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Own or inherited? The effect of national fiscal rules after changes of government¹

Csaba G. TÓTH²

In order to get to know more precisely the way national fiscal rules work, in our study³ we tried to differentiate the signaling function from the limiting one in regard to the operation of the rules. The former occurs when a government introduces fiscal rules to show its commitment to a disciplined fiscal policy, while the latter refers to the fact that rules constitute a true obstacle for budgetary policy. Through an empirical examination on our own database, we considered only the observations when the reigning government responsible for fiscal policy differed from the previous government responsible for its establishment; in this way we measured the effect of the limiting function the rules had. The results of our panel econometric study prove that fiscal rules can contribute to disciplined fiscal policy after a change in government, in times of economic upturn. All this, however, does not mean that the signaling function would be useless; quite the contrary. Our results, in line with the literature, indicate that the double functions of the rule complement one another. The government that introduces the rule is mostly already committed to a disciplined policy, and wishes to signal this in the short term. With the appearance of new governments, however, the rule changes its function and promotes disciplined economic activity efficiently in the long term.

1. INTRODUCTION

The European sovereign debt crisis beginning in 2009 became a turning point in judging the role and relevance of fiscal policy and more concretely the national budgetary rules (e.g., Cottarelli et al., 2014; Romer, 2012). This can be explained partly by the fact that the crisis—due to its nature—revealed the weakness of budgetary policies: the fiscal architecture that previously seemed to be so stable turned out to be significantly more vulnerable than expected. Budgetary policy often only seemed to be sustainable, later this turned out to be only a superficial and illusory observation. Although the differences between the individual cases are significant, and there were countries (such as Ireland and Spain) where the problem did not stem primarily from fiscal policy, in the end the crisis undermined public finance in these cases as well (Beetsma & Gradus, 2012). Besides, budgetary policy turned out in several countries to be unable to survive a trust crisis that appeared in the financial markets. In these cases, exaggerated indebtedness, procyclical economic policies, unpredictable governance, a lack of trust regarding budgetary policies, and a lack of transparency stood generally in the background of the problems. Although the reasons lie deeper (see Györfy, 2012), after the affected European societies experienced what enormous damage is caused by the correction of budgetary policy when carried out by the market, there was considerable pressure on European leaders to come up with a solution that would prevent its repetition. In accordance with the tenets and principles of mainstream economic thinking, established several decades ago, attention turned to institutional solutions.

As part of this process, on the one hand, interest in budgetary rules increased significantly, and on the other hand, it brought to an end an almost two decade-long procedure during which national budgetary rules conquered European countries; only a few European states had national fiscal rules at the beginning of the 1990s, whereas in 2014 there was at least one valid provision in each European Union (EU) member state (European Commission, 2015). During this period, the number of valid national rules increased sixfold in the EU, so today there are on average three provisions in each EU member state that try to limit budgetary policy. The aim of this limitation and the general aim of budgetary rules is usually to handle and mitigate

¹ The views expressed are those of the authors and do not necessarily reflect the official view of the Central Bank of Hungary (Magyar Nemzeti Bank).

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the effect of incentives stemming from the qualities of representative democracy, which lead decision makers toward budgetary overspending (deficit bias).

It is important to stress, however, that although fiscal rules are looked upon by many as a panacea, there is still a lot of uncertainty regarding the efficiency of the instrument. On the one hand, because the nature of fiscal policy is rooted in deeper social phenomena, a long-term solution is presumably not to be found in the regulation of budgetary policy (Brender & Drazen; 2005). Fiscal institutional solutions could still be able to support this process, for example, by internalizing the costs of undisciplined public policy for politicians (Kumar & Ter-Minassian, 2007). On the other hand, it is dangerous to consider these rules as a panacea, as we still do not have sufficient knowledge about their functioning and efficiency.

One of the most important obstacles that make the measurement of the effect of budgetary rules more difficult is the problem of endogeneity. This means that during measurement it is hard to separate the different kinds and directions of relations between fiscal policy and rules. According to one approach, the introduction of fiscal rules serves as a signal for the different market and political stakeholders in terms of the government's commitment to disciplined fiscal policy. In this case, the decision makers use fiscal rules as a means to influence the external evaluation of the government's economic policy, which Debrun and Kumar (2007) identify as a "signal" hypothesis. According to another approach, the fiscal rule that works adequately is the "limiting" means, which is able to affect the behavior of decision makers via different incentives and thus contribute to disciplined fiscal policy.

The empirical studies published so far handle the issue of endogeneity with instrumental variables, or do not handle them at all. Apart from the use of instrumental variables, we created a new variable and a related database, with which the problem can hopefully be handled successfully.

Contrary to most previous studies, our research question does not refer to the general effect the rules have on the fiscal balance, but we were curious to know precisely how the rules affect budgetary policy in times of economic upturn. Another change compared to most previous studies is that we used the primary balance for the measurement of fiscal performance instead of the cyclically adjusted primary balance.⁴

Apart from these changes, we tried to solve the apparent contradiction between the two approaches based on the results, differentiating the short- and long-term effects in the functioning of budgetary rules.

Next, in the second part of the study, we will sum up the most important literature related to the effect and efficiency of fiscal rules, discussing separately the works examining the limiting and signaling role. The third part will present the data used for our investigation, providing detailed justification in these terms for the parts and ways in which we differ from practice. The fourth part contains the descriptive statistics for the data. The fifth part presents the details of the results received during the different evaluation procedures, and the last part provides our conclusions.

2. FINDINGS FROM THE LITERATURE

While many studies, as early as the 1980s, have dealt with the nature and functioning of supranational rules, the research community has dedicated much less attention to national fiscal rules introduced to Europe (Benczes, 2011). The first wave of case studies (Berndsen, 2001; Hemming & Kell, 2001), as well as comparative examinations including qualitative means (Kopits, 2001), date from the end of the 1990s, but the compilation and publication of the European Commission Fiscal Rules Database from the middle of the first decade of the new millennium provided the real breakthrough that opened up the way to large-sample, quantitative investigations. Needless to say, this does not mean that case studies or qualitative investigations were reduced in their number or significance (e.g., Benecki et al., 2009; Dupont & Kwarteng, 2012; Hallerberg & Von Hagen, 2006; Wyplosz, 2012), but that the large-sample econometric studies appeared to complement them.

Apart from providing other useful pieces of information, the mentioned database (European Commission, 2015) contains an index, the Fiscal Rules Index (FRI), which measures the strength and institutional embeddedness comprising the whole set of valid national budgetary rules in individual countries in a given

⁴ To be comparable to the literature, we also carried out our evaluations in terms of the cyclically adjusted primary balance.

year. Its value is determined by the joint value of the Fiscal Rule Strength Index (FRSI), which measures the strength of the individual rules. When calculating this latter index, the extent to which the given rule covers the budget is particularly emphasized, together with the legal basis of the provision, the set character of the objectives that were determined in the rule, the elaborate character of the alert, and corrective mechanisms. The value of the index increases if there is a body (typically a fiscal council) with the task of monitoring and enforcing the rule, or if the discourse on rule compliance appears in public. The index therefore does not measure what the rule says, or whether the fiscal policy complies with its provisions (about this see Reuter, 2015 for more detail), but the extent to which the organizational, legal, and institutional background related to regulation supports the functioning of the rule.⁵

In line with theories referring to the objectives of budgetary rules, the largest group of econometric studies using FRI examines the extent to which the national fiscal rules are able to contribute to the improvement of budgetary balance. A part of the differences existing between them is of a technical nature, such as the number of examined countries and years, the type of chosen evaluation method, the selection of the index measuring fiscal performance, and the type and quantity of other factors and control variables considered apart from the rules.

