Volume Title: NBER International Seminar on Macroeconomics 2005

Volume Author/Editor: Jeffrey Frankel and Christopher Pissarides, editors

Volume Publisher: MIT Press

Volume ISBN: 0-262-06265-8, 978-0-262-06265-7

Volume URL: http://www.nber.org/books/fran07-1

Conference Date: June 17-18, 2005

Publication Date: May 2007

Chapter Title: Comment on "Fiscal Divergence and Business Cycle Synchronization: Irresponsibility is Idiosyncratic"

Chapter Author: Roberto Rigobon

Chapter URL: http://www.nber.org/chapters/c0359

Chapter pages in book: (299 - 304)

Comment

Roberto Rigobon, MIT and NBER

Since Gavin and Perotti (2004) highlighted the strong pro-cyclicality of fiscal policy in emerging markets, the international literature has devoted an enormous amount of research to two main aspects: first, continue documenting how pro-cyclical fiscal policy is, and second, understanding why it is pro-cyclical.

It is fair to say that the consensus is that fiscal policy is pro-cyclical in emerging and developing nations, but is far less in developed countries.[1] However, even a casual reader will find that the reasons behind the pro-cyclicality of fiscal policy are not clear at all. The main problem is the endogeneity of fiscal policy. The simplest framework to understand this dilemma is the following:

$$y = \alpha g + \varepsilon$$
$$g = \beta y + \eta$$

where y stands for output, and g stands for fiscal policy—either expenditures or fiscal deficit. For expositional simplicity, this comment will assume g are government expenditures.[2]

The first equation is the typical fiscal multiplier. The idea is that an increase in expenditure increases aggregate demand, and output. Hence, in general, we expect the coefficient of that equation to be positive—as in the traditional Keynesian multiplier. The second equation is the fiscal policy response. The classical theory predicts that if taxation or expenditures are distortionary, then government consumption should smooth out output fluctuations. In that regard, booms should be accompanied with government cuts, and conversely during recessions. That means that the standard theory predicts a counter cyclical policy. More precisely, the coefficient in the second equation should be negative if fiscal policy is used to smooth output fluctuations.

In reality, both equations are at work; the first one implying a positive correlation, the second one implying a negative correlation. Therefore, what is the correlation measured in sample? The reduced form is

$$y = \frac{1}{1-\alpha\beta}(\alpha\eta + \varepsilon)$$

$$g = \frac{1}{1-\alpha\beta}(\eta + \beta\varepsilon).$$

Which means that if the residuals are uncorrelated, that the correlation between output and expenditures is?

$$\rho = \frac{\alpha\sigma_\eta^2 + \beta\sigma_\varepsilon^2}{\sqrt{\left(\alpha^2\sigma_\eta^2 + \sigma_\varepsilon^2\right)\left(\sigma_\eta^2 + \beta^2\sigma_\varepsilon^2\right)}} = \frac{\alpha + \beta\theta}{\sqrt{\left(\alpha^2 + \theta\right)\left(1 + \beta^2\theta\right)}}$$

where θ is the relative variance of the two shocks.

$$\theta = \frac{\sigma_\varepsilon^2}{\sigma_\eta^2}.$$

When we compare two countries there are three reasons why their correlations can be different. First, a different correlation can be the outcome of how fiscal policy responds to output shocks. It is possible that because of credit constraints, or other inefficiencies, governments in emerging markets cannot smooth government expenditures as much as desired; and therefore, the coefficient β is too small, or even positive, in comparison to the benchmark. This is one of the preferred explanations in the literature, and the first one advanced by Gavin and Perotti. By far, most of the discussion in the literature is about this coefficient—although, I have rarely seen it estimated (with the exception of one paper). I come back to this point below.

Second, similarly, it is possible that fiscal policy is just extremely effective in smaller/emerging countries, and less effective in developed nations. This will point out to the pro-cyclicality being the outcome of a very strong Keynesian multiplier—i.e., the coefficient α is relatively big in emerging markets.

Lastly, a country can have a higher correlation because it is hit by a different combination of shocks. Under the assumption that α is positive and β is negative, a decrease in θ increases the correlation unambiguously. In other words, a country that is subject to a higher proportion of supply shocks has a small—and possibly negative—correlation.

