

Master Thesis

The increasing Debt problem: Is a fiscal rule an effective solution?

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Abstract

This paper addresses the debt increase problem within the European Union from the beginning of 2000s to the present day and the subsequent debt restructuring process achieved by different fiscal rules. It will be econometrically proved the positive impact of fiscal rules on the public debt of a EU member country. The methodology used in this paper refers to the “*Fiscal Rule Index*” designed by the European Commission and is applied to the EU countries.

1. Introduction

The debt problem came to light in 2002 when *Excessive deficit procedures (EDP)* were opened for Portugal, Germany and France and in the following years for Netherlands, Greece and Italy. After the closure of these EDP, in 2008 the debt level in Europe increased considerably as a consequence of the great economic recession following the financial crisis. As will be shown in the second chapter of this paper (Chapter 2.1), the debt increase trend affects the whole of Europe, in particular the eurozone debt average becomes equal to 88% GDP, considerably surpassing the 60% GDP established by the Maastricht criteria. Moreover we will analyse the structural and primary deficit changes during the period prior to and following the crisis in order to examine its impact on governmental debt (Chapter 2.2). Disassociating from the 2008's financial crisis, this study analyses the main economic and political causes behind a debt accumulation (Chapter 2.3). Economic variables like the increase of interest payment on debt, the diminution of GDP growth rate, the previously greater debt level and a negative primary budget balance over GDP are responsible for the boost of governmental debt-to-GDP ratio. Furthermore political factors like government's fragmentation (multiparty government coalition) and political instability create excessive deficits and debt (Roubini et al., 1989; Persoon et al. 2007). This deficit and debt accumulation creates sustainability problems such that higher primary surpluses are required for paying back debt and its interest rate. As we will see in the Chapter 2.4, the IMF has implemented a *Debt sustainability analysis (DSA)* in order to assess countries' sustainability. Several european countries, like Italy and Greece, surpass the 60% GDP threshold imposed by Maastricht criteria, yet have a sustainable debt in the sense of the IMF study (IMF, 2013).

After having treated the problem of debt accumulation, the third Chapter focuses on the debt restructuring process. Seeing the considerable number of countries subject to EDP or dangerously close to the 60% GDP of debt and 3% GDP of deficit limits, several supranational, national and subnational fiscal rules have been implemented in order to ensure fiscal discipline. There are many different fiscal rules for containing the debt level of a country, varying from having different characteristics and specific scope (subchapter 3.1.3). In particular the debt rule allows to establish a governmental debt ceiling which ensures sustainability and easy monitoring. Its no-short term influence can be avoided if the debt rule is combined with a deficit rule, in fact this formula is widespread across European Union Members. In addition, there are budget balance rules like overall balance, structural balance and balance over the cycle rules. These rules are also implemented to have

a greater fiscal discipline, taking into account the concepts of economic cycles and cyclical components in order to establish a budget limit that excludes the cyclical variations, thus being efficient over the long-term. Expenditure rules establish governmental spending limits (excluding the spending categories directly correlated with the public finance quality), forcing politicians to define spending priorities to fulfil the threshold imposed. Also this rule should be accompanied by another rule or by a revenue rule, otherwise it can not be totally effective. The revenue rule sets a revenue maximum to prevent surcharging and sets a revenue minimum for securing the necessary funds to fulfil financial commitments.

After having analysed different fiscal rules, in the second part of the Chapter (3.2) we will econometrically analysed the impact of specific fiscal rules on the public debt of a EU Member country. Using the “*Fiscal Rule Index*” methodology designed by the European Commission, Marneffe et al. (2011) we will verify the positive impact of fiscal rules on fiscal balances and hence on fiscal discipline. In this subchapter different studies are considered, such as Lara and Wolff (2011), Hatchondo et al. (2012) etc.

The last part of this research (chapter 3.3) studies the case of *Swiss debt brake* being an example of a successful fiscal restructuring process. This analysis highlights the mechanisms and the operating principles that have made it possible to restore the swiss finances since 2005 (date of the effective implementation of the rule). In fact after this period, the swiss debt steadily decreased, proving the effectiveness of debt rules in improving the country's fiscal discipline.

2. The increasing debt trend in Europe

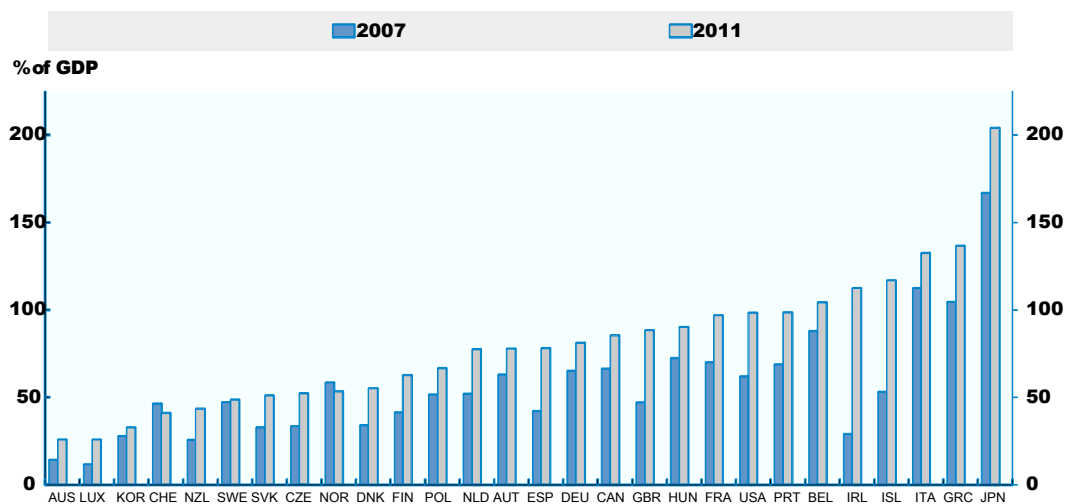
This chapter is divided into three parts. In the first subchapter we will give an idea about the amplitude and the evolution of the sovereign debt problem in Europe. In the second subchapter, we try to explain the debt accumulation problem with the analysis of structural and primary deficit changes in Eurozone countries. In the third part we focus on the economic and political reasons stimulating the debt accumulation. In conclusion, the fourth subchapter defines the debt sustainability and the consequent need for fiscal consolidation.

2.1 European debt evolution

From 2010 the increase of sovereign debt has reached problematic levels in advanced economies causing a sovereign debt crisis all around the world. Beginning in Greece, the european sovereign

debt crisis gradually affected the rest of Europe. In fact, the greek debt-to-GDP has risen from 108.9% in 2000 to 147.8% in 2010, becoming the first indebted country in Europe (OECD stat, 2012). This debt increasing trend has its affect worldwide, as we can observe from the 2012's OECD statistic (Figure 1). Except for Norway and Switzerland (the only countries with a debt reduction in this period and which will be discussed in Chapter 3), we verify a general and unprecedented debt accumulation characterising most of the OECD countries. In particular, we notice the considerable increase in Irish debt (from 28.7 % GDP in 2007 to even 91.7% GDP in 2010) due to the several rescue plans set for bailout of irish banks (OECD stat, 2012). An important debt-to-GDP increase is also verified in Italy, becoming the second most problematic country in Europe with a debt level of 126% GDP in 2010 (OECD stat, 2012).

Figure 1: Debt has jumped during the crisis in almost all countries - Gross government financial liabilities



Source: OECD Economic Outlook No. 89 Database

In 2011 the European gross debt average for 17 eurozone countries was 88.0% GDP (Latvia is in the eurozone since 2014 so is not considered in the data of 2011), while the estimation for 2013 was 92.7% GDP (European Commission, 2012). As we can see from the Figure 1, among the 17 eurozone countries there are large differences of gross debt ratio. With regard to the European Union countries average (EU-27 in 2011), the debt-to-GDP results a bit lower compared to 17 eurozone countries (83.0% GDP in 2011 while the estimation for 2013 is 87.3% GDP). This can be explained by the fact that the EU average incorporates countries with a low sovereign debt rates like Bulgaria, Latvia and Sweden (European Commission, 2012).

Although the convergence criteria has been introduced to ensure fiscal sustainability within the European Union, we can observe a considerable fiscal indiscipline across Member State. Consequently, most of EU Member States are prone to “Excessive deficit procedure“, jeopardising the credibility of the european debt rule and reducing its effective impact on country discipline. Additional and unprecedented fiscal adjustments are hence required in order to reduce debt to an endurable level.

2.2 Structural and primary deficit within European Union

After having treated the debt accumulation in the European union, we will analyse the deficit trend explaining the origin of the sovereign debt problem. In the period from 2002 to 2008 many excessive deficit procedures have been opened, as in the case of Portugal, France, Germany, Netherlands, Greece and Italy while in June 2008 no-one was imputed for EDP. As we can observe from Table 1, the eurozone deficit increases particularly from 2000 (budget balance of -1.1% GDP) to 2004 (budget balance of -3.0% GDP), as confirmed by several excessive deficit procedure (OECD, 2010). The second important deficit increase is in the period from 2007 (budget balance of -0.6% GDP) to 2010 (budget balance of -6.3% GDP) where the eurozone deficit and debt explode due to the consequences of the financial crisis (OECD, 2010).

Table 1: Public finance in eurozone

En %

	PIB	Solde public	Charges d'intérêt	Composante conjoncturelle	SPS*
1998	2,8	-2,3	4,2	-0,1	2,0
1999	2,9	-1,4	3,7	0,0	2,3
2000	4,0	-1,1	3,5	0,6	1,8
2001	1,9	-1,9	3,3	0,4	1,0
2002	0,9	-2,6	3,1	0,0	0,5
2003	0,8	-3,1	3,0	-0,2	0,1
2004	1,9	-3,0	2,8	-0,6	0,4
2005	1,8	-2,6	2,7	-0,5	0,6
2006	3,1	-1,3	2,6	0,0	1,3
2007	2,8	-0,6	2,6	0,5	1,5
2008	0,3	-2,0	2,6	0,0	0,6
2009	-4,1	-6,1	2,5	-1,9	-1,7
2010	1,7	-6,3	2,5	-2,4	-1,4

* Solde public primaire structurel.

Source : OCDE, *Perspectives économiques*, n° 88 (novembre 2010).

The structural primary budget (named *SPS* in the Table 1) is defined as the budget balance excluding both the interest payments on government debt (i.e. primary budget) and the estimated cyclical

component of government revenue and spending (i.e. structural budget) (European Commission web glossary; for deepen definition cf. Chapter 3). Despite the negative budget balance, the structural primary budget verifies a positive trend from 1998 (SPS of 2.0% GDP) to 2007 (SPS of 1.5% GDP) in the eurozone due to the positive growth rate and to the diminution of public expenditures (austerity plans in consequence to EDP) (OECD, 2010). This curious situation can be explained by both the exclusion of cyclical components (predominantly negative) and interest payments (in decreasing trend but essentially significant) from the primary structural balance. In fact, both these factors influenced negatively the eurozone's budget balance, explaining the negative budget balance and the increasing debt level. Contrarily, in the period from 2007 to 2009 the structural primary budget decreases considerably (SPS of -1.7% GDP in 2009). This negative trend is caused by the big economic slowdown that negatively affects not only the budget balance but also its structural part (OECD, 2010). In consequence, the decrease of structural primary balance (-1.7% GDP in 2009) and the negative budget balance (-6.1% GDP in 2009) accumulate public deficits and debt within the eurozone (OECD, 2010). It is important to underline that deficits or negative structural primary balance are not the result of past structural disequilibrium but from economic slowdown and the financial aid earmarked to combat the financial crisis (Mathieu et al., 2011). Moreover, the decrease of tax revenues and the increase of unemployment during the crisis has helped exacerbate the budget balance and the structural primary balance.

In 2010 there was a slight improvement of structural primary budget (SPS from -1.7 to -1.4 % GDP) thanks to the partial economic recovery and to the structural reforms implemented in Greece, Iceland, Ireland and Portugal as a consequence of the their sovereign debt crisis (OECD, 2010). The deficit level in 2010 (- 6.3% GDP) is the result of financial plans to overcome the crisis and decreasing tax revenue consequent to the financial troubles. Considering the 2013's Eurostat data (Eurostat, 2013), in 2011 the average deficit in the eurozone diminished (- 4.2% GDP in 2011) thanks to the recovery in tax revenues (from 44.8% GDP in 2010 to 45.3% GDP in 2011) and a further reduction of public expenditure (from 51.0% GDP in 2010 to 49.5% GDP in 2011) due to the austerity policies implemented in many eurozone countries. This positive trend concerning the public deficit also continues in 2012 (- 3.7% GDP in 2012) particularly due to the fiscal revenue increase (46.2% GDP for 2012) and to the favourable economic growth (GDP increase from 9'424 billion euro for 2011 to 9'490 billion euro for 2012) (Eurostat, 2013). Moreover, a slight but positive increase in public expenditure is registered for 2012 (49.9% GDP), indicating a partial recovery from the crisis (Eurostat, 2013).

Regarding the European Union (not only the eurozone like before), 2012 was characterised by low government deficits in countries like (Eurostat, 2013): Estonia (-0.3% GDP), Sweden (-0.5% GDP), Bulgaria (-0.8% GDP), Luxembourg (-0.8% GDP) and Latvia (-1.2% GDP) and even a budget surplus in the case of Germany (+0.2% GDP). Contrarily, the rest of member states surpassed the 3% GDP deficit threshold defined by convergence criteria (Eurostat, 2013): Spain (-10.6% GDP), Greece (-10.0% GDP), Ireland (-7.6% GDP), Portugal (-6.4% GDP), Cyprus (-6.3 % GDP), the United Kingdom (-6.3% GDP), France (-4.8% GDP), the Czech Republic (-4.4% GDP), Slovakia (-4.3% GDP), the Netherlands (-4.1% GDP), Denmark (-4.0% GDP), Slovenia (-4.0% GDP), Belgium (-3.9% GDP), Poland (-3.9% GDP), Malta (-3.3% GDP), Lithuania (-3.2% GDP) and Italy (-3.0% GDP). These countries with an excessive deficit have excessive or unsustainable public finances.

