particular this distinction could be important for considering future trends in the Japanese economy.

In the MSG2 model, infrastructure spending is an additional factor of production in the private sector production function and enters as an increasing returns factor. If private inputs are doubled, then output doubles. If private inputs and infrastructure capital stock is doubled, then

output more than doubles.

Figures 15 through 17 present results for the difference between changes in current spending on goods and services in Japan versus changes in capital spending. Both spending changes for this comparision are assumed to be unanticipated and permanent.

In many ways the explanation for the effects of the infrastructure spending change in the short run are the same as the benchmark simulation. A key difference can be seen in the results for real GDP (figure 15 top left panel). In contrast to the rise in current spending on goods and service, the rise in infrastructure spending is not crowded out over time because it has significant supply side effects as well as demand effects. In fact, real GDP is permanently higher after increases in infrastructure spending, although the growth rate of the economy eventually returns to the underlying growth of population plus labor augmenting technical change. The rise in infrastructure spending raises the marginal product of other inputs, capital, labor and imported inputs in private sector production. Thus real interest rates initially rise more than under the current spending increase (figure 16) . Over time, higher GDP raises tax revenues; the fiscal deficit thus begins to return gradually back towards baseline with infrastructure spending in contrast to a gradual further drift away from bseline with current spending change.

The results in this section for various fiscal policy actions suggest that it is important whether changes in fiscal policy are expected to be permanent or temporary and whether they are implemented when announced or implemented only after a lag. Since tax cuts are more easily implemented quickly relative to large scale spending programs, it is likely that tax cuts would be more stimulative although tax cuts are not explored further in this paper. In addition, the analysis in this paper suggests that empirical attempts to estimate the effects of fiscal deficits on interest

rates through simple reduced form regressions are likely to be spurious if the nature of fiscal shocks has changed over time. This is particularly true with respect to the Japanese case.

(c) The Kobe Earthquake

The great Hanshin earthquake struck the Kobe region on 17 January 1995. There are various estimates of the extent of the damage and of the impact of the earthquake on the Japanese economy (see Ueda (1995a), Ban and Moriguchi (1995) and IMF (1995, page 16)). This section will focus on the direct impacts of the earthquake on the Japanese economy, ignoring the fiscal implications through disaster relief and other spending programs. Those fiscal programs can be implicitly analyzed by using the results for fiscal policy already discussed above.

The earthquake is estimated to have caused damage of around 10,000 billion yen or about 2% of Japanese GDP (see above references). In this simulation it is assumed that the private capital stock falls by 1% of GDP at the beginning of year 1 and also that the public infrastructure capital stock falls by 1% of GDP at the beginning of year 1.

Results are contained in figures 17 and 18 The initial impact is a direct negative effect of the lower capital stock on aggregate supply. There is also a reduction in the value of the share market and therefore a decline in Japanese wealth which in turn reduces private consumption. The expected return to capital rises however because of the fall in the stock of capital. This attracts foreign capital in response to the higher expected rate of return. Thus the yen appreciates and the current account deteriorates reflecting the capital inflow. Over time as capital is put in place, real GDP returns to baseline. There is a short inflationary burst in the price level as supply contracts but upward pressure on the price level is partially offset by the strong currency. There is also a small

rise in long term interest rates reflecting the temporary rise in the marginal product of capital.

An earthquake, as with any disaster, is bad for the economy despite many commentators arguments that the earthquake would stimulate the Japanese economy through the demand stimulus that results. Again in the MSG2 model, the movements of key variables such as GDP, the real exchange rate, the share market and bond markets contribute to our understanding of the actual Japanese experience in 1995. The yen appreciates, GDP falls, the share market drops and long term real interest rates rise slightly.

(d) Impacts of Changes in U.S. Fiscal Policy on Japan

Apart from shocks originating inside Japan during the 1990s, a range of shocks buffeted Japan from overseas. With the global modelling framework at our disposal, each of these could be considered. Shocks to United States monetary and fiscal policy, European monetary and fiscal policy, the Gulf War and growth in the rest of Asia have some role to play in the Japanese experience. Space constraints prohibit an analysis of the impact of all of these shocks. In this section only the impacts of US fiscal policy are considered. I focus on that particular shock because from earlier research (McKibbin and Sachs (1991)) US fiscal policy was found to be important for the Japanese economy.

To illustrate the adjustment mechanism and in particular to point out the impacts of the deficit reduction strategy begun under President Bush and pursued with more vigor by President Clinton and the Republican Congress elected in November 1994 , results are presented for an anticipated reduction in US government spending on goods and services. The specific timing of this shock is a reduction in the fiscal deficit through spending cuts, all announced in year 1, of 0.5

percent of GDP in year 1, 1.0 percent of GDP in year 2, 1.5 percent of GDP in year 3 and 2.0 percent of GDP from year 4 forever.

The results for Japan only are presented in figures 20 and 21. Results for the United States for a similar simulation can be found in McKibbin and Sachs (1991) or McKibbin and Bagnoli (1993). The anticipated reduction in government spending in the United States has similar effects on the U.S. economy as the results shown for the Japanese economy above except that sluggishness in the U.S. labour market necessitates a larger and longer dynamic adjustment period in the case of the United States. The key impacts on Japan come through direct demand effects through trade with the United States and through effects on Japanese long term interest rates and the real exchange rate. In year 2, the phased-in cuts in U.S. spending have a direct negative effect on US aggregate demand and therefore a negative impact on Japan through reduced demand for Japanese exports. Through the interest rate channel, Japan receives a positive stimulus through a fall in long term real interest rates (figure 21, top right panel) which stimulates investment. The Yen appreciates relative to the US dollar and in effective terms by over 5 percent in year 1 and continues to appreciate further as cuts to US spending are made. The yen appreciation reduces Japanese net exports. Thus real GDP in Japan rises but then falls as the demand shock from the United States hits in year 2. Despite this cycle, real GDP remains above baseline throughout rising to a new permanently higher level. Higher US national saving translates into higher global saving which in turn leads to a higher global stock of physical capital. The larger capital stock is allocated across countries so as to equate rates of return in the long run..

The rally in Japanese bond prices (fall in interest rates) is accompanied by a rise in the value of the share market. The rise in U.S. saving and outflow of capital into Japan worsens the

Japanese current account balance through the exchange rate adjustment.

An anticipated contraction of US fiscal policy is mildly stimulating for Japanese GDP. The policy is also expected to appreciate the yen, lower real interest rates in Japan, raise the value of the share market and reduce the Japanese trade surplus.

The Overall Effects of the Shocks

The net effect of all the shocks considered above is complex to untangle when applying the role of each shock to explaining the Japanese experience since 1990. Nonetheless it is useful to use these results together with the changes in the underlying trends determining the baseline to provide some insights into the Japanese macroeconomic experience during the 1990s.

The underlying trend in Japan without shocks -- shown in figures 5 through 7 -- was for a slowing of economic growth, low inflation, stable interest rates and a gradual reduction in the current account surplus as an ageing Japanese population moved funds back into Japan to maintain a desired consumption level. As well as the emergence of new trends in the Japanese economy, a number of shocks emerged during the 1990s. The early 1990s began with a tightening of monetary policy, further appreciating the yen and slowing economic activity. The tightening of fiscal policy was followed by a series of announcements of fiscal expansions in 1993 and 1994 that were not as expansionary as proposed and that were delayed in implementation. As can be seen from the model simulations the fiscal and monetary actions had the effect of further appreciating the yen and contracting economy activity. In 1994, more serious (but still delayed) fiscal expansion was announced. Those actions again tended to raise world long term interest rates at the same time as the United States was expected to tighten fiscal policy and the European economies were

announcing fiscal consolidation based on the Maastricht Treaty[12]. These developments in the United States and Europe further appreciated the Japanese real exchange rate but had less effect on long term interest rates, because the United States and Europe were acting in offsetting directions to Japan. Finally in 1995, the Hanshen earthquake delayed the economic recovery. The fiscal stimulus of 1995 also further appreciated the yen and added to the crowding out of economic activity before the significant fiscal spending could stimulate the economy. The attempts to stimulate the economy with monetary policy were probably less successful than many analysts expected because this easing of monetary policy was anticipated in advance.

In 1996 the fall in the Japanese currency probably reflects, amongst other factors, the expected inflationary consequences of looser Japanese monetary policy through 1995 as well as the expectation of less fiscal consolidation in the United States which should also raise world long term real interest rates. The end of announced future fiscal expansions also suggests that a sustained Japanese recovery will now be possible unless accompanied by an unanticipated tightening of fiscal policy.

6 Conclusion and Future Prospects for the Japanese Economy

This paper has considered the macroeconomic experience of Japan since 1990 by attempting to quantify the impact of a variety of shocks from within Japan and from overseas. It is shown that an underlying slowdown of the high rates of growth of the Japanese economy was probably already in place going into the 1990s. In addition, the large current account surpluses and

[12] The effects of a European fiscal consolidation is not shown in this report although it is similar to the effects of the US fiscal consolidation on Japan. See also McKibbin (1994a).

gradually falling saving rate during the 1990s implied that a gradual appreciation of the real exchange rate would continue though the 1990s. On top of these underlying trends, a series of shocks then caused further problems. In particular, the tightening of monetary policy at the beginning of the decade slowed economic activity and appreciated the real exchange rate. This monetary tightening was followed by a series of announced future fiscal expansions through 1993 and 1994. Rather than stimulating the economy, these fiscal measures acted to further slow economic activity as well as appreciate the real exchange rate. The lack of a stimulus to the real economy occurred because the actual stimulus measures were partially illusory (although they did widen the fiscal deficit). That part that was real spending increases was delayed which caused crowding out through higher real interest rates and a stronger real exchange without being accompanied by any real direct spending stimulus. The Hanshen earthquake in early 1995 and further fiscal announcements constrained the economic recovery through 1995. At the same time expectations of US fiscal consolidation tended to depreciate the US dollar and further appreciate the Yen, although with some net benefits to Japan through minimizing the extent of increase of real long term interest rates as a result of the Japanese policy changes.

The results of this study suggest that, in an economy with relatively flexible labor markets and open capital markets, attempts to use fiscal policy to stimulate economic activity must pay careful attention to the reaction of financial markets. These reactions depend crucially on the timing of the policy announcement. The longer ahead the policy is announced the less stimulus that will be achieved.

