

## **The Drivers of Fiscal Deficits in Europe:**

### **The impact and interaction of internal and external fiscal rules and institutions**

#### **Abstract**

We search for drivers of fiscal deficits in Europe using a data panel containing annual data for 27 EU countries from 1991-2012. Our special focus is on the influence of fiscal rules as well as on fiscal councils, i.e. institutions that may help to reduce deficits and enforce fiscal rules by advising governments. We distinguish between internal fiscal rules and external rules that result from EMU membership. In addition, we consider the impact of measures that can help to circumvent fiscal rules, approximated by so called stock-flow-adjustments, which the literature suggests as an indicator for “creative accounting”. We especially analyze the interactive influence of the mentioned variables on the budget balance.

## **1 Introduction**

Fiscal deficits and the resulting extremely high indebtedness are a major threat to financial stability and the functioning of the financial and banking system, as for example the European debt crisis demonstrated very clearly. Fighting against deficits and high indebtedness is, thus, an important contribution to stability of the banking system and financial markets.<sup>1</sup> High deficits are primarily caused by myopic behavior of governments which optimize their behavior with a short-term perspective and neglect the long-term social optimum. Thus, they run high deficits, i.e. increase spending or cut taxes, in order to please the electorate, which is supposed to increase their chances to become reelected.

Fiscal rules are supposed to prevent such myopic behavior, which helps to reduce deficits. Besides internally imposed fiscal rules that result from the countries own initiative also external fiscal rules that result from international treaties may help to reduce deficits. In the European context especially EMU membership and the rules resulting from the stability and growth pact (the so-called Maastricht criteria) are to mention. More recently, as their major tool to fight deficits, the (most) European governments agreed on the fiscal compact, which implies that fiscal rules are enshrined in national laws. Thus, the fiscal compact is a kind of hybrid between internal and external fiscal rules. Thus, it is interesting question whether internal rules and/or external rules resulting from EMU membership influence fiscal budgets and whether there is a joint (reinforcing) impact of both types of rules.

However, not only fiscal rules but also institutional advisory bodies, so-called fiscal councils, that advise governments in fiscal and economic questions may help to fight against deficits by reducing myopic behavior of governments. This may result from two reasons.

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<sup>1</sup> Our paper deals with preventing future crises and increasing financial stability. It is not meant to provide answers to solve the current crisis. This means, we do not tackle the issue of whether it should be solved by higher deficit spending and deficits or austerity policy.

Firstly because they stimulate economic behavior of governments (even in the absence of fiscal rules) and second because they help to enforce fiscal rules, which also reduces deficits.

Our paper contributes to the literature in several ways. While there exists a comprehensive literature regarding the influence of fiscal rules on fiscal budgets only a few papers are concerned with the influence of fiscal councils. (See Section 2 for a literature overview). One major contribution of our paper is an indebt analysis of the influence of fiscal councils on fiscal budgets for a broad data sample. In particular, we consider the interactive influence of fiscal councils with several types of fiscal rules, which has not been done so far. The only papers that tackle the issue of fiscal councils (and rules) so far are Nehrlich and Reuther (2013) and Maltritz and Wüste (2014). While these papers focus on the interaction of internal fiscal rules with fiscal councils we contribute by considering in addition the interactive influence of external rules (resulting from EMU membership) with fiscal councils and the related external fiscal rules.

In addition, we contribute to the literature by considering the interactive influence of external fiscal rules resulting from EMU membership and internal fiscal rules in order to analyze whether both types of rules reinforce each other or whether they are rather substitutes. This is especially interesting with respect to the Fiscal Compact and the above mentioned hybrid nature of its resulting fiscal rules.

We contribute further by considering different periods. Besides the entire time span from 1991-2012 we especially focus on the pre-crisis period 1991-2006. This seems especially important since the battle against deficits and high indebtedness is first and foremost to fight in good and tranquil times while in crisis times the reduction of deficits and debts is much harder to achieve and maybe even bad for the economy – a lesson that many countries learnt in the great recession of the 1930ties. Our sample split provides, in addition, information on how the determinants of deficits change between tranquil and crisis times and may be seen as a robustness check for our findings.

Finally, we contribute by considering the influence of stock-flow-adjustments<sup>2</sup> and their relation to fiscal rules and councils. In several interesting paper, see, e.g. von Hagen and Wolff (2006), it has been shown that stock-flow-adjustments are strongly related to fiscal rules and EMU membership. This implies that governments apply creative accounting to circumvent fiscal rules. Based on these interesting findings we include stock-flow-adjustments in the analysis of fiscal budgets. In particular we consider the interactive influence of stock-flow-adjustments with the above mentioned variables. While Maltritz and Wüste (2014) provide first evidence on the interaction of (internal) fiscal rules and stock-flow-adjustments, we complement the literature by considering additionally the joint influence of EMU membership with stock-flow-adjustments. What is more, we analyze how stock-flow-adjustments and fiscal councils impact jointly fiscal budgets.

The remainder is organized as follows. In the next section we provide a more detailed overview on the literature and its results. In the third section we explain the empirical analysis and in the fourth section we provide our results. The last section concludes.

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<sup>2</sup> Stock-flow adjustments are deviations between fiscal deficits and changes in debt. In principle, the deficit should be equal to the increase of debt between two periods. However, this is often not the case. See Section 3 for more detailed discussion.

## **2 Literature review**

Since Kydland and Prescott (1977) posed the problems of time inconsistency and credible commitment in fiscal policy and postulated the advantages of rules-based over discretionary politics, a lot of empirical research has dealt with the effects of fiscal rules. Thereby, most scholars focused on U.S. states or EU members.

With regard to the U.S. states Clingermeyer and Wood (1995) come to a rather negative conclusion concerning fiscal rules. They find no significant effect of debt limitations on the change of the debt level. Legal constraints on taxation or spending even seem to have the paradox effect of increasing the debt level, as politicians strategically use borrowing to circumvent these constraints. Nice (1991) is similarly skeptical. He finds that balanced budget requirements have no positive influence – neither on the debt level nor on debt growth. Also debt limits seem to have only an effect on the kind of debt that is directly liable to the legal limit. However, overall governmental borrowing, e.g. including nonguaranteed or local debt, is not reduced.

A much more positive conclusion is drawn by the U.S. Advisory Commission on Intergovernmental Relations (ACIR 1987) and Alesina and Bayoumi (1996). Using an index which captures the stringency of the U.S. states' balanced budget requirements they find that stronger fiscal rules are associated with more fiscal discipline. However, when Eichengreen and Bayoumi (1994) use the same stringency index in a different setting, they find that it has no significant influence on the state budget balance. Instead they do find an effect of two dummy variables indicating whether there is a balanced budget requirement in a state and whether the state is obliged not to carry over a deficit into the next fiscal year. For expenditure and tax limitations ACIR (1987) could not verify a significant influence.

Regarding the influence of fiscal rules in the European Union the picture is equally diverse. Debrun (2007) and Debrun and Kumar (2007a; 2007b) conclude for the EU-15 excluding Luxembourg that fiscal rules are less an effective limit on discretionary fiscal

policy-making but rather a sign of some general governmental and societal commitment towards fiscal discipline. For the EU-25 Debrun et al. (2008) come to a different conclusion: In their model fiscal rules have a significant, positive influence on the cyclically adjusted primary balance. This finding is confirmed by Ayuso-i-Casals et al. (2009), who, however, use the same dependent variable but a lagged fiscal rule index in order to avoid issues of reverse causality. Also Nerlich and Reuter (2013) find for the EU-27 that fiscal rules significantly improve the cyclically adjusted primary balance, especially when they are laid down in the constitution. Particularly successful are balanced budget rules.

The recent sovereign debt crisis in Europe has led scholars to rivet also on the influence of fiscal rules on sovereign risk premia. Iara and Wolff (2011) analyze ten Eurozone countries and find that fiscal rules can effectively reduce yield spreads especially in times of market uncertainty. Heinemann, Osterloh and Kalb (2013), whose study covers 16 EU members, come to the conclusion that fiscal rules are particularly useful in increasing market confidence in countries with a history of low stability preferences or a low level of social capital and mutual trust within society.

So hitherto studies have given different answers to the question if fiscal rules have a significant, positive influence on fiscal discipline. The same is true for some control variables. In this context the voters' fiscal preferences are an illustrative example. To control for this effect is important because it can be the third variable to which both fiscal rules and tight fiscal policies might be connected. As Poterba (1996, 399) puts it:

“Voters in some jurisdictions may be less inclined to borrow to support current state outlays or to use deficits to shift the burden of paying for current state programs to the future. If these voters are also more likely to support legislative or constitutional limits on deficit finance, then the observed link between fiscal rules and fiscal policy could be spurious.”

For this reason many studies have introduced a proxy for voters' preferences in order to control for this potential omitted variable bias – with different results. Some studies on the U.S. states used a dummy variable indicating if a state is located in the south, because the Southern states are seen as fiscally more conservative and less prone to deficit spending. In ACIR (1987) this variable is insignificant in almost all models where it was applied. Also in Alesina and Bayoumi (1996) this variable is not significant on the five percent level. Eichengreen and Bayoumi (1994) find this variable highly significant in all of their models; however, it does not have the expected sign (i.e. southern states run smaller surpluses or larger deficits than others). Using poll data Clingermayer and Wood (1995) come to the conclusion that the more liberal (and the less conservative) a state's population the higher the growth in debt per capita. Also Nice (1991) and Kiewiet and Szakaly (1996) find that political liberalism is positively related to indebtedness.

