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Fiscal Rules, Financial Stability and Optimal Currency Areas

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Abstract

In this paper we suggest that Eurozone countries face a policy trade-off among: 1) a common rule imposing co-movements in fiscal policy; 2) financial stability; and 3) financial integration. We provide empirical evidence documenting the existence of such a trade-off in the period characterized by the financial crisis and by the sovereign debt crisis. Then, we conclude that the intense fiscal rules that have been introduced in the Eurozone after the emergence of the debt crisis reduced the capacity of national governments to deal with asymmetric shocks and became incompatible with either free capital mobility and/or financial stability.

JEL-Code: E440, E610, E620.

Keywords: fiscal policy rules, Eurozone, financial stability, policy objectives, optimal currency areas.

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1. Introduction

The theory of optimal currency areas (OCA) teaches us that in the absence of flexibility in the labour markets (wage flexibility and labour mobility) asymmetric shocks have to be taken care of by flexibility in national fiscal policies. If these fiscal policies are constrained by rules then countries will have an insufficient capacity for dealing with asymmetric shocks. We can then conclude that the monetary union will be suboptimal.

Prior to the emergence of the sovereign debt crisis, the notion that the monetary union was not optimal was considered to be of little practical importance. It appeared to be a purely academic concept without real world implications. The recent sovereign debt crisis has made it clear, however, that the implications of sub-optimality in the monetary union are very real. We now understand that a non-optimal monetary union can lead to financial instability and/or a breakdown of the integration of financial markets in the union. The reason why this is observed in a suboptimal monetary union is the following (see De Grauwe, 2011). When an asymmetric shock occurs and when national fiscal policies are constrained, financial market participants will anticipate major adjustment problems. If these are perceived to be severe enough, a self-fulfilling crisis may be set in motion pushing countries into a bad equilibrium. The latter is characterized by large capital outflows, surging government bond spreads and a deepening recession which leads to a further deterioration of public finances (De Grauwe, 2011; De Grauwe and Ji, 2013). This will also have as a result that financial markets get segmented with large differences in interest rates within the same monetary union.

The previous discussion suggests that in the presence of asymmetric shocks rigid fiscal rules are incompatible with financial integration and financial stability. Put differently, there appears to be a trade-off between fiscal rules, financial integration and financial stability. The reader steeped in the literature on "Impossible Trinities" will recognize a new one[1]. This is that in the presence of asymmetric shocks a monetary union cannot have fiscal rules together with financial stability and financial integration.

In this paper we analyse empirically whether such a trade-off (Impossible Trinity) exists in the Eurozone. Such an empirical analysis is important because it can shed

[1] The best known "Impossible Trinities" are: the open economy trilemma (Mundell, 1963; Fleming, 1962; Obstfeld and Taylor, 1998), the financial trilemma (Schoenmaker, 2011), the political trilemma (Rodrick, 2000) and the EMU trilemma (Pisany-Ferri, 2012).

some light on the need for enhanced fiscal rules in the Eurozone. These rules have become tighter since the sovereign debt crisis as a result of a perception among policymakers that a monetary union needs strong fiscal discipline. The issue remains whether making these rules tighter was the right response to the sovereign debt crisis.

The paper is organized as follows. In section 2 we present a stylized model in order to synthesize the essence of the trade-off. In section 3 we report the data used and show how the indicators to study the existence of the trade-off among the variables have been constructed. The results of the empirical analysis are reported and commented in section 4. In section 5 we conclude the study.

2. A Simple Representation of the Trade-Off

In this section we formalize the idea that there is a trade-off between fiscal rules, financial stability and financial integration in a monetary union. We adopt the formalization introduced by Ito and Kawai (2014), in which the authors develop an optimization problem for the open economy trilemma. Thus, we consider the problem to be one in which policymakers have three objectives: a fiscal rule, financial stability and financial integration. We obtain the following optimization problem:

$$\min_{FI,FS,FR} L = \alpha_1(1-FI)^2 + \alpha_2(1-FS)^2 + \alpha_3(1-FR)^2 \quad (1)$$

