



Government Weakness and Local Public Debt Development in Flemish Municipalities

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Abstract

The Weak Government Hypothesis states that government fragmentation leads to higher public deficits and debt. This relation can be explained by government inaction, common pool problems or the strategic use of debt that arise in coalition governments. Importantly, whereas government inaction models concentrate on the short-term effects of government fragmentation on indebtedness, common pool and strategic debt models imply that such effects will persist in the long term. We test these hypotheses using a large panel of data on municipal debt in 298 Flemish municipalities (1977–2000). We find that there is no long-run effect from weak governments. However, there is general support for the fact that the number of parties in a coalition has a positive effect on the municipality's short-term debt levels—in line with government inaction models.

Keywords: government fragmentation, debt, local government

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1. Introduction

In two path-breaking articles, Roubini and Sachs (1989a, b) show that ‘weaker’ (i.e. more fragmented) governments tend to face larger budget deficits and debts. Since these seminal contributions, numerous studies have examined this so-called Weak Government Hypothesis (WGH). While some authors have questioned the robustness of Roubini and Sachs’ findings, the general picture that emerges from the literature is supportive of their main idea: fragmented governments have larger deficits and debts.

Hitherto, the empirical WGH-literature has been characterised by a strong focus on country-level data (panel or time-series). However, looking at lower-level governments provides an interesting means to test the WGH on much broader—and more homogeneous—databases. To exploit this advantage, Alt and Lowry (1994), Poterba (1994) and Clingermayer and Wood (1995) look at US state-level data. Recently, the WGH has been

analysed in the context of Norwegian (Tovmo, 2001; Borge, 2003; Hagen and Vabo, 2005) and Danish municipalities (Rattsø and Tovmo, 2002), German Länder (Jochimsen and Nuscheler, 2004), Argentine provinces (Rumi, 2004) and Swiss cantons (Schaltegger and Feld, 2004).

The present paper contributes to this *local-government-tradition* in the literature. We test the WGH for Flemish municipalities. Analysing the relation between public debt and local politics in this context offers important advantages. First, and common to other analyses on local data, municipalities have a homogeneous institutional context. The electoral rules, the timing of the elections, the formal budget rules, . . . are identical across municipalities. This allows to concentrate on the crucial political (fragmentation) variables without the need to control for these intervening variables. A second advantage is that Flemish municipalities have a parliamentary system. As such, and in contrast to the other local contexts that have been examined, local governments in Flanders show more resemblance to the national governments that have been the focus of the earlier (international) studies. Third, the local focus allows making use of a very large set of data covering 298 of the 308 municipalities for a period of 24 years (1977–2000). This important time-dimension allows a disentangling of short- and long-term effects in the evolution of municipal debt through the use of an error correction model (ECM). As such, we are able to differentiate between the predictions of various theoretical models. More specifically, whereas ‘war of attrition’ models concentrate on the short-term effects of government fragmentation on indebtedness, ‘common pool’ and ‘strategic debt’ models imply that such effects will persist in the long term.

The remainder of the paper is structured as follows. Section 2 provides an overview of the theoretical as well as empirical WGH literature. In Section 3 we discuss the central data of our study: government fragmentation and long-term indebtedness in the Flemish municipalities. To empirically assess the role of government fragmentation on public debt, we estimate an error correction model (ECM). In contrast to previous studies that employ a similar methodology, we first empirically establish the existence of a long-run relation and then proceed to analyse possible short-term deviations from this long-run equilibrium. The results are in Section 4. Finally, Section 5 concludes.

2. Models of Government Fragmentation

2.1. Theoretical Underpinnings

Three groups of models concerning the (fiscal) policy effects of government fragmentation have been advanced. A first group comprises models that explain government inactivity *as such* and the budget deficits that may be the consequence of it. A second group argues that each politician in a decentralised or fragmented political system with common finances disregards the effects of his/her actions on other areas/politicians, hence creating over-expenditures and—in a dynamic setting—deficits. The third group indicates that debts and deficits may be the consequence of strategic behaviour by politicians, where debts are increased to compromise future governments’ policy options.

- Government inaction

Alesina and Drazen (1991) present a ‘war of attrition’ model for fiscal decisions within coalition governments (see also Bulow and Klemperer, 1999). The basic idea is that the number of partners in a decision-making process affects the timing of a decision. More precisely, decisions are delayed until the costs of this delay become too big for (at least) one of the decision-makers. Crucially, a party that by delaying the decision forces the other parties to give in, can pass the largest part of the negative effects of a decision to (the supporters of) the other parties. In the presence of an information asymmetry concerning the size of the cost borne by the other parties, each party has an incentive to wait and see whether the others give in first. Stabilisations are delayed until “one group concedes and bears a disproportionate share of the burden” (Alesina and Drazen, 1991, p. 1170).¹

Related to this line of argument is the veto-player approach proposed by Tsebelis (1995a, b). In his view, *each* coalition partner is a veto-player, that is, “an individual or collective actor whose agreement is required for a policy decision” (Tsebelis, 1995a, p. 293). If the number of veto-players increases, it becomes more difficult to reach agreement over a change in the status quo. This status quo bias leads to larger budget deficits and debts under more fragmented governments (see also Roubini and Sachs, 1989). A similar status quo bias arises in Howitt and Wintrobe (1995): parties refrain from bringing a policy issue on the political agenda as they fear that their preferred solution to the problem will be defeated by other parties’ solution.