The fundamental question, decisive from the aspect of interpreting the results, is handling endogeneity (Poterba, 1996). This question is nourished from multiple sources and is the recurring problem of each econometric and non-econometric examination of the field. This refers to the fact that even if it can be demonstrated that the appearance and strengthening of budgetary rules imply the improvement of budgetary discipline, it does not necessarily mean that the relation between the two is one-way and that only the former influences the latter. Many logical explanations indicate that this causal relation could be the other way around; in these cases, the politicians carrying out a disciplined budgetary policy may wish to show their dedication for disciplined public finance—a display aimed either toward the electors or toward other economic or political actors and communities.

As the solution to the problem encounters serious obstacles both statistically and economically, one part of previous studies concentrated on demonstrating joint movement (correlation) and did not try to solve the possible directions of causal relations. A classic example is the research of the European Commission (2006), whose authors as a first step examined the 15-year timeline of EU member states with the help of descriptive statistical methods and found that after the introduction of national fiscal rules, the cyclically adjusted balance to GDP improves 0.2 percent on average in the first year, and 0.4 percent on average until the third year. This was also confirmed by regression estimates carried out on the panel database, with the result that a unit (one standard deviation) increase in the FRI improves the cyclically adjusted primary balance by 0.21 percent of the GDP. This corresponds roughly to the results of Marneffe et al. (2010) and is in line with statements made by Bergman et al. (2013). Nerlich and Reuter (2013) found similar results with a different method, measuring the presence of fiscal rules with a binary variable (a dummy) instead of FRI, and found that this introduction improved the ratio of cyclically adjusted primary balance to GDP by 0.55 percent.

The first researchers to deal more in depth with the direction of the causal relation were Debrun et al. (2008), who tried to handle the endogeneity issue with instrumental variables, among them the delayed value of the FRI. The result of the exam carried out in this way was that one standard deviation increase of the FRI improves the cyclically adjusted primary balance by 0.4 percent of the GDP, and has a bigger effect in the long term. Ayuso-i-Casals et al. (2009), Afonso and Hauptmeier (2009), and Dahan and Strawczynski (2010) reached a similar result with a similar method.⁶ Heinemann and Yeter (2014), however, treated the endogeneity issue in a new way. According to their starting assumption, as soon as politicians decide to introduce a new rule or change the current one, they take into consideration its (political) costs and thus give up a part of (their) discretionality. The decision makers, however, do not account for cases with the appearance of sudden shocks, although the political costs of giving up discretionality in these cases are highest. For this reason, the authors investigated whether fiscal rules affect

⁵ The FRI index sums up the FRSI indices per year and per country in a way that as the last step of aggregation, the complete database, ranging from the first year to the last one, is transformed to a zero-mean, 1 standard-error distribution. The smallest possible value of the variable is -1.01, and it indicates when no fiscal rule is in force in a country in a given year, whereas the highest value of the index is 2.13.

⁶ In a recently published study, Bergman et al. (2016) used the database containing the IMF budgetary rules and concluded that fiscal rules are able to diminish structural deficits.

fiscal policy amidst negative increase shocks as well, and after they found a positive and significant effect, they considered it as proved that rules indeed are able to contribute to the improvement of the budgetary balance.

Sacchi and Salotti (2015) also examined the issue from a somewhat similar approach. They quote Musgrave (1959) when stating that the task of the state is not to run a strict budgetary policy all the time, but to adapt the public finances to ensure macroeconomic stability. The novelty of their method was that they examined not the fiscal indices, but their effect on GDP volatility. One of the advantages of this method is that it can directly measure the extent to which the rules help execute the state functions successfully, and on the other hand thereby also avoid the issue of endogeneity. The calculations carried out on the 21 OECD member states between 1985 and 2012 proved that the rules are able to contribute to macroeconomic stability.

Another group of empirical researchers examined the correlation previously identified by Debrun and Kumar (2007) as a “signal” hypothesis, the essence of which is that if a government manages to communicate authentically toward financial market stakeholders that it is able to run a disciplined budgetary policy, this will reduce public expenditure via financing costs and thereby improve budget balance.

The vast majority of empirical results indicate that budget rules are indeed able to strengthen trust concerning the economic policy of a given country and increase credibility. Bayoumi et al. (1995) were among the first researchers to prove, based on US data, that a state with an average level of indebtedness pays 50 base points less interest if it has a constitutional rule limiting government loans. Their results were generally confirmed by several others (e.g., Christoffel et al., 2010; Szczypińska, 2014; Thornton & Vasilakis, 2017), while Iara and Wolff (2010) called attention to the fact that the existence of fiscal rules can mitigate government bond yields, especially in times of crisis.⁷

3. DATABASE AND NEW APPROACHES

As we demonstrated above, the number of studies dealing with budget rules increased substantially in the past 10 years, but there are still many question marks and grey areas.

The issue of endogeneity and the method of handling it affect the very essence of the study results and the conclusions that can be drawn from them (Heinemann et al., 2016). The answers provided to these issues and presented above are by all means progressive, but we believe that more studies and new methods need to be elaborated in order to provide a reassuring answer to the question related to the efficiency and functioning of national budget rules. Apart from this, it is also important to call attention to the fact that the vast majority of studies examined fiscal discipline within the balance by ignoring the evolution of economic cycles—which substantially affects the direction of fiscal effects expected from economic policy. With our own research, we tried to contribute to progress primarily in these two fields.

Before going into the details, however, we need to stress that our definition of budgetary rules is limited in several directions. On the one hand, our examination comprehends only the numeric provisions containing procedural rules used during the practical compilation and enforcement of the general budget. On the other hand, we concentrate exclusively on the rules appearing directly in the national legal systems, and thus ignore supranational provisions. Third, budget rules are now widely used worldwide, so our study concentrates more on European practice, more precisely with the EU member states.

Our study evaluates the period of almost one and a half decades preceding the crisis (1995–2008). Ensuring the comparability of the data played a decisive role in choosing the starting date of the period, while the endpoint was determined by the crisis outbreak. We considered this latter to be justified because the global financial, economic, and European debt crisis stemming from it caused changes in the economic processes and institutional systems, which themselves justified the separation of the examined periods. On the other hand, most national rules were suspended in the affected countries during the crisis (Benczes, 2011). Third, one of the most important aspects of our research is aimed precisely at the way budget rules work in crisis-free periods. The database compiled with this method contains 14 years of annual data from the 27 states

⁷ The picture Heinemann et al. (2014) create is made more ambiguous by the empirical examinations according to which fiscal rules can contribute to decreasing risk premium in countries with a rather lower culture of stability.

that joined the European Union prior to the crisis. A part of the data is from the database of the European Commission (AMECO), and the source of the budget rules and rule systems is likewise the European Commission database we presented previously.

One of the changes compared to previous studies is that the fiscal orientation of the government is measured with the ratio of primary balance to GDP⁸ instead of the cyclically adjusted primary balance more frequently used in the literature, because in our view the former is a more adequate index for this purpose precisely due to the definition of countercyclical policy. According to the widespread view of experts, the condition of the countercyclical policy is the stability of the tax-to-GDP ratio and discretionary expenditures (see Alesina et al., 2008). In times of economic upturn, the non-discretionary items reduce the size of total expenditures in the percentage of GDP on the expenditure side, while progressive taxes improve the balance on the income side. These are the automatic stabilizers (Deroose et al., 2008) that can mitigate the volatility of the economic cycle by themselves, without state intervention (Tóth, 2010). Because, due to their character, the cyclically adjusted indices filter out precisely these effects, it is worth using the primary balance index to measure countercyclical policy.