My reading of the literature is that very few papers have disentangled these possibilities properly. The best attempt is Gali and Perotti (2004) where they use GDP of the trading partners as an instrument of domestic output to estimate β. Surprisingly, they find that it is negative—meaning that if there is a positive relationship between output and expenditures it is because there is a positive feedback that drives it.

The paper by Darvas, Rose, and Szapary (2005) offer a different approach to the resolution of this dilemma, one that I find particularly interesting, and convincing. The general idea of the paper is very simple, because countries embarked in a process of fiscal reform after signing the Maastricht Treaty, whose aim was to reduce the level and the volatility of fiscal deficits in Europe; we can evaluate what occurs to the correlation of GDP's across countries. Let's see how this question is related to the previous discussion.

Assume that there are two countries described as follows:

$$y_1 = \alpha_1 g_1 + \varepsilon_1$$

$$g_1 = \beta_1 y_1 + \eta_1$$

$$y_2 = \alpha_2 g_2 + \varepsilon_2$$

$$g_2 = \beta_2 y_2 + \eta_2$$

where we assume that the innovations to output are correlated, but the fiscal policy shocks are not. This is one of the crucial assumptions that the authors make, but one that I find reasonable. Outputs across European countries has very good reasons to be correlated—through trade, productivity, migration, etc.—while fiscal policy decisions (the shocks not the automatic response) are less likely to be correlated.

In this setup, output of each country is given by

$$y_1 = \frac{1}{1 - \alpha_1 \beta_1}(\alpha_1 \eta_1 + \varepsilon_1)$$

$$y_2 = \frac{1}{1 - \alpha_2 \beta_2}(\alpha_2 \eta_2 + \varepsilon_2)$$

which implies that the correlation between outputs is given by:

$$\rho_{y_1 y_2} = \frac{\alpha_1 \alpha_2 \operatorname{cov}(\varepsilon_1 \varepsilon_2)}{\sqrt{(\alpha_1^2 \sigma_{\varepsilon,1}^2 + \sigma_{\eta,1}^2)(\alpha_2^2 \sigma_{\varepsilon,2}^2 + \sigma_{\eta,2}^2)}}.$$

Notice that the assumption that countries are involved in a process of fiscal restructuring implies that both $\sigma_{\eta,1}^2$ and $\sigma_{\eta,2}^2$ are coming down. If that is the case, then the correlation between outputs increases. In the limit, when the variance of the fiscal shocks becomes zero, outputs are going to be correlated in the same way output innovations are.

This is exactly the hypothesis that this paper tests. They assume that the Maastricht criteria includes a heavy dose of fiscal reform—which is a sound assumption—and evaluate what are the implications of such policy on the comovement of output. They do not test their model using correlations. They use the average absolute deviation, but the implications are very similar. It is important to mention, that their results survive this minor change in the definition. I believe that concentrating on the correlation makes the intuition much simpler (as I did in my discussion), but the authors have decided to highlight the absolute deviation, instead.

One interesting aspect is to draw the yearly average correlation between all country pairs. This is done in Figure 1. As can be easily seen, the correlation of output growth among all developed nations increases substantially: from an average of 35 percent to an average of 45 percent. This is exactly what the authors would have expected if fiscal shocks are idiosyncratic and the fiscal reform makes them smaller.
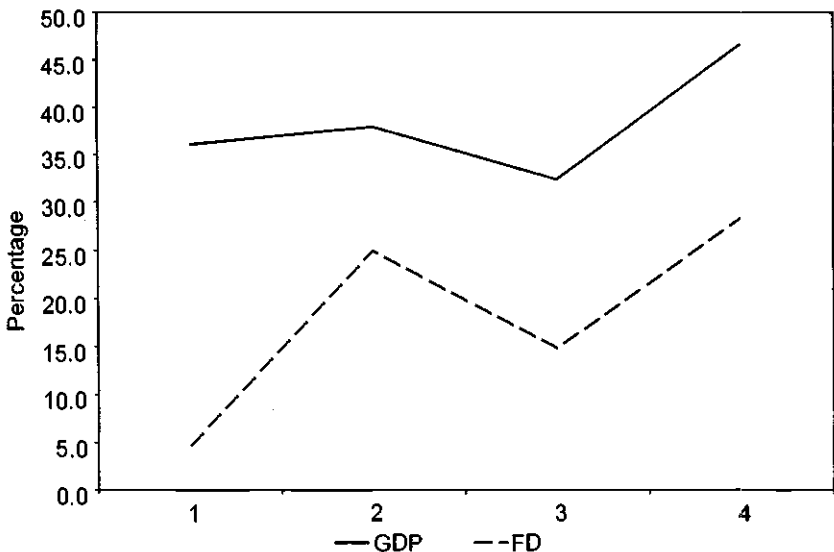

