

The Effects of Fiscal Consolidation in the OECD

Warwick J. McKibbin

Is fiscal consolidation in the OECD during a period of low growth a recipe for global stagnation? Credible deficit reduction may well stimulate growth in the long run, despite the likelihood of lower GDP in the OECD. Lower international interest rates and bigger capital flows to developing countries will sustain the growth of GDP there, offsetting lower exports.



Summary findings

Despite the current recession in many parts of the OECD, fiscal consolidation is likely in many OECD economies in the 1990s. McKibbin asks: Is fiscal consolidation in the OECD in a period of low growth a recipe for global stagnation? In particular, what effects are likely in developing countries?

McKibbin starts with an overview of cuts in the U.S. fiscal deficit proposed by the Clinton administration and the extent to which European governments must cut fiscal deficits between now and 1997 to satisfy deficit targets in the Maastricht Treaty.

How changes in fiscal policy are transmitted within an economy and between that economy and the rest of the world depends on whether those changes lead to permanent or temporary changes in government saving; whether they are implemented through government spending or taxes; and whether the taxes fall on households or firms. The main channels of transmission are through changes in

- Agents' expectations about future taxes
- Interest rates
- Exchange rates
- Economic activity.

McKibbin uses the MSG2 multicountry models to quantify the ramifications of those changes.

He concludes, among other things, that fiscal contraction in the OECD will probably lead to slower growth over the next several years. But the current and likely paths of fiscal policy are such that deficit reduction programs may have a stimulating effect in the short run, as long as future fiscal contraction is credible. And fiscal deficit reduction will probably increase long-run output in the OECD through its effects on savings and investment.

Finally, growth in the developing countries (at least total growth) may not be impaired at all by fiscal consolidation in the OECD. The negative effects of fiscal contraction will occur through lower net exports of non-OECD economies. For developing countries with open capital markets, the initial reduction in demand through lower exports can be offset by the reduction in interest rates following an inflow of capital from the countries with contracting fiscal policy.

A significant decline in real global interest rates is likely to increase growth in developing countries that are debt-constrained, either directly (through private capital inflows) or indirectly (by relaxing the balance of payments constraint, allowing more resources to be channeled to domestic investment needs).

This paper is one in a series of background documents commissioned by the International Economics Department to support analyses and scenarios in *Global Economic Prospects 1994*. Copies of this paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Jackie Queen, room S8-216, extension 33740 (30 pages). September 1994.

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1. *Introduction*

Despite the current OECD-wide recession, there is a likelihood of significant fiscal consolidation over the remainder of the decade in many of the OECD economies. In the United States, the Clinton Administration has proposed and Congress has passed, a credible fiscal deficit reduction package. In Europe, the Maastricht Treaty imposes a period of fiscal consolidation in most countries within the EMS, as these countries attempt to reach targets for government debt and fiscal deficits that are considered as preconditions for a move to a single currency. Other OECD countries such as Australia and Canada have also announced intentions to reduce fiscal deficits over the next few years.

Is fiscal consolidation within the OECD during a period of slow growth, a recipe for global stagnation for the remainder of the decade? A common argument is that the fall in government demand necessarily implies a fall in aggregate demand and therefore through conventional Keynesian mechanisms, a deficit reduction policy at this stage of the global business cycle would worsen the recession. An alternative argument is that because the fiscal consolidation will be undertaken gradually, long term interest rates will fall in the short run and this will help short term growth within the OECD. By the time the fiscal cuts are actually implemented the world economy will already be growing strongly and the negative demand consequences of the consolidation will largely be diluted. Opponents of this view argue that either interest rates are largely independent of fiscal policy, or that interest rate changes have little effect on real activity and the dominant outcome of fiscal consolidation will be the negative impact on aggregate demand.

This paper focuses on this issue. In particular, it presents some evidence on the impact of a change in fiscal policy in major OECD economies. Section 2, gives an overview of the extent of cuts in the fiscal deficit proposed by the Clinton Administration as well the extent to which European governments will need to cut fiscal deficits between now and 1997 if they are to satisfy the deficit targets in the Maastricht Agreement. In Section 3 the MSG2 multi-country model is used to focus on the key channels through which fiscal policy influences the economy as well as suggesting quantitative magnitude of the impact of the cuts. A global model is essential for capturing the many channels through which a change in fiscal policy influences global economic activity. In that section it is shown that the transmission of changes in fiscal policy within an economy and between that economy and the rest of the world depends on a number of factors. Among the many factors are: whether the change in fiscal policies lead to permanent or temporary changes in government saving; whether the change in fiscal policy occurs through changes in government spending or through change in taxes; if taxes are used it matters whether these taxes are levied on households or firms. The major channels of transmission are through changes in agents expectations of future taxes, changes in interest rates, changes in exchange rates, and changes in economic activity. In the MSG2 model, a reduction in government demand reduces overall economic activity because the Keynesian style multiplier more than outweighs the stimulus caused by lower real interest rates and a weaker exchange rate. However, it is shown that if the path of fiscal reduction is pushed sufficiently into the future, the change in interest rate and exchange rates which occur in the present, then it is possible for a deficit reduction program to be stimulatory in the short term. When the cuts in spending finally occur there is still a fall in aggregate demand but it is offset to some extent by the stimulus from changes in asset prices.

In section 4, the empirical relevance of the various channels that are the basis for the simulation results are reviewed. The evidence from econometric studies as well as simulations from other multi-country models are summarized. The evidence from econometric studies of the link between budget deficits and interest rates and between interest rates and economic activity are less than robust.

However, one point that is seen when examining the results from the MSG2 model is that the nature of expectations about current and future changes in fiscal policy are crucial for the outcomes. Given that reduced form correlations between key variables can change sign depending on the way the policy is simulated, it is difficult to see how reduced form econometric results, of the form that dominate the literature, are going to be successful in finding any strong empirical relationships between deficit changes, interest rates and economic growth that can act as a robust guide to policy.

A conclusion is summarized in section 5. It is shown in this paper that fiscal contraction in the OECD can lead to slower growth. However, the nature of the current and expected paths of fiscal policy are such that fiscal policy may be stimulative in the short run as long as future fiscal contractions are credible. Fiscal deficit reduction can also raise long run output through higher saving but at some stage during the fiscal consolidation it is likely that GDP will fall as factors of production are reallocated throughout the economy.

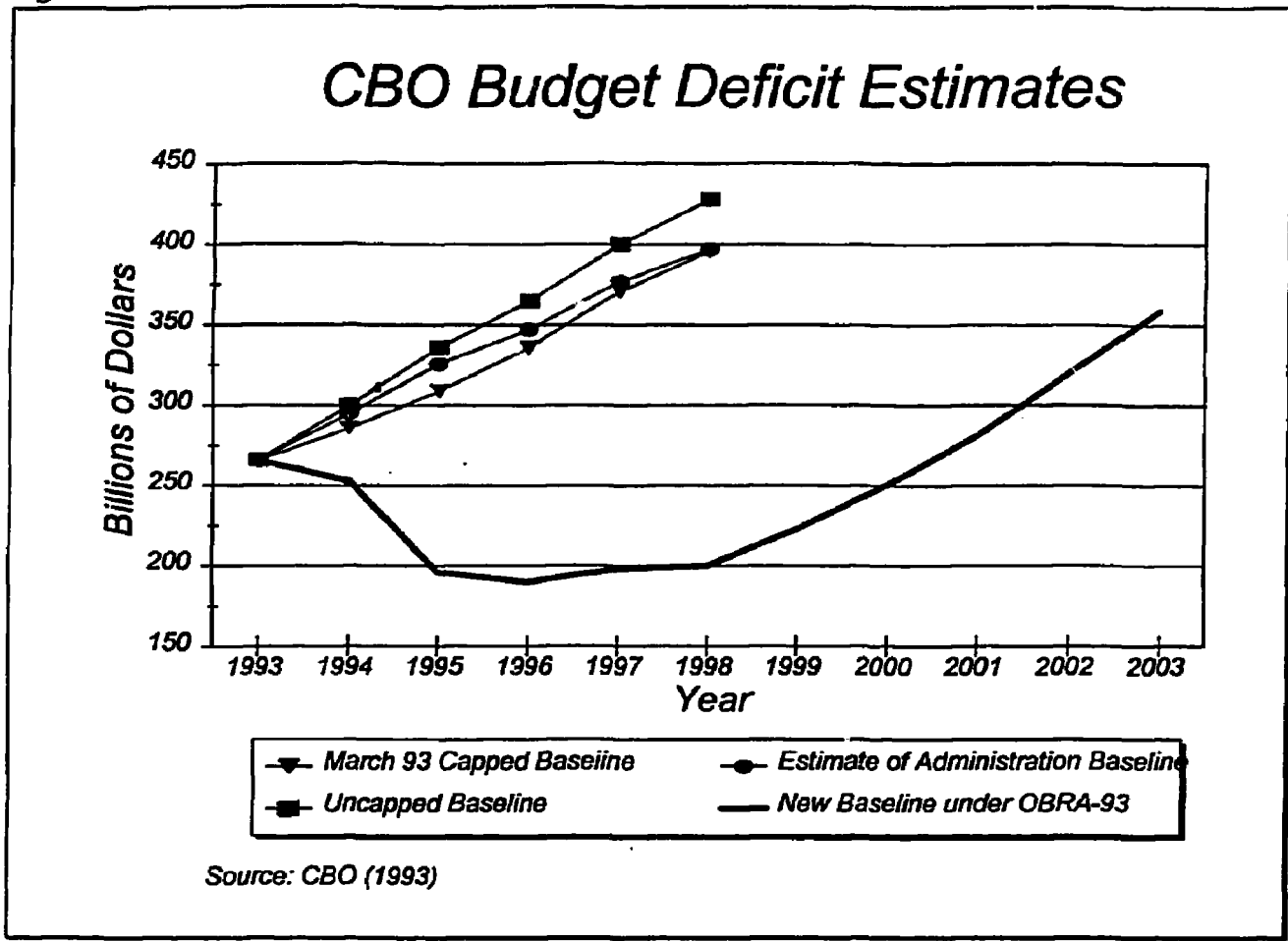
2. *Fiscal Scenarios*

This section summarizes the current state of fiscal policy in the OECD as well as outlining likely developments in the major OECD economies. Two issues dominate the global state of fiscal policy. The first is the recent passage in the United States of the Omnibus Budget Reconciliation Act of 1993, (OBRA-93, the first budget of the Clinton Administration). The second issue emerges from the guidelines for policy convergence proposed in the Maastricht Agreement.

The Clinton Administration's recently passed budget, proposes significant cuts in future U.S. fiscal deficits amounting to about 1.6 percent of GDP by 1997, relative to the earlier CBO baseline projections for 1997. The extent of cuts relative to 3 alternative baseline concepts are shown in figure 1. This figure gives the path of deficits in billions of dollars, from 1994 to 1998 for baselines defined as: "March 1993 capped baseline" (the CBO baseline from March 1993 assuming the caps on spending imposed by the Budget Enforcement Act of 1990, are applied); the CBO estimate of the latest Administration's baseline; and the uncapped baseline. This figure also shows the new CBO estimates for the OBRA-93. Of the reduction in projected fiscal deficits, about 55% of the reduction is through higher taxes, about 35% through spending cuts and 10% through lower debt servicing costs (see CBO(1993)). Figure 1 shows that if the budget is implemented as passed, there are likely to be significant reductions in U.S. fiscal deficits by 1997 and in the years beyond. After 1998 the budget deficit again begins to rise, primarily due to projections of exploding health care costs. However, the level of the deficit is permanently reduced relative to what it otherwise would have been.