These models thus lead to the hypothesis that fragmented governments have a tendency to postpone changes in their policy. Because fiscal consolidations are delayed, deficits and debt are allowed to increase further than in case of a one-party majority government. Still, “coalition or divided governments do not *create* budget deficits, but rather, procrastinate the adjustment to shocks” (Alesina and Perotti, 1995, p. 19, italics in original). Moreover, all three approaches imply that deficits and debt will be higher under fragmented governments only in the short run. Action to prevent increasing indebtedness is merely delayed, such that no long-run effects are expected.

- Common pool problems

In common pool models, politicians have a certain (policy) area they want to attend.² The funds to pay for government expenditures are obtained from nationwide taxation (the ‘common pool’) while benefits are targeted to specific groups (Weingast, Shepsle and Johnson, 1981). The rational strategy for each politician is then to ‘oversupply’ the public projects targeted at his/her electorate. This problem intensifies when the number of parties in the coalition increases. The reason is that the share of the costs that is internalised by each group decreases as the number of groups increases (the ‘Law of 1/n’). Moreover, the smaller the number of parties, the easier it is to come to a cooperative (and socially optimal) solution (Olson, 1982, 1993). Though the standard common pool model has a static set-up and only predicts over-expenditures, it has been shown that in a dynamic setting higher fragmentation levels lead to larger deficits (Velasco, 1999, 2000). Note, moreover, that in contrast to the government inaction models discussed above, this is a structural problem and thus implies that government fragmentation is expected to have a long-run effect on public debts and deficits.

Note, finally, that Tornell and Lane (1999) show that the relationship between the number of participants in an appropriation process and the extent of inefficiency in allocating resources may well be non-monotonic. The inefficiency (here: overspending) is at a minimum when there is only one agent and at a maximum with two agents. Further increases in the number of participants lead to lower levels of overspending. The reason for this prediction is that “an increase in the number of powerful groups [leads to] a dilution of power concentration” (Tornell and Lane, 1999, p. 32).

- Strategic use of debt

As shown by Persson and Svensson (1989), Alesina and Tabellini (1990) and Tabellini and Alesina (1990), uncertainty about future government may lead to strategic behaviour of current policymakers *and* “a deficit bias” (Alesina and Tabellini, 1990, p. 403). The present government attempts to affect the next term’s policy outcome by limiting the choice set of its successor through strategic policy decisions (and increasing indebtedness).³ Importantly, coalition members are—as a general rule—less certain about their position after the following elections. Not only are they uncertain about their election result (just the same as parties who do have a majority position); they also face an additional (and often much larger) uncertainty due to the unpredictability of the coalition formation process. This higher uncertainty about one’s prospects to be in power after future elections increases the incentive in fragmented governments to act strategically and thus leads those governments to aim for higher levels of debt.

2.2. *Empirical Evidence*

Roubini and Sachs (1989a, b) analyse the fiscal behaviour of 13 OECD countries over the period 1960–1985. Their main conclusions are drawn with respect to a “Type of Government”-index. This index takes values from 0 to 3. One-party majority governments or presidential systems receive the value 0. Coalitions consisting of two parties or presidential systems with different parties holding a majority in the executive and legislative branch receive the value 1. Coalitions of more than two parties get a value 2. Finally, minority governments get a value of 3. Introducing this “Type of Government”-index as a measure of political fragmentation, the WGH is confirmed: multi-party coalition governments face higher budget deficits (as measured by the year-to-year change in the debt-to-GDP ratio).

Since the seminal work of Roubini and Sachs, numerous studies followed. Some have questioned the robustness of the findings in Roubini and Sachs (1989a, b). Edin and Ohlsson (1991), for example, find that the fragmentation effect is “entirely due to minority governments having larger budget deficits” (Edin and Ohlsson, 1991, p. 1601; see also Kontopoulos and Perotti, 1998). Perotti and Kontopoulos (2002, p. 192) conclude that “any inference based on this [Type of Government] variable is extremely fragile to minor differences in the specification, the sample and especially the coding of the variable itself”. Later studies generally provided mixed support for the WGH. For example, Alesina and Perotti (1995) show that coalition governments are less successful in introducing fiscal adjustment measures while Borelli and Royed (1995) find that ‘weaker’ governments show a significant

rise in deficits *only* when GDP-growth is low. Analysing not only the deficit, but also its constituent parts: expenditures and revenues, Kontopoulos and Perotti (1998, 1999) find that fragmentation increases the deficit and that this effect is mostly due to the effect of fragmentation on expenditures.⁴ On the other hand, Hahm, Kamlet and Mowery (1996), Hallerberg and Von Hagen (1999) and Freitag and Sciarini (2001) fail to find any significant effect from government fragmentation (for further references, see Table A.1 in appendix).