subject to

$$0 \leq FI, FS, FR \leq 1 \quad (2)$$

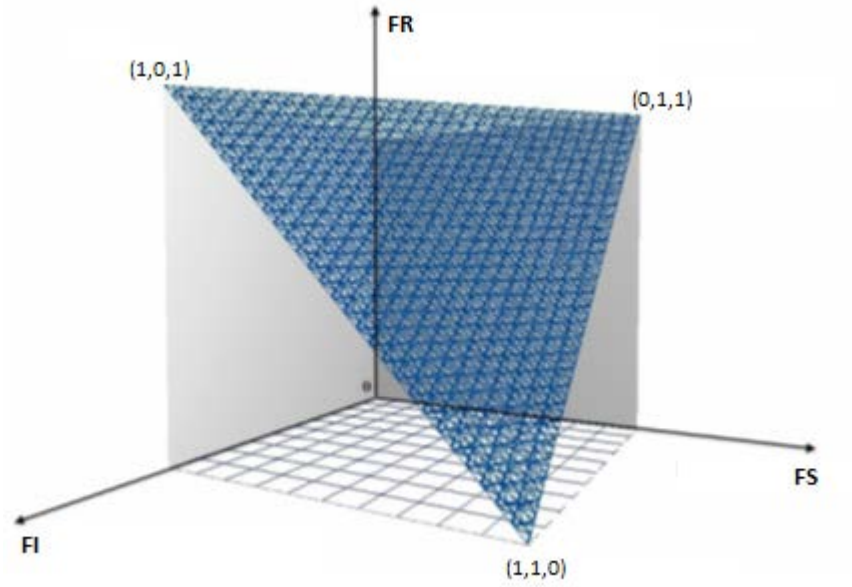
$$2 = FI + FS + FR \quad (3)$$

where *FI*, *FS* and *FR* represent the degree of Financial Integration, Financial Stability and Fiscal Rule, respectively. Each variable ranges between 0 and 1, and policy makers want to reach the highest degree possible of each policy goal in order to minimize their loss. When financial integration, financial stability and fiscal rule are fully reached together, the loss function reaches its minimum value of 0. The preference parameters α_1 , α_2 and α_3 represent the weight assigned by policy makers to each policy goal.

Equation (3) formalizes the existence of the trade-off, i.e. the maximum sum of the three indexes cannot be more than a constant and, combined with equation (4), it excludes any possibility of having full achievement of the three policy goals simultaneously. Since the indexes are assumed to range between 0 and 1, the fact their sum cannot exceed 2 establishes that the trade-off is binding.

In figure 1 the trade-off constraint is reported and it shows how each of the corner of the triangle excludes one policy objective. It is the result of the combination of the two constraints as represented by equations (2) and (3). Although equation (3) states that the sum of the three variables cannot exceed 2, the first constraint limits the value of a single variable to a maximum of 1. Therefore, the limited area in which possible combinations of the policy objectives can be achieved is the one showed in figure 1.

Figure 1: The Trade-off Constraint



Among all the combinations of the three variables allowed by the constraints, the policy maker choses the one that minimizes its loss function, and the mix of the three objectives is determined by the preferences parameters α_1 , α_2 and α_3. Any combination outside the shaded triangle is not feasible, while any combination below the triangle and inside the remainder of the cube is feasible but not efficient. Therefore, any policy maker choses a combiantion of the three policy objective that lies on the shaded trilemma triangle.

By solving the optimization problem, the following three first order conditions are retrieved:

$$FI = \frac{\alpha_1(\alpha_2 + \alpha_3)}{\alpha_1\alpha_2 + \alpha_2\alpha_3 + \alpha_1\alpha_3}$$

$$FS = \frac{\alpha_2(\alpha_1 + \alpha_3)}{\alpha_1\alpha_2 + \alpha_2\alpha_3 + \alpha_1\alpha_3}$$

$$FR = \frac{\alpha_3(\alpha_1 + \alpha_2)}{\alpha_1\alpha_2 + \alpha_2\alpha_3 + \alpha_1\alpha_3}$$