The rationale of our choice can also be well perceived in the following practical example. In order to halt a car rolling down a slope, the engine brake (automatic stabilizers) and the braking activity of the driver (discretionary measures) can also play a part. The driver's intention is to stop the car and to brake in a way that takes the effect of engine braking into consideration as well. The driver can therefore only affect his own braking, and when examining whether he achieved his aim, we do not measure how much he braked but whether the car came to a stop as a consequence of the joint effect of the two different braking mechanisms. Apart from what was mentioned above, the use of the primary balance as a target variable is more practical also because unlike the cyclically adjusted index, this is independent from the potential output that can be estimated only with significant uncertainty (Darvas & Kostyleva, 2011; Mellár, 2016), and thereby posterior revisions do not significantly alter sets of data (Checherita-Westphal & Ždarek, 2015). To confirm the robustness of our results, however, and to make our estimates comparable with previous research, we also carried out calculations for the cyclically adjusted balance.

As discussed above in regard to the issue of endogeneity, even if a correlation can be proven between the strength of the fiscal rules and budgetary discipline, this does not necessarily mean that the former affects the latter. It may be that a third (hidden) variable affects both indicators, such as the electors' preference (Krogstrup & Wälti, 2008), or the causal relation might be the other way around, and the government introduces the budget rules precisely to signal its commitment to disciplined fiscal policy toward the electors or other political or economic entities (e.g., Benczes, 2011; Debrun & Kumar, 2007). Some of the studies published so far did not manage endogeneity and examined the joint movement of the indices instead, and stressed that this does not affect the results (Bova et al., 2014). The fixed effect used for every country provides a solution to the problem of the hidden variable, as the electoral preference is presumably quite stable in such a short period of time within a state (Holm-Hadulla et al., 2012).

Several studies have used (an) instrumental variable(s) to handle reverse causality, especially the delayed value of the explanatory variable. During our examination, we also relied on instrumental variables, but apart from that we elaborated a new method to solve the problem. Our aim was to separate the political will originating in fiscal policy from the political will that is responsible for the introduction of the fiscal rule. We did this by separating (and later filtering) the cases when a government leads a country in a way that its own budget rules are in force, and the observations when the reigning government needs to consider the provisions and limitations of a set of rules created by a previous government.

For this reason, we created a new variable (GOV), which—in the framework of the previous categorization—can consider three values of the observations present in the database:

- The government operates without a fiscal rule in the examined period (year). (These cases were designated by 0.)
- The government operates with its *own* rule in the examined period (year). A rule is considered to be a government's own if it was created or passed during the administration of the reigning head of

⁸ Similar to our study, the primary balance is used also by Marneffe et al. (2010), Afonso and Hauptmeier (2009), and Cordes et al. (2015).

government (in presidential system it is the president) or by that of his/her party member. (These cases were designated by 1.)

– The government had an *inherited* rule in place in the examined period. Any observation that was omitted from the previous two categories belongs here. This means that the countries and years are part of the group with a valid budget rule, but its creation and establishment cannot be related to the reigning head of government or his/her party. (These cases were designated by 2.)

The separation seems to be effective because in the latter case we can affirm that the political will that brought about the rule (of a previous government) is separated from the political will (of the reigning government) responsible for the fiscal policy, and thus the previously mentioned endogeneity problem can be managed. Although the division is hopefully logical and effective, for the sake of consistent separation during classification some further conditions had to be defined in more detail. They are described below.

The hardest part of the categorization was ascertaining which government was in power when accepting the given budget rule. For this, one needs to know when exactly this rule was accepted. Our starting assumption was that the rules were accepted the year before they came into force. If it was critical for categorization, or if it was not obvious, for instance because several governments were in power in the year preceding the rule coming into force, we carried out further investigation to confirm or deny and correct our starting supposition. As part of this, we contacted the local institutions (e.g., fiscal councils) as well as researchers and specialists in several countries.⁹

In the examined period, several times several fiscal rules were born under different government regimes that were in force within a year. In these cases, we considered the rule to be prevalent if it covered the larger part of the public finances. For example, an expenditure rule was passed in Denmark under the 1993–2001 prime ministry of Social Democrat head of state Poul Nyrup Rasmussen, which regulated the growth rate of public expenditures in terms of consumption. In itself this would justify classifying the observations into the category of own rules from their coming into force until 2001. But as the rule only covered 45 percent of public finances, while the previous budget balance rule taken by the Conservative government—remaining valid during the Rasmussen regime as well—covered 100 percent, the years of the Social Democratic government increase the number of states working with the inherited rule. If the size of the state finances covered by the two rules did not differ in a proportion larger than 5 percent, then we considered the rule with a higher FRSI value.

In years of government change, the decision depended on which government behavior the fiscal policy of the given year reflected more, and on when the new government entered office during the year. If it was in the first semester, then the budget of the given year was the new government's responsibility, and it measured its performance. If it was in the second semester, then it was of the abdicating government.

Although in our opinion the problem of endogeneity can be handled with the introduction of the new variable, we must note that we needed to use one more assumption in order to ensure the coherence of the theoretical framework. The problem is caused by the fact that if a government can decide without particular consequences and external obligations about keeping a rule alive or abolishing it, then (again) we could not tell the difference between the political will that keeps the rule alive and the one responsible for budgetary policy. In practice, however, the apparent inability to differentiate these aspects is mistaken; and this can be explained with several factors.

On the one hand, a portion of the provisions and obligations related to fiscal rules belongs to the highest source of law, the constitution, i.e., basic law. In these cases, the new government often does not have a parliamentary majority to change or abolish the rule.

On the other hand, the abolition of a budgetary rule can also imply costs (Debrun & Kumar, 2007), as it reduces the credibility of the government considerably and makes investors uncertain about whether the state is committed to disciplined fiscal policy. This can have an effect via several channels, because such a measure can increase the financing costs coming from external sources for both the public and private sectors, and it can restrain the national activity of foreign investors; additionally, the reduction in

⁹In the case of Austria, Bulgaria, Estonia, Latvia, and Portugal, the doubtful questions could be answered with the help of a coworker or leader of the local fiscal council or central bank, or of a local economist dealing with the subject.

predictability generally deteriorates the business environment and competitiveness in the country. Precisely for this reason, such a decision implies considerable costs, which often probably exceed the benefits the government expects from the abolition of the rule.

Our assumption is also confirmed by data: during the total period when a fiscal rule was in force in a given state, there were 95 operational rules and 47 government changes, yet in only five countries did a government abolish a budgetary rule in the year of taking office, and we know of no cases when a new government altered a valid rule in a way that changed its strength. Furthermore, the rules abolished after government change were typically not the rules that covered most public finances in the given period, and did not influence whether the given observation belonged to the group of own or inherited rules. For these reasons, we believe the group of inherited rules represents a case in which the creation of the rule is separate from the will of the reigning government.

The next change does not affect primarily the database, but rather the way the question is raised. In most studies published so far, the authors looked for the relationship between fiscal rules and budgetary balance independently of the economic cycle. In these cases, one can identify the starting assumption that fiscal rules are successful if they improve fiscal management; in other words, the more a fiscal rule is able to improve the budget balance of a given state, the better and more successful it is. In our opinion, however, fiscal strictness is not always and not independently in all circumstances the objective of fiscal policy, or more precisely of fiscal rules. As Wyplosz (2012) pointed out, if there were no deficit bias, budgets would sometimes produce loss and sometimes profit. Instead, ensuring macroeconomic stability is what appears among the functions of state fiscal policy (Musgrave, 1959) and among the aims of fiscal rules (Kennedy & Robbins, 2001). This implies that fiscal rules are not intended to strengthen the defense against loss-making management in general, but to reduce and restrain deficit bias.

