

Some Cross-Country Evidence about Fiscal Policy Behavior and Consequences for EMU

Jacques Mélitz*

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Abstract: How do fiscal authorities behave and how do they interact with the national monetary authorities? Pooled data for the 15 members of the European Union except Luxembourg and five other OECD countries serve in an attempt to answer. Three basic conclusions emerge. First, fiscal policy responds to the ratio of public debt to output in a stabilizing manner. Second, coordinated macroeconomic policy exists: easier fiscal policy leads to tighter monetary policy, and easier monetary policy to tighter fiscal policy. Third, fiscal policy responds in a stabilizing manner to the cycle, but automatic stabilization through fiscal policy is much weaker than generally perceived. While expansion raises tax receipts, it also raises government expenditures. This last result, which is clearly the most surprising in the study, is also very robust and raises doubts about the extent of stabilization that country members of EMU can expect to get automatically.

* University of Strathclyde, CREST-INSEE, and CEPR. The author wishes to thank Matthieu Fayolle for excellent research assistance and Marco Buti, Isabelle Braun-Lemaire, Francis Kramarz, Carlos Martinez-Mongay, Heikki Oksanen, and Paul Levine for valuable comments.

The fiscal criteria of the Maastricht Treaty and the recent Pact for Stability raise many questions about the behavior of fiscal authorities: How do fiscal authorities respond to government debt? How do they respond to the business cycle? Other significant questions concern policy interactions with the monetary authorities: How does loose fiscal policy impinge on monetary policy? How does tight monetary policy affect fiscal policy? The recent advent of EMU adds a new dimension to these questions: How will fiscal policy change under the new regime? As regards this last question, the issue of "automatic stabilization" assumes particular significance. In principle, EMU could substantially alter discretionary fiscal behavior. But the very term "automatic" implies that the automatic stabilizers will be unaffected. Consequently, if the automatic stabilizers are really strong, as is often supposed, the members of EMU might be expected to benefit from sizeable smoothing from these stabilizers alone, and the degree of change in discretionary policy is less important. Current thinking in the European Commission runs along these lines. This study deals exclusively with such questions.

The work uses pooled data for the largest possible number of OECD countries, 19 in all. These include every member of the European Union (EU) except Luxembourg. The five other countries in the sample are the US, Canada, Japan, Australia and Japan. Separate work was done on the 14 EU members. Three basic conclusions emerge.

First, the fiscal authorities respond in a stabilizing manner to debt-output ratios. As levels of public indebtedness rise relative to output, ratios of taxes to output go up and ratios of government spending to output fall. These results hold up for the EU countries by themselves as well as for all 19 in the sample.

Second, monetary and fiscal policy move in opposite directions. Looser fiscal policy promotes tighter monetary policy, and tighter monetary policy encourages more expansionary fiscal policy. The contractionary response of monetary policy to an easing of fiscal policy is clearer in the sample of all 19 countries than for the 14 EU members

alone, and this contractionary response can be questioned altogether if Germany is removed from the EU sample. However, there is no support for the pessimistic view that monetary policy accommodates loose fiscal policy. The tightening of fiscal policy in response to easier monetary policy, in turn, results entirely from spending behavior. Taxes do not contribute at all. This next conclusion is also extremely robust. It holds for the EU countries alone, with or without Germany.

Third, and most challenging of all, the results imply a weak stabilizing response of deficit spending to the cycle. Taxes move in a stabilizing manner in response to news about output (with Student t 's of the order of 10). However, government expenditures react currently as well (with equally high Student t 's) but in a destabilizing direction. Net stabilization therefore only occurs because of a larger reaction of taxes than expenditures. A year after output news, more stabilization follows, this time coming from expenditures, but the extra stabilization is moderate. All of these results are extremely robust and hold for the EU14 as well as for all 19 countries.

After presenting the test outcomes, I will argue that the estimated responses to the cycle should be seen as entirely automatic and independent of decision-making. If this is so, we can expect much less automatic stabilization from fiscal policy under EMU than has been assumed.

One matter of vocabulary should be cleared up at the start. "Stabilizing fiscal policy" will refer here strictly to the direction of change of the government budget balance in response to the cycle. Specifically, any rise in tax receipts or fall in government spending in response to expansion will be said to be stabilizing. The term "automatic stabilizers" will be understood the same way. Ordinarily, "stabilizing fiscal policy" and "automatic stabilization" carry the wider connotation of a stabilizing effect on the economy. But unless otherwise specified, this added connotation is not intended here.

The reason for this narrow usage of the term is that the automatic stabilizers, as treated here, need not have stabilizing effects. Indeed we have known for a long time that Ricardian neutrality may prevent the automatic stabilizers from having any

influence at all on the economy. However, the grounds for caution are more extensive. Already in 1984 Christiano had assembled a host of reasons for destabilizing effects of automatic stabilizers on the economy, some of them holding in a strict Keynesian context (based on the dynamics and foresight), others in a real-business-cycle one (for example, because of labor/leisure choices). The theory of real business cycles is particularly ambivalent about the automatic stabilizers' impact on output and consumption (see Baxter and King 1993), and the empirical validity of the predictions of the theory about fiscal policy is now a subject of active research (Galí 1994, and Fatás and Mihov 1998). I will try to skirt these issues entirely. However, I will not succeed entirely, mainly because of the question of simultaneity bias. Still, in the absence of any word to the contrary, all of my references to "stabilizing" fiscal policy should be understood strictly in the previous narrow sense. In effect, the stabilizing or destabilizing repercussions of official behavior on the economy depends on other evidence, which is not really studied below.

The order of the discussion will be as follows: the hypotheses (section I), the main tests and results (II), further tests (III), comparison with other studies (IV), the concept of automatic stabilization (V) and the conclusion (VI).¹

I. Hypotheses

Since the interactions between fiscal and monetary authorities are a central concern of the study, the reaction functions of the fiscal and the monetary authorities will be estimated simultaneously. Monetary policy can be examined on the basis of monthly series, but fiscal policy cannot. At best, quarterly series must serve for fiscal policy. But even quarterly series are problematic: those regarding tax receipts are highly seasonal, and the ones for government expenditures are subject to accident and manipulation. In addition, reliance on quarterly series would limit the international range of the study. For all these reasons, I will stick to annual observations in dealing

¹ Most but not all of the empirical results of this study were prepared for a previous report to the European Commission (see Begg, Giavazzi and Wyplosz 1997), and have been recorded in a preliminary, more limited working paper (Mélitz 1997).

with fiscal policy. This will then restrict me to annual observations regarding monetary policy as well. As a result, even 40 observations per variable for any country will be many.² Consequently, I will use pooled data for the largest possible number of countries, all 19 mentioned above.

It is now conventional to use the intervention rate of the monetary authorities on the money market, R_m , as a measure of monetary policy. The appropriate measure of this rate obviously differs by country, and in deciding on a series, it was often necessary to compromise between the desire for continuous data and the one for the best possible index of the marginal cost of central bank funds. My chosen measures of R_m follow in the first appendix. The basic measure of fiscal policy in the study will be the primary surplus (the surplus exclusive of interest payments), S_p , divided by potential output, Y^* . There are two reasons for using the primary rather than the total surplus. First, the interest on the debt could create a spurious relationship between monetary and fiscal policy. Second, the intertemporal budget constraint of the fiscal authorities relates to the primary surplus. The reason for dividing the primary surplus by some measure of output is to make sure that the dependent variable in the fiscal policy equation takes the form of a ratio, as do all of the other variables in the equations (so that the coefficients are easier to interpret). The choice of dividing by potential output instead of current output comes because the dependent variable of the fiscal policy equation should reflect official behavior. The authorities obviously have more control over the ratio of the primary surplus to potential output than they do over the ratio of this surplus to current output.

