

# Sovereign Bond Market Reactions to Fiscal Rules and No-Bailout Clauses – The Swiss Experience

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## **Abstract:**

We investigate the political determinants of risk premiums which sub-national governments in Switzerland have to pay for their sovereign bond emissions. For this purpose we make use of financial market data from 288 tradable cantonal bonds in the period from 1981 to 2007. Our main focus is on two different political influences. First, many of the Swiss cantons have adopted very strong fiscal rules. We find evidence that both the presence and the strength of these fiscal rules contribute significantly to lower cantonal bond spreads. Second, we study the impact of a credible no-bailout regime on the risk premia of potential guarantors. We make use of the Leukerbad court decision in July 2003 which relieved the cantons from backing municipalities in financial distress, thus leading to a fully credible no-bailout regime. Our results show that this break lead to a reduction of cantonal risk premia by about 25 basis points. Moreover, it cut the link between cantonal risk premia and the financial situation of the municipalities in its canton which existed before. This demonstrates that a not fully credible no-bailout commitment can entail high costs for the potential guarantor.

**Keywords:** sub-national government bonds; numerical fiscal rules; no-bailout clause; sovereign risk premium; fiscal policy; Swiss cantons

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## 1. Introduction

The budgetary problems of many governments which emerged as a consequence of the economic and financial crisis are top of the political agenda. Simultaneously to the increasing debt levels, investors demanded much higher compensations for the growing default risks of several Euro countries (esp. Greece, Ireland, Portugal) as well as of US states (esp. California, Illinois), thus boosting their sovereign bond yields. The exploding refinancing costs put further pressure on the public budgets and call for measures which are capable of restoring the market confidence in the sustainability of public finances in the short run. Our work focuses on two different political measures which can be suspected to work in this direction: numerical fiscal rules and credible no-bailout policies. Their effects will be tested empirically for sovereign bond emissions at the sub-national level of Switzerland. The Swiss system serves as a perfect laboratory since it is characterised by an extensive fiscal federalism with high autonomy at the cantonal level – especially with regard to constitutional and/or statutory fiscal restraints. Since most Swiss cantons issue tradable bonds, we can make use of unique financial market data on 288 cantonal bonds in the period from 1981 to 2007 to measure the investors' confidence in the cantons' outstanding debt.

The two political measures we study are of particular interest from the European perspective. The founders of the EMU were fully aware that – as in any federal system with decentralised fiscal authority – the monetary union might run into danger of creating negative incentives for the national governments. According to the literature on “soft budget constraints” (see, e.g., Kornai et al., 2003), governments in a federal system have incentives to accumulate excessive debt if they can expect to be bailed out by someone else when running into financial trouble. As a remedy against this problem, the framework of the Maastricht Treaty included two main provisions which strongly relate to the policies studied in this paper: (i) fiscal rules in the form of the Stability and Growth Pact (limiting annual budget deficit to 3% and national debt to 60% of GDP), and (ii) a no-bailout clause (Art. 125 TFEU<sup>1</sup>) which prescribed that neither the EU nor countries are liable for other countries obligations. However, the experience shows that both provisions were not capable of curbing the problems related to the soft budget constraints. The reasons are evident: neither the Stability and Growth Pact, nor the no-bailout clause seems to be regarded as very reliable at any point of time. However, this experience

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<sup>1</sup> Treaty on the functioning of the European Union.

does not exclude that such political measures could be efficient in restoring the financial markets' confidence if they are enforced in a credible manner. Therefore, we refer to Switzerland which offers the opportunity to study the effects of very strong fiscal rules as well as an exogenous establishment of a credible no-bailout regime at the cantonal level.

Concerning fiscal rules, both the political as well as the academic sphere seem to be very optimistic that such numerical restrictions of fiscal policy can have a positive impact on the market participants' confidence. It is already shown in the literature that numerical fiscal rules limit debt, deficit, expenditure and revenue levels of governments, and therefore make public finances more sustainable. If the financial markets actually believe in such strong effects of fiscal rules, their adoption should immediately restore the market confidence in financial sanity and result in lower risk premia. However, as will be shown below, the empirical evidence for those fiscal rules already existing in US states and European countries points to a quantitatively rather low or even non-existent link between fiscal rules and government bond yields.

One explanation for such small effects is straightforward: the existing rules are usually too weak and unreliable in order to have a strong effect on the investors' confidence. Here the Swiss cantons come into play. In the past decades, almost all of the 26 cantons of Switzerland have introduced different forms of fiscal constraints that require them to balance their budget over time. On top of that, many of these rules are much more stringent than any form of restrictions existing in the US or at the European level. Just to give an example, some cantons have constitutional requirements which oblige them to increase tax rates if budget deficits surpass a deficit threshold. Such a mandatory enforcement mechanism is to our best knowledge unique and generates a much more credible restriction to public finances as compared to rules in other parts of the world. Our empirical results confirm that both the presence and the strength of fiscal rules in the Swiss cantons significantly contribute to lower risk premia, and that this effect is stronger than in comparable studies of US or national fiscal rules.

The second political influence concerns the benefits of having a credible no-bailout policy with respect to other (usually lower tier) governments – or put it another way, the costs of an implicit guarantee in a regime where market participants ascribe a positive possibility to a bailout. The literature has focused almost exclusively on the benefits of such an implicit

guarantee for those issuers who are potentially bailed out, and ignored the costs for those who potentially bail out. Furthermore, if the markets assume that a central government would support a lower-level government in distress, spillover effects should prevail. Risk premia should then not only reflect the government's own budgetary position, but also those of the lower-tier governments which potentially will be bailed out.

Concerning the costs of such an implicit guarantee, we can exploit a natural experiment generated by a Swiss court decision in July 2003. In this decision the Supreme Court in Lausanne decided – against general expectation – that the canton of Valais is not obliged to bail out the highly indebted municipality of Leukerbad. This decision was a break since it relieved the cantons from backing municipalities in financial distress, thus leading to a fully credible no-bail out regime at the cantonal level. We identify two consequences of this break: firstly, the cantonal yield spreads decreased significantly, and secondly, it cut the link between cantonal risk premia and the budgetary position of the canton's municipalities. These findings hint to significant costs that a non-credible no-bailout commitment can entail for the potential guarantor.

The remainder of this paper is structured as follows: In Section 2 the theoretical background is presented and the main hypotheses are derived. In section 3 we explain the institutional setting concerning cantonal fiscal rules in Switzerland. The empirical analysis is provided in section 4, and finally, section 5 reiterates the main findings of our study and discusses some implications.