Fiscal policy is adequate from the aspect of fiscal orientation if it is able to boost the economy in times of crisis (e.g., periods of insufficient demand) and is strict and disciplined when the economy prospers. On the one hand, if a government does not reduce its debt rate during economic upturn, a so-called ratchet effect might occur (P. Kiss, 2012). This means that if the debt rate increases during a crisis and does not merely increase further in crisis-free periods, then indebtedness will increase continuously in the long run due to the level shift related to crises, which endangers sustainability (Balatoni, 2015). Strict fiscal policy, however, is also needed in the short term to create fiscal space, because the acquired investor's trust is the indispensable condition for satisfying the financing needs that increase in times of crisis.

One of the aims of budgetary rules is not to force the countries to follow strict budgets independently of economic cycles, but to do this when the economy is prospering. To be sure, the size of the fiscal expansion must also be limited during the crisis, but so far there is no consensus about the threshold, which makes it difficult to evaluate the efficiency of the fiscal rules from that perspective.¹⁰ The rules are forced into the background during crisis because especially in the case of developing countries it is not the institutional environment, but the uncertainty of financial markets and the lack of credit supply that hinders expansive fiscal policy (Bova et al., 2014).

For these reasons, we do not examine the relation between budgetary rules and balance in general terms, but only in times of boom, when disciplined fiscal policy can truly be expected. For this, we need to define upturn precisely⁰; in the end we listed the periods when the gap between actual and potential output was more than 0.5 percent of the potential output. We did not choose zero as a threshold limit because the estimates regarding real-time output gap are extremely uncertain, and governments need to be sure to run a strict fiscal policy during upturns.¹¹

4. DESCRIPTIVE STATISTICS

The FRI value measuring the strength of fiscal rule systems was between -1.01 and +2.13 in the examined period. The first value indicates that the country had no budgetary rule in place at a national level. There were three of the 27 member states (Cyprus, Greece, and Malta) where there was no valid fiscal rule

¹⁰ About the mechanism of fiscal rules in recessions see Hong (2015).

¹¹ The results do not change if the threshold value is 0, as we will show below.

between 1995 and 2008; in these countries, the value stayed unchanged at -1.01. In the case of the other member states, nevertheless, budget rules strengthened substantially (Figure 4.1).

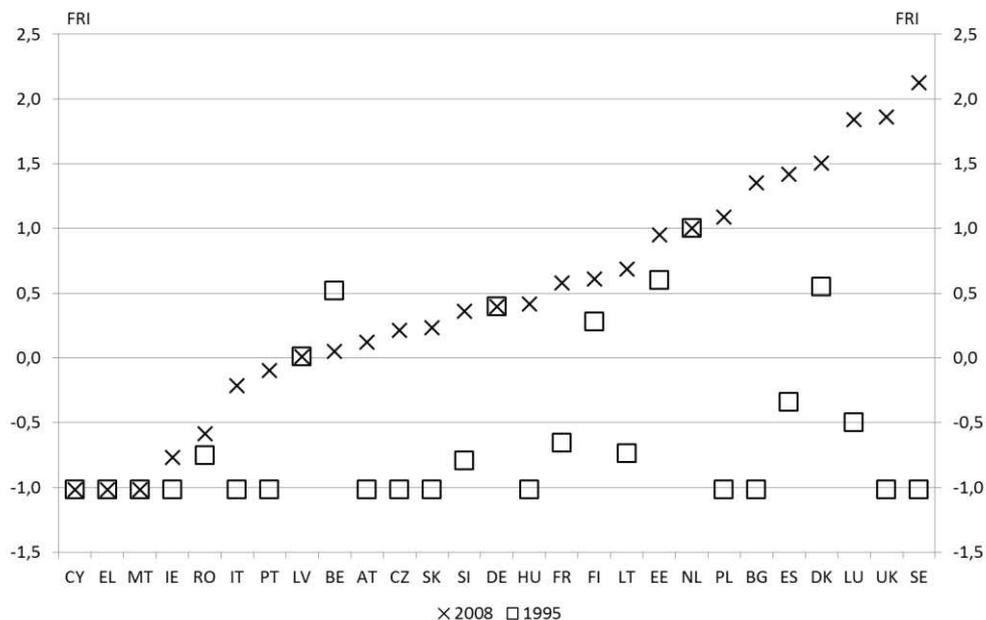


Figure 4.1. FRI value in the examined countries in 1995 and 2008 (European Commission, 2015)

The Netherlands, Estonia, Denmark, Belgium, and Germany were ahead in budget rules at the beginning of the period, while in 2008 the five strongest rule systems were in place in Sweden, Great Britain, Luxembourg, Denmark, and Spain. Between the beginning and the end of this period, the strength of the rule system decreased only in Belgium, it stayed unchanged in three countries (Germany, Latvia, and the Netherlands), and the FRI value increased in all the other countries, which therefore grew by one on the average in the entire database. The biggest growth in these 14 years was achieved in this field by Sweden, Great Britain, Bulgaria, Luxembourg, and Poland. Altogether, while the average FRI was -0.54 in 1995 in the entire database, by 2008 the index grew to 0.45 and the average for the whole period was 0.03.

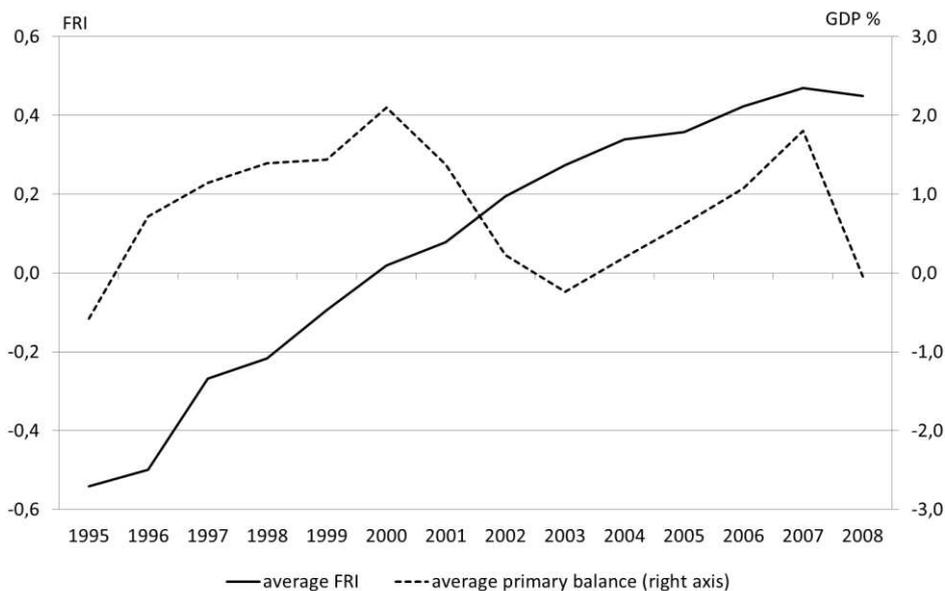


Figure 4.2: Changes of FRI and primary balance

Considering the average primary balance as a percentage of GDP and treated as a dependent variable throughout our examination, the image is more varied (Figure 4.2). The index increased continuously in the first half of the period until the turn of the millennium, which can partly be explained by the fact that the introduction of the euro affected the governments of the countries as a strong incentive, since no country wanted to be omitted from the creation of the eurozone due to bad fiscal performance. After this, however, the average primary balance deteriorated considerably, which can be explained partly with the 2002–2003 economic crisis also affecting Western Europe, and with the fact that after the introduction of the common currency the obligation that would have induced most of the old member states to carry out disciplined fiscal policy vanished.

In the entire database, for 290 of 378 observations some sort of national fiscal rule was in place, and for 88 cases this was not the case. In the cases where fiscal rules were in place, the average primary balance was 1.0 percent of GDP, which further strengthens our assumption that there is some sort of link between balance and the rules.

The new variable (GOV) that we created has a key role in handling endogeneity, and we used it to separate the observations functioning without any rule from the ones functioning with an own rule and the ones with inherited rules. As a result of the division, 133 cases of all the observations fell into the category of own rules, 157 were inherited rules, and there were 88 cases that had no valid rule (Attachment 1).