On the basis of the first order conditions it is possible to conduct a comparative statics analysis with respect to α_1, α_2 and α_3. The results are the following:

$$\frac{\delta FI}{\delta \alpha_1} \geq 0;\ \frac{\delta FI}{\delta \alpha_2} \leq 0;\ \frac{\delta FI}{\delta \alpha_3} \leq 0;$$

$$\frac{\delta FS}{\delta \alpha_1} \leq 0;\ \frac{\delta FS}{\delta \alpha_2} \geq 0;\ \frac{\delta FS}{\delta \alpha_3} \leq 0;$$

$$\frac{\delta FR}{\delta \alpha_1} \leq 0;\ \frac{\delta FR}{\delta \alpha_2} \leq 0;\ \frac{\delta FR}{\delta \alpha_3} \geq 0;$$

The results of this analysis are in accordance with the theorized trade-off, as placing a higher weight on a policy objective raises its level of attainment and reduces the levels of attainment in the other two. Therefore, these results synthesize the essence of the trade-off among financial integration, fiscal rule and financial stability. If, for instance, policy makers put a higher weight on the fiscal rule, the achievement of this policy objective increases ($\delta FR/\delta \alpha_3 \geq 0$), but the degree of achievement of the other two diminishes ($\delta FI/\delta \alpha_3 \leq 0$ and $\delta FS/\delta \alpha_3 \leq 0$). Similar conclusions can be obtained by modifying α_2 or α_1.

We will also allow for the possibility that the trade-off is not binding. In that case equation (3) becomes:

$$3 = FCM + FS + FPC \qquad (4)$$

Equation (4) implies that the three policy objectives can be fully achieved together and the trade-off is not binding for the policy maker. Therefore, the loss function can be minimized without any constraint and reaches its absolute minimum that is 0. In the empirical analysis we will test whether there are periods during which the trade-off was not binding in the Eurozone.

3. The Trade-off Indicators

In order to capture the trade-off among the policy variables, an appropriate set of indexes has to be selected. Along the framework highlighted in section 2, the existence of the trade-off is evaluated trough: 1) a financial integration index (FI); 2) a financial stability index (FS); and 3) a fiscal rule index (FR).

In order to estimate the trade-off, we employ a panel of 11 countries of the Eurozone (Austria, Belgium, Finland, France, Greece, Germany, Ireland, Italy, Netherlands, Portugal and Spain) by adopting quarterly data spanning the period 1999:Q1-2012:Q4.

We construct the three indexes so that each falls between zero and one. The indexes are constructed in the way that the value of one represents the maximum level of financial stability, a perfect degree of capital markets openness (financial integration), and the highest level of fiscal policy co-movement (full respect of the common rule). The opposite is when the indexes assume the value of zero.

Financial Integration Index (FI)

Concerning the measurement of the degree of financial market openness, there are two main categories of indexes: *de jure* and *de facto*. In this study a *de facto* measure is adopted. The motivation for this choice relies on the fact that members of the Eurozone are supposed to have implemented the necessary reforms for free capital mobility before entering the euro-area or during the first years of their membership. Therefore, a *de jure* measure will probably do not show any dynamics in the sample employed. The measure adopted relies on the one by Lane and Milesi-Ferretti (2003), in which the authors add up assets and liabilities for portfolio equity, FDI, debt, and financial derivatives and divide the total amount of capital movements by the national GDP. The

measure adopted in the present study is just a narrower version of this index considering only Direct Investment and Portfolio Investment. The index is calculated as follows:

$$FI_t = \frac{(FA+FL)_t - (FA+FL)_{min}}{(FA+FL)_{max} - (FA+FL)_{min}} \quad (5)$$

where FA and FL are financial assets and liabilities. FA is obtained by adding assets of direct investment and portfolio investment. FL is the sum of the liabilities of both direct investment and portfolio investment. Therefore, this index describes the capital account openness and it is based on the sum in absolute values of capital flows. Equation (5) shows how the index is constructed in a way that it ranges between 0 and 1, where 0 implies no capital flows. Therefore, perfectly open (and then integrated) financial markets will imply a value of 1.

Data for constructing FA and FL are obtained from the Balance of Payment database issued by the IMF (analytic presentation in BPM5 and BPM6 formats).