The other major potential shift in fiscal policy with global implications is the fiscal implications of the Maastricht revision to the Treaty of Rome which was endorsed by the European Council at Maastricht in December 1991. Under this agreement countries in the European Economic Community have proposed implementing a single currency in Europe by the end of this decade. To be a participant in this monetary union, countries should satisfy four indicators of policy convergence. These criteria are: a) inflation must not exceed the average inflation rate of the three lowest inflation countries by more than 1.5%; b) interest rates on long-term government securities must not be more than 2 percentage points higher than the interest rate in the lowest three inflation countries; c) the currency must have been within the narrow band of the ERM for two years without a realignment; d) the general government deficit should be no more than 3 percent of GDP and the ratio of government debt

Figure 1



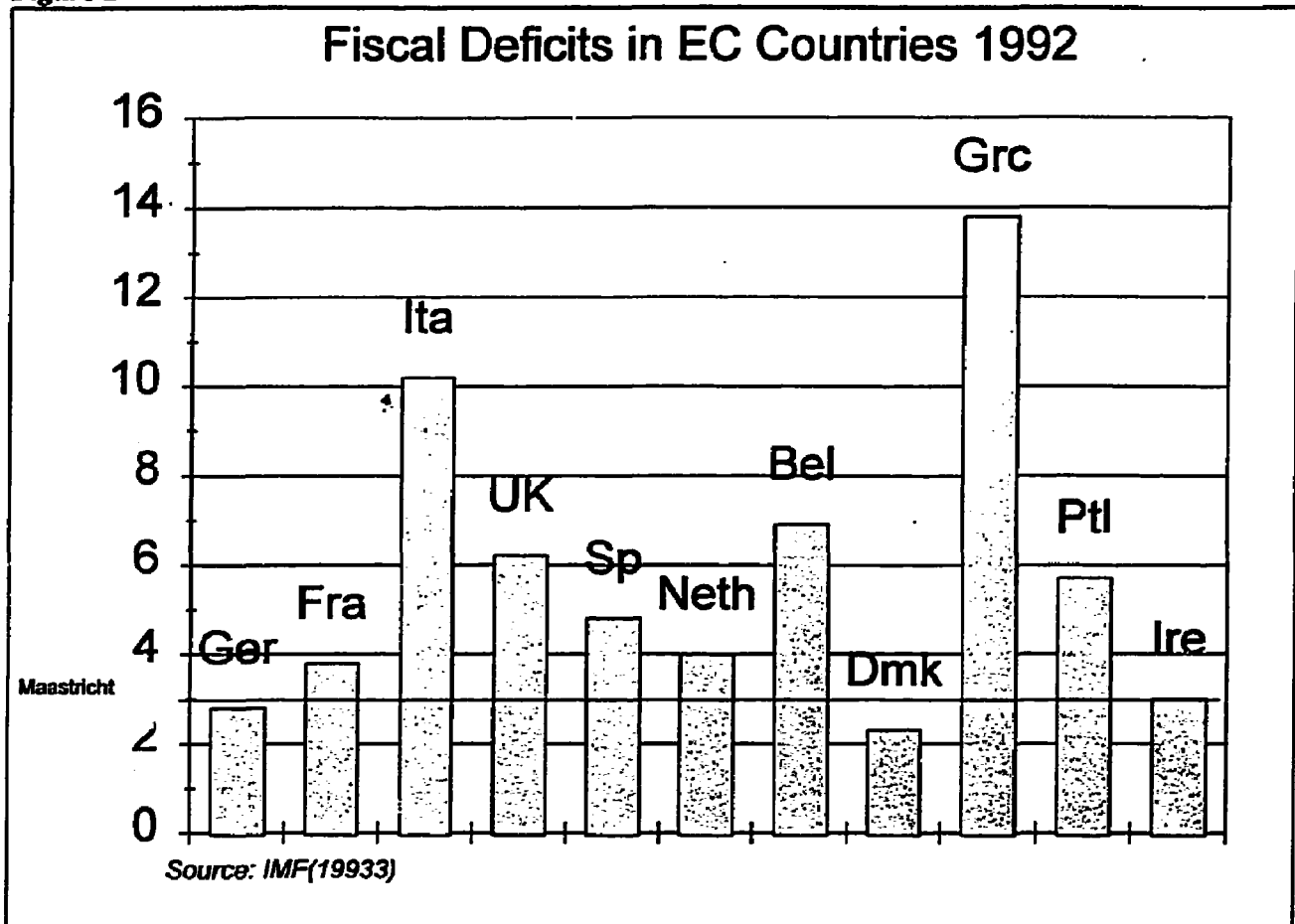
to GDP must be approaching the benchmark of 60% of GDP at a reasonable pace¹. Of these reference indicators, the last criteria on fiscal deficits is the focus of this paper.

To give an indication of the current fiscal position in Europe, Figure 2 shows fiscal deficits relative to GDP of EC countries in 1992. This figure also contains a line indicating the Maastricht guideline for fiscal deficits of 3% of GDP. Based on the fiscal deficits in 1992, it is clear that some countries, notably Italy, United Kingdom, Belgium, Greece and Portugal need to undertake a significant fiscal consolidation between now and 1997 if they are to satisfy the Maastricht guidelines for fiscal convergence. In many of these countries the fiscal deficits have worsened in 1993 due to the economic slowdown in Europe. A similar, and indeed more extreme picture emerges from examining the ratio of government debt to GDP for these economies. In this paper we ignore the debt targets and concentrate merely on the deficit targets as these are more likely to be achievable in the time frame considered (see Giovannini and McKibbin (1992)).

Developments in the United States and Europe, suggest the following stylization of scenarios for this paper. Fiscal deficit reduction in the United States will be around 1.6 Percent of GDP by 1997.

¹ See IMF (1992), Annex II on "The Maastricht Agreement on Economic and Monetary Union".

Figure 2



In Europe the amount of possible reduction varies across countries and is much less likely. Nonetheless, the extent of reduction conditional on reaching the Maastricht targets by 1997 would be: France (1% of GDP); Italy (7% of GDP), United Kingdom (3% of GDP); and other EMS countries (2% of GDP). In the following sections we examine the global impact of fiscal reduction of these magnitudes. A key aspect of both the U.S. and European policies is that they are to be phased in gradually over time. This is the focus of the next section.

3. *The Global Impact of OECD Deficit Reduction*

Understanding the major channels through which deficit reduction in the OECD impacts on countries within the OECD and throughout the world, requires a global model. We use the MSG2 model for several reasons. First it has a clear theoretical framework which makes disentangling the key channels of transmission relatively straightforward. Secondly it is empirically based, thus in addition to the theoretical insights we can also uncover the magnitude of certain effects. Thirdly it has been shown to be able to track important events in the global economy since the 1980s and is continually being used and evaluated by a wide range of users inside governments and at academic institutions. We first describe the model briefly. A number of deficit reduction scenarios are then

considered. The analysis proceeds sequentially so that we can build intuition on key aspects of results. First we focus on U.S. deficit reduction. Within this we consider three alternative ways of reducing the U.S. fiscal deficit by 1.6 percent of GDP²:

- cut in government spending on goods and services;
- an increase in the household income tax rate;
- an increase in the corporate income tax rate;

To accentuate the role of expectations we also consider these policies in the context of:

- a permanent deficit reduction policy;
- a temporary deficit reduction policy; and
- an anticipated, permanent deficit reduction policy;

In the third part of this section we then show the results for a Clinton-budget deficit reduction where we assume that 35% of the reduction in the budget deficit is through spending cuts and 55% through a combination of higher corporate and personal income tax rates. The remaining saving on lower debt servicing is endogenous to the model. We then show the results for a Maastricht deficit reduction program in Europe as interpreted in section 2 above. Finally, we combine the U.S. and European deficit reduction policies to gauge an overall assessment of the impact of the two main fiscal contractions on the global economy.

a) The MSG2 Model

The model we use is the McKibbin-Sachs-Global Model (also called MSG2 model, see McKibbin and Sachs (1991)). This model has a number of attractive features. Most importantly it is a global model which captures the interdependencies in the flows of goods and capital between countries that typifies the 1990s. Its major strengths include neo-classical long run properties, consistent intertemporal accounting of national and international stock-flow relationships, and explicit treatment of forward-looking expectations. The model's ability to explain the world economy during the 1980's has been shown in chapter five of McKibbin and Sachs (1991).

The MSG2 model encompasses major sectors of the economy at an aggregated level. The consumers and firms specified in the model are a mix of: (1) intertemporal optimizers whose expectations are postulated to be consistent with the structure of the model and, (2) liquidity constrained households and firms who do the best they can given existing budget constraints and incomplete access to financial markets³. Expectations play a crucial role in financial markets where agents maintain their non-human wealth in the form of equity claims on firms, claims on the government and claims on foreigners. Arbitrage keeps the financial markets from diverging in their expected rates of return. The model also features a careful treatment of stock-flow relations such as: the accumulation of current account deficits into foreign claims on domestic output, which has to be serviced by future trade surpluses; the accumulation of fiscal deficits into a government debt that has to be serviced from future revenues - though it does not have to be completely paid off; the accumulation of investment flows into a depreciating capital stock with which national output is produced. Furthermore, the model maintains

² This is scaled to be approximately equal to the deficit reduction expected to be achieved by OBRA-93.

³ For empirical evidence see Campbell and Mankiw (1990).

an equilibrium between aggregate demand and aggregate output so that demand increases will precipitate a rising price level as well as a short term supply response. In the long run, output is determined by the availability of factors of production such as labor, energy and physical capital (based on neoclassical growth theory). Only changes in consumers' rate of time preference, productivity growth and population growth, therefore, can affect long-term output growth. The *level* of long-term output, on the other hand, can be influenced by short run saving and investment decisions given the assumption of a wedge between the interest rate at which the government borrows and the rates of return on assets held by households and firms. Global accounting identities are imposed in the model by incorporating all regions of the world economy and the flows of goods and financial assets between these regions. The version of the model used in this paper contains explicit sub-models for the United States, Japan, Germany, France, Italy, United Kingdom, the Rest of the European Monetary System (REMS), Canada, the Rest of the OECD, non-oil developing countries, oil developing countries, and the eastern Europe economies with the Commonwealth of Independent States.

b) Alternative Instruments for Deficit Reduction

In this section, three alternative means of achieving deficit reduction are considered. The three policies are: a reduction in government spending on goods and services of 1.6% of GDP; an increase in the average household income tax rate of 2.4 percentage points and an increase in the average rate of tax on corporate income by 6.7 percentage points. These policies are chosen so as to lead to a reduction in the fiscal deficit of 1.6% of GDP by 1997.

As with any policy change in a model containing rational expectations, we must specify either the entire future path of the policy or the policy rule. In the case of fiscal policy we must also be careful to specify the method of financing to be used. In this case we assume that each of the three policies lead to a reduction in government debt (i.e. decreasing the budget deficit). Any changes in *servicing* the debt are assumed to be funded through lump sum tax changes on consumers. For example, a fiscal contraction today that cuts the deficit by 1.6 percent of GDP must be met at some stage in the future by a tax reduction to cover the reduced cost of servicing a smaller stock of debt, if the fall in the deficit is to remain at 1.6% of GDP. These policies are considered in the context of an announced permanent reduction in the fiscal deficit implemented in 1993. There is no phasing in of the policies. Changes in spending and tax rates are selected such that the fiscal deficit reduction under each policy is approximately equivalent by the year 1997. In the short run there is no attempt to standardize the policies on the change in the fiscal deficit because each policy has a different cyclical impact.

Figures 3 and 4 present results for the United States of a permanent reduction in the fiscal deficit using the three alternative fiscal instruments. Figure 3 contains results for real GDP, private consumption, private investment, and the trade balance for the United States. Figure 4 shows the results for the nominal effective exchange rate, inflation, the share market, and 10 year bond rate for the United States. These figures show the *deviation from baseline* of variables as a result of the policy changes. These variables are scaled so that real GDP is measured as a percentage deviation from base; private consumption, private investment and the trade balance are measured as percent of baseline GDP deviation from base (i.e. 0.5 percent is 0.5 percent of U.S. GDP in the year indicated); inflation and the interest rate on 10 year bonds are measured as percentage point deviation (i.e. -1 on the vertical axis is a fall of 1 percent or 100 basis points); and the share market and the nominal effective exchange rate are percentage deviation from base, where a fall in the exchange rate of 1 percent is a depreciation of that country's exchange rate relative to an export weighted basket of other currencies.

Figure 3: Real Consequences in the U.S. of Permanent U.S. Deficit Reduction Using Alternative Instruments