The Japanese experience illustrates that the increased openness of economies to global capital flows requires a re-evaluation of the usefulness of traditional economic policies in

stimulating economic activity. The results in this study also suggest that a significant part of the problem with Japanese macroeconomic performance during the 1990s may have been due to inappropriate macroeconomic policy settings.

In considering where the Japanese economy is likely to go from here, the above simulations also provide some guidance. The fact that some of the Japanese fiscal packages include infrastructure programs, suggests that future growth in Japan is likely to be stronger than would otherwise have been the case. A return to underlying growth of around 2.5 % per year is suggested by the underlying trends in population and productivity growth. The yen would be expected to continue to appreciate in real and nominal terms although the fiscal adjustment should bring forward the adjustment of the Japanese current account. Indeed the simulations in this report suggest that the Japanese current account surplus will shrink significantly during 1996 as a result of the substantial reduction in government saving in Japan and proposed fiscal consolidation in the United States. To the extent that the US situation changes the turnaround in the Japanese current account will be smaller.

The other factors likely to impact on the Japanese experience over the rest of this decade will be further changes in global saving and investment balances. In particular the U.S. fiscal consolidation and the fiscal adjustments explicit in the Maastricht Treaty in Europe are unlikely to produce significant increases in global saving. Combined with the likely fall in East Asia saving rates and rising demand for investment funds, the cost of the Japanese fiscal adjustment may be large for Japan as the problem of an aging population impinges more on the economy just at a time when funds are becoming relatively scarce in the world economy.

It is also worth speculating as to whether the Ministry of Finance would allow the larger

fiscal deficit in Japan to persist. It is plausible that a significant fiscal contraction through tax increases could be implemented in response to the widening of the fiscal deficit. In this case the above simulation results suggest that there would be a sharp depreciation of the yen (to the extent that this isn't already expected) and even stronger growth in Japan if the tax increases are announced in advance. The more likely scenario, however, is that the tax increases would be implemented quickly and thus the Japanese economy would experience another fiscally induced slowdown just at a time when growth is recovering. Contractionary fiscal policy in Japan would only extend the period of slow economic growth in Japan.

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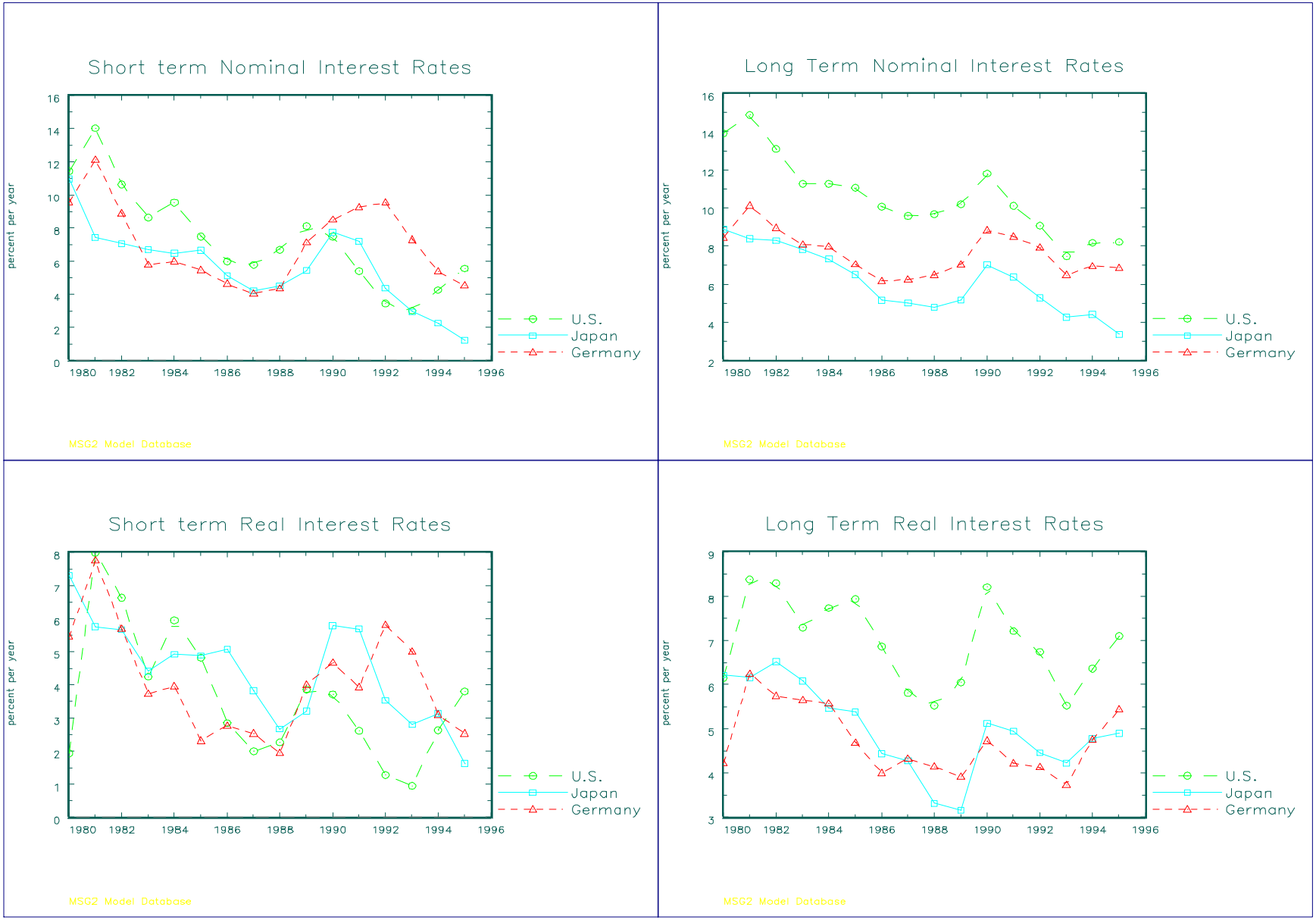
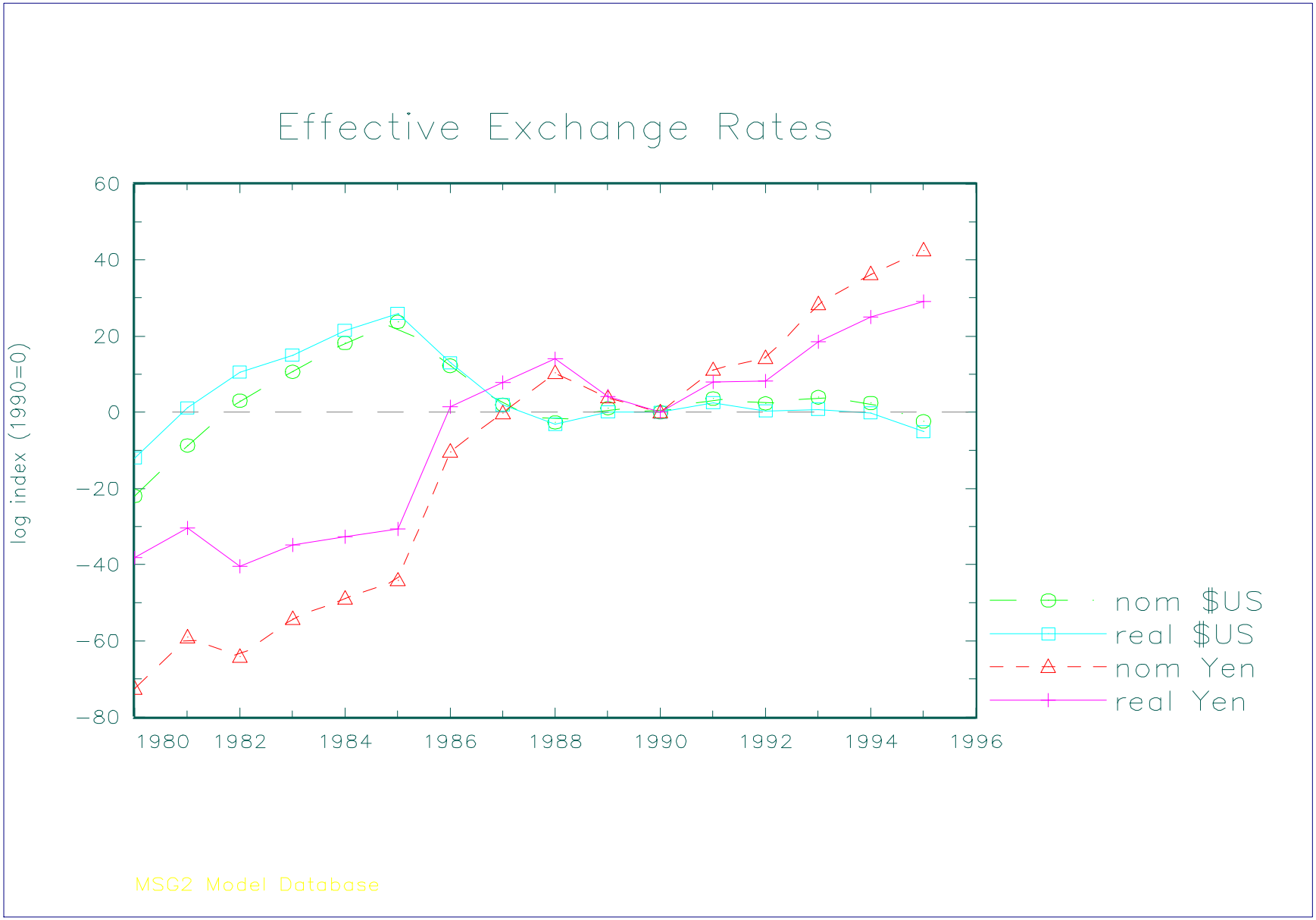
()(1): Historical Experience of Growth, Inflation, Current Accounts and Fiscal Deficits in Major Economies from 1980 to 1995

()(2) Historical Experience of Real and Nominal, Short and Long Term Interest Rates in Major Economies from 1980 to 1995