Most analyses of the WGH consider budget deficits at the country-level. There are some exceptions to this 'rule'. Alt and Lowry (1994), Poterba (1994) and Clingermayer and Wood (1995) analyse debts of US states. The notion of fragmentation takes a specific form in the US context. Fragmentation is defined in terms of divided government. The first two studies operationalize fragmentation via a dummy variable for the existence of 'compound' divided government in the state. This refers to a situation where "control of the two chambers of the legislature is split between the two parties" (Bowling and Ferguson, 2001, p. 189). Both studies provide some support for the WGH. Alt and Lowry (1994) find that divided governments are less able to react to revenue shocks. Poterba (1994) shows that in states where the government is divided, taxes are raised less and spending is cut by lower amounts in response to deficit shocks. Clingermayer and Wood (1995) use three dummy variables to represent all possible forms of divided government and find no support for the WGH.

Recently, the WGH has been tested on data at lower levels of government outside the US. Jochimsen and Nuscheler (2004) show that public deficit growth is lower for single-party governments in a panel of 10 German Länder. The effect, however, is not statistically significant. Rumi (2004) finds that divided governments in 24 Argentine provinces systematically face larger deficits. Finally, Schaltegger and Feld (2004) analyse fiscal policy outcomes in 26 Swiss cantons. The results indicate that the number of ministers in the cabinet "is of great importance for fiscal policy", while "coalition size has essentially no effect" (Schaltegger and Feld, 2004, p. 1). Only four studies have estimated the effect of fragmentation on deficits at the municipal level. Tovmo (2001), Rattsø and Tovmo (2002), Borge (2003) and Hagen and Vabo (2005) use a Herfindahl index to measure fragmentation. The former two studies look at Norwegian and Danish municipalities respectively. They find that "there is not much support for the hypothesis that deficits will be lower in local governments with a strong political leadership" (Tovmo, 2001, p. 12). Borge (2003), however, finds a very robust effect of fragmentation on the deficit in his sample of more than 350 Norwegian municipalities over the period 1991–1999. Hagen and Vabo (2005) corroborate this finding in a sample of 434 Norwegian municipalities over the period 1991–1998.

3. Government Fragmentation and Debt in Flanders

Flemish municipalities have a parliamentary system with a fixed electoral cycle of 6 years. In the elections, seats in the municipal council are allocated using a system of Proportional Representation. Within the council a majority forms the local government (the College of Mayor and Aldermen) that is the executive power in the municipality. It is a well-established fact that PR systems are characterised by fragmented political landscapes. The number of

Table 1. Number of parties in Flemish municipal governments.

	1977–1982	1983–1988	1989–1994	1995–2000
1 party	184 59.7%	126 40.9%	140 45.5%	120 39.0%
2 parties	103 33.4%	132 42.9%	136 44.8%	149 48.4%
3 parties	20 6.5%	43 14.0%	27 8.8%	31 10.1%
More than three	1 0.3%	7 2.3%	5 1.6%	8 2.6%
Average number of parties	1.47	1.78	1.67	1.77
Total	308	308	308	308

parties competing in elections and in the government is generally larger than under plurality rule. This is also the case in Flanders.

Table 1 reflects the political fragmentation in Flemish municipalities since 1976. The average number of parties in the College of Mayor and Aldermen hovers around 1.70. About 40% of municipalities have single party governments. Little over 40% of the municipalities are governed by a two-party coalition. The latter share increases slowly over the period under study. The remaining municipalities have coalitions of at least 3 parties.

Even though Flemish municipalities can arrange public loans, they borrow almost exclusively from banks. The empirical analysis in the present paper concentrates on long-term municipal debts. These are an indicator for a municipality's 'budgetary stress'. Key data with respect to municipal indebtedness are presented in Figure 1.⁵ The histograms in this figure—using the left-hand scale—depict the average level of local long-term debt (in 1981 prices). The line—using the right-hand scale—represents the coefficient of variation. This index describes how debt levels are distributed around the mean and allows for a comparison of the distribution of debt over time. While debt does give an indication of a municipality's financial health, this does, of course, not imply that any level of indebtedness is problematic. Loans are an important instrument to spread the costs of an investment over its (economic) lifetime. Nevertheless, it is clear that high levels of debt indicate (possibly severe) budgetary problems—just as this is the case for any private firm or individual.