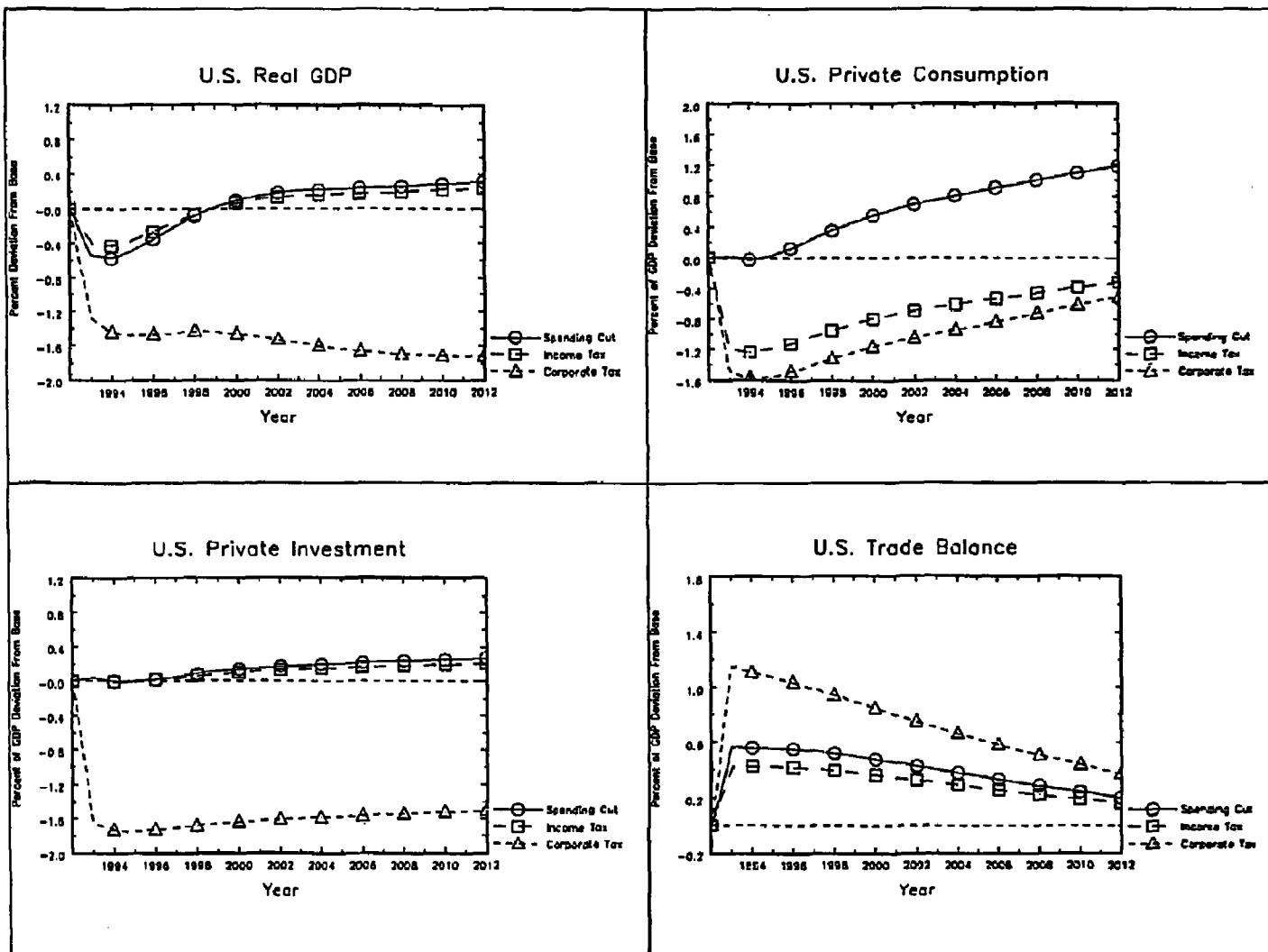
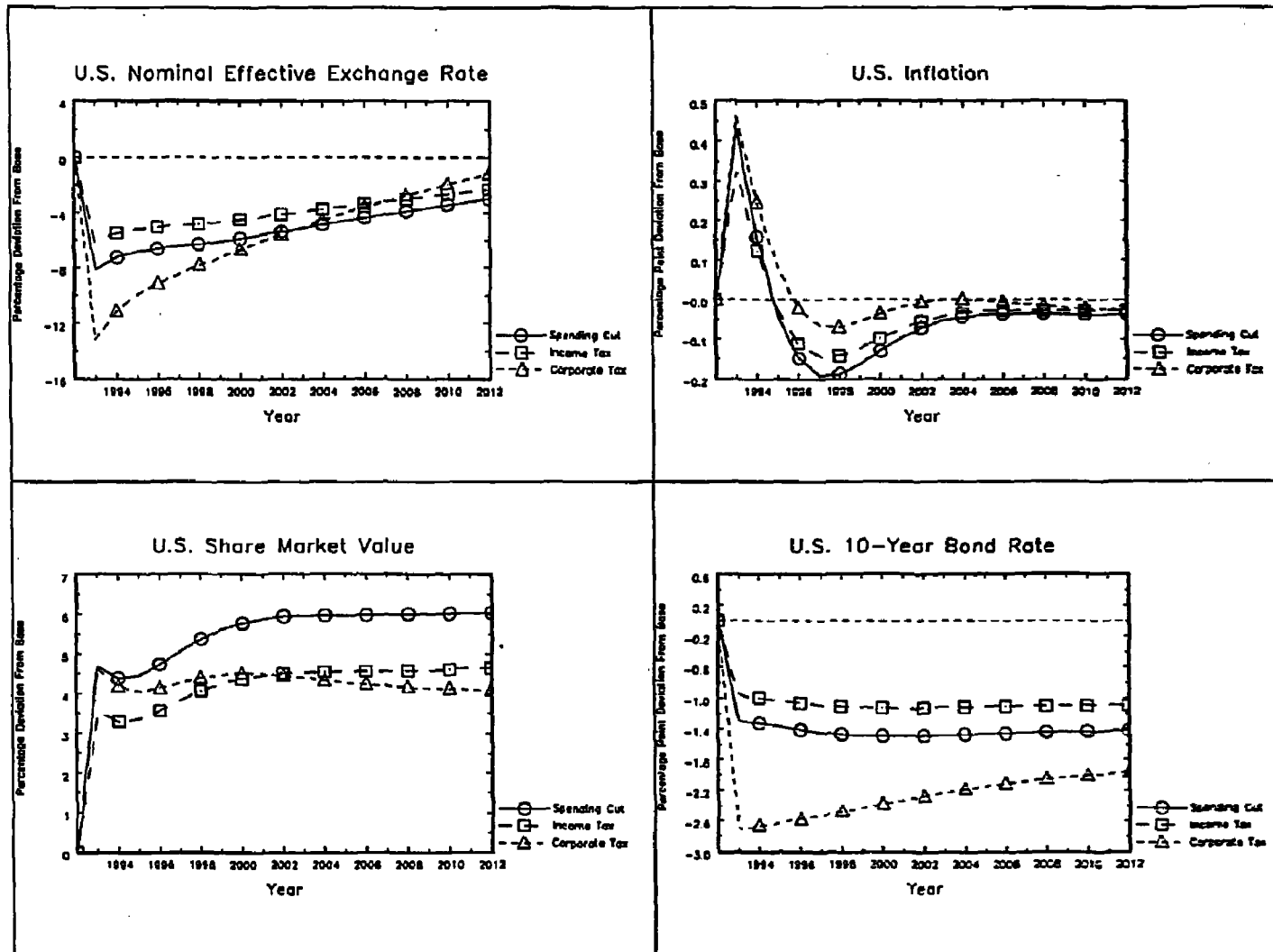


Figure 4: Financial Consequences in the U.S. of Permanent U.S. Deficit Reduction Using Alternative Instruments



First, refer to the results for the permanent reduction in government spending on goods and services in figure 3 and 4. The process of adjustment follows the familiar results of the theoretical Mundell-Fleming-Dornbusch models. The reduction in government demand and the fall in government borrowing lead to a fall in interest rates in the United States (real and nominal, short and long). This leads to a capital outflow which depreciates the U.S. dollar by around 5.7 percent in effective terms. The large size of the U.S. economy in world capital markets and the movement of capital out of the United States, leads to a global fall in interest rates. The fall in U.S. domestic demand lowers world output in the first year but is more than offset by the stimulative effects of lower world interest rates in subsequent periods.

The capital outflow is reflected in an improvement in the U.S. trade balance of around 0.6 percent of GDP in 1993. This improvement is gradually reversed over time. The subsequent deterioration (relative to baseline but not necessarily relative to 1993) reflects the intertemporal budget constraint: with a permanently smaller stock of external debt, the future U.S. trade surpluses that otherwise would be required to service the stock of external debt are now reduced. This is accomplished by a gradual appreciation of the U.S. dollar relative to baseline after the initial depreciation.

Inflation initially rises due to number of important factors. First, in the MSG2 model, consumer prices are used to measure inflation. Consumer prices include a rise in the price of imported goods reflecting the depreciation of the U.S. dollar. In addition some domestic goods require imported inputs into the production process. As the U.S. dollar depreciates, the cost of imported inputs rise. This leads to a rise in output prices.

The long terms positive effect on real GDP is driven by the assumption that, although forward looking, consumers are not completely Ricardian in this model. They discount future income streams at a higher rate than the real interest rate on government debt. Thus when government spending is reduced, to eliminate excess supply in the long run, interest rates fall which stimulates private investment in the long run. With higher investment, there is a higher capital stock and a higher capital output ratio. Thus the lower real interest rates are consistent with a lower marginal product of capital. With real wages adjusting to return the economy to full employment in the long run, the level of output will be higher due to the same quantity of labor inputs but a higher stock of physical capital.

Now compare the results under each of the three fiscal instruments. The income tax and the cut in government spending have similar consequences although there are a number of interesting differences. In terms of real GDP, the spending cut is more contractionary in the short run than the income tax increase but leads to a higher level of output in the long run than the income tax increase. This can also be interpreted in terms of the balance budget multiplier (adding a spending increase to a tax increase so that the deficit is unchanged). This multiplier is positive in the short term and negative in the long run. The long run result follows because consumers are not completely Ricardian in this model. Thus a change in government spending leads to a change in real interest rates in the long run, as described above. For a tax change in the long run, the fall in interest rates is smaller than the fall in interest rates under a spending cut. The change in the marginal product of capital is also smaller under the income tax and therefore the capital stock rises by less under the income tax change. In the short term, the standard Keynesian multiplier is relevant. The spending cut reduces aggregate demand by more than an equivalent change in taxes which are partly financed by consumers by a reduction in saving. Thus private consumption does not fall by as much as public consumption and the decline in aggregate demand is smaller when taxes increase.

The bigger difference in terms of GDP outcomes occurs when the deficit reduction is undertaken through increases in corporate taxes. The corporate tax has different consequences on both the aggregate demand and aggregate supply. The higher corporate tax rate, reduces the return to private capital. Thus private investment declines. Even though real interest rates also decline by more in this case, the impact of higher taxes on liquidity constrained firms far outweighs the stimulative effect of lower real interest rates on real investment. There is also a long run contraction in GDP because the lower rate of investment implies a lower physical capital stock in the longer run. Note that the share market rises under each policy because of lower real interest rates. However, the similarity in share market outcomes does not imply similar investment responses because of the role of liquidity constraints in investment.

The form of the deficit reduction has quite different implications within the U.S. economy. This is also true in the transmission of these policies to other countries. Although the MSG2 model contains country detail on a number of countries and regions it is convenient to summarize the transmission of the fiscal change by focussing on results for the ROECD region. These are shown in Figure 5.

The quantitative results differ for each country but the qualitative story is similar. In the first year of the fiscal contraction, there is a decline in ROECD GDP. This occurs because of the fall in U.S. demand for goods from other countries. The negative effects are reversed by 1994 because the fall in global real interest rates stimulates private investment in non-U.S. economies. This is seen clearly in Figure 5. It is also true that in the long run real GDP is higher in all countries. This occurs through the same mechanism as discussed above for the United States. Lower long term real interest rates must be consistent with a lower marginal product of capital in each country and therefore a higher capital stock, which implies that output is permanently higher.

The results for foreign economies across the three fiscal instruments also differ. The increase in corporate taxes leads to a larger outflow of private capital from the U.S. which results in a larger increase in physical capital in the rest of the world. The higher path of future output and the larger fall in real interest rates lead to a larger rise in non-U.S. share markets in the case of the corporate tax increase.

The consequences for countries outside the OECD are summarized in figure 5a. The MSG2 model does not contain a detailed internal macroeconomic structure for the non-oil developing countries. It is assumed that these countries are constrained by the amount of lending offered by the rest of the world. The amount that these countries can borrow plus the revenue from exports is then used to service outstanding debt and to purchase imported goods from each other region. Importantly it is also assumed that this region pegs to the U.S. dollar. Figure 5a contains the results for the trade balance and exports for this region. The key transmission mechanism to this region is that for a given capital account, lower interest rates imply a larger trade balance deficit can be run. In addition with a real and nominal depreciation relative to non-U.S. economies, real exports (defined in terms of US goods) also rise due to substitution by non-U.S. industrial economies towards the goods from developing countries. Thus real imports rise by more than the reduction in debt servicing costs. In this sense, the non-oil developing countries are better off. In both the case of non-U.S. industrialized economies and economies with balance of payments constraints the U.S. fiscal contraction is on balance positive. The channels are different in the sense that for ROECD economies, the assumption of open capital markets leads to a stimulus to investment through a reduction in real long term interest rates. In countries with a balance of payments constraint due to incomplete access to global capital markets, the benefits emerge from lower costs of servicing foreign debt.