Financial Stability Index (FS)

It this study, financial stability is intended as the absence of excessive volatility of the financial markets. In the literature a very broad range of indicators to assess overall financial stability in a reliable manner has been derived. Nelson and Perly (2005) provide an extensive survey of this literature. The indicator adopted in this study measures the overall financial stability as a linear combination of the stability of bonds and equities markets. It is constructed as follows:

$$FS_t = 1 - \frac{\frac{\sigma_t^{BM} - \sigma_{min}^{BM}}{\sigma_{max}^{BM} - \sigma_{min}^{BM}} + \frac{\sigma_t^{SM} - \sigma_{min}^{SM}}{\sigma_{max}^{SM} - \sigma_{min}^{SM}}}{2} \quad (6)$$

where σ represents the squared deviation of the ten year bond yield (BM) and stock market index (SM) from their means, respectively. After having normalized the two

series between 0 and 1, the arithmetic average of the two is calculated. Then the FS index is obtained according to equation (6). This calculation is intended to capture the overall financial market degree of volatility by assigning the same weight to each of its two main sectors. From equation (6) it is clear that the FS index ranges between 0 and 1, and complete financial market stability is represented by a value of 1 in the index.

BM data are from the IMF database, while SM data are ibex35 (Spain), dax (Germany), mib storico (Italy), cac40 (France), athex composite (Greece), bel20 (Belgium), atx (Austria), aex (Netherlands), psi20 (Portugal), iseq overall (Ireland) and hexpic (Finland). These series are obtained by individual indexes and national stock exchanges websites.

Fiscal Rule Index (FR)

Fiscal rules reduce the capacity of countries to follow flexible fiscal policies to deal with asymmetric shocks. The more rigid the rule the lower is the fiscal capacity of countries to deal with asymmetric shocks. Put differently, when fiscal rules are soft countries can perform fiscal policies flexibly to respond to idiosyncratic developments in the country. This then allows them to follow fiscal policies that deviate from what other countries do. Thus, flexible fiscal policies make uncorrelated national fiscal policies possible. Conversely, fiscal rules force national fiscal policies to be correlated. This is how we will measure the intensity of fiscal rules: by their capacity to impose correlated fiscal policies.

From the preceding discussion it follows that a common fiscal rule is a synonym for fiscal correlation with the other members' fiscal stance. Therefore, the intensity of the fiscal rule is measured as the quarterly correlation of the public deficit/GDP ratio between country and the EMU average at time t.

$$FR_t = \frac{corr(def_t; def_{emu,t}) + 1}{2} \qquad (7)$$

Where def_t and $def_{emu,t}$ are public deficit/GDP ratios for the single country and the EMU countries average respectively; while $corr(def_t; def_{emu,t})$ refers to their correlation

over a quarter and provides information on co-movements of domestic and EMU deficits. The index lies between 1 and 0. Therefore, the fiscal rule index is a min-max normalization of this correlation with a higher value indicating greater degree of fiscal policy co-movement. In this case, data are obtained from the Eurostat database.

4. Empirical Analysis and Results

The existence of a trade-off among alternative policy goals was first estimated by Aizenman et al. (2008) and then applied in other studies by Hutchison et al. (2012), Hsing (2012) and Aizenman et al. (2013). In these studies the trade-off involved monetary independence, exchange rate stability and free capital mobility. The authors of the aforementioned studies aimed at empirically testing the existence of the open economy policy trilemma theorized in the Mundell-Fleming model (Mundell, 1963 and Fleming, 1962). In order to achieve this task, the common practice in this literature is to test if the weighted sum of the variables in the trade-off adds up to a constant. If this is the case, it can be concluded that the trade-off is binding as the rise in one of the variables implies a drop in another variable, or in the weighted sum of the other two.

In this section we empirically investigate the existence of the trade-off in a policy setting where the authorities enforce a fiscal rule, financial markets stability and financial market integration (free capital movements). We follow Aizenman et al., (2008 and 2013) and test if the weighted sum of the three variables adds up to a constant. If the trade-off is binding, it implies that the enforcement of more intense fiscal rules is associated with lower financial stability, and/or less financial integration. Thus, the existence of such a trade-off implies that a common fiscal rule can be harming to the economic stability of the union, as it may imply financial instability.