In the context of European Union countries Debrun (2007) as well as Debrun and Kumar (2007a; 2007b) employ an ideology variable that increases with the degree of conservatism. They find that it has no significant influence on the cyclically-adjusted primary balance. However, when using the fiscal rule index as the dependent variable, it turns out that conservative governments even favor *less* strict fiscal rules than left governments. Debrun et al. (2008) use an index measuring the degree of conservatism in three different statistical specifications of the same model. In two of them the index is significant at the ten percent level and positively related to the cyclically adjusted primary balance, whereas it is not significant the other model. Nerlich and Reuter (2013) control for the ideological position of the government (on a left-right scale), too. However, they find this variable insignificant. In their study on the influence of fiscal rules on the yield spreads of 16 EU members Heinemann et al. (2013) use a control variable for the fiscal preferences of the incumbent government. They conclude that the investors' confidence is significantly higher for governments that favor higher taxes and higher spending than for low-tax and low-spending governments.

Feld and Kirchgässner (2006) use the share of left wing parties in the government as a control variable in their analysis on Swiss cantonal deficits and debt per capita. However, this measurement of the government's ideological position is insignificant. Feld et al. (2013) control for the voters' preferences towards government spending, when they analyze the influence of fiscal rules on cantonal bond yield spreads in Switzerland. They also find that it has no significant influence.

Of course, the results of these studies are not fully comparable, because the fiscal preferences of the electorate have been operationalized in many different ways, they were used in different models, different geographical contexts and were run against different dependent variables. Nevertheless: This control variable is highly volatile with regard to its significance throughout the models.

Also the influence of fiscal councils should be considered in an analysis of the determinants of fiscal deficits, on the one hand as a control variable when asking for the influence of fiscal rules, but on the other hand it is also interesting to see whether fiscal councils are of help in fighting deficits. This issue was addressed in Wyplosz (2012), who argues that fiscal rules may be ineffective because of time inconsistency, since policy makers have strong incentives to violate fiscal rules. He tackles the issue with case studies in which it turns out that fiscal councils can help to relieve the problem under certain circumstances. An attempt to approach this issue quantitatively has been made by Debrun (2007) and Debrun and Kumar (2007b; 2007a). They provide a bivariate analysis on the relationship between the restrictiveness of fiscal councils and the strength of fiscal rules, i.e. they employ a simple correlation without any control variables. Their conclusion is that the relationship between both is rather weak and that there is even some evidence for a negative relationship between them. This would allow for the counterintuitive assumption that fiscal rules and councils might be substitutes rather than complements. The reason therefore could be "that countries that feel the need for relatively restrictive fiscal rules, may be reluctant to allow for additional



external influence on the policymaking process, possibly because they value discretion per se” (Debrun and Kumar, 2007b). On the other hand, however, the same authors find that the coefficient of the fiscal council index is positive and highly significant in a multivariate regression analysis, where the fiscal rule index is used as a dependent variable, so that “the presence of fiscal councils would thus appear to contribute positively to either the emergence of fiscal rules or their more effective enforcement” (Debrun 2007; Debrun and Kumar 2007a; 2007b).

Finally, Nerlich and Reuter (2013) set out to test the relationship between fiscal rules and fiscal councils in a multivariate context. Analyzing the EU-27 from 1990 to 2012 they find that the effectiveness of fiscal rules can be strengthened by fiscal councils, especially when they are independent from the government regarding the nomination of staff and resources. We enhance this interesting literature by using indices to measure the strength of fiscal rules and fiscal councils with higher precision than with dummy variables used in this paper. Instead we use an interval-scaled index in order to measure different characteristics of fiscal rules and councils.

### **3 Description of the Empirical Analysis**

In the empirical analysis we use panel data of 27 EU countries with annual time series covering the period 1991 to 2012. More current data for our main quantity of interest, the fiscal rules index provided by the European Commission, is not available (even in 2014 when the paper is written). Annual data are used since most of the variables are not available in higher frequency. Since for some countries, especially new East- and Central-European EU members, the required data are not available since 1991 the panel is unbalanced.

We use the primary budget balance as the dependent variable. It results as the difference between government’s revenues and expenditures but excludes interest payments.

The major advantage of excluding interest payments is that it provides a more precise picture of the current situation and the work of the actual government. The major share of interest payments cannot be controlled by the current government, because they were typically contracted in former years (unless for very short-term debt). Also the amount of outstanding debt where this interest has to be paid for was taken up in former times.

We consider different types of explaining variables, which are described in more detail in Table A-2 in the appendix. In searching for determinants of fiscal budgets we consider a variety of economic and socio-political variables. Our main focus is on the influence of fiscal rules, fiscal councils, the membership in the EMU (which implies certain fiscal rules imposed by the Stability and Growth Pact) and stock-flow-adjustments (which may be used to ease the burden of fiscal rules). In particular, we analyze the joint influence of these variables by considering their interaction variables.

To measure the influence of fiscal rules we use a time series that reflects a broad and detailed set of information. It is based on the 2012 version of the fiscal rules index provided by the European Commission's (European Commission, 2006, and Table A-3 in the appendix). This data considers whether fiscal rules are in place and, what is more, several features of these rules. This covers the statutory basis of the rule (e.g. whether it is articulated in the constitution or in an ordinary law), the possibility to set and revise objectives, the mechanisms to enforce the rule, how visible are the rules in the media, how many rules a country uses, and which fraction of the government sector is subject to the rules.

Besides internal rules, which means rules that were installed by the country's own will without any external impact, we also consider fiscal rules that result from external relations. In particular we consider whether European countries are EMU members in the observed year, since the EMU related stability and growth pact imposes fiscal rules – the well-known 'Maastricht' criteria. Thus, we include an EMU dummy.

Countries that try to reduce fiscal deficits may (alternatively or additionally to fiscal rules) institute fiscal councils. In fact, several types of fiscal councils exist in many European countries for several years. Since the literature on the effectiveness of fiscal councils in influencing fiscal budgets is scarce and the results are mixed and even contradicting (see Section 2) a robust analysis of whether and under which circumstances fiscal councils do influence the fiscal budget is relevant. We constructed a fiscal council index along three dimensions: the scope, the independence, and the influence of the fiscal council (for more details on the index construction see Table A-2 in the appendix).

To explain stock-flow-adjustments (SFA), which are sometimes also called debt-deficit adjustments, we start with the basic relation for public finance:

$$D_t = B_t - B_{t-1} \quad \rightarrow \quad 0 = B_t - B_{t-1} - D_t \quad (1)$$

It says that the budget deficit,  $D_t$ , equals the change of the debt, i.e. the difference between the debt level in year  $t$ ,  $B_t$ , and the year before,  $B_{t-1}$ . However, in practice often differences are to observe. These residuals are the stock-flow-adjustments, SFA:

$$SFA = B_t - B_{t-1} - D_t \quad (2)$$

SFA appear as residuals resulting for a variety of reasons: “primarily from financial operations, for example, debt issuance policy to manage public debt, privatisation receipts, impact of exchange rate changes on foreign denominated debt. In general these should tend to cancel out over time” (European Commission 2003, 82). For a more detailed description of measures that lead to SFA, we refer to the literature, where this is already explained in detail

with interesting examples (see, e.g. Dafflon and Rossi (1999) as well as in Koen and van den Nord (2005)). While stock-flow-adjustments could be – in principle – random residuals the literature (see von Hagen and Wolff (2006)) could show that they are systematically correlated to fiscal rules. This provides evidence that stock-flow-adjustments are applied by policymakers to circumvent fiscal rules. Based on these findings we consider stock-flow-adjustments in our regressions as an control variable and to consider their joint impact with measures to fight deficits as fiscal rules and councils.

Additionally to the so far discussed variables on that we are primarily interested we consider also several other potential determinants discussed in the literature. This is, on the one hand, since we should control for such influences in delivering an unbiased results for the other variables. On the other hand, we are of course interested in deriving additional influences in order to provide a comprehensive picture about the drivers of fiscal deficits.

One group of variables concerns the economic conditions. One example is the total debt. We expect that higher debts tend to reduce deficits since they are related to higher spending for capital costs, which in turn is supposed to reduce the propensity for deficits. Of course higher debt also leads to higher interest rates, which increases deficits. Since we use the primary balance where interest rates are excluded, such an influence is not to expect. Similar reasoning applies for the interest rates, which we also include in our analysis. We use the 10-year sovereign bond yield. We expect that higher interest rates reduce deficits since higher interest rates mean higher cost of capital, which is supposed to reduce the propensity to run a deficits. In addition we include the real GDP growth. It serves as proxy for changes in the general economic situation and its influence on spending and tax revenues, which are directly related to the fiscal budget. Also the unemployment rate may be related to the fiscal budget, especially to public spending for unemployment benefits.

Besides economic conditions also socio-political influences (in addition to those already discussed) may impact the fiscal budget. We include the population share of people 65 years and older in as a proxy for the ratio of retired people and its influence on public spending, as suggested in Krogstrup and Wälti (2008). In addition, we include a dummy that reflects whether the country faced an election of (central) governmental institutions in the specific year. This aims to account for the findings of the political business cycle theory. We also include a federalism dummy in order to account for structure of the state, i.e. whether we consider a federal country, as e.g. in Germany, or whether it is governed in a centralized way, as e.g. in France. Since different incentives toward the fiscal budget between the central government and regions and between the regions itself exists and differences in the state structure provide different mechanisms for solving these problems one can suppose that the state structure has an influence on budget balance (in one direction or another). We also account for the political orientation of the government by including the ratio of left-wing members of the parliament. In the most discussions left-wing parties are assumed to be more in favor for public deficits than conservative ones.