Figure 5: Transmission to the Rest of the OECD of Permanent U.S. Deficit Reduction

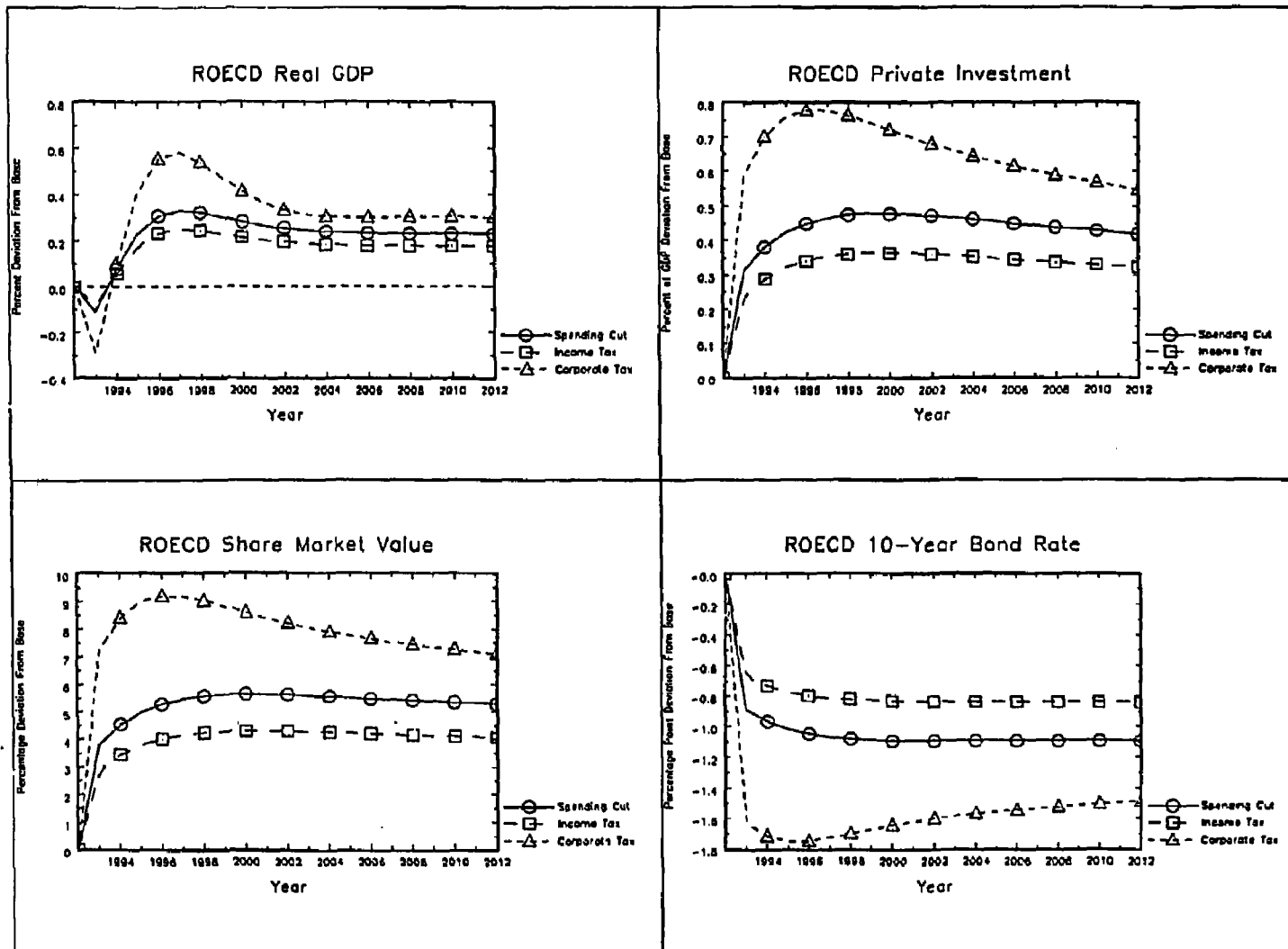
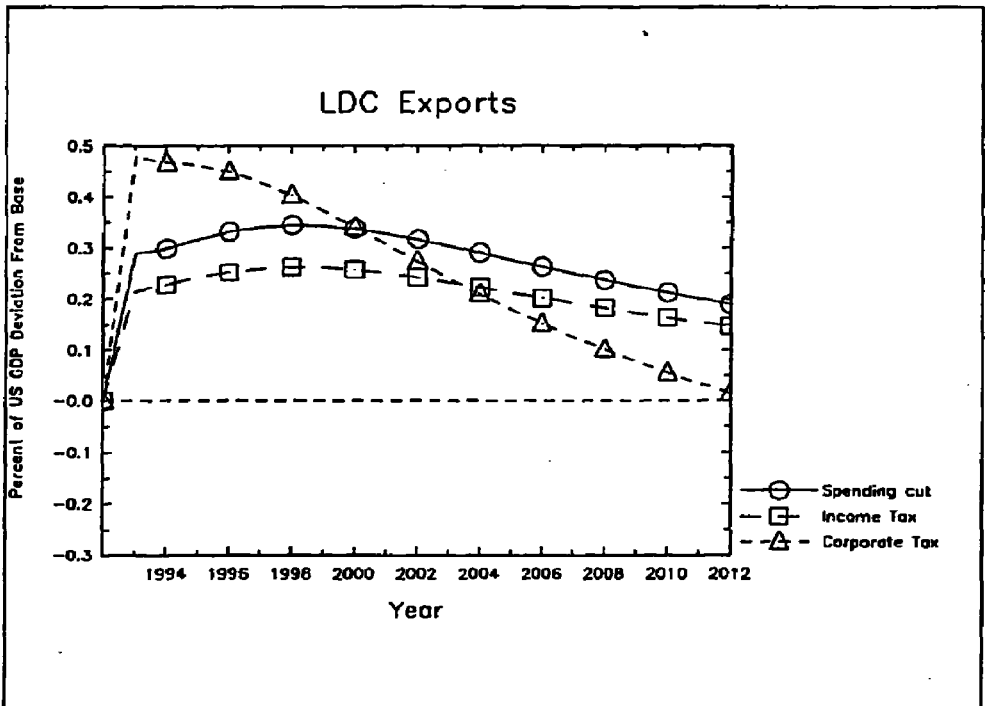
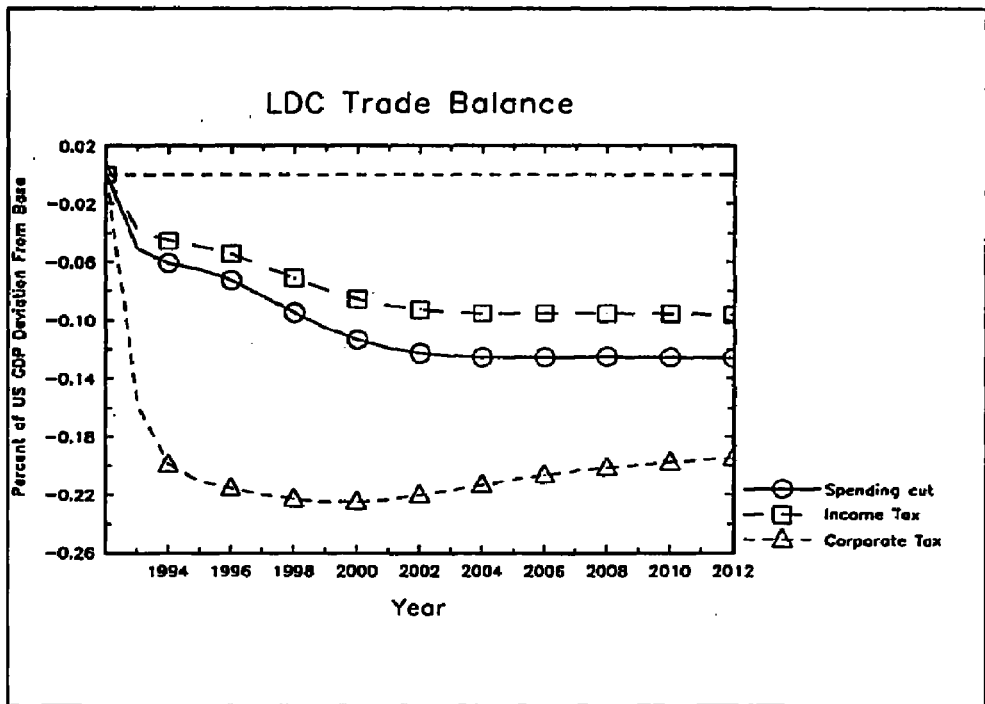


Figure 5a: Transmission to Non-Oil Developing Countries of U.S. Deficit Reduction



c) *Permanent Versus Temporary Versus Anticipated Policies*

We now consider the different between the time path and permanence of fiscal policy changes. Again we use the fiscal contraction in the U.S. as the example. We also focus on a reduction in spending on goods and services because the intuition on the effect of the time path of policy follows for each of the three alternative means of deficit reduction.

Figures 6 through 8 contain results for the permanent cut in government spending that we have already analyzed. In addition, we show results for a temporary cut in government spending which consists of a cut of 1.6 % of GDP in 1993 but spending returning to baseline from 1994 onwards. The third comparison is with a permanent cut in spending that is phased in from 1993 to 1996. This policy is a reduction of 0.4% of GDP in 1993, 0.8% of GDP in 1994, 1.2% of GDP in 1995 and 1.6% of GDP from 1996 forever.

The results for the United States are shown in figure 6. In the case where the spending cut is temporary, the initial fall in U.S. GDP is largest; close to 1.4% relative to 0.5% for the permanent policy. This result is because the real interest rate reduction is much smaller and the exchange rate depreciation is much smaller for a temporary change in government spending. In addition to the larger output effects, the consequences for trade are much smaller for the temporary policy. In the long run there is no effect of this policy.

In contrast, the results for an anticipated (or phased in) policy are also shown in Figure 6. A key point to note is the initial rise in U.S. real GDP as a result of the policy. This occurs because the spending cuts are primarily in the future whereas the changes in asset prices stimulate demand in 1993. The fall in interest rate acts as a stimulus, partly through intertemporal channels, but also because it reduces liquidity constraints on a proportion of firms and households in the model. In addition, the depreciation of the real exchange rate stimulates net exports which raises aggregate demand. Eventually the phased-in policy and the permanent policy lead to the same outcomes.

Figure 8 presents results for the transmission of the three types of spending cuts to the rest of the world. As with the results inside the U.S. the transmission to other countries is quite different. The negative effects of the policy for foreign GDP is again largest for the temporary policy because there is little reduction in global real interest rates in this case. Note that when the policy is phased-in, the fall in interest rates in the rest of the world dominates any negative effects of the contraction in U.S. output from 1994 through 1997 and GDP in the rest of the world is permanently above baseline. Thus although fiscal contraction reduces output at some point in the country undertaking the contraction, the timing of the cuts in fiscal deficits can be crucial for the sign of the transmission of this policy to other countries. This is an example where the changes in asset prices more than offset the negative Keynesian demand effects for each year.

Figure 8a shows the importance of the timing of spending cuts for the transmission of the policy to non-oil developing countries. The temporary policy leads to a larger trade balance deficit in the developing countries because of the smaller stimulus to exports. The trade balance actually improves for the anticipated policy because exports rise by less.

Figure 6: Real Consequences in the U.S. of U.S. Deficit Reduction: Permanent versus Temporary versus Anticipated

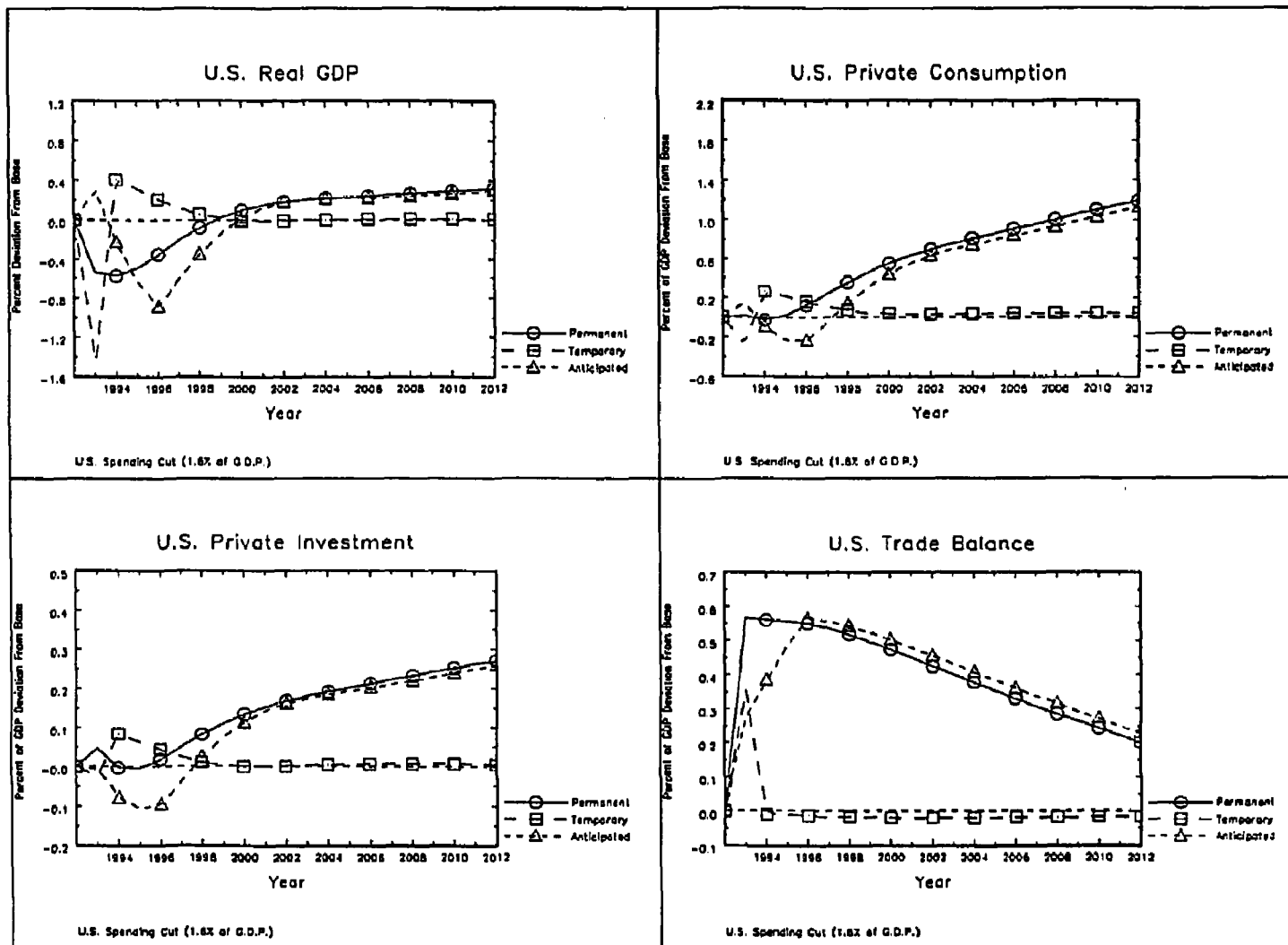


Figure 7: Financial Consequences in the U.S. of U.S. Deficit Reduction: Permanent versus Temporary versus Anticipated