Figure 1

In addition to the GDP correlation, we can check this hypothesis by observing the behavior of the fiscal accounts. Using the exact same model it is easy to check that the correlation between any two expenditures is

$$\rho_{g_1g_2} = \frac{\text{cov}(\varepsilon_1\varepsilon_2)}{\sqrt{\left(\sigma_{\varepsilon,1}^2 + \beta_1^2\sigma_{\eta,1}^2\right)\left(\sigma_{\varepsilon,2}^2 + \beta_2^2\sigma_{\eta,2}^2\right)}}.$$

Again, if the variances of the fiscal shocks become smaller, then the correlation between fiscal expenditures has to increase. In the limit, if the variance of the fiscal shocks is zero, then the correlation between the fiscal accounts is exactly the correlation of the output shocks. In Figure 1, I also depicted the average correlation between fiscal deficits in the region (the exact same pattern arises if we look at expenditures). Notice the extremely large increase in the fiscal deficit co-movement—from 5 percent to almost 30 percent!

This very simple exercise shows—also confirms—the hypothesis raised by the authors. In their paper, they make two important claims: (1) that fiscal shocks are idiosyncratic; and (2) that the Maastricht criteria reduced fiscal shocks. Because of these two assumptions, the movement toward fiscal responsibility has made the countries better candidates for a currency union.

In summary, this paper studies the implications of the movement toward fiscal responsibility that took place in Europe after the Maastricht Treaty, and its implications on output comovement across the member nations. The claim is that if the fiscal shocks are idiosyncratic, and if the fiscal effort implies a reduction in the variance of those shocks, then the Maastricht criteria implies an increase in the comovement of output across European countries, making them better candidates for a currency union. They find evidence that supports this view, and here I have presented further evidence.

All their results depend on the two assumptions. The second one is easily checked in the data. Fiscal deficits indeed came down, and their volatility was reduced significantly. The second claim is much harder to prove. In fact, it is the only critique I could see to the paper: fiscal shocks are not necessarily idiosyncratic. However, if you have ever worked in public office, as I did briefly, you will know this is not an assumption, it is a description of reality.

Notes

1. Kaminsky et al. (2005) also show that this pattern is also true for monetary policy.

2. If you would like to think about it as fiscal deficit, you are welcome to do the search and replace.

References

Darvas, Zsolt, Andrew K. Rose, and György Szapáry. 2007. "Fiscal Divergence and Business Cycle Synchronization: Irresponsibility is Idiosyncratic." In *NBER International Seminar on Macroeconomics 2005*. Jeffrey A. Frankel and Christopher A. Pissarides, eds., (Cambridge, MA: The MIT Press), p. 261–298.

Gali, Jordi, and Roberto Perotti. 2004. "Fiscal Policy and Monetary Integration in Europe." Economic Policy, forthcoming.

Kaminsky, Graciela, Carmen Reinhart, and Carlos Végh. 2005. "When It Rains It Pours: Procyclical Macropolicies and Capital Flows." In *NBER Macroeconomics Annual 2004*. Mark Gutler and Kenneth S. Rogoff, eds., (Cambridge, MA: The MIT Press), p. 11–53.

Rigobon, Roberto. 2004. "Comments on: "When it Rains, it Pours" by Graciela Kaminsky, Carmen Reinhart, and Carlos Vegh. NBER Macro Annual.