## **2. Literature review and hypotheses**

### **2.1. General determinants of (sub-national) bond spreads**

The methodological standards for the analysis of sovereign bond spreads are mainly set by several studies investigating the yield differentials of European bonds in the aftermath of the monetary union (see, e.g., Codogno et al. 2003; Manganeli and Wolswijk 2009; von Hagen et al. 2011). The following factors are identified as the main drivers of yield spreads by these authors:

1. Exchange rate risk
2. Default risk

3. International risk aversion
4. Liquidity risk

While most studies focus on the yield spreads of central governments, there are so far only few studies analysing the determinants of bond spreads for sub-national governments. Schuknecht et al. (2009), e.g., investigate the main drivers of sub-national bonds in Germany, Spain and Canada. Whereas exchange rate risk obviously plays no role for explaining yield differentials between bonds of different public issuers within the same country, their findings underpin the relevance of the before mentioned determinants. In particular, the bond spreads strongly depend on the fiscal performance of the sub-national governments (measured by the level of public debt and fiscal balance), thus reflecting the consideration of default risks.<sup>2</sup>

In the Swiss context, there is so far only one study which analyses the determinants of yield differentials between the cantonal bonds (Küttel and Kugler 2002). Using a relatively small sample covering 84 bonds from 15 out of the 26 Swiss cantons in the period from 1990 to 1998, the authors do not find significant effects of fiscal indicators such as debt, budget balance, or taxes on the yield spreads. In contrast, institutional factors such as direct democratic elements as well as cultural differences seem to be important. A variable which accounts for the existence or strength of numerical fiscal rules is, however, not incorporated to the estimation specification.

## **2.2. (Non-)credible no-bailout clauses**

A further aspect which might be relevant regarding the risk assessment of sovereign issuers in a federal setting is the risk taking for other, usually lower level, governments. This factor has not attracted attention in the literature so far. Although in many instances the liability for other federal levels is regularly disputed ex-ante, many of such no-bailout policies are regarded as not credible by investors. There often is the wide-spread expectation that the upper level government would – at least partially – bail out lower level governments which are in financial distress.<sup>3</sup> Such implicit debt guarantees should have contrary effects on the risk premia for those issuers who *are* potentially *bailed out* as compared to those who potentially *bail out*. The former should have a favourable assessment at financial markets, since their liabilities are backed up by the guarantor, whereas the latter must be expected to

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<sup>2</sup> Earlier evidence on sub-national bond-markets is provided by Bayoumi et al. (1995) for US states, Booth et al. (2007) for Canadian provinces, and Schulz and Wolff (2009) for German states.

<sup>3</sup> This commitment problem in federal systems has been studied extensively in the literature; see, e.g., the models by Wildasin (1997) and Goodspeed (2002) as well as the survey in Oates (2005).

pay an additional premium depending on the probability that other governments get into fiscal distress and are bailed out.

In addition to the level effect, a spillover effect can also be expected. For instance, if the markets expect that a certain government would bail out a lower level government which is in financial distress, the investor's risk sentiment deteriorates. It thus not only includes an assessment about the higher level government's budgetary position, but also about the probability of additional costs through a potential bailout, which is then reflected by the financial situation of the backed governments.

So far, the existing literature mainly focuses on the positive effect of potential bailouts for the risk assessment of lower level governments and thereby mainly rests upon indirect evidence. Schuknecht et al. (2009) show that a non-credible no-bailout policy in the federal context of Germany prior to the European Monetary Union (EMU) led to favourable risk premia of the German states. This finding is based on the widespread expectation that the federal government would help German states in financial trouble. However, the effect disappeared after the start of the EMU, which limited the possibility of the federal government to bail out the states. Heppke-Falk and Wolff (2008) provide further evidence that a higher probability of receiving a bailout by the federal government tended to reduce the German states' risk premia.<sup>4</sup> Contrary, Schulz and Wolff (2009) do not find the expected increase of state risk premia after a court decision that averted the bailout of the state of Berlin. Evidence at the international level comes from Dell'Ariccia et al. (2006) for emerging markets. They show that reduced expectations for a bailout of highly indebted countries by the international community after the decision not to bail out Russia in 1998 increased the cross-country dispersion of spreads.

Finally, the relevance of spillovers in a federation, i.e. the responsiveness of creditworthiness to other governments' fiscal positions, has received almost no consideration in the literature. The notable exception is Landon and Smith (2000) who study Canadian provinces. They use credit ratings (due to missing financial market data) and find negative effects of the central government's and other provinces' indebtedness on the creditworthiness of provinces.

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<sup>4</sup> The bailout probability is indicated by an increasing interest payments-to-revenue ratio; this is the guideline of the German constitutional court which has to declare the fiscal distress of the state to enable the bailout.

It is striking that almost all of the studies mentioned above focus on the benefits for the governments which are protected by conceivable bailouts. However, they do not account for the costs of the liable governments in terms of higher risk premia which are associated with the threat of potential bailouts. The adverse effects of such “risk transfers” on risk premia has only recently found some consideration with respect to the interplay of the private financial to the public sector: Ejsing and Lemke (2001) as well as Attinasi et al. (2009) demonstrate that the announcements of bank rescue packages by European governments in 2008 led to a decline of risk premia for banks at the expense of an increase for country bonds.

With respect to a risk transfer between the different tiers of a government in a federal system, the Swiss experience offers the chance to investigate the consequences for the liable government in greater detail. It is possible to estimate the costs of potential bailout guarantees by means of the Leukerbad court decision in 2003, where the Supreme Court in Lausanne decided – contrary to general expectations – that there is no-bailout of the canton Valais for the highly indebted municipality Leukerbad.<sup>5</sup> The small community (2,000 inhabitants) had gone bankrupt after having piled up debt amounting to 346 million Swiss francs. Since the cantonal government refused to bail out the municipality, a group of creditors issued lawsuits against the canton to pay for the obligations, so the case went to the Swiss Federal Court. Its decision was essential with respect to financial markets’ perceptions about implicit cantonal bailout obligations. Prior to the decision, the fiscal relations between the cantons and municipalities were not fully clear. Indeed, a federal law from 1947 excluded the possibility of a bailout; however, it also allowed the constitutions of the cantons to deviate from the clause, and this exemption was widely used on the cantonal levels (see Fasten 2006). Moreover, the cantons had a supervision duty regarding the public finances of their municipalities which also increased the probability of a bailout (see Feld and Kirchgässner 2008). As a matter of fact, the investors regarded the probability that cantons were obliged to help municipalities in financial distress as relatively high. Blankart and Klaiber (2006, p. 50) state that the creditors “thought that, if the municipality defaults, at least the canton (the state) will take over its obligation and bailout the municipality as could be expected in a mixed system”. However, after the court decision on July 3, 2003, it was resolved legally that cantons were not liable for unsustainable debt accumulation at the local level, so that the no-bailout clause became strongly binding and fully credible. Blankart and Klaiber (2006, p. 50)

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<sup>5</sup> A more detailed description of the case of Leukerbad can be found in Blankart and Klaiber (2006).

argue that the court decision “contributed to a complete wrap-up of the institutional organisation of the market for municipal and cantonal credits”. The decision thus led to a risk transfer from the cantonal to the municipal level.<sup>6</sup>

This leads us to the following hypotheses: (1) A punishment of Swiss cantons for serving as a potential bailout guarantor of municipal governments will be reflected in higher cantonal yield spreads before July 3, 2003, the day of the court decision. (2) Moreover, we expect that before the court decision, cantonal risk premia positively depend on the fiscal situation of their respective municipalities; i.e., cantonal risk premia increase with a higher probability of municipal defaults which is reflected by their fiscal situation. This link between municipal budgetary positions and cantonal bond yields is expected to disappear after the court decision.