I will also examine government tax receipts and expenditures separately, as is done with increasing frequency. More specifically, the study will divide up S_p/Y^* between government consumption plus transfer payments, $(G_c+TR)/Y^*$, and tax receipts

² This paucity of data may explain why study of the interactions between monetary and fiscal authorities still remains predominantly a theoretical topic. Much of the empirical work on these official interactions has also rested on simulation analysis. For some interesting recent examples, see Aarle, Bovenberg and Raith (1995), Agell, Calmfors and Jonsson (1996), and Levine and Brociner (1994).

minus public investment spending, $(T-G_i)/Y^*$. The choice of this particular division privileges the distinction between government net saving and "exhaustive" government expenditures. In making this division, I was influenced by Alesina and Perotti (1995), who argued that taxes and public investment were easier to adjust than government consumption at times of consolidations. According to them, governments tended to rely heavily on rises in taxes and reductions in investment during episodes of major retrenchment, and were prone to increase their consumption and transfer payments during episodes of major fiscal-policy expansion. At a later point I will extend the analysis and try to distinguish the behavior of G_c/Y^* and TR/Y^* . But at no stage will I study government investment separately.

The hypotheses suppose that monetary and fiscal policies depend partly on initial information, partly on fresh developments, whether anticipated or not. In the case of monetary policy, I assume the relevant initial information to regard the nominal long term interest rate R_{lt} , the relation of output to potential output, Y/Y^* , and the weight of the public sector in the economy, as measured either by the ratio of taxes to output, T/Y , or else by the ratio of debt to output, D/Y , or both. The long term interest rate is used to reflect official concern with inflation. A general failure of the authorities to respond to rises in R_{lt} by increasing R_m would be inflationary. The relevant new developments within the period regard output, inflation, and desired portfolio shifts in and out of money. In the case of fiscal policy, the pertinent initial conditions concern Y/Y^* , inflation π , and the burden of the public debt, as measured either by D/Y or by the interest on the debt relative to output. Movements in the burden of the debt in the recent past (lagged values of $\Delta D/Y$) could also be relevant. The current or new developments pertain to output and inflation. Because of possible interactions between monetary and fiscal policy, the study also prominently considers the response of R_m to S_p/Y^* and S_p/Y^* to R_m . The variables D_p , S_p , Y and Y^* are all measured at current rather than constant prices. This choice makes no difference in the case of the ratios S_p/Y^* and Y/Y^* . But since there is good reason to think of the public debt D in current prices and

therefore of the debt-output ratio D/Y the same way, I decided to measure all of these variables at current prices.

Measuring the relevant news poses a delicate problem, since all the data could be affected by current policy responses, and for purposes of the investigation, these events should be independent of policy or exogenous. Therefore, I tried to control for monetary- and fiscal-policy effects on the relevant variables. The current developments in output and inflation are then measured as follows:

$$\Delta\left(\frac{Y}{Y^*}\right) = a_0 + [a_1 \Delta(R_m - R_{lr})](L) + \left[a_2 \frac{\Delta(S_p / P)}{(S_p / P)_{-1}} \right](L) + \theta_y$$

$$\Delta\pi = b_0 + [b_1 \Delta(R_m - R_{lr})](L) + \left[b_2 \frac{\Delta(S_p / P)}{(S_p / P)_{-1}} \right](L) + \theta_\pi$$

where the policy instruments are in brackets, the notation (L) signifies both current and lagged values of the bracketed terms, and the residuals, θ_y and θ_π , represent the exogenous element of the current events. In the instances where I treated $T-G_i$ and G_c+TR separately rather than using their sum S_p , corresponding definitions of θ_y and θ_π follow.

The adoption of $R_m - R_{lr}$ instead of R_m , and $(S_p/P)/(S_p/P)_{t-1}$ instead of S_p/Y^* , in the previous equations, needs a word of explanation. While R_m is evidently the basic instrument of monetary policy, there is reason to consider the impact of this policy as depending upon a movement in R_m relative to R_{lr} rather than R_m alone. If R_m as such were present in the equations, then whenever R_{lr} rose for any reason, including anticipated inflation, the resulting impact of the fall of $R_m - R_{lr}$ on inflation and output would be treated as unaffected by monetary policy. But this would be wrong, since by keeping R_m the same, the authorities would be engaging in expansionary monetary policy. On this ground, $R_m - R_{lr}$ seems to be superior to R_m as a measure of monetary policy in the equations.

With respect to fiscal policy, the use of $\Delta(S_p/P)/(S_p/P)_{t-1}$ is motivated by the absence of separate deflators for S_p and Y , thus S_p and Y^* . As a result, whether we measure S_p and Y^* at current prices or constant prices, S_p/Y^* will be the same. Yet it

seems right to choose a measure of fiscal policy reflecting a real influence to the utmost. For this reason, I adopted $\Delta(S_p/P)/(S_p/P)_{t-1}$ in preference to $\Delta(S_p/Y^*)$.

The same principles that serve to identify θ_y and θ_π were also applied in identifying the exogenous current changes in the demand for money θ_m . In this next case, the dependent variables in the regressions were either $\Delta(M/P)$ or $\Delta(M/Y)$ (instead of $\Delta(Y/Y^*)$ or $\Delta\pi$) and various measures of M were tried.

I shall now proceed to the tests.

II. Data, Tests and Main Results

As mentioned earlier, requisite data for the tests were collected for 19 OECD countries altogether. The annual data begin as early as 1959 for some countries and as late as 1976 for others. They all run through 1995. I chose to carry out the econometric tests in lagged-adjustment form. Quite specifically, I estimated

$$\Delta_t X = f(X_{t-1}, \Delta_{t-1} Y, \theta_t, \Delta_t Z)$$

where $\Delta_t X$ is the current change in the monetary- or fiscal-policy variable, as the case may be, X_{t-1} is its lagged value, $\Delta_{t-1} Y$ the matrix of lagged changes in values of relevant initial conditions (starting with the change from $t-2$ to $t-1$), θ_t the matrix of the current developments, and $\Delta_t Z$ the change in the opposite policy variable from X. Regardless of the use of S_p or $T-G_i$ and G_c+TR separately, $\Delta_t Z$ in the monetary policy equation is always $\Delta_t(S_p/Y^*)$.

The main test methods were two-stage-least-squares (TSLS), and generalized TSLS or three-stage-least-squares (3SLS). Whenever fiscal policy was split into two parts, the appropriate constraint on S_p/Y^* was applied in the monetary policy equation.

Table 1 reports the leading results for the full sample period and all 19 countries. First in order of presentation are the results for the two-equation system, concerning strictly ΔR_m and $\Delta(S_p/Y^*)$. Next come those for the three-equation system which decomposes $\Delta(T-G_i)/Y^*$ and $\Delta(G_c+TR)/Y^*$. In the first stage of the estimation, some instruments were added as exogenous variables. These instruments are past inflation rates for recent years (in both consumer and producer prices) and past levels of the

dependent variables prior to $t-1$ (X_{t-2} , etc.). The exact beginning dates for the estimates, which differ for individual countries, appear in the note below.³ Starting the tests in 1973 (instead of 1964) would have given rise to a more synchronous treatment of the different countries. But experiments show that otherwise there would have been little change: if anything, the results would improve. A fully synchronous treatment of all countries would have meant limiting the study period too much.

