An analysis of fiscal policy in the Federal Reserve Board's global model

David Bowman and John H. Rogers[1]

Introduction

The march toward European Monetary Union (EMU) following the Maastricht accord has put the issue of budget deficit reduction and government debt levels on the front-burner of policymaking in 1997. The outlook on the fiscal front presents several challenges to monetary policy. Because of the lags associated with changing monetary policy instruments, it is incumbent upon the monetary authorities to be forward-looking, especially with regard to gauging the effects of impending fiscal policy developments.

The purpose of this paper is to evaluate the effects of fiscal policy from the perspective of a large-scale, multi-country simulation model. We consider three main issues: achieving budget balance through *spending cuts versus tax increases*; permanently reducing the *target debt-to-GDP ratio*; and *imperfect credibility* of announced fiscal policies;. We also consider the effects of two alternative monetary policy rules for a particular fiscal shock. Finally, we examine a fiscal policy scenario that is motivated by impending future developments, in particular actions to keep debt and deficit levels at or below those required for participation in EMU.

Recent changes in the design of the Federal Reserve Board's global model make it particularly well-suited for the task at hand. Such changes include the explicit incorporation of intertemporal budget constraints for the government and external sectors, and the forward-looking behavior of several important variables.

All simulations reported in this paper were carried out using the joint FRB/US-FRB/MCM model. Section 1 describes the general features of the models, focusing on the FRB/MCM model which is a more integral part of our analysis. The simulations and their results are described in detail in Section 2.

1. General features of the model

1.1 FRB/MCM[2]

The FRB/MCM is a dynamic global economic model, comprised of twelve country/regional sectors with a total of nearly 1,400 equations. Each of the G-7 economies (Canada, France, Germany, Italy, Japan, the United Kingdom and the United States) is represented by about 35 behavioral equations and 100 accounting identities. The specification of these equations is fairly similar for all seven countries; the differences are mainly with respect to the estimated regression

---

1 The authors are economists with the Division of International Finance of the Board of Governors of the Federal Reserve System, and wish to thank Andrew Levin and Ralph Tryon for useful suggestions, and Asim Husain for invaluable research assistance. The views expressed in this paper are those of the authors and should not be interpreted as representing the views of the Federal Reserve Board of Governors or other members of its staff.

2 The material in this section is taken from Levin (1996).

coefficients and bilateral trade weights. Three sectors – Mexico, the newly industrializing economies (NIEs), and other OECD economies (ROECD) – are modelled on a more aggregated and stylized basis, with about 20 behavioral equations and 75 accounting identities each. Finally, a total of about 45 equations are used to represent the behavior of OPEC members and of other developing and transition economies (ROW).

1.1.1 Long-run stability and dynamic adjustment

The FRB/MCM is designed to exhibit long-run stability and balanced growth, similar to that of a standard neoclassical growth model. Each consumption equation incorporates error-correction mechanisms to ensure that the level of consumption (in natural logarithms) is cointegrated with disposable income and the real interest rate. Hence, conditional on the long-term real interest rate, the savings rate is stationary (perhaps around exogenous trends related to demographics or other factors). Similarly, imports are cointegrated with domestic absorption and the real exchange rate, while exports are cointegrated with foreign absorption and the real exchange rate.

The long-run stability of the FRB/MCM is also facilitated by explicitly incorporating stock-flow relationships for physical capital and present-discounted-value constraints for government and net external debt. Thus, private investment exhibits short-run accelerator-type effects in response to output fluctuations. In the longer run, however, the investment rate adjusts to equate the marginal product of capital to its real rate of return. This adjustment effectively serves as an error-correction mechanism, ensuring that the level of investment and the capital stock are each cointegrated with gross output and with the long-term real interest rate (net of depreciation).

An important feature of the model for the purposes of our paper is long-run fiscal solvency. This is maintained by an endogenous tax rate reaction function, which adjusts the income or sales tax rate when the nominal government debt/GDP ratio deviates from a specified target. In the FRB/MCM, government expenditures and tax revenues are subject to cyclical movements as well as exogenous shocks. Since budget deficit fluctuations affect the stock of debt and hence subsequent interest payments, the tax rate adjustment must be sufficiently large to prevent an explosive path of government debt. Thus, given an appropriate specification of the tax rate reaction function, the model ensures that the stock of government debt is cointegrated (in natural logarithms) with nominal GDP.

Finally, changes in the net external debt/GDP ratio lead to corresponding movements in the sovereign risk premium. Thus, through uncovered interest parity, a deterioration of the current account induces an increase in the domestic real interest rate and/or a depreciation of the real exchange rate. A reasonable degree of sovereign risk premium adjustment ensures that improved net exports of goods and non-factor services will outweigh the higher net factor payments resulting from the initial increase in external debt, and thereby prevents an explosive path for the current account and net external debt.

1.1.2 Treatment of expectations

The explicit treatment of expectations has played an important role in the formulation of the FRB/MCM. In all countries/sectors except OPEC and ROW, expected values of future variables directly influence the determination of interest rates, consumption and investment expenditures, the aggregate wage rate, and the nominal exchange rate. First, the long-term nominal interest rate and long-term expected inflation rate are each determined as geometric weighted averages of future short rates. Secondly, consumption, residential investment and business fixed investment each depend on the *ex ante* long-term real interest rate (the long-term nominal interest rate less expected inflation), while business and petroleum inventory investment each depend on the *ex ante* short-term real interest rate. Thirdly, the aggregate nominal wage rate is defined in terms of the current and past values of overlapping four-quarter wage contracts, where each wage contract depends on expected future aggregate wages and expected deviations of unemployment from its natural rate. Finally, each bilateral nominal exchange rate (local currency/US$) is determined by uncovered interest parity; i.e.

the expected rate of depreciation depends on the current bilateral interest rate differential, adjusted by the endogenously determined sovereign risk premium described above.

The FRB/MCM can be simulated under two alternative assumptions about expectations formation: VAR-based expectations (referred to as backward-looking or "adaptive" expectations), and model-consistent expectations (also referred to as forward-looking or "rational" expectations). Since assumptions about expectations formation can have important implications for the simulation results, it is useful to review the implementation of these assumptions in some detail.