### **2.3. Fiscal rules and risk premia**

Fiscal rules should have an immediate effect on the risk premia of sovereign bonds if they convince the investors that the lower scope for discretion of fiscal policy reduces the future expansion of public finances, and, consequently, the danger of a default. In several instances, numerical fiscal rules have proven ex-post to fulfil the promised effects of improving fiscal indicators such as expenditures, revenue, deficits, and debt. This has been documented for the US states (see, e.g., Alt and Lowry 1994; Bohn and Inman 1996; Elder 1992; Poterba 1994; Shadbegian 1999; von Hagen 1991), European countries (see, e.g., Ayuso-i-Casals, et al. 2007; Debrun and Kumar 2007; Debrun, et al. 2008; European Commission 2006) and also Swiss cantons (see, e.g., Feld and Kirchgässner 2001; Feld and Kirchgässner 2008; Krogstrup and Wälti 2008; Schaltegger 2002). However, for generating an immediate increase of trust among investors in a more sustainable fiscal policy, rules have to be regarded as strong and credible by the market participants. For instance, rather weak fiscal rules such as the Stability and Growth Pact in the EU, can hardly be expected to restore trust among the investors and to dampen risk premia (see Afonso and Strauch 2007). Possibly for this reason, the empirical findings on a strong role of fiscal rules regarding the risk assessment of sovereign bonds are generally still scarce.<sup>7</sup>

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<sup>6</sup> In his unpublished paper, Fasten (2006) studies the hypothesised adverse effect on Swiss municipalities. Based on time series evidence he does not find an immediate reaction of the markets to the court decision.

<sup>7</sup> Apart from the studies investigating the effect of fiscal rules on bond spreads, there is another strand of literature which focuses on the relationship between fiscal institutions and yield differentials. For example, Hallerberg and Wolff (2008) show that better fiscal institutions like the institutional strength of the finance minister are associated with lower risk premia.



Conclusive evidence concerning the impact of fiscal rules on the financial markets' risk assessment is mainly based on studies for the US states. Poterba and Rueben (1999) are one of the first who investigate the effect of state fiscal rules on the yields of state general obligation bonds. Using an indicator reflecting the strength of fiscal rules in the states, the authors show that states with tighter deficit rules, and more restrictive provisions on the authority of state legislatures to issue debt, actually paid lower interest rates on their bonds. More specifically, their results suggest that the interest rate differential between states with a very strict anti-deficit constitution and one with a less strict anti-deficit constitution lies between 15 to 20 basis points. In the case of expenditure and revenue rules the authors come to similar conclusions; the quantitative effects on the bond spreads are, however, somewhat lower. In a related study Poterba and Rueben (2001) also analyse the reaction of risk premia on unexpected deficit shocks. They find that tighter anti-deficit rules almost completely offset the effect of unexpected deficits on the yields of state governments bonds. Lowry and Alt (2001) show that investors are more forgiving of one-time deficits in states with strict fiscal rules (i.e., the bond yields increase significantly less after a deficit), but respond more sharply to consecutive deficits.

However, contrary to the studies on the determinants of yield differentials (see previous subsection), all of these studies do not utilise financial market data but they base their findings on data from the "Chubb Relative Value Study". These are surveys conducted by an insurance company in which 25 traders were asked to evaluate "hypothetical" general obligation bonds of the US states. This kind of survey-based data has obvious drawbacks as compared to market data: Johnson and Kriz (2005, p. 86) argue that "its surveyed New Jersey-based yield spreads fall far short of yields on actual market transactions" and "are at best indirectly related to the interest costs faced by municipal borrowers in the primary market". Compared to the survey-based studies, Johnson and Kriz (2005) is the only paper studying the effects of US state fiscal rules using actual financial market data. Their estimated effects are quantitatively much smaller: spending limits reduce interest costs by modest 2.4 basis points while debt limits decrease by 3.3 basis points respectively.

The only related study in the European context is conducted by Iara and Wolff (2010). They analyse the relationship between numerical fiscal rules and government bond spreads for a panel of Euro area countries. Using the fiscal rule index provided by the European Commission (2006) they only find a very weak effect of fiscal rules on bond spreads. In

particular, they are not able to identify a direct effect of fiscal rules on government bond spreads. The effect is only significant and sizeable in periods of extremely high risk aversion and, thus, possibly driven by particular developments during the financial crisis. Similarly, a report by the International Monetary Fund (2009) does not find that the presence of fiscal rules affects the spreads of 22 OECD countries. Taken together, these findings suggest that the existing national fiscal rules of European and OECD countries are too weak or not credible enough to generate a strong effect on the investors' trust.

This is one of the main distinguishing features of our study. As will be demonstrated in the following section, over the past decades most Swiss cantons have implemented different forms of fiscal rules, and many of these can be characterized as very strict and highly credible. Therefore, we hypothesize a substantial negative effect of both the existence as well as the strength of cantonal fiscal rules on the respective bond yields. Moreover, market penalisation of increasing deficits or debt should be smaller the stronger the cantonal fiscal constraints are.

### **3. Sub-national fiscal rules in Switzerland**

#### **3.1 Institutional setting**

Contrary to other OECD countries, the Swiss federal system is denoted by two particular characteristics: (1) Huge participation possibilities for the population, i.e. strong direct democratic elements both at the national and the sub-national level, and (2) a special kind of fiscal federalism leading to relatively strong autonomy of the different cantons. As a result, fiscal institutions and thereby also fiscal rules differ substantially between the 26 cantons (Kirchgässner 2005). According to an agreement of the cantonal ministers of finance from 1981, the principle of a balanced budget has to be observed (Konferenz der Kantonalen Finanzdirektoren 1981). As a consequence, most of the cantons have implemented fiscal rules since then; however, the introduction of these rules happened at different points of time. Moreover, the specific configuration is up to the cantons. As a result, there are remarkable differences in the stringency of fiscal rules – both over time and between the several cantons.

While some cantons only refer to a mid-term balanced budget (“over the budget cycle”), other cantons trust on annual numerical standards, which have to be observed by the cantonal

managers. The main difference, however, refers to the implemented mechanisms for a connection of budget planning and budget execution. This comes along with particular sanction mechanisms. The most important sanctions thereby are automatic tax adjustments (e.g. in Basle country, Fribourg, Neuchâtel, Nidwalden, Schwyz, Vaud and Zurich) and specified expenditure cuts (Aargau, Basle city). That is, if the deficit exceeds a certain threshold, there is an automatic adjustment of particular cantonal tax rates, imposing a severe sanction for acting politicians. As can be imagined, sanctions like these are highly effective (Schaltegger and Frey 2004). This stands in sharp contrast to the sanction mechanisms of national fiscal rules (see, e.g., European Commission 2006). These rules typically do not comprise explicit sanctions comparable to the cantonal configurations (or the sanctions are not very credible, such as in the case of the Stability and Growth Pact of the EMU). Thus, in the end the arrangements mostly only rely on implicit sanctions, such as reputation costs of the politicians.

Additionally, several cantons have defined exception standards which allow the canton to deviate from the specified arrangements. These exceptions take account of narrowly defined events like economic slumps or environmental disasters. Such exceptions tend to weaken the stringency of the rules, since they allow loopholes. Again, the cantons differ both with respect to implemented exemptions per se but also concerning the strength of the exception standards. While some cantons do not have any exceptions in place<sup>8</sup>, cantons like Fribourg or Valais set strict precepts for a deviation from the original budget plan (i.e. extraordinary cyclical strain must be given and an absolute majority of the parliament has to approve the new proposal). On the contrary, Geneva or Lucerne (“worse cyclical situation”) undermine their overall guidelines by implementing weak exception standards. These narrowly defined exception standards furthermore ensure strong compliance of budget planning with actual budget execution and a high credibility of the rules.