The FRI value was 0.40 on average in the case of states that had a rule; within this category, in the case of own rules it was 0.58, for inherited rules it was slightly weaker, at 0.25, and in the case of the observations without rules it was of course -1,01, as this is the minimum value of the index.

There is a larger difference in terms of budgetary balances: while the average primary balance was 0.1 percent of GDP in the case of the observations without rules, if there was any fiscal rule in place, the index value rose to 1.0. Within this category, the average primary balance was 1.5 percent of GDP in the case of own rules and 0.6 percent of GDP in the case of inherited rules. This is particularly important to us because it shows that budget balance improves considerably after introduction, and although discipline decreases somewhat after government changes, the balance is still more favorable than in the case of countries working without a rule.

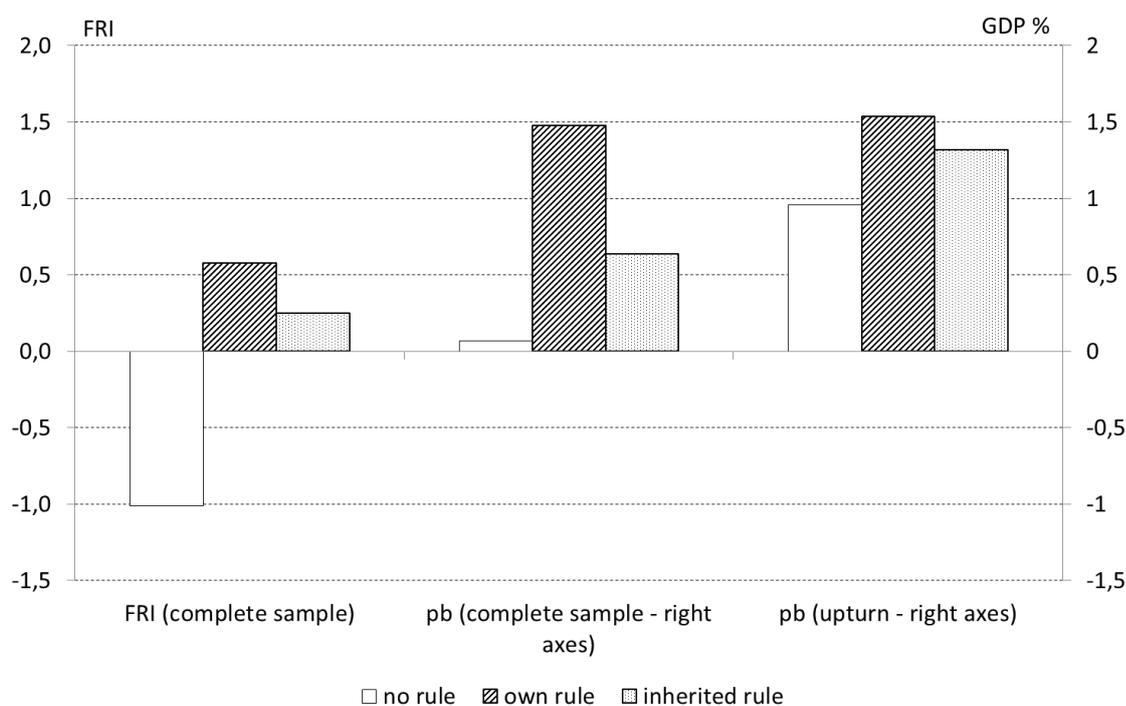


Figure 4.3: Changes of FRI and primary balance in different groups

We repeated the comparison by focusing only on the upturn period and filtered out the cases when the gap between the actual and potential gap was higher than 0.5 percent of the potential output. There are substantial differences in terms of primary-balance-to-GDP ratio between the fiscal performances governing without a rule (0.96), with inherited rules (1.32), and with own rules (1.54).

5. RESULTS

Before discussing the results of the estimate procedures, it is important to stress that our calculations contain a series of assumptions for which we have no precise knowledge. One of these is that we examined the existence of linear relations in the estimate procedures, while we assumed that the marginal effect of fiscal rules is not independent of the regulation level. Likewise, we could not take into consideration what several other investigations have called attention to (for example, Heinemann et al. [2014]), namely that the effect of the rules can depend on other factors, such as political culture, structure of the broader institutional circumstances, or the relevant attitude of citizens.

As a first step, before examining the database as a panel database, we took the average of the FRI value referring to the whole period in each country and compared the index we received to the average primary balance. Of course, this simplification covers many things, and the number of datapoints is too limited to draw relevant conclusions, but it still provides a comprehensive picture of the relation between the two variables in the long term.

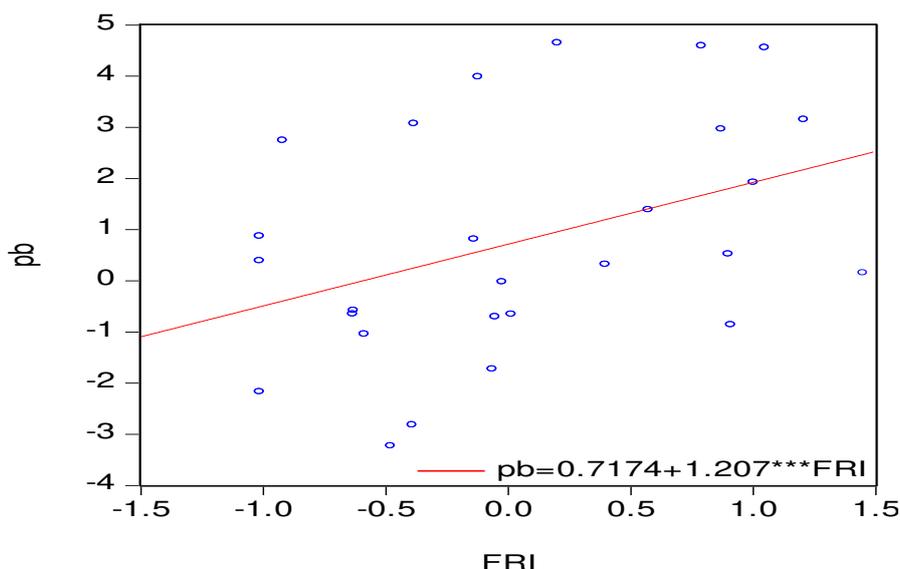


Figure 5.1: Relation between FRI and primary balance with crosscut data

*** denotes significance at 1% level

The vertical axis of Figure 5.1 is the primary-balance-to-GDP ratio, the horizontal axis FRI, and the relationship between the two appears to be quite strong: if FRI increases by 1 point, the primary-balance-to-GDP ratio improves 1.2 percent. To estimate more precisely, and to be able to explain more efficiently, we complemented the model with the 1995–2008 average of the following variables, in accordance with the literature:

1. GAP: output gap,¹² measuring the difference between the actual and potential GDP as a percentage of potential GDP.
2. WGI: index measuring the efficiency of government work, from the WGI indices elaborated by the World Bank (Worldwide Governance Indicators).

¹² Estimated with a Hodrick-Prescott filter. (Source: AMECO).

3. GDP: gross domestic product per capita calculated on purchasing power parity.
4. d: gross consolidated public debt as a percentage of GDP (debt rate).

With the integration of the new variables we estimated the following equation¹³ on the cross-section data, where i stands for the different countries:

$$pb_i = \beta_1 d_i + \beta_2 WGI_i + \beta_3 GAP_i + \beta_4 GDP_i + \beta_5 FRI_i + c \quad (1)$$

As a result of the inclusion of the new variables, the explanatory power of the estimation grew from 13 percent to 53 percent on the adjusted R square (Table 5.1).