## 4 Results

We make use of the panel structure of the data by considering time effects. We do not consider country effects since several variables are time invariant or they do not vary much over time. Additionally, we provide results for pooled data. We start with discussing the separate influence of the variables before we turn our attention to interaction terms and the joint influences. Since the numbers of the primary fiscal balance have strong first-order autocorrelation we include an AR(1) term, which shows high significance in all settings. The autocorrelation issue is solved by inclusion of the AR term as, e.g., results of the Breusch-Godfrey test show. Because of heteroskedasticity issues we use White robust standard errors.

### *Basic estimation: 1991-2012*

Our baseline results without interaction terms are displayed in Table 1. A first striking result with respect to our research question is that the (internal) fiscal rules index is significant with a very low p-value. This is in line with the majority of the papers on this issue and is backing their findings by new data. The sign of the coefficient is positive. This is what we expect since the primary balance is defined in a positive direction not in the direction of a deficit: An increase in the variable means that the difference between revenues and spending is increased or the deficit is reduced. This seems to be fostered by fiscal rules.

A second important result is that fiscal councils and external fiscal rules resulting from EMU membership seem to have no influence on the fiscal budget. Both seem not to improve (or worsen) the fiscal position significantly. With respect to EMU membership the low significance may result since the positive influence that rules related to EMU membership are supposed to have may be offset by negative influences of EMU membership. Membership in the Eurozone may, e.g., create stronger incentives to take up loans and provide better access

to capital markets, e.g. since governments and capital market (correctly) anticipated help from the EMU in crisis situations, which tends to worsen the fiscal position.

**Table 1: Estimation Results without Interaction Terms for Panel Regression with Time Effects**

Dependent Variable: PRIMEBAL

Sample: 1991-2012

Periods included: 22

Cross-sections included: 27

Total panel (unbalanced) observations: 449

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.212376	0.823590	-0.257866	0.7966
PRIMEBAL(-1)	0.709601	0.039686	17.88039	0.0000
GDP	0.034447	0.043287	0.795775	0.4266
DEBT	0.012345	0.003528	3.498738	0.0005
YIELD	0.092394	0.064825	1.425277	0.1548
INFLATION	-0.051458	0.051294	-1.003197	0.3164
UNEMPLOYMENT	-0.028295	0.007088	-3.991926	0.0001
POP-SHARE: 65	-0.053504	0.048303	-1.107657	0.2687
ELECTION-DUMMY	-0.641306	0.155492	-4.124359	0.0000
POL	-0.002479	0.002009	-1.233938	0.2179
FED	0.182836	0.236734	0.772326	0.4404
SFA	0.036250	0.009329	3.885669	0.0001
FRI	0.368457	0.099178	3.715089	0.0002
FCI	0.005209	0.044177	0.117914	0.9062
EURO	0.045208	0.211427	0.213823	0.8308
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.800151	F-statistic	47.24466	
Adjusted R-squared	0.783215	Prob(F-statistic)	0.000000	

Note: The meaning of the shortcuts is as follows: POL = political orientation, FED = federalism dummy, SFA = stock-flow-adjustments, FRI = fiscal rules index, FCI = fiscal councils index, EURO = EMU membership. See the appendix for further explanation of variables.

In addition to the fiscal rules also stock-flow-adjustment (SFA) are highly significant. Since this indicates a strong relation between stock-flow-adjustments and the (officially reported) fiscal balance one should take into account stock-flow-adjustments, at least as a

control variable, in analyzing the determinants of fiscal balances. The positive sign is what we expect (as Eq. 2 shows): higher stock-flow-adjustment increase the official reported numbers of the fiscal budget (i.e. they reduce the reported deficit).

Also the election dummy shows a significant negative influence, i.e. it points the expected direction. In election years the fiscal balance is significantly lower since governments are (more) in favor for deficit spending in order to increase the chances to become reelected, as the political business cycle theory predicts. The significant and robust influence of the election dummy is a very important finding for our research since it indicates myopic behavior of governments, which is why fiscal rules (supposed to bind governments) may help to improve the fiscal budget. With respect to the other socio-political variables, as political orientation of the government, the federalism dummy and the share of people over 65 we do not find a significant influence.

Besides the so far discussed socio-political variables also some of the economic variables show a significant influence in the expected direction. The indebtedness has a significant positive influence on the primary balance. This result seems somewhat surprising at the first glance since high debt is usually thought to be associated with high deficits instead of positive balances. However, higher debt implies higher financing cost. This should reduce (incentive for) deficits. This is reflected by our findings. Here, one has to keep in mind that the *primary* fiscal budget, which excludes interest payments for outstanding debt, is our dependent variable. While such interest payments and thus the amount of outstanding debt tend to reduce the fiscal balance (or increase the deficit) in general, such type of impact does not impact the primary balance. Also the unemployment rate has a significant influence on the primary balance. The influence of the unemployment rate is negative. This is again what we expect; a higher unemployment rate means higher government spending since unemployment benefits are mostly not (fully) financed by insurances.



Several economic variables seem to have no influence on the fiscal budget. These are inflation, the GDP growth rate and interest rates reflected by 10-year bond yields. However, their insignificance should be handled with care since it may result from multicollinearity issues. The GDP growth rate is highly (negatively) correlated with the unemployment rate with a correlation coefficient of -0.71 and both variables are thought of as a measure for the business cycle. If we neglect the unemployment rate in the regression GDP growth is highly significant with a positive sign. Similarly bond yields and debt are both a measure for the costs of capital and both variables are correlated (correlation coefficient: 0.23). If we neglect debt the bond yields are highly significant. Only inflation remains insignificant in both cases.

These results are confirmed by results of pooled regression which we add as a robustness check in Table A-5 in the appendix. In this case GDP growth, yield spreads and even GDP are significant. For all the variables where we detect significant influences in the panel regression with time effects, we found significance at usual levels in the pooled estimation, too. Also the direction of influence is equal.

#### *Results for the pre-crisis period*

Now we consider the results for pre-crisis years 1991-2006. This issue is important since we aim to answer the question of how deficits and high indebtedness can be avoided in non-crisis years, while in crisis years the reduction of deficits, as by cuts in spending, are maybe not the best idea. In addition, considering the pre-crisis period may be seen as an additional robustness check. The results are shown in Table 2.

In fact, the results with respect to significant variables differ not much from those obtained for the entire sample. All the variables significant for the entire sample are significant at usual levels also in the pre-crisis period, while the insignificant variables remain insignificant in the

pre-crisis sample. The only exception is the share of people above 65, which is significant in the pre-crisis period but not in the entire sample. Also the overall fit of the regression is rather similar as the comparable  $R^2$  of about 80% shows.

**Table 2: Estimation Results without Interaction Terms for Panel Regression with Time Effects for the Pre-Crisis-Period (1991-2006)**

Dependent Variable: PRIMEBAL

Sample: 1991-2006

Periods included: 16

Cross-sections included: 27

Total panel (unbalanced) observations: 292

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.059219	0.935819	1.131863	0.2587
PRIMEBAL(-1)	0.707422	0.038881	18.19473	0.0000
GDP	0.034475	0.049266	0.699767	0.4847
DEBT	0.014761	0.003953	3.734083	0.0002
YIELD	0.047529	0.092973	0.511211	0.6096
INFLATION	-0.030274	0.064317	-0.470699	0.6382
UNEMPLOYMENT	-0.030223	0.006739	-4.484909	0.0000
POP-SHARE: 65	-0.110695	0.052619	-2.103696	0.0364
ELECTION-DUMMY	-0.717547	0.171278	-4.189369	0.0000
POL	-0.002335	0.002299	-1.015391	0.3109
FED	0.173259	0.273947	0.632454	0.5276
SFA	0.029687	0.012457	2.383219	0.0179
FRI	0.463321	0.108514	4.269697	0.0000
FCI	-0.022426	0.049188	-0.455930	0.6488
EURO	0.271107	0.247171	1.096837	0.2737

Effects Specification

Period fixed (dummy variables)

Weighted Statistics

R-squared	0.816350	F-statistic	40.15950
Adjusted R-squared	0.796022	Prob(F-statistic)	0.000000

Note: The meaning of the shortcuts is as follows: POL = political orientation, FED = federalism dummy, SFA = stock-flow-adjustments, FRI = fiscal rules index, FCI = fiscal councils index, EURO = EMU membership. See the appendix for further explanation of variables.

As a robustness check we provide the results for pooled estimation for the pre-crisis-period in Table A-6. The results are very similar to those obtained for panel estimation with

pre-crisis-data (Table 2) and confirm these findings. Compared to the pooled estimation for the entire sample (See Table A-5 in the appendix) two main differences are to observe. Inflation as well as bond yields are not significant, while they are in the pooled estimation for the entire sample but not in the panel estimation. The non-significance of the bond yields indicates that especially in the pre-crisis period the capital costs did not influence the government's decision on fiscal budgets.