2.3 Main causes behind the debt accumulation

This subchapter focuses on political and economic causes of an increase in public debt, which go beyond the specific factors triggering the recent sovereign debt crisis.

As argued by Alesina and Perotti (1995), the debt accumulation problem can not be explained only from an economic reasons but should be accompanied by political considerations.

We begin with the definition of debt-to-GDP ratio so we can then analyse the influence of each economic variable on the debt formation. The second part of this chapter will analyse the political variables affecting the sovereign debt level.

2.3.1 Debt-to-GDP definition and economic variables

According to the European Commission study, the debt-to-GDP ratio of a government at time t (b_t) is obtained by considering the debt evolution and assuming zero stock-flow adjustments (European Commission, 2012):

$$b_t = b_{t-1} \frac{1+i_t}{1+g_t} - pbal_t \quad (2.1)$$

Where $pbal_t$ represents the primary budget balance over GDP at time t ; i_t is the average effective nominal interest rate on government debt; g_t is the nominal GDP growth rate and b_{t-1} is the debt-to-GDP ratio in the previous period. This equation shows how the debt-to-GDP ratio (at time t) depends on the difference between the debt-to-GDP ratio from the previous period (multiplied with the actual ratio of effective interest rate on debt and the growth rate of the economy) and the primary budget

balance. The mutation of these economic variables have different impacts on debt-to-GDP ratio, particularly leading to four different scenarios that will be discussed now. Firstly, if the average interest rates on government debt are larger than GDP growth rate (at time t) and the primary budget balance is negative (the governmental expenditure are bigger than sovereign revenue), the debt-to-GDP ratio is expected to increase continuously (compared to the previous period) raising the insolvency risk in the medium and long term. Secondly, the GDP growth rate is higher than i_t and the primary budget records a deficit. In this case, if the initial debt-to-GDP ratio is larger than steady state, the debt-to-GDP ratio will decline and converge towards a steady state economy. The steady state economy is defined as an inter-temporal equilibrium between debt ratio and primary budget position, in which the governmental fiscal policy is considered sustainable (Collignon, 2012; for debt sustainability cf. subchapter 2.3).

In order to reduce debt-to-GDP ratio, the growth rates have to be sufficiently larger while the primary deficit must be as small as possible. In the opposite case, where the debt-to-GDP ratio is lower compared to the steady level, the ratio will increase in order to reach the steady state of economy. Thirdly, if the interest rate on debt is higher than growth rate and the primary budget balance results are positive (revenue larger than expenditures) then the tendency of debt-to-GDP is not certainly known. In particular, when the country is not in a stationary situation, the debt-to-GDP ratio tends to decrease if the changes in growth rate (respect to t_1) are sufficiently small and the increased revenues are sufficiently large. In cases where the initial debt-to-GDP ratio is above a stationary level, the ratio tends towards infinity, causing debt sustainability problems. Fourthly, the GDP growth rate increases more sharply than interest rate on debt and a positive primary balance is registered. In this situation the debt-to-GDP ratio will strongly decrease, considerably reducing the insolvency risk of government.

In conclusion, these four situations summarise the possible influences of economic variables (such as GDP growth rate, interest rate on government debt, primary budget balance and debt-to-GDP ratio of previous periods) in determining the debt-to-GDP ratio of a government. As we have shown above, the real impact of each economic variable depends on specific situation, or from changes of other economic variables. In general, we can conclude that factors giving a boost to the increase of debt-to-GDP ratios are raising interest rate on government debts, decreasing GDP growth rates, greater debt-to-GDP ratios in previous periods and additional primary deficits over GDP (Blanchard et al., 2007).

2.3.2 Political causes

After having analysed the main economic variables, we will see now the political factors have a direct impact on the debt-to-GDP level. We first analyse the relation between the government's fragmentation and the existence of deficits and debt. In particular, the multiparty governments have the tendency to engage higher levels of spending in comparison to a single-party government, consequently causing higher deficits. At the base of spending decisions is a problem of common pool resources that create difficulties in containing governmental expenditure, therefore expanding the size of the public sector (Persson et al., 2007). This common pool resource problem (cf. Box 1) further increases when the governmental coalition size is enlarged (additional parties participate to the coalition). The study conducted by Persson (2007) on UK colonies (with an estimation of ordinary least squares OLS for 1990s) proves a correlation between multiparty coalition government and excessive level of spending. In detail, the multiparty coalition government works in the following way: each party tries (through their elected ministers) to “push“ spending in the favoured area of their constituents in order to take advantage of these public expenses. Electoral motivation is the main policy-makers advantage, this opportunistic behaviour creates higher deficits in election years so as to gain popularity for its reelection or for maintain the stable governmental coalition, consequently increasing public debt. This is indeed demonstrated by Mink (2006) who provide that this opportunistic behaviour creates higher deficits in EU member states (after the introduction of EMU) during election periods. Therefore, policy-makers are representing specific interest groups or orientation parties, so they tend to overestimate the spending's net benefit for the whole society in order to legitimate their decisions. Concerning the spending decisions of other parties, they have weak stimulus to block them as they allow the reduction of responsibility of their specific expenditures. Both these mechanisms create an obvious incentive to increase public expenditure and therefore raise the probability of recording deficits in the state budget (Persson et al., 2007). Persson (2007) concludes that UK multiparty coalition governments are less efficient because they encourage excessive expenditure that entail deficits and debt accumulation. This inefficiency increases with the growth of parties' numbers in the government coalition. Moreover, the empirical study conducted by Vanberg et al. (2012) on fifteen European Countries for the period 1970-2009, also proves that multiparty coalition governments have a higher probability of accumulating more deficit and debt. Additionally, it demonstrates that deficit and debt further increase when political tenures are shorter.

Box 1: Common pool problem

The “common pool“ problem of public budgeting arises from a divergence between marginal social utility and marginal social costs. The beneficiaries of a particular good or service do not fully coincide with the taxpayers (who are more numerous), therefore the governmental public policy causes a redistribution effect within the population. The beneficiaries are chosen from policy-makers who take the spending decision in order to favour their electorate or interest area. The costs of these public policies are diffused to the whole population, while the beneficiaries are targeted in some specific groups decided by policymakers (Von Hagen and Harden, 1996). We can therefore say that these public policies create externalities, as they use money from general taxes to finance projects aimed at specific targeted groups (Von Hagen, 2002, pp. 263-284). This mechanism involves a greater tendency to ask public services compared to the case where the target groups bear all the costs. This method incentivises excessive spending levels, excessive deficits and government debt, as costs are not completely internalized by beneficiaries (Velasco, 1999; Von Hagen and Harden, 1996). In the case of multiparty government, this common pool problem is more remarkable than in a single-party government. In fact, when the ruling parties are numerous, the overspending is greater as every policymaker tries to spend addressing to its specific electorate or by following their own interests.

The second important aspect of political variables is represented by the effect of political instability on budget deficits, in other words the impact of government duration on public budget. Several economists (Cukierman et al., 1992; Tabellini et al., 1990; Persson et al., 1990) find a correlation between political instability and higher debt levels. When a country is characterised by large political instability, the government has the tendency to act with short-term policy strategies (different for each party or interest group) because of the uncertainty about its reelection and about future coalition's composition (different party composition within a coalition can considerably change its finance policy). This attitude of being determined by short-term considerations instead of long-term strategies, engenders a debt bias: government have the tendency to increase spending, not raising tax rates (or even reducing it), causing a debt growth and consequently a rise of debt servicing costs (Persson et al., 1989; Das et al., 2010).

Economists like Persson, Tabellini and Alesina (1990) highlight the strategic role of debt to convince the electorate to renew their confidence in such governments, thus causing a significant increase in debt levels when political instability is greater.

The soft budget constraint (SBC) is another political aspect explaining the debt accumulation in transition and developing countries. This problem arises from the decentralization processes or responsibilities transferred from central government to lower levels of government but maintaining a central government's strong interest on local finance (also if its control over sub-national government finance is limited because of substantial local autonomy). The local government interprets this decentralization process as an expectation to be bailed out or receive additional funds from the central government in case of financial trouble. This financial rescue expectation from the upper-layer of government creates a consequent softened local budget constraint (Vigneault, 2010). In fact, local jurisdictions are independent in deciding their fiscal policy like tax rates, public expenditures and public borrowing in order to become more attractive for individuals and enterprises. This decision is often influenced by the expectation of receiving additional funds from the central government, in fact sub-national governments can behave in an opportunistic manner decreasing tax rates and hence their tax revenue (in order to attract more taxpayers) such that it will be compensated by upper financial aids. Rodden (2008) articulates that the scale of the SBC problem depends on different countries and particularly on the vertical tax gap or “the extent to which subnational governments’ expenditures exceed their own-source tax revenues“ (Rodden et al., 2008; p. 1). When this tax gap is large or when local government decides to cut important expenditure categories (for example education), the upper-layer financial aid or the central bailing out is necessary for re-equilibrate the sub-national finances. Moreover Wildasin (1997) verifies that upper-layer governments have interest in bailing out subnational entities when the latter have greater negative externalities to other jurisdictions or when it is “too big to fail”. The bailout mechanisms cause a common pool problem, such that the cost of federal bailout is redistributed to the whole sub-national jurisdictions within a country (Wildasin, 1997). The expectation of being bailed out by federal government creates an incentive for subnational jurisdiction to make excessive spending and consequently accumulate deficits and debt (Pisauro, 2001). Indeed, Kornai (2003) concludes that SBC problems create a debt level increase, such that sub-national jurisdictions take higher risks (such as reducing the tax rate or increasing expenses) expecting to be financially rescue from the federal government in case of financial crisis.

2.4 Debt sustainability

In this subchapter we will focus on debt sustainability, based on the IMF definition and on its “debt sustainability analyses (DSAs)“.

According to the IMF definition, a debt is considered "sustainable if it satisfies the solvency condition without a major correction [...] given the costs of financing" (IMF, 2002, p.5). The solvency condition or the inter-temporal budget constraint (cf. Box 2) is fulfilled when “future primary surpluses will be large enough to pay back the debt, principal and interest“ (IMF, 2002, p.5). In other words, the current debt plus the discounted value of the costs must not exceed the present value of revenue. So if the governmental revenues are not large enough to bear with the costs associated with public debt, there will be a problem of debt sustainability expressed by an excessive debt-to-GDP ratio. A higher debt-to-GDP ratio requires a higher primary surplus for sustaining it, in addition this debt accumulation is associated with higher interest rates and possible decline in growth rate, involving an even larger primary surplus needed to stabilise the debt ratio (IMF, 2011). In particular, Collignon (2012) distinguishes between strong and weak debt sustainability. Considering the previous steady state economy concept (subchapter 2.2.1), he defines the strong debt sustainability as the situation in which the public debt levels converge to the steady state economy (Collignon et al., 2012). In this case the inter-temporal budget constraint is fulfilled because the initial debt level is compensated by future primary budget surpluses (discounted with the interest rate on public debt and taking into account the GDP growth rate) and consequently the governmental debt level is considered strongly sustainable (Collignon et al., 2012). When the public debt doesn't coincide totally with the steady state economy, the debt sustainability of a specific country is considered weak. The government is therefore unable to continue with a weak fiscal debt sustainability or even an unsustainable fiscal policy, requiring a fiscal restructuring policy. We will see how fiscal rules allow to restructure the governmental policy in order to respect debt sustainability in the Chapter 3.

Box 2: Solvency conditions and inter-temporal budget constraint (Ley, 2010)

Algebraically, the governmental solvency condition is fulfilled when:

$$D(p, r, \pi) = B(b, r, \pi) \quad (2.2)$$

where D represent the stock of government debt, B the primary government balance, both expressed in term of r (average interest rate), π (inflation rate) and p (net present value of future payments). Assuming that primary balances progress in line with nominal GDP growth (g for GDP growth rate), or constant balance as a percent-to-GDP, we have the following inter-temporal budget constraint:

$$B_t = (1 + g)(1 + \pi)B \quad (2.3)$$

Following the whole mathematical transformation of the World Bank study (Ley, 2010), we lead to the required balance budget (b^*) for preserving a stable debt-to-GDP ratio. The required balance is calculated as follow:

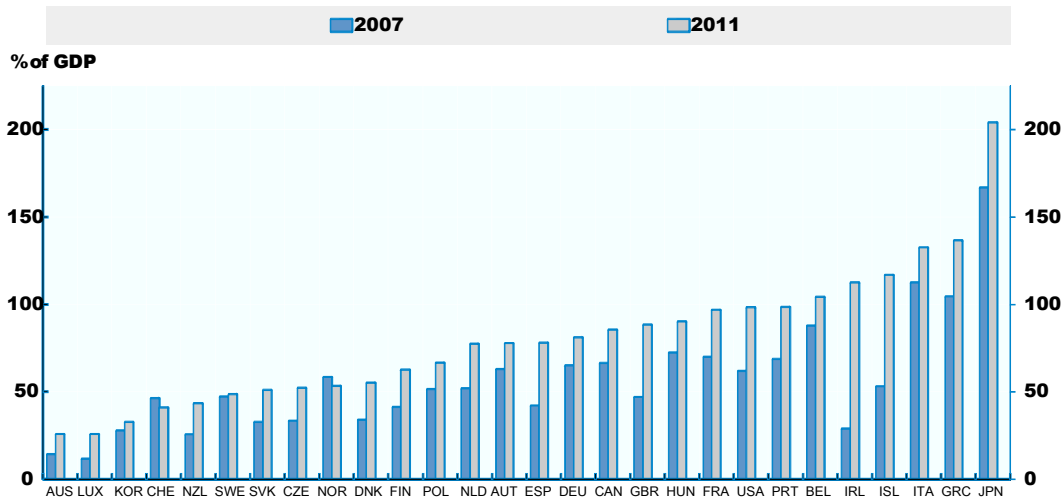
$$b^* = \frac{r - g}{1 + g} \cdot d_s \quad (2.4)$$

where d_s is the current debt ratio. The objective is not to have a zero debt ratio, but to simply stabilise it in order to be sustainable. The growth rate is therefore important for determine b^* . When g increases, then the required balance budget (for respecting the solvency criteria) is lower. For a rising average interest rate, the required balance budget for fulfilling solvency criteria is larger and more difficult to reach. This mathematical representation is useful for understanding how each components influence solvency criteria, and more generally when a debt can be considered sustainable.