Table 5.1: Results of the cross-section estimate

Explanatory variables	Dependent variable: pb
Debt rate (d)	0,05 *** (0,00)
Government efficiency (WGI)	-3,42 (0,74)
Output gap (GAP)	1,50 *** (0,01)
Gross Domestic Product (GDP)	0,12 *** (0,01)
Fiscal Rules Index (FRI)	1,76 *** (0,01)
N	27
R ²	0,63
ADJ R ²	0,53

*** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level. p probability values are in brackets. The OLS estimate was carried out with clustered standard errors.

At the same time, the FRI coefficient grew to 1.76, which indicates that while we control the level of the debt rate, the GDP, the output gap, and the government efficiency, if the average value of the FRI grows by 1, the average value of the primary-balance-to-GDP ratio improves by 1.76 percent.

However, the estimation carried out on the cross-section data is small, consisting of only 27 data points and considering only the differences between countries. In other words, it cannot capture the effect of a fiscal rule being introduced or the strength of an already existing rule being changed within a country from one year to another. For this reason, we “unfolded” the dataset for further examination, and examined the 14 years and the 27 EU members; that is, we treated the database containing 378 observations as a panel.

To start with, similar to the previous examination, with the help of the new panel database we represented the relation between the balance indicator and FRI (Figure 5.2). This also indicates that there is a relationship between budgetary policy and the rule system: the regression line rising from left to right indicates that the stronger a rule is, the more advantageous the primary balance becomes. The coefficient of the regression line is significant, which numerically means that if the FRI value increases by 1, the primary-balance-to-GDP ratio improves by 0.87 percent, with a relatively low 7 percent R².

¹³ The invariant is indicated with “c.”

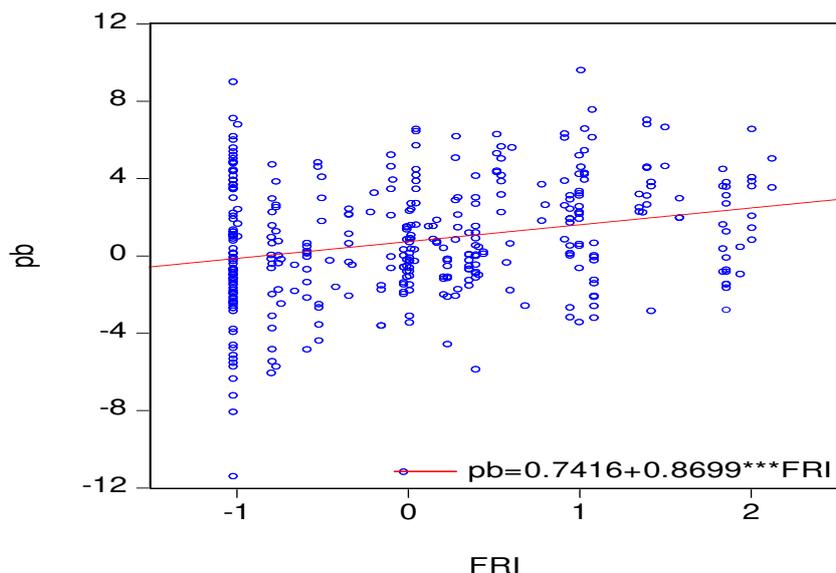


Figure 5.2: Relation between FRI and primary balance

*** denotes significance at 1% level

For more precise estimates, we transformed the regression into a fiscal reaction equation, and apart from the above complemented it with further two variables, which could play an important role in the case of a given country in forming the primary balance. These are:

- ELCT: This variable controls the effect that political cycles have on the budgetary balance. It measures the years until the next parliamentary elections compared to the current year.
- EURO: This variable tries to capture the relation according to which the countries that introduced the euro as a cash currency in 2001 were expected to exert disciplined fiscal policy. This is therefore a binary variable: a value of 1 for the 12 affected countries from the start of the examined period until 2000, and 0 for upcoming periods and for the other countries.

Apart from this, we omitted six countries in which the FRI value did not change during the examined period. As the model structured on the panel database was able to handle changes in time, as part of the changes, instead of the debt rate for the examined period (d) we included in the equation its value delayed by 1, which can be described in the following way:

$$pb_{i,t} = \beta_1 FRI_{i,t} + \beta_2 d_{i,t-1} + \beta_3 GAP_{i,t} + \beta_4 GDP_{i,t} + \beta_5 WGI_{i,t} + \beta_6 EURO_{i,t} + \beta_6 ELCT_{i,t} + c \quad (2)$$

Here i indicates the individual countries and t the individual years. It is important to stress that there is a significant difference between the fiscal reaction function we revealed and the classical equation of a fiscal reaction function. This latter can be linked to Bohn (1998), and its essence is that the primary balance can be found on the left side of the equation, while on the right appear the delayed value of state debt next to other control variables. The delayed value of the primary balance generally has an important role among control variables, as autocorrelation is naturally high in the way this indicator changes, so its representation on the right side truly increases the explanatory force of the estimation.

In our case, however, employing the classical equation would lead to misleading results if the delayed value of the primary balance were included among the explanatory variables. As Balázsi et al. (2014) pointed out in their article summing up the development of panel econometrics, in the case of an OLS estimate carried out on a panel database, the estimative equation provides inconsistent results if the delayed value of the dependent variable is included in the equation (first mentioned by Nickell, 1981). Although there are examples of studies in which the range of explanatory variables included the delayed value as well

(European Commission, 2009), we omitted this variable for the sake of more precise calculation, and we will deal with the problem further on in a different way.

Table 5.2: Results of the panel estimate

Explanatory variables	Dependent variable: pb
Fiscal Rules Index (FRI)	0,87 ** (0,02)
Debt rate (d-[1])	0,05 *** (0,00)
Output gap (GAP)	0,12 (0,26)
Gross Domestic Product (GDP)	-0,01 (0,85)
Government efficiency (WGI)	3,20 ** (0,05)
Introduction of euro (EURO)	-0,40 (0,58)
Electoral cycle (ELCT)	0,19 *** (0,01)
N	267
R ²	0,35

*** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level. *p* probability values are in brackets. The OLS estimate was carried out with clustered standard errors.

The results indicate that the relation between fiscal rules and the primary balance is significant. If the FRI value increases by 1, the primary-balance-to-GDP ratio improves by 0.87 percent. We found a significant causal effect between the delayed value of the debt rate (d), the index measuring government efficiency (WGI), and the index of the time until the next parliamentary elections (ELCT).

Our results are in line with the results of studies carried out with a similar methodology. Marneffe et al. (2010), for instance, also found that the FRI effect on the primary balance is significant. Although the value of the coefficient they provided (0.32) was somewhat lower, this can partly be explained by the fact that they examined the member states of the eurozone during a shorter time period (1998–2008) and included the delayed value of the dependent variable among the explanatory variables, and the range of further control variables was more reduced than in the model we used.

These last two differences are true even if we compare our results to the study of the European Commission (2009), which, although it examined the 27 EU members during a longer time period (1990–2007), also found significant relations and a coefficient (0.48) similar to ours. And although that researcher did not focus the study on the primary balance but on the effect of the cyclically adjusted primary balance, considering that our model contains the output gap (GAP) among the explanatory variables precisely to control the effect of the cycle, the results of the two models can be compared. Debrun et al. (2008) and Ayuso-i-Casals et al. (2009) also reached a similar result when examining different models.

The examinations carried out so far serve multiple purposes. First, we presented the database, pointed out the most important processes and relations, and determined the starting point defined by results from the literature, compared to which we tried to complement and modify the studies examining the relation between fiscal rules and budgetary discipline with new conditions and new means. We started the presentation of our results by creating a new model with the help of the estimate procedure used so far, in which on the one hand we considered the cyclical position, and on the other hand we integrated our proposal referring to the handling of the endogeneity issue.

