

# SHIFT OF PUBLIC EXPENDITURES THROUGH DEBT BRAKES

## THE SWISS EXPERIENCE

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### **Abstract**

Formal fiscal rules have currently been introduced in several countries. In fact, a recent survey reveals that their number has risen from five in 1990 to almost 80 in 2012. While most studies focus on intra-jurisdictional effects of fiscal rules, vertical impacts on the finances of other levels of governments have yet to be thoroughly explored. Hence, this paper studies the influence of Swiss cantonal debt brakes on municipal finances. In order to investigate that matter, a unique database that encompasses the 141 largest Swiss municipalities and cities between the years 1982 and 2007 is examined in a panel analysis. The estimation results suggest that municipal expenditures and revenues significantly decreased in the aftermath of a cantonal debt brake implementation. This holds in particular, when the rigidity of the debt brake is strong, as well as when local spending on security, education, and health is considered

**Keywords**                      debt brake; shift of expenditures; subnational finances; Swiss municipalities

**JEL Classification**        D78, H60, H77, H74

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## 1. INTRODUCTION

Formal fiscal rules currently exist in several countries. In fact, a recent survey reveals that their number has risen from five in 1990 to almost 80 in 2012 (Budina et al. 2012, Schaechter et al. 2012). At the end of 2012, the heads of state or government of 25 European countries agreed on the Fiscal Compact that obliges the signatories to implement debt brakes at the national level by 2014. Their configuration should basically follow the provisions of the German and Swiss debt brakes. The number of countries constrained by national or supra-national fiscal rules will therefore further increase.

Fiscal rules are commonly justified on basis of the problem of fiscal commons, as basically elaborated by Buchanan and Tullock (1962). Two elements are pivotal to this problem. First, the common pool of public revenues can be accessed by every politician. Second, the political actors face incentives to serve special interest groups to get (re)elected and, thus, use this funding widely. Government activities are subsequently extended and the common pool becomes overused. The costs of additional spending are hardly noticeable to the citizens since they are spread across taxpayers today and – through debt – in the future. However, the beneficiaries observe marked benefits and, thus, increase their demand for (fiscal) privileges. Fiscal sustainability is eventually eroded (Weingast et al. 1981, von Hagen and Harden 1995, Velasco 2000, Schaltegger and Feld 2009). A multitude of recent empirical studies suggest that fiscal rules reduce the problem of fiscal commons and thus imply lower expenditures, deficits and debts, e.g., Debrun et al. 2008, European Commission 2006, Deroose et al. 2006, Debrun and Kumar 2007, Krogstrup and Wälti 2008, Kopits 2004, Corbacho and Schwartz 2007, Guichard et al. 2007 and Feld and Kirchgässner 2008.

Fiscal rules may also, however, create incentives to avoid constraints and regain fiscal leeway. Regarding this objective, literature primarily discusses strategic use of fiscal projections, creative accounting and “windows-dressing” (e.g., Luechinger and Schaltegger 2012, Balduzzi and Grembi 2011, Milesi-Ferretti 2003).<sup>1</sup> Yet, an increase in the financial scope might also be reached through the delegation of public tasks and expenditures to other levels of government. Despite the prevalence of statutory fiscal constraints, little research exists on the topic, at this point. The paper aims at closing this research gap by focusing on the impact of cantonal debt brakes on Swiss municipal finances during the period 1982-2007. Switzerland provides an ideal institutional setting for testing a potential downward-shift of fiscal burdens for four reasons. First, debt brakes have been enshrined into cantonal law at different points of time. While statutory fiscal rules were only in place in two cantons in the early 1980s, they currently exist in most cantons. Second, the cantons are endowed with the right to award mandates and thus fiscal burdens to their municipalities. Third, tax autonomy enables the municipalities to offset additional local expenditures through increased tax revenues. Fiscal

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<sup>1</sup> “Windows dressing” refers mainly to fiscal gimmickry, e.g., shift of deficits to off-budget funds, to hardly visible accounting items or to non-restricted debt instruments.

transfers from the cantonal level are instead optional. Fourth, despite institutional differences between Swiss municipalities, the common political, cultural and constitutional framework implies less heterogeneity across municipalities than across countries. Hence, spurious correlation due to omitted variables seems less likely (Luechinger and Schaltegger 2012).

In fact, municipalities in Switzerland and Germany have been complaining about a rising share of expenditures imposed by upper level governments. A survey (Steiner et al. 2012) conducted among 133 municipal secretaries (Gemeindeschreiber) in the canton of Zurich reveals that most communities experienced both a shift in fiscal burdens from the cantonal to the municipal level and, simultaneously, a reduction of decision-making power during the period 1999-2009 (Table 1). This is remarkable since the canton of Zurich added a debt brake to its constitution in 2001. A similar conclusion can be drawn from a questionnaire answered by almost 1,500 municipalities across Switzerland (Ladner et al. 2012). While debt brakes in the federal states of Germany have yet to come into force (Burret and Feld 2013), the German municipalities already expect a shift of tasks and expenditures due to the introduction of the new fiscal rules (Lenk et al. 2012, German Association of Cities 2011). Such a shift would, *ceteris paribus*, worsen the situation of local finances in Germany. Since little tax autonomy is granted to the German municipalities and borrowing is restricted to investments, additional local spending is likely to be financed by the means of cash advances.<sup>2</sup>

The remainder of the paper is structured as follows: Section 2 presents the local and cantonal framework in Switzerland. Section 3 provides a review of empirical studies and our hypotheses. The data, empirical strategy and estimation results are presented in section 4. Section 5, finally, discusses implications of our main findings and offers concluding remarks.

Table 1 Shift of fiscal burden and decision-making power between the canton of Zurich and its municipalities in selected categories, average values for 1999-2009

| index values*  | Fiscal burden | Decision-making power |
|----------------|---------------|-----------------------|
| Security       | 0.39          | 0.04                  |
| Health         | 0.38          | -0.15                 |
| Social Welfare | 0.36          | -0.09                 |
| Education      | 0.35          | -0.16                 |
| Finances       | 0.27          | -0.17                 |
| Child care     | 0.18          | -0.04                 |
| Environment    | 0.17          | -0.09                 |

Note: \*The index values specify the extent and direction of the shift. A value of -1 indicates a maximal shift from the municipalities towards the canton, whereas a value of +1 indicates a maximal shift from the canton towards the municipalities. The survey was conducted in 2009. Source: Steiner et al. (2012).

<sup>2</sup> Although cash advances should merely be used to cover current outlays, they have become the primarily mean of municipal borrowing in some entities (Burret and Feld 2013, Heinemann et al. 2009).

## 2. INSTITUTIONAL FRAMEWORK IN SWITZERLAND

### 2.1. MUNICIPAL SETTING

Municipalities are the smallest administrative unit with political responsibilities in Switzerland. The number of municipalities has, however, declined since the formation of the Swiss Confederation in 1848. This trend has particularly gained momentum during the last two decades: While more than 3,000 municipalities existed until the mid 1990s, the amount dropped to 2,408 in 2013. The reduction was driven mainly by amalgamations and territorial reforms. Still, most Swiss municipalities tend to be rather sparsely populated: About half the municipalities have less than 1,000 residents and a third less than 500. The six largest cities account for almost 14% of the total population.

Although Swiss municipalities existed even before the Swiss Confederation was constituted, the structure of the local level is subject to cantonal provisions and thus varies across Switzerland. However, all cantonal constitutions provide for a division into municipalities and implicitly or explicitly grant autonomy to them. In fact, Swiss municipalities have a long tradition of autonomy: Although the first Federal Constitution of the Swiss Confederation of 1848 assigned no special status to the municipalities, they have de facto constituted the third level of government and have experienced substantial autonomy since then (Meyer 2011). After all, article 50 as set out in the Swiss Constitution of 1999 mentions municipalities explicitly:

- Art. 50*
1. *The autonomy of the communes shall be guaranteed in accordance with cantonal law.*
  2. *The Confederation shall take account in its activities of the possible consequences for the communes.*
  3. *In doing so, it shall take account of the special position of the cities and urban areas as well as the mountain regions.*

Despite the constitutional recognition of the authority of municipalities, local responsibilities are still to be primarily determined by the cantons. Since a wide range of public services are not solely provided by one level of government, the expenditures for public goods are often shared across all three government levels (Table 2). In order to coordinate the resulting expenditure-sharing, the cantons may award mandates to their municipalities. Thus local spending is, at least partly, determined by the corresponding canton, implying an inter-cantonal variation in the local expenditure autonomy.

Table 2 Share of public expenditures in different categories by level of government, 2010

| in percentage          | Federal | Cantons | Municipalities |
|------------------------|---------|---------|----------------|
| Administration         | 35.9    | 32.2    | 31.9           |
| Security               | 36.1    | 46.2    | 17.7           |
| Education              | 14.2    | 57.5    | 28.3           |
| Culture and recreation | 8.0     | 31.5    | 60.5           |
| Health care            | 3.2     | 83.9    | 12.8           |
| Social welfare         | 41.1    | 38.8    | 20.1           |
| Environment            | 14.9    | 22.2    | 63.0           |
| Economy                | 43.4    | 41.3    | 15.3           |
| Total                  | 33.6    | 42.3    | 24.1           |

Source: Swiss Federal Department of Finance.

Municipalities are not, however, merely an executive arm of the upper levels of government; rather, they experience a certain degree of spending autonomy. Therefore communities are necessarily vested with an executive and legislative body. The latter may take the form of a municipal parliament or – most often – a town meeting.<sup>3</sup> While municipal parliaments are required in most cantons of the Romandy if the population exceeds a certain threshold, they are compulsory in the cantons of Geneva and Neuchâtel. Conversely, no statutory provisions exist in the cantons of the German-speaking parts.

Swiss communities thus have to fulfil tasks arising from local decision-making and provide services mandated by the upper level of government. It is therefore hardly surprising that local annual spending accounts for almost 25% of total expenditures. The costs arising from municipal activities are, however, only partly compensated by financial transfers.<sup>4</sup> In fact, Switzerland shows the lowest share of municipal funding through transfers across the whole of Europe (Council of Europe 1997: 25). The majority of Swiss municipal spending is instead financed through local revenues from taxes, fees and charges. In our dataset a relatively constant share of 84% is financed by own means (Figure 7, appendix). Though the share of own-means spending has remained constant, total municipal per capita revenues and expenditures have been increasing by almost 50% since 1982 (Figure 5). While some taxes can only be levied by certain levels of government (e.g. VAT by the federal government), all three levels are allowed to impose taxes or levy tax surcharges on individual and corporate income. Municipalities can set their tax surcharges relatively autonomously, however, tax bases and rates are usually defined on the cantonal level (Feld et al. 2011). The right to determine own tax surcharges implies varying tax burdens between the communities and, thus, tax competition. The maximal local tax burden in relation to the minimal local tax burden (=100%) is substantial within some cantons. It amounts to more than 140% in Grisons, Solothurn, Vaud, Lucerne and Valais and to 240% in Schwyz (see Angelini and Thöny 2004).

Despite tax and expenditure autonomy, municipalities are also endowed with the right to borrow. While local debt is relatively low across Switzerland (Figure 3), a closer look reveals interesting insights. Swiss communities seem to increasingly rely on short-term debt and current liabilities. This development has become particularly apparent since the early 2000s (Figure 1). The share of short-term liabilities on total debt exceeded 50% in 25 of the 151 largest municipalities and cities in 2010 (Figure 6, appendix). In four communities the entire debt was even funded exclusively on a short-term basis. This development seems remarkable since short-term debt should mainly be used to cover

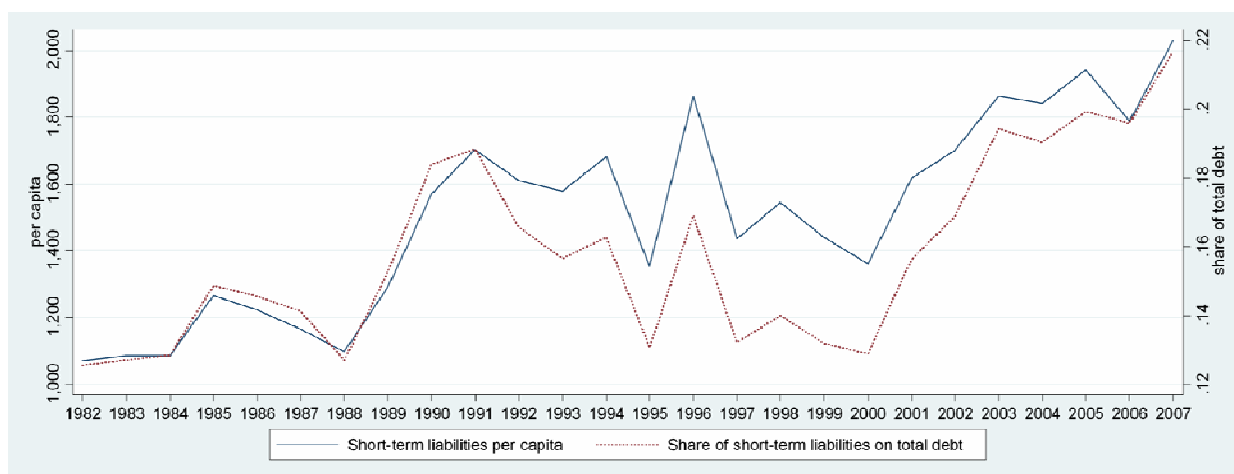
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<sup>3</sup> Town meetings are often criticized due to relatively low participation rates and a minor quality of the decision-making process. For instance, an average of 4.5% of the residents of Zurich participated in the municipal town meetings in 2008 (Kübler and Rochat 2009).

<sup>4</sup> Besides cantonal or federal grants, financial transfers might derive from fiscal equalization schemes. Most cantons provide for a horizontal and vertical financial equalization system regarding their municipalities. While structure and extent of this scheme varies between the cantons, the leveling is in most cantons more extensive than on the federal level (Swiss Federal Tax Administration 2013). A comparison of 22 cantonal equalization systems is provided by Angelini and Thöny (2004).

current outlays. Yet, short-term borrowing was below 5% in six municipalities. In fact, municipalities with a high proportion of short-term liabilities face relatively low debts per capita (Figure 6, appendix). This observation is in line with the findings by Feld et al. (2011), who concludes that the heavy use of short-term debt seems not to threaten financial sustainability of the respective cities.

Figure 1 Short-term liabilities in Swiss municipalities, 1982-2007



Note: Real short term debt and current liabilities. The sample size varies between 125 and 141, see Table 13 in the appendix. Own illustration. Source: Statistical Yearbook of the Swiss Association of Cities, various years.