The implementation of *adaptive expectations* formation in the FRB/MCM closely parallels the approach followed in the FRB/US quarterly model. In particular, regression equations have been estimated for each of the G-3 economies (Germany, Japan and the United States) using historical data on the output gap (i.e. the deviation of real GDP from potential), the GDP price deflator, the short-term Treasury bill rate and the average wage rate. The current output gap and the current price inflation rate are each regressed on up to eight quarters of lagged output gaps, inflation rates and interest rates; and the wage inflation rate is regressed on its own lags as well as lags of the other three variables.

For a given simulation experiment, a monetary policy rule must also be specified, in which the short-term interest rate is determined as a linear function of the current output gap and the rate of price inflation; e.g. the rule analysed by Taylor (1993). The interest rate reaction function is combined with the reduced-form output gap and price inflation equations to create a three-variable VAR model. For any forecasting horizon $N \geq 0$, the VAR model can be evaluated recursively to obtain a forecasting equation for each variable, in which the N-step-ahead forecast is expressed in terms of the current and lagged values of all three variables. An algorithm developed by David Bowman is used to compute the geometric weighted average of these forecasts over all horizons, yielding reduced-form equations for the long-term nominal interest rate and long-term expected inflation in terms of the current and lagged values of the output gap, the inflation rate and the short-term interest rate.

In each period of a dynamic simulation, current and lagged variables are used to evaluate each reduced-form equation and obtain new expectations of future variables. For example, the reduced-form price inflation equation is used to determine short-term expected inflation, which is needed to calculate the *ex ante* short-term real interest rate for each of the inventory investment equations. The reduced-form equations for the long-term interest rate and long-term expected inflation are used to calculate the *ex ante* long-term real interest rate, which enters the consumption, fixed investment and uncovered interest parity equations. Finally, the aggregate wage rate is determined directly from the reduced-form wage equation.

For each dynamic simulation of the FRB/MCM, *model-consistent expectations* are implemented by obtaining the perfect foresight solution path for all endogenous variables. To understand how this solution is obtained, it is useful to define the set of "expectations variables" as those endogenous variables whose expected future value enters into one or more equations in the model. The solution algorithm requires the long-run stability of all expectations variables: i.e. after a shock occurs, each expectations variable must eventually return to the baseline (or to some other known steady-state value). In this case, the baseline or steady-state values can serve as terminal conditions for the expectations variables at some date sufficiently far into the future. Thus, the perfect foresight solution algorithm determines the paths of all endogenous variables over the simulation period, using prespecified values for the terminal conditions as well as for the initial conditions and the exogenous variables.

For example, suppose that one wishes to evaluate the effects of an exogenous change in government spending over the period 1996Q1-1999Q4. If the model is reasonably stable, one might expect that all variables would return to baseline within about 25 years. Thus, the use of model-consistent expectations would typically require a dynamic simulation over the period 1996Q1-2025Q4. In this case, the required initial conditions would be the pre-1996Q1 values of all lagged variables in the model, which can be specified using historical data and/or an extrapolated baseline. The required terminal conditions would be the post-2025Q4 values of all expectations variables in the model, which would be specified based on the long-run properties of these variables.

1.1.3 Monetary policy rules

In the FRB/MCM, monetary policy is modeled using an interest rate reaction function. Many of the simulations below are run assuming that monetary policy follows the rule analysed by Taylor (1993). This rule adjusts the short-term interest rate based on deviations of inflation from its target rate and on deviations of output from potential:

Taylor's rule: $i \equiv \bar{r} + \pi^* + 1.5INFGAP + 0.5YGAP$ where *INFGAP* is defined as the deviation of current inflation from its target rate, $\pi - \pi^*$, and *YGAP* is the deviation of current GDP from potential. Taylor calculated the US federal funds rate implied by this rule and found that the implied interest rate followed a path quite similar to that of the actual federal funds rate over the period 1983-92.

If both current and expected inflation are at the target rate, and output is at potential, then Taylor's rule implies that the *ex ante* real interest rate is at the equilibrium rate, yielding steady inflation and sustainable real GDP growth. If current inflation exceeds the target rate by one percentage point, Taylor's rule prescribes a 1.5 percentage point increase in the nominal interest rate, which will typically raise the *ex ante* short-term real interest rate by about 50 basis points. (The exact increase in the *ex ante* real interest rate depends on short-term expected inflation, but this is typically quite close to the current inflation rate.) The increase in the real interest rate dampens economic activity, thereby depressing employment and placing downward pressure on wages and prices until inflation returns to its target rate.

Taylor's rule also indicates that the federal funds rate should be adjusted in response to deviations of output from potential. When economic activity is relatively weak, this component of Taylor's rule reflects the effect of an interest rate cut in stimulating economic activity. In some of the simulations that follow, we consider a variant of Taylor's rule, in which the coefficient on *YGAP* is raised to 10. This alternative prescribes a much stronger response of interest rates to a deviation of output from potential and thus, all else constant, has the effect of keeping real GDP closer to baseline.

1.2 FRB/US

The FRB/US model is described in detail in Brayton and Tinsley (1996). FRB/US is similar in spirit to an individual country sector of the FRB/MCM in terms of reliance on long-run equilibrium conditions, treatment of expectations, and modeling of dynamic adjustments. However, FRB/US, with roughly 280 equations, contains much more detail than the US model of FRB/MCM. Much of the additional detail is contained in the financial sector of the model. Bridging the FRB/US model with the foreign sectors of the FRB/MCM produces the Federal Reserve Board's global model, which is used for all simulations in this paper.

2. Simulation results

This section reports the results of four different fiscal experiments, each of which is run in the global model. We make use of both VAR-based expectations and model-consistent expectations in the various simulations. The simulations are designed to mimic several aspects of real world fiscal policy, and thereby provide some guidance for monetary policy. The simulations also highlight several new mechanisms of the FRB global model.