The main problem in determining fiscal sustainability is the uncertainty and imprecision in the parameters calculation. In fact real interest rate on debt and long-term real growth of GDP are uncertain and must be correctly estimated in order to establish a correct fiscal sustainability of a country. This estimation method will not treated in detail throughout this thesis.

Since 2002 the IMF has implemented the “debt sustainability analyses (DSAs)“, a surveillance programs aiming to analyse the country's capacity to finance its policy objectives and its debt services (without resorting to severe expenditures cuts or large revenue increases). This analysis allows to highlight and prevent potential payments crisis, assessing the current debt situation (both total public debt and total external debt) and identifying possible debt vulnerability (IMF, 2013). The DSA assessment takes into account the economic and financial environment of given country, categorising it into two framework types: advanced economies or low-income countries. In the figure below we consider only the advanced economies (AE) and we verify that 19 AE countries' debt exceed the 60 percent ceiling (considered as long-run debt range by Ostry et al., 2010). Although at the end of 2010 these countries (like Greece or Italy) are above the long-run debt threshold, they comply with the IMF's debt sustainability criteria of DSA study, as we can gather from Figure 2. Japan represent an exception due to the problematic debt level of the country in 2010, which is a consequence of the Fukushima disaster and the related reconstruction efforts.

Figure 2: Long-run Debt and Maximum Sustainable Debt: Advanced Economies (percent of GDP, end-2010)



Source: WEO and Ostry et al., 2010

3. Debt restructuring process: implementation of fiscal rules

As discussed in the previous chapter, the problem of sovereign debt arises from the 90s and reached its peak on 2009-2010 with the governmental debt crisis. This sovereign debt and public finances crisis have further stimulated the introduction of new local fiscal rules. In fact, numerous bailouts made possible by substantial IMF and EU loans have been accompanied by strict fiscal adjustments and spending reductions in domestic economy.

The first subchapter (3.1) will explain the fiscal rule definition and its main objectives. Then different types of existing fiscal rules are analysed, namely debt and deficit rules, budget balance and structural budget balance rules, expenditure rules and the combination of different rules. The second subchapter (3.2) will analyse the econometric impact of a rule introduction on the governmental fiscal performance of European countries using the “Fiscal Rule Index” methodology designed by European Commission. In the last subchapter (3.3) we examine the debt brake implementation in Switzerland, explaining this study case choice, its mechanisms and its effectiveness in reducing the swiss debt since 2003.

3.1 Survey on the different fiscal rules methods

According to an IMF study (2009), fiscal rules are implemented in 80 countries and may vary from constraints on total government expenditures, deficits or debt. In this chapter we will analyse the objectives and characteristics of fiscal rules, reviewing some fiscal rule types that can be chosen by politicians. We will highlight the different structures for each rule and their effectiveness in debt reduction.

3.1.1 Definition and characteristics of fiscal rules

Before starting to look into various forms of fiscal rules and their impact on fiscal policies, it is necessary to better understand their definition and characteristics.

Many definitions about this topic are possible, in particular we refer to Kennedy et al. (2001, p. 238) that defined a fiscal rule as a “statutory or constitutional restriction on fiscal policy setting a specific limit on a fiscal indicator such as the budgetary balance, debt, spending, or taxation“. In other words, fiscal rules are binding constraints able to influence present and future governmental decisions, changing the fiscal policy framework of subnational, national or supranational authorities. These constraints are established differently depending on the type of fiscal rule, inasmuch are expressed in reference to budget deficit, revenues, expenditures or debt ceiling (cf. Chapter 3.1.3). The above-mentioned definition of Kennedy (2001) is aligned with others authors’ studies, which considered fiscal rules as restrictions on fiscal policy process over time (Kopits et al. (1998); Buti et al. (2002); Milesi-Ferretti (2000)).

After the fiscal rule definition, it will be noteworthy to analyse the main characteristics of these rules according to Kopits and Symanski (1998). In particular, we will examine the following five aspects: legal basis, rule's coverage, enforcement procedures and finally the flexibility of the rule.

Firstly, legal basis plays an important role because it assures the legitimacy of national rules, resulting from different features: constitutional law, statutory law, coalition agreements or political commitments. Constitutional law is characterised by a complicated and long-lasting procedure for changing or revoking a constitutional provision. For this reason, constitutional laws are generally less effective in constraining the rule over long period (Kennedy, 2001). Contrarily, the statutory fiscal rule is more subject to fluctuations over the years, due to easily changing procedures and because of its greater clarity (with economic parameters specification) that requires modifications when economic

situation changes (Kennedy, 2001). Moreover, coalition agreements are established within a national government, particularly between different political parties or interest groups from different government levels. These agreements change over long term because they result from political negotiations influenced from national or international political and economic contexts. In other words, the changing political composition of a country can radically modify the coalition agreement, transforming its fiscal policy orientation (Schick, 2003). For this reason, the political commitments set in a coalition agreement are usually limited to a single fiscal year, which means constant fiscal policy changes (new commitments at the end of every year) and no stable fiscal discipline over the long-term. Fiscal commitments are defined as the governmental willingness to comply with a rule, this means that, when conditions change (economy or politics changes), the enforcement of this rule is not assured (OECD, 2003). There is a strong link between the legal basis' composition and the specific politics and economic circumstances of a country. Legal support is different in each country, in fact, emerging or developing countries are predominantly characterised by statutory norms. In these cases, statutory law represents the easier way for achieving a compulsory support for the respect of the rule. Regarding developed countries, the political commitments or coalition agreements represent the main instrument for enacting legal basis (IMF, 2012). Being the result of various domestic policy negotiations, these commitments and agreements have generally greater social/political acceptance because of their adaptability and are indicated for central or general government constraints (IMF, 2009). At local or regional government level, the fiscal rules are mostly statutory or constitutional laws (IMF, 2009). As shown by the IMF study, at the regional and local level the enforcement mechanisms are then stronger in comparison to the general and central government. In conclusion, constitution and statutory laws have a direct impact on fiscal discipline setting binding constraint on fiscal policy, while political commitment and coalition agreements have an indirect influence establishing fiscal policy measures and benchmarks values.

Countries with fiscal rules set by statutory laws are Austria (budget balance rule since 1999) and France (revenue rule in 2011), coalition agreements characterised Belgium (expenditure rule since 1993 and revenue rule since 1992) and Finland (debt rule in 1995 and revisited in 2011), political commitment distinguish Norway (budget balance rule since 2001), while constitutional laws were adopted by Germany (budget balance rule in 1969 and revisited in 2011) and Switzerland (debt brake rule in 2003) (IMF, 2013).

Secondly, the fiscal rule coverage establishes which governmental level and sector it is applied to. In particular, the coverage rule is distinguished between three cases: central government, general

government (including central and subnational governments) or wider public sector coverage (including security accounts or public companies). Moreover, the rule coverage should specify what expenditure and revenue items are included in the target variable.

The fiscal policy management of a country is carried out at multiple governmental levels. In fact, the coverage of fiscal rules may vary from the national to the supranational level. The bulk of supranational rules are addressed to general government aggregates, while national rules guarantee a coverage for central government but without envisaged constraints for subnational entities.

Referring to the national rules, the central government coverage is mainly guaranteed by national expenditure rules and national budget balance rules, accentuating autonomy and coordination issues with sub-nationals entities. At the supranational level, the general government coverage is mainly set by debt and balance rules (IMF, 2012).

A national rule thus requires additional subnational rules set independently for each local government. In countries with a decentralised framework, it becomes essential to find proper coordination on different governmental levels in order to ensure macroeconomic stability and fiscal discipline. It is therefore important to implement a sound fiscal policy shared across multiple tiers of government; circumventing the subnational possibility to overspend, under-tax and borrow excessively. Fiscal policy decentralization across different governmental levels create three main issues. First, the “common pool“ problem is manifested when “multiple territorially overlapping governments share the authority to provide services and levy taxes in a common geographic area“ (Berry, 2008, p. 802). The Berry's study highlights how (across U.S. government levels) the financial integration across overlapping government tends to create inefficiencies, inasmuch the divergence between marginal social utility and marginal social costs causes higher debt level than it would be if all costs would be assumed from the targeted beneficiaries. Second, the moral hazard arises from the local incentive to weaken their fiscal responsibility transferring the economic cost of indiscipline to the central government (Ter-Minassian, 2007). In fact, local indiscipline cause strong political and social consequences that forces the central government to bailout the subnational government. These mechanisms cause a softening of local budget constraints, due to the scarce credibility of any no-bailout attempt by central government. Indeed, Goodspeed (2002) shows how lower levels of government can lead the central government to implement bailout policies. Furthermore, he highlights how this mechanisms is more common in the case of a discretionary power of central government,

making it possible to modify its grant allocation in favour of subnational level. This topic is studied by a wide number of economists like Tommasi (1999), Von Hagen and Dahlberg (2002), Borge and Rattso (1999) and it was elaborated in the Chapter 2. Third, the presence of constitutional autonomy for subnational jurisdictions limits the constraining power of central government. In fact, the central government is not able to set and enforce effective budget constraint on the local level, because of the local fiscal autonomy. This subnational autonomy creates a fiscal competition among local jurisdictions that may create difficulties in implementing coordinated stabilisation policies on different governmental levels within a country. In conclusion, the fiscal decentralisation can be characterised by macroeconomic instability, higher deficits and debt levels (Goodspeed, 2002).

As we have previously disclosed, the fiscal rules should specify what expenditure and revenue items are covered by the targeted rule. According to a recent IMF's study (Schaechter et al., 2012), about 20 percent of OECD countries exclude certain types of expenditures and revenues (like interest payments, cyclically-sensitive expenditure and capital expenditures) from the application of a specific fiscal rule. The omission of capital expenditure is widespread globally, even if the interest payment and the cyclical expenditures exclusion are predominantly in European countries (Schaechter et al., 2012). The interest payments are often excluded from the target variables, as they result from choices of expenditure made by previous governments and therefore should not affect present policy. The cyclically sensitive expenditures contain volatile items, so they are excluded in order to limit overall stability problems due to the difficult variation forecast. The omission of cyclically sensitive expenditure decreases the influence of countercyclical policy and also requires spending adjustments during the short term. We have to consider that often a greater vulnerability affects governmental revenues and lesser spending (Schaechter et al., 2012).

For example, interest payments are excluded from the target variable in France, Finland, Spain and Sweden. Denmark, Finland and Switzerland exclude cyclically-sensitive expenditures, while Brazil and Japan exclude capital expenditures.

Thirdly, the enforcement mechanism is a fundamental characteristic that is definite if there are formal enforcement procedures and/or monitoring mechanisms of compliance outside the government. Concerning formal enforcement procedures, each country decides to establish a corrective mechanism at the national level in order to envisage sanctions for non compliance of such rules. This characteristic directly influences the success of a fiscal rule as the cost of non respect/abandoning of such rules would be higher than the benefit of breaking it. In case of deviations from fiscal targets, a sanction will

be addressed to the government, making the rule more effective and stringent (Debrun et al., 2008). Sanctions differ depending on the type of fiscal rule and from the supranational institutions.

Box 3: Excessive deficit procedure in European Union

In the European Union, countries violating the Convergence Criteria (general government deficit of 3% GDP and gross debt of 60% GDP) are subject to the Excessive Deficit Procedure (EDP). If the ECOFIN Council considers the exceeded deficit as an exceptional and temporary deviation from the reference value, no procedure is addressed. Contrarily, if the qualified majority of the Council judge the deviated deficit not exceptional, even if temporary, an excessive deficit procedure is officially opened for a Member State. The determination of EDP considers relevant factors such as development in the medium-term economic position, cyclical conditions, implementation of research and innovation policies, structural reforms and fiscal consolidation efforts in normal situations (EC Council Regulation, No 1177/2011). In some special cases, the Council considers these factors in order to avoid a deficit procedure, allowing a bigger transition time to comply with the rule. When EDP is confirmed by the Council, the latter make recommendations to Member State defining the size of fiscal adjustment needed and the deadline for these corrections. Which is that the Member State should register a yearly structural deficit improvement at minimum of 0.5% of GDP each year.

Revised recommendations can be admitted in case of unexpected adverse economic events (subsequent to the EDP execution) causing additional unfavourable consequences in the public finance of the concerned member state. After this recommendation period, Member States subject to EDP have to face sanctions provided for in Article 129 of the Treaty on the Functioning of the EU. Moreover, with the new “Six-Pack“ measures of the Stability and Growth Pact, approved by the European Commission and the European Parliament, the european economic governance results promptly reinforced. Given the grand number of countries subject to an EDP (currently 23 of the 27 member states), the recommendations and deadlines set by the EU Council require additional measures contained in the new “Six-Pack“ legislation (referred to euro area and into force since december 2011). The enforcement mechanisms generated from this new legislation package are based on financial sanctions that arise in case of deficit deviations. In particular, an interest-bearing deposit of 0.2% of GDP is imposed, and every additional year the Council can intensify the sanction requiring one tenth of the difference between the deficit (as % GDP) in the preceding year and the reference value of 3 % of GDP (EU Regulation, No 1173/2011). Moreover, the “reverse qualified majority“ voting system strengthened the enforcement mechanism, semi-automatically adopting a Commission

recommendation since no qualified majority of Member States is needed. This new legislative package guarantees the enforcement procedure of Convergence Criteria, allowing a greater fiscal discipline and a stable EU economy.

Returning to the second characteristic of an enforcement procedure, we will consider the importance of monitoring mechanisms of compliance outside the government. Monitoring systems envisage independent overseers in order to point out existing or potential violations of fiscal rules. This mechanism is fundamental because it discovers and forecasts deviations from fiscal discipline, enforcing the fiscal rule in place at the national or international level. For greater explanations we take into account the monitoring principles in place in the European Union.