All the variables mentioned in discussing the hypotheses were tested. But the estimates in the table exclude most of those that proved insignificant in earlier experiments. Thus, the lagged values of the levels of the fiscal variables (either $[(T-G_i)/Y^*]_{-1}$ or $[(G_c+TR)/Y^*]_{-1}$) do not appear. It seems from the tests, therefore, that full adjustment of fiscal policy takes place within one period, or one year. But the same is not true regarding monetary policy, where $(R_m)_{-1}$ in the table is highly significant. The coefficient of $(R_m)_{-1}$ in the relevant equation(s) says that a bit over two-thirds of the adjustment of monetary policy occurs within the current year, while the rest follows later. This difference in speed of the adjustment of fiscal and monetary policy could reflect the fact that the fiscal policy response is essentially automatic – or at least that is my favored interpretation. Current news about inflation and the demand for money also proved insignificant in earlier tests and are omitted. The only contemporary exogenous events in the table therefore concern output.⁴ All the estimates took place with fixed effects for individual countries. The 2SLS estimates differ little from the 3SLS ones, and the only reason for reporting the 2SLS ones is to give some idea of the quality of the fits of the separate equations. The 3SLS estimates offer no such possibility.

³ These dates are, namely: Canada and Germany 1964; the US 1965; Australia, Denmark, Greece, France, Italy, the Netherlands, Sweden and the UK 1972; Belgium and Japan 1973; Austria 1975; Norway and Spain 1977; Finland 1978; Ireland 1979; and Portugal 1981.

⁴ In the estimates giving rise to the series for θ_y , those which gave the best results, and which were consequently retained, proved to be the ones without any lagged values for monetary and fiscal policy.

As can be seen, the general fit of the three-equation model is far superior to that of the two-equation one. However, this superiority is almost entirely due to the separate treatment of the impact of news about output on $(T-G_i)/Y^*$ and $(G_c+TR)/Y^*$. The separate responses of $(T-G_i)/Y^*$ and $(G_c+TR)/Y^*$ to θ_y are estimated with an extraordinary degree of precision, whereas the estimate of the response of $\Delta(S_p/Y^*)$ to θ_y in the two-equation system appears with a Student t of only around 1.5. In other respects, the estimates of the two- and three-equation systems are similar. Perhaps the negative interaction between the monetary and fiscal authorities emerges more clearly in the two-equation system. But that is just about the only other difference of note.

The fiscal policy equations generally perform much better than the monetary policy one in the three-equation model. According to the 2SLS estimates (where the R^2 's of the separate equations can be viewed individually), the adjusted R^2 for the tax-minus-investment equation is 35 percent and that for the expenditure one 46 percent, as opposed to only 17 percent for the monetary policy equation. Some of the national dummy variables (unshown) also prove to be important in the monetary policy equation (those for Greece, Spain, Portugal and Italy especially). But despite the presence of these dummies, omitted variables evidently explain most of the variance in monetary-policy behavior in the study period. We can only infer that omitted variables – for example, international differences in exchange rate regimes, openness, and wage-price flexibility – play a large role in connection with monetary policy. Similar international differences (if no others) apparently matter less in explaining the variance of fiscal policy, and national distinctions do not matter much either, since the national dummy variables are not important in the fiscal policy equations. Indeed, based on general fit, the degree of international uniformity in government spending behavior is even surprising.

Let us next examine monetary policy and fiscal policy separately. As regards monetary policy, the sole indication of any response to anticipated inflation concerns the long term interest rate. The one other initial condition that emerges as significant in the monetary policy equation is the level of economic activity: the authorities respond

to the business cycle in a stabilizing manner after a year. Monetary policy also reacts without a lag to fiscal policy as such. Quite interestingly, the monetary authorities tend to tighten when fiscal policy loosens.

In the case of fiscal policy, the tests reveal no reaction to inflation – whether past inflation or current inflationary developments. This is not necessarily cause for surprise, since taxes are largely indexed, and the Olivera-Tanzi effect could cancel any tendency that might otherwise exist for inflation to raise real taxes. In addition, there is no obvious reason why inflation should systematically affect aggregate real government spending. On the other hand, the tests clearly say that fiscal policy responds to government debt in a stabilizing manner, both on the tax and the spending side. Based on the impact of $(D/Y)^2$, the response to debt heightens as the debt-output ratio rises. As a matter of fact, D/Y and the ratio of interest on the debt to output performed just as well as $(D/Y)^2$ in earlier tests, and my use of $(D/Y)^2$ is simply a choice but an acceptable one. Experiments with $(D_{t-1}-D_{t-2})/Y_{t-1}$ also proved to be futile. There is no evidence of any sensitivity of fiscal policy to any mere *deterioration* of the debt.

The influence of monetary policy on fiscal policy is also challenging. Evidently fiscal policy eases when monetary policy tightens. Here again, the action takes place essentially on the spending side.

Most interesting of all are the fiscal policy responses to the business cycle. Based on the estimates, the clearest *stabilizing* response of fiscal policy to the cycle comes with a lag. As seen in the estimate of the three-equation system, this next response also results exclusively from spending: $(G_c+TR)/Y^*$ reacts negatively to $(Y/Y^*)_{t-1}$. On the other hand, the current responses of fiscal policy to the cycle are much weaker than generally supposed. While an adverse shock to output (a negative θ_y) reduces taxes, it reduces government spending as well, and any stabilizing movement results from the stronger reaction of taxes than spending. This stronger reaction is also marginally significant because of the enormous Student t 's on both sides. The same conclusion emerges from the two-equation system, where we find a stabilizing response of the primary *surplus* to θ_y which is significant at the 10-15 percent confidence level.

Given the separate responses of government spending to θ_y and $(Y/Y^*)_{t-1}$, it appears that the spending reacts in a destabilizing manner to a recession at first (a negative θ_y) before turning around and responding in a stable fashion a year later. The right interpretation will receive more attention below. But a simple account would be that a certain bureaucratic impulse prevails at the start. When tax receipts falter, government tends to nibble at individual ministerial budgets and transfer programs, and when tax receipts flow in from everywhere, the government tends to be more lenient in meeting budget requests from the individual ministries and in disbursing transfer payments that are permitted by legislation.

Table 2 delves deeper into the choice of θ_y instead of Y/Y^* in the estimates and the results associated with the business cycle. This choice of θ_y is intended strictly to avoid simultaneous-equation bias. According to textbook logic (which can be challenged, as mentioned in the introduction), a rise in $(T-G_i)/Y^*$ should lower Y/Y^* and a rise in $(G_c+TR)/Y^*$ should raise Y/Y^* . If the reasoning is correct, the use of Y/Y^* instead of θ_y would lead the series for $\Delta[(T-G_i)/Y^*]$ to be associated with excessively low values of $\Delta(Y/Y^*)$ and would bias the coefficient of $\Delta Y/Y^*$ on the tax side upward, while it should lead the series for $\Delta[(G_c+TR)/Y^*]$ to be associated with excessively high values of $\Delta(Y/Y^*)$ and should bias the coefficient of $\Delta(Y/Y^*)$ on the spending side downward. Alternatively stated, using Y/Y^* instead of θ_y means associating increases (decreases) in primary surpluses with excessively small rises (drops) in output during the expansionary (contractionary) phase of the cycle, and therefore means biasing the estimate of the impact of Y/Y^* upward. Table 2 confirms this logic.