2.1 Government spending cuts versus tax increases

The first experiment is designed to compare the effects of a cut in government spending, arbitrarily set at 1% of GDP, to an equivalent increases in personal income taxes. So, beginning in 1997Q1, government spending is cut (or tax revenues are increased) by 1% of GDP for 7 years, after which spending (taxes) return gradually to baseline. Monetary policy is assumed to follow Taylor's rule in each country except France, whose currency is tied to the DM, and Mexico, where the currency is tied to the US dollar. The experiment is run under both VAR-based, or "adaptive", expectations and model-consistent ("rational") expectations. We are mainly interested in the magnitude of the short-run and intermediate-run effects of the shock on GDP, although we also display results for the components of GDP as well as nominal short-term and real long-term interest rates. In order to make the spending cut and tax increase scenarios as comparable as possible, we "turn off" the tax rate reaction function in the former case.

The results for Germany are depicted graphically in Figures 1a and 1b for, respectively, the adaptive and the rational expectations version. A cut in government spending directly reduces aggregate demand, and leads to a contraction of GDP that is larger on impact than a tax increase, which lowers disposable income and reduces aggregate demand indirectly through lower consumption expenditures. The monetary authority responds to the drop in real GDP by lowering short-term interest rates. The associated decline in real long rates eventually spurs investment spending and, along with the rise in net exports that is due to a drop in domestic absorption, brings GDP back to baseline. In the intermediate-run, as early as approximately six quarters after the shock, the effect on GDP is the same under either spending cuts or tax increases. Finally, a comparison of Figures 1a and 1b indicates that the results are very similar for either assumption about expectations. In both cases, (a) the peak drop in GDP is nearly twice as large for spending cuts as tax increases, and (b) the effects on GDP are the same after about six quarters.

2.2 Alternative monetary policy rules

Next we consider how the simulated effects of a particular fiscal shock may be affected by altering the monetary policy rule. We consider a permanent one percent of GDP cut in government spending as in the first simulation.[3] We focus on the rational expectations model because it best illustrates the mechanisms through which contractionary fiscal policy may have a positive effect on GDP. The potential for such an unconventional effect has recently captured a lot of attention in both academic and policy-making circles. Two alternative rules for monetary policy are considered. The first is a Taylor rule, as described above. The second rule assigns a weight of 10 to the output gap in the variant of Taylor's rule described above, while keeping the coefficient on *INFGAP* unchanged (one might loosely refer to this as a real GDP target).

The results are depicted for Germany in Figure 2. The cut in government spending has a direct negative effect on aggregate demand, and immediately moves GDP below baseline. The monetary authority responds to the output gap by lowering short rates. This response is larger under the modified Taylor rule (with a large weight on the GDP gap), as indicated by the dashed lines. Thus, as depicted at the bottom of Figure 2, nominal short rates fall by more under the real GDP rule than under the Taylor rule (almost three times as much), as do real long rates. The extra drop in long rates provides an additional boost to investment spending, props up consumption more, and hence keeps GDP closer to baseline.

---

3 In this case, however, we turn the tax rate reaction function on immediately and leave it on throughout the simulation.

Figure 1a

Government spending cuts versus tax increases (AE)