Figure 1 shows that average municipal debt levels have been lingering in a range between 7 and 11 million Euro (in 1981 prices). This average, however, pays no attention to the significant cross-sectional variation in debt levels. The coefficient of variation indicates that the standard deviation around the mean is at least two thirds of the mean. To give an example, in the final year of our sample (i.e. 2000), the lowest debt level is almost 0.27 million euro while the highest is approximately 100 million euro. The standard deviation is little over 11 million euro, which is only slightly below the mean value of debt in that year. Note also that the movement in the coefficient of variation is roughly in line with the movement of average debt levels. This indicates that most movement is due to changes in debt by heavily indebted municipalities (as their

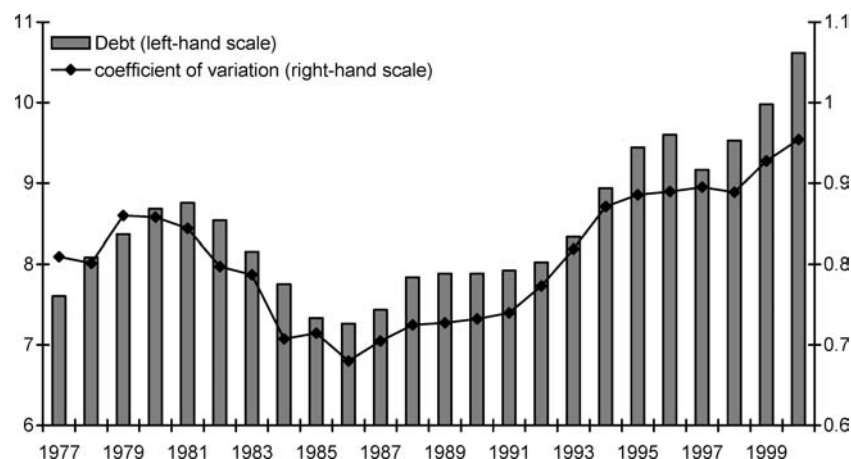


Figure 1. Average real long-term debt, in million Euro (in 1981 prices; $N = 296$).

increases in level of debt move both the average debt level *and* the coefficient of variation upwards).

Three periods can be distinguished in Figure 1. The first—from 1977 to 1981—is characterised by steadily increasing local indebtedness. This increase reflects the general problematic nature of the municipal finances at the end of the 1970's when the oil shocks, booming interest rates and lagging economic growth drastically affected local public expenditures as well as revenues (Dexia, 2001). Moreover, municipalities had to deal with 'transition' problems following the 1977 merger operation that considerably reduced the number of municipalities.

In the second period—the early 1980's—a number of reforms were implemented to ensure the viability of local public finances (Van Audenhove, 1990, pp. 735–741). Crucially, a balanced budget rule for local budgets was introduced in 1982. Though such a rule already existed since 1945 (Moesen, 1985; Van Audenhove, 1990), the 1982 legislation authorised the supervising provincial government to impose expenditure reductions or revenue increases to assist a development towards a balanced budget, and thereby led to the enforcement of the 'golden rule' in practice. Specifically, the balanced budget rule maintains that municipalities may under no circumstances, present a negative balance on the 'general' budget, "nor a fictitious equilibrium or surplus" (Royal Decree 110, 1982) from budgetary year 1988 onwards.⁶ Since the rule was introduced in 1982, municipalities were expected to adjust their revenue and spending patterns from 1983 onwards in order to conform to the balanced budget rule by 1988. This decision, among others, led to a steep downward movement in local public debt, especially from 1982 to 1986. The effectiveness of the rule is further illustrated by the fact that all 63 Flemish municipalities with a negative balance on the 'general' budget in 1982 (almost 20% of all municipalities) had balanced their budgets by 1988.

The third and longest period commences with the reversal of the downward trend in 1987. Since then, average debt has been in near-continuous increase. Still, in relation to total personal income levels (as proxy for municipal GDP), average local indebtedness

has remained relatively stable since 1987. That is, the average debt-to-income ratio has persistently hovered around 9% of total personal income over the period 1987–2000.

4. Empirical Analysis

We start our empirical analysis with a description and operationalization of the explanatory variables used in this work (Section 4.1). The empirical specification distinguishes between long-term and short-term effects of these variables (Section 4.2). Our analysis is different from previous work in that we first establish a long-run relationship between the variables and then establish how the short-run varies from this relationship (rather than inferring the long-run relation from a direct estimation of an error-correction model). This allows for the long-run relationship to be empirically tested (which is not the case when inferring it from the error-correction term).