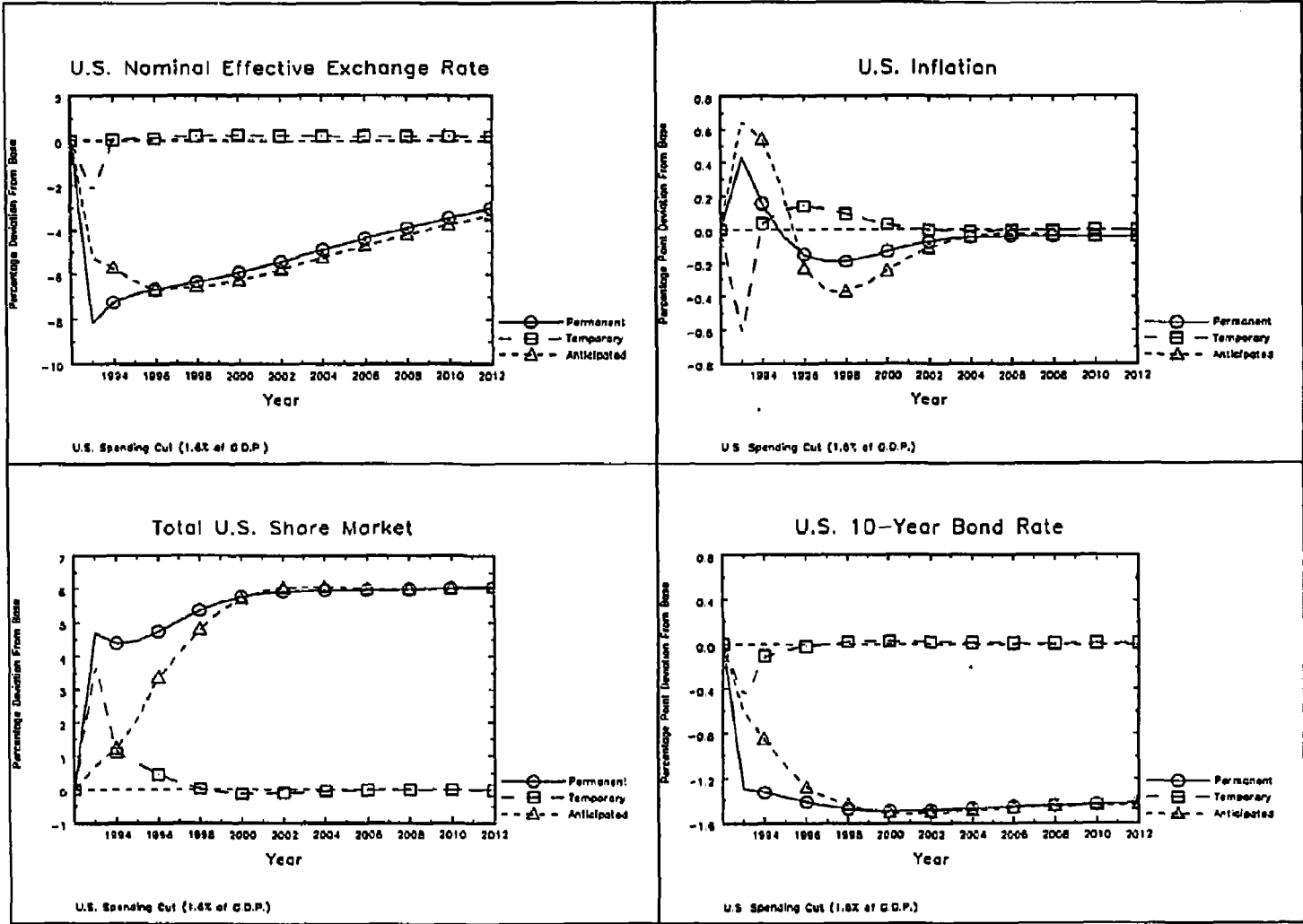


Figure 8: Transmission to the Rest of the OECD of U.S. Deficit Reduction: Permanent versus Temporary versus Anticipated

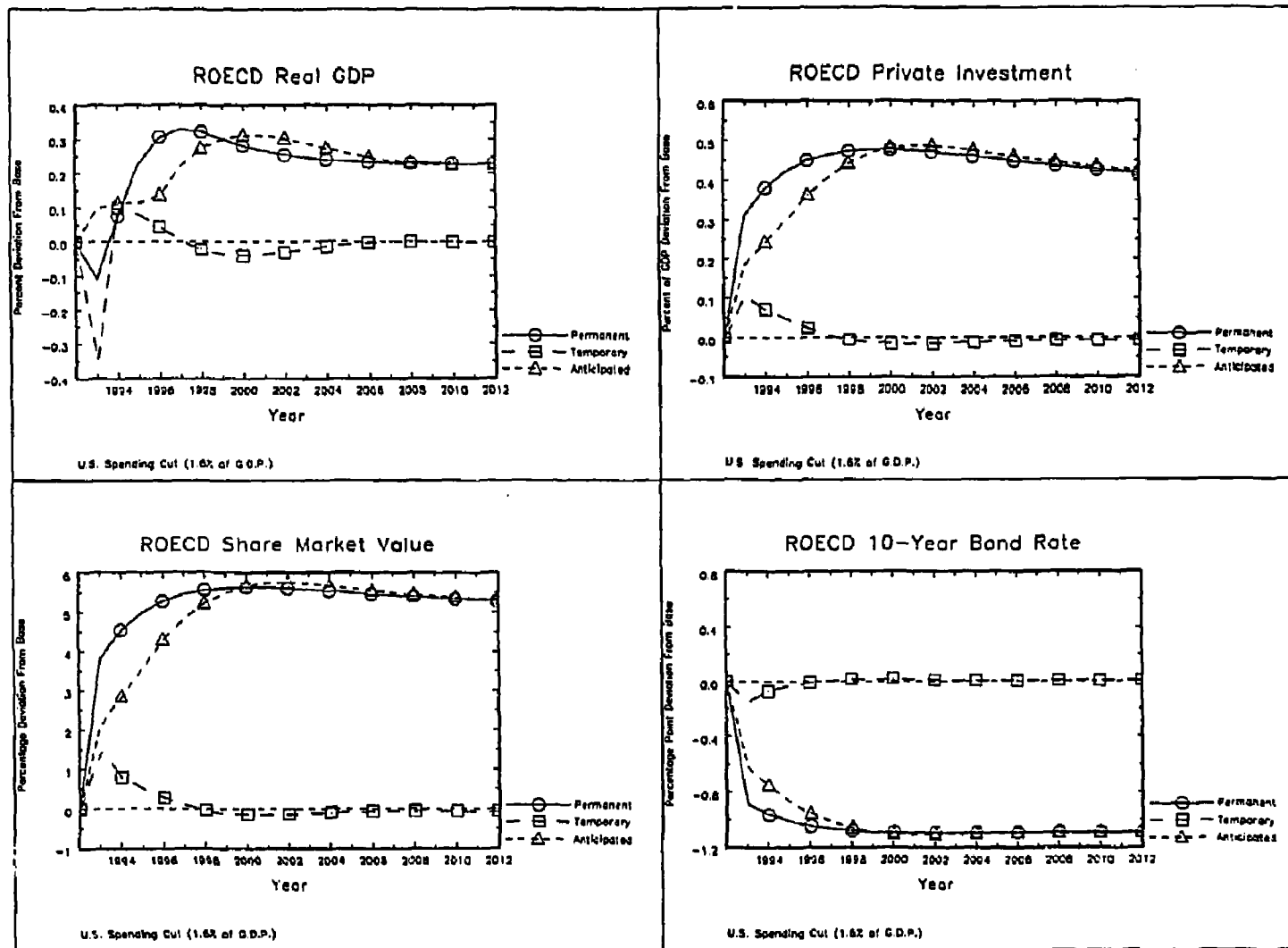
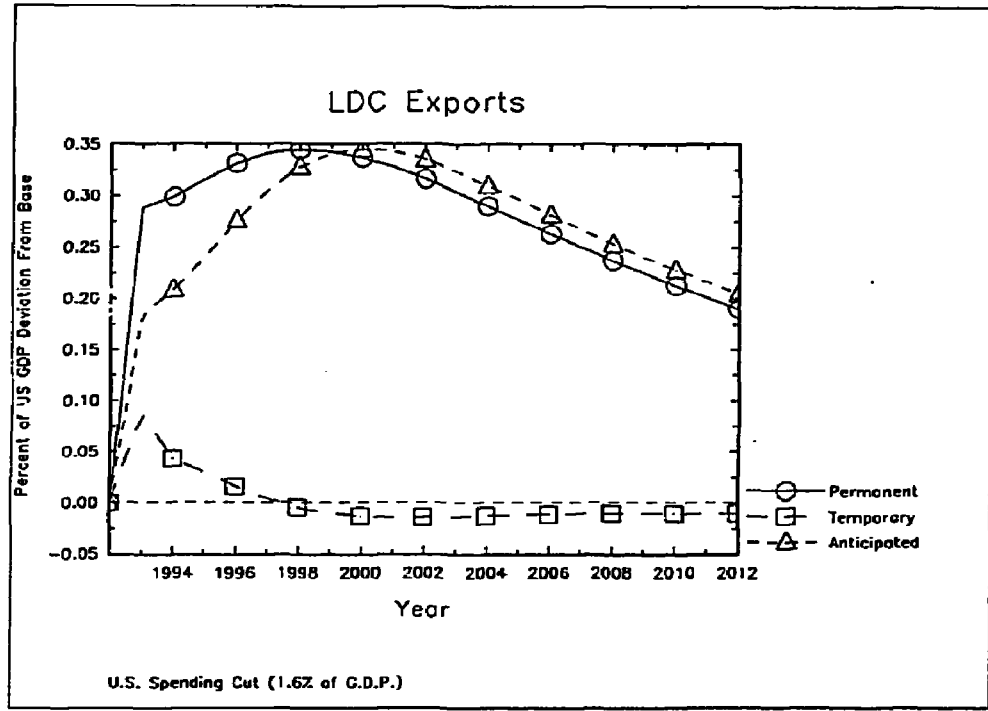
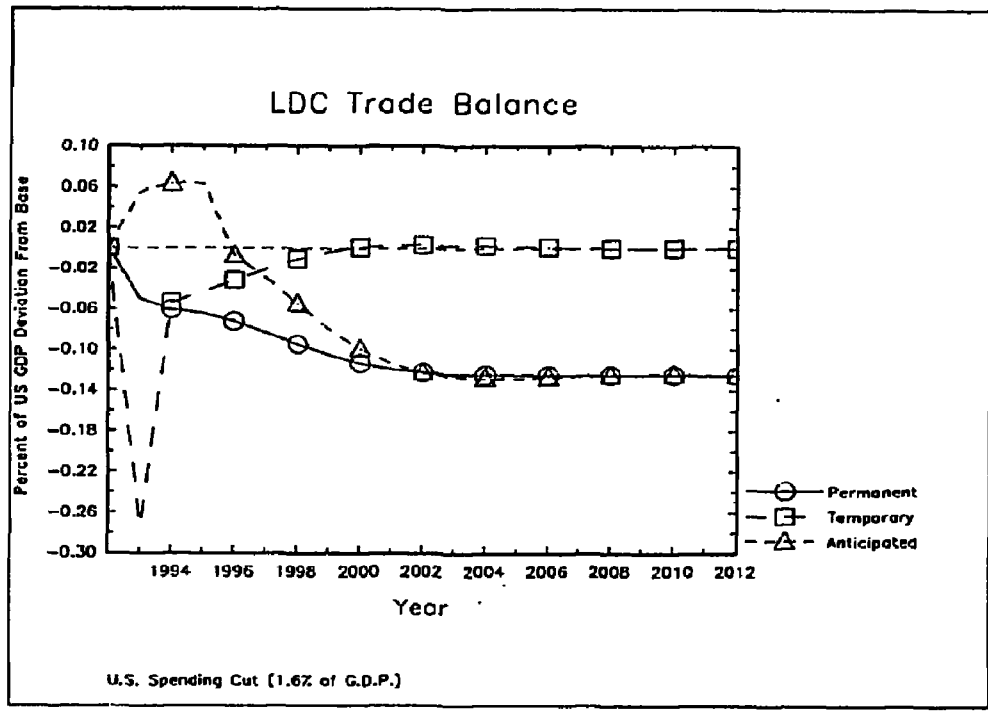


Figure 8a: Transmission to Non-Oil Developing Countries of U.S. Deficit Reduction: Permanent versus Temporary versus Anticipated



d) The Clinton Budget

This section uses the stylization of the Clinton Budget discussed above to simulate the global impacts of this particular fiscal package⁴. Figures 9 and 10 illustrate the consequences for the same range of variables as considered above. Three lines are shown on each figure. The solid line is the OBRA-93 (or Clinton budget). The dashed line is the outcome for of the Maastricht simulation. The thick dashed line is the combination of both the Clinton budget and the Maastricht scenarios. These other results will be discussed below.