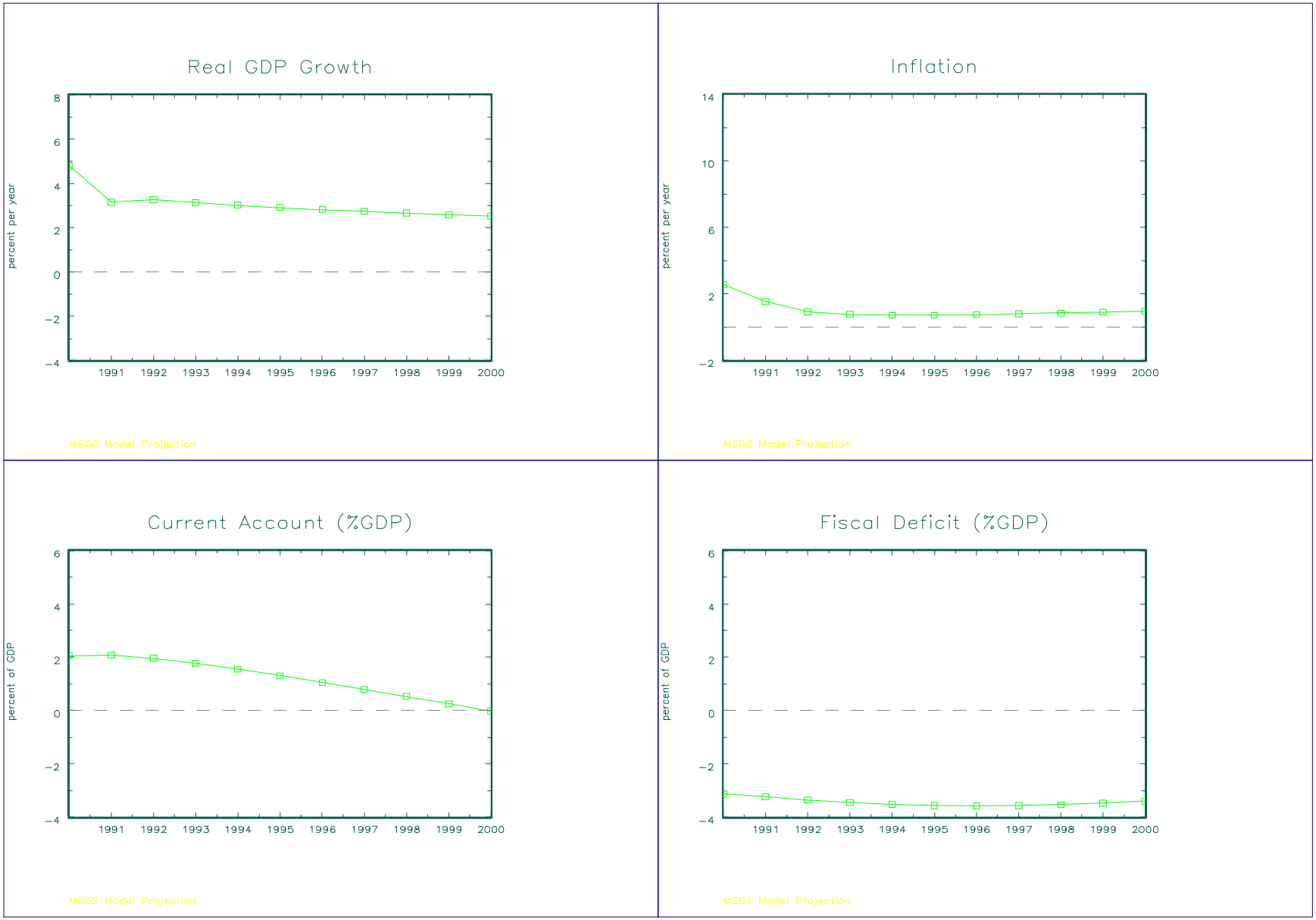


()(3) Historical Experience of Real and Nominal Effective Exchange Rates in the United States and Japan from 1980 to 1995



()(4) Historical Experience of Real Unit labor Costs in the United States and Japan from 1980 to 1995

()(5): Baseline Projection from 1990 for Japanese GDP Growth, Inflation, Current Account and Fiscal Deficit Without any Shocks



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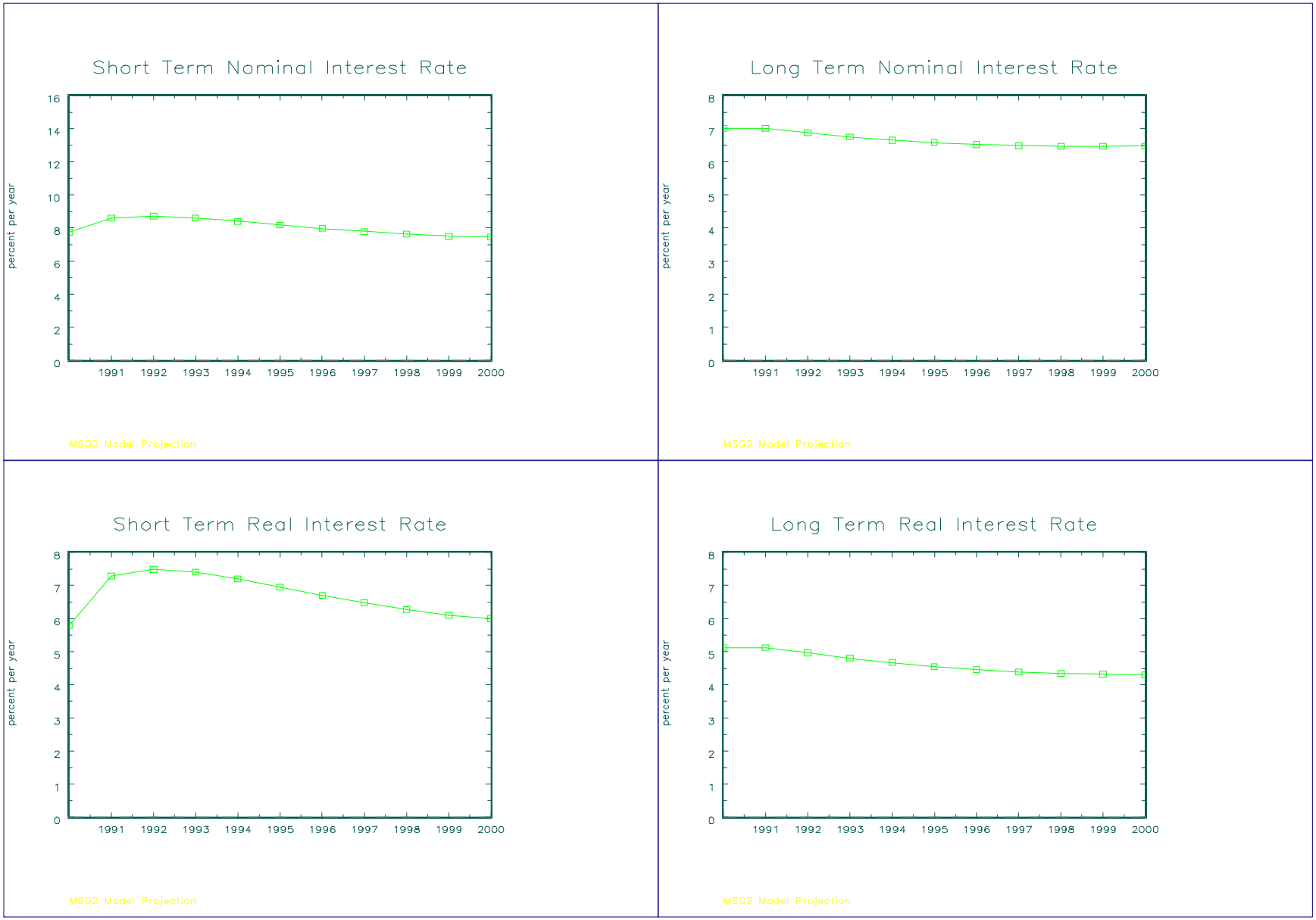
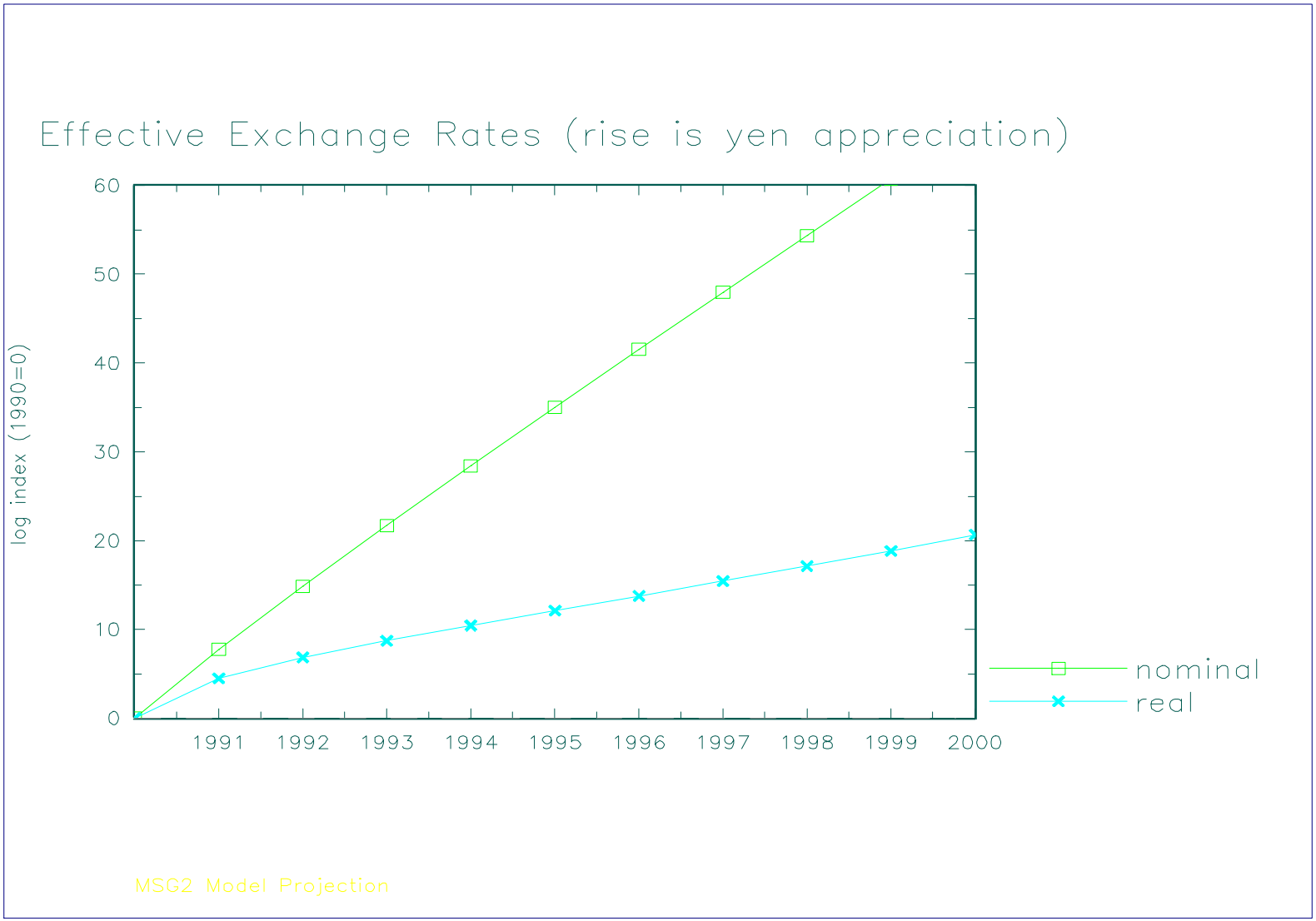
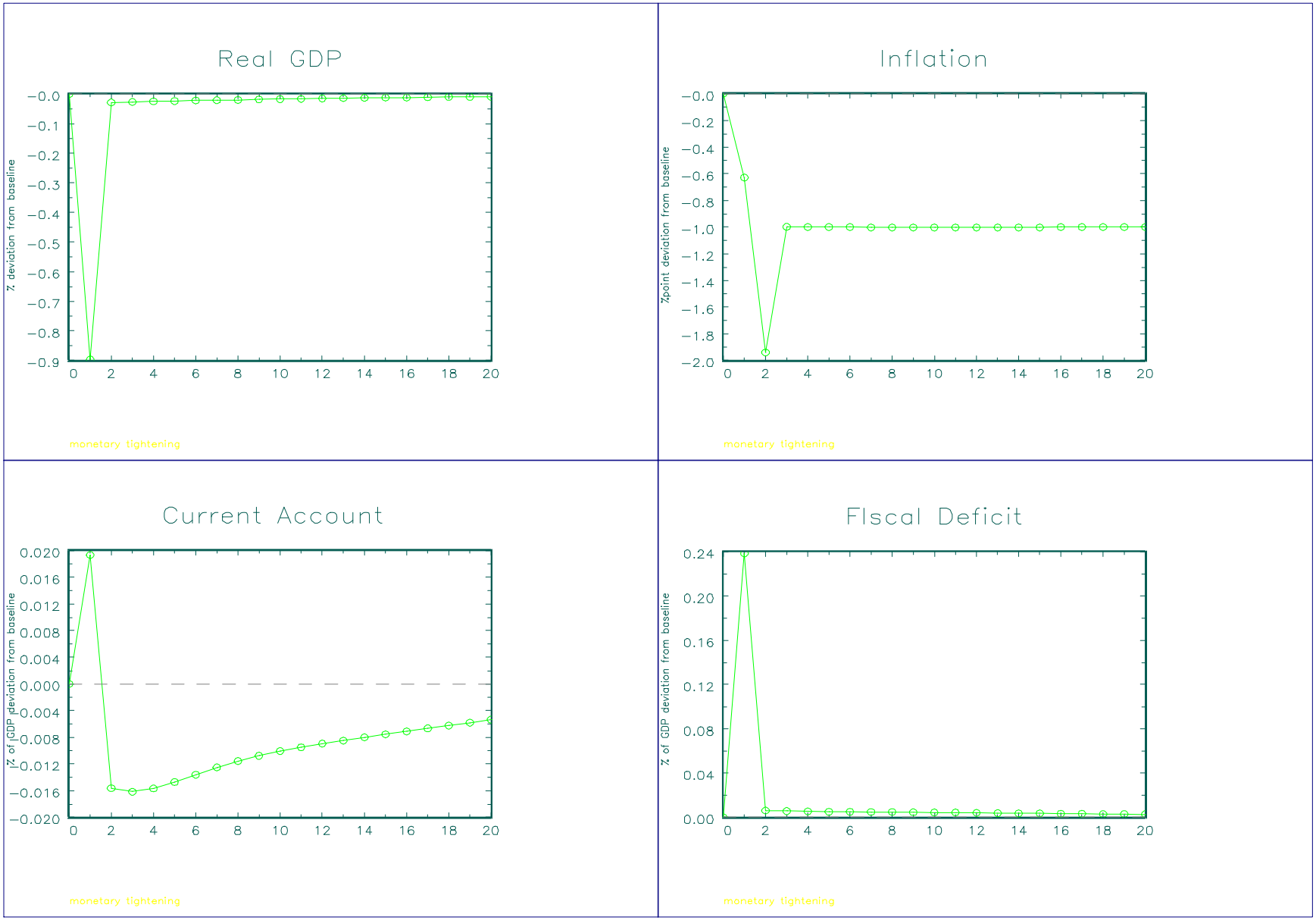