4.1. Explanatory Variables

We analyse the effect of political fragmentation on local public debt using a panel dataset on 298 Flemish municipalities over the period 1977–2000.⁷ The dependent variable, DEBT, is defined as the level of long-term municipal debt for which the financial burden falls entirely on the municipality ('own share' debt, see note 5). Our explanatory variables are the following:

$$\text{DEBT} = f(\text{INC}^*, \text{POP}, \text{COST}, \text{ELECT}, \text{BBR}, \text{IDEO}, \text{MAJ}, \text{FRAG}) \quad (1)$$

In line with the literature, we include a number of economic control variables in the model. *Firstly*, ideally, wealth, in practical terms permanent income (INC*), is what will determine the ability to carry and service any required debt; an issue discussed further below.⁸ However, there is only data on real taxable income earned by the municipalities' inhabitants (INC, in 1981 prices). This income reflects two elements. On the one hand, it indicates the demand for public goods. Income is expected to have a positive effect if the public goods are normal goods. Then public expenditures and indebtedness will positively relate to income. On the other hand, income affects the extent to which debt is 'needed' to finance expenditures. If debt is considered a second-best solution in financing expenditures relative to self-financing (as in the Pecking Order Hypothesis in financial economics, see Myers and Majluf, 1984; Myers, 1984) increases in income reduce the need for loan financing. The interplay of both effects means that the expected sign is ambiguous. Real per capita taxable income varies between 2.550 (6.975) euro in the poorest (richest) municipality in 1977 and 4.425 (8.925) euro in the poorest (richest) municipality in 2000 (in 1981 prices).

Secondly, we introduce the size of the municipal population (POP). This varies—in the first (last) year of our sample (1977 and 2000 respectively)—between 1.096 (966) inhabitants for the smallest municipality in the sample and 530.826 (446.525) inhabitants in the largest. Larger municipalities are likely to have higher demands for public expenditures, leading to higher levels of public debt. The extent to which this coefficient diverges from unity reflects possible (dis)economies of scale. *Thirdly*, COST is the real interest rate on

long-term (federal) government bonds, measuring the cost of loan financing. This cost is highest in 1988 (6.69%) and lowest in 1977 (1.68%). To the extent that higher costs lead governments to curtail their borrowing, we expect a negative relation with municipal indebtedness.

We also include four political control variables. *ELECT* measures the time before election (in years). This is equal to 5 in post-election years, 4 in the second year after the election ... and 0 in the election year. It picks up the effect of potential political budget cycles (cfr. Baber and Sen, 1986; Clingermayer and Wood, 1995). The idea is that local politicians, motivated by their chances of re-election, increase expenditures and/or lower taxation before elections. Both policies negatively affect the budget balance, leading to higher debt before elections. A second political control variable—*BBR*—measures the effect of a Balanced Budget Rule in Flanders. Such rules are often effective in limiting debts and deficits (Millar, 1997; Kirchgässner, 2003). As discussed, a Balanced Budget Rule was introduced in 1982 obliging municipalities to balance their budgets from 1988 onwards. This change in institutions is captured by a dummy variable (*BBR*) equal to 1 from 1983 onwards, 0 otherwise. We expect the coefficient of this variable to bear a negative sign. In addition, consideration is made of the effect that governments with larger electoral margins may find it easier to remain in power after the next election. As this lowers the incentive to strategically use debt, we expect a negative effect from the government's "excess seats" (*MAJ*), defined as the number of seats in excess of simple majority (Volkerink and de Haan, 2001). Finally, a measure of the government's ideology (*IDEO*) is included to examine whether parties of a left-wing political persuasion have a willingness to furnish higher levels of debt. This would result from the fact that the higher spendthrift generally associated with the political left (see Hibbs, 1977; Schmidt, 1996) is not sufficiently compensated by increased revenue generation.⁹

The central interest of our analysis is the effect of political fragmentation (*FRAG*). From the assessment of the theoretical literature in Section 2.1, we hypothesize that fragmented governments face larger deficits and debts. We measure fragmentation in a number of ways, each time expecting to find positive coefficients.

- Firstly, we define a single dummy variable, *COAL*, equal to 1 in case of coalition governments and 0 for single party majorities.
- Secondly, following Edin and Ohlsson (1991), we split the municipalities into groups. For each we create a separate dummy variable. The first, *TOG2*, is 1 where there are two parties in the coalition, 0 otherwise. The other, *TOG3*, is equal to 1 where there are three or more parties in the coalition, 0 otherwise. When increases in coalition size lead to more problematic public finances, we expect the coefficient on both variables to be significantly positive, and a larger coefficient for *TOG3*. If, however, the relation is non-monotonic, we should find that the parameter for the larger coalitions is smaller than that for the 2-party coalitions.
- Thirdly, we use the 'actual' and 'effective' number of parties in the coalition (*NOP* and *ENOP* respectively). The latter is the inverse of the Herfindahl index, $1 / \sum_{i=1}^n p_i^2$, with n equal to the number of parties in the coalition and p_i the seat share of party i (Laakso and Taagepera, 1979). In contrast to the *NOP*-indicator, it accounts for the size

inequalities between parties within a given coalition. Such differences have been argued to be relevant by Howitt and Wintrobe (1995) and Huber, Kocher and Sutter (2003). To test for a possible non-linear effect of fragmentation in these estimations, we add the squared values of the (effective) number of parties.

- Finally, we examine the extent to which ideological fragmentation affects local indebtedness. Indeed, it can be argued that higher diversity of preferences increases debt as there are more competing desires for expenditures (Tsebelis, 1995a; Volkerink and de Haan, 2001). We measure the ideological fragmentation of government by the standard deviation of the ideological positions of the coalition partners (see Volkerink and de Haan, 2001).