Box 4: Monitoring mechanism within European Union

According to the Stability and Growth Pact, the Council of Ministers and the European Commission are in charge of supervising the fiscal policy of each Member State. Particularly, the Commission gives country-specific recommendations in case of significant divergence from the established target, while the Council assess and delivers opinions about these guidances. Therefore both the Council of Ministers and the European Commission monitor the effective execution of the corrective programmes and decide eventual additional actions in order to fulfil the budgetary objectives (Balassone and Franco, 2001). Concerning the surveillance and monitoring within the European Union, in May 2013 an additional reform called “Two Pack Regulation“ was introduced. This new reform aims to reinforce the SGP's surveillance framework, requiring Member States the implementation of independent monitoring organisms in order to improve budgetary forecasts. Moreover a graduated monitoring is established so as to detect early and then durably correct excessive deficits of Member State. Therefore the Two Pack strengthened the enforcement of national fiscal rules, improving the macroeconomic and budgetary forecast (EC, 2012).

In conclusion, the enforcement mechanisms results in one of the main fundamental characteristics of the effective implementation of a fiscal rule.

Fourthly, flexibility of fiscal rules is considered. In particular, the possibility to have clearly-defined escape clauses or cyclically adjusted fiscal balance. At first, we will analyse potential escape clauses.

These give the possibility to flexibly react with temporal deviations from fiscal rules, in case of extraordinary events (beyond the control of the authorities) such as unexpected economic recession, natural disaster or bank insolvency. Each country defines in its law what specific circumstances are subject to loopholes, providing distinct guidelines on the treatment of accumulated deviations (Kumar et al., 2009). Escape clauses have been inserted in legislation to avoid calling fiscal rules into question, when unexpected shocks appear, so as to maintain a rule credibility. The escape clauses are characterised by possible interpretations and political measures in developing Countries.

Referring to the EU Member States, in case of unforeseen shocks, no EDP is opened if the 3% deficit ceiling is temporarily and exceptionally overstepped, moreover it has not to significantly overpass of the limit. This was set by the 2005's reform of the SGP contemplating escape clauses only in case of economic recession; in this situation the possibility of extending the time period of adjusting fiscal policy exists (Schaechter et al., 2012). On the other hand, in Switzerland natural disasters and other events outside government control are also considered as escape clauses (Schaechter et al., 2012). The Swiss debt brake allows spending deviations from the target in case of sharp recessions or unforeseeable events, inasmuch the political cost of respecting the rule under these situations is definitely larger, encouraging this break (Geier, 2011).

The escape clause hence represents a solution for avoiding fiscal rule jeopardisation. The fiscal rule flexibility envisages fiscal balance defined in cyclically adjusted terms.

Box 5: Cyclical adjusted balance

Fiscal rules are flexible when budget balances are adjusted for cyclical effects (or temporary measures) affecting the country-specific medium-term fiscal objectives. Cyclical adjusted balance (*CAB*) is defined as a nominal budget balance to GDP ratio (B/Y) subtracted from cyclical components (*CC*). The algebraic equation is:

$$CAB = \frac{B}{Y} - CC \quad (3.1)$$

Cyclical components take into account two elements. First, the cyclical position of the economy (the output gap *OG*) and, second, the link between the economic cycle and the budget (cyclical-adjustment budgetary parameter ε). The cyclical components are defined as a time series (regular or periodic) fluctuating around the trend (with expansion and contraction phases), without taking into account irregular components (OECD, Glossary of statistical terms). The product of these two elements provide the cyclical components size of the budget, in fact:

$$CC = \varepsilon \cdot OG \quad (3.2)$$

This calculation method is characterised by uncertainty, as the potential output measurement and the estimation vary with uncertainty. However, possible errors in this calculation are difficult to precisely measure. The cyclical components of budget balance calculated through this formula show how they corresponds to the cyclical elements of tax revenue and current primary expenditure. These elements are sensitive to the output gaps estimation, the weighting tax revenue per category, the current primary expenditure and the expenditure elasticities.

3.1.2 Objectives of fiscal rules

As we shall see, fiscal rules have several objectives.

First, fiscal rules aim to control/limit the size of the annual deficit in the current budget and to restrain the government debt ratio. Indeed, deficit and debt sustainability are at the core of fiscal policy objectives, in fact fiscal rules can help in containing the explosion of deficit and debt levels, making politicians more alert and aware of the real financial capacity of the state improving the fiscal responsibility.

Second, a rule must provide a clear and transparent view about costs and benefits of public policies, laying the groundwork to pursue efficient policies. More particularly, fiscal rules aim to reduce the excessive level of spending, taxation and public borrowing in favour of economic stability. Fiscal rules aim to contain the size of the government and supporting intergenerational equity. Future generations are influenced by actual debt levels, in fact a higher debt level entails higher interest payments which impose on future taxpayers. An increasing debt can create several negative implications for future generations, like higher taxes and inflation, lower government benefit, and higher economic instability.

Third, the fiscal policy system of a government is positively influenced by fiscal rules. In fact the latter are preserved in the medium or long term and aim to build a stable fiscal policy credibility. Through fiscal rules, the fiscal credibility of a Central Bank's results are reinforced because of its sustainable and stable policy (Fitoussi et Saraceno, 2007).

For example, in the European Union the debt limit set by Maastricht criteria supports the European Central Bank policy in maintaining a price stability (low inflation) and a sustainable fiscal debt in order to provide higher credibility. In fact, supranational fiscal rules lead Member State to implement restrictive fiscal policies in order to maintain a sustainable debt, limiting the monetary intervention of Central Bank, in particular concerning the bailout of Member State. Despite the fact that bail-outs from EU member states is formally prohibited (No-bail-

out clause from Article 125 of the Treaty on the Functioning of the EU), the credibility of this clause has been greatly challenged after the Greek crisis.

The no-bail-out clause represents a crucial and controversial point for fiscal discipline. In fact, due to the several spillover effects deriving from excessive debt/deficit to the whole economic system, the central government decide to support financially the lower-level of government, disregarding the clause (Feld et al., 2013). Therefore this mechanism of no-bail-out has to be combined with an adequate national fiscal rule framework in order to maintain a given discipline.

In conclusion, fiscal rules aim to reinforce the credibility of the whole economic system, as it reduces bailout opportunity and the Central Bank's monetary manoeuvres, maintaining a stable and credible fiscal policy within the Country or in the EU.

3.1.3 Types of fiscal rules

In this subsection we will deal with certain types of fiscal rules as debt and deficit rules, budget balance rules, structural budget balance rules, expenditure rules and some possible combination between these rules. We will show how each type of fiscal rule is characterised from different properties associated to diverse objectives.

3.1.3.1 Debt and deficit rules

In this subchapter we will first discuss the debt rule and then the deficit rules. Concerning the debt rule, Schaechter et al. (2012) defined it as an "explicit limit or target for public debt in percent of GDP"(for more detail cf. equation 2.1). The debt-to-GDP ratio relates the sovereign debt with the economic output of a country (annual GDP). As discussed in the second chapter, the importance of a correct estimation of GDP evolution and a proper calculation of public debt level are central in determining the debt-to-GDP ratio of a country. It is crucial for observing possible deviation from the debt target and establishing structural reforms. In particular, this ratio reveals the country's ability to pay off its debt, influencing the country borrowing costs and the governmental bond yields. In general, a higher debt-to-GDP ratio entails higher costs for paying back loans and for obtaining new credits, because of the higher interest rate required by investors.

Concerning the European Union, the maximum debt level accepted is 60% of GDP and eventual gaps between the debt level and the reference debt limit have to be reduced annually to 1/20th on average over three-years (Treaty on the Functioning of the EU, Art. 126).

After a brief definition, we analyse the positive and negative aspects related to the debt rules. The

positive aspects of debt rules are mainly two. Firstly, this rule ensures convergence to debt limit, establishing a direct link to debt sustainability. In fact, a debt-to-GDP ceiling is calculated taking into account all the variables ensuring the sustainability of the debt, such as the interest rate on debt, the changes in GDP growth rate, the annual primary budget balance and last but not least the debt accumulated during previous periods. In fact, the determination of debt-to-GDP ceiling through these parameters guarantees the sustainability of sovereign debt. Secondly, this rule becomes almost easy to communicate and monitor. Thanks to the standard calculation of debt-to-GDP limit, the identification of possible deviations from the target is easily identifiable in each country.

The negative aspects of debt rules principally arise from the design and the time-horizon considered by the rules. Firstly, a clear problem arises from no-short term influence of this indicator; in fact budgetary measure take time to have a real impact on debt-to-GDP level so that there is no immediate effect. Secondly, debt is sometimes influenced by external factors, such as exchange or interest rates which are beyond the full control of government, making it difficult to achieve a complete discipline (Schaechter et al., 2012). Thirdly, there is no economic stabilisation mechanism due to the procyclicality of this fiscal rule; in fact it becomes more binding when the economy is in a recession, while less constraining in an expansion period. Generally in times of economic booms, spendings have the tendency to grow (proportionately more than the current GDP growth) because of lower cost of borrowing capital, while in recession time spending decrease (as a percentage of GDP) in order to contain the debt level (Alesina et al., 2005). When the economy is in a boom period, spendings have the tendency to increase causing a decrease in the primary budget balance ($pbal_t$, expressed as the difference between public revenues and expenditures, cf. Equation 2.1). This primary budget balance reduction is more pronounced than the increasing growth of GDP, creating an increase of debt-to-GDP ratio (Equation 2.1 explain this mechanism). Therefore, in case of economic booms, the debt-to-GDP rule is becoming “less binding“, because despite the fiscal rule, the debt level increases in the subsequent period. During recessions, the expenditures have the tendency to decrease (because of higher borrowing capital costs) stimulating the growth of primary budget balance (supposing unchanged revenues). This primary budget balance increase results are proportionally higher than the decrease of GDP growth (due to the recession), therefore there is a positive impact on debt-to-GDP ratio (debt-to-GDP ratio decrease). Indeed, the positive impact of higher primary budget balance prevails on the negative impact of economic slowdown. In conclusion, in case of economic recession, the debt rule becomes “more binding“ because it allows to significantly reduces the debt-to-GDP ratio.

At this point we explain in detail the deficit fiscal rule. The fiscal deficit to GDP ratio measures the annual gap between budget revenues and predicted expenditures, in relation to the annual GDP of a country. When such gap exists, governments have to finance it by borrowing; additional borrowings causes an accumulation of national debt and a subsequent increase of interest on debt. In other words, the deficit to GDP ratio shows the proportion between what the country borrows and the national product, indicating the annual government's ability to repay debts. The introduction of a deficit limit does not solve the problem of pro-cyclicality that prevents economic stabilization. As we have previously seen in the case of a debt rule, the pro-cyclicality also exists in the case of deficit making the constraint less binding during economic growth and more binding in situations of economic slowdown (Manasse, 2006). Given the direct link between annual deficit and debt-to-GDP ratio, a combination of debt rule with a deficit threshold guarantees debt sustainability (when this rules are correctly respected by governments).

In the European Union, the debt rule (previously explained) is combined with a deficit rule in order to attenuate problem of no short-term influence. The Maastricht criteria set for member countries (see Treaty on the Functioning of the European Union, Art.126) provides a maximal deficit-to-GDP ratio of 3% GDP at the end of each financial year. Otherwise, this ratio must be reduced in order to reach a level close to 3%, as any deviation from the reference value is only exceptional and temporarily accepted. Remarkably also in the case of deficit rule, the 3% GDP limit is exceeded in seventeen EU Member States causing economic repercussions on national and supranational level (Eurostat website, 2011 data).

3.1.3.2 Budget balance and structural budget balance rules

The rules on balanced budgets establish a direct link with debt sustainability, being directly affected by and under the control of politicians. These rules are mainly divided into four types: the overall balance, the structural or cyclically adjusted balance and the balance over the cycle.

Firstly, the overall balance rule aims to require federal spending equal (or lower) to governmental revenue, in order to constitutionally prevent budget deficit. In particular, the overall balance is composed of a cyclical and structural budget balance. This overall regulation presents advantages and disadvantages for each specific fiscal rule. In particular, the first flaw is caused by external factors (beyond the full governmental control) that affect the budget balance of a country. For example, the payment of interest on debt can modify the annual budget balance, inasmuch they can yearly change, engendering a decreased governmental control. Another negative aspect of this rule is expressed by the absence of an economic stabilisation feature; no compensation account for responding to economic shocks is required by the rule, so fiscal policies have the tendency to become pro-cyclical. The overall

balanced budget can cause a reduction in governmental finance quality and an inefficient allocation of public resources, in cases where significant budget cuts are needed to comply with the rule. Often these expenditure cuts are applied to the less politically-sensitive categories despite being important expenses for R&D, education etc. (Schaechter et al., 2012). When the overall balance rule is correctly fulfilled (without presence of annual deficit), the debt sustainability is guaranteed (Schaechter et al., 2012). Moreover, the control and the communication of the overall budget balance results easy to realise in most countries.

Subsequently, the cyclically adjusted balance consists of a structural budget balance rule introduced with the 2005 reform of the SGP. This rule is more laboriously communicated and supervised, as it is based on adjustment estimates that are adapted only at the end of a cycle, as in the case of “over a cycle“ rule. Moreover, “the structural budget balance is the government’s actual fiscal position purged of the estimated budgetary consequences of the business cycle, and is designed in part to provide an indication of the medium-term orientation of fiscal policy“ (Hagemann, 1999, p.1).

Box 6: Structural budget balance in EU

Following the EU fiscal model, the structural budget balance or the cyclically adjusted balance (*CAB*) is established as:

$$CAB = \left(\frac{B}{Y}\right) - CC \quad (3.3)$$

where B/Y is the nominal budget balance to GDP ratio and CC the cyclical components. It is therefore important to correctly establish the cyclical components in order to exclude it from budget balance so as to maintain a medium-term fiscal stability of the country. By definition, the cyclical component is “that part of the change in the budget balance that follows automatically from the cyclical conditions of the economy, due to the reaction of public revenue and expenditure to changes in the output gap“ (European Commission web glossary). The CC determination is therefore based on the measurement of output gap (OG , or cyclical position of the economy) and on the “cyclical-adjustment budgetary parameter“ (tax elasticity ε , or the link between economic cycle and budget balance). Important critiques concerning these two parameters are made; problems in the output gap measurement (GDP updates within a cycle and changes in forecast) and difficulty in determining the correct “cyclical-

adjustment budgetary parameters“ due to its short-term fluctuations. The cyclical components are the results of the multiplication of these two components, algebraically:

$$CC = \varepsilon \cdot OG \quad (3.4)$$

After a correct calculation of cyclical components, the latter be will subtracted from annual budget in order to achieve an appropriate cyclically-adjusted budget balance.