Municipal finances are subject to various budgetary laws, particularly those provided by cantonal constitutions, cantonal municipal laws, financial equalization laws, cantonal legal texts and municipal codes (Feld et al. 2011). Since Swiss municipalities are neither entirely autonomous nor do they de jure constitute the third level of government, the cantons face – at least a partial – responsibility for local finances. A survey conducted in 2004 reveals that all cantons have provisions in place requiring the municipalities to submit their annual accounting to a cantonal supervisory institution. The local accounting is, however, only subject to cantonal authorization in half of all cantons (Finances Publiques 2004). Some cantonal laws even provide formal fiscal constraints for municipal finances (Feld et al. 2011). Such regulations imply a crucial intervention in local fiscal autonomy. While the degree of cantonal control, supervision, approval and regulation of municipal finances varies widely, most cantonal regulations tend to be rather weak (Finances Publiques 2004, Dafflon 2002, Geschäftsprüfungskommission des Grossen Rates 1999). The flaw of the cantonal supervision became obvious in the case of Leukerbad. In 1998 the municipality of Leukerbad was unable to finance its accumulated CHF 346 million in debt and was placed under forced administration of its canton. Since the cantonal regulations of Valais neither revealed nor prevented the unsustainable debt development in Leukerbad, the creditors accused the canton of Valais of neglecting its duty to supervise the finances of Leukerbad and filed a lawsuit aiming at a bailout. In mid-2003 the Swiss Supreme Court judged in favour of the existence of a no-bailout commitment for the canton by emphasizing the autonomy of municipalities and the obvious deterioration in the finances of Leukerbad. At the same

time the judgment stressed the cantonal duty to supervise local finances. Hence the court decision indicates that municipalities' fiscal autonomy is accompanied by a certain extent of fiscal responsibility.<sup>5</sup>

The limited cantonal liability for local finances, the local tax autonomy and the cantonal ability to award mandates to municipalities may constitute a good starting point for a shift of fiscal burdens from the cantonal to the local level. The municipal response to such a shift might depend on its own fiscal regulations. The municipal codes frequently entail provisions for budget balance and obligatory and facultative referenda, respectively. Although the regulations vary significantly between municipalities, citizens are mostly empowered to decide on new spending projects in fiscal referenda if a certain spending threshold is exceeded. In addition, most municipalities allow for fiscal referendums to be initiated by residents if a specific signature requirement is reached. Direct democracy is, however, not restricted to expenditure projects. A change in tax surcharges or the issuance of bonds may also be subject to referenda in some municipalities.<sup>6</sup>

## **2.2. CANTONAL DEBT BRAKES**

The Swiss cantons enjoy a larger extent of fiscal autonomy than the municipalities. To secure financial transparency and stability the Conference of the Cantonal Ministers of Finance agreed in 1981 on a role model law for cantonal budgeting, requiring a balanced budget in the medium term (article 4). Today all cantons but Appenzell Inner Rhodes have implemented fiscal rules (Conference of the Cantonal Ministers of Finance 2012). However, substantial inter-cantonal differences exist in the timeframe until the proposed regulation was translated into cantonal law, the specific configuration of the fiscal rule and, thus, its stringency: While some cantonal laws place numeric thresholds for annual deficits, the legal provisions of most others require only a balanced budget in the medium term. More importantly, some fiscal rules do not allow for sanctions in the case of an ex-post deviation. They thus refer to budget planning rather than execution (Feld et al. 2013), thereby rendering an ex-ante compliance and ex-post circumvention politically attractive. On the contrary, sanctions in terms of expenditure cuts and tax adjustments, respectively, are in place in the cantons of Aargau, Basle Country, Fribourg, Geneva, Lucerne, Neuchâtel, Nidwalden, Schaffhausen, St. Gall, Vaud and Zurich. While automatic sanctions are likely to increase the effectiveness of fiscal rules (Schaltegger 2002, Schaltegger and Frey 2004), their rigidity might be weakened by means of escape clauses. Wide loopholes, created by loosely defined exceptions, can be observed in the regulations of Geneva and Lucerne. Quite the opposite is true for Aargau, Fribourg, Valais and Zurich, whose escape clauses are narrowly defined. In fact, Appenzell Outer Rhodes, Basle Country, Glarus, Grisons, St. Gall,

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<sup>5</sup> A detailed description of the course of events in the Leukerbad case can be found, e.g., in Blankart and Klaiber (2006) or Fasten (2006).

<sup>6</sup> The impact of fiscal referenda on local finances is subject to various studies. An overview is provided by, e.g., Feld et al. (2011).

Schaffhausen, Schwyz, Thurgau and Ticino do not allow for any exception (Conference of the Cantonal Ministers of Finance 2012).

The large variation in cantonal fiscal regulations is exploited by Feld and Kirchgässner (2008) in order to construct a debt brake index. They classify a fiscal rule as a debt brake if it encompasses at least one of the following three components: (I) a strong link between budget planning and execution, (II) numeric threshold for deficits or (III) sanctions through automatic tax adjustments. If a cantonal fiscal rule meets all three requirements, a debt brake index of "3" is assigned. In the case that no requirement is fulfilled, the fiscal rule is classified by a debt brake index of "0", i.e. not a debt brake. Hence, the cantonal debt brakes can be classified on an ordinary scale between "0" and "3", leading to a division of the cantons into four groups (Feld et al. 2013). In spite of the implementation of fiscal rules in (almost) all cantons, debt brakes, as classified above (i.e., index value of 1, 2 or 3), have only been introduced in 15 cantons so far. Figure 2 depicts the year of introduction and stringency of the cantonal debt brakes between 1980 and 2007. Remarkably, only the two oldest debt brakes implemented in the cantons of St. Gall (1929, revised 1997) and Fribourg (1960, revised 1996) meet all three requirements of a strong fiscal rule and reach, thus, an index value of "3". While debt brakes have also been in place for some time in Solothurn (1986, revised 2005), Grisons (1988) and Appenzell Outer Rhodes (1996), most other cantons did not follow until recently: Jura (2001), Lucerne (2001), Zurich (2001), Berne (2002), Schwyz (2004), Aargau (2005), Neuchâtel (2005), Valais (2005), Obwalden (2006), Vaud (2006), Basle Country (2008), Geneva (2010), Nidwalden (2010), Glarus (2011).<sup>7</sup>

Despite the attempt to restrict cantonal finances, public debt per capita rose by 167% between 1980 and 2004. However, the cantonal debt-to-GDP ratio started decreasing shortly before every second canton had implemented a debt brake in 2004 (Figure 3). A closer look reveals that debt amortization since 2004 is particularly profound in cantons with a statutorily enshrined debt brake (Figure 4). While this observation does not hold for St. Gall and Grisons, their public debt was comparably low throughout the period 1980-2007. The decrease in cantonal debt induces the cantonal debt ratio to converge towards the municipal debt ratio (Figure 3). In 2012 the cantonal debt ratio might even slip below the local debt ratio for the first time since the early 1990s. The driving force of this development might be a shift of fiscal burdens from the cantons to their municipalities.

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<sup>7</sup> The dates in brackets indicate the year the law became effective, not the year of the political decision or referendum.

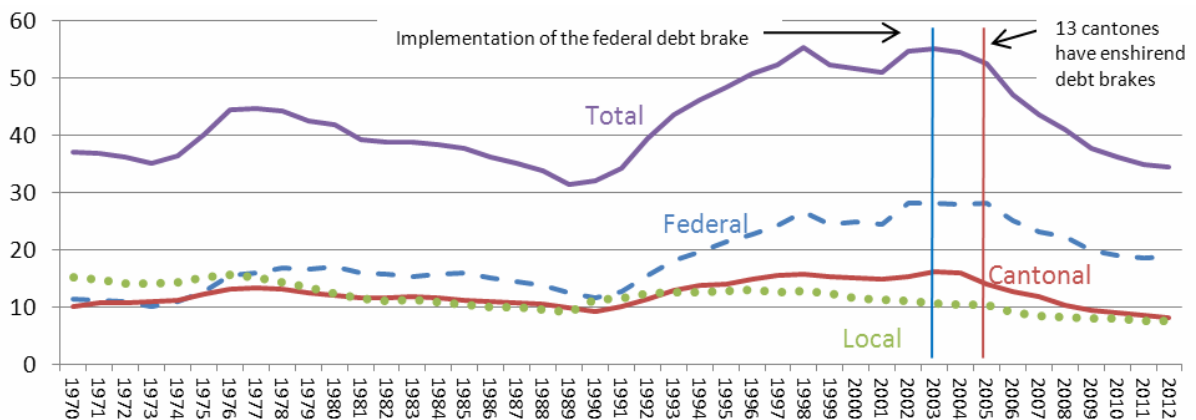


Figure 2 Debt brake index, 1980-2007



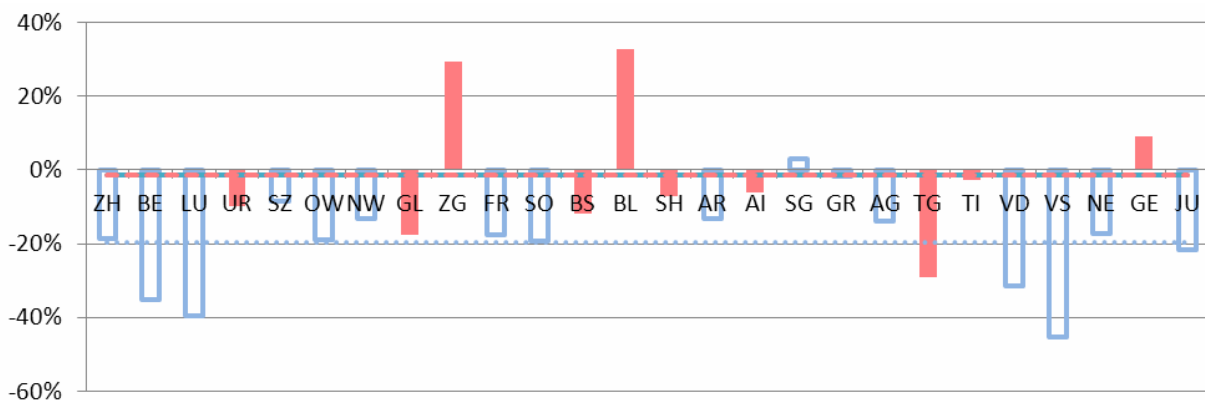
te: Graph based on Feld et al. (2013). Fiscal rules of cantons not depicted have not been eligible to classify as debt brakes in the period 1980-2007, thus, "0" is assigned.

Figure 3 Public debt in % of total GDP, 1970-2012



Note: For the years 1990-2012 municipal time series revised (higher debt). Own illustration. Source: Federal Department of Finance.

Figure 4 Change in debt per capita, all cantons 2004-2007



Note: Blue bars (blank) indicate cantons with a legally enshrined debt brake in place during the period 2004-2007. Red bars (filled) mark the other cantons. The data for Geneva include liabilities due to the cantonal assumption of bad loans of the Banque Cantonale de Genève. The data for Basle Country are corrected for

transitory items. For abbreviations see Table 15 in the appendix. Own illustration. Source: Federal Department of Finance.

### 3. LITERATURE REVIEW AND HYPOTHESES

Empirical studies analysing the impact of cantonal debt brakes have emerged subsequent to a detailed description of these rules by Stauffer (2001). Feld and Kirchgässner (2001a) provide evidence in favour of debt brakes significantly reducing cantonal debt and deficit by analysing a period from 1986 to 1997. Regarding public spending and revenues the estimates are not statistically significant. A similar conclusion is drawn by Schaltegger (2002) focusing on the time span from 1980 to 1998. Feld et al. (2010) analyse the effect of the cantonal debt brakes on the combined revenues of the state and local level. They do not, however, find significance. Employing the same period, Schaltegger and Feld (2009) analyse whether debt brakes reduce the problem of fiscal commons by interacting the cabinet size with a dummy variable for fiscal rules. However, their estimation results are not unambiguous. Feld and Kirchgässner (2008) construct a fiscal rule index, measuring the stringency of the debt brakes and provide evidence that debt brakes significantly reduced cantonal deficits and combined deficits of the cantonal and local level during the period 1980-1998. The debt brake index is applied by subsequent studies. In line with previous literature, Luechinger and Schaltegger (2012) find that fiscal rules significantly reduce the probability of realized and projected cantonal deficits. A recent paper by Feld et al. (2013) enhance this index up to the year 2007, thereby increasing the number of cantons constrained by a debt brake from five in former studies to 14. The study provides evidence that stricter fiscal rules lead to lower yield spreads of cantonal bonds. Hence, the notable majority of empirical studies suggest that debt brakes encourage fiscal discipline on the cantonal level.

Fiscal prudence might imply the need to cut public spending, to revoke election promises or to increase taxes. Since none of these alternatives seem politically feasible, governments face incentives to circumvent fiscal rules and regain fiscal leeway. Regarding this objective, three strategies can be roughly distinguished: (I) the (mis)use of escape clauses and the strategic use of fiscal projections, (II) the concealment of fiscal burden through creative accounting and “window-dressing”, and (III) the shift of fiscal burden to other levels of government. Since the pursuit of the latter two strategies cannot be easily observed or detected, their use may spuriously lead to the finding that fiscal rules lead to fiscal consolidation, although fiscal burdens are simply veiled. While a few studies focus on the use of the first and the second strategy (see Luechinger and Schaltegger (2012) for an overview), papers considering potential spill-over effects of formal fiscal constraints on other levels of government are scarce.<sup>8</sup>

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<sup>8</sup> An early attempt to address vertical effects of fiscal institutions was conducted by Matsusaka (1995). Using panel data of the U.S. states during the period 1960-1990 Matsusaka (1995) concludes that local spending is higher in states with referendums. By using a dataset of Swiss cantons during the period 1980-1998 Feld et al. (2008), too, find evidence that centralization of expenditure is less likely in cantons with direct democracy. A

In the case of Switzerland, a shift of fiscal burden from the cantonal to the local government level seems particularly attractive: First, most cantons are legally constrained by debt brakes (Figure 2). Second, the relatively strong debt brakes of some cantons offer hardly any possibilities for circumvention of strategy (I) or (II). Third, the Swiss constitution enables the cantons to award mandates to their communities (section 2.1). Fourth, due to local tax autonomy the cantons can assume that they do not have to finance a shift of fiscal burdens through increased transfers. Fifth, most municipalities are sparsely populated and thus might lack the political power to object a delegation of tasks without an adequate compensation. The considerations lead to the following two hypotheses:

- (1) *The introduction of a debt brake in a canton leads to increased expenditures, revenues, deficits and debts in the municipalities located within that entity.*
- (2) *The extent of the shift is, at least partly, determined by the rigidity of the cantonal rules.*

However, there are also theoretical arguments suggesting the contrary effects of cantonal debt brakes on municipal finances, i.e. promoting local fiscal stability. Such an impact is likely if the introduction of a debt brake forces the canton to take the responsibility of observing its municipalities' finances, as emphasized in the Leukerbad Supreme Court decision, more seriously. In fact, cantonal support for municipalities in fiscal distress can hardly be financed by means of debt if a cantonal debt brake is in place, but require own revenues instead. To avoid such transfers, the cantonal governments might face incentives to restrict local finances in advance. Debt brakes could also therefore lead to reduced local expenditures, debts and deficits. The empirical goal of this paper is to clarify the manner in which municipal finances are affected by cantonal debt brakes.