4.2. Empirical Specification and Results

It is likely that the debt position in one time period is affected by previous debt and that, potentially the variables in our model have long-term and short-term effects. That is, there may well be a long-run position on ‘sustainable’ debt that municipal governments aim at (and which is influenced by the values of the variables in the model), while short-run (political) decisions cause temporary deviations from this long-run target. If this is the case, a dynamic model is needed. This can be done either through an error-correction model (ECM) or a simple dynamic model with lags. Further, whether this distinction between long-term and short-term effects is necessary is essentially an empirical question.¹⁰ Therefore, as a first step we consider the variables’ degree of integration. If all the variables are stationary, i.e. $I(0)$, the distinction between long-term and short-term would be superfluous.

The (non-)stationarity of the variables in our model is analysed using the test for panel stationarity of Im, Pesaran and Shin (2003).¹¹ The results of these tests are provided in Table 2. It can be seen that debt, income, population and interest rates are all $I(1)$ variables. For the political variables in the model, it is not very clear what the tests would indicate as these variables change only infrequently (and so present a series of breaks). The general

Table 2. Im, Pesaran and Shin (2003) tests of panel stationarity for the main economic variables.

Variable	IPS test statistic
Ln (INC)	−0.733
Ln (DEBT)	−0.959
Ln (POP)	1.571
Ln (DEBT/INC)	−1.063
Ln (INC/POP)	−1.398
Ln COST	−1.285

Note: the IPS test statistic, in the limit, follows a standard normal distribution. Values smaller than −1.645 imply rejection of null hypothesis of a unit root at the 5% level.

inference, however, is that these variables are $I(0)$ as the test statistics fall dramatically when breaks are considered. Given this, and the work of Perron (1988) on individual time series, the political variables were considered as $I(0)$. Nonetheless, as will be seen, some consideration was made of what effect, if any, these variables may have on the long-run pattern of debt.

Given the non-stationarity in our economic variables observed in Table 2, we specify the structure of debt evolution as an error-correction model. In its most general form, this has the following structure:

$$\Delta \ln(\text{DEBT}) = a + b_1 \Delta \ln(\text{INC}) + b_2 \Delta \ln(\text{POP}) + b_3 \Delta \ln(\text{COST}) + b_4 \Delta \text{BBR} \\ + b_5 \text{ELECT} + b_6 \text{FRAG} + b_7 \text{IDEO} + b_8 \text{MAJ} + b_9 \text{ECM}_{-1} + e$$

ECM refers to the error-correction mechanism and represents deviations from any (long-run) relationship between the $I(1)$ economic variables (DEBT, INC, POP, COST) and, possibly, additional $I(0)$ variables. In addition, the political variables (ELECT, FRAG, IDEO and MAJ) are vectors reflecting potentially more than one term, e.g. quadratic terms. This is explored in more detail below.

The above equation could be estimated directly. This approach has in a related context been followed by Rattsø and Tovmo (2002). Whilst the long-run relationship can then be inferred from the error-correction term, this is not ideal because the long-run relationship is not empirically tested. Recent developments, from Pedroni (1995, 1999), Kao (1999) and McCoskey and Kao (1999), enable a long-run relationship to be established first, after which the short-run can be investigated. This is the route followed here and thus extends a similar approach on a time-series of Italian public deficits followed by Galli and Padovano (2002).

- Long-run effects

We proceed by first assessing whether our variables together form a long-run cointegrating relationship. If this is the case, the residuals from this cointegrating equation constitute a stationary variable, i.e. these residuals are $I(0)$, and so can be incorporated into the estimating equation above. We consider this by employing the tests of Kao (1999).¹²

The results of the cointegration tests are given in Table 3. A number of specifications are presented. Firstly, there is a basic test of cointegration between the three economic variables in the model (INC, POP and COST). In the third column, allowance is made for the introduction of the balanced-budget rule to reflect the change in institutional rules from that date.¹³ Subsequently, we consider adding political fragmentation to the long run cointegrating relationship.¹⁴ The explanation is that more fragmented governments may face a structural deficit bias (due to the common pool problem) or may aim for higher levels of debt in order to “compromise” future governments, possibly with different parties in power (i.e. use debt strategically). Obviously, on the basis of the war of attrition model, no long-run relation between fragmentation and deficits is expected (see also Galli and Padovano, 2002, p. 48).