#### *Interaction terms and joint influences*

Now we turn our attention to the joint influences of the internal fiscal rules and external fiscal as well as of fiscal councils. We also consider the interaction of these measures to improve the fiscal budget with stock-flow-adjustments, i.e. indicators for measures to circumvent such improvements. In order to analyze the joint influence of these variables we include their interaction terms in the analysis. The results are reported in Table 3.

With respect to the control variables significant in the settings without interaction terms discussed above we do not find considerable differences. All of them are significant in the new regression model, too. This underpins the robustness of our results with respect of the significant control variables. Especially also the yield spreads are significant even in the panel setting with time effects. The other control variables are still insignificant. Our robustness check with pooled estimation shows also for GDP growth and inflation a significant influence, which is, however, weak in the latter case. With exception of these findings the results are generally confirmed.

**Table 3: Estimation Results including Interaction Terms**

Dependent Variable: PRIMEBAL

Sample: 1991-2012

Periods included: 22

Cross-sections included: 27

Total panel (unbalanced) observations: 449

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.999625	0.811865	-1.231270	0.2189
PRIMEBAL(-1)	0.688512	0.042092	16.35723	0.0000
GDP	0.041031	0.041237	0.995008	0.3203
DEBT	0.013610	0.003779	3.601511	0.0004
YIELD	0.146571	0.068491	2.140006	0.0329
INFLATION	-0.056266	0.051208	-1.098788	0.2725
UNEMPLOYMENT	-0.028915	0.006946	-4.162599	0.0000
POP-SHARE: 65	-0.034713	0.048977	-0.708760	0.4789
ELECTION-DUMMY	-0.608843	0.151137	-4.028408	0.0001
POL	-0.001862	0.002044	-0.910958	0.3629
FED	0.435827	0.261741	1.665110	0.0967
SFA	0.026662	0.014967	1.781379	0.0756
FRI	0.167946	0.132410	1.268376	0.2054
FCI	0.022125	0.046532	0.475469	0.6347
EURO	0.173417	0.328723	0.527549	0.5981
FRIxFCI	0.089391	0.032429	2.756511	0.0061
FRIxSFA	0.019957	0.009511	2.098271	0.0365
FRIxEURO	0.182512	0.190314	0.959007	0.3381
FCIxSFA	-0.005006	0.006621	-0.756089	0.4500
FCIxEURO	-0.117712	0.078936	-1.491230	0.1367
SFAxEURO	0.040133	0.025285	1.587221	0.1132

## Effects Specification

Period fixed (dummy variables)

## Weighted Statistics

R-squared	0.811042	F-statistic	42.60768
Adjusted R-squared	0.792007	Prob(F-statistic)	0.000000

Note: The meaning of the shortcuts is as follows: POL = political orientation, FED = federalism dummy, SFA = stock-flow-adjustments, FRI = fiscal rules index, FCI = fiscal councils index, EURO = EMU membership. See the appendix for further explanation of variables.

Also the stock-flow-adjustments are significant in the new setting. The (internal) fiscal rules index, by contrast, loses its significance if we include its interaction with other variables. However, this may result from multicollinearity issues because of a high correlation to the newly included interaction terms. In interaction with fiscal councils and stock-flow-

adjustments the fiscal rules index has, by contrast, a significant influence. Thus, fiscal rules have in any case a positive impact on the fiscal budget either jointly with fiscal councils or stock-flow-adjustments or even without these interactions. Since the fiscal rules index is significant in the setting without interaction terms we cannot rule out that it has an impact even without the interaction and we falsely neglect its significance.

The positive joint influence of fiscal rules and fiscal councils means that councils improve the performance of rules, e.g. by supervising governments and leading the public opinion. The positive impact of the interaction of councils and rules also indicates that councils do help to improve the fiscal balance, at least when rules are in place.

With respect to the other interaction terms we do not find a significant influence. This could, however, result from multi-co-linearity issues following from correlation between interaction terms. To control for this issue we run separate regressions for the non-significant interaction terms where all other interaction terms are excluded. The results are shown in Tables A-8 a)-d) in the appendix. It can be seen that also in these settings the other interactions are not significant. The only exception is the interaction between stock-flow-adjustments and EMU membership. Thus, we cannot be sure whether a joint impact of both variables exists. It would mean that EMU membership stimulates the window-dressing of fiscal budgets by stock-flow-adjustments.

Also the evidence provided by pooled estimation (see Table A-7 in the Appendix) points to a significant joint influence of stock-flow-adjustments and Eurozone membership. It confirms also the significant interactive influence of fiscal rules and fiscal councils as well as of fiscal rules and stock-flow-adjustments, which we detected by panel estimation with time effects. In the pooled estimation we find furthermore a significant joint influence of fiscal councils and stock-flow-adjustments. Regarding the influence of control variables we come up with similar results as discussed so far and, thus, confirm these findings: Besides the

election dummy out of the socio-political variables several economic variables, as GDP growth, outstanding debt and unemployment are significant. The results of the pooled setting again indicate that also inflation and bond yields have a significant impact on the fiscal budget.

#### *Interaction terms and joint influences in the pre-crisis-period*

Next we consider how joint influences work in the pre-crisis-period, which will be interesting since it shows whether there is a positive interactive impact that helps to improve the fiscal budget and reduce indebtedness in tranquil periods, when such improvements should be mainly achieved.

First of all, our findings confirm the major results from above. There is a positive joint impact of (internal) fiscal rules and fiscal councils, which we also detected for the complete sample. Similarly the joint impact of fiscal rules and stock-flow-adjustments is confirmed. Also the significant joint impact of stock-flow-adjustments and EMU membership, which we found at least by excluding the other interaction terms, is approved. In addition, we found in the pre-crisis period a significant joint influence of EMU membership and fiscal rules as well as EMU membership and fiscal councils. The former could be interpreted as evidence that external and internal rules reinforce each other.

The findings of the pooled estimation for the pre-crisis period displayed in Table A-9 in the appendix again confirm the results for our single variables and control variables. Also the significant joint influence of fiscal rules and councils as well as fiscal rules and stock-flow-adjustments is approved. Also concerning the other interaction terms the pooled estimation provides evidence that support impact of the interaction terms since in the pooled estimation all interaction terms are significant in the pre-crisis period.

**Table 4: Estimation Results including Interaction Terms in the Pre-Crisis-Period (1991-2006)**

Dependent Variable: PRIMEBAL

Sample: 1991-2006

Periods included: 16

Cross-sections included: 27

Total panel (unbalanced) observations: 292

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.320138	0.892994	0.358500	0.7203
PRIMEBAL(-1)	0.663631	0.040710	16.30130	0.0000
GDP	0.051818	0.046004	1.126370	0.2611
DEBT	0.018518	0.004317	4.289794	0.0000
YIELD	0.068303	0.089026	0.767218	0.4437
INFLATION	-0.020174	0.064535	-0.312612	0.7548
UNEMPLOYMENT	-0.028835	0.006671	-4.322360	0.0000
POP-SHARE: 65	-0.099657	0.054843	-1.817114	0.0704
ELECTION-DUMMY	-0.664400	0.168237	-3.949190	0.0001
POL	-0.001477	0.002256	-0.654616	0.5133
FED	0.416157	0.290718	1.431479	0.1535
SFA	0.023125	0.015523	1.489698	0.1375
FRI	0.211753	0.155957	1.357769	0.1757
FCI	0.027132	0.053267	0.509367	0.6109
EURO	0.333306	0.354009	0.941518	0.3473
FRIxFCI	0.103756	0.039485	2.627707	0.0091
FRIxSFA	0.030508	0.011101	2.748222	0.0064
FRIxEURO	0.359142	0.182582	1.967015	0.0503
FCIxSFA	-0.000450	0.006455	-0.069742	0.9445
FCIxEURO	-0.166854	0.083777	-1.991644	0.0475
SFAxEURO	0.070539	0.029435	2.396428	0.0173
Effects Specification				
Period fixed (dummy variables)				
Weighted Statistics				
R-squared	0.837375	F-statistic	37.66209	
Adjusted R-squared	0.815141	Prob(F-statistic)	0.000000	

## 5 Conclusion

We analyze empirically the determinants of fiscal deficits in Europe using panel regressions for a sample of 27 EU countries from 1991 to 2012 where the primary budget balance is the dependent variable. Besides the entire sample we also consider the pre-crisis period in order

to identify measures to reduce deficits and debts in tranquil times, which are better suited to achieve these aims than crisis periods. We especially consider on the influence of (internal) fiscal rules, membership in the Eurozone, which indicates external fiscal rules resulting from EMU membership, and fiscal councils. We also include stock-flow-adjustments, which are supposed to indicate “creative accounting”, i.e. measures to circumvent fiscal rules. Our special focus is on the interaction of the mentioned variables in influencing the budget balance. Our data set comprises besides these variables several economic and social-political control variables.

We find a significant negative influence of unemployment rates on the fiscal balance and a positive influence of total government debt. Regarding bond yields and GDP growth the results are somewhat mixed, presumably because of multicollinearity issues. In panel estimations of the full model with time effects they are not significant, while in pooled estimations or by excluding the correlated variables they show significant positive impact on the fiscal balance.

We find a very robust negative impact of elections on fiscal budgets, which indicates myopic behavior of governments. Fiscal rules seem to be helpful in reducing such behavior since they have positive impact on the fiscal balance. Also stock-flow-adjustments are significantly related to the fiscal balance, which indicates that they should be included in the regression as control variable. Fiscal councils and EMU membership show, by contrast, no significant influence as stand-alone variable.