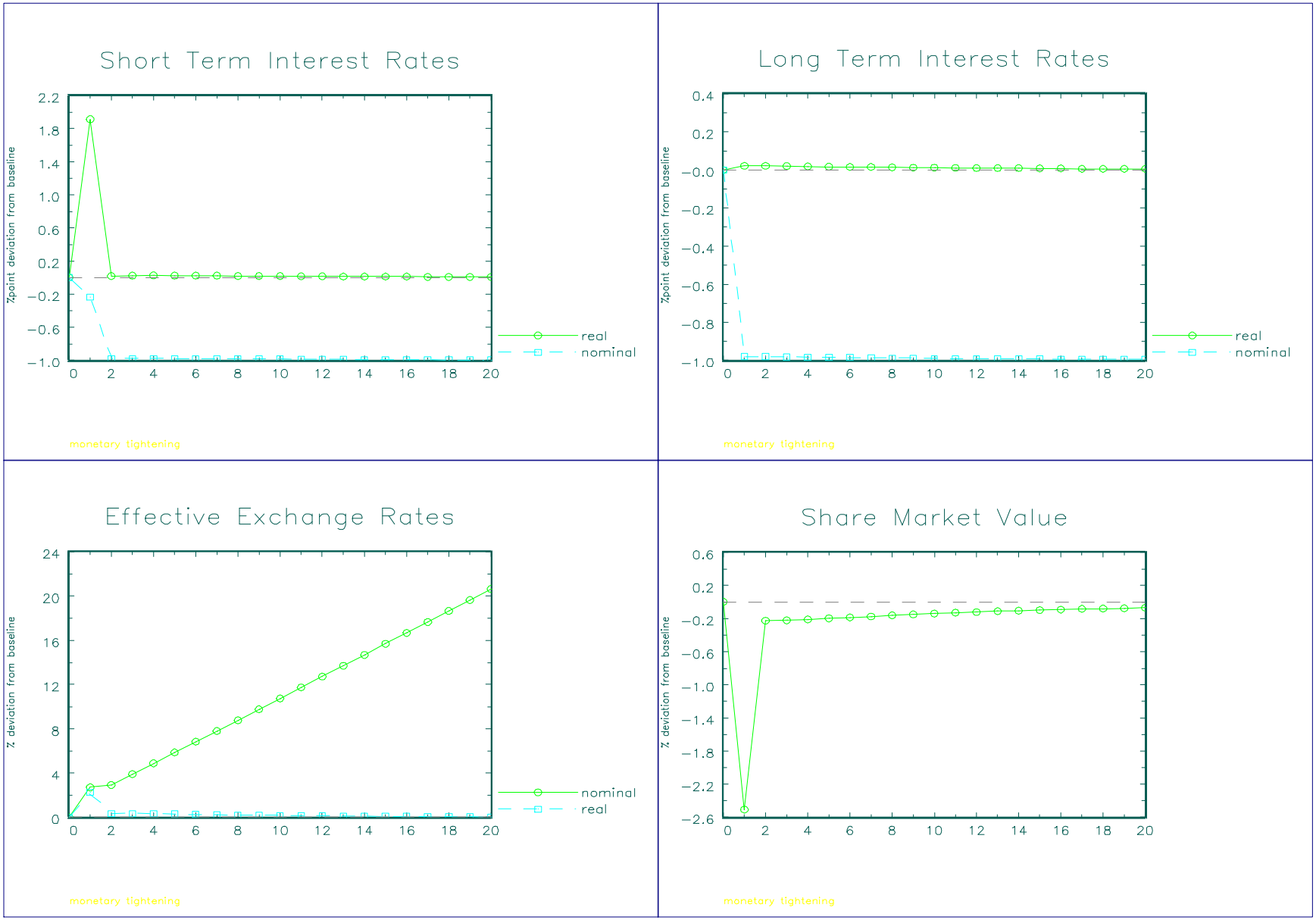
()(7): Baseline Projection from 1990 for Japanese Effective Exchange Rates Without any Shocks