The easiest way to test the existence of the trade-off among the three variables is to suppose a linear relation. In particular, we investigate if the weighted sum of the three variables (FS, FI and FR) adds up to a constant, in this case set up to one. This implies examining the significance of the coefficients in the following linear regression:

$$1 = \beta_1 FI_{i,t} + \beta_2 FS_{i,t} + \beta_3 FR_{i,t} + \varepsilon_{i,t} \qquad (8)$$

The regression in equation (8) is first estimated for the entire panel and full sample period.

In the case of positive signs of the coefficients in the regression of equation (8), it can be concluded that the linear regression is able to model the trade-off among the three policy variables. On the contrary, a negative sign could indicate that the theory behind the trilemma is not correct, or that the relationship among its variables is not linear. Statistical significance of the estimated parameters also plays a role in this analysis.

The results from the pooled panel estimation of equation (8) are reported in Table 1(A). The first thing to note is that all the three estimated coefficients are positive and highly statistically significant. These elements suggest that a linear trade-off among the variables exists. Therefore, this constitutes evidence that the member countries of the Eurozone cannot fully achieve free capital mobility and financial stability under the constraint of a rule that tries to enforce national fiscal policies co-movements.

The estimated coefficients from equation (8) do not provide accurate measure of the weights policy makers attach to each policy goal. To obtain these weights we multiply the estimated coefficients with the average values of the variables. If the linear approximation is satisfactory, the sum of these weights should be close to 1. Therefore, in the fourth column of table 1 we report these weights. It is clear that the predicted weights based on our linear model sum up to around 1 (see the fifth column in table 1). This result further indicates that the linear trade-off is binding for the Eurozone. These results also show that for the euro-area countries, fiscal rules have been the main goal while financial integration and financial stability have had relatively small weights. Our panel estimation suggests that the weight assigned to the fiscal rules has been 0.82, while the weights assigned to financial stability and financial integration have been 0.12 and 0.01 respectively.

The previous estimation was obtained for the whole period. It is not to be excluded that there are changes in the trade-off over time. Therefore, we also perform a panel estimation of equation (8) for two sub-periods. We divide the sample in two periods, i.e. the period before the financial crisis and the period after where we use 2008 as the threshold. Therefore, our pre-crisis period runs from 1999:Q1 to 2008:Q2, while the post-crisis period runs from 2008:Q3 to 2012:Q4.

Tab. 1: Estimation Results

	Coefficient	Mean	Contribution (weight)	Sum of Contributions
(A) All Countries				0.9697
FR	1.109307*** (0.0212858)	0.7480992	0.8299	
FS	0.3933144*** (0.0394951)	0.306819	0.1207	
FI	0.0498086* (0.0262119)	0.3847142	0.0192	
(B) All Countries (99:q1-08:q2)				0.9911
FR	1.279704*** (0.0143372)			
FS	-0.0015529 (0.0302072)			
FI	-0.0361152** (0.0171049)			
(C) All Countries (08:q3-12:q4)				0.9456
FR	0.861252*** (0.0523422)	0.6677458	0.5751	
FS	0.7703814*** (0.0818211)	0.3654993	0.2816	
FI	0.2549367*** (0.063969)	0.3489782	0.0889	
(D) Core (99:q1-08:q2)				0.9963
FR	1.235773*** (0.0132837)			
FS	-0.0144138 (0.0240923)			
FI	-0.0165154 (0.0150306)			
(E) Core (08:q3-12:q4)				0.9593
FR	0.7676599*** (0.0752687)	0.7055332	0.5416	
FS	0.9037072*** (0.1084972)	0.3814626	0.3447	
FI	0.2154382*** (0.0799183)	0.3388622	0.0730	
(F) Periphery (99:q1-08:q2)				0.9879
FR	1.311854*** (0.0243197)			
FS	0.0814635 (0.0650986)			
FI	-0.0506847 (0.0319137)			
(G) Periphery (08:q3-12:q4)				0.9330
FR	0.9528364*** (0.0780349)	0.6190829	0.5899	
FS	0.6255768*** (0.1334098)	0.3478059	0.2176	
FI	0.3457828*** (0.1113804)	0.3631299	0.1256	
Notes: standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1				

The results of this analysis are reported in panels (B) and (C) of table 1. The results show that the trade-off among the three policy variables is binding only for the post-crisis period while it is not in the pre-crisis period. This suggests that before the crisis it was possible to enforce free capital mobility and fiscal rules without harming financial markets stability. It is only after the start of the financial crisis and during the sovereign debt crisis that the linear trade-off involving fiscal rules, financial stability and financial integration became binding. Thus, we can conclude that during the crises the use of intense fiscal rules that reduced the capacity of national governments to deal with asymmetric shocks became incompatible with either free capital mobility and/or financial stability.