Figure 9 shows that the stylized representation of the Clinton Budget reduces level of U.S. GDP relative to baseline from 1993 through 2002⁵. The growth rate (seen from the slope of the GDP line) falls from 1993 through 1997 but rises above baseline after 1997. This pattern is also reflected in the paths for private consumption and investment. This model projects a decline in the interest rate on 10 year bonds of about 120 basis points in 1993, followed by additional declines in the following years. The budget package also leads to a depreciation of the effective value of the US dollar by around 7 percent on impact. This depreciation together with the contraction of domestic demand improves the U.S. trade balance by 0.5 percent of GDP in 1993. The Clinton Budget also improves the U.S. share market by 3 percent in 1993. This is despite the fall in real GDP but is because of the rise in bond prices (or fall in real and nominal interest rates). Despite the share market rise, private investment remains weak because of lower demand acting to constrain liquidity constrained firms that invest out of retained earnings.

The transmission of the Clinton budget to other countries is a combination of the results for each individual component of spending cuts and tax increases. In figure 11, ROECD GDP falls in 1993 but is above baseline by 1994. The global fall in real interest rates stimulates non-U.S. private investment as well as non-U.S. share markets. The rise in share markets outside the U.S. is reflecting the higher expected level of future output as well as the fall in real interest rates in these economies.

The results for non-oil developing countries are shown in figure 12. The Clinton budget raise LDC exports in terms of U.S. goods and allows an increase in imports of developing countries through relaxing the balance of payments constraint through lower real interest rates. These results follow directly from the discussion of the individual components discussed above.

e) The Fiscal Implications of the Maastricht Agreement

In addition to showing the results for the Clinton budget, figures 9 through 12 contain results for the Maastricht agreement. When interpreting these results, some care should be exercised. The results assume that in 1993 there is a new understanding that fiscal consolidation in Europe will occur from 1993 through 1997. In fact, the Maastricht Agreement has been a significant issue since 1991. Some of the results, especially those for asset markets will not line up with the actual experience from 1993 because presumably some of the asset price story will have already occurred before the starting

⁴ See McKibbin and Bagnoli (1993) for detailed analysis of the impacts of the budget that was originally presented to Congress in early 1993.

⁵ In McKibbin and Bagnoli (1993) as in Clark and Symansky (1993), the Clinton budget that was proposed in February actually raised GDP in the early years because of a greater initial rise in spending as well as the introduction of an investment tax credit that are absent from the package of measures that passed Congress.

Figure 9: Real Consequences in the U.S. of Clinton Deficit Reduction Program and Maastricht Agreement

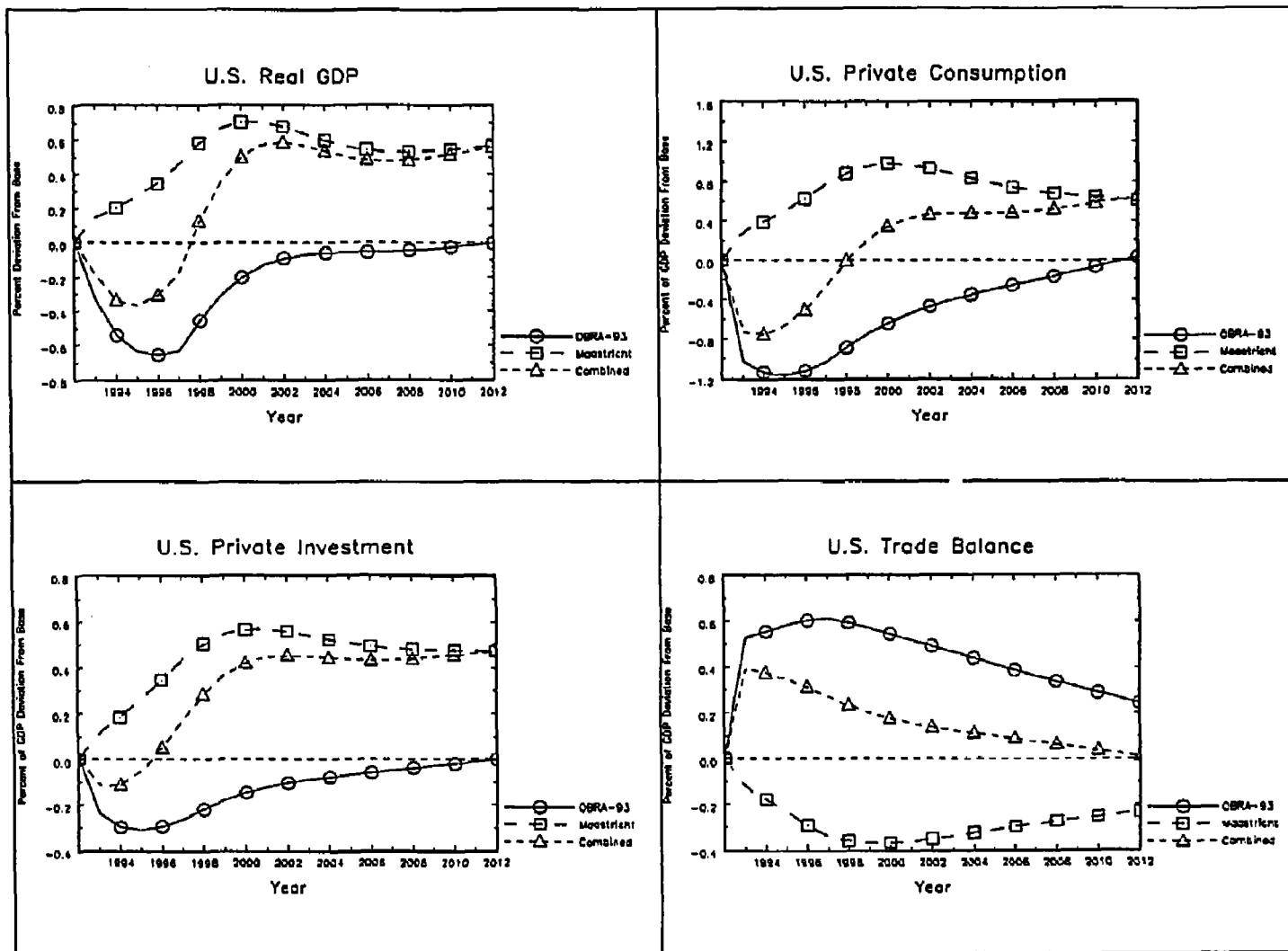


Figure 10: Financial Consequences in the U.S. of Clinton Deficit Reduction Program and Maastricht Agreement

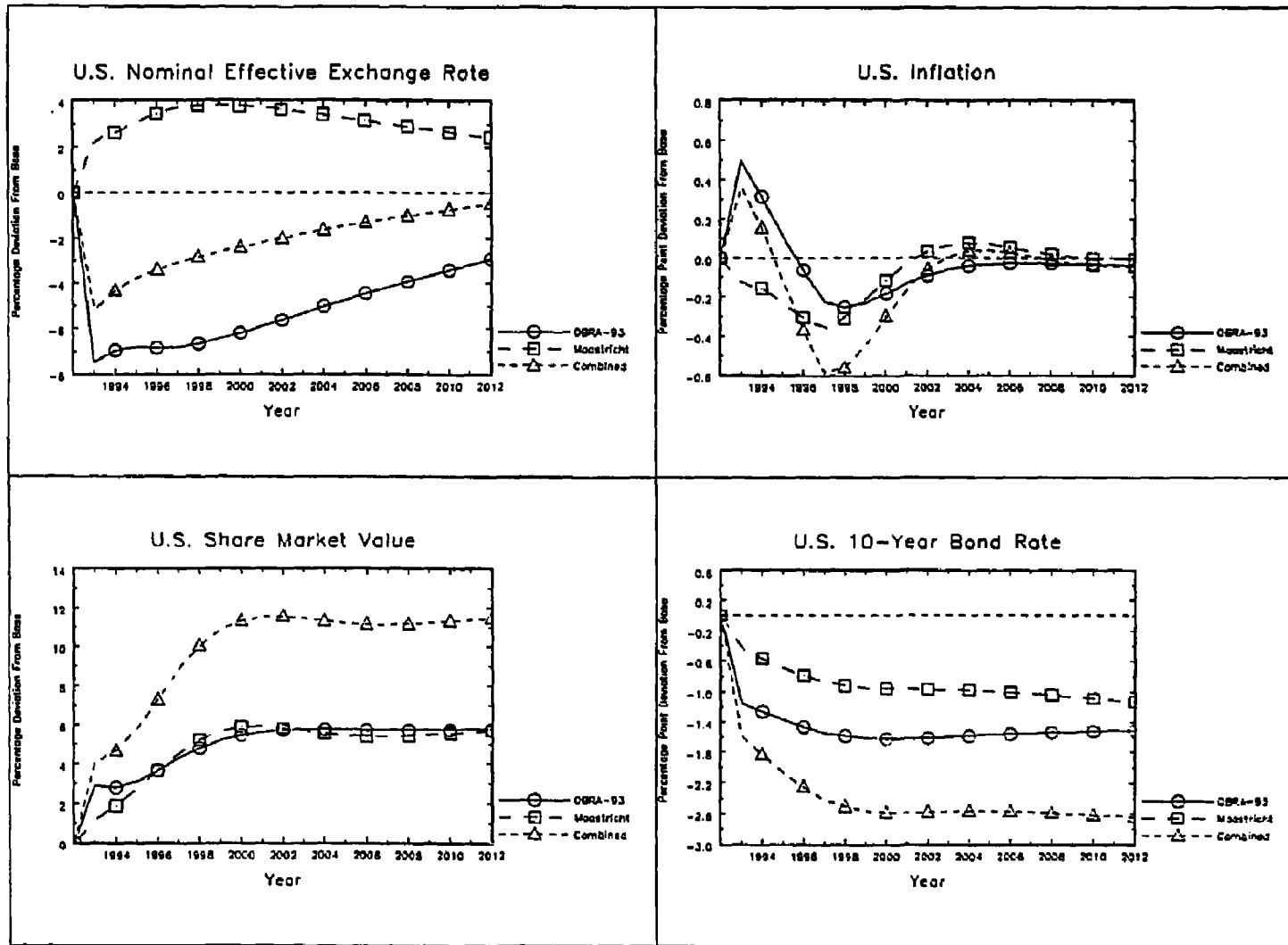
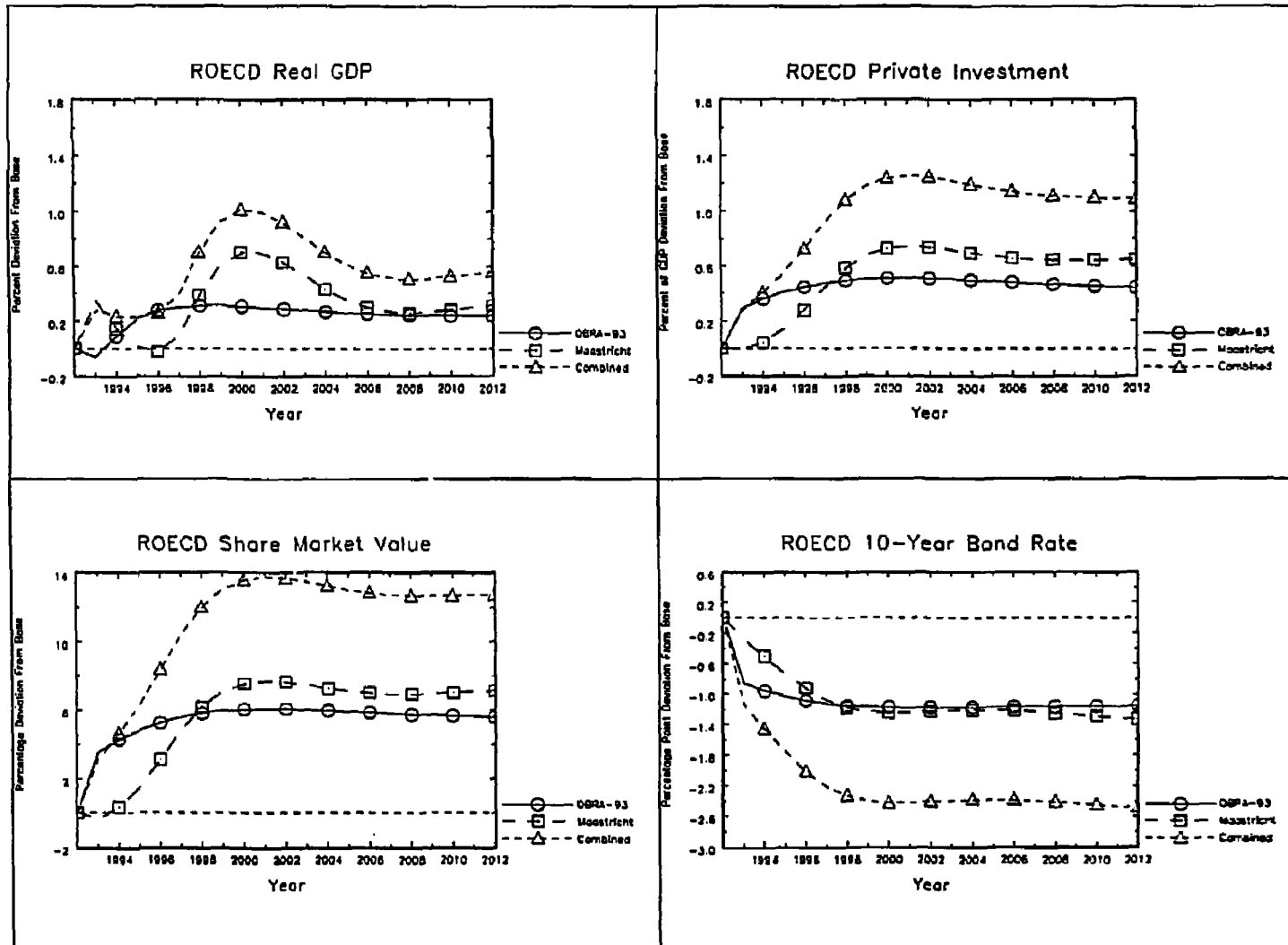