To our knowledge this research issue has only been touched upon by Feld and Kirchgässner (2008) and Feld et al. (2010) at this point. However, their primary objectives deviate notably from our purpose: Feld and Kirchgässner (2008) focus particularly on the effectiveness of debt brakes on the cantonal level and Feld et al. (2010) mainly analyse determinants of the size of government. The latter study does not find any significant effect of fiscal rules on the combined revenues of the cantonal and local level. Similarly, Feld and Kirchgässner (2008: 237) conclude that debt brakes have "no relevant impact on the local deficits" since the estimated coefficients of the combined local and cantonal deficit and of the cantonal deficit are almost equal. Yet, these analyses might fall short of the mark: First, both studies focus on combined, rather than local, finances. Second, missing control variables on the municipal level might distort the estimates. Third, the analyses neglect possible effects on local expenditure and debt. Fourth, Feld and Kirchgässner (2008) might have failed to reveal a shift of fiscal

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more recent study by Funk and Gathmann (2011) revisits the findings for Swiss cantons by focusing on the period 1890-2000. Yet, they do not find any significant effect of cantonal direct democratic institutions on lower level expenditures. A related field of research focuses on vertical tax externalities, e.g., Besley and Rosen (1998) and Brühlhart and Jametti (2006).

burden since they focus on deficits only. Municipalities could, however, finance shifted spending through increased revenues. A delegation of tasks would then not necessarily lead to fiscal deficits. Fifth, during the time periods analysed only five cantonal debt brakes are observed, limiting the validity of the results. In sum, a research gap still exists, which the paper aims to close. Therefore we go beyond the aforementioned studies and conduct a more in-depth analysis of local expenditures, revenues, debt and deficits using municipal controls and exploiting a quasi-natural experiment generated by the introduction of debt brakes in 15 cantons at different points of time during the period 1982-2007.

## **4. EMPIRICAL ANALYSIS**

### **4.1. DATA, DESCRIPTIVE STATISTICS AND ECONOMETRIC MODEL**

We employ a panel analysis in order to estimate the reaction of Swiss municipal finances in the aftermath of a debt brake introduction in the corresponding canton. The required municipal data are drawn from a unique database, compiled of annual data primarily derived from the Statistical Yearbook of the Swiss Association of Cities (Table 14, appendix). The entire data set encompasses financial measures and other covariates of the 141 largest Swiss cities and communities from all cantons except Obwalden for the years 1982-2007.<sup>9</sup> All but one cantonal capitals are included in the dataset. Since some municipalities and cities have joined the Swiss Association of Cities only recently and others left or amalgamated, the panel is unbalanced (Table 15, appendix). Overall the municipalities included in our dataset encompass more than 40% of the total population in Switzerland. The largest city is Zurich with a population of above 338,500 during the whole period, while the smallest municipality, Arosa, counts only between 2,272 and 3,240 citizens.

In order to test our hypotheses all four measures of fiscal policy are examined as dependent variables: municipal expenditures, revenues, debts and budget balance. Further, local spending in nine categories is employed as a left-hand side variable to clarify whether fiscal shifts can be attributed to a certain group of expenditures. As in most studies on fiscal policy, the dependent variables are measured in logarithms of real Swiss Francs per capita. Since it is not possible to employ a logarithmic transformation of deficits, the deficit equation is instead measured in real Swiss Francs per capita (Table 3 and Figure 5).

Drawing on common literature on fiscal policy analysis (e.g. Roubini and Sachs 1989a, 1989b, De Haan and Sturm 1994, Shadbegian 1996, Feld and Kirchgässner 2001a, 2001b, Feld et al. 2011) fiscal outcome is typically determined by institutional, economic, socio-demographic and political variables. The econometric model employed to explain the outcome of our dependent variables ( $Y$ ) is as follows:

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<sup>9</sup> Due to inconsistencies in the time series we refrain from including more recent observations.

$$Y_{i,t} = \beta_0 + \beta_1 \text{Debt\_brake}_{c,t} + \beta_2 \text{Income}_{i,t} + \beta_3 \text{Unemployment}_{i,t} + \beta_4 \text{Grants}_{i,t} + \beta_5 \text{Share\_old}_{i,t} + \beta_6 \text{Share\_young}_{i,t} + \beta_7 \text{German\_speaking}_{c,t} + \beta_8 \text{Pop}_{i,t} + \beta_9 \text{Political\_controls}_{i,t} + \epsilon_{i,t}$$

where  $t$  indicates the year,  $i$  the municipal and  $c$  the canton, respectively. All monetary data employed in the analysis is deflated to the year 2000 using the annual consumer price index.

The key *institutional variable* is a dummy variable which equals one if a debt brake is in place in the corresponding canton and zero otherwise. It is assumed to exhibit a positive impact on municipal expenditures and, probably to a lesser extent, on local revenues, deficits and debt. Thereby hypothesis (1) is tested. In order to examine hypothesis 2, the debt brake index constructed by Feld and Kirchgässner (2008) and Feld et al. (2013) is enhanced and supplementary employed (Figure 2). Since voter participation in Switzerland is quite strong and is supposed to influence fiscal outcomes (e.g., Feld and Kirchgässner 2001a,b; Feld and Matsusaka 2003; Funk and Gathmann 2011), we tried to include indicators of direct democracy. However, there is not enough institutional variation across time to take into account the influence of town meetings and municipal parliaments, respectively. In fact, only around ten municipalities out of our sample changed their legislative institution. The inclusion of other local direct democratic measures failed since the municipal and cantonal regulations valid between 1982 and 2007 were unavailable. While this shortcoming also prevented the inclusion of an indicator for local fiscal constraints, those rules do not seem to have a significant impact on local finances anyway (Feld and Kirchgässner 2001a). However, we employ three cantonal controls for direct democracy in the robustness analysis: A dummy for mandatory referendums, the spending thresholds which enforce referendums if exceeded and the signature requirement necessary for statutory initiatives.<sup>10</sup>

The most important *economic variable* in our model is the amount of real taxable income per capita (logarithmic transformation) within a municipality. A higher income is supposed to lead to an increase in public spending and revenues due to a rise in the citizen's demand for public services and progressive tax rates. In most of the years cantonal and thus municipal taxes were collected on basis of the average income of the previous two years (praenumerando). Therefore income data does not change for two consecutive years. In 1999 some, and two years later all, cantons moved towards a system of postnumerando taxation, i.e. tax collection according to same year's income, providing us with annual income data. Due to the transition from praenumerando to postnumerando taxation, municipal income data is missing for two consecutive years in most cases and had to be derived through interpolation.

In order to capture economic developments and business cycle movements, respectively, local unemployment rates are incorporated. The unemployment rate is predicted to have a positive impact

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<sup>10</sup> We are grateful to Feld et al. (2013) for providing us the data for the years 1982-2005.

on all dependent variables but revenues. In addition, we control for the influence of inter-governmental fiscal transfers. Grants are likely to place political incentives to increase local spending, debts and deficits (Feld and Kirchgässner 2001a, Rodden 2002). Due to data unavailability it is not possible to distinguish between unconditional (lump-sum) and conditional grants before 1990. Our grants variable therefore indicates real non-own revenues per capita (logarithmic transformation).

*Socio-demographic* measures should map demographical and cultural issues and voters' preferences, respectively. According to Poterba (1996, 1997), the inclusion of voter preferences is important, since the implementation of budget rules could merely be an expression of voter's preferences for sound finances. The preferences of the municipal inhabitants for public services are captured by the share of citizens older than 65 and the share of citizens younger than 20 years of age. The cultural differences are approximated by the share of the cantonal population speaking German. It is commonly supposed that citizens speaking a Latin language have preferences for a larger public sector. Due to lack of data, the language and demographic indicators change only once in a decade. Since culture, demography and voter preferences are not likely to be subject to vast changes, it still seems appropriate to employ these controls. Finally, the number of citizens (logarithmic transformation) is expected to be a crucial determinant of all dependent fiscal variables.

Further, *political controls* are included in the analysis. One indicator measures the ideology of the government.<sup>11</sup> There is some evidence that a higher share of left-wing parties might lead to increased spending, deficit and debt (e.g. Tavares, 2004). In addition, the share of left-wingers may be used to control for voters' fiscal preferences (Luechinger and Schaltegger 2012). A second political control is employed to evaluate the effects of the number of parties in the executive. Roubini and Sachs (1989a) point out that a broad coalition government may affect public finances due to the need to satisfy more voters and the problem of fiscal commons. In fact, empirical evidence suggests that expenditures, deficits and debts increase if more parties are involved in the executive (e.g., Feld et al. 2010, Volkerink and de Haan 2001). Variables measuring the ideology of parliament and the number of parties in the legislative are included in the robustness analysis. For this specification, municipalities with a town meeting are excluded.

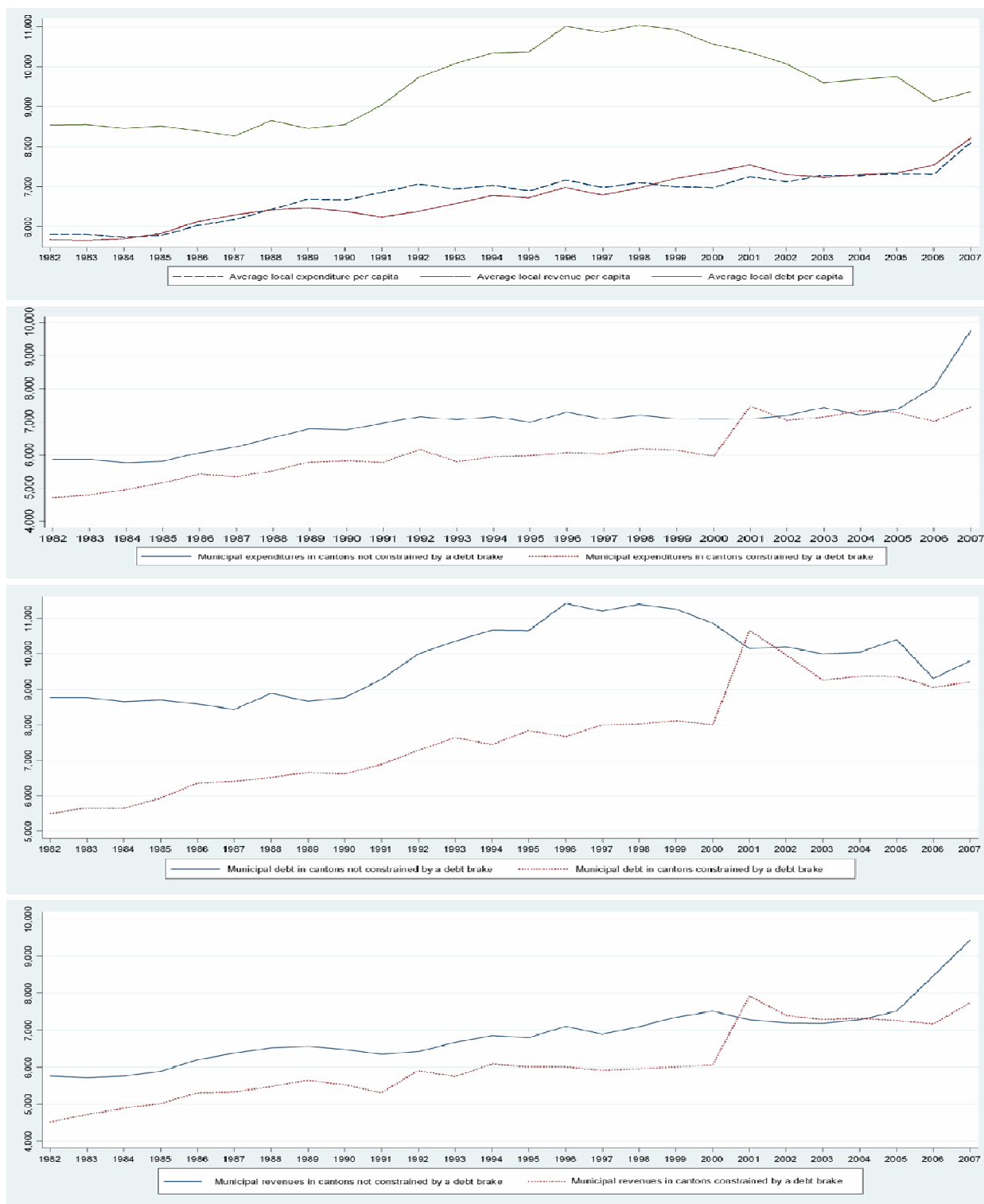
A summary of the descriptive statistics including all variables is provided in Table 3. Figure 5 illustrates the development of our dependent variables across time. While local debt peaked in the mid 1990s, revenues and expenditures seem to increase steadily. Municipalities located in cantons that are constrained by debt brakes showed notably lower debts, expenditures and revenues during most years. This gap diminishes in the early 2000's, when many cantons implemented statutory debt brakes (chapter 2.2). However, shortly thereafter the gap re-emerges. It could, thus, be hypothesized that

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<sup>11</sup> The following Swiss parties are considered as left-wing orientated: Social Democratic Party (SPS), Swiss Party of Labour (PDA), Progressive Organizations of Switzerland (POCH) and Green Party (GPS).

cantonal debt brakes reduce local expenditures, revenues and debts by inducing state politicians to take their duty to control, supervise, approve and regulate municipal finances more seriously.

Figure 5 Municipal finances in per capita, 1982-2007



Note: The values are measured in real terms. The sample size varies between 125 and 141 Swiss municipalities, see Table 15 in the appendix. For a definition of a debt brake see chapter 2.2. Own illustration. Source: Statistical Yearbook of the Swiss Association of Cities, various years.