However, the interaction of fiscal councils with fiscal rules has a significant impact on the budget balance. This can be seen as empirical evidence that fiscal councils contribute to the improvement of fiscal balances by enforcement of fiscal rules. This result is confirmed in various settings, i.e. also for the pre-crisis-period, no matter whether we consider panel or pooled estimation. Similarly also fiscal rules and stock-flow-adjustments have a robust significant joint impact.



The evidence regarding the influence of other interaction terms is somewhat mixed. For the interaction of fiscal councils with EMU membership and stock-flow-adjustments as well as of Eurozone membership with stock-flow-adjustments and with (internal) fiscal rules we do not find a significant impact for panel estimations of the entire sample. However, in the pre-crisis period we observe significant influences. In particular internal and EMU membership (and the related external fiscal rules) have a joint positive impact. Pooled estimations of these interaction terms provide additional evidence for the significance of the interactions.

In order to increase financial stability and the functioning of the financial and banking system European countries need to reduce fiscal deficits and the enormous levels of public debt. Our results indicate that fiscal rules help to achieve this goal by binding governments and reducing their myopic behavior, for which our results provide clear evidence. Fiscal councils seem to be helpful at least by enforcing fiscal rules. EMU membership and the corresponding external fiscal rules seem not to improve fiscal budgets, which may, however, result because other features of EMU membership may provide incentives to run high deficits.

The Fiscal Compact – thought as one of the EU’s main tools to prevent future crisis – implies the adoption of external rules into national laws, which means that rules have an external and internal component. Our results indicate that because of the latter it may become more effective than the Stability and Growth pact. Also the positive joint impact of (internal) fiscal rules and EMU membership, which implies external rules, found especially for tranquil times can be seen as a good sign in this respect.

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## Appendix

Table A-1: Empirical Studies on the Influence of Fiscal Rules on Fiscal Performance

### Empirical Studies on the Influence of Fiscal Rules on Fiscal Performance

Table 3 below reviews the most important studies on the empirical effect of fiscal rules on the sustainability of government finances. Studies which include fiscal rules as dependent variables are not reviewed here. Likewise, we have ignored studies that mainly use fiscal rules as regressors for dependent variables not directly related to fiscal sustainability, e.g. output volatility (Bayoumi and Eichengreen, 1995; Fatás and Mihov, 2006; Badinger, 2009) or the response to fiscal shocks (Alt and Lowry, 1994; Poterba, 1994). Furthermore, we incorporated only papers which test *explicitly* for fiscal rules, studies where fiscal rules are only one of several items in a composite index of fiscal governance (e.g. Gleich, 2003; Mulas-Granados et al., 2007) are excluded here, too.

Table 1: Major Studies on the Influence of Fiscal Rules on Fiscal Sustainability

(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
Studies on U.S. states					
ACIR (1987) 50 U.S. states	Balanced budget rules	<ul style="list-style-type: none"> <li><i>Stringency Index</i> Additive index which covers the legal basis of the BBR, whether a balanced budget must only be submitted or also passed, and in how far a deficit can be carried over to other</li> </ul>	<ul style="list-style-type: none"> <li>State budget balance per capita; level of state spending from own sources; state tax revenue; net long-term state debt per capita; full-faith and credit debt per capita; non-guaranteed debt per capita</li> </ul>	<ul style="list-style-type: none"> <li>State income per capita</li> <li>Mineral output per capita</li> <li>Percentage of population aged 65 and older</li> <li>Dummy variable indicating whether a state is located in the south</li> <li>Year in which the statehood was granted</li> <li>Size of the</li> </ul>	<ul style="list-style-type: none"> <li>The more stringent the balanced budget rule, the lower the governmental deficits, the debt, the spending and taxes</li> <li>Debt limits have a significant, negative influence</li> </ul>

<sup>3</sup> Excluding lagged dependent variables the variables named in column (3). Significant variables are italicized, insignificant ones are not; in brackets: “+” means a positive and “-” a negative influence on the dependent variable(s)

(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
		<p>periods; index ranges from 0 to 10, whereby 0 indicates no balanced- budget rule at all and 10 the strictest one possible</p> <ul style="list-style-type: none"> <li>• Dummy variable indicating whether a state is allowed to carry over a deficit into the next fiscal year</li> <li>• Dummy variable indicating whether a state has a constitutional debt limit</li> <li>• Dummy variable indicating whether a state has a tax and/or expenditure limit</li> </ul>		<p>state legislature</p> <ul style="list-style-type: none"> <li>• Federal grants</li> <li>• Value of agricultural output per capita</li> <li>• State tax revenue per capita</li> <li>• Dummy variable indicating whether a state's governor has a line-item veto authority</li> </ul> <p>As these variables are run in different models against different independent variables, a general statement on significance is not possible</p>	<p>on state net debt and full-faith and credit debt per capita</p> <ul style="list-style-type: none"> <li>• For tax and/or expenditure limits no significant influence on the dependent variables could be verified</li> </ul>
<p>Alesina and Bayoumi (1996) 48 (mainland) U.S. states</p>	<p>Balanced budget rules</p>	<p>Stringency Index (see ACIR, 1987)</p>	<p>Ratio of primary and total surplus to state product</p>	<ul style="list-style-type: none"> <li>• Average logarithm of the state's nominal product between 1965 and 1992</li> <li>• <i>Average percentage of the state product originating from the mining sector between 1965 and 1992(+)</i></li> <li>• Dummy variable indicating</li> </ul>	<p>The more stringent the balanced-budget rules, the higher the surpluses</p>

(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
Bohn and Inman (1996) 47 U.S. states	Balanced budget rules; debt limits	<ul style="list-style-type: none"> <li>• Dummy variables indicating whether (1) the government must submit a balanced budget, (2) the legislature must pass a balanced budget, (3) a carried-over deficit must be corrected in the next year, (4) carried-over deficits are prohibited, (5) gubernatorial line-item vetoes are possible, and (6) there are referendum restrictions to raise debt</li> <li>• Stringency Index (see ACIR, 1987)</li> </ul>	General fund deficit	whether a state is located in the south	Well-designed balanced-budget rules and gubernatorial line-item vetoes reduce governmental deficits; debt limits have no influence if balanced-budget rules are controlled for
Clingermayer and Wood (1995) 48 U.S. (mainland) states	Taxing and expenditure limits; debt limits	Dummy variables for (1) the existence of taxing and expenditure limits and (2) the existence of debt limits	Annual change in debt per capita	<ul style="list-style-type: none"> <li>• <i>Per capita income</i> (+)</li> <li>• <i>Per capita own-source revenues</i> (+)</li> <li>• <i>Per capita intergovernmental revenues</i> (+)</li> <li>• <i>Growth in income</i> (-)</li> <li>• <i>Growth in own-source revenues</i> (-)</li> <li>• <i>Growth in intergovernmental revenues</i> (-)</li> </ul>	No significant effect of fiscal rules on the dependent variable, weak evidence that taxing and expenditure limits may even increase debt



(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
				<ul style="list-style-type: none"> <li><i>ntal income (-)</i></li> <li>• <i>Current interest rate (-)</i></li> <li>• <i>Dummy variable capturing the 1986 federal tax reform act (-)</i></li> <li>• <i>Federal debt (+)</i></li> <li>• <i>Political culture towards debt financing (+)</i></li> <li>• <i>Financial centralization</i></li> <li>• <i>Divided government</i></li> <li>• <i>Interparty competition (+)</i></li> </ul>	
Hagen (1991) 50 U.S. states	Balanced-budget rules; debt limits	<ul style="list-style-type: none"> <li>• Dummy variables indicating whether a state has (1) a constitutional debt limit and (2) special legislative requirements (e.g. referenda) to raise debt</li> <li>• Stringency Index (see ACIR, 1987)</li> </ul>	Debt per capita; debt growth (1975-1985); debt mix (ratio of nonguaranteed to guaranteed debt); debt-income ratio		States with debt limits and strict balanced-budget rules have less debt per capita and smaller debt-income ratios; however, they also issue more nonguaranteed debt
Eichengreen and Bayoumi (1994) US states (different number and time spans)	Balanced-budget rules	<ul style="list-style-type: none"> <li>• Stringency Index (see ACIR, 1987)</li> <li>• Dummy variable indicating whether a deficit can be carried over into the next year</li> <li>• Dummy variable</li> </ul>	Budget balance; bond yields; stabilization over the cycle		Fiscal restraints, especially the stronger ones, reduce the size of budget deficits and the borrowing costs. However, they diminish the government's ability to stabilize over