Figure 11: Transmission to the Rest of the OECD of Clinton Deficit Reduction Program and Maastricht Agreement



period of the simulation. It is probably better to interpret these results in terms of average outcomes from 1991 through to 2012. Nonetheless it is instructive to treat the fiscal implications of Maastricht as a surprise given that few of the countries have actually begun to undertake the required adjustments necessary to achieve these targets.

It is clear from figure 9 that the fiscal consolidation in Europe is positive for the United States. Real GDP in the United States rises in 1993 and continues to rise over the period. This reflects a rise in private investment and consumption and occurs despite a deterioration in the trade balance that occurs due to dollar appreciation. The U.S. share market is also stimulated through the same channel of lower interest rates and higher expected output as we described previously.

In figure 11 it is clear that the results for the ROECD differ from those for the U.S. This reflects the much closer trade ties between the European countries in the EMS and many of the ROECD economies. The slowdown in European demand has a bigger negative effect on these other countries. The consequence for real GDP in each of the main EMS members is shown in figure 13. Some countries, notably Italy experience a significant fall in real GDP. The extent of the contraction in GDP depends on the severity of the fiscal contraction. In addition, because trade is more highly integrated in Europe, the contraction tends to slow growth in each country. A third point which is important is the assumption that each country remains pegged within a small band to the deutschmark. Since we assume no fiscal contraction in Germany, those countries that undertake a fiscal contraction tend to experience a weakening of their currencies relative to the Deutschmark. They are then forced to raise interest rates to defend the peg. This adjustment reduces output further in these economies.

In figure 12 it is clear that in contrast to the Clinton package, exports fall as a result of the fiscal contraction in Europe. This reflects the appreciation of the LDC exchange rates in European markets as a result of the assumption that these economies peg to the US dollar. The appreciation of the dollar relative to the European economies has an additional problem for the non-oil developing economies. The fall in global interest rates as a result of the fiscal contraction is insufficient to offset the short term constraint that debt is assumed to be primarily denominated in \$US. As the dollar appreciates in real terms the developing economies the value of external debt rises.

The combined outcome of both the U.S. deficit reduction program and the Maastricht agreement are shown in figures 9 through 12. It is clear from these results that gradually contracting together is better for the U.S. and Europe than either going alone. The main effect is through lower real interest rates which relies on the credibility of the two programs.

4. The Empirical Robustness of the Main Channels

Thus far, the paper has focussed on the results from one particular model. This has been done with the purpose of highlighting the main channels of transmission within the economy and throughout the global economy, of changes in fiscal policy in the U.S. and Europe. In addition this provides some evidence on the likely magnitude of affects.

There are a number of important determinants of the results above. The first is the link between the contraction in government demand and the contraction in aggregate demand. This channel is unambiguously negative (in the sense that a reduction in government demand tends to lower

Figure 12: Transmission to Non-Oil Developing Countries of Clinton Deficit Reduction Program and Maastricht Agreement

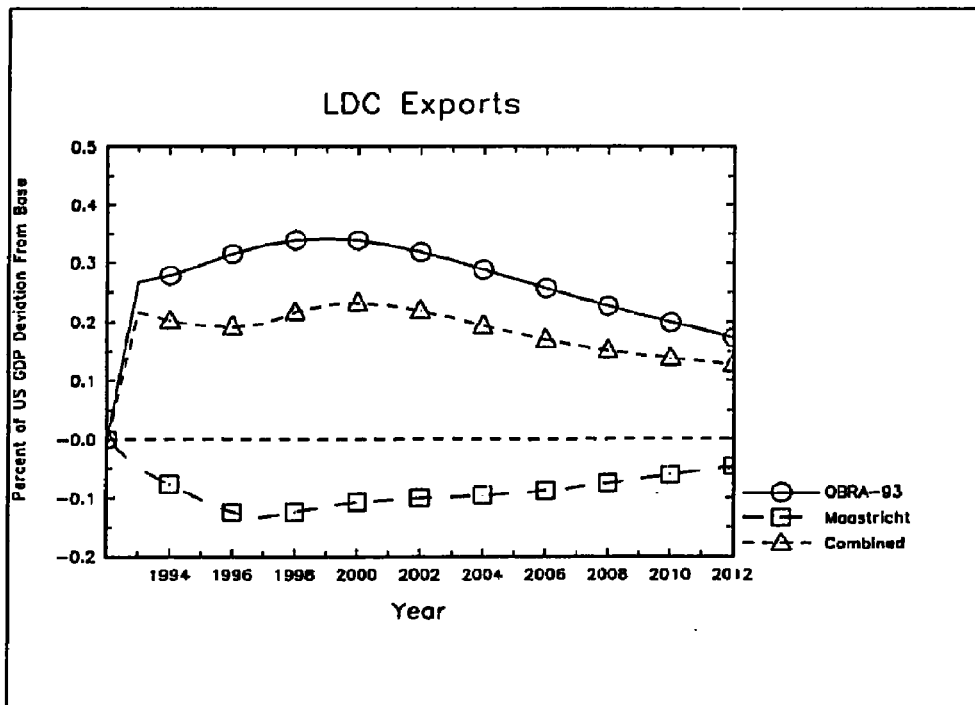
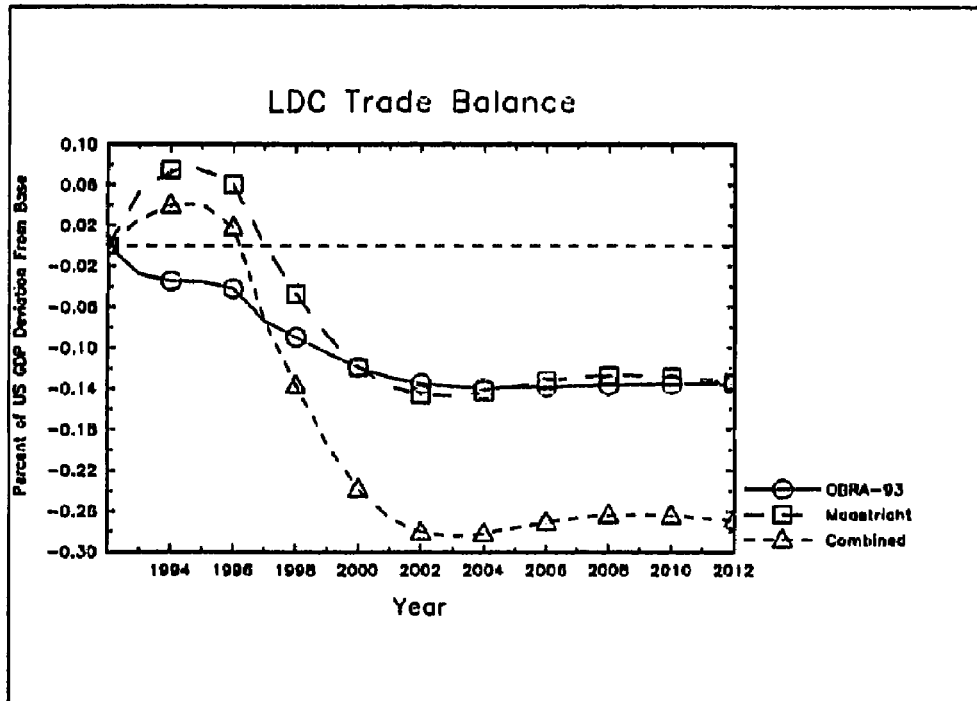
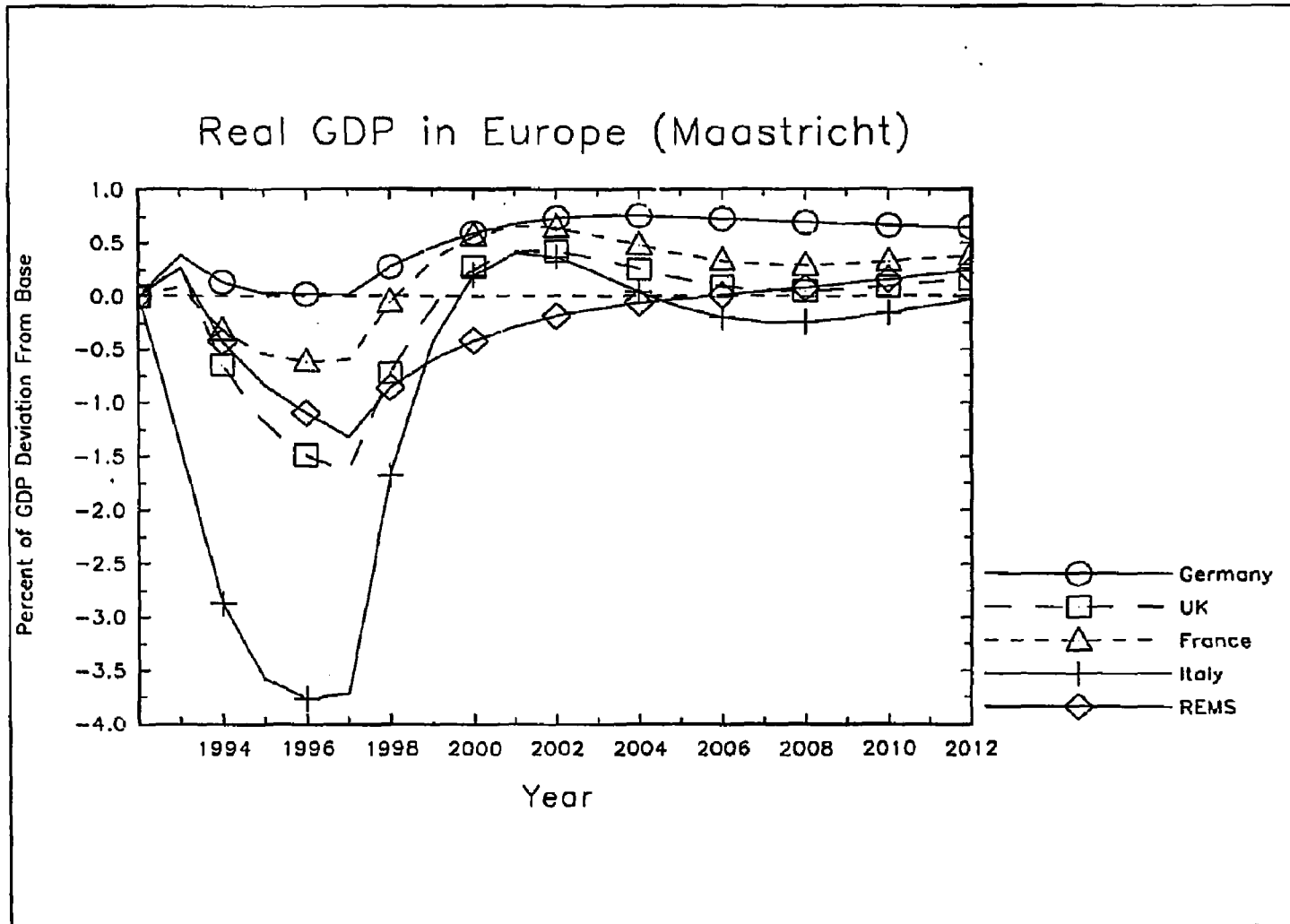


Figure 13: Consequences of Maastricht Fiscal Contraction for European GDP



aggregate demand) for the contracting economy as well as being negative for the foreign economy for unchanged prices. Where the ambiguities arise are through the changes in goods and asset prices. The important link is between the change in the fiscal deficit and the change in interest rates, the change in interest rates and the change in real activity, and the change in interest rates which affects exchange rates and through that channel, net exports.