Table 3 Descriptive statistics, all variables 1982-2007

| Variable                                                  | Coverage  | Obs   | Mean      | Std. Dev. | Min        | Max        |
|-----------------------------------------------------------|-----------|-------|-----------|-----------|------------|------------|
| <b>Dependent variables (all in per capita)</b>            |           |       |           |           |            |            |
| Log real revenues                                         | 1982-2007 | 3,414 | 8.480     | 0.365     | 7.035      | 10.303     |
| Real deficit <sup>1)</sup>                                | 1982-2007 | 3,414 | 10.878    | 580.664   | -6,990.880 | 3,465.495  |
| Log real debt <sup>2)</sup>                               | 1982-2007 | 3,414 | 8.538     | 0.635     | 5.299      | 10.604     |
| Log real expenditures                                     | 1982-2007 | 3,414 | 8.480     | 0.370     | 6.955      | 10.347     |
| Log real expenditures on administration                   | 1982-2007 | 3,414 | 6.117     | 0.368     | 4.399      | 8.778      |
| Log real expenditures on security <sup>3)</sup>           | 1982-2007 | 3,414 | 5.298     | 0.716     | 1.645      | 7.862      |
| Log real expenditures on education                        | 1982-2007 | 3,414 | 7.076     | 0.589     | 4.160      | 8.830      |
| Log real expenditures on culture and recreation           | 1982-2007 | 3,414 | 5.381     | 1.031     | -0.724     | 7.779      |
| Log real expenditures on health care                      | 1982-2007 | 3,252 | 5.194     | 1.327     | -3.009     | 8.941      |
| Log real expenditures on environmental issues             | 1982-2007 | 3,414 | 6.052     | 0.496     | 3.505      | 8.238      |
| Log real expenditures social welfare                      | 1982-2007 | 3,414 | 6.439     | 0.764     | 3.115      | 8.525      |
| Log real expenditures on traffic <sup>4)</sup>            | 1982-2007 | 3,414 | 5.962     | 0.492     | 3.879      | 8.008      |
| Log real expenditures on other issues                     | 1982-2007 | 3,414 | 6.215     | 0.682     | 2.904      | 8.848      |
| <b>Independent variables</b>                              |           |       |           |           |            |            |
| Dummy for debt brake                                      | 1982-2007 | 3,414 | 0.250     | 0.433     | 0.000      | 1.000      |
| Debt brake index                                          | 1982-2007 | 3,414 | 0.492     | 0.949     | 0.000      | 3.000      |
| Ideology of parliament (Share of left-wing parties)       | 1982-2007 | 2,427 | 0.284     | 0.112     | 0.000      | 0.634      |
| Ideology of government (Share of left-wing parties)       | 1982-2007 | 3,397 | 0.244     | 0.160     | 0.000      | 1.000      |
| Number of parties involved in executive                   | 1982-2007 | 3,397 | 3.792     | 0.968     | 1.000      | 7.000      |
| Number of parties involved in legislative                 | 1982-2007 | 2,427 | 5.793     | 1.623     | 2.000      | 10.000     |
| Log real income per capita <sup>5)</sup>                  | 1982-2007 | 3,414 | 10.297    | 0.227     | 8.876      | 11.922     |
| Log real income per capita (quadratic term) <sup>5)</sup> | 1982-2007 | 3,414 | 20.594    | 0.455     | 17.753     | 23.843     |
| Log population                                            | 1982-2007 | 3,414 | 9.661     | 0.716     | 7.728      | 12.816     |
| Log population (quadratic term)                           | 1982-2007 | 3,414 | 19.323    | 1.433     | 15.457     | 25.631     |
| Unemployment rate                                         | 1982-2007 | 3,414 | 0.028     | 0.022     | 0.000      | 0.123      |
| Share own local revenue on total revenue <sup>6)</sup>    | 1982-2007 | 3,414 | 0.841     | 0.089     | 0.273      | 0.999      |
| Log real grants per capita <sup>7)</sup>                  | 1982-2007 | 3,414 | 6.303     | 0.842     | 1.514      | 8.357      |
| Log real unconditional grants per capita                  | 1990-2007 | 2,182 | 3.617     | 2.391     | -4.098     | 7.929      |
| Share population below 20 years of age                    | 1982-2007 | 3,414 | 0.230     | 0.039     | 0.146      | 0.362      |
| Share population above 65 years of age                    | 1982-2007 | 3,414 | 0.148     | 0.037     | 0.038      | 0.248      |
| Time trend                                                | 1982-2007 | 3,414 | 13.654    | 7.467     | 1.000      | 26.000     |
| Mandatory referendum (cantonal level)                     | 1982-2005 | 3,150 | 0.520     | 0.500     | 0.000      | 1.000      |
| Spending threshold (cantonal level)                       | 1982-2005 | 3,150 | 5,511,942 | 8,143,413 | 0.000      | 25,000,000 |
| Signature threshold (cantonal level)                      | 1982-2005 | 3,150 | 6,307.596 | 4,159.063 | 1.000      | 15,000     |
| Share of cantonal population speaking German              | 1982-2007 | 3,414 | 0.677     | 0.351     | 0.039      | 0.979      |

Note: <sup>1)</sup>The deficit variable is derived by subtracting total revenues from the total expenditures. A fiscal deficit is, thus, indicated by a positive sign and a surplus by a negative sign. <sup>2)</sup>The composition of municipal debt basically follows the Swiss harmonized accounting model, defining debt as the sum of current liabilities, short-, medium- and long-term debts and liabilities for special accounts (Federal Department of Finance 2007). <sup>3)</sup>Expenditures on judiciary, police and fire department. <sup>4)</sup>Until 1989 traffic and energy and since then only traffic. <sup>5)</sup>Taxable income includes special cases (e.g., in-between and temporary assessment, flat tax, residents with overseas income and foreigner with domestic income). For a precise definition and the points of time the cantons moved towards postnumerando taxation refer to sources listed in Table 14 in the appendix. <sup>6)</sup>Own revenues are compiled of local taxes, regalia and concessions ("Regalien und Konzessionen"), asset earnings ("Vermögenserträge"), administrative assets and fees ("Verwaltungsvermögen und Entgelte"). <sup>7)</sup>Grants are composed of revenues from shares of cantonal taxes and public funds ("Anteil kantonaler Steuern" and "Beiträge der öffentlichen Hand") and since 1990 of revenues from shares, unconditional grants and condition grants ("Anteile, Beiträge ohne Zweckbindung" and "Zweckgebundene Beiträge"). Further information on the variables is provided in Table 14 and 15 in the appendix.

The model is finally estimated with unit and time fixed effects. We thereby control for unobserved time-invariant heterogeneity across municipalities and unobserved time-specific factors affecting all municipalities. Such a proceeding is rather unproblematic since the debt brake variable varies enough across municipalities and over time. In addition, various control variables account for cantonal and municipal heterogeneity. Despite institutional differences between Swiss municipalities the common political, cultural and constitutional framework implies less heterogeneity across municipalities than across countries. Hence, spurious correlation due to omitted variables seems less likely (Luechinger and Schaltegger 2012). However, the panel data structure might result in biased standard errors due to an autocorrelation of standard errors of municipalities. Therefore the error terms are clustered on the



municipal level and corrected for heteroscedasticity. While a small number of clusters can lead to a downward-bias of the cluster-robust standard error terms (Angrist and Pischke 2009, Luechinger and Schaltegger 2012), this should not pose any problems to our analysis since we have above 140 clusters.

Endogeneity of the cantonal debt brakes is hardly an issue since the municipalities enjoy large autonomy from their cantons and the institutional variables vary only slightly over time. However, we follow Poterba (1996, 1997) and address potential endogeneity of fiscal institutions by including measures of voters' preferences. Endogeneity of economic variables seems also less of a problem since they should hardly be subject to influences of the predicted variables in the same year. It might, however, be a problem in the case of public debt. Local public debt measures the accumulated annual deficits, which might have influenced the economic performance of the municipalities. Yet, following Feld and Kirchgässner, (2001a) an instrumental variable estimation is hardly appropriate.

## 4.2. RESULTS<sup>12</sup>

The baseline regressions for the local expenditure, revenue, deficit and debt equation are presented in Table 4. All regressions include unit and time fixed effects. We report heteroscedasticity-robust and clustered standard errors on the municipal level computed with the Huber-White sandwich estimator. The deficit is measured in real CHF per capita, the other dependent variables in logarithms. While the model explains around 45-50% of the variance of the expenditure and revenue equations, it has notably less explanatory power regarding the deficit and debt equations. The estimation results suggest that the introduction of a cantonal debt brake induces municipal expenditures and revenues to decrease. On the contrary, debt and deficits are supposed to rise, which seems reasonable given the fact that the coefficients indicate that expenditures decline by less than revenues. The debt brake dummy is, however, only statistically significant in the case of expenditures, revenues and deficits. Similarly, the debt brake index is highly significant in the expenditure and revenue equation. Cantonal governments constrained by debt brakes might, thus, take their responsibility to observe municipal finances more seriously, resulting in lower expenditures on the local level. Municipalities seem to respond to the decrease in expenditures by reducing their revenues. Overall, the empirical evidence seems to reject our hypotheses (1) and (2).

To clarify, if the decrease in local spending can be attributed to a certain group of expenditures, we test the reaction of nine different expenditure categories to the introduction of cantonal debt brakes. The results suggest that spending decreases in most categories (Table 5). However, statistical

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<sup>12</sup> All estimates have been performed with Stata 12. The discussion of our findings is primarily restricted to the effects of debt brake variables.

significance is only indicated regarding expenditures on security, education, health and environment. In these categories local autonomy is rather small.

Table 4 Baseline FE-regression: Expenditure, revenue, debt and deficit per capita, 1982-2007

|                                 | Expenditure |           | Revenue   |           | Debt      |           | Deficit     |             |
|---------------------------------|-------------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|
| Debt brake                      | -0.034*     |           | -0.053*** |           | 0.009     |           | 86.008*     |             |
|                                 | (-1.950)    |           | (-3.238)  |           | (0.198)   |           | (1.788)     |             |
| Debt brake index                |             | -0.038*** |           | -0.046*** |           | 0.007     |             | 35.326      |
|                                 |             | (-2.980)  |           | (-3.970)  |           | (0.225)   |             | (1.128)     |
| Unemployment                    | -0.576      | -0.672    | -0.805*   | -0.914**  | 0.156     | 0.172     | 1615.155    | 1672.436    |
|                                 | (-1.276)    | (-1.518)  | (-1.831)  | (-2.135)  | (0.096)   | (0.106)   | (0.987)     | (1.028)     |
| Income                          | 0.103       | 0.103     | 0.135     | 0.133     | -0.058    | -0.058    | -175.555    | -169.267    |
|                                 | (1.423)     | (1.430)   | (1.653)   | (1.649)   | (-0.463)  | (-0.460)  | (-0.970)    | (-0.933)    |
| Population                      | -0.251**    | -0.265*** | -0.356*** | -0.373*** | -1.027*** | -1.025*** | 986.175***  | 995.935***  |
|                                 | (-2.579)    | (-2.774)  | (-3.387)  | (-3.615)  | (-3.406)  | (-3.380)  | (2.944)     | (2.983)     |
| Grants                          | 0.124***    | 0.126***  | 0.124***  | 0.125***  | 0.108**   | 0.108**   | 18.037      | 23.015      |
|                                 | (4.522)     | (4.609)   | (4.590)   | (4.643)   | (2.042)   | (2.036)   | (0.526)     | (0.678)     |
| Share young                     | -0.148      | -0.159    | -0.225    | -0.230    | 5.076***  | 5.075***  | 833.961     | 806.527     |
|                                 | (-0.314)    | (-0.344)  | (-0.536)  | (-0.563)  | (2.959)   | (2.965)   | (0.764)     | (0.736)     |
| Share old                       | 1.210***    | 1.183***  | 0.577     | 0.536     | -1.568    | -1.561    | 3842.171*** | 3906.315*** |
|                                 | (2.703)     | (2.659)   | (1.239)   | (1.160)   | (-0.890)  | (-0.888)  | (2.861)     | (2.908)     |
| Share German speaking           | -0.640*     | -0.660*   | -0.901*** | -0.908*** | -0.034    | -0.035    | 1135.089    | 1077.770    |
|                                 | (-1.854)    | (-1.939)  | (-3.372)  | (-3.532)  | (-0.035)  | (-0.036)  | (0.844)     | (0.808)     |
| Share left-wingers in executive | -0.017      | -0.017    | 0.005     | 0.005     | -0.214    | -0.213    | -145.879    | -143.356    |
|                                 | (-0.432)    | (-0.426)  | (0.151)   | (0.156)   | (-1.613)  | (-1.613)  | (-0.973)    | (-0.953)    |
| Parties in executive            | -0.008      | -0.007    | -0.006    | -0.005    | 0.011     | 0.011     | -18.783     | -21.249     |
|                                 | (-1.136)    | (-1.092)  | (-0.912)  | (-0.777)  | (0.436)   | (0.428)   | (-0.765)    | (-0.869)    |
| Constant                        | 9.271***    | 9.418***  | 10.236*** | 10.415*** | 17.203*** | 17.177*** | -9.2e+03*** | -9.3e+03*** |
|                                 | (7.715)     | (7.967)   | (8.361)   | (8.654)   | (4.799)   | (4.762)   | (-2.620)    | (-2.682)    |
| Adj. R2                         | 0.44        | 0.44      | 0.51      | 0.52      | 0.12      | 0.12      | 0.08        | 0.08        |
| N                               | 3397        | 3397      | 3397      | 3397      | 3397      | 3397      | 3397        | 3397        |
| Cluster                         | 141         | 141       | 141       | 141       | 141       | 141       | 141         | 141         |

Note: The numbers in parentheses indicate the estimated t-statistics. Standard errors are clustered on the municipal level and corrected for heteroscedasticity. \* $p < 0.1$  (significance on the 10% level), \*\* $p < 0.05$  (significance on the 5% level), and \*\*\* $p < 0.01$  (significance on the 1% level).

Table 5 Debt brake dummy and expenditure categories on the municipal level, 1982-2007

|                                 | Admin    | Security  | Education | Culture   | Health    | Environment | Social Welfare | Traffic   | Others    |
|---------------------------------|----------|-----------|-----------|-----------|-----------|-------------|----------------|-----------|-----------|
| Debt brake                      | -0.034   | -0.078*** | -0.139*** | 0.038     | -0.444*** | -0.069*     | -0.067         | 0.005     | 0.062     |
|                                 | (-1.196) | (-2.689)  | (-3.312)  | (0.750)   | (-3.526)  | (-1.794)    | (-1.274)       | (0.157)   | (1.296)   |
| Unemployment                    | -0.148   | -0.011    | -3.032*** | 3.562*    | 2.017     | -0.511      | 0.702          | -0.526    | -1.589    |
|                                 | (-0.193) | (-0.013)  | (-2.875)  | (1.677)   | (0.676)   | (-0.345)    | (0.490)        | (-0.512)  | (-1.222)  |
| Income                          | 0.247**  | 0.073     | 0.080     | 0.125     | 0.645     | 0.166*      | -0.085         | 0.068     | 0.333**   |
|                                 | (2.517)  | (0.717)   | (0.425)   | (0.525)   | (1.496)   | (1.809)     | (-1.059)       | (0.948)   | (2.248)   |
| Population                      | -0.125   | -0.077    | 0.434*    | -0.452    | 0.959     | -0.452*     | -0.375         | -0.765*** | -0.781*** |
|                                 | (-0.793) | (-0.377)  | (1.856)   | (-1.373)  | (1.200)   | (-1.838)    | (-1.418)       | (-3.427)  | (-3.423)  |
| Grants                          | 0.019    | -0.007    | 0.144*    | -0.064    | 0.214     | 0.082**     | 0.138***       | 0.031*    | 0.125***  |
|                                 | (1.063)  | (-0.381)  | (1.967)   | (-1.397)  | (1.600)   | (2.422)     | (4.191)        | (1.841)   | (3.811)   |
| Share young                     | 0.113    | -0.052    | -0.449    | -7.593*** | -3.574    | 0.540       | 1.335          | -1.727    | 4.443***  |
|                                 | (0.166)  | (-0.065)  | (-0.427)  | (-4.401)  | (-0.932)  | (0.388)     | (1.000)        | (-1.476)  | (3.938)   |
| Share old                       | -1.226   | 1.502     | 2.645*    | -3.142    | 10.894*** | 1.653       | 2.959**        | -1.506    | 0.067     |
|                                 | (-1.638) | (1.607)   | (1.921)   | (-1.261)  | (2.759)   | (1.245)     | (2.092)        | (-1.635)  | (0.052)   |
| Share German speaking           | 0.129    | -0.526    | -2.171**  | 0.044     | -3.707    | 1.110       | -1.380         | 0.399     | 1.410*    |
|                                 | (0.220)  | (-0.930)  | (-2.199)  | (0.040)   | (-1.469)  | (1.315)     | (-1.149)       | (0.459)   | (1.798)   |
| Share left-wingers in executive | -0.080   | -0.004    | -0.014    | -0.096    | 0.224     | -0.055      | -0.066         | -0.129    | 0.048     |
|                                 | (-1.088) | (-0.054)  | (-0.135)  | (-0.531)  | (0.880)   | (-0.494)    | (-0.693)       | (-1.458)  | (0.458)   |
| Parties in executive            | -0.005   | 0.018     | -0.015    | -0.023    | 0.019     | -0.024      | -0.023         | 0.010     | 0.021     |
|                                 | (-0.404) | (1.314)   | (-0.974)  | (-0.867)  | (0.347)   | (-1.431)    | (-1.072)       | (0.619)   | (1.013)   |
| Constant                        | 4.592**  | 5.125**   | 2.422     | 10.019**  | -10.215   | 7.077**     | 9.807***       | 12.793*** | 7.766***  |
|                                 | (2.213)  | (2.086)   | (0.825)   | (2.496)   | (-1.024)  | (2.406)     | (3.456)        | (4.399)   | (2.815)   |
| Adj. R2                         | 0.16     | 0.28      | 0.12      | 0.63      | 0.12      | 0.07        | 0.60           | 0.04      | 0.42      |
| N                               | 3397     | 3397      | 3397      | 3397      | 3237      | 3397        | 3397           | 3397      | 3397      |
| Cluster                         | 141      | 141       | 141       | 141       | 138       | 141         | 141            | 141       | 141       |

Note: refer to Table 4.