Considering the deviation of actual from potential output, and the sensibility of public revenues and expenditures to these deviations, makes it possible to estimate the cyclical component of the budget balance. If the latter are subtracted from the current budget balance, we can obtain a good estimation of the structural budget balance (SBB).

The SBB structure is based on potential output estimation which is determined with the “Hodrick-Prescott (HP) time-series filtering method“. The HP method provides an “estimation of a trend line around which the deviations of actual from trend output are symmetric over the complete business cycle“ (Hagemann, 1999, p.4). This procedure, used by the European Commission, allows obtaining potential output estimation though it presents problem of asymmetry in the extremes of time series.

In conclusion, the CAB methodology is used in the EU and in most of OECD countries to oversee the fiscal policy of member states, despite its negative aspect (possible errors in the cyclical components estimation) (European Commission, 2013). In particular, these above-mentioned rules have positive effects like an economic stabilisation function that allows reacting to the economic shocks with a “compensation account“ made for temporary and one-off factors (account in which the accumulation of temporary/one-off surplus in economic growth allows to compensate temporary/one-off deficits in recession time). It is therefore important to clearly define the situations and factors benefitting from these corrections account, in order to prevent abuse. In this subsection we will not get to the bottom of this issue. The introduction of a budget balance rule in a cyclical-adjusted term allows therefore to reduce the pro-cyclical problem thanks to the constitution of compensation account aiming to cyclically stabilise the budget balance.

Usually, structural budget balance rules are applied at local or regional government levels. For example, advanced countries like Germany, Hungary and Switzerland have implemented this type of fiscal rule.

3.1.3.3 Expenditure rules

The rules on public spending can also be used to reduce debt, although there is no direct link with debt sustainability if any revenue constriction is established. In fact, an expenditure rule needs to be supported by revenue or a balanced budget rule. In particular, they provide the ability to stabilise the economy and limit the extent of government, affecting the amount of public resources.

The expenditure rule is defined in two different ways: in nominal terms or in terms of expenditure-to-GDP ratio (rarely observed in practice). In the first case, the expenditure rule is characterised by counter-cyclicality, while the second can entail pro-cyclical bias (Ayuso-i-Casals et al., 2012). Firstly, counter-cyclicality is verified both in economic downturn and in economic growth. If in economic downturn the inflation expectations diverge from the real measurements, or when the real inflation is lower than the expected inflation, the nominal expenditure is larger than it should be (an higher inflation entails an increase in amount of the nominal expenditures). This nominal expenditure increase during economic slowdown operates counter-cyclically, inasmuch it consents with macroeconomic stabilisation. This mechanism also works during economic growth, where the expected inflation is lower than real inflation so as the nominal expenditure does not increase as expected (following the real inflation) and so it decrease in value terms, causing a counter-cyclical policy. The nominal targets have the advantage of being easily monitored and more transparent; in addition, the exclusion of cyclical expenses allow to strengthen counter-cyclicality of such fiscal policy (European Commission, 2012).

For example in France, expenditure rule is applied to the central government and set limit of governmental spending volume in nominal term (since 1998 and revisited in 2004 and 2011). In Sweden, the three-year nominal expenditure ceiling (implemented in 2010) is applied to the central government and to pension system. The swedish government is obliged to abide by expenditure limit set by three-years.

Secondly, expenditure targets defined in real terms are less common because of the numerous and difficult adjustments required to eliminate the inflation influence (price deflators depending on each expenditure categories and on GDP deflator) in the medium-term perspective. This expenditure rule has the same problem of pro-cyclicality as previously observed for debt and structural budget balance rules. In particular, in periods of economic growth the expenditure amount tends to increase (because of the economic expansion that increases the demand for public goods and services), preventing any stabilisation or counter-cyclical policy. In times of recession, important expenditure cuts are made in order to ensure fiscal sustainability, so no kick-start or counter-cyclical policy is achievable. As a

consequence, the pro-cyclicality bias of the expenditure-to-GDP ratio may jeopardise the sustainability of the debt.

For example, the expenditure-to-GDP rule has been implemented in Netherlands since 1994. The spending limit covers three sectors: central government, social security and healthcare sector. Eventual expenditure deviation from the target must be compensated within each specific sector through the use of windfall revenues.

It is fundamental to exclude certain number of selected productive expenditures from expenditure rules. This procedure allows to guarantee the quality of government finances even if its fiscal discipline can be slightly reduced. This rule requires a medium term determination of public spending priorities that influence politicians in their policy decision. The spending limit is determined by referring to the total public finances. The decision on how to split this constraint in the different departments or expenditure areas depends on the priority of a particular government. As previously covered in the subchapter concerning the fiscal rule characteristics, some specific categories of spending are not included in the coverage of the rule. First, the interest payments are excluded from the target because they can not be fully controlled by the government. In fact, forecast errors like under- or overestimation of interest payment can negatively or positively influence public spending, therefore a primary expenditure target is preferred. Second, public investments are not to be included in the expenditure target in order to favour growth-oriented spending categories, being alert to creative accounting or reclassification of spending items made for circumventing the target. Third, cyclically sensitive items (e.g. unemployment benefits) are not covered by the rule because of its non-controllability in the short-run. These fluctuating items create additional and unwanted spending reductions during a period. These three spending categories mentioned above are excluded from the target in order to contain potential negative effects derived from its inclusion. The negative impact of this exclusion procedure is represented by a lowered link with debt sustainability, in fact the excluded spending categories can register important deficits and consequently increase public debt.

The expenditure rule implemented in France since 1998, has been recently amended in order to increase its effectiveness. In particular, since 2011 the interest payments on debt and the pensions for civil servants are excluded from the spending rule applied to the central government. Also the Swedish expenditure rule applied to the central government (since 1997) excludes interest payments on debt from the target.

As for the budget balance rule, in the case of expenditure target there are possible negative effects concerning the expenditure composition as well. Potential changes in the expenditure composition can modify the consistency of the government budgets balance and the population's welfare. In fact, there is danger for increased political pressure on less politically-sensitive categories of expenditure, regardless of their productivity. The politicians are encouraged to increase spending in those politically-sensitive categories (such as security and welfare expenditures, regardless of their productivity) in order to take larger electoral advantages. Concerning less sensitive categories (such as R&D, infrastructure and education), politicians have the tendency to decrease this spending amount in favour of more visible projects. Moreover, Drazen and Eslava (2010) suggest an interesting argument with the aim to explain changes in spending composition with the analysis of 46 US states data from 1977 to 2008. They argue that spending composition turns in favour of more "visible" projects like social security, while education, health and transportation expenditures are classified as capital expenditures and therefore "less visible" projects.

3.1.3.4 Revenue rules

In this subchapter we analyse the mechanism of revenue rules, in particular we distinguish two categories. First, the rules setting caps on tax burdens (preventing too high taxation) or establishing minimum thresholds on revenue (providing adequate government grants). The main negative aspect of this first category is represented by the potential pro-cyclical bias arising from the progressivity of tax system. Progressivity of tax system is manifested when tax burden increases proportionally more than tax base, indeed the tax base increment further raises the tax rate. Consequently, in a upturn period the public revenue increases proportionally more than GDP growth, engendering pro-cyclicity of revenue-to-GDP ceiling. No attitude towards macroeconomic stabilization is guaranteed because of the pro-cyclicity of this rule. The second category concerns the use of windfall revenue derived from economic and tax code changes. Indeed, tax revenues are directly affected by changes in economic activity and then the notion of tax revenue elasticity to GDP ratio plays a central role. Tax elasticity is defined as "a parameter measuring the relative change in tax revenues with respect to a relative change in GDP" (European commission, 2013; p. 209). In particular, the main tax revenue categories such as income tax and value-added tax (VAT) have a tax elasticity close to one so they evolve in line with the GDP growth, then they are not considered unexpected revenue. Instead of income tax and VAT, there are windfall revenues (unforeseeable because of their higher and variable elasticity) that cannot be used freely but only for debt reduction or for some special spending (established by a clear rule). In

general, the windfall revenues are used to substantially reduce debt and deficit bias, so as to limit the potential pro-cyclical issue (European Commission, 2012). In doing so, this rule allows to contain the size of the public sector.

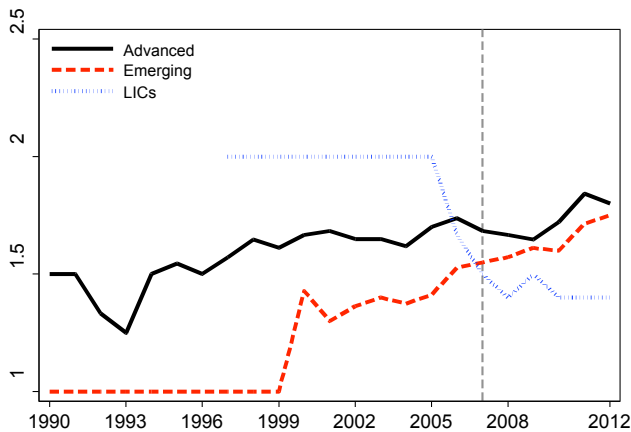
For example, since 2006 the french government adopted the revenue rule in order to regulate the allocation of windfalls revenues. Every year the government decide ex-ante which part of the total windfalls revenue is used to decrease public deficit. The same thing applies to Lithuania since 2008.

The monitoring of this rule depends on the existing structure of the tax system. If the latter is safeguarded by a solid structure, it will be possible to monitor and verify the potential defaults in the revenues. The exclusion of certain revenue categories from the rule causes a transparency and credibility bias so as a change in the structure of tax system, reducing the effectiveness of this rule (European Commission, 2012). In fact, if windfall revenues are not fully utilised in order to reduce debt, the link with debt sustainability is reduced.

As discussed in the spending rule subchapter, even rules on revenue do not have a direct link with debt sustainability, because no expenditure constraints are provided for. For these reasons the implementation of revenue rules have to couple with other rules like expenditure rules or budget balance rules (Hatchondo et al., 2012).

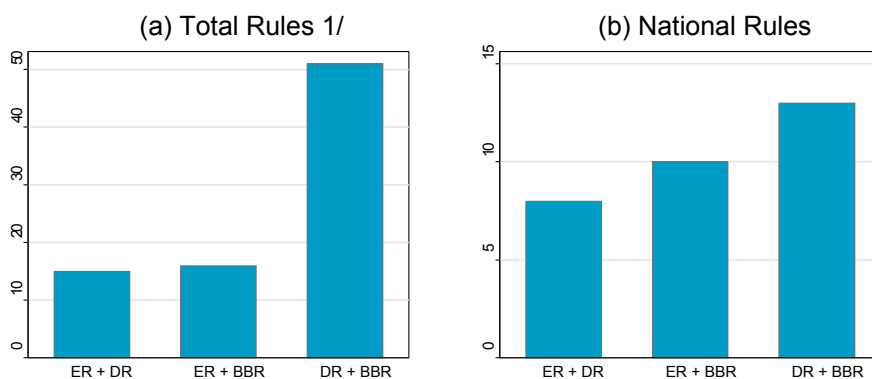
3.1.3.5 Combination of different rules

After analysing the pros and cons of each fiscal rule, we verify a tendency for the combination of different regulations within a country. As we can see from the figure below, both emerging and advanced countries showed a steady increase in the number of fiscal rules (Hatchondo et al., 2012). Concerning the low-income countries (LICs), we observe an uncontroversial trend that is not relevant in our analysis.

Figure 3: Average Number of National Fiscal Rules

Source: National authorities and IMF staff assessment

The supranational fiscal rules most used are the budget balance and debt rules, which are often combined to allow a greater fiscal sustainability. Analysing the IMF's statistic (figure below), we see that the most frequently used combination is a debt rule accompanied by a budget balance rule. This combination, chosen mainly from emerging and advanced countries, allows establishing a direct link with debt sustainability. Furthermore it is easily monitored and communicated to the population and politicians. Another alternative is represented by the combination of spending and budget balance rules, as well as the combination of spending with debt rules. These two possibilities are not, however, chosen so frequently by governments because of their low effectiveness.

Figure 4: Widespread Combinations of Fiscal Rules in Use (Number of Countries Combining Two Rules), 2012

Source: National authorities and IMF staff assessment

Note: BBR= budget balance rule; DR= debt rule; ER= expenditure rule, 1/ includes national and supranational rules

The differences in the fiscal rules choice depend on the economic structure of a country, which often has different needs, financial capabilities and exposure to shocks.

For example, an advanced economy prefers "cyclically adjusted balances" because of the greater flexibility and medium term fiscal policy perspectives. While emerging economies need a higher level of debt coverage due to its high economic vulnerability, therefore politicians usually opt for an implementation of debt rules.