To sum up, cantonal fiscal rules in Switzerland as they have developed in the past 30 years can be regarded as much stronger as compared to existing national or sub-national fiscal rules in other countries. Especially the strong link between budget planning and budget execution, and the ex-ante defined sanction mechanisms (foremost automatic tax adjustments) in line with the overall fiscal framework in Switzerland, i.e., the strong implementation of direct

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<sup>8</sup> Appenzell Inner Rhodes, Appenzell Outer Rhodes, Basle country, Glarus, Grisons, St Gall, Schaffhausen, Ticino and Uri

democracy (e.g. the implementation of fiscal referenda on the expenditure side) impel this result. Moreover, these rules were introduced at different points of time; this significant time variation in the existence of cantonal fiscal rules will be shown in the following.

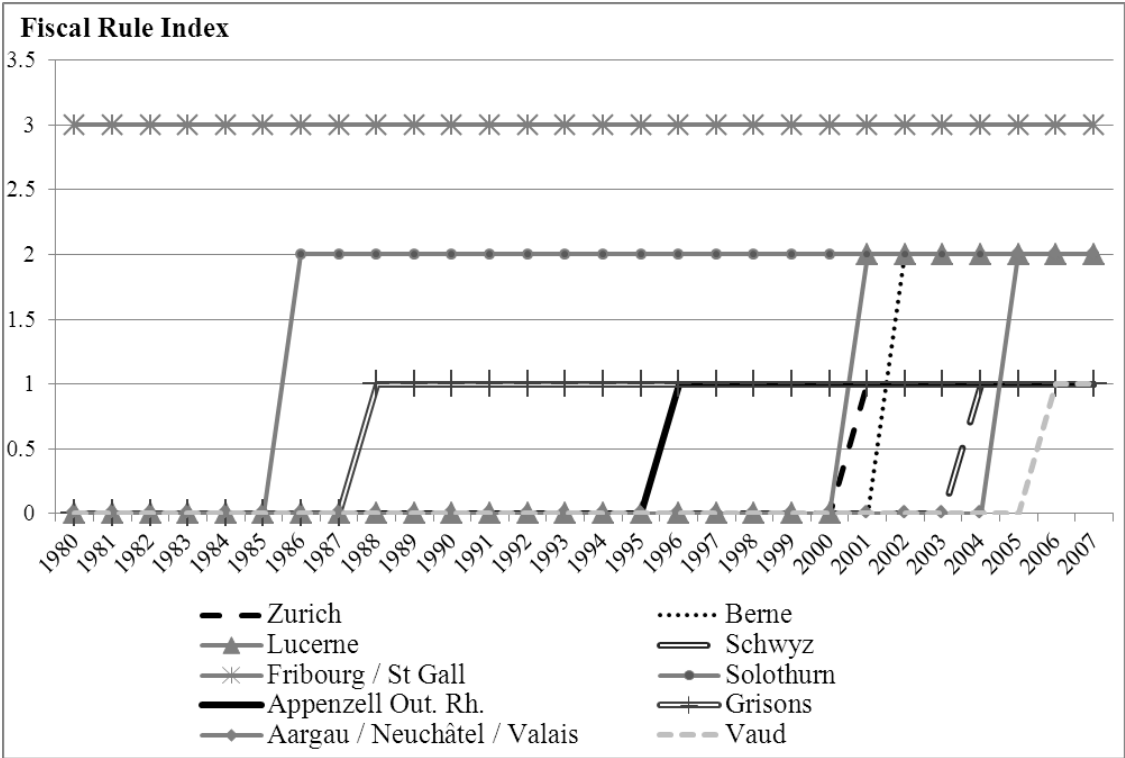
### **3.2 Fiscal rules index**

Based on the peculiarities of the fiscal rules described above, it is now possible to group the cantons according to the strength of their implemented fiscal rules and to describe their developments over time. Following Feld and Kirchgässner (2008), we make use of the stated three main components of strong cantonal fiscal rules in order to develop a compound fiscal rules indicator. First, there should be a strong connection of budget planning with actual budget execution; second, the cantonal rule should be characterised by strong numerical constraints and third, highly effective sanctions in the form of automatic tax adjustments have to be implemented. With respect to the 18 cantons used in the estimation, there are two cantons (Fribourg and St Gall) which are characterised by the most stringent fiscal rules in place. Both cantons fulfil all prerequisites stated above. The second group consists of Aargau, Berne, Lucerne, Neuchâtel, Solothurn and Valais. In each of these cantons at least one of the main items is missing. The third group comprises the cantons Appenzell Outer Rhodes, Grisons, Schwyz, Vaud and Zurich. Finally, the last category covers all cantons without (binding and legally defined) fiscal constraints (Basel-Country, Basel-Town, Geneva, Thurgau and Ticino).

We can now construct the fiscal rules indicator by making use of the before elaborated classification of cantons into four groups. In the following, we use an ordinal scale reaching from 3 (all three requirements fulfilled) up to zero (no requirement fulfilled; i.e. all cantons with no fiscal rules in place). The development of our fiscal rule indicator is depicted in Figure 1. The figure reveals that the fiscal rules in Fribourg and St Gall are highly persistent over time while most other cantons changed their institutional framework within the last twenty years. Most cantons thereby strengthened their fiscal framework in the early 2000s; Solothurn, Grisons and also Appenzell Outer Rhodes already strengthened their rules in the mid-1980s and the mid-1990s, respectively. To sum up, the institutional characteristics – high stringency of the rules and variation between and within cantons – within the same constitutional environment make the Swiss cantons very suitable for studying the impact of fiscal rules on financial markets.

In our empirical part, we follow two different approaches to appraise the effects of the cantonal fiscal rules. First, we employ the fiscal rules indicator based on the peculiarities described above, which has an ordinal scale reaching from 3 (strongest fiscal rules) up to zero (no fiscal rules in place). Second, we follow the strategy of Krogstrup and Wälti (2008) and create a dummy variable which is coded one if the fiscal rule index in a particular year is greater than zero (zero otherwise).

**Figure 1: 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.

**4. Empirical Analysis**

**4.1. Model specification and estimation method**

In order to investigate the determinants of the cantons’ yield spreads we make use of the following estimation specification which is largely motivated by the literature on European bond spreads presented in subsection 2.1 (see, e.g., Schuknecht, et al. 2009):

$$\begin{aligned}
& \text{Yieldspread}_{i,j,t} \\
(1) \quad & = \beta_0 + \beta_1 \text{FR}_{j,t} + \beta_2 \text{Debt}_{j,t} + \beta_3 \text{Deficit}_{j,t} + \beta_4 \text{Interactions}_{j,t} + \beta_5 \text{Liquidity}_{i,j,t} \\
& + \beta_6 \text{RiskAversion}_t + \beta_7 \text{Duration}_{i,j,t} + \beta_8 \text{NoBailOut}_t + \beta_9 \text{Timetrend}_t + \gamma_j + \varepsilon_{i,j,t}
\end{aligned}$$

As dependent variable we use the yield spreads of the cantonal bonds compared to Swiss federal bonds. The latter are chosen as reference values, since federal bonds account for country-specific influences on sovereign yields, such as monetary policy, exchange rate developments or country-wide political developments. Subtracting this common component of the cantonal bonds – expressed as the yield of federal bonds with a duration of 10 years – allows us to isolate the canton-specific effects. Therefore, the cantonal yield spreads are obtained from the difference of the yield of bond  $i$  of a particular canton  $j$  at time  $t$  to the average yield of the federal bonds. The time indicator  $t$  is included on a monthly basis to the estimation equation. To account for diverging maturities of the bonds, we restrict our sample to cantonal bonds with a time to maturity of 8 to 12 years and, furthermore, control for the time to maturity in our regressions.