Key variables (B): Germany

Absolute (+/–) and relative (%) deviations from baseline, in percentage points

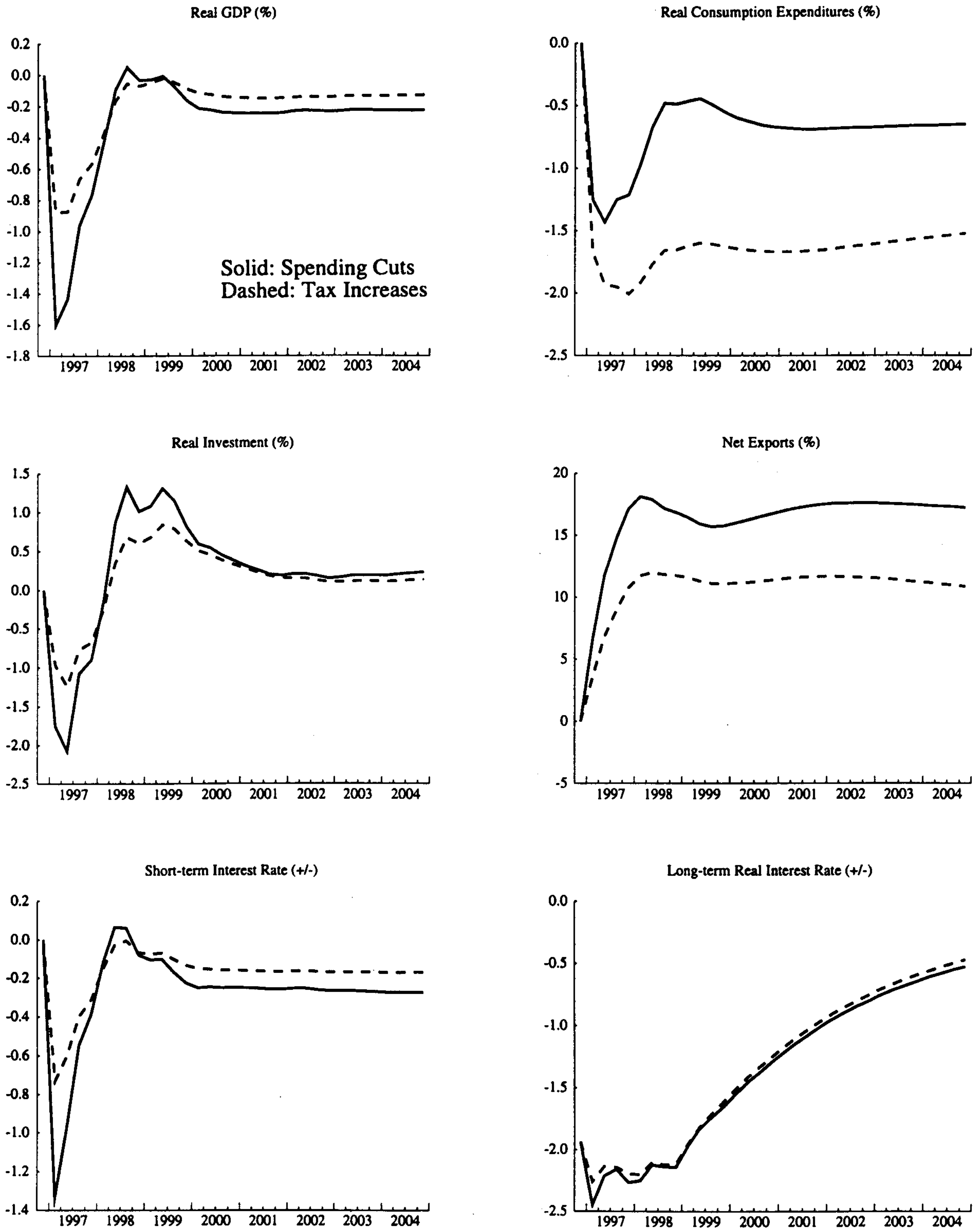


Figure 1b

Government spending cuts versus tax increases (RE)

