

Web Appendix

for: Fiscal Policy and Monetary Integration in Europe

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In this Appendix we discuss the robustness of our estimates for fiscal-rule equations in the form

$$d_t^* = c_{BM} + c_{AM} + \mathbf{f}_{x_{BM}} E_{t-1} x_t + \mathbf{f}_{x_{AM}} E_{t-1} x_t + \mathbf{f}_b b_{t-1} + \mathbf{f}_d d_{t-1}^* + u_t \quad (*)$$

This is the same as equation (2) in the article, to which readers should refer for variable definitions as well as for references to the literature.

Given the substantial uncertainty inherent in any cyclical adjustment procedure, it is important to make sure that our results are robust to alternative measures of cyclically adjusted budget variables. We have replicated all the tables displayed so far with cyclically adjusted data from the European Commission, and in the two versions now available (based on HP-filtered GDP or potential output). In all cases, the results are virtually identical to those obtained with OECD data.

Our results focus on the response of discretionary fiscal policy to the indicator of cyclical conditions relevant for fiscal policy making. Since we have little information on what the latter actually is, it is also important to experiment with alternative measures. Thus, we replicated all our tables using the actual growth forecast for year t , made by the OECD in the fall of year $t-1$, as a proxy for the anticipated cyclical indicator in the fiscal rule. We have obtained these forecasts manually from the printed versions of the OECD *Economic Outlook*. The OECD *Economic Outlook* has started publishing forecasts of the output gap, as opposed to GDP growth, only in 1995. We found an even larger decline in the expected output gap coefficient in the post-Maastricht period. In the EMU

countries, this coefficient declines by 0.5 points, by 1.3 in the EU3 countries, and by 0.6 in the OECD5 countries. In all cases, that difference is significant at the 5 percent level.

Note that, if the growth forecasts are “unbiased”, then the regression residual can now be viewed as an estimate of the ‘non-systematic’ or ‘exogenous’ component of the structural deficit. It is interesting to compare the behavior of this residual to the behavior of a fiscal rule like

$$d_t = \mathbf{f}_0 + \mathbf{f}_x x_t + u_t$$

(without instrumenting for GDP and with the unadjusted deficit as dependent variable), estimated by Fatás and Mihov (2002a) and (2002b). They show that the standard deviation of the residual of this equation has declined in the nineties, and interpret this finding as evidence that European countries have been less able to conduct stabilizing fiscal policy. As we discuss in the article, we believe this conclusion is unwarranted, because the residual of that equation does not have a clear interpretation. In fact, we also find that the standard deviation of the residual of equation (*), with the OECD growth forecast as independent variable, has fallen after Maastricht in EMU countries (although, interestingly, not in the two other groups). However, as we have seen this is not inconsistent with discretionary fiscal policy becoming more stabilizing over the same period. Indeed, the reduction of the standard deviation of the residual of equation (*) can be interpreted as another sign of improvement in fiscal policy management, in the sense that discretionary fiscal policy has become less erratic. Interestingly, this is consistent with similar evidence concerning monetary policy.

We also estimated a backward-looking version of equation (*), where the structural deficit is assumed to respond to the lagged output gap rather than the expectation of the current output gap. We view this as a plausible alternative to a forward-looking rule, given the inertia and complexity of the fiscal policymaking process. This time the decline in the estimate of the output gap coefficient was slightly smaller, but still significant at the 5 percent level in both the EMU and OECD5 groups.

We also re-estimated equation (*) allowing the sample for each country to start as early as possible, instead of in 1980, obtaining virtually identical results. One might argue that 1992-93 were rather special years, with their large realignments within the ERM system, and therefore might unduly influence the comparison between the pre- and post-Maastricht periods (we thank a referee for drawing this point to our attention). When we excluded 1992-93, we found virtually identical results to the benchmark case for EMU countries, a much larger (and statistically significant) drop in the expected output gap coefficient in the EU3 countries in the post-Maastricht period (-1.68), and essentially no change in the same coefficient in the OECD5 countries. Thus, the main findings for EMU countries are unaffected.

One potential problem with our estimates is the possibility of cross-country correlation in fiscal policy. If for some reason countries typically move their fiscal policies together, or if fiscal policies largely respond to common shocks, this will create a correlation between the instruments we use and the disturbance in the equation we are estimating. We could not come up with clearly superior alternative instruments. But one way to

address this problem is to include fixed time effects in the regressions: the year dummies would then largely absorb the common shocks. When we did this, predictably the size and especially the significance of the difference in the expected output gap coefficients between the two subperiods declined. Now the difference is no longer significant in all groups. Still, there is no evidence of any decline in the countercyclicality of fiscal policy in the post-Maastricht period.

We estimated the fiscal rule (*) by imposing the non-linear constraints that arise when the rule is derived from a model of target debt and deficit and costly adjustment, as in Ballabriga and Martinez-Mongay (2002), obtaining once again very similar results.

To evaluate the “recession argument” addressed in the article’s section 6.3, we also re-estimated equation (*) allowing for a term in the squared gap (again with a break in 1992). We did not find evidence of a significant non-linearity in the coefficient of the expected gap in EMU countries, nor of a difference between the two periods. We recognize that this specification with squared terms and a break in the middle of the sample might suffer from overfitting and poor instruments. But the same conclusion applies to fixed effect estimates of the backward-looking version, where the independent variable is the lagged gap and its square.

One may argue that, to the extent that the MT and SGP constraints are binding on the cyclical behavior of fiscal policy, they are also likely to be binding on the electoral variation in fiscal policy. To address this issue, we re-estimated our equation (*), with an extra variable: an “electoral” dummy variable, taking the value of 1 if an election took place in the last 6 months of year t or in the first 6 months of year $t+1$. In panel estimates for the EMU countries we did find a positive and significant coefficient of about .60 for this variable in the pre-Maastricht period, indicating a non-trivial effects of the “electoral cycle” on fiscal policy. However, the coefficient was essentially unchanged in the post-Maastricht period; and the inclusion of this variable had virtually no effect of the estimate of the expected output gap coefficient.