We also find that, in the post-crisis period the weight assigned to financial stability increased and more than doubled (0.28), while the weight of fiscal rules decreased to 0.54. This suggests that during the financial and sovereign debt crises, countries in the Eurozone have been forced to reduce the importance for fiscal coordination in order to preserve financial stability by the fact that the trade-off started being binding.

As a further analysis we also split the panel in the groups of countries. The two groups are defined as "core" (Germany, France, Netherlands, Finland, Austria and Belgium) and "periphery" (Italy, Greece, Portugal, Spain and Ireland). As it is clear that the periphery group contains all the Eurozone countries that have suffered the major imbalances during the crises, this further division of the sample allows us to study if, and when, the trade-off has been binding and how it has been tackled in both groups. We report these results in table 1 panel (D) to (G). Once again, the linear trade-off is binding only in the post-crisis period in both groups. In addition, the weight assigned to financial stability increases in the core Eurozone countries, while in the periphery countries the weight assigned to fiscal rules is slightly higher.

How can these results be interpreted? Here is a possible interpretation. A monetary union creates the potential for two regimes. If there is trust in the optimality of the monetary union and thus in its long-term survival then asymmetric shocks lead to stabilizing capital flows. There is then little need for flexibility of fiscal policies to deal with these asymmetric shocks. Capital markets then take over the stabilizing role and capital flows are a stabilizing factor. In this case the trade-off between fiscal rules, financial stability and financial integration is non-binding. Financial integration is sufficient to maintain financial stability. There is little need for fiscal policies to take an

active role in stabilizing the economy after an asymmetric shock. This seems to have been the prevailing regime in the Eurozone during the period 1999-2008.

If, however, there is distrust in the optimality of the monetary union, so that financial markets lose their confidence in the sustainability of the monetary union, the trade-off between fiscal rules, financial stability and financial integration becomes binding. In this case fiscal flexibility is needed to maintain financial stability and financial integration. In this regime capital flows cease to be a source of stability after asymmetric shocks. On the contrary they become major sources of instability. This forces fiscal policy to take over as a stabilizing instrument. When, however, fiscal rules prevent governments from using fiscal policies flexibly, financial stability cannot be guaranteed. Financial integration can then also be turned back. This seems to have been the prevailing regime in the Eurozone during the period after 2008.

5. Conclusion

The theory of optimal currency areas suggests that in the presence of asymmetric shocks and rigidities in the labour markets rigid fiscal rules makes the monetary unions suboptimal. The latter creates the risk that market participants will fear difficult adjustment problems. This in turn can lead to self-fulfilling crises that undermine financial stability and that may lead to a breakdown of financial integration. This allowed us to conclude that a monetary union can give rise to a trade-off between fiscal rules, financial integration and financial stability.

In this paper we tested whether such a trade-off exists in the Eurozone. We found such a trade-off in the post-crisis period but not in the period preceding the financial crisis. Our interpretation of this result is the following. There appears to be two regimes in a monetary union. When trust in the stability of the Eurozone prevails then asymmetric shocks lead to stabilizing capital flows. There is then little need for flexibility of fiscal policies to deal with these asymmetric shocks. Capital markets then take over the stabilizing role and capital flows are a stabilizing factor.

When, however, there is distrust in the optimality of the monetary union, so that financial markets lose their confidence in its sustainability, the trade-off between fiscal rules, financial stability and financial integration becomes binding. In this case fiscal flexibility is needed to maintain financial stability and financial integration. Thus, we

can conclude that the intense fiscal rules that have been introduced in the Eurozone after the emergence of the debt crisis reduced the capacity of national governments to deal with asymmetric shocks and became incompatible with either free capital mobility and/or financial stability.

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