### 4.3. ROBUSTNESS CHECKS

The robustness analysis is conducted in seven consecutive steps. *First* we included a time trend variable to account for general changes in the dependent variable over time. As one might expect, the time trend has a highly significant positive impact on expenditures, revenues and debt and a negative effect on deficits (Table 6, appendix). However, the estimation results correspond to our baseline regression. In a *second* step we omit all cantonal capitals from the original dataset. Thereby the cantons of Appenzell Inner Rhodes, Appenzell Outer Rhodes, Glarus, Nidwalden and Uri are excluded and the number of observations is reduced by almost one fifth. While this specification might exclude disturbing outliers, non-normally distributed residuals should not pose a problem to the validity of our results since our sample is large enough. This specification confirms our baseline estimates. The debt brake dummy remains significant regarding the expenditure, revenue and deficit equation (Table 7, appendix).

A *third* robustness check is conducted by excluding political controls, since they are not significant in any of the baseline regressions. However, the coefficients and t-statistics of our main independent variables hardly deviate from the baseline regressions (Table 8 and 9, appendix). In a *fourth* step we include three measures of direct democracy on the cantonal level (Table 10, appendix). While the signature requirement seems to be statistically significant in the expenditure and revenue equations, the coefficients are far from indicating economic significance. However, regarding the debt brake dummy and fiscal rule index, significance is not reached in the expenditure equation anymore but in the revenue and deficit equation.

In a *fifth* step the analysis is extended by adding two more political controls, namely the number of parties in the legislature and the share of left-wingers in parliament. Thereby we exclude cities with town meetings from our panel. The estimated coefficients of the debt brake dummy and debt brake index are in all but the deficit equation larger than in the baseline regression (Table 11, appendix). This finding points towards a larger effect of cantonal debt brakes on local finances if the municipalities are not endowed with town meetings, but have parliaments instead.

Since the non-own revenues variable includes conditional grants which commonly require a co-funding of the receiving jurisdiction, endogeneity problems might arise. Thus, we follow Feld and Kirchgässner (2001a, 2008) and Schaltegger (2002) and replace the non-own revenues per capita variable with unconditional grants per capita (logarithmic transformation) in a *sixth* robustness check. Lump-sum grants can be allocated according to their own priorities by the receiving jurisdiction. Due to data unavailability this specification restricts our analysis to the period 1990 to 2007. The results are shown in Table 12 in the appendix. In this model significance of the debt brake dummy is only indicated in the debt regression. However, the coefficients of the fiscal rules index reach significance in all but the deficit equation. Additionally, we replaced our grant variable with the share of own local

revenues on total local revenues, as suggested by Feld and Kirchgässner (2001a, 2001b). The estimation results are still similar to those shown in the baseline regression.<sup>13</sup> In a *last* robustness check we employ quadratic terms of income per capita and population (both logarithmic transformation) to account for the different sizes of the municipalities in our sample. This specification does not, however, change our results (Table 13, appendix).

After having conducted several robustness checks we conclude that the effect of our debt brake dummy and debt brake index is largely unaffected by the modifications of our model. In fact, local expenditures and revenues seem to decrease significantly after (strong) debt brakes have been introduced in the corresponding canton. The results therefore reject the hypothesis of a shift of fiscal burdens from cantons that are constrained by debt brakes to their municipalities. The reduction of local expenditures might result from the cantonal responsibility to observe municipal finances, which is taken more seriously by cantonal governments constrained by strong debt brakes.

## **5. DISCUSSION AND CONCLUSION**

Empirical evidence suggests that public finances of Swiss jurisdictions are influenced by various institutional arrangements. While most studies focus on intra-jurisdictional effects, the vertical impacts of formal fiscal constraints on the finances of other levels of government remain a largely unexplored topic. This paper analyses the influence of cantonal debt brakes on municipal finances by examining a unique database of the 141 largest Swiss municipalities and cities during the period 1982-2007. The estimation results suggest that municipal expenditures and revenues decreased significantly in the aftermath of a cantonal debt brake implementation. In particular, local spending on security, education and health is supposed to decrease significantly. These findings hold especially if strong debt brakes are considered. Formal fiscal constraints may thus place incentives on cantonal governments to restrict local spending. Further, municipalities seem to react to the decreased local expenditures by lowering their revenues.

Our analysis might possess importance regarding the current tendency in many federations to introduce fiscal rules. The empirical results suggest that fiscal rules on an upper level of government have a constraining effect on the finances of lower level governments, particularly regarding local expenditures. Thus, our results reject the claim that formal fiscal rules on an upper level of government imply a shift of fiscal burdens toward the municipal level.

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<sup>13</sup> Results are available upon request.

## REFERENCES

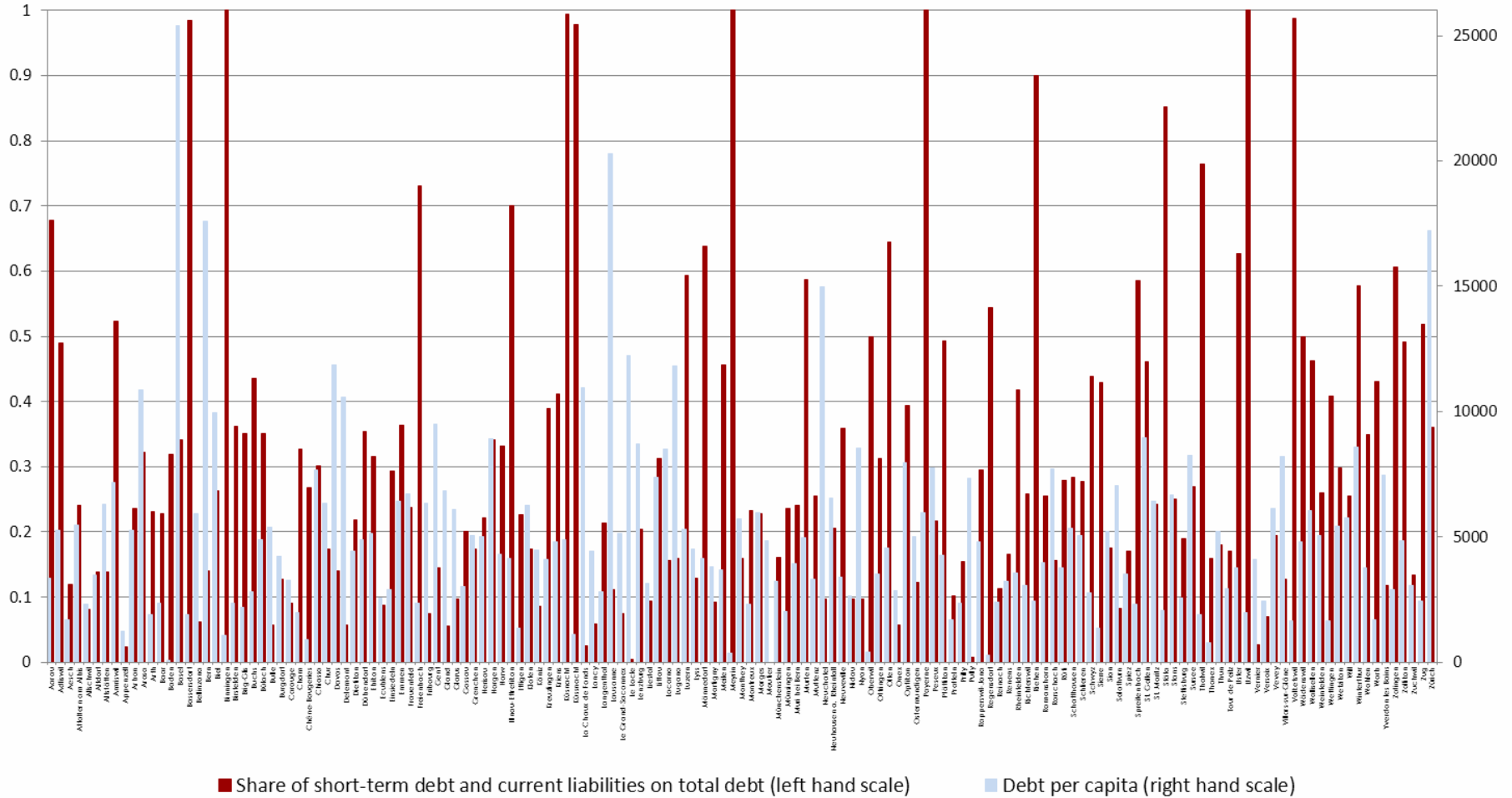
- Angelini, T. and B. Thöny, 2004. Vergleich der kantonalen Finanzausgleichssysteme, der Aufgaben- und Einnahmeverteilung und der Gemeindeformen, Schlussbericht. Institut für Finanzwirtschaft und Finanzrecht, St. Gallen.
- Angrist, J.D. and J.-S. Pischke, 2009. *Mostly harmless econometrics*. Princeton University Press: Princeton et al.
- Balduzzi, P., and V. Grembi, 2011. Fiscal Rules and Window Dressing in Italian Municipalities. *Giornale degli Economisti* 70: 97-122.
- Besley, T.J., and H.S. Rosen, 1998. Vertical externalities in tax setting: evidence from gasoline and cigarettes. *Journal of Public Economics* 70, 383-398.
- Blankart, C.B., and A. Klaiber, 2006. Subnational Government Organisation and Public Debt Crises. *Economic Affairs* 26, 48-54.
- Brühlhart, M., and M. Jametti, 2006. Vertical versus horizontal tax externalities: An empirical test. *Journal of Public Economics* 90, 2027-2062.
- Buchanan, J.M., G. Tullock, 1962. *The Calculus of Consent*. University of Michigan Press: Ann Arbor.
- Budina, N., T. Kinda, A. Schaechter, and A. Weber, 2012. Fiscal Rules at a Glance: country Details from a New Dataset. IMF Working Paper 12/273.
- Burret, H. T., and L.P. Feld, 2013. Fiscal Institutions in Germany. *Swiss Journal of Economics and Statistics*, forthcoming.
- Conference of the Cantonal Ministers of Finance, 2012. Finanzpolitische Regeln der Kantone: Ausgaben-, Defizit- und Schuldenbremsen. Stand 18. Dezember 2012.
- Corbacho, A., and G. Schwartz, 2007. Fiscal Responsibility Laws. In: Ter-Minassian, T., and M.S. Kumar (eds.). *Promoting Fiscal Discipline*, pp. 58-77, International Monetary Fund: Washington, D.C.
- Council of Europe, 1997. Local Finance in Europe. In: *Local and regional authorities in Europe*, No. 61.
- Dafflon, B., 2002. Capital expenditures and financing in the communes in Switzerland. In: *ibid.* (ed.). *Local Public Finances in Europe*, pp. 209-230, Edward Elgar: Cheltenham and Northampton.
- De Haan, J., and J.-E. Sturm, 1994. Political and institutional determinants of fiscal policy in the European Community. *Public Choice*, 80, 157-172.
- Debrun, X., and M.S. Kumar, 2007. Fiscal Rules, Fiscal Councils and All That: Commitment Devices, Signaling Tools or Smokescreens?. In: Banca d'Italia (eds.). *Fiscal Policy: Current Issues and Challenges*, pp. 479-512.
- Debrun, X., L. Moulin, A. Turrini, J. Ayuso-i-Casals, and M.S. Kumar, 2008. Tied to the Mast? National Fiscal Rules in the European Union, *Economic Policy* 23, 299-362.
- Deroose, S., Moulin, L., and P. Wierdsma, 2006. National Expenditure Rules and Expenditure Outcomes: Empirical Evidence for EU Member States. *Wirtschaftspolitische Blätter*, 1/2006, 27-42.
- European Commission, 2006. Public Finance Report in EMU - 2006. Part III: National Numerical Fiscal Rules and Institutions for Sound Public Finances. *European Economy* No. 3, European Commission: Brussels.
- Fasten, E.R., 2006. Market Mechanisms to Restrict Irresponsible Politicians - Lessons from Switzerland, unpublished, Paper presented at the EPCS 2006, Turku, Finland.
- Swiss Federal Department of Finance, 2007. Bericht des Bundesrates über die Schuldenentwicklung der öffentlichen Haushalte, may be downloaded from (accessed 6 February 2012): <http://www.efd.admin.ch/dokumentation/zahlen/00578/01051/index.html>.
- Feld, L.P., and G. Kirchgässner, 2001a. The political economy of direct legislation: direct democracy and local decision-making. *Economic Policy* 16, 329-367.
- Feld, L.P., and G. Kirchgässner, 2001b. Does Direct Democracy Reduce Public Debt? Evidence from Swiss Municipalities. *Public Choice* 109, 347-370.