(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
		indicating whether a balanced-budget is statutory or constitutionally required			the cycle
Kiewiet and Szakaly (1996) 50 U.S. states	Constitutional debt limits	Dummy variables indicating whether (1) the issuance of bonds must be approved in a referendum, (2) the issuance of bonds is subject to a supermajority requirement in the legislature, (3) the issuance of guaranteed debt is prohibited and (4) there is a limit of the debt-to-revenue ratio	Guaranteed, nonguaranteed, total state, as well as total state and local debt		States with prohibitions of guaranteed debt and referendum requirements have less debt than states with supermajorities and revenue-based debt limits
Nice (1991) 50 U.S. states	Balanced-budget rules; debt limits	<ul style="list-style-type: none"> <li>• Annual amount of debt permitted according to the prevailing debt limit and given the current economic data</li> <li>• Dummy variable indicating whether a constitutional or statutory BBR prevails or not</li> </ul>	Debt per capita; debt growth per capita (1962-1982)		Balanced-budget rules do neither significantly affect debt growth nor per capita debt levels; debt limits seem to influence the kind but not the amount of borrowing
Studies on EU members					
Ayuso-i-Casals et al. (2009) and Debrun et al. (2008)	Deficit rules, debt rules, expenditure rules, revenue rules	<ul style="list-style-type: none"> <li>• <i>Fiscal rule coverage index</i> indicating how many</li> </ul>	Cyclically adjusted primary balance, primary		The stronger a country's fiscal rules, the higher its cyclically adjusted

(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
EU-25		<p>fiscal rules are in place in each country in every year and which share of the general government finances is covered by them</p> <ul style="list-style-type: none"> <li>• <i>Index of strength of fiscal rules</i> calculated for each fiscal rule; taking into account its legal basis, the bodies in charge of monitoring and enforcing it, the enforcement mechanisms and the rule's media visibility</li> <li>• <i>Fiscal rule index</i> calculated for each country in each year; taking into account the number of fiscal rules each country had, their strength and the share of government finances covered by the rule</li> </ul>	expenditure		primary balance. However, deficit and debt rules seem to be more effective with regard to that than expenditure rules

Indices originally developed by the European

(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
		<p>Commission (2006); for more details see Annex 3 in this thesis An <i>expenditure rule coverage index</i> and an <i>expenditure rule index</i> are also calculated with the same procedures as above. However, with samples restricted to expenditure rules only.</p> <ul style="list-style-type: none"> <li>• <i>Fiscal rule cyclical index</i> indicating if each country's fiscal rules are calculated in a way that is likely to have pro- or countercyclical impact</li> </ul>			
Broesens and Wierds (2009) EU-15	Deficit rules, debt rules, expenditure rules, revenue rules	<ul style="list-style-type: none"> <li>• Fiscal rule index (see Ayuso-i-Casals et al., 2009)</li> <li>• Variable for the EU's fiscal rule according to the SGP (see Golinelli and Momigliano, 2006 for details)</li> </ul>	Primary and nominal balance		EU and national fiscal rules are significantly and positively correlated with the budget balance
Debrun (2007) and Debrun and Kumar (2007b; 2007a) 14 EU members	Deficit rules, debt rules, expenditure rules, revenue rules	<ul style="list-style-type: none"> <li>• Fiscal rule coverage index</li> <li>• Fiscal rule index</li> </ul> <p>See above Ayuso-i-Casals et al. (2009)</p>	Cyclically adjusted primary balance	<ul style="list-style-type: none"> <li>• Output gap</li> <li>• <i>Lagged public debt</i> (+)</li> <li>• Government stability</li> <li>• <i>Dummy variable</i></li> </ul>	Fiscal rules seem to reflect more a general governmental and societal commitment to fiscal discipline rather than an

(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
				<i>indicating if the fiscal government is of the commitment type (+)</i> <ul style="list-style-type: none"> <li>• Government fragmentation</li> <li>• Degree of conservatism</li> <li>• <i>Election year dummy</i></li> <li>• Fiscal council index</li> </ul>	effective limit on discretionary fiscal policymaking
Deroose et al. (2006) EU-15	Expenditure rules	<i>Index on the strength of national expenditure rules</i> which indicates how much percent of total expenditure is covered by the rule, what the rule's legal basis is, how much media report on rule-compliance, how closely the rule is monitored, how strongly it is enforced, and what the degree of compliance is	Change in public expenditure		As expected, expenditure rules have a significant, negative impact on public expenditure
Hagen (1992) EU-12	Multi-annual deficit, debt, expenditure, and revenue targets	<i>Index of long- term constraint</i> indicating if there is a multi- annual fiscal target which is backed by strong political commitment and consistent economic projections, if the budget is transparent, and if the parliamentary amendment power as well as the flexibility in budget execution	Debt-to-GDP, net lending-to- GDP, and primary net lending-to-GDP ratio		Long-term fiscal constraints are almost always not significant when regressed on the dependent variables. If at all, fiscal rules can only be effective when combined with efficient budget procedures

(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
		are limited			
Hagen (2006) and Hallerberg et al. (2009a) EU-15; Japan <sup>4</sup>	Deficit, debt, and expenditure rules	<i>Fiscal rule index</i> , which covers “the time horizon of a government’s multi-annual fiscal program, the degree of commitment to annual fiscal targets, the anchoring of fiscal targets in the coalition agreement, the connection between the national budget and the national stability program, the existence of clear rules for dealing with shocks to expenditures or revenues during the year, and the strength of the finance minister to enforce the budget law” (Hagen, 2006)	Annual growth rate of debt-to- GDP ratio		Countries with hard fiscal rules perform significantly better with regard to a reduction of the debt-to-GDP ratio than states with soft rules
Hallerberg et al. (2009b) EU-15	Multi-annual deficit, expenditure, and revenue targets	<ul style="list-style-type: none"> <li>• <i>Targets index</i> which captures the type of target, its time horizon, the quality and regularity of the multi-annual planning, and the degree of commitment to the target</li> <li>• Dummy variable indicating</li> </ul>	Change of gross government debt-to-GDP ratio		Fiscal rules and sub-central borrowing restraints reduce the growth of public debt, especially when the governing parties are ideologically very divers or when the fiscal procedures are modeled according to the contract or delegation approach.

<sup>4</sup> Japan is only included in the analysis of von Hagen (2006)

(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
		whether there are borrowing restraints for sub-central entities or not			
Heinemann et al. (2013) 16 EU members	Deficit rules, debt rules, expenditure rules, revenue rules	<i>Fiscal rule index</i> of European Commission (2006). See also Iara and Wolff (2011) below.	Sovereign risk premia		Fiscal rules are more effective in countries with a lower reputation of financial stability, whereas in countries with a history of financial stability fiscal rules are rather seen as a further illustration of commitment to fiscal discipline.
Iara and Wolff (2011) 10 Eurozone members [1999-2009]	Deficit rules, debt rules, expenditure rules, revenue rules	<i>Fiscal rule index</i> of European Commission (2006): Strength of fiscal rules is measured along five dimensions: (1) legal base, (2) room for setting or revising objectives, (3) monitoring and enforcement body, (4) enforcement mechanism, and (5) media visibility.	Sovereign risk premia		Fiscal rules are effective in keeping risk premia low, especially in times of uncertainty when investors become risk averse. The most important features for a rule to be effective are the legal base and the enforcement mechanisms.
Nerlich and Reuter (2013) EU-27 [1990-2012]	Balanced- budget, debt, expenditure and revenue rules	Dummy variables indicating whether a fiscal rule was in place and which characteristics it exhibits (legal status, type of fiscal rule, enforcement mechanism, and	Primary balance, primary expenditure, primary revenues (all cyclically adjusted)		Fiscal rules reduce both revenues and expenditures, all in all, however, also the primary balance. Particularly successful are balanced-budget rules and rules that are legally

(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
		coverage, i.e. if the rule covers general/central government, regional/local government or social insurances			grounded in the constitution or law. Further the rules' effectiveness can be strengthened by combining them with (independent) fiscal councils
Studies with other geographical foci					
Guichard et al. (2007) 24 OECD countries	Balanced-budget and expenditure rules	Dummy variables indicating (1) whether a balanced-budget rule is in place and (2) whether it is supplemented by an expenditure rule	Duration and size of fiscal consolidation episodes		Especially when balanced-budget rules are substituted with expenditure rules fiscal consolidation episodes were longer and more successful
Alesina et al. (1999) 20 Caribbean and Latin American countries	Deficit limits	<i>Borrowing constraint sub-index</i> which captures the existence of constitutional deficit limits, the importance of previously approved macroeconomic programs for the budget draft, the government's borrowing autonomy, the legislature's power to modify the budget draft, and the government's possibility to cut spending after the budget is passed. This sub-index is also integrated in an overall index that captures also fiscal transparency and	Central government primary deficit-to-GDP ratio		From all the sub-indices the borrowing constraint sub-index has the most significant and clear-cut impact on deficit. The tighter the deficit limits the smaller the deficit-to-GDP ratio



(1) Author(s) and scope Time span of the analysis in square brackets	(2) Type of fiscal rules considered	(3) Measurement of fiscal rules	(4) Dependent variable(s)	(5) Independent and control variables <sup>3</sup>	(6) Evaluation of the impact of fiscal rules on the dependent variable(s)
		procedural rules.			
Hagen and Eichengreen (1996) 16 federal countries world-wide	Deficit limits on the sub- central level	<i>Index of stringency of sub-central borrowing restraints</i> which takes the value 0 if no restraints are in place, 1 if a golden rule prevails or congressional approval is necessary, 2 if there are self- imposed restraints, 3 if central government approval is necessary, and 4 if sub-central borrowing is completely prohibited	Debt exposure (ratio of central government debt to central government tax revenues)		In countries where strong sub-central borrowing restraints are in place, the central government is more exposed to debt
Feld and Kirchgässner (2006) 26 Swiss cantons	Balanced- budget rules; debt limits	<i>Index of statutory fiscal restraints</i> which ranges from 0 to 3, where 0 means no and 3 the strongest fiscal rule	Deficit per capita; debt per capita		Fiscal restraints reduce the deficit but not the debt-per- capita ratio
Feld et al. (2013) 18 Swiss cantons (1981- 2007)		<i>See</i> Feld and Kirchgässner (2006)	Yield spreads between cantonal and Swiss federal bonds		Both the existence and the strength of fiscal rules lead to lower risk premia
Krogstrup and Wälti (2008) 25 Swiss cantons	Deficit limits	Dummy variable indicating whether a canton has a fiscal rule or not	Real budget balance per capita		Fiscal rules have a positive impact on a canton's budget balance