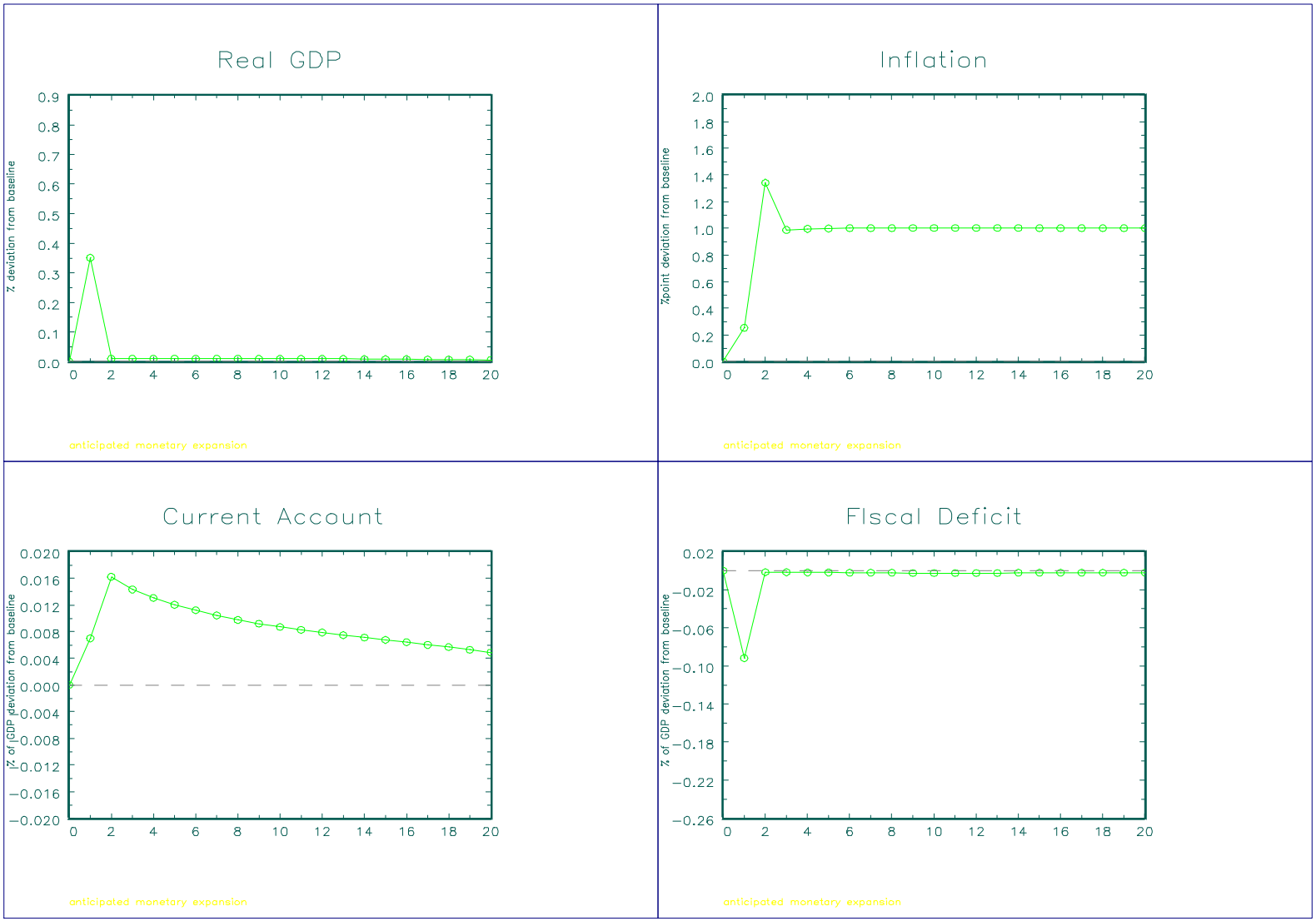
()(8): Effects of a Monetary Contraction on GDP, Inflation, Trade and the Fiscal Deficit in Japan



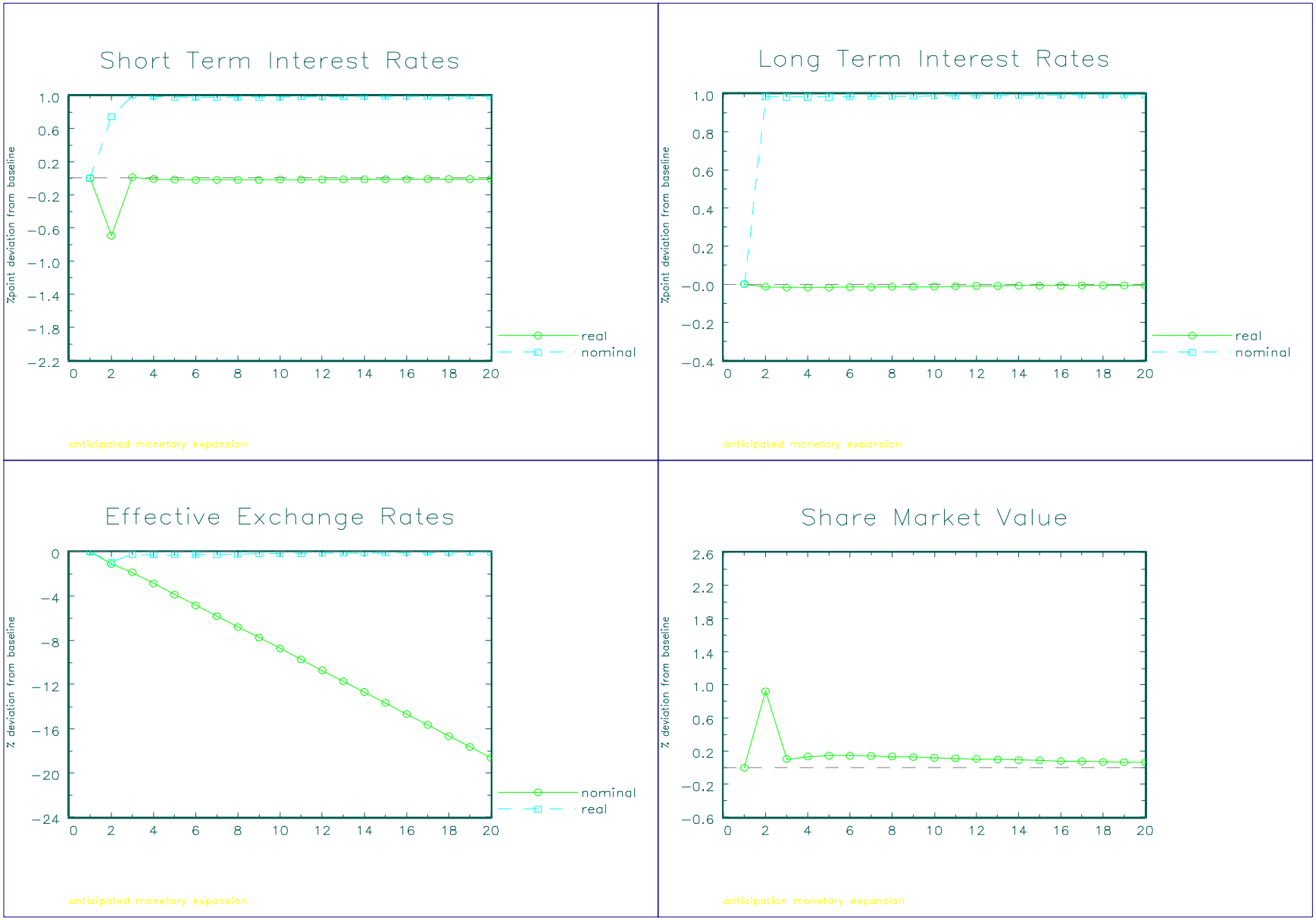
()(9):Effects of a Monetary Contraction on Interest Rates, Exchange Rates and the Share Market in Japan



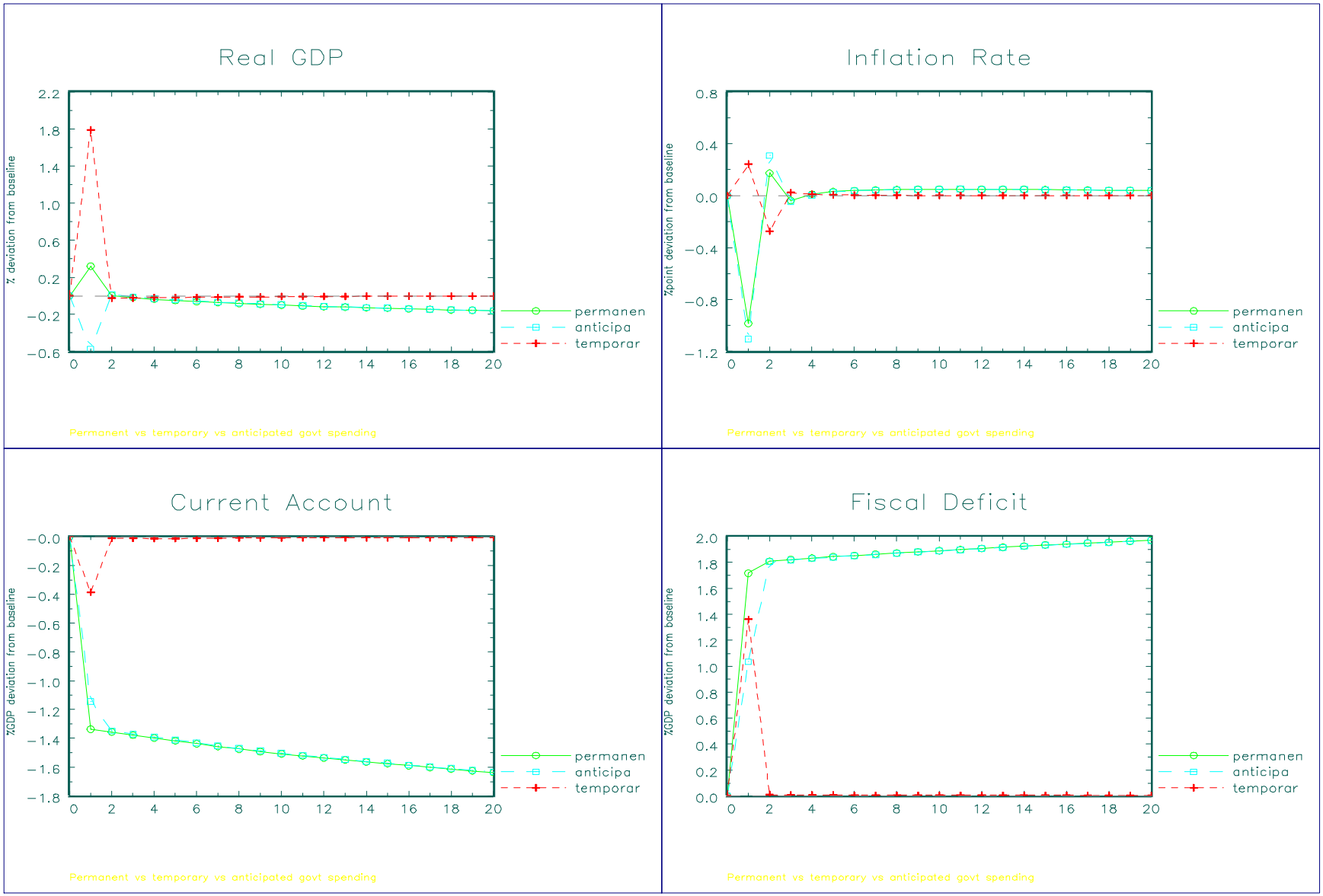
()(10): Effects of an Anticipated Monetary Expansion on GDP, Inflation, Trade and the Fiscal Deficit in Japan