- Feld, L.P., and G. Kirchgässner, 2008. On the Effectiveness of Debt Brakes: The Swiss Experience, in: R. Neck and J.-E. Sturm (eds.), *Sustainability of Public Debt*, pp. , 223-255, MIT Press: Cambridge/London.
- Feld, L.P., and J.G. Matsusaka, 2003. Budget referendums and government spending: evidence from Swiss cantons. *Journal of Public Economics* 87, 2703-2724.
- Feld, L.P., G. Kirchgässner, and C.A. Schaltegger, 2011. Municipal debt in Switzerland: new empirical results. *Public Choice*, 149, 49-64.
- Feld, L.P., G. Kirchgässner, and C.A. Schaltegger, 2010. Decentralized Taxation and the Size of Government: Evidence from Swiss State and Local Governments. *Southern Economic Journal* 77(1), 27-48.
- Feld, L.P., C.A. Schaltegger, and J. Schnellenbach, 2008. On government centralization and fiscal referendums. *European Economic Review* 52, 611-645.
- Feld, L.P., A. Kalb, M.-D. Moessinger, and S. Osterloh, 2013. Sovereign bond market reactions to fiscal rules and no-bailout clauses: the Swiss experience. CESifo Working Paper Series No. 4195.
- Finances Publiques, 2004. Evaluation – Einhaltung der Minimalanforderungen an die kantonale Aufsicht über die Gemeindefinanzen durch die Schweizer Kantone, may be downloaded from (accessed 6 February 2012): [http://www.esgccs.ch/pdf/ES\\_d.pdf](http://www.esgccs.ch/pdf/ES_d.pdf).
- Funk, P., and C. Gathmann, 2011. Does Direct Democracy Reduce the Size of Government? New Evidence from Historical Data, 1890–2000. *Economic Journal* 121(557), 1252-1280.
- German Association of Cities 2011. Städte fordern Schutzschirm wegen Schuldenbremse der Länder, Press release (3. May 2011). may be downloaded from (accessed 26 June 2012): <http://www.staedtetag.de/presse/mitteilungen/057674/index.html>.
- Geschäftsprüfungskommission des Grossen Rates, 1999. Sonderbericht über die Dossiers Leukerbad und Casino de Saxon, may be downloaded from (accessed 6 February 2012): [http://www.vs.ch/Press/DS\\_3/PU-1999-02-16-1652/de/rap\\_cg\\_d.pdf](http://www.vs.ch/Press/DS_3/PU-1999-02-16-1652/de/rap_cg_d.pdf).
- Guichard, S., M., Kennedy, E. Wurzel, and C. André, 2007. What promotes fiscal consolidation: OECD country experience. OECD Economic Departments Working Paper No. 443. OECD: Paris.
- Hagen, J. von, and I.J. Harden, 1995. Budget Processes and Commitment to Fiscal Discipline. *European Economic Review* 39, 771 779.
- Heinemann, F., L.P. Feld, B. Geys, C. Gröpl, S. Hauptmeier, and A. Kalb, 2009. Der kommunale Kassenkredit zwischen Liquiditätssicherung und Missbrauchsgefahr, Baden-Baden: Nomos.
- Krogstrup, S., and S. Wälti, 2008. Do fiscal rules cause budgetary outcomes?. *Public Choice*, 136(1-2), 128-138.
- Kopits, G. 2004. Overview of Fiscal Policy Rules in Emerging Markets. In: Kopits, G. (ed.) *Rules-Based Fiscal Policy in Emerging Markets. Background, Analysis, and Prospects*, pp. 1–11, Palgrave Macmillan: Houndmill et al.
- Kübler, D., and P. Rochat, 2009. Sind Gemeindeversammlungen noch zeitgemäss?. *Statistik info* 15, Statistisches Amt des Kantons Zürichs: Zürich.
- Ladner, A., R. Steiner, K. Horber-Papazian, J. Fiechter, C. Jacot-Descombes, and C. Kaiser, 2012. Gemeindefinanzierung 2009/2010. Kurzbericht zur fünften gesamtschweizerischen Gemeindefinanzbefragung, KPM: Bern.
- Lenk, T., O. Rottmann, and M. Kuntze, 2012. Auswirkungen der Schuldenbremse auf die kommunale Ebene, Commerzbank AG: Frankfurt am Main.
- Luechinger, S., and C.A. Schaltegger, 2012. Fiscal rules, budget deficits and budget projections. *International Tax and Public Finance*, online published.
- Matsusaka, J.G., 1995. Fiscal Effects of the Voter Initiative: Evidence from the Last 30 Years. *Journal of Political Economy*, University of Chicago Press 103(3), 587-623.
- Meyer, K., 2011. Gemeindeautonomie im Wandel - Eine Studie zu Art. 50 Abs. 1 BV unter Berücksichtigung der Europäischen Charta der Gemeindeautonomie. Books on Demand GmbH: Norderstedt.
- Milesi-Ferretti, G., 2003. Good, Bad, or Ugly? On the Effects of Fiscal Rules with Creative Accounting. *Journal of Public Economics* 88, 377-394.

- Poterba, J.M., 1997. Do budget rules work?. In: A.J. Auerbach (ed.), *Fiscal policy: lessons from economic research*, pp. 53-86, MIT Press: Cambridge.
- Poterba, J.M., 1996, Budget institutions and fiscal policy in the U.S. states, *American Economic Review* 86, 395-400.
- Rodden, J., 2002. The Dilemma of Fiscal Federalism: Grants and Fiscal Performance Around the World. *American Journal of Political Science* 46, 670-687.
- Roubini, N., and Sachs, J.D., 1989a. Political and economic determinants of budget deficits in the industrial democracies. *European Economic Review* 33, 903-938.
- Roubini, N., and Sachs, J.D., 1989b. Government spending and budget deficits in the industrial countries. *Economic Policy* 8, 99-132.
- Schaechter, A., T. Kinda, N. Budina, and A. Weber, 2012. Fiscal Rules in Response to the Crisis - Toward the "Next-Generation" Rules. A New Dataset, IMF Working Paper 12/187.
- Schaltegger, C.A, 2002. Budgetregeln und ihre Wirkung auf die öffentlichen Haushalte: Empirische Ergebnisse aus den US-Bundesstaaten und den Schweizer Kantonen. *Schmollers Jahrbuch* 122, pp. 369-413, Duncker & Humblot: Berlin.
- Schaltegger, C.A., and L.P. Feld, 2009. Do large cabinets favor large governments? Evidence on the fiscal commons problem for Swiss Cantons. *Journal of Public Economics* 93, 35-47.
- Schaltegger, C.A., and R.L. Frey, 2004. Fiskalische Budgetbeschränkungen zur Stabilisierung öffentlicher Haushalte, *Volkswirtschaft* 77, 16-19 .
- Shadbegian, R.J., 1996. Do Tax and Expenditure Limitations Affect the Size and Growth of State Government?. *Contemporary Economic Policy* 14, 22-35.
- Stauffer, T.P., 2001. *Instrumente des Haushaltsausgleichs: Ökonomische Analyse und rechtliche Umsetzung*. Helbing und Lichtenhahn: Basel et al.
- Steiner, R., J. Fiechter, and C. Kaiser, 2012. *Gemeindebefragung 2009/2010: Zustand der Gemeinden des Kantons Zürich*, KPM-Verlag: Bern.
- Swiss Federal Tax Administration, 2013. *Grundzüge des schweizerischen Steuersystems*. Ausgabe 2013.
- Tavares, J., 2004. Does right or left matter? Cabinets, credibility and fiscal adjustments. *Journal of Public Economics* 88(12), 2447-2468.
- Velasco, A., 2000. Debts and Deficits with Fragmented Fiscal Policymaking. *Journal of Public Economics* 76, 105-125.
- Volkerink, B., and J. De Haan, 2001. Fragmented Government Effects on Fiscal Policy: New Evidence. *Public Choice* 109, 221-242.
- Weingast, B.R., K.A. Shepsle, and C. Johnson, 1981. The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics. *Journal of Political Economy* 89, 642-664.

APPENDIX

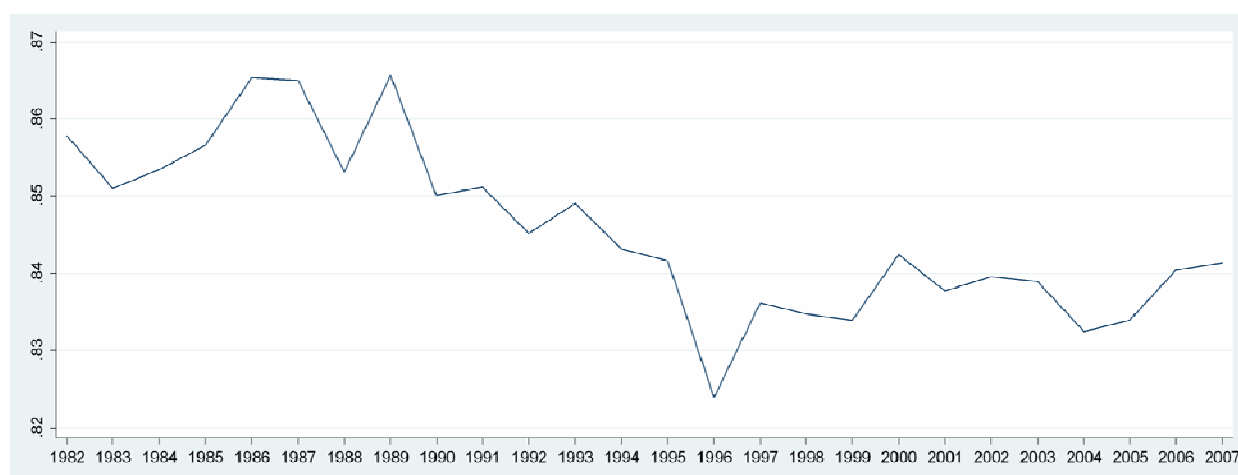
Figure 6 Short-term liabilities and total debt per capita in 151 Swiss cities and municipalities, 2010



Note: Values are in real terms. Since municipalities with the name can be found in different cantons, refer to Table 13 in the appendix to see the corresponding canton. Own illustration. Source: Statistical Yearbook of the Swiss Association of Cities 2012.



Figure 7 Share of own revenues on total revenues in Swiss municipalities, 1982-2007



Note: For a definition see Table 3. The sample size varies between 125 and 141, see Table 15 in the appendix. Own illustration. Source: Statistical Yearbook of the Swiss Association of Cities, various years.

Table 6 Robustness check: Time trend, 1982-2007

|                                 | Expenditure |           | Revenue   |           | Debt      |           | Deficit     |             |
|---------------------------------|-------------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|
| Debt brake                      | -0.034*     |           | -0.053*** |           | 0.009     |           | 86.008*     |             |
|                                 | (-1.950)    |           | (-3.238)  |           | (0.198)   |           | (1.788)     |             |
| Debt brake index                |             | -0.038*** |           | -0.046*** |           | 0.007     |             | 35.326      |
|                                 |             | (-2.980)  |           | (-3.970)  |           | (0.225)   |             | (1.128)     |
| time trend                      | 0.009***    | 0.009***  | 0.011***  | 0.012***  | 0.012***  | 0.012***  | -15.097***  | -14.581***  |
|                                 | (5.735)     | (6.020)   | (8.208)   | (8.613)   | (2.895)   | (2.818)   | (-3.054)    | (-2.901)    |
| Unemployment                    | -0.576      | -0.672    | -0.805*   | -0.914**  | 0.156     | 0.172     | 1615.155    | 1672.436    |
|                                 | (-1.276)    | (-1.518)  | (-1.831)  | (-2.135)  | (0.096)   | (0.106)   | (0.987)     | (1.028)     |
| Income                          | 0.103       | 0.103     | 0.135     | 0.133     | -0.058    | -0.058    | -175.555    | -169.267    |
|                                 | (1.423)     | (1.430)   | (1.653)   | (1.649)   | (-0.463)  | (-0.460)  | (-0.970)    | (-0.933)    |
| Population                      | -0.251**    | -0.265*** | -0.356*** | -0.373*** | -1.027*** | -1.025*** | 986.175***  | 995.935***  |
|                                 | (-2.579)    | (-2.774)  | (-3.387)  | (-3.615)  | (-3.406)  | (-3.380)  | (2.944)     | (2.983)     |
| Grants                          | 0.124***    | 0.126***  | 0.124***  | 0.125***  | 0.108**   | 0.108**   | 18.037      | 23.015      |
|                                 | (4.522)     | (4.609)   | (4.590)   | (4.643)   | (2.042)   | (2.036)   | (0.526)     | (0.678)     |
| Share young                     | -0.148      | -0.159    | -0.225    | -0.230    | 5.076***  | 5.075***  | 833.961     | 806.527     |
|                                 | (-0.314)    | (-0.344)  | (-0.536)  | (-0.563)  | (2.959)   | (2.965)   | (0.764)     | (0.736)     |
| Share old                       | 1.210***    | 1.183***  | 0.577     | 0.536     | -1.568    | -1.561    | 3842.171*** | 3906.315*** |
|                                 | (2.703)     | (2.659)   | (1.239)   | (1.160)   | (-0.890)  | (-0.888)  | (2.861)     | (2.908)     |
| Share German speaking           | -0.640*     | -0.660*   | -0.901*** | -0.908*** | -0.034    | -0.035    | 1135.089    | 1077.770    |
|                                 | (-1.854)    | (-1.939)  | (-3.372)  | (-3.532)  | (-0.035)  | (-0.036)  | (0.844)     | (0.808)     |
| Share left-wingers in executive | -0.017      | -0.017    | 0.005     | 0.005     | -0.214    | -0.213    | -145.879    | -143.356    |
|                                 | (-0.432)    | (-0.426)  | (0.151)   | (0.156)   | (-1.613)  | (-1.613)  | (-0.973)    | (-0.953)    |
| Parties in executive            | -0.008      | -0.007    | -0.006    | -0.005    | 0.011     | 0.011     | -18.783     | -21.249     |
|                                 | (-1.136)    | (-1.092)  | (-0.912)  | (-0.777)  | (0.436)   | (0.428)   | (-0.765)    | (-0.869)    |
| Constant                        | 9.262***    | 9.408***  | 10.225*** | 10.404*** | 17.191*** | 17.164*** | -9.2e+03*** | -9.3e+03*** |
|                                 | (7.706)     | (7.958)   | (8.351)   | (8.643)   | (4.796)   | (4.759)   | (-2.616)    | (-2.678)    |
| Adj. R2                         | 0.44        | 0.44      | 0.51      | 0.52      | 0.12      | 0.12      | 0.08        | 0.08        |
| N                               | 3397        | 3397      | 3397      | 3397      | 3397      | 3397      | 3397        | 3397        |
| Cluster                         | 141         | 141       | 141       | 141       | 141       | 141       | 141         | 141         |

Note: See Table 4.

Table 7 Robustness check: Exclusion of cantonal capitals, 1982-2007

|                                 | Expenditure |           | Revenue   |           | Debt      |           | Deficit     |             |
|---------------------------------|-------------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|
| Debt brake                      | -0.040**    |           | -0.064*** |           | 0.026     |           | 107.768*    |             |
|                                 | (-1.984)    |           | (-3.498)  |           | (0.496)   |           | (1.792)     |             |
| Debt brake index                |             | -0.045*** |           | -0.056*** |           | 0.009     |             | 46.865      |
|                                 |             | (-3.082)  |           | (-4.398)  |           | (0.267)   |             | (1.174)     |
| Unemployment                    | -0.169      | -0.294    | -0.496    | -0.637    | -0.381    | -0.373    | 1580.055    | 1648.818    |
|                                 | (-0.314)    | (-0.555)  | (-0.923)  | (-1.219)  | (-0.203)  | (-0.199)  | (0.765)     | (0.807)     |
| Income                          | 0.230***    | 0.231***  | 0.278***  | 0.276***  | 0.006     | 0.010     | -301.097    | -289.960    |
|                                 | (4.428)     | (4.686)   | (4.108)   | (4.253)   | (0.043)   | (0.064)   | (-1.133)    | (-1.085)    |
| Population                      | -0.255**    | -0.275*** | -0.384*** | -0.406*** | -0.998*** | -0.997*** | 1078.345*** | 1087.342*** |
|                                 | (-2.529)    | (-2.799)  | (-3.524)  | (-3.854)  | (-3.085)  | (-3.084)  | (2.812)     | (2.838)     |
| Grants                          | 0.098***    | 0.101***  | 0.098***  | 0.100***  | 0.107*    | 0.108*    | 21.623      | 27.397      |
|                                 | (5.668)     | (5.855)   | (6.333)   | (6.550)   | (1.956)   | (1.979)   | (0.570)     | (0.731)     |
| Share young                     | 0.127       | 0.088     | 0.063     | 0.034     | 7.415***  | 7.400***  | 537.630     | 493.248     |
|                                 | (0.244)     | (0.177)   | (0.137)   | (0.079)   | (4.067)   | (4.070)   | (0.439)     | (0.401)     |
| Share old                       | 1.184**     | 1.150**   | 0.477     | 0.433     | -0.198    | -0.189    | 3808.605**  | 3853.149**  |
|                                 | (2.587)     | (2.520)   | (0.964)   | (0.877)   | (-0.096)  | (-0.092)  | (2.413)     | (2.445)     |
| Share German speaking           | -0.523      | -0.561    | -0.826*** | -0.835*** | -0.344    | -0.382    | 481.813     | 355.555     |
|                                 | (-1.338)    | (-1.461)  | (-2.905)  | (-3.084)  | (-0.292)  | (-0.328)  | (0.287)     | (0.216)     |
| Share left-wingers in executive | -0.047      | -0.048    | -0.008    | -0.009    | -0.192    | -0.192    | -199.860    | -198.341    |
|                                 | (-0.967)    | (-1.001)  | (-0.215)  | (-0.240)  | (-1.146)  | (-1.142)  | (-1.049)    | (-1.036)    |
| Parties in executive            | -0.018**    | -0.018**  | -0.012*   | -0.012*   | -0.000    | -0.001    | -44.989     | -48.370     |
|                                 | (-2.250)    | (-2.299)  | (-1.772)  | (-1.689)  | (-0.008)  | (-0.039)  | (-1.494)    | (-1.615)    |
| Constant                        | 8.013***    | 8.234***  | 9.029***  | 9.280***  | 15.530*** | 15.513*** | -8.0e+03*   | -8.1e+03*   |
|                                 | (7.179)     | (7.585)   | (7.292)   | (7.683)   | (3.811)   | (3.797)   | (-1.763)    | (-1.805)    |
| Adj. R2                         | 0.44        | 0.45      | 0.54      | 0.55      | 0.13      | 0.13      | 0.07        | 0.07        |
| N                               | 2747        | 2747      | 2747      | 2747      | 2747      | 2747      | 2747        | 2747        |
| Cluster                         | 116         | 116       | 116       | 116       | 116       | 116       | 116         | 116         |

Note: See Table 4.