Source: Own synopsis

**Table A-2: Description of Variables**

Variable	Definition	Source
Primebal: Primary balance	Net lending (+) or net borrowing (-) excluding interest calculated as the difference between general government revenue and general government expenditures excluding interest	AMECO
GDP: Real GDP growth	Change of real GDP in percent	IMF Economic Outlook Database
Unemployment: Change in unemployment rate	$\frac{u_{i,t} - u_{i,t-1}}{u_{i,t-1}} \times 100$ <p>where <math>u_{i,t}</math> is the unemployment rate in country <math>i</math> at time <math>t</math></p>	AMECO; own calculations
Yield	Sovereign Bond Yield (10 year maturity)	Datastream
Pop-Share 65: Share of population over 65	Inhabitants which are 65 year old or older divided by total population multiplied with 100	AMECO; own calculations
Election-Dummy	Dummy variable which takes the value 1 if there was a legislative or executive election in a given country in a given year and 0 if otherwise	Beck et al. (2001); own calculations
Federalism	Federalism; coded: 0 = no; 1 = yes.	Armingeon et al. (2010); own calculations
Pol	Political Orientation of the government: Percentage share of government posts that were held by social democratic or other left parties whereby the percentaged share is weighted by the number of days the government was in office in a given year	Armingeon et al. (2010); own calculations
Euro	Dummy variable which takes the value 1 if a country was a member of the Eurozone in a given year and 0 if otherwise	European Central Bank <sup>5</sup>
FRI (Fiscal Rule Index)	See Table A-3	EU Fiscal Rules Database <sup>6</sup> ; own calculations
FCI: Fiscal Council Index	Each fiscal council is scored as 1 respectively if it (1) provides analysis on fiscal policy developments without normative judgement, (2) provides independent macroeconomic and/or budgetary forecasts, (3) issues normative statements (involving judgement) on fiscal policy, or (4) issues recommendations (considering policy alternatives) in the area of fiscal policy. If one country posses more than one council in a given year, the councils are added, whereby the highest ranked council is weighted with 1, the second highest with 1/2 , the third highest with 1/3 etc. Construction based on European Commission (2011, 117).	EU Fiscal Institutions Database <sup>7</sup> ; own calculations
SFA: Stock-flow adjustments	Stock-flow adjustments in percent of total general government expenditures, whereby stock-flow adjustments are calculated as the sum of the general government budget balance and the difference of general government consolidated gross debt from year $t$ and $t-1$ (see Equation 2)	AMECO; own calculations

<sup>5</sup> <http://www.ecb.int/euro/intro/html/map.en.html>

<sup>6</sup> [http://ec.europa.eu/economy\\_finance/db\\_indicators/fiscal\\_governance/fiscal\\_rules/index\\_en.htm](http://ec.europa.eu/economy_finance/db_indicators/fiscal_governance/fiscal_rules/index_en.htm)

<sup>7</sup> [http://ec.europa.eu/economy\\_finance/db\\_indicators/fiscal\\_governance/independent\\_institutions/index\\_en.htm](http://ec.europa.eu/economy_finance/db_indicators/fiscal_governance/independent_institutions/index_en.htm)



**Table A-4: Criteria and Scores for the Construction of the Fiscal Rule Index**

<p><b>Criterion 1: Statutory base of the rule</b></p> <ol style="list-style-type: none"><li>4 Constitutional base</li><li>3 The rule is based on a legal act (e.g. Public Finance Act, Fiscal Responsibility Law)</li><li>2 The rule is based on a coalition agreement or an amendment reached by different general government tiers (and not enshrined in a legal act)</li><li>1 Political commitment by a given authority</li></ol> <p><b>Criterion 2: Room for setting and revising objectives</b></p> <ol style="list-style-type: none"><li>3 There is no margin for adjusting objectives (they are encapsulated in the document underpinning the rule)</li><li>2 There is some but constrained margin in setting or adjusting objectives</li><li>1 There is complete freedom in setting or adjusting objectives (the statutory base of the rule merely contains broad principles or the obligation for the government or the relevant authority to set targets)</li></ol> <p><b>Criterion 3: Nature of body in charge of monitoring respect and enforcement of the rule</b></p> <p>The score of this criterion index is constructed as a simple average of the two elements below:</p> <p><i>Nature of the body in charge of monitoring respect of the rule</i></p> <ol style="list-style-type: none"><li>3 Monitoring by an independent authority (Fiscal Council, Court of Auditors or any other Court) or the national parliament</li><li>2 Monitoring by the ministry of finance or any other government body</li><li>1 No regular public monitoring of the rule (there is no report systematically assessing compliance)</li></ol> <p><i>The score of this sub-criterion is augmented by 1 if there is real time monitoring of compliance with the rule, i.e. if alert mechanisms of risk of non-respect exist.</i></p> <p><i>Nature of the body in charge of enforcement of the rule</i></p> <ol style="list-style-type: none"><li>3 Enforcement by an independent authority (Fiscal Council or any Court) or the national parliament</li><li>2 Enforcement by the ministry of finance or any other government body</li><li>1 No specific body in charge of enforcement</li></ol> <p><b>Criterion 4: Enforcement of mechanisms of the rule</b></p> <ol style="list-style-type: none"><li>4 There are automatic correction and sanction mechanisms in case of non-compliance</li><li>3 There is an automatic correction mechanism in case of non-compliance and the possibility of imposing sanctions</li><li>2 the authority responsible is obliged to take corrective measures in case of non-compliance or is obliged to present corrective proposals to Parliament or the relevant authority</li><li>1 There is no ex-ante defined actions in case of non-compliance</li></ol> <p><i>The score of this variable is augmented by 1 if escape clauses are foreseen and clearly specified.</i></p> <p><b>Criterion 5: Media visibility of the rule</b></p> <ol style="list-style-type: none"><li>3 Observance of the rule is closely monitored by the media; non-compliance is likely to trigger public debate</li><li>2 High media interest in rule compliance, but non-compliance is unlikely to invoke public debate</li><li>1 No or modest interest of the media</li></ol>
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Source: Fiscal Rules Database; see also European Commission (2006, 163–4)

**Table A-5: Regression Results for Pooled Estimation without Interaction Terms for the Entire Sample (1991-2012)**

Dependent Variable: PRIMEBAL

Sample: 1991-2012

Periods included: 22

Cross-sections included: 27

Total panel (unbalanced) observations: 449

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.312733	0.891130	-1.473110	0.1414
PRIMEBAL(-1)	0.707980	0.034749	20.37402	0.0000
GDP	0.192276	0.040434	4.755240	0.0000
DEBT	0.018021	0.003294	5.470402	0.0000
YIELD	0.136713	0.053307	2.564645	0.0107
INFLATION	-0.097212	0.045921	-2.116955	0.0348
UNEMPLOYMENT	-0.029824	0.006763	-4.409843	0.0000
POP-SHARE: 65	-0.035902	0.049461	-0.725871	0.4683
ELECTION-DUMMY	-0.618485	0.161439	-3.831061	0.0001
POL	-0.000656	0.002056	-0.319241	0.7497
FED	0.175561	0.248511	0.706453	0.4803
SFA	0.034466	0.009515	3.622479	0.0003
FRI	0.350015	0.096237	3.637015	0.0003
FCI	0.043418	0.045841	0.947157	0.3441
EURO	-0.065898	0.191696	-0.343766	0.7312

Weighted Statistics

R-squared	0.751490	F-statistic	93.74356
Adjusted R-squared	0.743474	Prob(F-statistic)	0.000000

Note: The meaning of the shortcuts is as follows: POL = political orientation, FED = federalism dummy, SFA = stock-flow-adjustments, FRI = fiscal rules index, FCI = fiscal councils index, EURO = EMU membership.

**Table A-6: Regression Results for Pooled Estimation without Interaction Terms for the Pre-Crisis-Period (1991-2006)**

Dependent Variable: PRIMEBAL

Sample: 1991-2006

Periods included: 16

Cross-sections included: 27

Total panel (unbalanced) observations: 292

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.404994	0.994807	0.407108	0.6842
PRIMEBAL(-1)	0.734483	0.033482	21.93663	0.0000
GDP	0.087792	0.051629	1.700445	0.0902
DEBT	0.017333	0.003718	4.662459	0.0000
YIELD	0.076946	0.065723	1.170758	0.2427
INFLATION	-0.079285	0.054415	-1.457051	0.1462
UNEMPLOYMENT	-0.032746	0.006958	-4.706321	0.0000
POP-SHARE: 65	-0.092758	0.053900	-1.720941	0.0864
ELECTION-DUMMY	-0.727835	0.171488	-4.244233	0.0000
POL	-0.000906	0.002303	-0.393310	0.6944
FED	0.148064	0.280460	0.527932	0.5980
SFA	0.029032	0.012636	2.297567	0.0223
FRI	0.392642	0.109950	3.571102	0.0004
FCI	0.004789	0.052056	0.091994	0.9268
EURO	0.009993	0.218582	0.045718	0.9636
Weighted Statistics				
R-squared	0.783469	F-statistic	71.59023	
Adjusted R-squared	0.772525	Prob(F-statistic)	0.000000	

Note: The meaning of the shortcuts is as follows: POL = political orientation, FED = federalism dummy, SFA = stock-flow-adjustments, FRI = fiscal rules index, FCI = fiscal councils index, EURO = EMU membership.