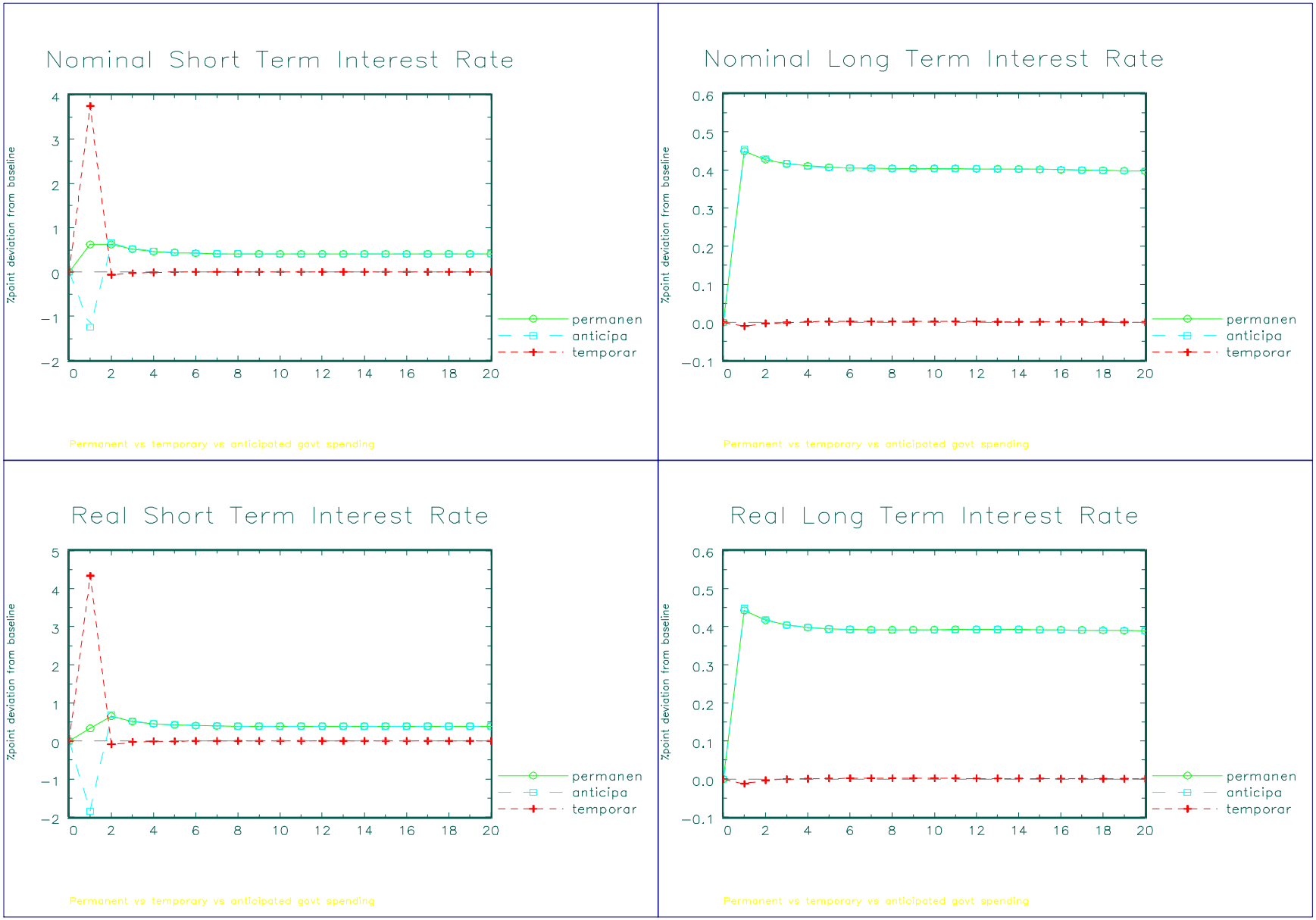
()(11):Effects of an Anticipated Monetary Expansion on Interest Rates, Exchange Rates and the Share Market in Japan



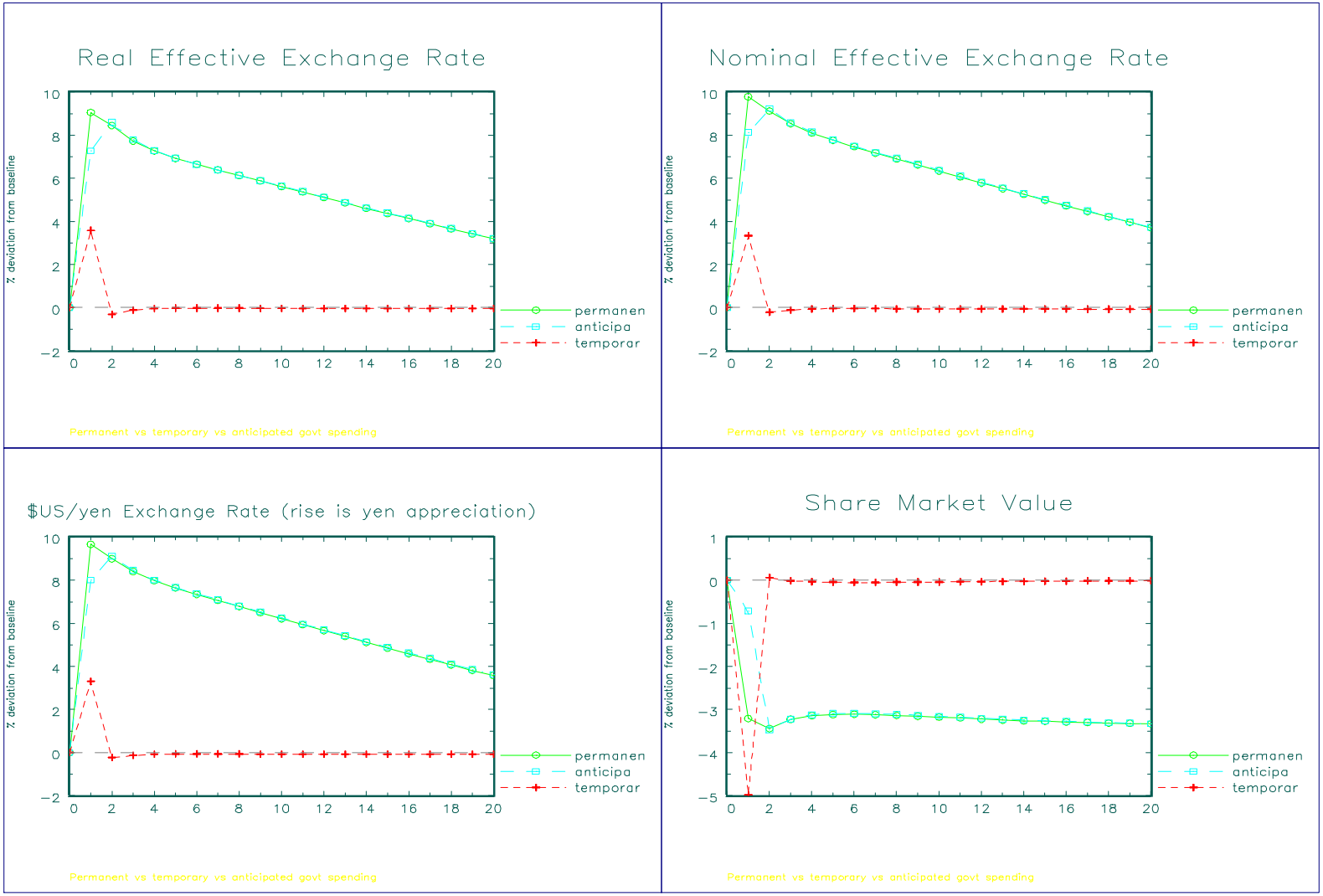
()(12): Effects of Permanent versus Temporary versus Anticipated Government Spending Increase on GDP, Inflation, Trade and the Fiscal Deficit in Japan



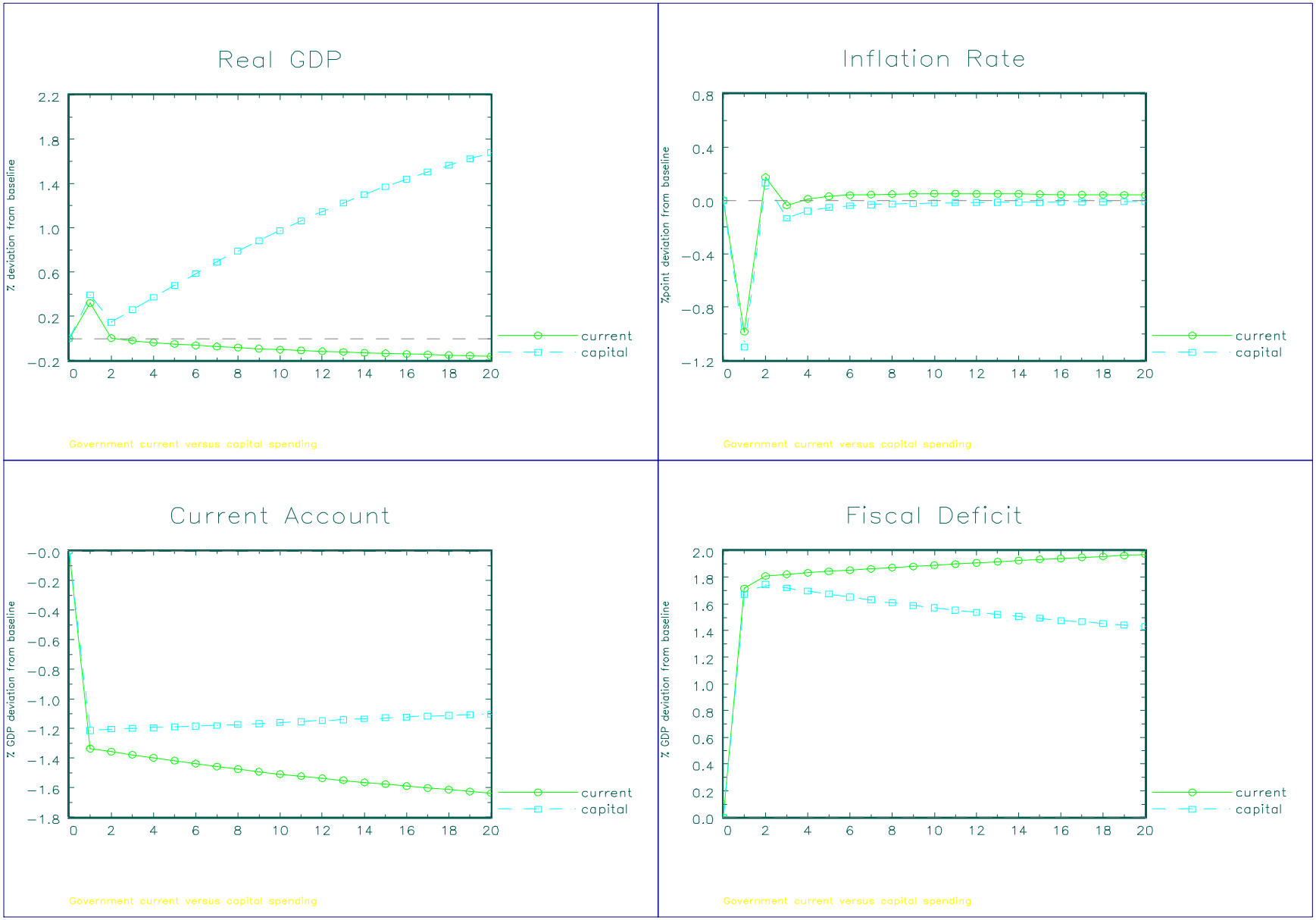
()(13):Effects of Permanent versus Temporary versus Anticipated Government Spending on Interest Rates in Japan