Table 8 Robustness check: Exclusion of political controls, 1982-2007

|                       | Expenditure |           | Revenue   |           | Debt      |           | Deficit     |             |
|-----------------------|-------------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|
| Debt brake            | -0.033*     |           | -0.053*** |           | 0.007     |           | 91.323*     |             |
|                       | (-1.921)    |           | (-3.289)  |           | (0.141)   |           | (1.949)     |             |
| Debt brake index      |             | -0.038*** |           | -0.046*** |           | 0.007     |             | 38.424      |
|                       |             | (-2.988)  |           | (-4.049)  |           | (0.231)   |             | (1.249)     |
| Unemployment          | -0.560      | -0.657    | -0.812*   | -0.923**  | 0.103     | 0.120     | 1669.218    | 1733.773    |
|                       | (-1.231)    | (-1.472)  | (-1.843)  | (-2.154)  | (0.063)   | (0.074)   | (1.019)     | (1.065)     |
| Income                | 0.102       | 0.102     | 0.145*    | 0.144*    | -0.068    | -0.068    | -211.363    | -205.612    |
|                       | (1.432)     | (1.439)   | (1.750)   | (1.751)   | (-0.518)  | (-0.519)  | (-1.131)    | (-1.097)    |
| Population            | -0.253**    | -0.266*** | -0.352*** | -0.368*** | -1.030*** | -1.028*** | 961.742***  | 972.224***  |
|                       | (-2.586)    | (-2.781)  | (-3.373)  | (-3.608)  | (-3.419)  | (-3.393)  | (2.929)     | (2.970)     |
| Grants                | 0.124***    | 0.126***  | 0.126***  | 0.127***  | 0.107**   | 0.107**   | 12.713      | 17.822      |
|                       | (4.539)     | (4.631)   | (4.666)   | (4.726)   | (2.058)   | (2.047)   | (0.375)     | (0.530)     |
| Share young           | -0.194      | -0.206    | -0.186    | -0.191    | 4.976***  | 4.977***  | 548.779     | 520.554     |
|                       | (-0.409)    | (-0.443)  | (-0.442)  | (-0.469)  | (2.948)   | (2.954)   | (0.500)     | (0.472)     |
| Share old             | 1.219***    | 1.188***  | 0.608     | 0.563     | -1.418    | -1.412    | 3770.191*** | 3833.711*** |
|                       | (2.738)     | (2.679)   | (1.310)   | (1.224)   | (-0.798)  | (-0.796)  | (2.818)     | (2.866)     |
| Share German speaking | -0.608*     | -0.629*   | -0.901*** | -0.910*** | -0.056    | -0.053    | 1219.715    | 1161.419    |
|                       | (-1.754)    | (-1.839)  | (-3.362)  | (-3.523)  | (-0.056)  | (-0.054)  | (0.901)     | (0.866)     |
| Constant              | 9.252***    | 9.399***  | 10.047*** | 10.226*** | 17.345*** | 17.318*** | -8.6e+03**  | -8.8e+03**  |
|                       | (7.697)     | (7.955)   | (8.167)   | (8.476)   | (4.819)   | (4.787)   | (-2.478)    | (-2.539)    |
| Adj. R2               | 0.43        | 0.44      | 0.51      | 0.52      | 0.12      | 0.12      | 0.08        | 0.08        |
| N                     | 3414        | 3414      | 3414      | 3414      | 3414      | 3414      | 3414        | 3414        |
| Cluster               | 141         | 141       | 141       | 141       | 141       | 141       | 141         | 141         |

Note: See Table 4.

Table 9 Robustness check: Exclusion of political controls, spending categories, 1982-2007

|                       | Admin               | Security             | Education             | Culture               | Health                | Environment         | Social Welfare      | Traffic               | Others                |
|-----------------------|---------------------|----------------------|-----------------------|-----------------------|-----------------------|---------------------|---------------------|-----------------------|-----------------------|
| Debt brake index      | -0.024<br>(-1.276)  | -0.043**<br>(-2.306) | -0.140***<br>(-4.382) | -0.001<br>(-0.016)    | -0.380***<br>(-3.596) | -0.017<br>(-0.733)  | -0.036<br>(-1.412)  | -0.007<br>(-0.363)    | 0.038<br>(1.357)      |
| Unemployment          | -0.227<br>(-0.298)  | -0.144<br>(-0.162)   | -3.366***<br>(-3.290) | 3.551*<br>(1.669)     | 1.120<br>(0.377)      | -0.513<br>(-0.346)  | 0.601<br>(0.422)    | -0.508<br>(-0.497)    | -1.498<br>(-1.165)    |
| Income                | 0.255***<br>(2.633) | 0.086<br>(0.831)     | 0.073<br>(0.392)      | 0.101<br>(0.458)      | 0.623<br>(1.485)      | 0.175*<br>(1.853)   | -0.087<br>(-1.091)  | 0.063<br>(0.882)      | 0.352**<br>(2.281)    |
| Population            | -0.110<br>(-0.684)  | -0.075<br>(-0.371)   | 0.386*<br>(1.742)     | -0.472<br>(-1.427)    | 0.793<br>(1.003)      | -0.437*<br>(-1.790) | -0.366<br>(-1.361)  | -0.772***<br>(-3.482) | -0.779***<br>(-3.351) |
| Grants                | 0.019<br>(1.085)    | -0.009<br>(-0.481)   | 0.150**<br>(2.074)    | -0.064<br>(-1.390)    | 0.220*<br>(1.669)     | 0.077**<br>(2.258)  | 0.138***<br>(4.330) | 0.030*<br>(1.772)     | 0.124***<br>(3.789)   |
| Share young           | 0.239<br>(0.343)    | 0.025<br>(0.031)     | -0.467<br>(-0.455)    | -7.746***<br>(-4.377) | -3.824<br>(-1.010)    | 0.672<br>(0.489)    | 1.514<br>(1.141)    | -1.946*<br>(-1.670)   | 4.219***<br>(3.636)   |
| Share old             | -1.207<br>(-1.578)  | 1.443<br>(1.519)     | 2.474*<br>(1.864)     | -2.996<br>(-1.199)    | 10.300***<br>(2.705)  | 1.630<br>(1.238)    | 3.073**<br>(2.142)  | -1.499<br>(-1.595)    | 0.069<br>(0.054)      |
| Share German speaking | 0.151<br>(0.263)    | -0.518<br>(-0.938)   | -2.227**<br>(-2.333)  | -0.071<br>(-0.062)    | -3.836<br>(-1.542)    | 1.246<br>(1.498)    | -1.296<br>(-1.084)  | 0.410<br>(0.477)      | 1.406*<br>(1.781)     |
| Constant              | 4.278**<br>(2.027)  | 5.035**<br>(2.031)   | 2.958<br>(1.053)      | 10.451***<br>(2.676)  | -8.002<br>(-0.821)    | 6.642**<br>(2.265)  | 9.511***<br>(3.342) | 12.973***<br>(4.473)  | 7.692***<br>(2.667)   |
| Adj. R2               | 0.16                | 0.28                 | 0.14                  | 0.63                  | 0.14                  | 0.07                | 0.61                | 0.04                  | 0.42                  |
| N                     | 3414                | 3414                 | 3414                  | 3414                  | 3252                  | 3414                | 3414                | 3414                  | 3414                  |
| Cluster               | 141                 | 141                  | 141                   | 141                   | 138                   | 141                 | 141                 | 141                   | 141                   |

Note: See Table 4.

Table 10 Robustness check: Inclusion of direct democratic indicators, 1982-2005

|                                 | Expenditure           |                       | Revenue               |                       | Debt                  |                       | Deficit                 |                         |
|---------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------|-------------------------|
| Debt brake                      | -0.021<br>(-1.116)    |                       | -0.047***<br>(-2.826) |                       | 0.061<br>(1.307)      |                       | 147.379**<br>(2.267)    |                         |
| Debt brake index                |                       | -0.020<br>(-1.636)    |                       | -0.031***<br>(-2.811) |                       | 0.040<br>(1.515)      |                         | 59.036*<br>(1.821)      |
| Unemployment                    | -0.911**<br>(-2.186)  | -0.933**<br>(-2.244)  | -1.223***<br>(-3.071) | -1.249***<br>(-3.156) | 0.155<br>(0.093)      | 0.188<br>(0.113)      | 2127.895<br>(1.337)     | 2146.036<br>(1.349)     |
| Income                          | 0.030<br>(0.437)      | 0.032<br>(0.463)      | 0.061<br>(0.832)      | 0.062<br>(0.846)      | -0.094<br>(-0.647)    | -0.096<br>(-0.660)    | -108.932<br>(-0.753)    | -104.483<br>(-0.722)    |
| Population                      | -0.288***<br>(-2.857) | -0.292***<br>(-2.906) | -0.400***<br>(-3.875) | -0.403***<br>(-3.931) | -1.083***<br>(-3.449) | -1.079***<br>(-3.437) | 971.739***<br>(3.024)   | 964.188***<br>(3.021)   |
| Grants                          | 0.127***<br>(4.589)   | 0.128***<br>(4.605)   | 0.127***<br>(4.661)   | 0.127***<br>(4.674)   | 0.125**<br>(2.536)    | 0.125**<br>(2.529)    | 15.358<br>(0.447)       | 16.330<br>(0.478)       |
| Share young                     | -0.191<br>(-0.437)    | -0.190<br>(-0.436)    | -0.248<br>(-0.630)    | -0.231<br>(-0.588)    | 4.738***<br>(2.904)   | 4.716***<br>(2.898)   | 519.638<br>(0.442)      | 425.460<br>(0.363)      |
| Share old                       | 1.090**<br>(2.495)    | 1.084**<br>(2.482)    | 0.500<br>(1.077)      | 0.503<br>(1.085)      | -1.107<br>(-0.643)    | -1.111<br>(-0.646)    | 3662.936**<br>(2.405)   | 3605.499**<br>(2.373)   |
| Share German speaking           | -0.386<br>(-1.092)    | -0.401<br>(-1.140)    | -0.754***<br>(-2.854) | -0.783***<br>(-3.026) | -0.316<br>(-0.332)    | -0.278<br>(-0.289)    | 1518.482<br>(1.206)     | 1593.942<br>(1.260)     |
| Share left-wingers in executive | -0.029<br>(-0.787)    | -0.029<br>(-0.779)    | 0.004<br>(0.124)      | 0.004<br>(0.133)      | -0.207<br>(-1.500)    | -0.207<br>(-1.505)    | -246.335<br>(-1.636)    | -246.212<br>(-1.637)    |
| Parties in executive            | -0.004<br>(-0.584)    | -0.004<br>(-0.594)    | -0.003<br>(-0.411)    | -0.002<br>(-0.376)    | 0.018<br>(0.704)      | 0.018<br>(0.694)      | -20.550<br>(-0.750)     | -22.201<br>(-0.809)     |
| Mandatory referendum            | -0.049<br>(-0.990)    | -0.048<br>(-0.969)    | -0.054<br>(-1.305)    | -0.052<br>(-1.280)    | -0.040<br>(-0.338)    | -0.042<br>(-0.352)    | -47.019<br>(-0.224)     | -48.760<br>(-0.236)     |
| Spending threshold              | 0.000<br>(0.333)      | 0.000<br>(0.365)      | 0.000<br>(0.328)      | 0.000<br>(0.547)      | 0.000<br>(1.132)      | 0.000<br>(1.045)      | 0.000<br>(0.685)        | 0.000<br>(0.474)        |
| Signature requirement           | -0.000***<br>(-4.448) | -0.000***<br>(-4.117) | -0.000***<br>(-5.461) | -0.000***<br>(-4.937) | -0.000<br>(-1.123)    | -0.000<br>(-1.286)    | 0.006<br>(0.543)        | 0.004<br>(0.365)        |
| Constant                        | 10.282***<br>(8.443)  | 10.311***<br>(8.473)  | 11.388***<br>(10.192) | 11.411***<br>(10.225) | 18.232***<br>(4.921)  | 18.202***<br>(4.921)  | -9.9e+03***<br>(-3.079) | -9.9e+03***<br>(-3.085) |
| Adj. R2                         | 0.45                  | 0.45                  | 0.52                  | 0.52                  | 0.13                  | 0.13                  | 0.08                    | 0.08                    |
| N                               | 3133                  | 3133                  | 3133                  | 3133                  | 3133                  | 3133                  | 3133                    | 3133                    |
| Cluster                         | 141                   | 141                   | 141                   | 141                   | 141                   | 141                   | 141                     | 141                     |

Note: See Table 4.