The incorporation of the control variables in equation (1) largely follows the standard approaches in the literature on sovereign bonds (see section 2). Firstly, we include the *debt* as well as the *deficit* of the cantons in order to control for the effect of the cantons' actual fiscal position and to account for the default risk which is reflected by the fiscal variables. Both variables are defined as a share of GDP.<sup>9</sup> In addition, we include the aggregated *municipal deficit* in the respective canton in order to account for spillover effects from the fiscal situation of the municipalities.<sup>10</sup> Moreover, the *liquidity* of the bonds is accounted for by including the issue volume of the respective bonds. If the market size for a certain security is rather small, investors request a higher liquidity premium. We therefore expect the liquidity premium to be negatively related to the yield spreads. As a further explanatory variable we also include a measure for the general *risk aversion* in international bond markets. This variable is derived from the spread of low-grade US corporate bonds (grade “BBA”) to risk-free US federal bonds. It is expected that the higher this spread is, the greater is the general risk aversion in international bond markets, i.e., the higher is the investors' request for a

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<sup>9</sup> Since information about cantonal GDP growth is not available, we use the federal growth rate in order to adjust the fiscal variables.

<sup>10</sup> Data about municipal debt is not available; therefore we cannot include this variable.

sufficient compensation of default risks. Finally, we include the *duration* of a particular bond to equation (1) assuming that yield spreads should be higher with an increasing maturity.

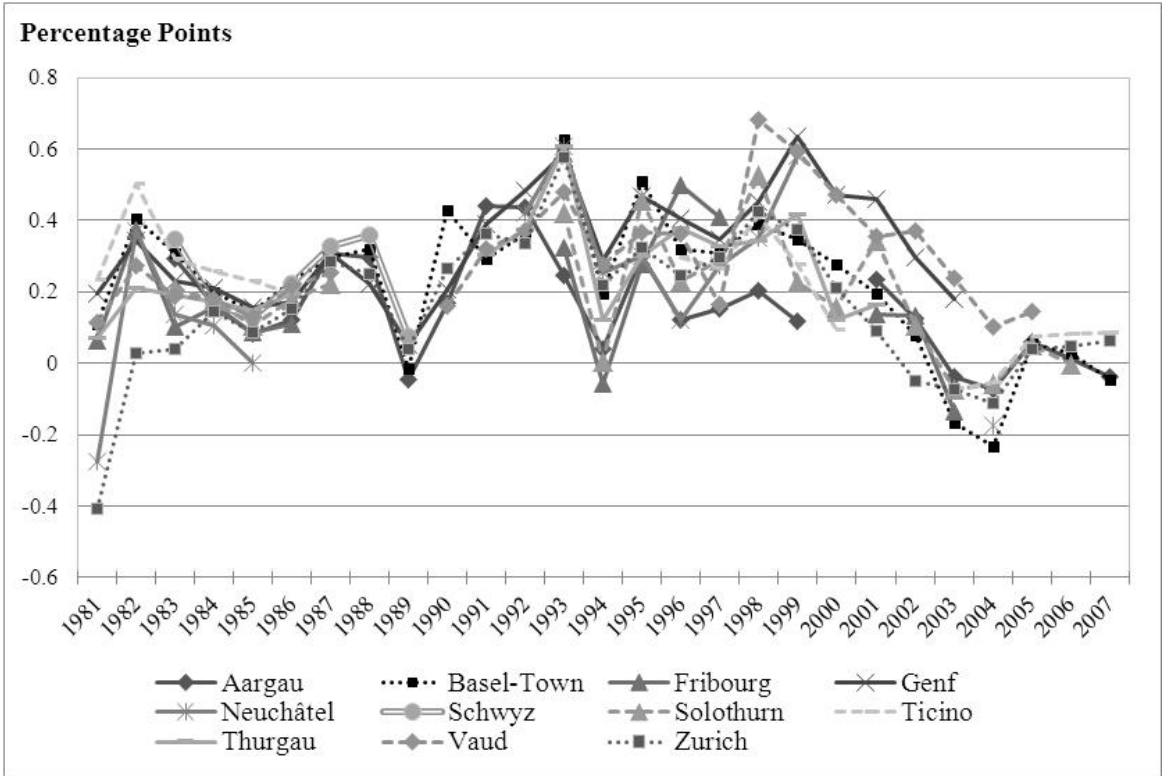
Our main variables of interest are the measures of fiscal rules (*FR*), its *Interactions* with the fiscal variables and the dummy variable *NoBailOut*. We study both the effects of the existence of fiscal rules – represented by a dummy variable which is coded one if a fiscal rule exists in a canton at a given point of time – and the strength of fiscal rules (fiscal rule index, see section 3) on the bond spreads. In order to test the hypothesis whether market penalisation of increasing deficits or debt is smaller the stronger the cantonal fiscal constraints are, we further interact the fiscal variables (deficit and debt) with the dummy variable for the existence of fiscal rules as well as with the fiscal rule index. In addition, the dummy variable *NoBailOut* is included to equation (1) to test the hypothesis whether the cantonal risk premia decreased in the aftermath of July 3, 2003, the day of the Supreme court decision excluding the bailout of Swiss municipalities by the cantons. Finally, the *NoBailOut* variable is further interacted with the deficit level of the cantons' municipalities in order to test whether the spillover effect from municipal indebtedness changed after the Leukerbad court decision.

We estimate an unbalanced panel, since there are cantons which are tabbed with several bonds  $i$  at time  $t$ ; on the other hand, there are also periods for particular cantons without any bonds issued. To cope with the problem of canton-specific unobserved effects, we include cantonal dummies ( $\gamma_j$ ) to control for cantonal effects which are time-invariant, such as language or culture. In our robustness checks, we will furthermore account for possibly time-varying influences. These can be captured by an indicator about voters' preferences for the size of the public sector in the Swiss cantons which is provided by Funk and Gathmann (2010). In addition, a time trend variable is included to control for general changes of risk evaluation over time. Since our data structure would result in biased standard errors based on autocorrelation of the error term between bonds issued in the same canton, the error terms are clustered on cantonal-year levels and corrected for heteroscedasticity.

**4.2. Data and descriptive statistics**

Our empirical analysis is based on data for the period of 1981 to 2007 and covers 18 out of the 26 Swiss cantons.<sup>11</sup> These are the cantons which issued traded bonds in the period mentioned above. Taken together, the overall sample consists of 288 cantonal bonds. The average yield spreads (on a yearly basis) of the largest emitting cantons compared to the federal level are presented in Figure 2.<sup>12</sup> As can be seen from the figure the yield spreads are – with few exceptions – positive, whereas maximum premiums reached up to 60 basis points to the end of the 1990s. At the beginning of the last decade, however, the cantonal yield spreads started to decrease until 2003. This decrease exactly coincides with both the introduction of several cantonal rules but also with the Leukerbad court decision on July 3, 2003. Especially the latter event seems to change the financial markets perceptions about the relative risk structure concerning cantonal vs. federal bonds, thus leading to a period of risk moderation of cantonal bonds.