Key variables (B): Germany

Absolute (+/–) and relative (%) deviations from baseline, in percentage points

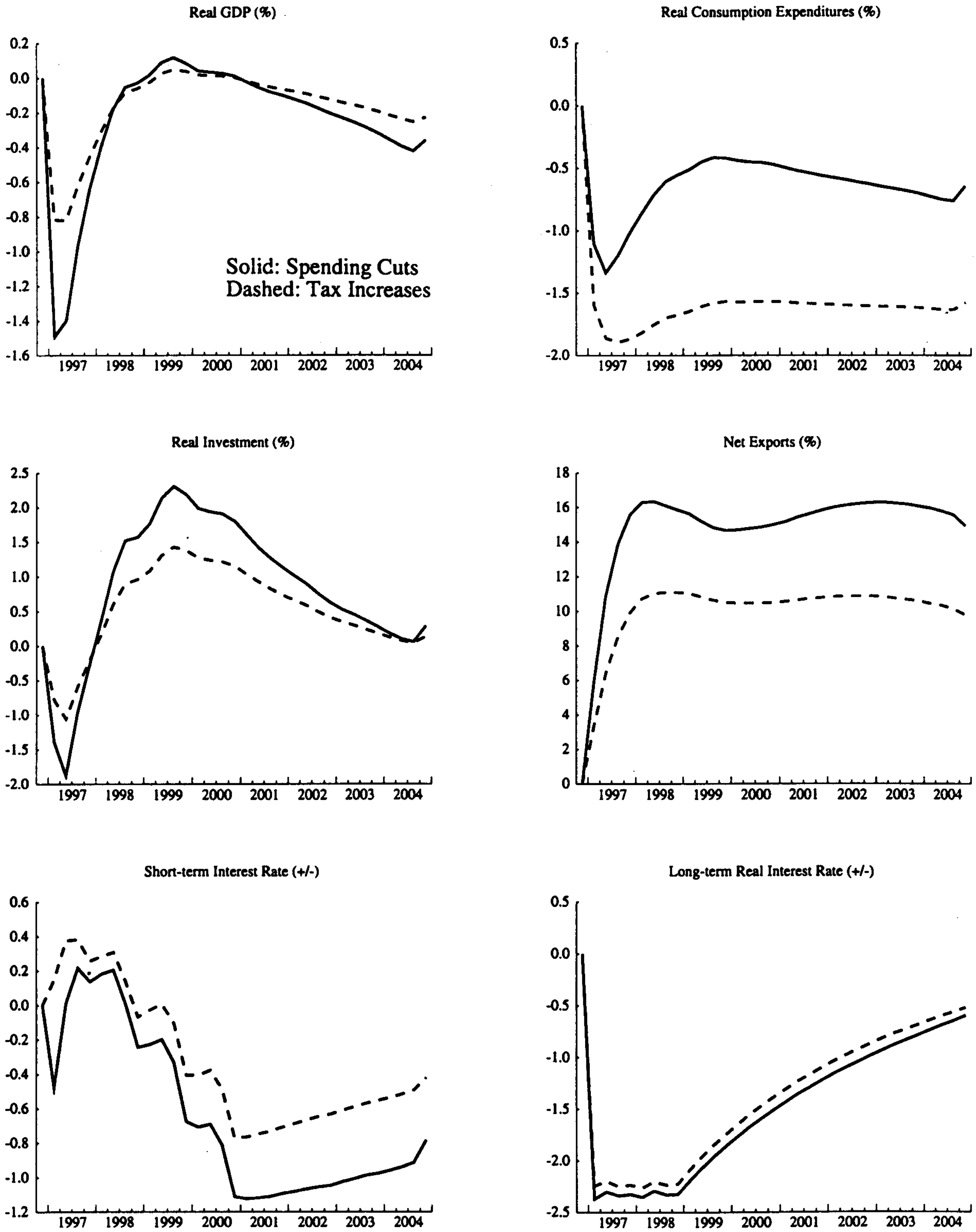


Figure 2

Comparing monetary policy rules

Key variables (B): Germany

Absolute (+/–) and relative (%) deviations from baseline, in percentage points

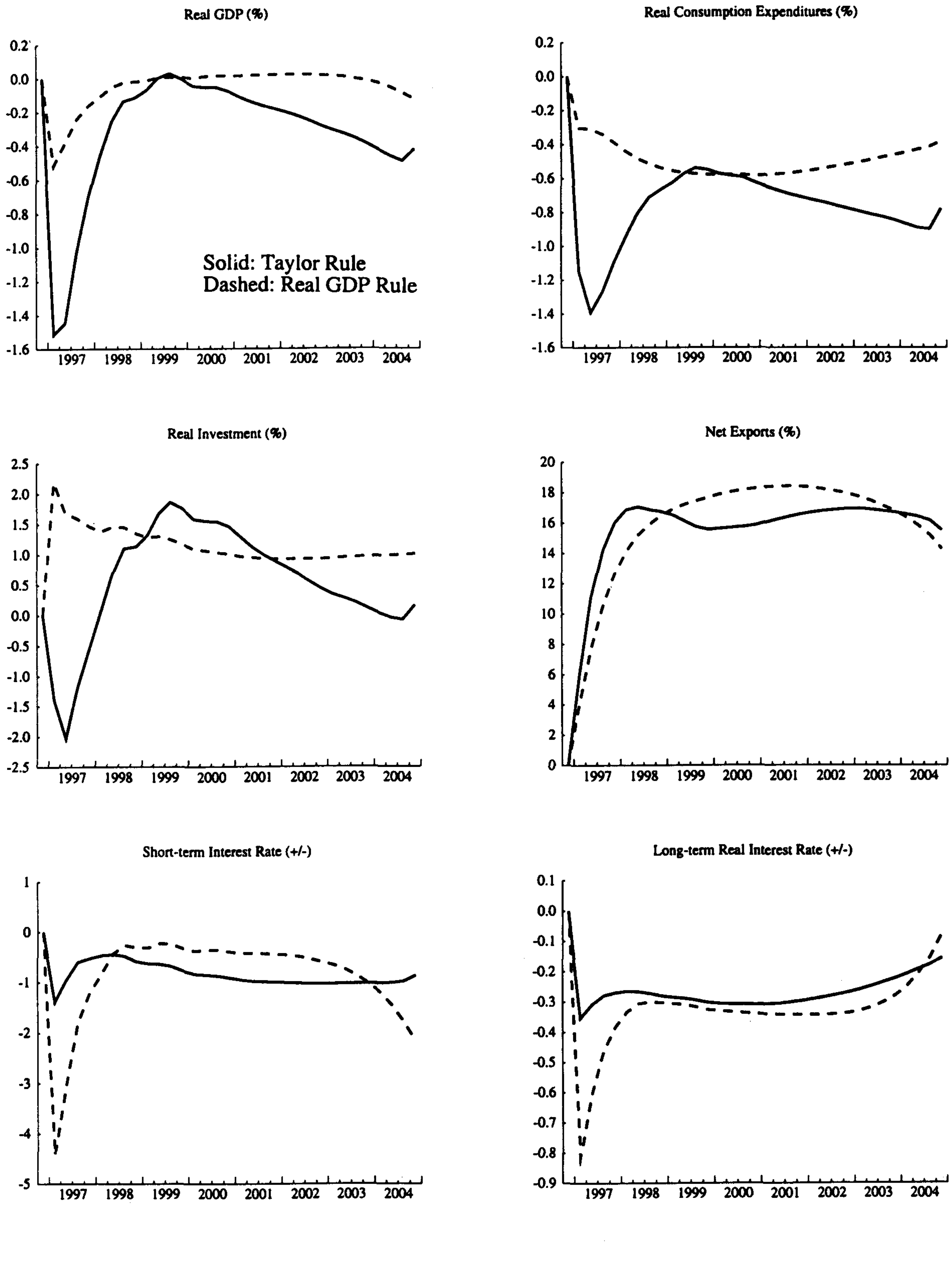
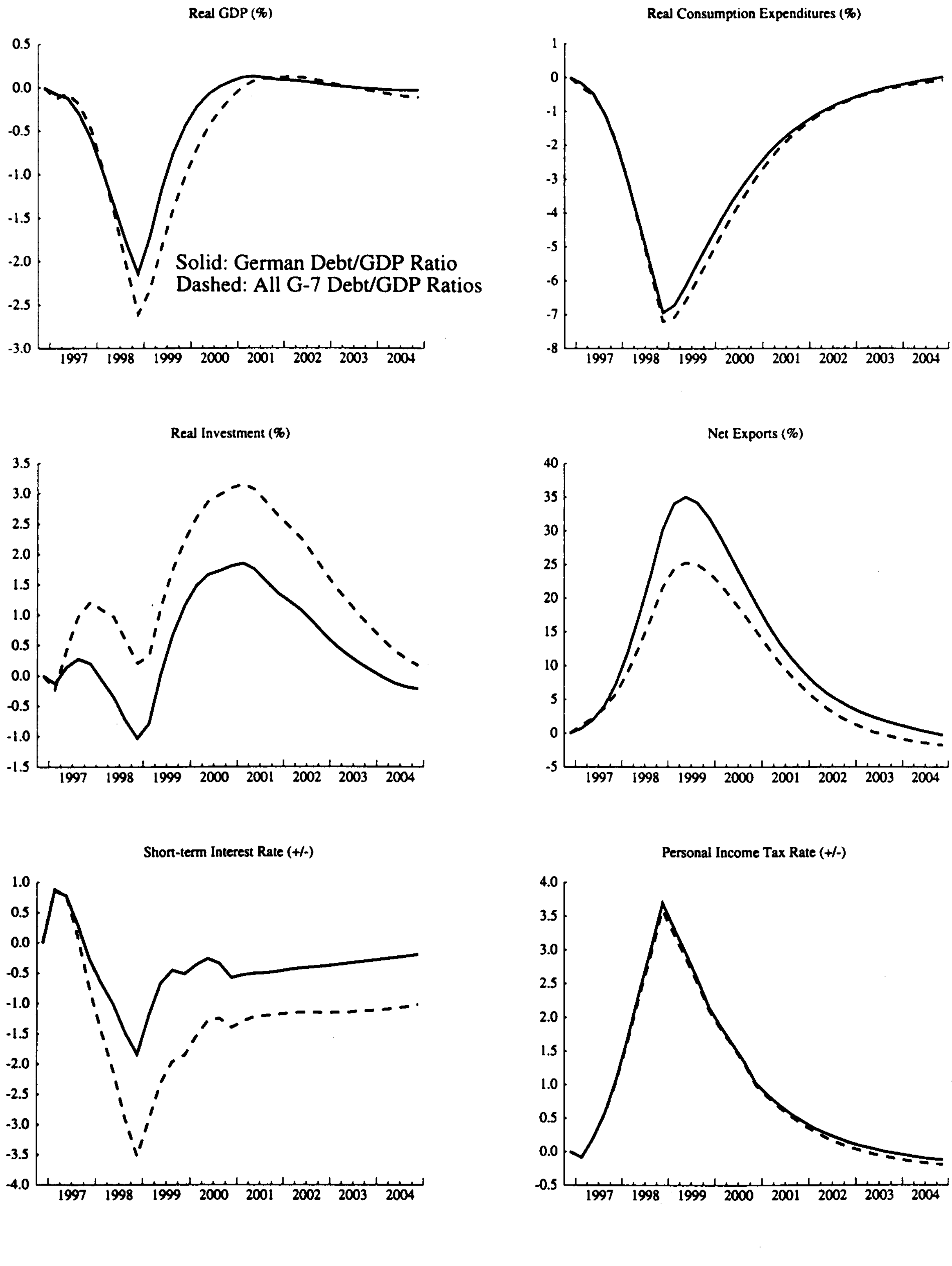