For both the basic version of the cointegration equation (including INC, POP, COST and BBR) and the expanded one (including various definitions of FRAG and other political variables such as IDEO and MAJ), the fully modified OLS (FMOLS) results are reported.¹⁵

As can be seen, there are statistically significant positive effects on debt from both the income level and population size. This higher long-run equilibrium value of municipal debt derives from an additional demand for public expenditures when the income level and population size within the municipality are higher. Population has a greater proportional effect than income on debt—the estimated elasticities are 0.4 and 0.6 respectively. Also, considering the size of the coefficients on income and population would suggest that these sum to unity. Imposing this restriction brings our model more in line with the traditional functional form as proposed in Roubini and Sachs (1989a).¹⁶ The results of this reformulation of the empirical specification—provided in the last columns in Table 3—are consistent with the results when not imposing the restriction. The negative sign on per capita income here points to an elasticity of less than unity, that is, debt rises at a slower rate than income. Note that there is a slight increase in the significance of fragmentation in these estimations, but that it remains insignificant.

Negative effects are observed for the interest rate and the imposition of a more rigorous regime with respect to debt management (i.e. the balanced-budget rule). This indicates that raising the costs of public debt lowers the long-run position on ‘sustainable’ debt that municipal governments aim at, in line with our expectations. The political fragmentation variables, whilst having the anticipated sign, are generally insignificant. We interpret this as an indication that *political fragmentation does not significantly affect local public indebtedness in the long run*. This means that the ‘equilibrium’ or ‘optimal’ level of municipal debt is unaffected by the number of parties in government, the ideological fragmentation of government or its anticipated tenure of office. This is in contrast to predictions from the common pool and strategic debt models. It should be observed, however, that the ‘equilibrium’ level is—in terms of practical policies—seldom attained. The coefficient on the error correction mechanism (see Table 4) indicates that the movement towards equilibrium is very slow, so that disequilibrium is the rule.¹⁷

- Short-run effects

Having established a long-run relationship, it is now possible to estimate how the short-run varies from this relationship.¹⁸ The results of the estimation of the ECM are given in Table 4. It is noteworthy that there was little difference in the results, no matter whether the residuals came from the long-run relationship including or excluding the political fragmentation variables or from the relationship imposing the Roubini-Sachs restriction on the coefficients. Two reasons may explain this. The first is that the coefficient on the error-correction, though highly statistically significant, is very small indicating a slow speed of adjustment. Thus, for practical purposes, the short run decisions on debt are tending to outweigh the underpinning correction to the long-run that is occurring. The second reason may be that the political fragmentation variables are indeed insignificant for the long-run (as argued above) such that all political effects are short-term. Taking these two factors together, the results presented in Table 4 use the residuals from the basic long-run (column 3 in Table 3), though it cannot be emphasised too strongly that the implications below hold for all specifications of the long-run (including imposing the Roubini and Sachs specification) and for all data sets (with or without the major cities of Antwerp and Ghent).¹⁹

Table 4. Short-run results (estimation of error-correction equation).

Dependent variable	ΔLn Debt	ΔLn Debt	ΔLn Debt	ΔLn Debt	ΔLn Debt	ΔLn Debt	ΔLn Debt
Independent variables							
ΔLn income	0.348 (6.887)	0.350 (6.872)	0.351 (6.891)	0.357 (7.000)	0.357 (7.017)	0.354 (7.696)	0.342 (6.935)
ΔLn population	0.309 (2.112)	0.309 (2.122)	0.310 (2.121)	0.309 (2.106)	0.309 (2.109)	0.313 (2.144)	0.315 (2.148)
ΔLn cost	0.005 (3.698)	0.005 (3.703)	0.005 (3.712)	0.005 (3.416)	0.005 (3.621)	0.005 (3.875)	0.005 (3.611)
ΔBalanced budget regime	-0.089 (-11.018)	-0.089 (-11.013)	-0.089 (-11.001)	-0.090 (-11.111)	-0.090 (-11.202)	-0.090 (-11.211)	-0.089 (-11.117)
Number of parties	-0.004 (-1.118)						
Number of parties ²	0.002 (2.172)	0.002 (2.144)	0.002 (2.337)				
ΔNumber of parties ²	0.001 (2.002)	0.001 (2.007)	0.001 (2.114)				
Electoral cycle	-0.039 (-11.754)	-0.039 (-12.484)	-0.039 (12.361)	-0.039 (-12.486)	-0.039 (-12.499)	-0.039 (-12.776)	-0.039 (-12.513)
Electoral cycle ²	0.006 (9.332)	0.006 (9.577)	0.006 (9.622)	0.006 (9.566)	0.006 (9.571)	0.006 (9.724)	0.006 (9.610)
Effective number of parties				0.013 (1.783)	0.013 (1.877)	0.014 (2.244)	
Effective number of parties ²				-0.003 (-2.553)	-0.003 (-2.774)	-0.003 (-2.596)	
ΔEffective number of parties ²				0.002 (1.678)	0.002 (1.775)		
Coalition						0.002 (0.756)	0.008 (1.653)
Two-parties							

(Continued on next page.)

Table 4. (Continued).