3.2 Testing the efficacy of fiscal rules on governmental performance: an european approach

In this subchapter we aim to verify the impact of fiscal rules on budgetary discipline in the European Union. In doing so we refer to a recent study that analyses the impact of fiscal rules on several specific fiscal variables (e.g. fiscal balance, primary balance, governmental expenditures) through the construction of a "Fiscal Rule Index" (Marneffe et al., 2011). After having analysed the Marneffe (2011) study, the main econometric studies about the effectiveness of fiscal rule will be illustrated (Alesina and Perotti, 1996; Wälti and Krogstrup, 2008; Alesina and Ardagna, 2010; Perotti, 2011; Iara and Wolff, 2011; Hatchondo et al., 2012). This allows having a precise and innovative vision about the econometric impact of fiscal rules, providing some interesting mechanisms to improve the efficiency of fiscal frameworks. Based on the period 1995-2008, the Marneffe's (2011) study confirms a positive impact of fiscal rule on fiscal balance that was already shown by previous research (Deroose et al., 2007; Debrun et al., 2008; European Commission, 2009). Before analysing the econometric impact of fiscal rules, we will explain the construction of FR (Fiscal Rule Index) methodology designed by the European Commission. In particular, the Directorate General for Economic and Financial Affairs (DGECFIN) uses some strength indexes of fiscal rules, in order to measure the influence of institutional structures on the application of certain fiscal rules. The constraint of a rule is based on five variables characterising each national rule: (1) statutory base of the rule, (2) surveillance institution, (3) nature of the enforcement system, (4) mechanism of application, and (5) media visibility of the rule. Each characteristic is assigned a score according to a pre-defined strength scale (0 if no rule is employed and maximum 5 if rules are very strong and well-implemented according to IMF methodology). First, when the statutory base of the rule is guaranteed by law or by constitution, the rule is considered stronger (then an higher score is attributed, while a lower score is given in case of no law or constitutional provision) in comparison to the rule based on political

agreements or commitment. Second, when the surveillance institution is carried out by an independent body (e.g. fiscal council, court of auditors, et.), the rule tends to be stronger and respected more (scores tend to 5 and 0 when surveillance isn't independent). Third, also the nature of enforcement system is considered stronger when the institution is independent (independent institutions register a score tending to 5, while 0 for dependent institution). Fourth, a stronger application mechanism of the rule consists of automatic correction and the possibility of sanctions in case of non-compliance (scores tend to 5 with the existence of correction and sanction mechanisms while tending to 0 in the opposite case). Fifth, a large media visibility (scores tend to 5 when rule have a greater media visibility, while to 0 in the opposite case) of the rule is intended to reinforce its effectiveness, inasmuch violation is likely to trigger public debate. The indices of strength obtained for each characteristic are aggregated into a unique fiscal rule index (characterising each type of fiscal rule) and furthermore each specific FR is combined to acquire a composite fiscal rule index per country per year. The “Random Weights Technique“ used for this accumulation procedure, in order to obtain the “Fiscal Rule Index (FR)“ (see Box 7) per country, is proposed by Sutherland (2005).

Box 7: The random weights technique (OECD, 2006)

“Starting with low-level indicators, this technique uses 10 000 sets of randomly-generated weights to calculate 10 000 overall indicators for each sub-central level of government. The random weights are drawn from a uniform distribution between zero and one and then normalised so as to sum to one. This is equivalent to assuming complete uncertainty about the most appropriate value of each of the individual weights used to construct the sub-index and overall composite indicator. Accordingly, the resulting distribution of indicators for each sub-central level of government reflects the possible range of values given no *a priori* information on the most appropriate value for each of the weights. Confidence intervals and the probability of a given country achieving a given rank are calculated from these distributions. The confidence intervals are centred on the mean value of each country’s 10 000 indicator values. Given that the weights are drawn from a uniform distribution between zero and one, the mean indicator values are asymptotically equivalent to indicators calculated using equal weights on each of the low-level indicators“ (OECD, 2006; p.48).

The FR index is therefore a sum of all the indices of strength within a country, weighted by the coverage of governmental finances.

In order to analyse the impact of FR on fiscal policy variables, a panel data regression is estimated as follow:

$$FP_{i,t} = \alpha + \beta_0 FP_{i,t-1} + \beta_2 FR_{i,t} + X'_{i,t} \gamma + \varepsilon_{i,t} \quad (3.5)$$

where FP_t represents the fiscal policy variable as primary balance, primary government expenditures and government revenue. FR_t is the fiscal rule index while $X_{i,t}$ is a vector of control variables (economic control variables as lagged output gap, lagged debt level, natural logarithm of total population, dependency ratio and inflation; political control variable as fragmentation of government, ideology of governments measured on a left-center-right scale and years left in office). The Database hails from the annual macro-economic database of European Commission's Directorate General for Economic and Financial Affairs (AMECO) from 1990 until 2011. In particular, we refer to Table 1 for analysing the effects of fiscal rules index on the primary balance, on primary governmental expenditures and on governmental revenue. The first column of the panel data estimates represent EMU countries, while the second is NON-EMU countries. In our analysis we will put the emphasis on the FR influences in the EMU countries. Before examining FR impact, we verify a permanent significance of few control variables (as lagged government debt, lagged output gap, population and number of years left in office) regardless of public policy considered.

Table 2: The effect of fiscal rules index on primary balance, primary government expenditures and government revenue

	Primary balance		Primary expenditures		Revenues	
FP _{t-1}	0.708*** (0.047)	0.707*** (0.047)	0.663*** (0.046)	0.661*** (0.043)	0.689*** (0.055)	0.707*** (0.057)
Debt _{t-1}	0.036*** (0.006)	0.036*** (0.007)	-0.012* (0.006)	-0.015** (0.006)	0.022*** (0.006)	0.019*** (0.006)
Gap _{t-1}	-0.075*** (0.020)	-0.075*** (0.020)	0.116*** (0.026)	0.116*** (0.026)	0.040** (0.018)	0.039** (0.017)
Dependency	-0.132** (0.062)	-0.134** (0.064)	0.176*** (0.054)	0.157*** (0.058)	0.034 (0.058)	0.010 (0.060)
Openness	0.904 (0.711)	0.909 (0.716)	-1.945** (0.751)	-1.896** (0.740)	-1.012 (0.765)	-0.908 (0.720)
Inflation	0.058** (0.030)	0.058* (0.030)	-0.050 (0.036)	-0.049 (0.034)	0.016 (0.018)	0.017 (0.016)
Population	-33.996*** (9.394)	-33.737*** (9.922)	43.675*** (9.915)	46.644*** (9.764)	6.870* (4.089)	9.292** (4.132)
Ideology	-0.140 (0.114)	-0.142 (0.116)	0.066 (0.107)	0.052 (0.100)	-0.074 (0.094)	-0.091 (0.093)
Years left in office	0.205*** (0.072)	0.205*** (0.072)	-0.106*** (0.040)	-0.110*** (0.040)	0.096** (0.048)	0.093* (0.048)
Government fragmentation	-0.007 (0.005)	-0.007 (0.005)	0.006** (0.002)	0.006** (0.003)	-0.002 (0.004)	-0.001 (0.004)
Opposition fragmentation	0.004 (0.008)	0.004 (0.008)	0.006*** (0.002)	0.005* (0.003)	0.010 (0.007)	0.008 (0.006)
×	0.466*** (0.134)	0.450*** (0.168)	-0.698*** (0.162)	-0.863*** (0.130)	-0.196 (0.210)	-0.358** (0.175)
		0.052 (0.250)		0.514** (0.247)		0.561** (0.233)
Sargan test	0.112	0.110	0.073	0.088	0.171	0.179
AR(2) test	0.867	0.835	0.076	0.122	0.436	0.310

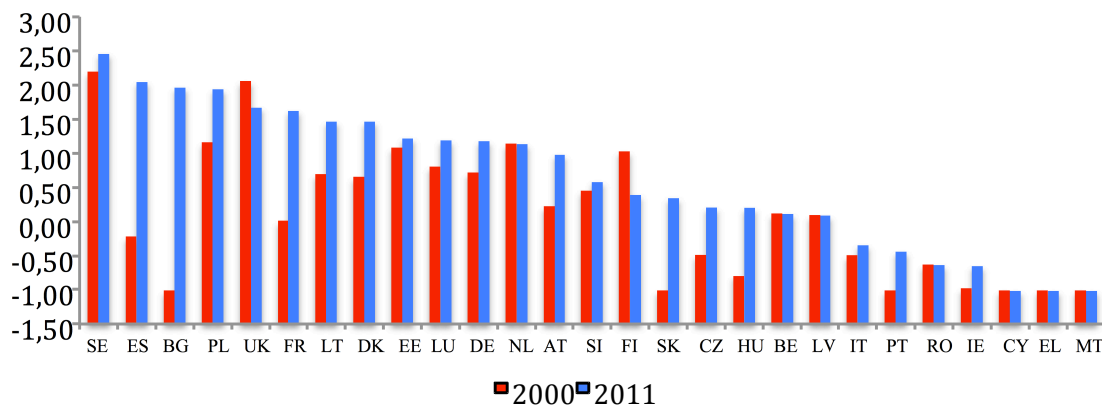
Note: The table reports one-step Arellano-Bond estimates of unbalanced dynamic panel data regressions (1) with country fixed effects. Robust standard errors are reported within parentheses below each estimate. Sargan is the test of overidentifying restrictions whereas AR(2) is a test of second order autocorrelation. Only p-values are reported for these two tests. **Source:** Bergman et al. (2013)

Concerning the impact of the FR we confirm previous results from other studies (Ayuso-i-Casals et al., 2008) which demonstrate a positive and significant influence on deficit and debt reduction. In fact, the FR shows a positive and very significant effect on primary balance (0.466***), confirming the effectiveness of fiscal rules in reducing deficit. The positive parameter, therefore, shows that EMU countries with stricter fiscal rules measure generally larger primary surpluses, substantially improving the country's fiscal discipline and reducing sovereign debt. The statistically FR significance is also verified for government expenditures. The FR has a significant negative impact on primary expenditures (- 0.698***), inasmuch the introduction of strict fiscal rule engender a restrictive effect

on governmental expenditures. As previously analysed, the expenditures are directly controlled by government, being an effective and immediate tool to slow the debt increase. Stricter FR are therefore related to lower primary spending. Contrary to the primary balance and primary expenditures, the impact of FRI on governmental revenue is not significant. In fact, we verify a slight decrease of revenue due to the introduction of a fiscal rule (- 0.196) also if no significant effect is recorded.

With the help of an additional graph provided by European Commission (Figure 3), we perceive the FRI diversity within the European Union in the period from 2000 to 2011.

Figure 5: The EU Commission numerical Fiscal Rule Index in 2011



Source: Bergman et al. (2013)

In particular, we verify that countries with higher fiscal rules index in 2011 are Sweden, Spain, Bulgaria and Poland, while countries with lower fiscal rule index are Ireland, Cyprus, Greece and Malta. In the case of Sweden, the high level of FR reveals sound and sustainable finances. In fact, the most important reforms were implemented in 1997 (Expenditure rule) and 2000 (Budget balance rule), substantially improving the governmental fiscal discipline (Schaechter et al., 2012). The case of Spain is particular because the high level of FR in 2011 doesn't implicate sustainable fiscal policy. In effect, despite greater fiscal rule index, the Spanish debt-to-GDP increased substantially (since 2008) recording 61.7% GDP in 2011 and even 93.9% GDP in 2014 (Trading Economics website). This situation highlights the main problem behind the FR methodology: a greater index is not synonymous of higher performance, as this indicator doesn't guarantee any real implementation of the rule. The FR is considered a "quality index" based on country specificities and doesn't verify whether the rules have been implemented in practice (Bergman et al., 2013). Note that FR significance is not questioned. Concerning Spain, in 2011-2012 were adopted new fiscal rules as expenditure, debt and budget

balance rules in order to improve the country's solvency and adjust it to the EU standard (Schaechter et al., 2012). These new fiscal reforms have increased the spanish FR value even though the country is in transition times (rules are accepted but they take into force only in 2020). The FR level reached by Bulgaria in 2011 is similar to the spanish index, although there is a substantial difference in the debt level of these two countries. In fact, the Bulgarian debt-to-GDP ratio is 16.2% GDP confirming the antecedent implementation of fiscal rules (in contrast with the spanish case) (Trading Economics website).

Most of SWEAP (Southwest euro area periphery) countries (except for Spain) have a weak fiscal rules index which remains substantially unvaried over years and indeed leads to problems on government debt sustainability (Bergman et al., 2013). The FR evolution of such country's results are very limited and insufficient compared to other EU's countries, requiring important fiscal reforms to consolidate their unstable public finances. Looking at figure 3 we can see how the fiscal rule index increased over years in most of european members, while remaining quite stable in major underperformed countries. This mechanism is accentuated by the fact that countries with better long-term sustainability are also likely to carry out stricter fiscal rules, improving further the government fiscal stance (Bergman et al., 2013).

The construction of such an index can help the government assess when rules require an increasing effectiveness; in fact if the FR is considered as a target or a benchmark, it can be easily observed when deviations are recorded and when correction policies are needed (like in the case of SWEAP countries).

The study conducted by Hatchondo (2012) furthermore shows the positive impact of fiscal rules on the market value of bonds. The introduction of a fiscal rule (this study refers to a debt ceiling implementation) lowers the debt level which causes an increase in the bonds' value in favour of creditors. This mechanism is thoroughly explained. The announcement of a future fiscal rule reduces the interest rate on public debt, as lenders anticipate greater governmental diligence that increases the bond value (Hatchondo et al., 2012). The spread interest rate decline is related to the considered initial spread level, in other words, the spread downturn is higher when the country is in low or normal spread risk situation. This means, when country is in precarious situation (high spread level), the investors have no credible anticipation about a greater fiscal discipline, significantly limiting the effect on spread reduction subsequent to the rule announcement (Hatchondo et al., 2012). We have to

consider that a higher reduction of spread level (caused by fiscal rule declaration) goes not necessarily in favour of government; mostly increasing lenders capital gains. Therefore, it is needed to establish an adequate transition time length so as to maximise the welfare gain of a rule introduction, establishing an balance between the possible capital gains (thanks to the higher bond value) and the cost needed for fiscal adjustments for respecting the ceiling. The mechanism of spread reduction allows registering a lower debt level compared to countries without fiscal rules.

The econometric impact of national fiscal rules is therefore confirmed and highlights the existing country's differences arising from diverse fiscal rules and from macroeconomic and regulatory local conditions. As we have seen earlier, in some countries fiscal rules are more influential than others, though it confirms a general positive and significant influence on the fiscal balance and on sovereign default premium of a country. For example, the Swedish and Bulgarian fiscal rule index is higher, while SWEAP country (except for Spain) are characterised by lower index compared to other EU members.