**Table A-7: Regression Results for Pooled Estimation with Interaction Terms**

Dependent Variable: PRIMEBAL

Sample: 1991-2012

Periods included: 22

Cross-sections included: 27

Total panel (unbalanced) observations: 449

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.107064	0.886006	-2.378161	0.0178
PRIMEBAL(-1)	0.694274	0.038015	18.26323	0.0000
GDP	0.194468	0.038840	5.006937	0.0000
YIELD	0.160541	0.053648	2.992486	0.0029
DEBT	0.018165	0.003522	5.158045	0.0000
INFLATION	-0.086902	0.048243	-1.801337	0.0724
UNEMPLOYMENT	-0.032154	0.006901	-4.659034	0.0000
POP-SHARE: 65	-0.000941	0.051381	-0.018311	0.9854
ELECTION-DUMMY	-0.590899	0.155506	-3.799838	0.0002
POL	-0.000254	0.002103	-0.120777	0.9039
FED	0.367780	0.265661	1.384398	0.1670
SFA	0.048474	0.015121	3.205826	0.0014
FRI	0.125149	0.136003	0.920196	0.3580
FCI	0.076559	0.048032	1.593908	0.1117
EURO	-0.047401	0.332781	-0.142439	0.8868
FRIxFCI	0.079070	0.035026	2.257446	0.0245
FRIxSFA	0.017596	0.010324	1.704473	0.0890
FRIxEURO	0.263909	0.201781	1.307896	0.1916
FCIxSFA	-0.018586	0.006195	-3.000164	0.0029
FCIxEURO	-0.086740	0.078311	-1.107634	0.2686
SFAxEURO	0.047601	0.026018	1.829523	0.0680

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Weighted Statistics

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R-squared	0.761882	F-statistic	68.47144
Adjusted R-squared	0.750755	Prob(F-statistic)	0.000000

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Note: The meaning of the shortcuts is as follows: POL = political orientation, FED = federalism dummy, SFA = stock-flow-adjustments, FRI = fiscal rules index, FCI = fiscal councils index, EURO = EMU membership.

**Table A-8: Results for Panel Estimation with Selected Interaction Terms****a) FRIxEuro**

Dependent Variable: PRIMEBAL

Sample: 1991-2012

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.660170	1.197730	-1.386097	0.1665
PRIMEBAL(-1)	0.705306	0.038692	18.22883	0.0000
GDP	0.055134	0.069689	0.791151	0.4293
YIELD	0.131348	0.043160	3.043287	0.0025
DEBT	0.010401	0.004038	2.575706	0.0104
INFLATION	-0.039178	0.071418	-0.548567	0.5836
UNEMPLOYMENT	-0.022253	0.011131	-1.999114	0.0463
POP-SHARE: 65	0.029412	0.059467	0.494592	0.6212
ELECTION-DUMMY	-0.432108	0.217798	-1.983979	0.0479
POL	-0.003794	0.002170	-1.748559	0.0811
FED	0.118807	0.329251	0.360840	0.7184
SFA	0.044394	0.012877	3.447557	0.0006
FRI	0.264238	0.122397	2.158857	0.0314
FCI	0.042469	0.069468	0.611352	0.5413
EURO	-0.281344	0.220635	-1.275156	0.2030
FRIxEURO	0.142410	0.231870	0.614181	0.5394

**Table A-8: Results for Panel Estimation with Selected Interaction Terms****b) FCIxSFA**

Dependent Variable: PRIMEBAL

Sample: 1991-2012

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.665267	1.289185	-1.291720	0.1972
PRIMEBAL(-1)	0.703763	0.040206	17.50382	0.0000
GDP	0.053311	0.069885	0.762839	0.4460
YIELD	0.132004	0.043865	3.009320	0.0028
DEBT	0.009893	0.004101	2.412087	0.0163
INFLATION	-0.036619	0.071816	-0.509904	0.6104
UNEMPLOYMENT	-0.022973	0.011036	-2.081572	0.0380
POP-SHARE: 65	0.029140	0.063202	0.461060	0.6450
ELECTION-DUMMY	-0.428940	0.217845	-1.969011	0.0496
POL	-0.003754	0.002258	-1.662417	0.0972
FED	0.131294	0.326876	0.401663	0.6881
SFA	0.047851	0.023105	2.071006	0.0390
FRI	0.315884	0.135242	2.335692	0.0200
FCI	0.045297	0.072820	0.622041	0.5343
EURO	-0.210100	0.239451	-0.877423	0.3808
FCIxSFA	-0.001885	0.007104	-0.265388	0.7908



**Table A-8: Results for Panel Estimation with Selected Interaction Terms**  
**c) FCIxEuro**

Dependent Variable: PRIMEBAL		Sample: 1991-2012		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.623498	1.176191	-1.380301	0.1682
PRIMEBAL(-1)	0.705206	0.036649	19.24203	0.0000
GDP	0.052240	0.068565	0.761896	0.4466
YIELD	0.132208	0.044908	2.943975	0.0034
DEBT	0.009868	0.004076	2.421070	0.0159
INFLATION	-0.036545	0.071611	-0.510320	0.6101
UNEMPLOYMENT	-0.022688	0.010980	-2.066242	0.0394
POP-SHARE: 65	0.027009	0.059726	0.452224	0.6513
ELECTION-DUMMY	-0.428739	0.218505	-1.962145	0.0504
POL	-0.003693	0.002260	-1.633791	0.1031
FED	0.118968	0.391410	0.303947	0.7613
SFA	0.044267	0.013068	3.387433	0.0008
FRI	0.314167	0.133193	2.358733	0.0188
FCI	0.039074	0.065355	0.597877	0.5503
EURO	-0.226514	0.384096	-0.589733	0.5557
FCIxEuro	0.010274	0.106353	0.096603	0.9231

**Table A-8: Results for Panel Estimation with Selected Interaction Terms**  
**d) SFAxEuro**

Dependent Variable: PRIMEBAL		Sample: 1991-2012		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.895509	1.308642	-1.448454	0.1483
PRIMEBAL(-1)	0.706838	0.038408	18.40323	0.0000
GDP	0.050667	0.070894	0.714688	0.4752
YIELD	0.152105	0.053072	2.866002	0.0044
DEBT	0.010443	0.004274	2.443148	0.0150
INFLATION	-0.043480	0.067634	-0.642872	0.5207
UNEMPLOYMENT	-0.022810	0.010466	-2.179517	0.0299
POP-SHARE: 65	0.035617	0.064382	0.553218	0.5804
ELECTION-DUMMY	-0.382954	0.212890	-1.798834	0.0728
POL	-0.004000	0.002127	-1.880822	0.0607
FED	0.113759	0.322576	0.352658	0.7245
SFA	0.013539	0.015021	0.901346	0.3679
FRI	0.318117	0.135781	2.342874	0.0196
FCI	0.055118	0.067856	0.812278	0.4171
EURO	-0.347024	0.220747	-1.572046	0.1167
SFAxEuro	0.064937	0.022123	2.935268	0.0035

**Table A-9: Regression Results for Pooled Estimation with Interaction Terms in the Pre-Crisis-Period**

Dependent Variable: PRIMEBAL

Sample: 1991-2006

Periods included: 16

Cross-sections included: 27

Total panel (unbalanced) observations: 292

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.580765	0.955913	-0.607550	0.5440
PRIMEBAL(-1)	0.695945	0.036327	19.15804	0.0000
GDP	0.104617	0.049601	2.109187	0.0358
YIELD	0.085419	0.062474	1.367263	0.1727
DEBT	0.019844	0.004116	4.821212	0.0000
INFLATION	-0.053584	0.057094	-0.938529	0.3488
UNEMPLOYMENT	-0.034300	0.007669	-4.472319	0.0000
POP-SHARE: 65	-0.060370	0.055437	-1.088986	0.2771
ELECTION-DUMMY	-0.681634	0.169246	-4.027471	0.0001
POL	1.70E-05	0.002336	0.007268	0.9942
FED	0.369909	0.288152	1.283730	0.2003
SFA	0.042557	0.016288	2.612848	0.0095
FRI	0.090356	0.166312	0.543291	0.5874
FCI	0.067805	0.056853	1.192648	0.2341
EURO	0.052308	0.343767	0.152161	0.8792
FRIxFCI	0.107570	0.044163	2.435769	0.0155
FRIxSFA	0.027258	0.011621	2.345473	0.0197
FRIxEURO	0.467936	0.186212	2.512919	0.0126
FCIxSFA	0.013392	0.006067	-2.207388	0.0281
FCIxEURO	-0.145082	0.079166	-1.832623	0.0680
SFAxEURO	0.074843	0.030833	2.427396	0.0159

Weighted Statistics

R-squared	0.798887	F-statistic	53.82493
Adjusted R-squared	0.784044	Prob(F-statistic)	0.000000