Figure 3

Reducing the target debt/GDP ratio

Key variables (A): Germany

Absolute (+/–) and relative (%) deviations from baseline, in percentage points



2.3 Permanent lowering of the target debt/GDP ratio

Recall from Section 1 that the tax rate reaction function, through which long-run fiscal solvency is maintained, adjusts the income tax rate when the debt/GDP ratio deviates from its target. In this experiment, we consider the effects of a permanent reduction of the target debt/GDP ratio to one-half its current level. Starting in 1997Q1, the target debt ratio is gradually reduced for 8 quarters, at which time it is 50 percent below its original value, where it remains permanently. We consider two cases, one in which Germany alone adjusts the target debt ratio, and a second in which each of the non-US G-7 countries adjusts the debt ratio. Only the rational-expectations version of the model is used. Other aspects of the simulation, including the assumptions about monetary policy, are the same as those in the first experiment.

Results are displayed for Germany in Figure 3. The solid line represents the case in which Germany alone reduces the debt ratio, while the dashed line represents the multi-country scenario. Notice from the bottom right panel that the shock induces a (gradual) increase in the tax rate which peaks eight quarters after the shock. The tax hike induces a drop in disposable income, and hence consumption expenditures, and a decline in GDP which also peaks at the eight-quarter point. The recession induces a loosening of monetary policy, which eventually leads to a rise in investment spending and, via a real depreciation, an improvement in net exports. Real GDP returns to baseline approximately 3 to 4 years after the shock, while the stock of government debt is permanently lower.

Finally, a comparison of the dashed and solid lines in the figure indicates that the qualitative features of the simulation described above hold for either the single-country or the multi-country case. The effects (on Germany) are slightly stronger in the case in which other G-7 countries also reduce the debt ratio, as the recessionary impact of such a policy in Germany's trading partners spills over via lower German net exports.

2.4 EMU participation scenario

Finally, we examine a fiscal policy scenario that is motivated by likely future developments, in particular actions to keep debt and deficit levels at or below those required for participation in EMU. We also use this simulation to gauge the extent to which past and prospective monetary policy actions are likely to be sufficient to offset the negative effects associated with the fiscal actions.

A detailed breakdown of the fiscal shock is provided in the following table. Each fiscal shock was implemented at an equal amount each quarter within the year. The 1997 (1998) changes were added cumulatively on top of the cuts which occurred in the previous year(s). After 1998, all fiscal variables gradually return to baseline by 2006. The tax reaction function for each country was shut off until 2001Q1. The assumed monetary policy rule is that which puts a weight of 10 on the output gap in the interest rate reaction function. Once again, Mexico ties monetary policy to the United States and France ties policy to Germany.

Simulations were run using both expectational assumptions. Because we also wish to use this scenario to examine the effects of imperfect credibility, we focus only on the model-consistent expectations version, as this model contains forward-looking elements. The experiment is conducted in two parts. In the first, policy is completely credible: the entire path of fiscal policy changes is correctly foreseen. In the second, policy is imperfectly credible, in the sense that the 1998 policy changes are not anticipated as of 1997.

Simulations were run using both expectational assumptions. Because we also wish to use this scenario to examine the effects of imperfect credibility, we focus only on the model-consistent expectations version, as this model contains forward-looking elements. The experiment is conducted in two parts. In the first, policy is completely credible: the entire path of fiscal policy changes is correctly foreseen. In the second, policy is imperfectly credible, in the sense that the 1998 policy changes are not anticipated as of 1997.

Summary of fiscal shock used in EMU-inspired simulation

	Fiscal changes in 1996 (as a percentage of GDP)		
	Taxes	Goods & services	Transfers
Canada	0.117	-0.927	-0.126
France	0.348	-0.568	-0.244
Germany*	-0.050	0.050	0
Italy*	-0.485	0.121	0.364
Japan*	0	0.360	0.040
United Kingdom	0	-1.350	0

	Fiscal changes in 1997 (as a percentage of GDP)		
	Taxes	Goods & services	Transfers
Canada	0.028	-0.222	-0.030
France	0	-0.371	-0.159
Germany	0.212	-0.424	-0.424
Italy	0.335	-0.084	-0.251
Japan	0.720	-1.404	0.324
United Kingdom	0	-0.650	0

	Fiscal changes in 1998 (as a percentage of GDP)		
	Taxes	Goods & services	Transfers
Canada	0.039	-0.351	0
France	0	-0.315	-0.135
Germany	0	-0.090	-0.090
Italy	0.420	-0.105	-0.315
Japan	0.160	-0.312	0.072
United Kingdom	0	-0.560	0

* Denotes an expansionary policy.

Figure 4 depicts the results graphically for Germany. The hike in taxes and cut in government spending, which total about 1% of GDP in 1997, have a contractionary effect on output.[4] Under the interest rate rule used, the monetary authority responds by cutting short-term interest rates. In the case of perfect credibility (the dashed lines), short rates are cut by less than under imperfect credibility.