Some high FR (as in the case of Spain) include large periods of transition (between the acceptance of a rule and its actual implementation) that reduce their impact on budgetary outcome. Despite that, the fiscal rules maintain a significative positive impact on primary budget balance and a significant negative influence on primary expenditures. This link between national fiscal rules and budgetary outcome is very significant and allows a considerable improvement of governmental finance.

In countries where the national fiscal rules are not completely influential on the fiscal balance, it is necessary to implement additional rules like supranational regulation. The main example of supranational rule in the European Union is the *Stability and Growth Pact*. This mechanism allows complementing and adapting the national fiscal rules to the European fiscal policy, ensuring a fiscal discipline. The main policy challenge is that of being able to combine and coordinate national and supranational rules, managing to maintain a high efficiency and stringency of both. The ceilings of national and supranational rules have to be consistent and must not be in opposition between them.

For ensuring an adequate effectiveness of national fiscal rules, it is important to make sure of the consistency of subnational fiscal policy. In fact, subnational authorities have numerous incentives to overspend, under-tax and borrow excessively, jeopardizing the central policy stringency. Therefore it will be essential to set subnational rules in line with national rules, so as to assure the debt sustainability. The question of the subnational rule will not be treated in this paper because it is a wide

subject and requires additional considerations.

Several studies show how the implementation of a fiscal rule allows an improvement in fiscal discipline. Iara and Wolff (2011), who inspired the Hatchondo study (2012), conclude early that the introduction of a national fiscal rule facilitates the containment of the governmental debt spread and this positive effect can be expanded to the euro zone member countries. This influence will depend on the specific characteristics of fiscal rules in a given country, as well as the global risk aversion. The study of Wälti and Krogstrup (2008) conducted on Swiss cantons, confirms a significant impact of fiscal rules. This study shows how the introduction of the variable "voter preference" does not question the correlation between fiscal rules and the budget deficit, confirming the results obtained by previous studies. In fact, with the consideration of "voter preference" the impact of a fiscal rule is slightly reduced although remaining significantly positive.

The effectiveness of fiscal rules is then recognized by different empirical studies even though there are numerous strategies to circumvent them. Indeed, Alesina and Perotti (1996) consider different techniques of creative accounting that allow circumventing the budget discipline. Furthermore, Alesina and Perotti (1996) and Alesina and Ardagna (2010) carry out a study on OECD countries affected by a massive reduction of debt. They demonstrate the positive impact of debt reduction (for example through cuts in spending) on output and on private consumption. Perotti (2011) reconsiders this argument, wondering if a short-term policy of fiscal consolidation (ever alluding to a cut spending) has an expansionary effect or not. He points out that the actual situation has changed compared to the past, in fact that if the current interest rates are very low and close to zero then the default premium reduction becomes unattainable. He also criticizes the fact that thanks to sound finance the net exports are expected to increase, noting that this cannot happen in countries highly integrated with each other. This study concludes that the impact of fiscal policy consolidation results still significant even if less influential compared to the past.

In conclusion, we note that the fiscal rule topic is very controversial and current. In fact many econometric studies are presently treating this issue.

3.3 The Swiss debt brake

This subchapter analyses the Swiss fiscal rules context, in particular referring to Swiss debt brake. The latter was applied in 2003 to contain the increasing debt level during the 90's. This rule has the peculiarity of being anchored in the Federal Constitution, preventing any changing in law without a popular vote. Thanks to the debt brake introduction, we record balanced budget over cycles, allowing a greater fiscal discipline (it will be shown how in the Figure 4). The case study is about Switzerland as it represents an interesting institutional laboratory and as it denotes a positive example in the world, because of his high effectiveness in debt reduction and its capacity to adapt to exceptional situations. In fact, Switzerland is considered as an institutional laboratory inasmuch has a fiscal federalism structure in which subnational levels (cantonal governments) have essential fiscal autonomies regarding constitutional and/or statutory fiscal restraints. These cantonal differences constitute an opportunity for studying the effect of different institutions on fiscal discipline within the same country.

In this subchapter, we will first explain the debt brake mechanisms and then its positive impact on public finance and on swiss debt.

Since the nineties, Switzerland has been characterised by a sharp increase of public debt due principally to the pro-cyclicality of fiscal policy (periods of growth were not used to consolidate public finances but to increment spending) and due to the facilitated legal permissions for higher expenditure (an increase of spending volume only requires a simple majority of vote in parliament, while a raise of revenue needs change in Swiss Constitution). A more detailed analysis of this period of debt accumulation highlights the insufficient revenues or own funds in relation to the public expenditures due to low economic growth, to several strategies for recapitalization and to financial aid for various public companies, banks and pension funds. The 39% of additional debt (during the period between 1990 and 2005) was used to cover past deficit accumulation of financial account, while the 27.8% is intended to finance public services like SBB, Post and RUAG, or for recovery of the pension funds (DFF, 2006). In addition, the remaining debt is caused by treasury finance, as payments to Collective Institution (like PUBLICA), or other public projects (FFA, 2006). The peak was reach in 2005, when the federal gross debt was 130'339 million CHF and the debt ratio 27.2% of GDP (DFF, 2013). After this period, we register a debt-decreasing trend, stimulated by an economic upturn and by implementation of debt brake mechanism. In order to ensure sound public finances over the long term, in 2001 85% of voters accepted the new fiscal rule known as *The debt brake*.

3.3.1 Mechanisms

The Swiss debt brake is designed to maintain balanced public finances in the medium term (i.e. over a business cycle) and to stabilise the sovereign gross debt. This debt brake mechanism is based on Article 126 of the Swiss Federal Constitution (see annexe 1). Depending on the current economic situation, deficits or surpluses are allowed in the short term or over a business cycle. The mechanism of debt brake contributes to the implementation of "passive countercyclical" budgetary policy, avoiding engaging excessive expenditures during boom phases in order to prevent important cuts in recession periods (FFA, 2012). In particular article 126 of the Swiss Constitution requires an equilibrium between expenditures and revenues within an economic cycle. To achieve this goal, the ceiling on total expenditures (to be approved in the budget) is set on estimated revenues considering the economic situation. Therefore the implementation of this fiscal rule aims to limit expenditures to the amount of structural revenues and envisage an annual government expenditure ceiling (is \bar{G} the maximum level of expenditures) established as a function of revenues (R are the estimated revenue) and position of the economy in the business cycle (k is the business cycle adjustment factor). Algebraically:

$$\bar{G}_t = k_t R_t \quad \text{where} \quad k_t = \frac{Y_t^*}{Y_t} \quad (3.6)$$

and Y^* is the predicted Trend-GDP and Y the predicted GDP. The business cycle adjustment aims to stabilise the expenditure level, taking into account the level of cyclical-adjusted revenue represented by the k factor and estimated using the HP filter methodology (previously explained in the course of this thesis). The HP filter is used to correctly estimate a structural revenue trend in order to get stable and appropriate expenditures. In particular, when the economy is below trend (k is larger than one), deficits are allowed, while in case of growing economy (k smaller than one) budgetary surplus are required. These deviations from the expenditure limit are credited (during economic expansion) or debited (during recession) to a compensation account. Spending deviations from the debt brake limit exist in the short term or within an economic cycle, allowing to accumulate surplus during growth in order to compensate possible deficits in economic recession. In detail, in period of economic boom the permitted expenditures have to be lower than forecasted revenue, ensuring important surplus deviated to the compensation account, while in economic recession the permitted expenditures have to result in bigger than forecasted revenue in order to boost the economy. The expenditure limits thus become countercyclical. When deficits are bigger than 6% of annual expenditure limit, then the new

expenditure ceiling for the following years have to be lowered in order to eliminate this excessive spending within three years (FFA, 2012). This debt brake mechanism has the purpose of matching the permitted expenditure level with the amount of estimated structural revenue, making public spending independent from economic cycle fluctuations. The main problem is represented by the possible GDP forecasting errors that influence both structural revenue estimation and cyclical adjustment factors. In practice these estimation errors don't significantly influence the expenditure ceiling, as these errors tend to be cancelled in the medium/long term (after 3-4 years the k factor tend to 1, or expenditures tend to equalise to revenue).

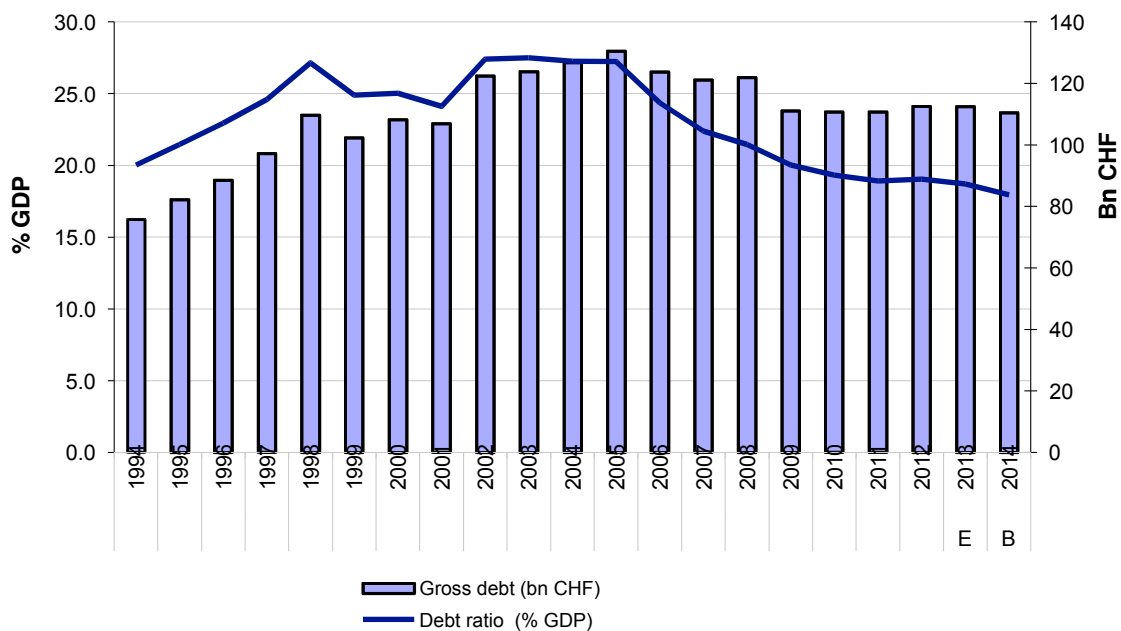
This Swiss model has the advantage of being highly credible, in fact the regulation envisage provisions for exceptional circumstances in order to maintain the validity of the fiscal rule even during periods of crisis or unexpected shocks. In other words, the political cost for abandoning this fiscal rule during difficult periods is large enough to discourage its violation, maintaining its effectiveness over the long term.

Another characteristic of the debt brake rule is its application to the ordinary and extraordinary budget (Economie Suisse, 2012). Furthermore, the swiss methodology does not distinguish between current and investment expenditures, applying both categories to debt brake law. For obtaining extraordinary expenditure or additional expenditure beyond the limit established by The Financial Budget Act, the majority of both chambers' members of federal parliament have to accept the exceptional credit used to counteract special and uncontrollable situations like natural disasters or economic shocks. These extraordinary expenditures are debited to an "amortisation account" and must generally be compensated for during the following six years (established by "debt-brake extension" of 2010), in order to prevent abuse (OECD, 2011). Exceptions are made for some categories such as public transport funds, infrastructure funds, social insurance funds or unemployment insurance, in fact these classes are not subjects to the expenditure-limit established by the debt brake but to specific rules. Another peculiarity of the Swiss system is that the debt brake applies only at the federal budget, leaving the financial autonomy to cantons and municipalities. Each canton is responsible for its own finances (as indicated by the Swiss Federal Constitution) and therefore is indicated to implement specific fiscal rules to limit cantonal and local debt. This analysis of the relation between federal and cantonal regulation will not be detailed in this thesis.

3.3.2 Implications

The first and main implication of debt-brake rule is the positive effect on debt-to-GDP ratio. The Swiss Government registered a remarkable reduction of debt-to-GDP after the implementation of debt brake rule, fulfilling the objective of stabilising the national debt by the balance between expenditure and income over an economic cycle. As we can observe from Figure 4, with the debt-brake implementation (particularly after the transition time, or since 2005) the gross debt and the debt-to-GDP have recorded a steady decrease, extended to subsequent years.

Figure 6: Gross Debt ratio of Swiss Confederation (1994-2014)



1990-2012: State account 2012 (in 27 March 2013); 2013: Estimation June 2013; 2014: Budget 2014 (in 21 August 2013); Last update: August 2013; Source: Federal Finance Administration FFA (2013)

Since 2005 the debt-to-GDP ratio has become lower than 27% GDP and even below 20% GDP since 2009 (FFA, 2013). The principal difference between the nineties and the post-implementation debt-brake years is the change from a pro-cyclical fiscal policy into a countercyclical budgetary policy. As already explained, the nineties' growth was exploited to further increase expenditures, while since 2003 this mechanism was reversed. In fact, since the beginning of the 21st century the period of growth acts to accumulate surplus in order to be able to compensate deficits during economic slowdown. The combination of the strong growth and the debt brake rule allowed to register this fiscal

stance improvement. The public debt decreasing is therefore not only attributed to the introduction of this new fiscal rule but also to the strong economic growth context that has allowed accumulation of surpluses to be deviated to the compensation account. The period from 2005 to 2013 is furthermore characterized by a substantial decrease of unemployment rate and a growth of Swiss GDP. Although the two shocks occurred in 2007, or rather the rise of petrol price and the increased volatility of financial markets, the Swiss economic situation continues its positive evolution. During the subprime crisis of 2008, we note that Switzerland was also affected by price fluctuations of raw materials and by decreasing import/export, although the GDP evolution remains positive (+2.2%) and allows a constant fiscal discipline (OFS, 2013).

A small increase of gross debt and debt ratio is recorded during the period 2011-2012, as a result of the European sovereign crisis that affects the whole economic world. In conclusion, we can observe a general decreasing trend of gross debt (estimated 110'300 billion CHF in 2014) and debt ratio (estimated 17.9 % of GDP in 2014) in Switzerland. Based on the study conducted by the BNS (BNS, 2014), we can confirm a propagated trend to a decreasing gross debt and debt ratio in the subsequent years (estimation provided until 2017) with some possible significant debt increase after 2018 due to the increasing cost of social security as old-age insurance (FFA, 2012). The debt brake influence on sovereign debt is hence calculated including the benefit of economic growth. Consequently, the determination of the specific debt brake role results slightly overrated but still significantly positive (FFA, 2014).