Table 11 Robustness check: Restriction to municipalities with parliaments, 1982-2007

|                                  | Expenditure |           | Revenue   |           | Debt     |          | Deficit     |             |
|----------------------------------|-------------|-----------|-----------|-----------|----------|----------|-------------|-------------|
| Debt brake                       | -0.056**    |           | -0.070*** |           | 0.058    |          | 38.863      |             |
|                                  | (-2.531)    |           | (-3.713)  |           | (1.011)  |          | (0.656)     |             |
| Debt brake index                 |             | -0.052*** |           | -0.059*** |          | 0.024    |             | 19.325      |
|                                  |             | (-3.390)  |           | (-4.605)  |          | (0.661)  |             | (0.518)     |
| Unemployment                     | -0.639      | -0.825*   | -0.432    | -0.632    | 1.460    | 1.499    | -675.907    | -632.709    |
|                                  | (-1.251)    | (-1.674)  | (-0.888)  | (-1.363)  | (0.803)  | (0.830)  | (-0.320)    | (-0.304)    |
| Income                           | 0.327***    | 0.316***  | 0.420***  | 0.411***  | 0.309    | 0.301    | -487.169    | -490.395    |
|                                  | (3.487)     | (3.410)   | (4.615)   | (4.502)   | (1.141)  | (1.117)  | (-1.046)    | (-1.058)    |
| Population                       | -0.306***   | -0.324*** | -0.438*** | -0.456*** | -0.869** | -0.870** | 1162.368*** | 1164.100*** |
|                                  | (-2.800)    | (-3.006)  | (-4.081)  | (-4.318)  | (-2.451) | (-2.452) | (2.788)     | (2.773)     |
| Grants                           | 0.099***    | 0.100***  | 0.100***  | 0.101***  | 0.084    | 0.087    | 18.468      | 19.888      |
|                                  | (5.315)     | (5.522)   | (5.979)   | (6.235)   | (1.339)  | (1.374)  | (0.524)     | (0.569)     |
| Share young                      | 0.473       | 0.412     | 0.430     | 0.375     | 6.867*** | 6.832*** | 845.092     | 832.477     |
|                                  | (0.893)     | (0.815)   | (0.972)   | (0.900)   | (3.249)  | (3.232)  | (0.550)     | (0.544)     |
| Share old                        | 1.237**     | 1.192**   | 0.469     | 0.422     | -0.982   | -0.979   | 4813.513*** | 4820.128**  |
|                                  | (2.424)     | (2.426)   | (0.935)   | (0.876)   | (-0.495) | (-0.493) | (2.725)     | (2.723)     |
| Share German speaking            | -0.716*     | -0.779**  | -1.010*** | -1.073*** | 0.597    | 0.591    | 1074.925    | 1078.405    |
|                                  | (-1.899)    | (-2.084)  | (-4.157)  | (-4.600)  | (0.582)  | (0.568)  | (0.582)     | (0.590)     |
| Share left-wingers in executive  | -0.003      | -0.007    | 0.024     | 0.021     | -0.232*  | -0.235*  | -229.216    | -230.651    |
|                                  | (-0.066)    | (-0.144)  | (0.734)   | (0.655)   | (-1.770) | (-1.784) | (-1.197)    | (-1.215)    |
| Parties in executive             | -0.009      | -0.009    | -0.007    | -0.007    | 0.014    | 0.013    | -24.079     | -24.906     |
|                                  | (-1.164)    | (-1.163)  | (-1.061)  | (-1.004)  | (0.499)  | (0.448)  | (-0.710)    | (-0.740)    |
| Share left-wingers in parliament | -0.060      | -0.061    | -0.084    | -0.087    | 0.100    | 0.112    | 254.676     | 261.182     |
|                                  | (-0.619)    | (-0.638)  | (-1.156)  | (-1.251)  | (0.421)  | (0.463)  | (0.709)     | (0.736)     |
| Parties in parliament            | 0.003       | 0.004     | 0.008     | 0.008*    | -0.022   | -0.024   | -20.559     | -21.287     |
|                                  | (0.559)     | (0.670)   | (1.633)   | (1.874)   | (-1.270) | (-1.337) | (-0.858)    | (-0.893)    |
| Constant                         | 7.559***    | 7.896***  | 8.166***  | 8.493***  | 11.492** | 11.581** | -7.9e+03    | -7.9e+03    |
|                                  | (4.479)     | (4.756)   | (4.984)   | (5.199)   | (2.077)  | (2.096)  | (-1.251)    | (-1.250)    |
| Adj. R2                          | 0.48        | 0.49      | 0.58      | 0.59      | 0.15     | 0.15     | 0.08        | 0.08        |
| N                                | 2426        | 2426      | 2426      | 2426      | 2426     | 2426     | 2426        | 2426        |
| Cluster                          | 106         | 106       | 106       | 106       | 106      | 106      | 106         | 106         |

Note: See Table 4.

Table 12 Robustness check: Unconditional grants, 1990-2007

|                                 | Expenditure |           | Revenue   |           | Debt      |           | Deficit     |             |
|---------------------------------|-------------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|
| Debt brake                      | -0.021      |           | -0.029    |           | 0.090*    |           | 56.911      |             |
|                                 | (-0.851)    |           | (-1.218)  |           | (1.913)   |           | (0.903)     |             |
| Debt brake index                |             | -0.034**  |           | -0.037**  |           | 0.051*    |             | 14.343      |
|                                 |             | (-2.200)  |           | (-2.564)  |           | (1.659)   |             | (0.400)     |
| Unemployment                    | -0.918      | -1.016*   | -1.420**  | -1.527**  | 1.116     | 1.253     | 1976.109    | 2009.309    |
|                                 | (-1.514)    | (-1.729)  | (-2.306)  | (-2.577)  | (0.844)   | (0.958)   | (1.147)     | (1.170)     |
| Income                          | 0.086       | 0.090     | 0.108     | 0.111     | -0.120    | -0.115    | -28.613     | -21.632     |
|                                 | (1.084)     | (1.139)   | (1.338)   | (1.391)   | (-0.930)  | (-0.892)  | (-0.217)    | (-0.164)    |
| Population                      | -0.316***   | -0.337*** | -0.412*** | -0.436*** | -1.338*** | -1.304*** | 953.416**   | 963.658**   |
|                                 | (-2.736)    | (-2.970)  | (-2.737)  | (-2.963)  | (-5.494)  | (-5.306)  | (2.149)     | (2.211)     |
| Unconditional Grants            | 0.002       | 0.003     | 0.008**   | 0.009**   | 0.027*    | 0.027**   | -36.748***  | -35.651***  |
|                                 | (0.550)     | (0.813)   | (2.197)   | (2.489)   | (1.963)   | (1.993)   | (-2.689)    | (-2.663)    |
| Share young                     | 0.093       | -0.007    | 0.184     | 0.086     | 5.516*    | 5.545*    | -868.535    | -924.734    |
|                                 | (0.093)     | (-0.007)  | (0.181)   | (0.086)   | (1.795)   | (1.799)   | (-0.430)    | (-0.456)    |
| Share old                       | 1.122*      | 1.107*    | 0.369     | 0.341     | -3.750*   | -3.612*   | 5477.348*** | 5578.254*** |
|                                 | (1.882)     | (1.903)   | (0.635)   | (0.612)   | (-1.891)  | (-1.838)  | (2.862)     | (2.855)     |
| Share German speaking           | -1.263***   | -1.346*** | -1.108*** | -1.163*** | -0.577    | -0.808    | 771.241     | 517.224     |
|                                 | (-3.160)    | (-3.413)  | (-3.045)  | (-3.234)  | (-0.453)  | (-0.622)  | (0.509)     | (0.343)     |
| Share left-wingers in executive | 0.034       | 0.039     | 0.011     | 0.014     | -0.119    | -0.111    | 28.241      | 37.816      |
|                                 | (0.761)     | (0.877)   | (0.263)   | (0.348)   | (-0.909)  | (-0.842)  | (0.144)     | (0.193)     |
| Parties in executive            | -0.007      | -0.007    | -0.002    | -0.002    | 0.002     | 0.001     | -38.182     | -39.394     |
|                                 | (-0.898)    | (-1.020)  | (-0.245)  | (-0.323)  | (0.086)   | (0.053)   | (-1.126)    | (-1.159)    |
| Constant                        | 11.295***   | 11.552*** | 11.926*** | 12.195*** | 22.200*** | 21.950*** | -9.6e+03*   | -9.6e+03**  |
|                                 | (8.663)     | (9.120)   | (7.692)   | (8.077)   | (7.815)   | (7.701)   | (-1.976)    | (-1.999)    |
| Adj. R2                         | 0.07        | 0.08      | 0.20      | 0.21      | 0.13      | 0.13      | 0.10        | 0.10        |
| N                               | 2169        | 2169      | 2169      | 2169      | 2169      | 2169      | 2169        | 2169        |
| Cluster                         | 133         | 133       | 133       | 133       | 133       | 133       | 133         | 133         |

Note: See Table 4.

Table 13 Robustness check: Quadratic terms for population and income, 1982-2007

|                                 | Expenditure |           | Revenue   |           | Debt      |           | Deficit     |             |
|---------------------------------|-------------|-----------|-----------|-----------|-----------|-----------|-------------|-------------|
| Debt brake                      | -0.034*     |           | -0.053*** |           | 0.009     |           | 86.008*     |             |
|                                 | (-1.950)    |           | (-3.238)  |           | (0.198)   |           | (1.788)     |             |
| Debt brake index                |             | -0.038*** |           | -0.046*** |           | 0.007     |             | 35.326      |
|                                 |             | (-2.980)  |           | (-3.970)  |           | (0.225)   |             | (1.128)     |
| Unemployment                    | -0.576      | -0.672    | -0.805*   | -0.914**  | 0.156     | 0.172     | 1615.155    | 1672.436    |
|                                 | (-1.276)    | (-1.518)  | (-1.831)  | (-2.135)  | (0.096)   | (0.106)   | (0.987)     | (1.028)     |
| Income (quadratic term)         | 0.051       | 0.052     | 0.067     | 0.067     | -0.029    | -0.029    | -87.778     | -84.633     |
|                                 | (1.423)     | (1.430)   | (1.653)   | (1.649)   | (-0.463)  | (-0.460)  | (-0.970)    | (-0.933)    |
| Population (quadratic term)     | -0.125**    | -0.132*** | -0.178*** | -0.186*** | -0.514*** | -0.512*** | 493.087***  | 497.967***  |
|                                 | (-2.579)    | (-2.774)  | (-3.387)  | (-3.615)  | (-3.406)  | (-3.380)  | (2.944)     | (2.983)     |
| Grants                          | 0.124***    | 0.126***  | 0.124***  | 0.125***  | 0.108**   | 0.108**   | 18.037      | 23.015      |
|                                 | (4.522)     | (4.609)   | (4.590)   | (4.643)   | (2.042)   | (2.036)   | (0.526)     | (0.678)     |
| Share young                     | -0.148      | -0.159    | -0.225    | -0.230    | 5.076***  | 5.075***  | 833.961     | 806.527     |
|                                 | (-0.314)    | (-0.344)  | (-0.536)  | (-0.563)  | (2.959)   | (2.965)   | (0.764)     | (0.736)     |
| Share old                       | 1.210***    | 1.183***  | 0.577     | 0.536     | -1.568    | -1.561    | 3842.171*** | 3906.315*** |
|                                 | (2.703)     | (2.659)   | (1.239)   | (1.160)   | (-0.890)  | (-0.888)  | (2.861)     | (2.908)     |
| Share German speaking           | -0.640*     | -0.660*   | -0.901*** | -0.908*** | -0.034    | -0.035    | 1135.089    | 1077.770    |
|                                 | (-1.854)    | (-1.939)  | (-3.372)  | (-3.532)  | (-0.035)  | (-0.036)  | (0.844)     | (0.808)     |
| Share left-wingers in executive | -0.017      | -0.017    | 0.005     | 0.005     | -0.214    | -0.213    | -145.879    | -143.356    |
|                                 | (-0.432)    | (-0.426)  | (0.151)   | (0.156)   | (-1.613)  | (-1.613)  | (-0.973)    | (-0.953)    |
| Parties in executive            | -0.008      | -0.007    | -0.006    | -0.005    | 0.011     | 0.011     | -18.783     | -21.249     |
|                                 | (-1.136)    | (-1.092)  | (-0.912)  | (-0.777)  | (0.436)   | (0.428)   | (-0.765)    | (-0.869)    |
| Constant                        | 9.271***    | 9.418***  | 10.236*** | 10.415*** | 17.203*** | 17.177*** | -9.2e+03*** | -9.3e+03*** |
|                                 | (7.715)     | (7.967)   | (8.361)   | (8.654)   | (4.799)   | (4.762)   | (-2.620)    | (-2.682)    |
| Adj. R2                         | 0.44        | 0.44      | 0.51      | 0.52      | 0.12      | 0.12      | 0.08        | 0.08        |
| N                               | 3397        | 3397      | 3397      | 3397      | 3397      | 3397      | 3397        | 3397        |
| Cluster                         | 141         | 141       | 141       | 141       | 141       | 141       | 141         | 141         |

Note: See Table 4.

Table 14 Data sources

|                                                                 |                                                                                                  |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Debt brakes index                                               | Feld et al. (2013), enhanced by one canton                                                       |
| Local income                                                    | Direkte Bundessteuer: Natürliche Personen, Swiss Federal Tax Administration Berne, various years |
| Share German speaking                                           | Feld et al. (2013)                                                                               |
| Mandatory referendum, signature requirement, spending threshold | Feld et al. (2013)                                                                               |
| All other variables                                             | Statistical Yearbook of the Swiss Association of Cities, various years                           |

Note: For further information refer to Table 3 and sources.

Table 15 Summary of observed municipalities, 1982-2007

| Municipal              | Canton | '82 | '83 | '84 | '85 | '86 | '87 | '88 | '89 | '90 | '91 | '92 | '93 | '94 | '95 | '96 | '97 | '98 | '99 | '00 | '01 | '02 | '03 | '04 | '05 | '06 | '07 |
|------------------------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Aarau                  | AG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Baden                  | AG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Brugg                  | AG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Lenzburg               | AG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Rheinfelden            | AG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Wettingen              | AG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Wohlen                 | AG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Zofingen               | AG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Appenzell              | AI     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Herisau                | AR     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Bern                   | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Biel                   | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Burgdorf               | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Ittingen               | BE     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Köniz                  | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Langenthal             | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Lyss                   | BE     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Moutier                | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Münsingen              | BE     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Muri bei Bern          | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| La Neuveville          | BE     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Nidau                  | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Ostermundigen          | BE     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Spiez                  | BE     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Steffisburg            | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Thun                   | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Worb                   | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Zollikofen             | BE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Aesch                  | BL     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Allschwil              | BL     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Binningen              | BL     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Birsfelden             | BL     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Liestal                | BL     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Münchenstein           | BL     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Muttenz                | BL     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Pratteln               | BL     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Reinach                | BL     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Basle                  | BS     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Riehen                 | BS     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Bulle                  | FR     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Fribourg               | FR     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Murten                 | FR     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Carouge                | GE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Geneva                 | GE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Lancy                  | GE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Meyrin                 | GE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Onex                   | GE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Thônex                 | GE     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Vernier                | GE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Versoix                | GE     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Glarus                 | GL     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Arosa                  | GR     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Chur                   | GR     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Davos                  | GR     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| St. Moritz             | GR     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Delémont               | JU     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Porrentruy             | JU     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Ebikon                 | LU     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Emmen                  | LU     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Horw                   | LU     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Kriens                 | LU     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Littau                 | LU     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Lucerne                | LU     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Sursee                 | LU     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| La Chaux de Fonds      | NE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Le Locle               | NE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Neuchâtel              | NE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Peseux                 | NE     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Stans                  | NW     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Altstätten             | SG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Gossau                 | SG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Jona                   | SG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Rapperswil             | SG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Rorschach              | SG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| St. Gall               | SG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Uzwil                  | SG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Wil                    | SG     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Neuhausen am Rheinfall | SH     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Schaffhausen           | SH     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Grenchen               | SO     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Olten                  | SO     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Solothurn              | SO     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Einsiedeln             | SZ     | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   | x   |
| Freienbach             | SZ     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