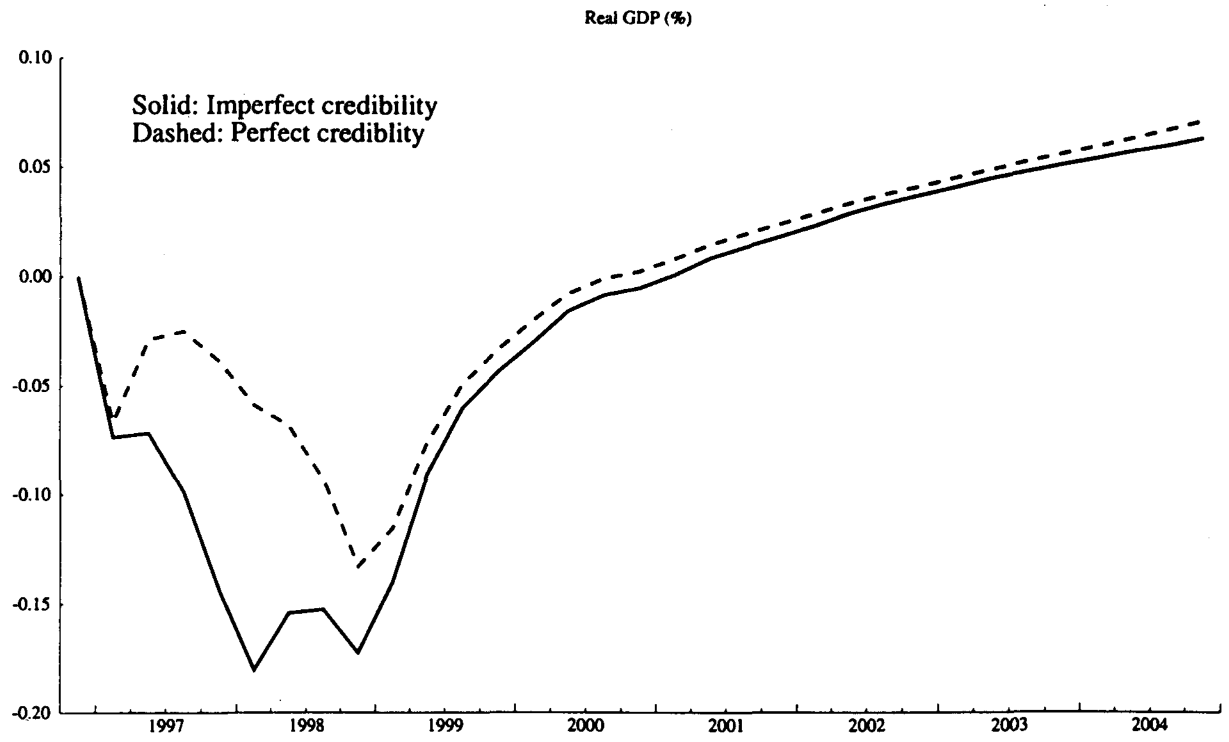
It is useful to take from this simulation some guidance concerning the appropriate degree of monetary ease that will be required to keep GDP at (or "close to") baseline, given the impending fiscal cuts.

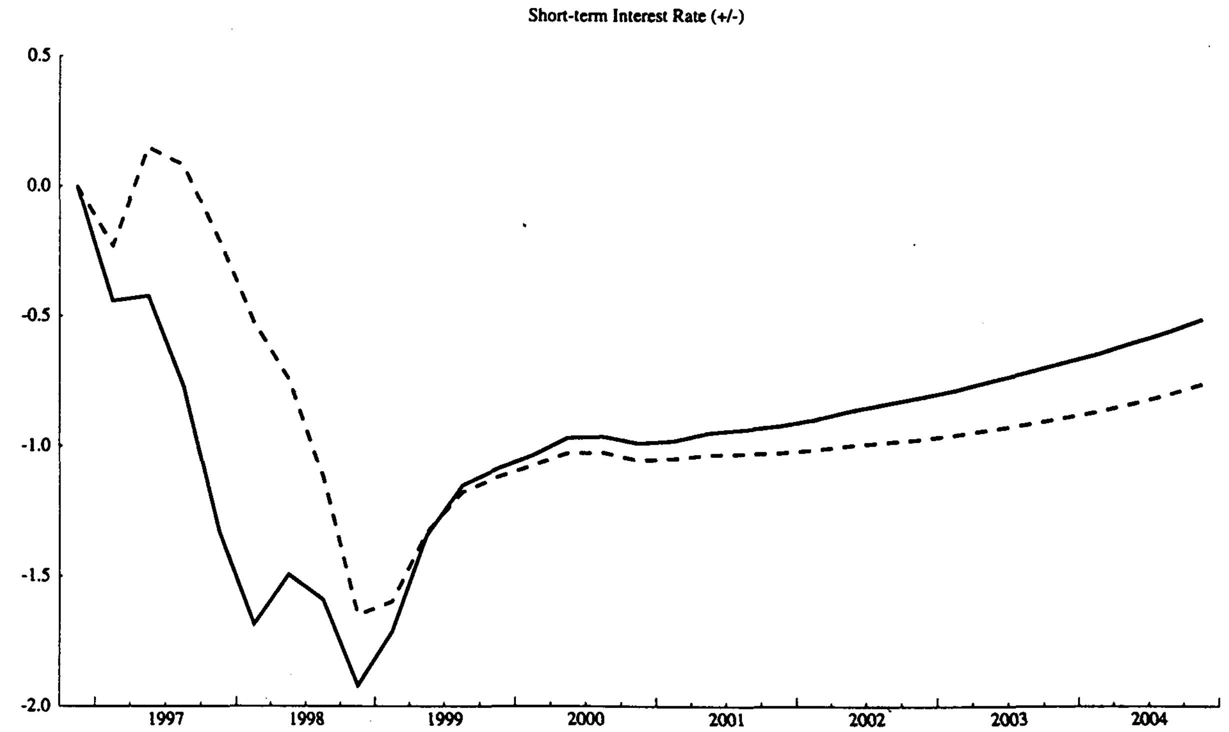
The following table displays figures for the change in real long-term interest rates over the period 1995Q4-1997 (where 1997 is the annual average rate). The first column displays the change in real long rates implied by the model simulation. The second column displays the average over this same period of the Board staff's projection of the actual change in real long rates (actual numbers for 1996 and forecasted numbers for 1997). The third column displays the difference. Based

4 The peak drop in GDP is substantially less than what was observed with either tax increases or spending cuts in Figure 1b, where a fiscal contraction equal to 1% of GDP in 1997 was also examined. There are two main reasons for this. First, in the present case there is a relatively high weight on the GDP gap in the interest rate reaction function. Secondly, in the outer years – 1998 and beyond – the fiscal contraction is smaller in this case.