**Figure 2: Cantonal yield spreads compared to Swiss federal bonds**



Datastream (own calculations)

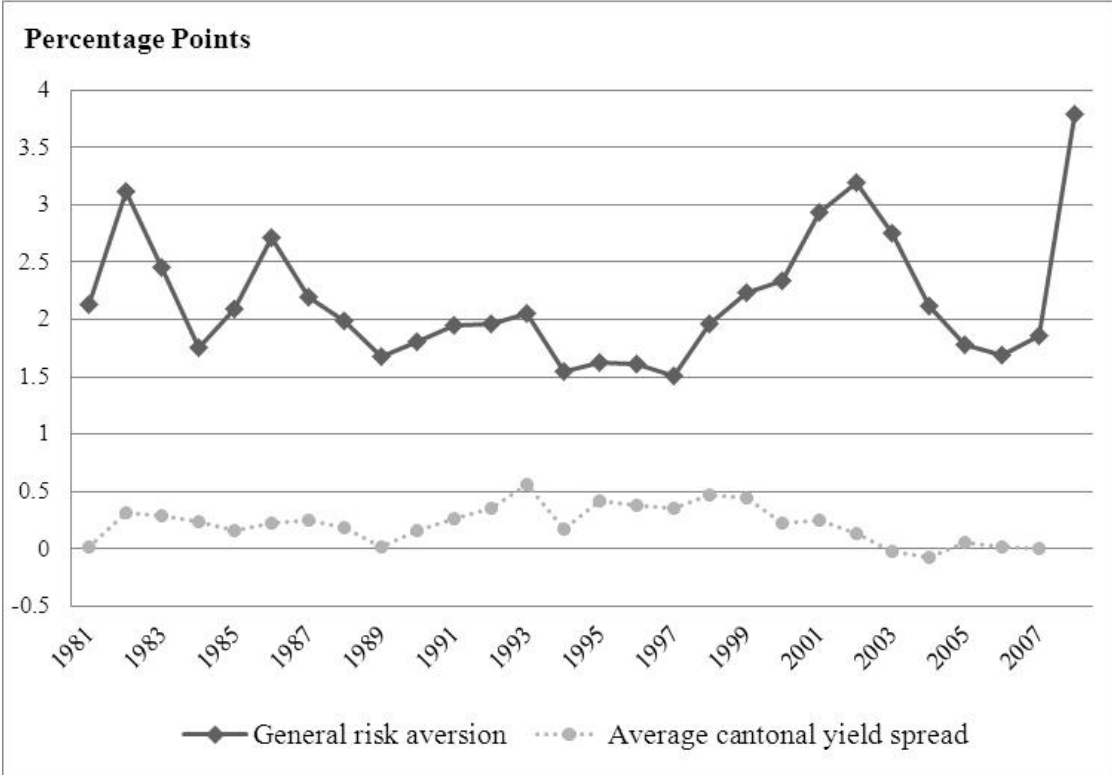
<sup>11</sup> These are Aargau, Appenzell Outer Rhodes, Basel-Country, Basel-Town, Berne, Fribourg, Geneva, Grisons, Lucerne, Neuchâtel, Schwyz, Solothurn, St Gall, Ticino, Thurgau, Vaud, Valais, and Zurich.

<sup>12</sup> Since several cantons have issued bonds only within specific periods, showing the full set of all average yield spreads is not much demonstrative with respect to a description of a general trend.



Figure 3 presents the indicator on the risk aversion in international bond markets. The indicator is constructed by comparing average US corporate bond yields with a Moody’s “BAA” rating with average yields of ten year US Treasury bonds. Higher spreads thereby indicate a higher general risk aversion. This is the standard approach employed by studies investigating risk premiums in international bonds markets. The comparison of Figure 2 and Figure 3 shows that cantonal yield spreads in Switzerland basically changed in line with international risk aversion. To facilitate the comparison, Figure 3 also contains a simple time series on the development of the annual average cantonal yield spreads of those cantons shown in Figure 2. In particular, the development of the average cantonal bonds spreads for the period from 1981 until the mid-1990s is in line with the development of the general risk aversion. Subsequently, however, cantonal bond spreads seem to decouple from international trends. While general risk aversion of financial markets started to increase strongly from 1997 on, and further intensified after 2001, yield spreads at the cantonal level did not follow this development. A summary of the descriptive statistics of all variables used in the analysis is provided in Table 1.

**Figure 3: Development of general risk aversion**



Datastream (own calculations)

**Table 1: Descriptive statistics**

<b>Variable</b>	<b>Unit</b>	<b>Frequency</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Yield Spread	Percentage points (reference: Swiss federal bonds)	Month	7,919	0.232	0.267	-2.292	1.690
Debt Canton	Share in GDP	Year	697	0.123	0.106	0.023	0.813
Deficit Canton	Share in GDP	Year	698	0.001	0.009	-0.051	0.054
Deficit Municipalities	Share in GDP	Year	698	0.000	0.004	-0.015	0.018
Liquidity	Issue volume (bond denomination: 1,000,000 units)	Month	7,919	0.124	0.103	0.018	0.750
Risk Aversion	Percentage points (yield US corporate minus yield US Treasury bonds)	Month	324	2.111	0.534	1.290	3.820
Duration	Years	Month	7,919	9.453	0.989	8	12
Dummy Fiscal Rule	Dummy variable	Year	513	0.292	0.455	0	1
Fiscal-Rule-Index	Ordinale scale (3: strongest fiscal rules; 0: no fiscal rule)	Year	513	0.589	1.023	0	3
No-bailout	Dummy Variable	Month	324	0.167	0.270	0	1
Fiscal Preferences	Index	Year	324	0.749	7.506	-19.156	35.889
Mandatory Referendum	Dummy variable	Year	475	0.587	0.493	0	1
Spending Threshold	Swiss Francs	Year	475	3,818,275	6,838,388	0	25,000,000
Signature Requirement	Number of signatures	Year	475	4,934	3,410	1	15,000

### 4.3. Results

The results of the empirical analysis are shown in Table 2. Column (1) presents the results for the baseline specification where only the standard control variables are used. It can be seen that the signs of almost all coefficients in column (1) are in line with the results of previous studies for the US or Europe (see also section 2). The coefficient of the cantonal debt is positive and highly significant in all specifications; this is also true for the coefficients of the deficit variables – on the cantonal as well as the municipal level. Our results suggest that an increase of the cantonal debt by 1% of its GDP induces the yield spread to rise by approximately 0.9 basis points. The effect on the municipal level even turns almost at the same level; however, this does not imply that municipals' fiscal situation is equally important for investors regarding the evaluation of default risks of cantonal bonds as the cantonal fiscal situation, since the latter is reflected in the conjoint effect of cantonal debt and deficit. Furthermore, the coefficients of the variables for the market liquidity and the international risk aversion show the expected signs and are mostly statistically significant. An increase of the yield spread between low grade US corporate bonds (“BAA”) and benchmark US government bonds by one percentage point leads to an increase in the cantonal bond spreads by approximately 8 basis points. Finally, the duration of the bonds does not have a sizeable effect on the spreads which seems reasonable given that our sample is restricted to a very narrow margin of durations around 10 years in which the yield curve is usually very flat.