In terms of the transmission of the fiscal contraction to other countries, the key channels are through the extent of trade between the two economies as well as the degree of capital mobility (as well as the assumption about input price changes as is familiar from early results in the Mundell-Fleming Model under alternative wage assumptions (see Bruno and Sachs (1979)). For example, as U.S. demand contracts, this reduces imports from other economies which is a negative demand shock for those economies. This is then offset through lower real interest rates if private capital flows into those economies.

There is a large literature on the links between changes in fiscal deficits and change in interest rates. In theory, the link between deficits and interest rates depends on whether the deficit change is due to a change in taxes or a change in spending on goods and services. In a Ricardian world (see Barro (1972)) there is no link between interest rates and deficits caused by a change in taxes. The deficit is internalized by consumers, and thus total saving and total investment does not change as taxes change. When government spending changes, even in a Ricardian model there can be changes in interest rates during the transition to a new steady state (see Zhang(1993)). A number of tests of the Ricardian equivalence proposition tend to reject it (see for example Bernheim (1987)) although even this is not consensus (see Seater(1993)). The failure of the extreme form of Ricardian equivalence indirectly provides empirical support for the link between deficits and interest rates.

More direct tests tend to be less clear. Evans (1985,1987) and Barro (1989) found little evidence of the link between fiscal deficits and interest rates. A comprehensive survey of the evidence can be found in Barth et al (1989). These latter authors amongst others note the many problems that arise in undertaking the empirical testing including the problem of calculating real interest rates and the appropriate concept of fiscal deficit to use in regressions. In a recent study, using data on 13 OECD countries Tanzi and Lutz (1991) found strong positive correlation between government debt and long term interest rates. The evidence for fiscal deficits was less clear but the results for the link between government debt and interest rates appeared robust across a range of tests.

The link between interest rates and real activity is also open to some debate. The direct link in the model simulation results presented above are via private investment. The empirical links between interest rate and investment are mixed. In an early survey Jorgensen (1971) found a link between the two via the cost of capital. However more recent surveys by Clark (1979) and Chirinko (1991) find the cost of capital to be relatively insignificant determinant of private investment. These studies of the link between the cost of capital and investment all suffer from the problem of measuring the relevant variables. For example, problems of calculating expected inflation for calculating real interest rates as well as problems of capturing tax effects are large. Other empirical studies that have couched the impact of interest rates through Tobin's Q have also met with little success. Even these studies have floundered on the problem of relating the available data to the relevant economic concept. The one area where the empirical evidence of investment is giving positive results is in the cash flow theory of investment. A number of recent authors have found empirical support at the macroeconomic and individual firm level that the availability of funds within the firm is an empirically important determinant of investment (see for example Fazzari (1993), Fazzari, Hubbard and Petersen (1988)) .

In the MSG2 model private investment is partly determined by Tobin's Q and partly by current firm profitability. Lower real interest rates raise Tobin's Q but also increase the cash flow of firms and this is an important determinant of the changes in investment in the model. The interest rates reduction from deficit reduction acts both through the cost of capital channels as well as through the liquidity constraint channel.

The final important channel for the positive effects of a unilateral change in fiscal policy is via the exchange rate. As interest rates fall, the exchange rate of the country undergoing the fiscal consolidation depreciates in response to the outflow of private capital. The evidence on the links between interest rates and exchange rates is also mixed. In a recent study, Bosworth (1993) surveys the literature on this link and presents empirical support for this link as well as the link between exchange rate changes and changes in net exports.

Evidence from Large Scale Models

The results from the MSG2 model have been analyzed in depth. Results from other multi-country models tend to support the results presented above in the following sense. In Bryant et al (1986) a number of models performed standardized simulations of a fiscal expansion which was permanent and unanticipated. In that study, the fiscal expansion uniformly raised real GDP in the country undergoing the fiscal stimulus and also raised GDP in foreign economies. The fiscal expansion also increased interest rates in all models. In a more recent model comparison project summarized in Bryant and McKibbin (1994), the positive fiscal multiplier is again found across all models although the size of the multiplier is lower than in the earlier model comparisons, primarily because of greater changes in real interest rates and exchange rates in the models compared in the updated study.

The issue of the impact of phased-in fiscal contractions is less clear. In models such as Project Link, DRI, GEM⁶ etc, even a phased in fiscal contraction is contractionary for output. However these models have limited role for changes in asset prices and/or do not have forward looking asset prices. The other multi-country model that has extensively analyzed phased in fiscal contractions is the MULTIMOD model at the IMF. In a recent study of the Clinton program, the results have been similar to those for the MSG2 model. In Clark and Symansky (1993) for example, the Clinton budget program raises GDP in 1993, reduces GDP in the years from 1994 through 1997 but then lead to GDP above baseline from 1998. It should be noted that the initial raise in GDP is due to a small fiscal stimulus that was included in the originally proposed budget. When only a phased -in fiscal contraction is considered, GDP falls for a number of years being rising in the long run. In MULTIMOD, a rise in private investment and net exports both significantly dampen the fall in GDP. The mechanism is the same as that found in the MSG2 model. The fiscal contraction in the U.S. does not lower real GDP of industrial economies but does initially lower real GDP of developing countries in that study.

5. Conclusion

This paper has presented results for the impact of fiscal consolidation in the United States and Europe. It is shown that a credible reduction of fiscal deficits that is phased-in need not reduce aggregate demand in the short term. Over time as spending is cut or taxes raised, there is a negative

⁶ See Allen and Vines (1993) for results from the GEM model.

impact on aggregate demand. In the long run output is above baseline due to higher aggregate saving. Although the intertemporal consequences working through expectations are important for this result, the key effect is on the consequence of lower interest rates on the return to investment but also on the cash flow of firms which stimulates private investment. A number of different scenarios for deficit reduction including spending cuts, and corporate or household income tax increases are presented. In addition the important difference between temporary, permanent and anticipated policies is illustrated. From these results it is difficult to see how simple reduced form econometric studies of the relationship between deficit reduction and interest rates could provide robust results. Indeed the empirical literature on the key parts of the transmission mechanism is mixed.

The consequence of fiscal consolidation in the United States and Europe on other OECD economies and on developing countries are quite different. For countries with open capital markets, the transmission of the OECD fiscal contractions are positive as long as the United States and Europe are not large trading partners for these economies. For other countries that are debt constrained, the significant fall in real interest rates is likely to raise growth in these economies either directly through private capital inflows or indirectly by relaxing the balance of payments constraint, allowing more resources to be channeled to domestic investment needs.

References

- Allen C. and D. Vines (1993) "Should Clinton Cut the Deficit or is There a Global Paradox of Thrift" in D. Currie and D. Vines (eds) (1994) *North-South Linkages and International Macroeconomic Policy*, CEPR and Cambridge University Press (forthcoming)
- Barro R. (1989) "The Stock Market and Investment"
- Barro R. and X. Sala i Martin (1990) "World Real Interest Rates" NBER Working Paper 3317, National Bureau of Economic Research, Cambridge, MA.
- Barth J, G. Iden, F. Russek and M. Wohar (1989) "Effects of Federal Deficits on Interest Rates and the Composition of Domestic Output", mimeo, Congressional Budget Office.
- Bernheim B. Douglas (1987) "Ricardian Equivalence: An Evaluation of Theory and Evidence" in Fischer (ed) (1987) *Macroeconomics Annual*, NBER, Cambridge MA.
- Bosworth B. (1993) *Savings and Investment in a Global Economy*, Brookings Institution, Washington, D.C.
- Bryant, R., Henderson D., Holtham, G., Hooper, P. and S. Symansky (eds) (1988) *Empirical Macroeconomics for Open Economies*. Brookings Institution, Washington, D.C.
- Bryant R.C. and W.J. McKibbin (1994) "The Implications of Shocks in the OECD: A Comparison of Results from Multi-Country Models" in D. Currie and D. Vines (eds) (1994) *North-South Linkages and International Macroeconomic Policy*, CEPR and Cambridge University Press (forthcoming)
- Bryant R., Hooper P., and C. Mann (eds) (1993) *Evaluating Policy Regimes: New Research in Empirical Macroeconomics* (Washington: The Brookings Institution)
- Campbell J. And N.G. Mankiw (1987) "Permanent Income, Current Income and Consumption" NBER Working Paper 2436.
- Chirinko R. (1991) "Business Fixed Investment Spending: A Critical Survey of Modeling Strategies, Empirical Results and Policy Implications" Federal Reserve Bank of Kansas City.
- Clark P. (1979) "Investment in the 1970s: Theory, Performance and Prediction" *Brookings Papers on Economic Activity*, 1:1979, pp73-113
- Clark P. and S. Symansky (1993) "An Analysis of the Effects of U.S. Fiscal Consolidation Using MULTIMOD", Paper prepared for the Project LINK Meeting in New York.
- Congressional Budget Office (1993) *The Economic and Budget Outlook: An Update*, September.
- Dornbusch R. (1976) "Expectations and Exchange Rate Dynamics" *Journal of Political Economy* 84, pp 1161-76.

- Evans P. (1985) "Do Large Deficits Produce High Interest Rates?" *American Economic Review* March, vol 75, no 1, pp68-87.
- Evans P. (1987) "Do Budget Deficits Raise Nominal Interest Rates? Evidence from Six Countries" *Journal of Monetary Economics*, vol. 20 no. 2, pp281-300.
- Fazzari S. (1993) "Investment and U.S. Fiscal Policy in the 1990s" Economic Policy Institute Briefing Paper, Washington D.C.
- Fazzari, S. R. Glenn Hubbard, and B. Petersen (1988) Financing Constraints and Corporate Investment", *Brookings Papers of Economic Activity* 1:1988, pp141-195.
- Ford R. and P. Poret (1990) "Business Investment in the OECD Economies: Recent Performance and Some Implications for Policy" OECD Working Paper #88.
- Giovannini A. and W. McKibbin (1992) "The Economic Implications of Maastricht" mimeo The Brookings Institution, June.
- Hayashi, F. (1982a) "Tobins Marginal q and Average q: A Neoclassical Interpretation." *Econometrica* 50, pp.213-224.
- Hayashi, F. (1982b) "The Permanent Income Hypothesis: Estimation and Testing by Instrumental Variables. *Journal of Political Economy* 90(4) pp 895-916.
- International Monetary Fund (1992) *World Economic Outlook*, May. International Monetary Fund, Washington D.C.
- International Monetary Fund (1993) *World Economic Outlook*, May. International Monetary Fund, Washington D.C.
- Jorgenson D. (1971) Econometric Studies of Investment Behavior: A survey" *Journal of Economic Literature*, vol 53, pp1111-1147.
- Lucas, R. E.(1967) "Adjustment Costs and the Theory of Supply." *Journal of Political Economy* 75(4), pp.321-334
- Lucas, R. E. (1973) "Econometric Policy Evaluation: A Critique" *Carnegie Rochester Series on Public Policy*, vol 1, pp19-46.
- McKibbin W. (1993) *The MSG Multi-Country Model: European version (#36)*, Computer Manual, McKibbin Software Group Inc, Arlington VA.
- McKibbin W. and P. Bagnoli (1993) "Fiscal Deficit Reduction: An Evaluation of Alternatives", Brookings Discussion Paper in International Economics #101, July.
- McKibbin W.J. and J. Sachs (1991) *Global Linkages: Macroeconomic Interdependence and Cooperation in the World Economy*, Brookings Institution, June.

McKibbin W. and P. Wilcoxon (1993) "The Global Costs of Policies to Reduce greenhouse Gas Emissions" progress report to the U.S. Environmental Protection Agency on Grant # CR818579-01-0.

Masson P., S. Symansky, R. Haas and M. Dooley (1988) "Multimod - A Multi-region Econometric Model" Part II, IMF Staff Studies for the World Economic Outlook, July.

Seater J. (1993) "Ricardian Equivalence" *Journal of Economic Literature*, vol XXXI, no I pp142-190.

Tanzi V. and M. Lutz (1991) Interest Rates and Government Debt: Are the Linkages Global Rather than National?" IMF Working Paper 91/6, International Monetary Fund, Washington D.C.

Treadway, A. (1969) "On Rational Entrepreneurial Behavior and the Demand for Investment." *Review of Economic Studies* 36(106), pp.227-239.

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