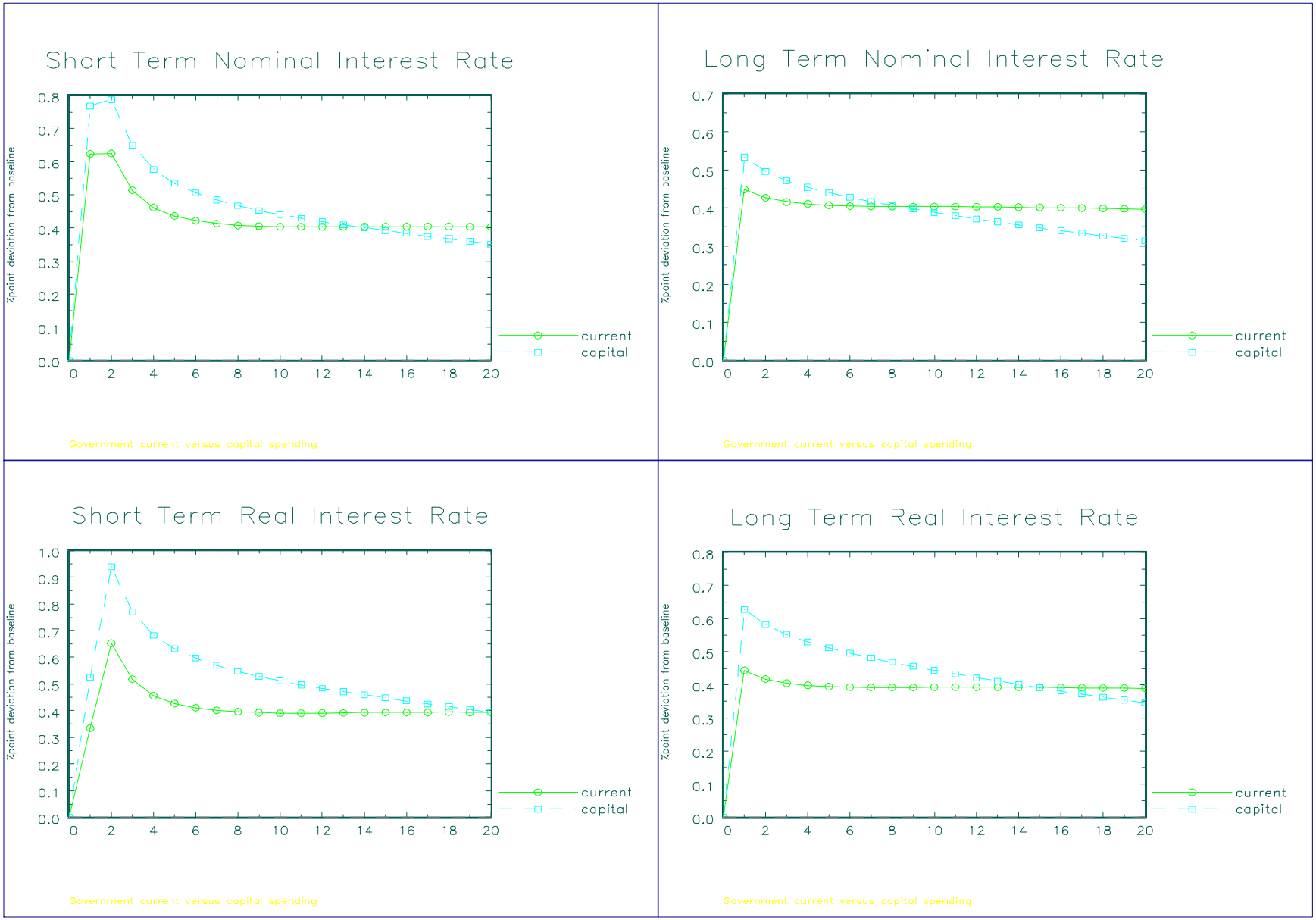
()(14): Effects of Permanent versus Temporary versus Anticipated Government Spending Increase on Exchange Rates and the Share Market in Japan



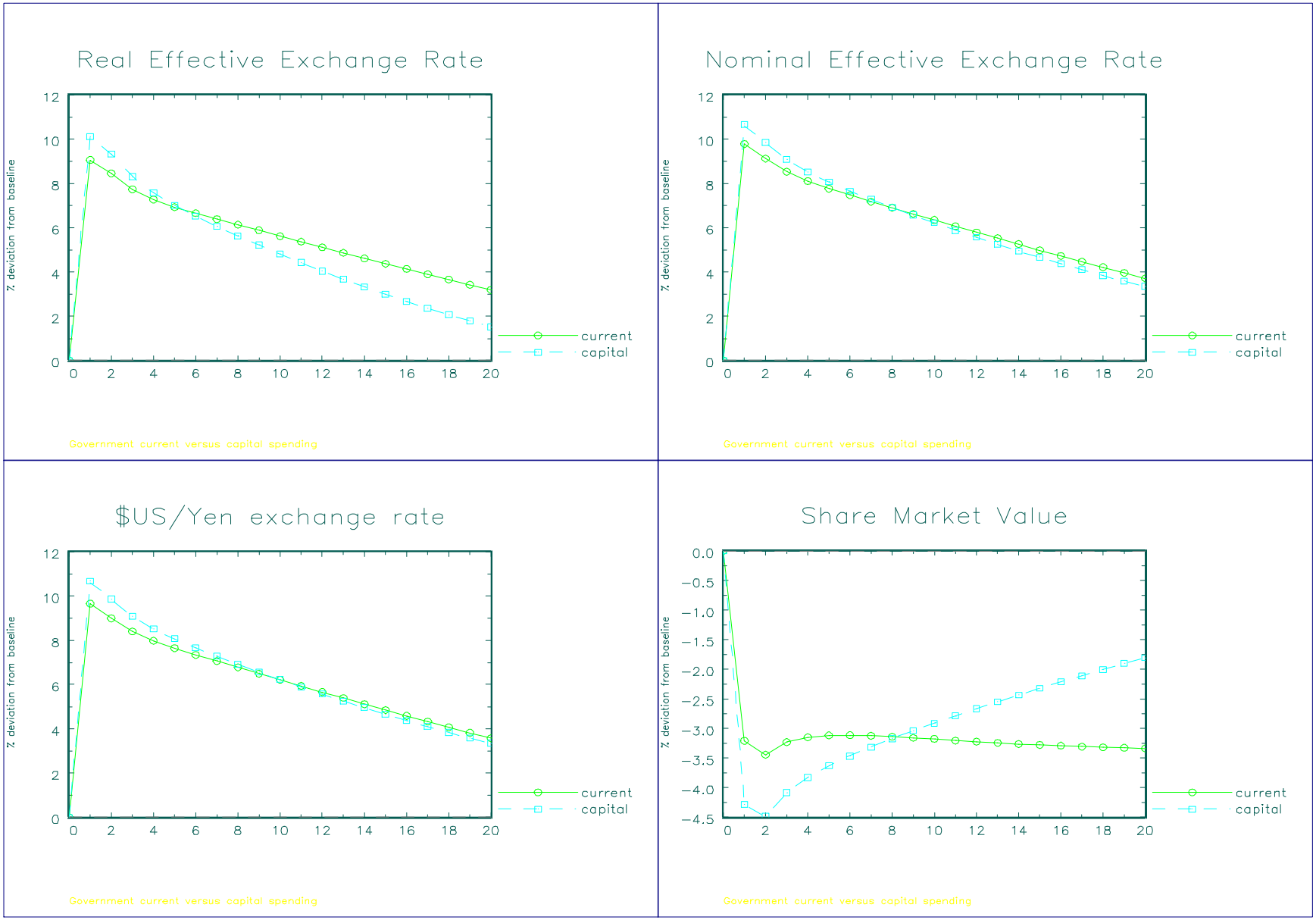
()(15) Effects of Current versus Capital Government Spending Increase on GDP, Inflation, Trade and the Fiscal Deficit in Japan