The table shows what happens when we estimate the three-equation model with $\Delta(Y/Y^*)$ instead of θ_y . All the lagged influences come out as clearly as before. But the coefficient of $\Delta(Y/Y^*)$ becomes much higher in the tax equation than the spending equation. The textbook reasoning thus applies: an exaggerated level of automatic stabilization appears. Not surprisingly either, the interaction between monetary and fiscal policy becomes more blurry. In principle, failure to correct for reciprocal effects of the policy instruments on economic activity can only make it more difficult to isolate

the interaction between the monetary and fiscal policy instruments. This is exactly what happens. The Student t associated with $\Delta(S_p/Y^*)$ in the monetary policy equation in Table 2 falls below the level in Table 1, while the effects of $\Delta(R_m)$ on taxes and spending now tend to cancel each other out. These last two effects become almost equally important (whereas only the one on spending mattered before) and of the same sign.

III. Further Tests

In this next section, we will consider a variety of major additional questions, which concern robustness, the distinction between government consumption and transfer payments, and the performance of the model during episodes of unusually energetic fiscal policy.

(1) Robustness

Table 3 reports the results of the estimates for the 14 member countries of the European Union as such rather than all 19 OECD countries in the sample. These estimates show some improvement in general fits, but also some deterioration pertaining to monetary policy. The response of central banks to fiscal policy becomes murkier and no plain evidence remains of any reaction of monetary policy to the business cycle. Of course, this could simply reflect a tendency of all monetary authorities outside Germany in the EMS to follow the lead of the Deutsche Bundesbank regardless of domestic conditions. In addition, what remains of the earlier, negative response of monetary policy to expansionary fiscal policy could depend entirely on Germany. The second set of estimates in Table 3 confirms the last suspicion: the presence of the German central bank in the sample is indeed vital for the conservative response of monetary policy to expansionary fiscal policy. Similarly, as is not shown in the table but can be reported, if we leave out both the US and Germany from the full 19-country sample, the same deterioration occurs in the monetary policy equation: that is, the fiscal policy variable ceases to matter (as does the lagged value of the cycle, Y/Y^*).

In effect, therefore, the presence of the Federal Reserve and the Bundesbank in the sample has a lot to do with the conservative stance of monetary policy.

Another series of questions about robustness relates to the stability of the reported behavior during the sample period. Chow tests clearly lead to a rejection of stability if we break-up the study period into two parts around the middle. Another way to proceed is to introduce dummy variables for consecutive time intervals. This other method provides a means of controlling for common changes in policy under the impact of common problems and possible imitative behavior in policy decisions. The use of the technique does indeed produce an increase in the quality of the fits but, if carried too far – that is, if too many individual dates are included – the interaction between monetary and fiscal policy disappears. Nonetheless, a third set of estimates in Table 3 shows that if we introduce indices for six five-year intervals, we clearly get an improvement. So doing raises the quality of the estimates while the interaction between monetary and fiscal policy stays fairly plain. In this case, the estimate for the EU sample without Germany also provides better results than before for monetary policy. As seen in the fourth and last division of Table 3, there is also a negative reaction of monetary to fiscal policy at the 10 percent confidence level for the EC14 even without Germany.⁵

(2) Decomposition of government consumption and transfer payments

Major interest also centers on the question of the decomposition of government spending behavior between consumption and transfer payments. Table 4 shows what happens when the 2SLS and 3SLS estimates of Table 1 are repeated for a four-equation model breaking up fiscal policy into three parts: $(T-G_i)/Y^*$, G_c/Y^* and TR/Y^* . The estimates imply much more uniformity in behavior for government consumption than transfer payments across countries. The G_c/Y^* equation yields a notably better fit than the one for TR/Y^* . It is also interesting to see that consumption and transfer payments both contribute to the earlier destabilizing response of government spending to current news about output. Furthermore, the separate responses of TR/Y^* and G_c/Y^* to θ_y

⁵ Of course, German behavior could still underlie the result, since other monetary officials could be following a German lead (i.e., tracking the Deutsche mark).

agree perfectly with the earlier estimate of the sum of the two in Table 1. In addition, the lagged stabilizing response of fiscal policy to the cycle can be seen to be essentially the work of transfer payments. This could be interpreted as a delayed response of unemployment compensation, since unemployment is known to move sluggishly over the cycle. That explanation, in turn, would help to see why transfer payments are just as destabilizing as government consumption at first (the stabilizing response of unemployment compensation coming only later, with a lag). Notably too, the opposite reaction of fiscal policy to monetary policy shows up exclusively in transfer payments. But the stabilizing adjustment of spending to debt comes principally from government consumption.

All the same, the four-equation model in Table 4 does not perform as well as the three-equation one in Table 1. The weighted R^2 for the 3SLS estimate covering all 19 countries in the new table is 29 percent, well below the earlier 35 percent level. If we look further behind this deterioration, we also find that the cross-equation correlation between the 2SLS residuals of the G_c/Y^* and TR/Y^* equations is almost 50 percent – much higher than the one between any other pair of equations. Thus, governments do not necessarily draw as clear a line between public consumption and transfer payments in adjusting their spending as the four-equation model says. An alternative explanation would be that statistical flaws are at work. Informed sources agree that the statistical divisions of various governments make some conflicting choices of distinction between public consumption and transfer payments (see the associated reflections in Perotti 1996). Still, the four-equation model works well enough to give weight to its strongest results.

(3) Episodes of vigorous fiscal policy

Giavazzi and Pagano (1995) aroused a lot of interest when they suggested that the private sector may respond differently to fiscal policy measures depending on how sustained and vigorous the measures are (see also Bertola and Drazen 1993 and Sutherland 1997). Perhaps even more to the point at present is the contention of Alesina and Perotti (1995) that during episodes of energetic fiscal policy behavior, governments

make atypical choices between taxes and public investment, on the one hand, and public consumption and transfers, on the other. During major expansions, politicians predominantly raise consumption and transfers, while during vigorous consolidations, they raise taxes and limit investment. If Alesina and Perotti are right, my estimates might not capture episodes of highly energetic uses of fiscal policy as well the rest. Or to state the matter more prudently, the estimates might apply differently in the two periods. A simple way of exploring the issue is to introduce a dummy variable for the country-years of vigorous policy action. In doing so, I experimented with other definitions of country-years of large-scale fiscal expansion and fiscal retrenchment besides those of Alesina and Perotti. Cour *et al.* (1996) also identified such episodes, as have the OECD (1996) and the IMF (1996) but only for periods of fiscal adjustment.

All four previous sets of definitions involve corrections for automatic responses of government budget balances to the business cycle. Alesina and Perotti base theirs on the suggestion of Blanchard (1990) to center attention on the rate of unemployment. The other three adhere to the more widespread practice of using some indicator of potential output in order to deduce a "structural" government balance. In other respects, the differences between the four definitions are not conceptual and regard amplitude and duration of required changes in order to qualify for a "large-scale" fiscal episode. In my experiments, the OECD measure of large-scale fiscal adjustments yielded fairly similar results to those of Cour *et al.*, while the IMF measure was entirely unsuccessful. Table 5 displays strictly the results of using the Alesina-Perotti and Cour *et al.* measures – the only two which include both periods of expansion and retrenchment. The country-years based on those two measures (which fall within the present study period) are presented in Appendix 2. In testing the two, I used a separate dummy variable for the country-years of vigorous expansion (one for those country-years, zero for the rest) and for those of vigorous retrenchment (one and zero as before).