Figure 4
European Monetary Union scenario
Key variables (B): Germany

Absolute (+/–) and relative (%) deviations from baseline, in percentage points





on these results we would characterize the model as saying that monetary policy will do enough to offset fiscal cuts in Canada, France, and Italy, while for the United Kingdom, factors other than monetary policy may be at work to offset the fiscal cut.[5]

Real long-term interest rates in the EMU scenario

	Change in real long rates from model (1995Q4-1997 average)	Projected change in real long rate (1995Q4-1997 average)	Difference (projected less model simulation)
United Kingdom..............	-0.89	-0.07	+0.82
Canada............................	-0.34	-0.51	-0.17
France.............................	-0.57	-1.11	-0.54
Germany..........................	-0.62	-0.18	+0.44
Italy................................	-0.35	-3.97	-3.62
Japan...............................	-0.70	-0.18	+0.52

Conclusions

The lags associated with monetary policy make it imperative to gauge the effects of impending fiscal policies. This paper evaluates the effects of fiscal policy from the perspective of the Federal Reserve Board's global simulation model.

Four main results are worth noting. First, achieving fiscal consolidation through spending cuts has a larger short-term recessionary effects than via tax increases. Secondly, permanently reducing the debt-to-GDP ratio has a recessionary effect whose length depends critically on both the level of debt-reduction and the speed with which any particular level of debt reduction is implemented. Thirdly, the monetary policy response that is required to offset the recessionary effects of fiscal consolidation must be larger the less credible is the announced fiscal package. Finally, using a fiscal policy scenario motivated by impending actions to keep debt and deficit levels at or below those required for participation in EMU, we project that monetary policy will do enough to completely offset the recessionary effects of fiscal cuts in Canada, France, and Italy.

References

Brayton, F. and P. Tinsley (ed.), (1996): "A Guide to FRB/US". FEDS *Working Paper* No. 96-42, Board of Governors of the Federal Reserve System.

Levin, A. (1996): "A Comparison of Alternative Monetary Policy Rules in the FRB Multi-Country Model", Board of Governors of the Federal Reserve System.

Taylor, J.B. (1993): "Discretion vs. policy rules in practice". *Carnegie-Rochester Conference Series on Public Policy*, No. 39, pp. 195-214.

---

5 Japan is a counter-intuitive case, as the model appears to be predicting negative nominal interest rates in light of the large fiscal contraction in 1997.

Comments on: "An analysis of fiscal policy in the Federal Reserve Board's global model" by David Bowman and John H. Rogers

by Frank Smets

The question of the recessionary impact of fiscal consolidation and the appropriate monetary policy response is an important and topical one, in particular in the context of the drive towards EMU and the need to fulfil the fiscal convergence criteria of the Maastricht Treaty. This paper uses the Federal Reserve Board's Global Model to simulate various fiscal policy scenarios. The main results are that, first, spending cuts are more recessionary than tax increases and, second, that the recessionary impact of permanently reducing the level of debt will depend on the level of debt-reduction and the monetary policy response. In particular, the authors find that the recessionary effects of the additional fiscal tightening necessary to fulfil the Maastricht criteria will be limited if monetary policy eases sufficiently.

These results are familiar in that they can be derived in a standard IS/LM model and are similar to the simulation results obtained by the OECD using the Interlink model and by the IMF using the Multimod model. They contrast, however, with the analysis of episodes of fiscal consolidation by, for instance, Giavazzi and Pagano, Alesina and Perotti and Wescott and McDermott. These authors find that large packages based on spending cuts may be less recessionary than small packages which rely on tax increases. To explain these results one needs to rely on the positive effects of fiscal consolidation programmes on consumption and investment through higher expectations of future output and lower risk premia.

Although the Global Model of the FRB does include forward-looking expectations and a country risk premium, the results are more in line with the standard IS/LM analysis than with some of the historical episodes of fiscal consolidation. It would be interesting if the authors included a discussion of the various channels that may be operative and which ones are captured in the FRB model. One feature of the simulations which may limit the importance of the expectational channels is the specification of the steady state. First, in most simulations it has a fixed and known debt/GDP steady-state ratio and a fixed and known inflation target. Many of the risk premia and expectational effects of fiscal consolidation have to do with a reduced fear of monetisation and/or the effects on the credibility of the central bank's inflation target. Because of the fixed and credible inflation and debt targets, such effects are absent from the model. Second, one would like to explore to what extent different consolidation programmes (in terms of taxes versus spending cuts, government consumption versus investment cuts) have different effects on long-run output and to what extent these long-run effects can feed back into current consumption and investment. Finally, one element that is operative in the FRB model is the effect of debt on the risk premium. There is, however, no indication in the paper how important this effect is in offsetting the short-run negative demand effects of fiscal consolidation.

A more significant role for credibility effects may not only reverse some of the results concerning the output effects of fiscal consolidation, it may also affect how monetary policy should respond to fiscal consolidation. For example, the paper finds that because a less credible package has a larger recessionary impact, the central bank needs to ease policy more the less credible the package. Central bankers often have a different view: limited credibility of the fiscal package requires a cautious response or the credibility of the central bank may be negatively affected.

One of the comparative advantages of using a multi-country model is that one can explicitly address the role of the exchange rate. It is, therefore, somewhat surprising that the authors do not address this issue. The role of the exchange rate may be important in a number of ways. First, when comparing single-country with multiple country fiscal consolidations, the usual crowding-in through exchange rate depreciation may be less. Is this the case in the FRB model and what are the implications for the monetary policy response? Second, the effects on the exchange rate are important in assessing what happens to risk premia as a result of fiscal consolidation. Finally, the monetary policy reaction function is only in terms of output and inflation. In open economies the monetary authorities may also respond to the exchange rate.