Thus, as a first step we filtered out the observations from the database when there was an own rule in force, that is when GOV=1. After that we created a binary variable, GAP3, which assumed the value of 1 if the output gap in the percentage of potential GDP was higher than +0.5, and 0 otherwise. Next, we examined

the interaction of the explanatory variable (FRI) and GAP3, which due to its character shows to what degree FRI contributes to primary balance in times of upturn (when the output gap is larger than 0.5). This solution is better than simply filtering out the cases from the database in which the output gap is smaller than 0.5, because the size of the database and the number of observations that can be used for the estimate do not decrease like this. The threshold value is again 0.5 and not 0 because the estimate of the indicator, especially its forecast, is highly uncertain, while a government needs to be sure that the crisis is over when deciding about demand-reducing fiscal policy. It is important, however, to stress that the results do not change even if the threshold value is 0, which shows the robust character of our findings. These calculations are included in Attachment 2. Second, we elaborated a basic model (I.) along the changes above, in which among the explanatory variables we included only two variables (FRI, GAP3) and their interaction, as well as a detailed model (II.), containing all the other explanatory variables according to the following:

$$pb_{i,t} = \beta_1 FRI_{i,t} + \beta_2 FRI_{i,t} * GAP3_{i,t} + \beta_3 GAP3_{i,t} + \beta_4 WGI_{i,t} + \beta_5 d_{i,t-1} + \beta_6 ELCT_{i,t} + \beta_7 GDP_{i,t} + \beta_8 EURO_{i,t} + c \quad (3)$$

What we found in the case of the basic model is that the effect of both the FRI and GAP3 is significant, and what is even more important to us is the interaction (multiplication) of the two variables. All of this means that the primary-balance-to-GDP ratio improves more than an additional 1 percent in times of upturn if the FRI value increases by 1.¹⁴ The detailed model led to a similar result from an interaction point of view. While the explanatory value of the model increased with the inclusion of new explanatory variables, the sum of the two coefficients increased as well. Based on the estimation, a 1-unit increase of the FRI improves the primary-balance-to-GDP ratio by 1.27 (0.46+0.81).¹⁵ Apart from this, WGI measuring government efficiency also proved to be significant, together with the number of years until the next parliamentary elections (ELCT), the level of gross domestic product per capita (GDP), and the lagged value of the debt rate (d).

Table 5.3: Results of the reduced/adjusted panel estimates

Explanatory variables	Basic model (I.)	Detailed model (II.)
	Dependent variable: pb	Dependent variable: pb
Fiscal Rules Index (FRI)	-0,88 *	0,46
	(0,08)	(0,389)
FRI*GAP3	1,08 **	0,81 **
	(0,04)	(0,033)
Output gap (GAP3)	0,87 **	0,17
	(0,04)	(0,702)
Government efficiency (WGI)		2,7 *
		(0,06)
Debt rate (d[-1])		0,06 ***
		(0,00)
Electoral cycle (ELCT)		0,18 *
		(0,09)
Gross Domestic Product (GDP)		0,56 **
		(0,02)
Introduction of euro (EURO)		0,74
		(0,40)
N	167	151
R ²	0,04	0,34

*** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level. p probability values are in brackets. The OLS estimate was carried out with clustered standard errors.

¹⁴ The sum of FRI and the coefficients of the interaction did not prove to be significant in this case, so their sum cannot be interpreted.

¹⁵ The sum of the two coefficients also proved to be significant (p=0,006)

As the scope of our examination was primarily the interaction between explanatory variables, the Wald-test also needed to be carried out. As the p-value of the test was 0.06 with the basic model (I.) and 0.001 in the case of the detailed model (II.), in the latter case we can certainly reject the assumption that both coefficients are equal to zero.

As pointed out above, in the case of the regression estimates so far there were methodological obstacles that made the precise revelation of the correlations more difficult. In the case of our panel database, the OLS estimate did not permit using the dynamic model, that is, including the delayed variable of the primary balance among the explanatory variables. As results from the literature, similar to our estimates, also indicate that the explanatory value of the model thereby decreases significantly, we therefore looked for another solution.

In order to handle the problem, we used a special version of the general moments method (GMM) created by Arellano and Bond (1991). This dynamic model estimates the changes of the dependent variable based on the changes of the explanatory variable with the help of instrumental variables. The estimated equation is:

$$pb_{i,t} = \beta_1 pb_{i,t-1} + \beta_2 FRI_{i,t} + \beta_3 GAP3_{i,t} * FRI_{i,t} + \beta_4 GAP3_{i,t} + \beta_5 WGI_{i,t} + \beta_6 d_{i,t-1} + \beta_7 ELCT_{i,t} + \beta_8 GDP_{i,t} + \beta_9 EURO_{i,t} + c$$

(4)

The most important result of the model estimate, in our opinion, is that the interaction variable affects fiscal discipline significantly (Table 5.4). This means that the budgetary rules have no provable effect on balance in times of crisis, but in times of upturn, if the FRI value increases by 1, the primary-balance-to-GDP ratio will improve by 1.03 percent.¹⁶ Apart from this, the causal relation can be considered as proven in the case of the lagged value of the primary balance and WGI measuring government efficiency. In our case, a 0.00 value for the Wald test also confirms the obtained result.¹⁷

Table 5.4: Results of the Arellano-Bond estimate

Explanatory variables	Dependent variable: capb
Cyclically adjusted primary balance (capb[-1])	0,25 *** (0,00)
Fiscal Rules Index (FRI)	-1,03 (0,15)
FRI*GAP3	0,96 *** (0,01)
Output gap (GAP3)	-0,36 (0,17)
Government efficiency (WGI)	-0,98 (0,35)
Debt rate (d[-1])	0,03 (0,26)
Electoral cycle (ELCT)	0,14 (0,13)
Gross Domestic Product (GDP)	0,02 (0,95)
Introduction of euro (EURO)	1,26 (0,28)
N	123

*** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level. p probability values are in brackets. The Arellano-Bond estimate was carried out with clustered standard errors by country and time fixed effect.

¹⁶ The sum of the FRI and the interaction coefficient was not significant.

¹⁷ Because of the multicollinearity, we ran the regression omitting FRI and GAP3 from the right side of the equation, and in that case their interaction (FRI*GAP3) still was significant, and the coefficient was 0.96.

Altogether, therefore, if we treat the endogeneity issue by filtering out the countries with own regulations, and if we focus on how fiscal rules behave in times of boom, the result is that national fiscal rules are able to contribute considerably to disciplined fiscal policy and to improve fiscal balance. To our knowledge, no researchers have tried to handle endogeneity in this way previously, and because we did not find any other study in which the rules were examined separately, with this method only in times of boom, we cannot compare our results directly with others.

Partly for this reason, we also carried out our estimate by changing the dependent variable to the cyclically adjusted balance-to-GDP ratio that is more frequently used in the literature and found that the growth of the FRI index measuring the strength of the fiscal rules system improves this indicator significantly in times of upturn¹⁸. This is in line with the results of Bergman et al. (2014), who also used the relation between FRI and different fiscal indices with the help of the Arellano-Bond model on a database containing 21 years of data for the EU member states. According to the estimate of Bergman et al., if FRI increases by 1, the cyclically adjusted budgetary balance in the percentage of GDP improves by 0.47 percent.