In general, both the Alesina-Perotti and the Cour *et al.* indicators of large-scale fiscal policy episodes give good results. As seen in Table 5, in both examples, periods

of vigorous retrenchment imply tighter monetary and tighter fiscal policy, whereas periods of vigorous expansion show at least easier fiscal policy. The negative interaction between monetary and fiscal policy also still emerges. Thus, while the settings of R_m and S_p/Y^* are both higher during periods of major consolidation, the tightening of either tool still causes a loosening of the other. The Alesina-Perotti measure suggests more discipline in monetary policy during major consolidations than the Cour *et al.* one does. The latter, in turn, implies easier fiscal policy during expansionary episodes than the former.⁶

But the major conclusion of Table 5 is that little is gained by introducing episodes of unusually energetic fiscal policy. Far more amelioration resulted from the earlier admission of dummy variables for separate time intervals. In addition, combining indices of large-scale episodes with the dummy variables for time or adding these episodes in the study of the EC14 alone sheds no extra light.⁷

IV. Other Studies

To take stock, there are three outstanding results of the study: namely, (1) the stabilizing response of governments to debt; (2) the opposite interaction between fiscal and monetary policy;⁸ and (3) the moderation of the counter-cyclical reaction of fiscal policy. What evidence have we from other sources about all three results, especially the last one?

⁶ Since the two studies do not use exactly the same sample – specifically, Cour *et al.* omit Greece, Norway and Portugal, while Alesina-Perotti use the entire present sample of 19 countries plus Switzerland but stop in 1992 – I made a number of experiments with Cour *et al.*'s sample of 16 but ending in 1992. There is a mild deterioration generally, but as regards the comparison between Cour *et al.* and Alesina-Perotti, the picture stays much the same.

⁷ For clarity, it should be noted, however, that my study does not question Alesina and Perotti's main result, which concerns the relative success of adjustments of $G_c + TR$, as opposed to $T - G_i$, in achieving a *sustained* change in the government balance.

⁸ This negative interaction should be interpreted as saying that more tightening (easing) of one instrument means less tightening (easing) of the other. Both instruments may still concurrently be tight (or easy, as the case may be).

We must look for answers in other studies dealing with the same or similar countries. The evidence for countries with much higher inflation rates – say, occasionally above 50% annually – would not be particularly relevant. Gavin and Perotti (1997) confirm this last view in a study of Latin American countries. So does Fry (1998) in research covering a world sample of developing countries. Studies of subaltern governments within countries are also not exactly to the point, since in these cases, the tax capacities of the governments are far more limited, and the interactions between the authorities and the central bank are bound to differ. Such other studies may have multiple interests,⁹ but they cannot serve either to confirm or negate our findings.

To my knowledge, the only effort to deal with the same set of questions for the same set of countries is Wyplosz (1999). Though limited to EMU members, his study offers pooled estimates of the official reaction functions of monetary and fiscal authorities that are based on annual observations, as mine does. Wyplosz's specification differs from my own in several respects. He proceeds in levels rather than first differences (in conformity with Taylor (1993) and Clarida, Galí and Gertler (1998) in treating central bank behavior). In addition, Wyplosz estimates the reaction functions of the monetary and fiscal authorities separately (though experimenting with 3SLS estimates which contain the opposite policy variable as endogenous). Finally, he incorporates relative unit labor costs as an explanatory variable.

Given Wyplosz's formulation in levels, it is not surprising that he obtains much higher R^2 's than I do, nor that he finds the lagged dependent variables notably more significant. But in other respects, our estimates are very close, as he recognizes. The same stabilizing response to debt arises. So does the same interaction between monetary and fiscal policy (though, in his case, with a one-year lag, and in the instance of monetary policy, strictly in the 3SLS estimate that allows for simultaneity). Furthermore, he finds the same mildness of the stabilizing response to the cycle as I do.

⁹ Two prominent examples are Bayoumi and Eichengreen (1995), and Sørensen, Wu and Yosha (1999).

According to his estimate, an extra percent of output above potential raises the primary budget surplus by 0.18 of the change. In mine, the response is about 0.10 (as is found by adding up the coefficients of $(Y/Y^*)_{t-1}$ and θ_y in the fiscal policy equations of Table 1). Unfortunately, Wyplosz does not distinguish between government spending and receipts, so that we can only guess what the outcome would be.

In light of my results and Wyplosz's, the evidence in favor of the strength of the automatic stabilizers may demand reconsideration. If we do re-examine, we find the supporting evidence for the view to hinge largely on preconception. The typical practice in estimating the automatic stabilizers is to limit attention strictly to the responses of taxes and unemployment compensation to the cycle, and to treat other elements of the budget as exogenous and the work of current policy decisions. The most detailed estimates of automatic stabilizers on hand, coming from the OECD, rest exclusively on measures of the respective responses of personal income taxes, corporate income taxes, indirect taxes, social security taxes, and unemployment compensation to the cycle. (See *Giorno et al.* 1995 and the recent update by Van den Noord 2000).¹⁰ The IMF proceeds in a similar fashion (see IMF 1993, pp. 99-103). These kinds of tests usually yield estimates saying that a fall in output below potential causes a rise in government deficits of about half the size of the fall in output.¹¹ Based on the same assumption of the exogeneity of government expenditures (except for G_i), I get a response of fiscal policy to the cycle of 31% to 37% – not too different from 50%. 31% of the response owes to the coefficient of θ_y in the tax-minus-investment equation, and the rest from the assumption that some part of the lagged effect of Y/Y^* on spending can be attributed to unemployment compensation.

But there are also a few isolated estimates of the responses of the fiscal authorities to the cycle that do not proceed the previous way and do look at all parts of

¹⁰ See also a particularly detailed test by Cohen and Follette (2000), however, only concerning the US.

¹¹ But with significant dispersion between individual countries. See Ribe (1995) and Van den Noord (2000).

the government budget. What do they say? I know of four recent examples: Fatás and Mihov (1999), Virén (1998), Gavin and Perotti (1997), and Fiorito (1997). Arreaza, Sørensen and Yosha (1998) might be considered a fifth, but I have doubts, which I will expose in a footnote below. In none of the first four cases is there any adjustment for simultaneity. For this reason, the estimates can be biased upward, as already explained. In addition, Fatás and Mihov engage strictly in a bivariate analysis in which only fiscal policy and the cycle are present. So does Fiority. Virén and Gavin and Perotti add a third variable: inflation in Virén's case, the percentage change in the terms of trade in Gavin and Perotti's. Still, the paucity of variables in these studies may be another source of differences.

To report on the four studies in turn, Fatás and Mihov estimate the impact of the cycle on the primary deficit (the negative of the primary surplus) over basically the same sample as I use, and they do pooling as well. They come up with an estimate of -0.26 (with a standard error of 0.04). Thus theirs is an intermediate result between the usual one of -0.5 , based on strict concern with taxes and unemployment compensation, and mine of -0.1 . However, when Fatás and Mihov decompose the responses of some parts of the budget, the outcome deviates markedly from mine. The response of taxes is 0.82 (with a standard error of 0.05), and that of government spending on goods and services (G_c+G_i) is 0.03 (with a standard error of 0.006). Their estimated response of G_c+G_i is particularly at odds with my results (though of the same sign).

In Virén's study, the ratio of the observed deficit to output serves as the measure of fiscal policy. Virén uses VAR's to estimate the response of this ratio to the cycle for 21 different countries individually: the 19 in my sample plus Switzerland and Iceland. On average for the countries, he finds that a one-standard-deviation change in output lowers the deficit-output ratio by 0.55 of the change (see Table 1, columns D1, D2, and D3). Thus, Virén's estimate comforts the usual views.

Gavin and Perotti center on Latin America, but also provide a pertinent estimate for "industrial" countries as a point of comparison. This last estimate, which rests on pooled data for 16 of the 19 countries in my study (all except Canada, Greece

and Portugal), says that a one-percentage-point rise in output will raise the total fiscal surplus by 0.37 (with a Student t of about 11) of the rise in output.¹² Thus, their estimate is of the same general order as the OECD's and close to Virén's. When Gavin and Perotti divide up the government surplus into parts, their results also resemble Fatás and Mihov's rather than mine. They come up with a response of 0.93 (with a Student t of 12) to the cycle for taxes and no response of any note for spending.