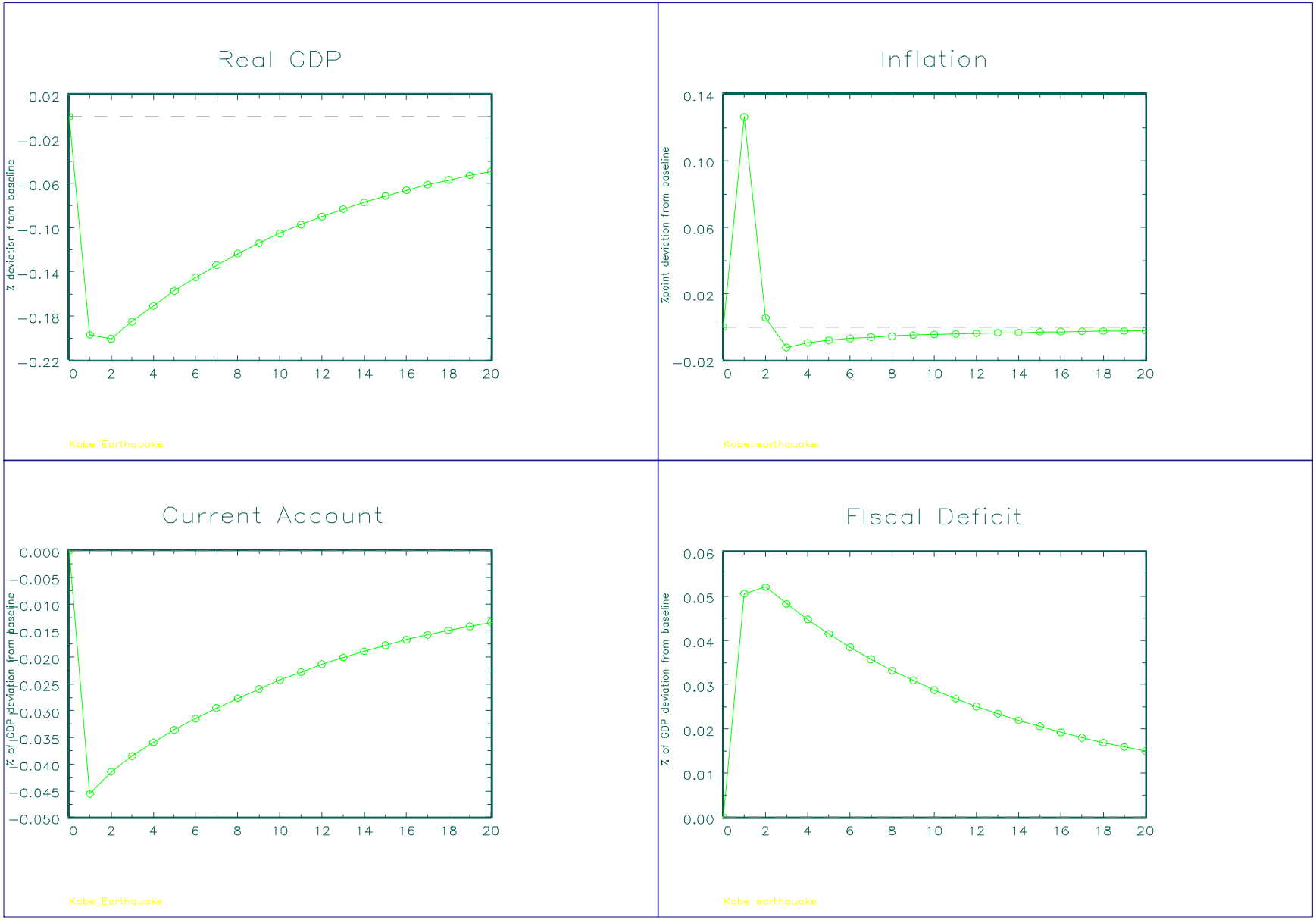
()(16):Effects of Current versus Capital Government Spending Increase on Interest Rates in Japan



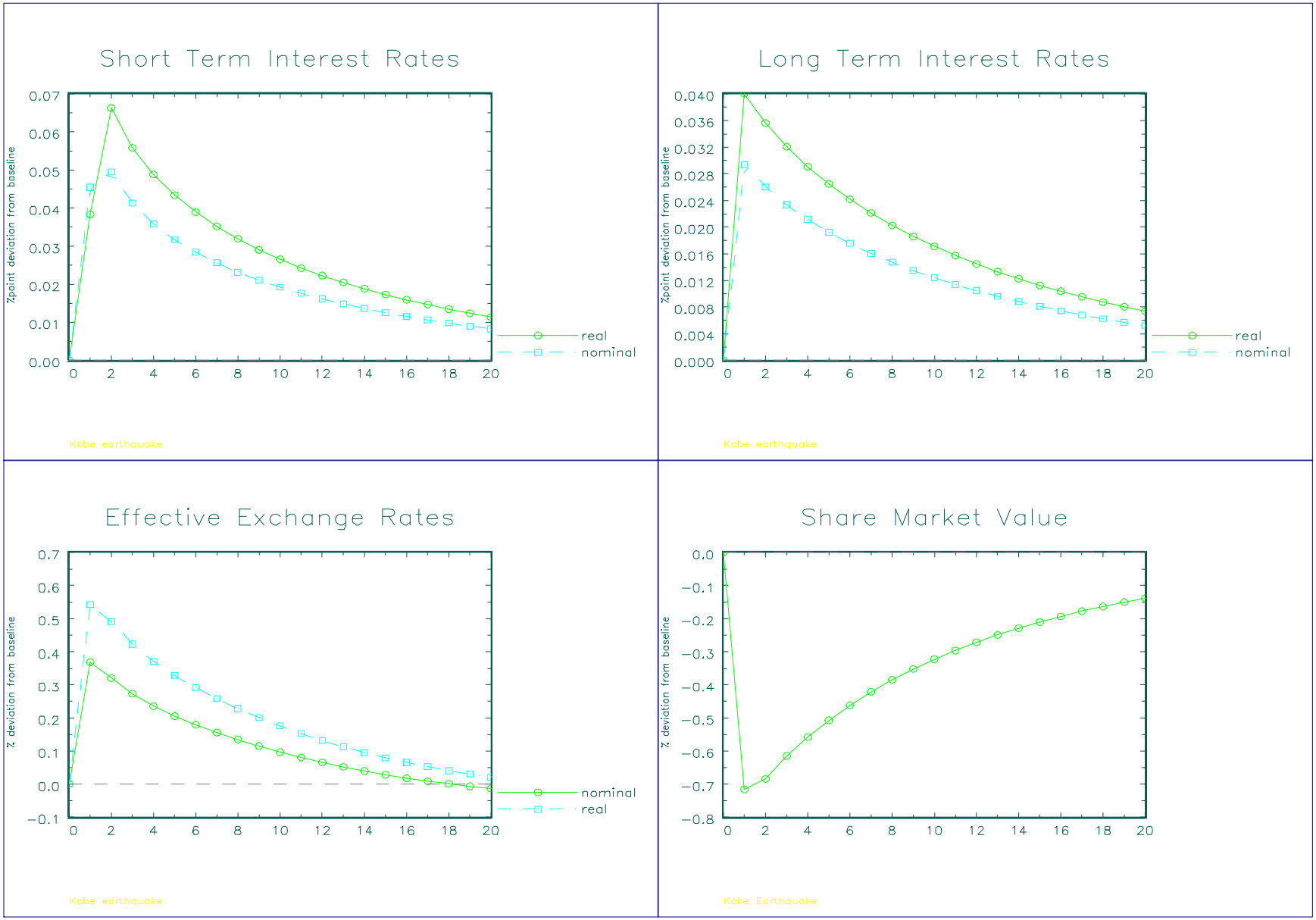
()(17):Effects of Current versus Capital Government Spending Increase on Exchange Rates and the Share market in Japan



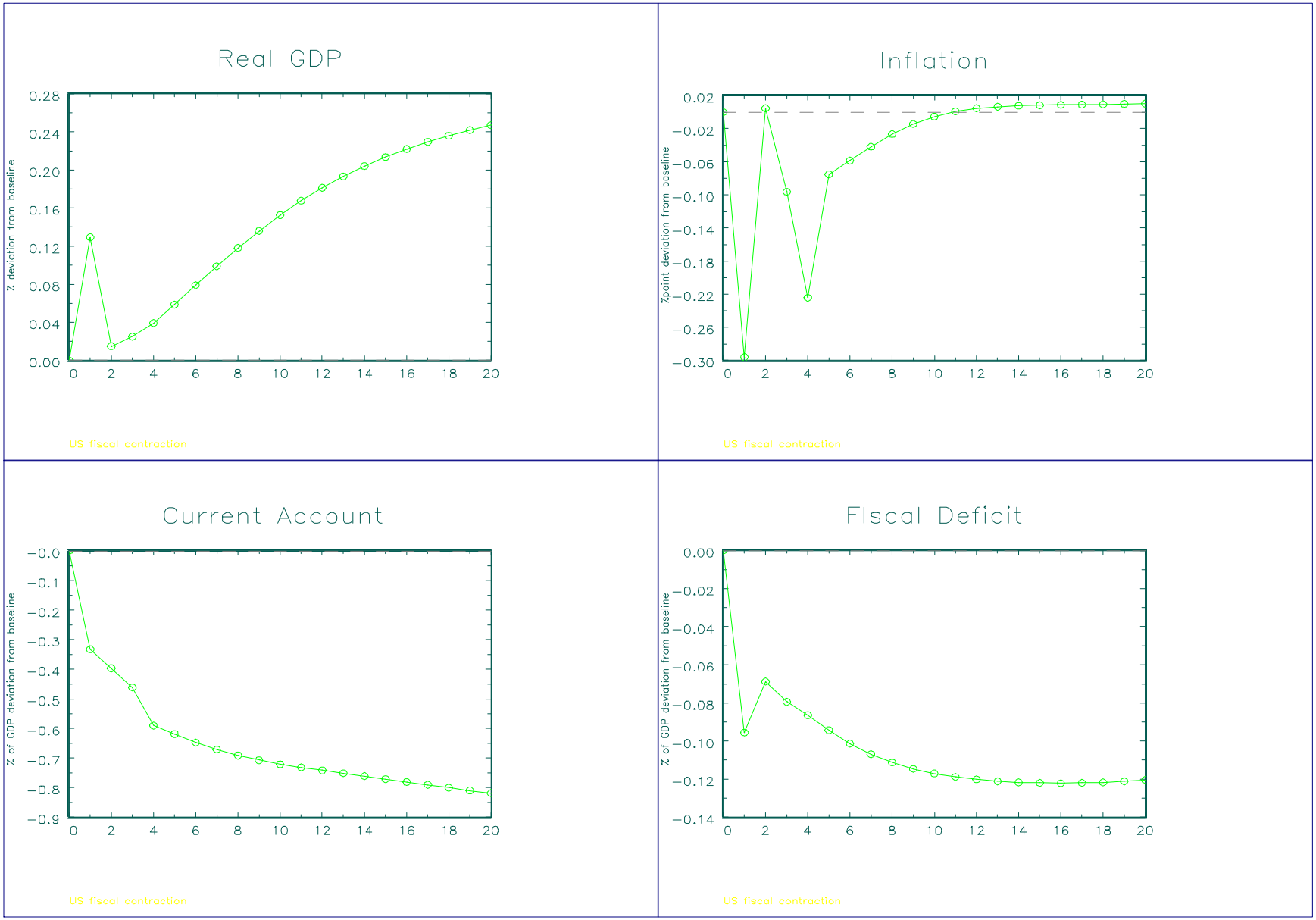
()(18): Direct Effects of the Kobe Earthquake on GDP, Inflation, Current Account and the Fiscal Position of Japan



()(19): Direct Effects of the Kobe Earthquake on Interest Rates, Exchange Rates and the Share market in Japan



()(20): Effects of Anticipated U.S. Fiscal Contraction on GDP, Inflation, Current Account and the Fiscal Position of Japan



()(21): Effects of Anticipated U.S. Fiscal Contraction on Interest Rates, Exchange Rates and the Share Market in Japan