Seeing that Swiss sovereign debt level is directly influenced by cantonal and local debts, we will also deepen (in the following box) the effect of debt-brake implementation at the cantonal level.

Box 8: Cantonal debt-brake rule

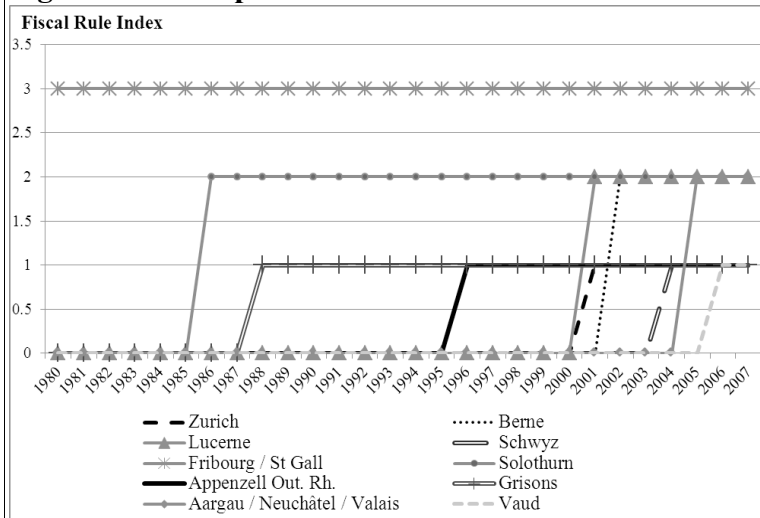
To cope with the increasing levels of deficit and debt, many Swiss cantons (since 80s) have introduced fiscal rules, or cantonal debt brakes (subnational rules set independently from the national government), with the aim of improving the sustainability of their public finances. Due to the high fiscal autonomy characterizing Swiss cantons, there are many remarkable differences in the stringency of these fiscal rules between different time frames and different cantons. There are cantons with mid-term balanced budgets or over the budget cycles, while others have annual ceilings. Moreover each cantonal rule presents a different execution and sanction mechanism.

Feld and Kirchgaessner (2008) studies the stringency of Swiss cantonal debt-brakes in order to explain differences in fiscal discipline. In particular they construct a fiscal rule index (FR) for

subnational level. The construction of such cantonal fiscal rule index considers three main components: (i) the effective link between budget planning and actual budget execution (when this connection is strong, the FR results strengthen), (ii) cantonal numerical constraints (when strong numerical constraints are characterising the cantonal rule, then the FR is higher), (iii) effective sanctions (if cantons implement automatic tax adjustment when the deficit ceiling is overstepped, then the FR is higher) (Feld et al., 2012). For example cantons like Basle country, Fribourg, Neuchâtel, Nidwalden, Schwyz, Vaud and Zurich have the automatic tax adjustment or when the deficit limit is overstep, the cantonal tax rate is automatically adjusted in order to balance budget and severe sanctions are also provided. If all the three components are fulfilled, the FR is the strongest and have a score of “3”, while “0” if none of these requirements are present and hence the FR is weak.

The figure above (Figure 7) shows the FR for swiss cantons. Cantons of Fribourg and St. Gall have the most stringent and most stable (from 1980 to 2007) fiscal rules inasmuch all the three requirements (previously treated) are fulfilled, having a FR equal to 3 (Feld et al., 2012). Concerning cantons like Aargau, Berne, Lucerne, Neuchâtel, Solothurn and Valais, the FR equal to 2 or rather only two characteristic are fulfilled. Appenzell Ausserrhoden, Grisons, Schwyz, Vaud and Zurich are cantons with less stringent fiscal rule (FR equal to 1), while Basel-Country, Basel-Town, Geneva, Thurgau and Ticino have not fiscal constraint in 2007. Except for Fribourg and St. Gallen, most cantons have strengthened their fiscal rule especially since 2000s, like Lucerne, Berne and Zurich, or even since 80s in Solothurn, Schwyz and Grisons.

The impact of subnational fiscal rules on cantonal deficit and debt is significant, or the introduction of strict fiscal rule aiming at balancing budget allow to improve the cantonal discipline (Feld et al., 2012). Several studies conducted on swiss cantons (Feld et al., 2001; Feld et al. 2012; Kirchgaessner 2013) shows that cantons with more stringent fiscal rule register significantly lower levels of debt and deficit (as showed from the high significance of fiscal constraint on cantonal deficit, see Annexe 2).

Figure 7: Development of the Fiscal Rule Index

Source: Feld and Kirchgässner (2008)

The cantons Basel-Country, Basel-Town, Geneva, Ticino and Thurgau are excluded from the figure since they had no fiscal rules in place over the regarded period.

In conclusion, considering the period from 1980 to 2010, St. Gallen and Fribourg are cantons with more stringent fiscal rule and because of that they have only modest nominal increase of their debt, while Geneva (have no debt-brake till 2006) and Vaud (debt-brake implementation in 2005 and FR equal to 1) are the cantons most indebted in Switzerland (Feld et al., 2012).

The second implication of national debt brake introduction concerns the swiss budget process. With this new fiscal regulation, the expenditure ceiling is determined at the beginning of the budget process, being subsequently divided in expenditure target constraining each different ministry. This top-down process (or aggregate level of expenditures) is in contrast with the previously methodology which consisted in a bottom-up system, or in a bargaining within the coalition government in order to establish a ceiling approved by the majority of ministers. This changing method allows the finance minister to enforce easily responsible fiscal policy and to effective reduce public debt.

Third, after the debt brake rule introduction the expenditures have the tendency to become quite stable, in fact any excessive fluctuations may endanger the government policy and the fulfilment of the rule. Being the expenditures closely linked to revenue, any remarkable revenue fluctuation would cause an adjustment of public spending, generating fiscal policy instability.

Fourth, the budget quality can be jeopardised by the debt brake rule. In particular, with the introduction of an expenditure ceiling the budget composition can change in favour of more expenses with an higher political cost (spending categories with low political costs are more easily cuttable). In

fact the debt brake rule aims to improve the swiss fiscal stance reducing public deficit and debt, not ensuring a specific budget quality. Nevertheless, this fiscal rule aims to promote growth and welfare policies over the long term, hence fundamental spending categories are maintained.

3.3.3 Discussion

The swiss debt brake experience is considered a success as it contributed to significantly reducing the sovereign debt. This success, however, is not attributable only to this debt-brake rule, but to the whole fiscal system (including the subnational rules) and to the preceding rules like the "expenditure brake" (introduced in 1995) or the "budget target 2001" (introduced in 1998). In addition, the rise of economic growth favoured the increase of fiscal discipline and prepared the way for a debt brake introduction (Geier et al., 2012). The swiss case highlights the inadequacy of discretionary policies which doesn't follow strict rules but changes policy depending on economy. The implementation of a credible and stringent rule like the debt-brake rule both to national and subnational levels show how the fiscal policy stance is certainly improved. In fact, this methodology allows an effective budget consolidation both in positive and negative economic conditions, following stabilisation objectives over long time period and being flexible to unforeseen events. As demonstrated in recent financial crisis, the debt brake method allows to maintain a stable discipline despite many economic difficulties. Moreover, the reduction of debt burden and debt servicing costs have donated more available budget resources to devote to spending categories like education and development. This demonstrates how the budget quality is not reduced through debt-brake rules.

Given the success of this fiscal rule, however, we must not underestimate future challenges as demographic changes or structural lowering of GDP growth that may greatly influence the mechanisms of debt brake and thus could put the rule under pressure. In conclusion, thanks to its solid structure, the swiss debt brake results in an effective solution for implementing a correct fiscal discipline.

4. Conclusion

This thesis address the problem of debt increases that characterised the European countries since the end of the 90s. At the beginning of the 2000s, several European countries were subject to excessive deficit procedures manifesting an important governmental challenge for guaranteeing an adequate fiscal discipline. This problematic issue is still present in to this day as evidenced by the high levels of debt in the EU. It is a structural problem as shown from the negative primary structural balance hence requiring a structural reform. In the 2000s national or supranational governments have attempted to alleviate the problem by implementing diverse fiscal rules. This paper analysed different fiscal rules such as debt and deficit rule, budget balance and structural budget balance rules, expenditure rules and revenue rules. Such fiscal rules are implemented to ensure fiscal discipline over the long-term, while presenting different features and obtaining different results. The debt and deficit rules have the advantage of establishing a direct link to debt sustainability and are easy to communicate and monitor, despite its pro-cyclicality problem. The positive aspect of structural budget balance rule lies in its economic stabilisation function that allows reacting to the economic shocks with a “compensation account“ made for temporary and one-off factors. The expenditure rules have no direct link with debt sustainability but they stabilise the economy if they are combined with revenue rules, therefore limiting the fiscal deficit. This paper also shows the possible combinations of different fiscal rules, proving its great effectiveness in debt reduction.

The construction of the *Fiscal Rule Index* (proposed by the European Directorate General for Economic and Financial Affairs) made it possible to econometrically measure the impact of a fiscal rule on a country's debt and deficit level. Thanks to the analysis of different studies we could notice that even if the impact of a fiscal rule is almost unanimously recognized, it can vary according to each considered study. Marneffe et al. (2011) empirically shows, through the construction of the FR index, a positive rule impact on the fiscal balance, governmental spending and revenues. On the other hand, Hatchondo et al. (2012) proves a positive influence of fiscal rules on the sovereign default premium. In fact, in an economy without rules determining the fiscal discipline we note that the premium on sovereign debt is higher. This mechanism is explained by the fact that the introduction of a fiscal rule allows to influence the expected future sovereign debt, thereby reducing the interest rates at which the government borrows. This reduction of borrowing allows obtaining a direct positive effect on the sovereign debt.

Moreover, several economists prove the positive impact of fiscal rule on the governmental fiscal balance as the case for the study of Iara and Wolff (2011) which demonstrates how national fiscal rule facilitates the containment of the debt spread. Wälti and Krogstrup (2008) analyse the fiscal rules in Swiss cantons, confirming a significant impact of fiscal rules on budget deficit, despite taking into account the "voter preference" variable.

The topic of fiscal rules effectiveness has been studied by several economists who obtained similar results. In fact the effectiveness of fiscal rules in improving fiscal discipline is unanimously recognised even when Alesina and Perotti (1996) give attention to the different techniques of creative accounting possible for circumventing the budget discipline of a rule.

In conclusion, the debt increase trend forced the European Union and its Member states to restructure its financial system, implementing fiscal rules reform on the supranational and national level. These financial reforms have partially allowed for the restructure of discipline even if several countries are faced with unsustainable or higher debt levels. In fact the Stability and Growth Pact have been modified recently with the additional reform called "*Two Pack Regulation*" (May 2013) in order to quickly detect and durably correct excessive deficits of Member State. Given the effectiveness of fiscal rules, it is not excluded that in the future we will increase these national and supranational measures in order to prevent future crises jeopardising the sustainability of a state.

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*Annexe*Annexe 1: Article 126 Financial management of Swiss Federal Constitution

- 1 The federal government shall maintain its income and expenditure in balance over time.
- 2 The ceiling for total expenditure that is to be approved in the budget is based on the expected income after taking account of the economic situation.
- 3 Exceptional financial requirements may justify an appropriate increase in the ceiling in terms of paragraph 2. The Federal Assembly shall decide on any increase in accordance with Article 159 paragraph 3c.
- 4 If the total expenditure in the federal accounts exceeds the ceiling in terms of paragraphs 2 or 3, compensation for this additional expenditure must be made in subsequent years.
- 5 The details shall be regulated by law.

Annexe 2: Cantonal Deficits and Debt per Capita

<i>Cantonal Deficits and Debts per Capita, 1980 - 1998</i>			
dependent variable	cantonal deficit	cantonal and local deficit	log of cantonal debt
constant	-1726.722(*) (1.94)	-2961.395* (2.53)	20.478*** (5.20)
direct democracy	-49.489 (0.82)	-23.493 (0.82)	-0.123* (2.05)
fiscal constraints	-106.768*** (3.67)	-109.545*** (2.96)	-0.048 (1.18)
fiscal decentralisation	-299.387 (0.85)	24.694 (0.06)	-1.433*** (3.93)
(log of) tax competition	617.461 (1.41)	726.284 (1.41)	-0.267(*) (1.83)
(log of) unconditional grants	-0.756** (2.82)	-0.928** (2.72)	-0.395** (2.92)
ideology of the government	69.039 (0.43)	110.891 (0.56)	0.109 (0.52)
(log of) disposable income	0.012* (2.13)	0.014* (2.02)	-0.587(*) (1.86)
(log of) population	0.067 (0.52)	0.100 (0.63)	-0.230*** (3.77)
urbanisation	499.292* (2.23)	591.414* (2.25)	1.597*** (6.05)
dummy for French and Italian language	-313.814* (2.05)	-528.718** (2.75)	0.269 (1.41)
share of young population	52.883* (2.46)	80.145** (3.01)	-0.038 (1.53)
share of old population	37.062* (2.57)	63.159*** (3.59)	-0.042(*) (1.96)
dummy for Appenzell Ausserrhoden in 1996	-3065.430*** (25.78)	-3038.398*** (22.33)	-0.273** (2.68)
\bar{R}^2	0.489	0.478	0.633
SER	348.798	433.530	0.310
J.-B.	205.347***	82.908***	22.871***

The numbers in parentheses are the absolute values of the estimated t-statistics, based on the Newey-West autocorrelation-consistent standard errors. '***', '**', '*' or '(*)' show that the estimated parameter is significantly different from zero at the 0.1, 1, 5, or 10 percent level, respectively. SER is the standard error of the regression, and J.-B. the value of the Jarque-Bera-test for normality of the residuals.

Source: Feld et al. (2006)