The final study, by Fiorito, concerning the G7, is the only one to use quarterly instead of annual data. This study is also by far the most disaggregative: it looks at comovements of real GDP with eight different sub-components of government expenditures and four sub-components of government receipts. In effect, the analysis relates strictly to correlations, and therefore, all the inferences about influences hinge on leads and lags, as the author recognizes. The general impression is not favorable to my results. There are too many cases of sub-categories of government expenditures that are negatively correlated with lagged real output. As a general point of contrast, the author finds less uniformity of comovements between government expenditures and output than between government receipts and output, whereas I obtain a higher quality of fits for government expenditures than for taxes (but, notably, only when I take simultaneity into account: that is, in Table 1, not Table 2).

On the whole, these last studies give greater support to the usual view of the strength of countercyclical fiscal policy than to my findings. But since all of the studies stick – or nearly so – to a unicausal explanation of official behavior, and all of them fail to correct for simultaneity, I conclude that the issue remains wide open. It is all the more so in the light of the corroborative results of Wyplosz, who is the only author to apply similar methods to the same data.¹³

¹² Bayoumi and Eichengreen (1995) perform similar tests on 8 OECD countries, each taken individually, but they always treat central and local governments separately (while dropping two of the 8 countries because "the results were unsatisfactory" (note 19)).

¹³ On the surface at least, Arreaza, Sørensen and Yosha (1999) also furnish estimates of the response of government budgets to the cycle. In addition, their work seems to agree with mine at first sight, since they clearly report a tendency for government

IV. Interpretation

Two fundamental issues remain for discussion. How do we interpret the policy record of deficits and debts over recent decades in the light of the estimates in this work? How much *automatic* stabilization is there?

(a) The fiscal policy record

On the first issue, the Services of the European Commission offer a basic point of departure. In an important study (Buti and Sapir, eds., 1998), these Services analyze the record of fiscal policy in the EU since the seventies on the usual view of the automatic stabilizers (see also Buti, Franco, Ongena 1997). In addition, the Services consider all movements in primary surpluses which do not come from the automatic stabilizers as discretionary responses to the cycle. Since the authors agree with the OECD estimates of the automatic stabilizers as about one-half the size of any deviation from normal output and they find that the deficits did not grow nearly as much during recessions in the EU as this estimate would imply, they conclude that contractionary fiscal policy prevailed during recessions. In other words, governments kept debt in check at those times. Since deficits persisted during mild phases of expansions and only abated at the peaks, the authors also conclude that fiscal discipline was lacking during the expansionary phases. Finally, since debt-output ratios grew by about 30 percentage points (from 40% to 70% levels) from the early seventies to the mid-nineties, they conclude that the deterioration of fiscal discipline during expansions was far greater than the strengthening of fiscal discipline during recessions.

consumption to rise during the expansionary phase of the cycle. But the terms of their discussion raise doubts. According to their interpretation, mere *constancy* of government consumption in the face of a boom is highly stabilizing, since it contributes to saving and the smoothing of consumption. On the other hand, taxes need to grow faster than output during a boom in order to be stabilizing, as otherwise the taxes still encourage current (relative to future) consumption. Thus, upon finding that both taxes and government consumption grow less than output in a boom, the authors conclude that government consumption is stabilizing and taxes are destabilizing. In addition and quite significantly, Arreaza *et al.* adapt their test specifications to their interpretation. For this last reason as well, their test results are difficult to compare with mine and any of those I discuss (all of which relate strictly to the public budget's response to the cycle).

My results require a different reading of the same facts. According to my study, fiscal policy responded in a stabilizing manner in all phases of the cycle but only mildly so. In the case of contractions, there is minor disagreement. On either interpretation, fiscal policy was only moderately easy. But under expansion, the divergence is important. Based on my interpretation, fiscal policy was moderately tight. Thus, in my case, the explosion of debt/output ratios in the EU, and the OECD as a whole, must be explained independently of the cycle. It is easy to see what such an alternative explanation might be. Life expectancy lengthened greatly during the period. The retired population became much larger as a percentage of the labor force. The demand for medical care also shot up as wealth increased and the population aged. Consequently, public spending on pensions and medical care progressed rapidly, while taxes did not keep pace. This went on during recessions and expansions alike. For a corroborating analysis, consult Shigehara (1995). Based on the view I propose, note also that these exogenous forces must have been powerful enough to overcome the stabilizing response of governments to the debt-output ratios.

(b) Automatic stabilization

Another basic question is whether the fiscal policy responses to the cycle in my analysis should be regarded as automatic. Could the destabilizing behavior of government spending be attributed to deliberate policy choices?

There are two reasons for considering the destabilizing spending behavior as automatic. First, any deliberate attempt to engage in pro-cyclical spending – even if understood merely as an attempt to mitigate the automatic stabilizers – would be difficult to explain. No *systematic* efforts of the sort have ever even been envisaged. It would be strange to think that such efforts nevertheless prevail in the OECD. Second, my estimates of the coefficients of θ_y in the spending equations are extremely significant. They have Student *t*'s as high as those on the tax side. If the destabilizing spending were then a matter of deliberate policy, the international adherence to the policy would be as well defined as the automatic stabilizers themselves, as those are usually understood. This seems unlikely.

On the other hand, it is easy to see why destabilizing spending could be automatic. The literature on bureaucracy and public choice offers an obvious perspective. Like many an ordinary organization, government could simply loosen its purse strings when receipts abound and do the opposite when revenues merely trickle in. Under expansion, the income bonuses of civil servants would grow; the public employees would climb up more easily along the salary ladder; appropriations would possibly be spent more quickly and readily. There could even be greater largesse in paying out legal entitlements. In one case – public spending on health – there are some separate indications of a pro-cyclical tendency in spending, apart from any discretionary official behavior. People seem to avail themselves more of health services during booms than contractions.¹⁴

A certain analogy with monetary policy may be apt. For decades, economists assumed that central banks controlled base money since they could do so in principle. But when the Volcker administration decided to engage in strict base control in the US in 1979, it was discovered that the effort required major changes in administrative procedures. After a period of experimentation, the Fed opted to return to control of the short term interest rate and to abandon base control. Since that episode, we generally view the short term interest rate as the basic instrument of monetary policy, and the monetary base as an intermediate target. Perhaps a similar adaptation is fitting as regards fiscal policy. We now consider the government as directly controlling public spending on goods and services. But what government really controls are appropriations, guidelines, schedules and entitlements, which, in turn, give rise to a value of $G_c + TR$ to which the government is able to react. This account of government

¹⁴ In conformity, Decressin (1999) documents a pro-cyclical reshuffling of per capita transfer payments on health services between expanding and contracting regions of Italy. On the other hand, there is also reason to think that pensions and retirement benefits move in a counter-cyclical manner. But even in that case, as long as those counter-cyclical movements took place with a lag, there would be no contradiction. The stabilizing response of TR to the lagged value of Y/Y^* in my tests would then simply need to be seen as coming from pensions as well as unemployment compensation.

spending is indeed the prevailing one in detailed descriptions of the budgetary process. Yet, in theoretical disquisitions, we assume that G_c+TR can be seen as a direct instrument of control. But if bureaucratic impulses really generate strong pro-cyclical movements in G_c+TR , as my study would mean, the assumption is wrong, and we should properly view G_c+TR as an intermediate target.¹⁵