Heinemann and Yeter (2014) and Sacchi and Salotti (2015) reached a result similar to ours with a completely different method; they also found that fiscal rules are able to strengthen fiscal discipline. Apart from the above, our results are also confirmed by previous work of Bergman et al. (2013), who—though they did not handle endogeneity—examined the years of the economic crisis (2009–2012) separately from the whole time series making up their database (1990–2012) using the Arellano-Bond method. They found that increasing FRI by 1 in the whole database improved the cyclically adjusted balance-to-GDP ratio by 0.54 percent, while in the case of the model reduced to the crisis years the FRI value was negative and not significant. These two pieces of information indicate that fiscal rules can certainly have a substantial effect on fiscal discipline in crisis-free years. And although this division into crisis and crisis-free years does not correspond exactly to the categorization we use and that is adapted to the size of the output gap, and although the endogenous variable is also not exactly identical, we believe that the results of Bergman et al. indirectly confirm our findings.

6. CONCLUSIONS

The main role of our examination was to try to differentiate the signaling and limiting functions of fiscal rules. By handling the endogeneity issue with a new method, we demonstrated that national fiscal rules are able to contribute to disciplined fiscal policy. This of course does not mean that rules would not also have a signaling function; quite on the contrary. One of our most important partial results is that the government that introduces the rule usually runs a stricter fiscal policy than its successor. This is in line with empirical results and theoretical trends according to which governments often introduce national fiscal rules after a fiscal correction and amidst a stable and disciplined fiscal policy to signal to the market their commitment to a sustainable economy.

Our two statements, according to which rules affect fiscal policy and that they are introduced primarily so that politicians can show their commitment, are only in seeming contradiction. The results of our investigation, in line with findings from the literature, indicate precisely that although the signaling function was stronger when introducing a rule—and we cannot measure to what extent the rule affected budgetary policy directly, but this can be proved later—following a government change the rules could contribute substantially to fiscal discipline. Thus, the two functions of the rule complement one another. The government that introduces the rule is usually already committed to disciplined policy and wishes to signal this with the new rule, but with the appearance of the new government, the rule changes its function according to our findings, and promotes disciplined management efficiently. This therefore means that fiscal rules are able to strengthen fiscal discipline not necessarily in the short term, but in the mid- and long term instead, which is also supported by the fact that the older the rule is, the higher the reputation cost its violation or modification implies.

¹⁸ The interaction coefficient was 0.96 and proved to be significant. Detailed results are shown in Attachment 3.

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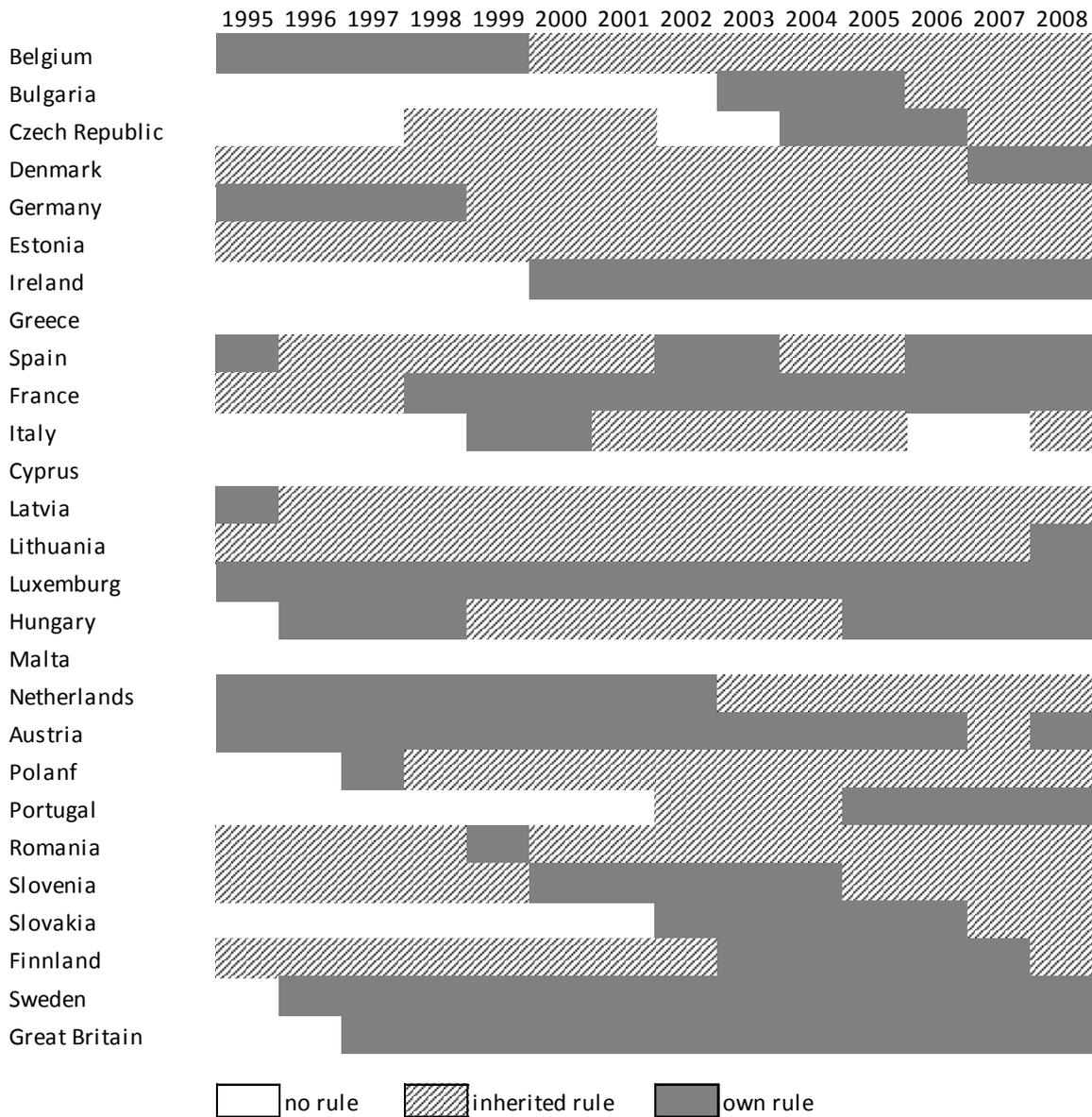
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ATTACHMENTS

1. ATTACHMENT



2. ATTACHMENT

Results of the regression equation (8), using GAP2 instead of GAP3. The GAP2 binary variable assumes a value of 1 if the output gap is positive, and 0 otherwise.

Explanatory variables	Dependent variable: pb
Primary balance (pb[-1])	0,16 ** (0,02)
Fiscal Rules Index (FRI)	-0,65 (0,26)
FRI*GAP2	0,95 *** (0,00)
Output gap (GAP2)	0,44 ** (0,05)
Government efficiency (WGI)	1,83 (0,11)
Debt rate (d[-1])	0,03 (0,23)
Electoral cycle (ELCT)	0,11 (0,19)
Gross Domestic Product (GDP)	-0,02 (0,95)
Introduction of euro (EURO)	0,27 (0,79)
N	123
R ²	0,34

*** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level. p probability values are in brackets. The Arellano-Bond estimate was carried out with clustered standard errors by country and time fixed effect.

3. ATTACHMENT

The following regression table contains the results of equation (8) with the difference that the primary-balance-to-GDP ratio was changed on both sides of the equation to cyclically adjusted primary-balance-to-GDP.

Explanatory variables	Dependent variable: capb
Cyclically adjusted primary balance (capb[-1])	0,25 *** (0,00)
Fiscal Rules Index (FRI)	-1,03 (0,15)
FRI*GAP3	0,96 *** (0,01)
Output gap (GAP3)	-0,36 (0,17)
Government efficiency (WGI)	-0,98 (0,35)
Debt rate (d[-1])	0,03 (0,26)
Electoral cycle (ELCT)	0,14 (0,13)
Gross Domestic Product (GDP)	0,02 (0,95)
Introduction of euro (EURO)	1,26 (0,28)
N	123

*** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level. p probability values are in brackets. The Arellano-Bond estimate was carried out with clustered standard errors by country and time fixed effect.