Turning now to the central fiscal rules variables, Table 2 shows that both the existence and the strength of numerical fiscal rules add significantly to the explanatory power of the model. A first conclusion clearly is that numerical fiscal rules matter regarding the confidence of market participants. In particular, our results indicate that the pure existence of a numerical fiscal rule in a Swiss canton is accompanied by a yield spread which is on average 17 basis points lower than in cantons without fiscal rules. Moreover, the stricter the existing rule in one canton, the lower is the yield spread: the results in column (3) suggest that cantons with stricter fiscal rules are associated with yields spreads than cantons without fiscal rules.

**Table 2: Cantonal fiscal institutions and bond yield spreads: baseline regressions**

<b>Dep. Var.:</b>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Yield Spread</b>									
Debt Canton	0.866*** (3.891)	0.729*** (3.363)	0.793*** (3.657)	0.760*** (3.426)	0.798*** (3.607)	0.706*** (3.217)	0.798*** (3.645)	0.449** (2.179)	0.410** (2.003)
Deficit Canton	6.128*** (5.598)	5.527*** (4.955)	5.598*** (5.047)	5.515*** (4.950)	5.596*** (5.041)	5.761*** (5.072)	5.542*** (4.863)	4.929*** (4.705)	4.944*** (4.737)
Deficit Municipalities	5.728** (2.155)	5.286** (2.104)	5.296** (2.075)	5.379** (2.135)	5.308** (2.079)	5.361** (2.142)	5.274** (2.069)	4.970** (2.074)	5.660** (2.295)
Liquidity	-0.303** (-2.040)	-0.194 (-1.491)	-0.252* (-1.876)	-0.186 (-1.439)	-0.250* (-1.867)	-0.173 (-1.337)	-0.256* (-1.913)	-0.010 (-0.0793)	0.041 (0.313)
Risk Aversion	0.083*** (4.897)	0.089*** (5.086)	0.089*** (5.122)	0.091*** (5.147)	0.089*** (5.127)	0.089*** (5.106)	0.089*** (5.123)	0.084*** (4.746)	0.085*** (4.796)
Duration	-0.008 (-1.091)	-0.007 (-0.993)	-0.007 (-1.018)	-0.007 (-1.019)	-0.007 (-1.020)	-0.007 (-0.967)	-0.007 (-1.029)	-0.003 (-0.387)	-0.003 (-0.421)
Dummy Fiscal Rule		-0.170*** (-3.997)		-0.0505 (-0.508)		-0.176*** (-4.219)			
Fiscal-Rule-Index			-0.101*** (-3.936)		-0.091 (-1.646)		-0.010*** (-3.804)	-0.052** (-2.030)	-0.053** (-2.130)
Dummy Fiscal Rule * Debt Canton				-1.033 (-1.256)					
Fiscal-Rule-Index * Debt Canton					-0.082 (-0.198)				
Dummy Fiscal Rule * Deficit Canton						-3.034 (-0.832)			
Fiscal-Rule-Index * Deficit Canton							0.474 (0.241)		
No-bailout								-0.255*** (-6.807)	-0.277*** (-7.008)
No-bailout * Deficit Municipalities									-15.85* (-1.739)
Time Trend	0.002 (1.090)	0.004* (1.874)	0.004* (1.943)	0.004* (1.774)	0.004* (1.915)	0.004* (1.794)	0.004** (1.976)	0.006*** (3.339)	0.006*** (3.136)
Number of Observations	7,919	7,919	7,919	7,919	7,919	7,919	7,919	7,919	7,919
R <sup>2</sup>	0.133	0.145	0.144	0.146	0.144	0.146	0.144	0.170	0.172

Note: All specifications include canton-specific fixed effects (canton dummies). Robust t-values in parentheses. \*\*\* (\*\*) (\*) denotes significance at the 1-, (5-), (10-)%-level. Clustered error terms on canton-level per year.

In columns (4) to (7) we additionally test the effect of the interactions of the fiscal rule variables with the fiscal variables, i.e. debt and deficit. As can be seen from the table, the interactions with the fiscal rules dummy are negative indicating that increases in the deficit or debt levels of cantons with numerical fiscal rules induce cantonal yield spreads to increase not as strong as for cantons without fiscal rules. However, the coefficients of these interactions miss statistical significance.

In column (8) we test for the effect of the risk transfer on the cantonal yield spreads after the Leukerbad court decision (“no-bailout regime”) in July 2003. The coefficient indicating the no-bailout regime after the court decision shows a statistically significant negative effect: after the decision the spread between the yields of cantonal and federal bonds was on average up to 25 basis points lower as compared to the time before the decision. This result confirms the hypothesis that prior to the court decision the cantons had to pay higher risk premia due to their (potential) liability for the municipalities located in their cantons. The interaction of the “*No-Bailout*” dummy with the deficit of the municipalities further shows that – after the court decision – cantonal yield spreads decreased as a direct response to increases in municipal deficit levels. This reflects the severing of the link between cantonal yield spreads and the budgetary situation of the respective municipalities after the court decision. The consideration of the no-bailout regime after the court decision also has a non-negligible effect on the quantitative impact of the fiscal rules index: the coefficient drops from about -0.10 to -0.05, but stays statistically highly significant. This implies that the introduction of a reasonable strong fiscal rule (index change from 0 to 2) reduces the bond spread by about 10 basis points, which is still a strong impact, but apparently falls short of the effect of the no-bailout regime.

#### **4.4. Further discussion**

In the following robustness checks, we first address concerns which may arise due to potential endogeneity of fiscal rules. In any analysis of fiscal institutions, an omitted variable bias cannot fully be excluded, since fiscal institutions are not fully exogenous and also depend on the preferences of the voters or legislatures. However, in the Swiss context, this problem seems to be of minor importance. As compared to cross-country studies, preferences within a country can be assumed to be more homogenous than between countries. Since we add cantonal dummies in our regression model, we further explicitly control for time-invariant influences (such as cultural factors or long-term preferences of the citizens in the cantons).

Due to the relevance of direct democracy in Switzerland, the introduction of cantonal fiscal rules has to be adopted by the canton's electorate in form of a referendum. Therefore, we account for possibly time-varying preferences of the citizens by making use of the fiscal preferences measure provided by Funk and Gathmann (2010). This indicator measures the preferences for government spending of each canton's inhabitant.<sup>13</sup> Column (1) of Table 3 shows the results of the re-estimation using the fiscal rules index. The fiscal preferences indicator has no significant effect on bond spreads, whereas the coefficients for our fiscal rules variable as well as the no-bailout variable remain negative and highly statistically significant. This suggests that taking into account time-varying voter preferences does not substantially affect the impact of our main variables on the cantonal yield spreads. Moreover, both coefficients change only by a relatively small amount of less than one basis point. We therefore find no evidence that changes of the voters's preferences interfere the qualitative or quantitative impact of fiscal rules or of a reliable no-bailout regime on bond spreads.