V. Conclusion

In conclusion, it is fitting to consider the possible impact of the advent of EMU on the three major results of the study – the stabilizing fiscal-policy responses to debt, the negative interaction between monetary and fiscal policy, and the weakness of automatic stabilization. In fact, the first two results could easily be upset by monetary union. Indeed, the official thinking underlying the Maastricht Treaty anticipates a certain mutation in public behavior regarding debt. The legal architecture of EMU, and the subsequent Stability and Growth Pact, are designed to avoid an expected weakening of fiscal discipline on account of monetary union. According to Lamfalussy's influential contribution to the Delors report (1989), monetary union brings an ability to borrow on a broader capital market than before and an end to earlier worries about interest rate penalties based on expected exchange rate depreciation relative to fellow union members. As a result, governments may be tempted to adopt looser fiscal policy. Thus, the fiscal authorities need to be reined in. Of course, this view can be challenged: it is possible to reason, quite the opposite, that shorn of their previous monetary influence, governments will act more prudently than before once they enter EMU, especially if

¹⁵ In a recent study, Blanchard and Perotti (1999) try to identify discretionary fiscal policy in the US by switching from annual to quarterly data. To quote them: "With enough institutional information about the tax and transfer systems and the timing of tax collections, one can construct estimates of the automatic effects of unexpected activity on fiscal variables, and, by implication, obtain estimates of fiscal shocks." Further they say: "The same would not be true if we used annual data: to some degree, fiscal policy can be adjusted in response to unexpected changes in GDP within a year." However, based on my results, the move to the quarterly frequency may do little. If government expenditures (especially those on goods and services) really respond automatically to the cycle, no amount of institutional detail about taxes and transfers will account adequately for the automatic responses, any more at the quarterly than the annual frequency.

they start off with an important overhang of debt from earlier times. But even on this last interpretation, a regime-change in behavior is expected. Thus, the fiscal policy responses to debt may clearly be affected by monetary union. As regards the second major conclusion of the study – about the interactions between monetary and fiscal authorities – it is almost transparent that EMU may upset behavior. The implications of the first two major conclusions of the study about the future for EMU are therefore difficult to read.

However, the third conclusion, concerning automatic stabilization, has a clear meaning for EMU. Almost by assumption, automatic responses of taxes and government expenditures to the cycle will not be affected by EMU. Therefore, based on the view that the automatic stabilizers impinge heavily on the economy (which is not necessarily followed here), the country members of EMU might possibly be expected to get substantial smoothing of real activity from the automatic stabilizers alone, apart from any reinforcement by deliberate fiscal policy. On those premises, one could then legitimately reason, as Buti, Franco, and Ongera (1998) do, that if only the members of EMU manage to get their houses in order and reduce their public deficits well below the 3% ceiling of the Maastricht Treaty and the Stability and Growth Pact, the country members can reap ample benefits of macroeconomic stabilization from automatic fiscal policy alone. But if the automatic stabilizers are as weak as my study says, little smoothing of economic activity will come from this source.¹⁶ The implication is obvious: discretionary fiscal policy remains important under EMU. As a corollary, the coordination of fiscal policies in the EMU may need careful attention too.

¹⁶ The European Commission (2000), section 5, suggests that the destabilizing responses of government expenditures (exclusive of unemployment compensation) to the cycle in my study may be considered as only "quasi-automatic." By inference, the destabilizing responses are more easily modified than the stabilizing ones coming from taxes and unemployment compensation. It is true that the destabilizing behavior on the spending side could be modified. But the inevitability of the stabilizing behavior on the tax side can also be questioned. Tax collection can lag. Tax obligations may be imposed on the income of earlier years. Thus, it is not clear there is really anything less automatic – say, less robust and easier to reform – about the destabilizing behavior on the spending side than the stabilizing behavior on the tax one.

APPENDIX 1
DATA

All of the data concerning output, potential output, prices, government expenditures and receipts come from the OECD data base. The following table indicates the series for the central bank intervention rate, R_m , and the long term interest rate, R_{lt} :

COUNTRY	INTERVENTION RATE : R_m	LONG TERM INTEREST RATE : R_{lt}	SOURCE
AUSTRALIA	Short term money market rate	Long term obligations : secondary market	OECD
AUSTRIA	3-month VIBOR	Government bonds	IMF
BELGIUM	Rate on cash surpluses at the central bank	Government bonds	OECD & IMF
CANADA	Weekly tender rate of the central bank	Government bonds	OECD
DENMARK	Rate on trade bills charged by banks	Government bonds	OECD
FINLAND	Daily interbank rate	Rate on bank loans	OECD
FRANCE	Money market rate	Public and semi-public bonds	OECD
GERMANY	3-month FIBOR	Long term obligations : secondary market	OECD
GREECE	Central bank intervention rate	Government bonds	IMF
IRELAND	Central Bank intervention rate	Government bonds	IMF
ITALY	Money market rate	Government bills	OECD
JAPAN	Daily central bank rate	Government bonds	OECD
NETHERLANDS	Brokers' call rates	Government bonds	OECD
NORWAY	Central bank intervention rate	Government bonds	IMF
PORTUGAL	Central bank intervention rate	Government bonds	IMF
SPAIN	Daily interbank rate	Government securities (medium term)	OECD
SWEDEN	Central bank daily rate	Government bonds	OECD

UK	Money market rate	Government bonds	OECD
US	Federal funds rate	Government bonds	OECD

Many of the money series which served to calculate the money demand shock θ_m came from the IMF, others from the OECD. But since none of those shocks were retained, the details about sources and definitions are omitted.

APPENDIX 2
LARGE EXPANSIONS AND
RETRENCHMENTS

ALESINA AND PEROTTI (1995)

COUNTRY	LARGE EXPANSION	LARGE RETRENCHMENT
AUSTRALIA	1975, 76, 91, 92	1974, 77, 87
AUSTRIA	1975	1977,84
BELGIUM	1975, 81	1982, 84
CANADA	1975, 82, 91	1981
DENMARK	1975, 87, 88	1983, 84, 85, 86
FINLAND	1978, 87, 90, 91, 92	1984, 88
FRANCE	1975, 81, 92	
GERMANY	1974, 75, 90	1969, 73, 76, 89
GREECE	1981, 85, 88, 89	1982, 86, 87, 90, 91, 92
IRELAND		1984, 87, 88, 89
ITALY	1972, 75, 81	1974, 76, 80, 89, 92
JAPAN	1975	1984
NETHERLANDS	1975, 87	1985, 91
NORWAY	1977, 86, 91	1979, 80, 83, 84, 89, 90
PORTUGAL	1981, 83, 87	1982, 84, 89
SPAIN	1982	1986, 87
SWEDEN	1974, 77, 79, 88, 91	1976, 83, 84, 87
UK	1972, 90, 91, 92	1969, 76
US	1967, 75	1969, 76

COUR, DUBOIS, MAHFOUR, AND PISANI-FERRY (1996)

COUNTRY	LARGE EXPANSION	LARGE RETRENCHMENT
AUSTRIA	1975, 76	
AUSTRALIA	1975, 76	1980-82, 1985-88
BELGIUM	1980, 81	1982-87, 1993, 94
CANADA	1975-78	1979-81
DENMARK	1974-77, 1979-83, 1987-94	1983-86
FINLAND	1978-80, 1990-92	
GERMANY		1980-83
IRELAND	1979	1982-84, 1986-89
ITALY		1976, 77, 82, 83, 1991-93
JAPAN	1975-78, 1990-94	1979-87
NETHERLANDS		1991-93
SPAIN		1992-95
SWEDEN	1972-74, 1977-79, 1990-93	1986, 87, 94, 95
UK	1972-73, 1992-93	1979-82

NOTE : The only episodes mentioned are those falling within the present study period.