Since direct voter participation is quite strong in Switzerland and also increases fiscal austerity (Funk and Gathmann 2011), a link between direct democracy and market confidence seems to be reasonable. Therefore, we include variables reflecting differences in levels of direct democracy in the cantons to the estimation specification. We add three variables which have become standard in the analysis of direct democracy in Switzerland (see, e.g., Feld and Matsusaka 2003): (1) A dummy variable which indicates whether there are *mandatory referendums* – in which a majority of all voters have to approve a proposal – on spending projects in the canton, (2) a variable indicating the *spending threshold*, i.e., the lower limit of project costs which enforces a mandatory referendum, and (3) a variable representing the *signature requirement*, i.e., the number of signatures required for an initiative process, which allows citizens to propose entirely new laws which will then be subject to a referendum. A positive value of (1) represents stronger participation rights of the citizens, whereas positive values of (2) and (3) have the opposing meaning since they hamper the participation of the citizens in political decisions in their canton.

The results are shown in columns (2) and (3) of Table 3 – with and without the fiscal preferences indicator, respectively. It can be seen that none of the proxy variables for the

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<sup>13</sup> This indicator is based on voting data of 331 federal ballot propositions. It measures the preferences for government spending of each canton's inhabitants, and it is demonstrated to have a sizable effect on government spending even conditional on observable characteristics.

strength of direct democracy at the cantonal level has a significant effect on the risk premia. Moreover, the table reveals that the coefficients of the fiscal rules indicator as well as the no-bailout regime are not affected considerably. The coefficients still remain negative and statistically highly significant. Therefore, taking into account direct democratic elements of the cantons also does not change our main results, namely, that governments with (stricter) fiscal rules enjoy higher confidence among the market participants which is represented by lower yield spreads.<sup>14</sup>

Finally, we show that the negative effect of the no-bailout dummy can actually be ascribed to a changed risk assessment of the cantonal level, and is not caused by contemporaneous developments at the federal level. In columns (4) and (5) we replace the values of the debt and deficit variables with their spreads relative to the debt and deficit values for the federal level. The effects of our main variables are largely unaffected by this modification, so that we can conclude that the slump of cantonal bond spreads relative to federal bonds after the Leukerbad decision was not due to a deterioration of the federal fiscal situation at that time.

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<sup>14</sup> Note that we conducted further robustness tests where we included nominal values of the fiscal variables. Using nominal instead of GDP adjusted fiscal variables changes the results only marginally. Moreover, the results still hold, if we include lagged instead of real fiscal variables (deficit and debt levels) to the estimation equation (Results are available upon request).

**Table 3: Cantonal fiscal institutions and bond yield spreads: robustness checks**

<b>Dep. Var.:</b>	(1)	(2)	(3)	(4)	(5)
<b>Cantonal Bond Spread</b>					
Debt Canton	0.445** (2.156)	0.496** (2.314)	0.491** (2.281)	0.618*** (2.939)	0.631*** (2.997)
Deficit Canton	4.906*** (4.763)	5.039*** (4.699)	5.004*** (4.750)	1.386 (1.353)	1.049 (0.999)
Deficit Municipalities	5.129** (2.112)	4.978** (2.010)	5.120** (2.039)	-7.102*** (-5.329)	-7.587*** (-5.564)
Liquidity	0.011 (0.0802)	-0.038 (-0.280)	-0.014 (-0.103)	-0.055 (-0.385)	-0.050 (-0.327)
Risk Aversion	0.086*** (4.682)	0.087*** (4.854)	0.089*** (4.774)	0.091*** (5.069)	0.098*** (5.308)
Duration	-0.003 (-0.424)	-0.004 (-0.612)	-0.004 (-0.648)	-0.002 (-0.275)	-0.004 (-0.561)
Fiscal-Rule-Index	-0.056** (-2.133)	-0.066** (-2.005)	-0.069** (-2.080)	-0.065** (-2.418)	-0.073** (-2.207)
No-bailout	-0.255*** (-6.817)	-0.271*** (-7.082)	-0.271*** (-7.112)	-0.202*** (-4.519)	-0.216*** (-4.939)
Fiscal Preferences	-0.001 (-0.634)		-0.001 (-0.607)		-0.000 (-0.248)
Mandatory Referendum		-0.225 (-0.840)	-0.211 (-0.781)		-0.164 (-0.566)
Spending Threshold		1.16e-08 (0.917)	1.11e-08 (0.868)		1.11e-08 (0.801)
Signature Requirement		-1.09e-05 (-0.761)	-1.04e-05 (-0.719)		-9.11e-06 (-0.584)
Time Trend	0.006*** (3.323)	0.006*** (3.017)	0.006*** (3.004)	0.008*** (3.774)	0.008*** (3.319)
Number of Observations	7,919	7,746	7,746	7,919	7,746
R <sup>2</sup>	0.171	0.166	0.166	0.172	0.171

Note: All specifications include canton-specific fixed effects (canton dummies). Robust t-values in parentheses. \*\*\* (\*\*) (\*) denotes significance at the 1-, (5-), (10-)%-level. Clustered error terms on canton-level per year.



## 5. Conclusions

The Swiss experience teaches us some important insights on the potential effects of political measures on sovereign risk premia. First, we show that both the presence and the strength of fiscal rules in Swiss cantons significantly contribute to lower risk premia. These effects are relevant in qualitative and quantitative terms: the introduction of a strong fiscal rule contributes to a decline of risk premia of more than 10 basis points, even under stable market conditions before the beginning of the financial crisis.

This result is also important beyond the Swiss context. The implementation of strong and binding fiscal rules can contribute to significantly lower refinancing costs. The comparison with the much weaker effects found in earlier studies underlines that only rules which are formulated in a strong way can be expected to have a credible effect on the financial markets' assessment. Due to their design, several of the Swiss cantonal rules serve as a benchmark in order to foster a sustainable budget policy. In turn, the capital markets treat the rules as credible and thus respond in a positive manner. In many respects these Swiss cantonal rules have already served as a benchmark model for the creation of the Swiss and the German federal debt brakes. Both rules in turn have set a standard which ambitious national reforms can look to.

Second, we showed that risk premia of cantonal bonds were on average 25 basis points higher before the Swiss Supreme Court decided that the cantons are not liable for the obligations of their municipalities. This suggests that the implicit liabilities in a non-credible no-bailout regime impose severe sanctions on the possible guarantors. Our results provide an indication for the potential costs of sovereign liabilities in general, e.g., in the Euro area. As a matter of fact, there is already some evidence that bonds of hitherto creditworthy European sovereign issuers might become negatively affected as a result of the guarantee commitments made in the context of the European Financial Stability Facility (EFSF). For instance, in October 2011 the rating agency Moody's communicated that due to the "possible need to provide additional support to other European sovereigns", France's "stable outlook of the government's Aaa debt rating" could come highly under pressure (Moody's 2011).

Consequently, the results presented in this paper suggest that both strong and reliable fiscal rules as well as a credible no-bailout regime can actually contribute to restore the financial

market confidence and lead to lower refinancing costs. However, the experience with both kinds of political measures in the Euro area suggests that just “lip services” are not sufficient to reach such targets. In fact strong commitments, such as fiscal rules with enforceable sanction mechanisms, are needed, and in the end will be rewarded by the financial markets.

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