See footnote 6.

References Cited

- Aarle, Bas van, A. Lans Bovenberg and Matthias Raith (1995). "Is there a Tragedy of a Common Central Bank? - A Dynamic Analysis," Tilburg University, mimeo.
- Agell, Jonas, Lars Calmfors and Gunnar Jonsson (1996), "Fiscal Policy when Monetary Policy is Tied to the Mast," *European Economic Review* 40, August, pp. 1413-40.
- Alesina, Alberto and Roberto Perotti (1995). "Fiscal Adjustment: Fiscal Expansions and Adjustments in OECD Countries," *Economic Policy* 21, October, pp. 205-48.
- Arreaza, Adriana, Bent Sørensen and Oved Yosha (1999). "Consumption Smoothing through Fiscal Policy in OECD and EU Countries," in James Poterba and Jürgen von Hagen, eds., *Fiscal Institutions and Fiscal Performance*, Chicago: University of Chicago Press.
- Baxter, Marianne and Robert King (1993). "Fiscal Policy in General Equilibrium," *American Economic Review* 83, June, pp. 315-34.
- Bayoumi, Tamim and Barry Eichengreen (1995). "Restraining Yourself: The Implications of Fiscal Rules for Economic Stabilization," *IMF Staff Papers* 42, March, pp. 32-48.
- Begg, David, Francesco Giavazzi and Charles Wyplosz (1997). "Options for the Future Exchange Rate Policy of the EMU," CEPR Occasional Paper no 17.
- Bertola, Giuseppe and Allan Drazen (1993). "Trigger Points and Budget Cuts: Explaining the Effects of Fiscal Austerity," *American Economic Review* 83, March, pp. 11-26.
- Blanchard, Olivier (1990). "Suggestions for a New Set of Fiscal Indicators," OECD Department of Economics and Statistics Working Papers no. 79, April.
- Blanchard, Olivier and Roberto Perotti (1999). "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output," NBER Working Paper 7269 (July).

- Buti, Marco, Daniele Franco and Hedwig Ongera (1997). "Budgetary Policies During Recessions – Retrospective Application of the 'Stability and Growth' Pact to the Postwar Period," European Commission Economic Papers no. 121 (May).
- Buti, Marco, Daniele Franco and Hedwig Ongera (1998). "Fiscal Discipline and Flexibility in EMU: the Implementation of the Stability and Growth Pact," *Oxford Review of Economic Policy* 14, pp. 81-97.
- Buti, Marco and André Sapir, eds. (1998). *Economic Policy in EMU: A Study by the European Commission Services*, Oxford: Clarendon Press.
- Christiano, Lawrence (1984). "A Reexamination of the Theory of Automatic Stabilizers," *Carnegie-Rochester Conference Series on Public Policy* 20, pp. 147-206.
- Clarida, Richard, Jordi Galí, and Mark Gertler (1998). "Monetary Rules in Practice: Some International Evidence," *European Economic Review* 42, June, pp. 1033-67.
- Cohen, Darrell and Glenn Follette (2000). "The Automatic Stabilizers: Quietly Doing their Thing," Federal Reserve Bank of New York *Economic Policy Review*, April, pp. 35-67.
- Cour, Philippine, Eric Dubois, Selma Mahfouz and Jean Pisani-Ferry (1996). "The Cost of Fiscal Retrenchment Revisited: How Strong is the Evidence?" paper presented at the CEPII and DELTA workshop on "The Macroeconomic Effects of Fiscal Adjustments," Paris, September 12.
- Decressin, Jörg (1999). "Regional Income Redistribution and Risk Sharing: How Does Italy Compare with Europe?" IMF, mimeo. (September).
- European Commission (2000). *Public Finances in EMU – 2000*, to appear.
- Fatás, Antonio and Ilian Mihov (1998). "Measuring the Effects of Fiscal Policy," INSEAD, mimeo.
- Fiorito, Ricardo (1997). "Stylized Facts of Government Finance in the G-7," IMF, mimeo. (October).
- Fry, Maxwell (1998). "Macroeconomic Policy and the Negative Relationship Between Growth and Inflation," University of Birmingham, mimeo.

- Galí, Jordi (1994). "Government Size and Macroeconomic Stability," *European Economic Review* 38, January, pp. 117-32.
- Gavin, Michael and Roberto Perotti (1997). "Fiscal Policy in Latin America," *NBER Macroeconomics Annual 1997*.
- Giavazzi, Francesco and Marco Pagano (1996). "Non-Keynesian Effects of Fiscal Policy Changes: International Evidence and the Swedish Experience," *Swedish Economic Policy Review* 3, Spring, 67-103.
- Giorno, Claude, Peter Richardson, Deborah Roseveare and Paul van den Noord (1995). "Production potentielle, écarts de production et soldes budgétaires structurels," *Revue économique de l'OCDE*, no. 24, pp. 179-224 (an English version exists).
- International Monetary Fund (1993). "Structural Budget Indicators for the Major Industrial Countries," *IMF World Economic Outlook*, October, pp. 99-103.
- International Monetary Fund (1996). "Fiscal Challenges Facing Industrial Countries," *IMF World Economic Outlook*, May, pp. 44-62.
- Lamfalussy, Alexandre (1989). "Macro-coordination of Fiscal Policies in an Economic and Monetary Union in Europe," annex to the *Report on the Study of Economic and Monetary Union in the European Community* (Delors Report), EC, Luxembourg.
- Levine, Paul and Andrew Brociner (1994). "Fiscal Coordination under EMU and the Choice of Monetary Instrument," *Journal of Economic Dynamics and Control* 18, pp. 699-729.
- Mélitz, Jacques (1997). "Some Cross-Country Evidence about Debt, Deficits and the Behavior of Monetary and Fiscal Authorities," CEPR Discussion Paper no. 1653 (May).
- OECD (1996), *Economic Outlook*, June.
- Perotti, Roberto (1996). "Fiscal Policy when Things are Going Badly," CEPII-DELTA conference on "The Macroeconomic Effects of Fiscal Adjustments," Paris, September 12.

- Ribe, Frederick (1995). "Structural Fiscal Balances in Smaller Industrial Countries," *IMF World Economic Outlook*, May, pp. 108-11.
- Shigehara, Kumiharu (1995). "Commentary" on Paul Masson and Michael Mussa "Long-Term Tendencies in Budget Deficits and Debt," in Federal Reserve Bank of Kansas City Symposium, *Budget Deficits and Debt: Issues and Options*.
- Sørensen, Bent, Lisa Wu and Oved Yosha (1999). "Output Fluctuations and Fiscal Policy: US State and Local Governments 1978-1994," CEPR Discussion Paper no. 2286 (November).
- Sutherland, Alan (1997). "Fiscal Crises and Aggregate Demand: Can High Public Debt Reverse the Effects of Fiscal Policy?" *Journal of Public Economics* 65, pp. 147-62.
- Taylor, John (1993). "Discretion Versus Policy Rules in Practice," *Carnegie-Rochester Conference Series on Public Policy* 39, pp. 195-214.
- Van den Noord, Paul (2000). "Automatic Stabilisers in the 1990s and Beyond," *this volume*.
- Virén, Matti (1998). "Do the OECD Countries Follow the Same Fiscal Rule," Government Institute for Economic Research, Helsinki, Vatt Discussion Papers no. 186.
- Wyplosz, Charles (1999). "Economic Policy Coordination in EMU: Strategies and Institutions," in Zentrum für Europäische Integrationsforschung (ZEI) Policy Paper B11.