Dependent variable	$\Delta \text{Ln Debt}$	$\Delta \text{Ln Debt}$	$\Delta \text{Ln Debt}$	$\Delta \text{Ln Debt}$	$\Delta \text{Ln Debt}$	$\Delta \text{Ln Debt}$	$\Delta \text{Ln Debt}$
Independent variables							
Three parties							0.001 (0.255)
Ideology (Left to Right)	-0.002 (-0.461)						
Δ Ideology (Left to Right)*	0.014 (1.339)						
Fragmentation of ideology	0.002 (0.457)						
Δ Fragmentation of ideology	0.014 (1.753)	0.008 (1.603)	0.008 (1.597)		0.009 (1.847)	0.009 (1.833)	0.010 P1.899)
Excess seats in the majority	-0.001 (-1.306)						
Δ Excess seats in the majority	-0.001 (-0.627)						
ECM-1	-0.040 (-10.447)	-0.042 (-10.240)	-0.042 (-10.226)	-0.043 (-10.426)	-0.043 (-10.433)	-0.043 (-10.409)	-0.043 (-10.441)
Intercept	0.053 (11.661)	0.051 (11.664)	0.057 (11.558)	0.041 (4.721)	0.041 (4.361)	0.052 (14.112)	0.052 (14.033)
R^2	0.129	0.129	0.128	0.132	0.131	0.118	0.125
Roubini-Sachs	6.332	6.118	5.889	5.897	6.444	6.289	7.322
Fixed effects	0.991	0.844	0.993	0.965	0.873	0.994	0.957
Hausman test	0.662	0.773	0.322	0.324	0.644	0.336	0.442
RESET	3.221	1.432	3.114	2.874	3.914	3.467	3.004
Normality	4.662	4.337	5.110	4.998	6.983	4.145	4.922

Notes: Estimated t -statistics are in parentheses. The fixed effects and Hausman tests are the standard panel tests for a different fixed effect for each municipality and whether this can be modelled as a random effect. It can be seen that the fixed effects test is on the borderline of significance and, by the Hausman test, such an effect could be modelled as a random effect. Given the similarity of the random effects to the standard OLS pooled panel results, the OLS results are presented. The random effects results are available on request. RESET is the Ramsey test of (in)appropriate functional form and "normality" is the Jarque-Bera test. Roubini-Sachs is a test on imposing that the parameters on income and debt sum to unity. ΔENOP and ΔNOP are insignificant if included.

Before examining the political effects, the effect of the main economic variables is discussed. As would be anticipated, increased income and population have a statistically significant positive short-term effect on local indebtedness. These effects are smaller than the long-run effects, especially for the income variable. Though changes in income and population affect the government's behaviour in the short term, it apparently takes some time to conform to the long-run equilibrium. It is noteworthy that, unlike in the long-run regressions, the restriction that the coefficients of Δinc and Δpop sum to 1 is not applicable; it takes time for the exact relationship to emerge. It can furthermore be seen that the imposition of the balanced-budget rule had an immediate effect on the behaviour of the Flemish local governments. The short-run coefficient is about half that of the long-run estimation.

Further, the interest rate variable bears a *positive* sign in the short term. This is surprising as it would indicate that higher costs of loan financing increase municipal indebtedness. This is at odds with the idea that rational governments would decrease their borrowing when interest rates rise. It also contrasts with the negative effect we found in the long-run relation. A likely explanation is the so-called 'snowball effect'. This relates to the perverse effect that high interest rates may have on indebtedness. In the short term, it is hard to decrease the level of debt when rising interest rates lead to increasing debt-related expenditures. These additional expenditures may distort the government's budget balance and lead to further increases in public debt in the short run (Roubini and Sachs, 1989a, p. 921). In the longer run, however, governments might well be able to adapt their behaviour to the changed circumstances leading to a downward adjustment of debt in the long run (as observed in Table 3).

Some experimentation was undertaken with respect to making the election cycle non-linear. Specifically, a quadratic term was included in addition to the time-before-election variable (CYCLE). The results show that debt first decreases after elections and increases when elections are imminent.²⁰ This confirms a standard finding in the public choice literature (Imbeau and Chenard, 2002) and a characteristic of local public finances that is widely acknowledged among the general population. In addition, it can be seen that the effect of a greater security of tenure, measured by the excess seats of the ruling parties (MAJ), is insignificant. This indicates a lack of evidence for strategic debt usage in Flanders.

Turning to the short-term effects on debt of the central—political fragmentation—variables, it can be seen from Table 4 that, overall, *the results provide additional empirical support for the weak government hypothesis*. The main conclusion is that an increase in the number of parties in the coalition leads to a larger change in local public indebtedness. Still, the pattern is not a simple one and the definition of fragmentation does (marginally) affect the interpretation.

In terms of the simple dummy definitions, there is no evidence that having a coalition leads to greater indebtedness (column 8). However, when this is subdivided into types of coalitions (column 9), it can be seen that debts rise with two parties in the coalition but that there is no effect from larger coalitions. This is in line with the model of Tornell and Lane (1999). Note, however, that the non-linear effect may also indicate that broad-based coalitions are more likely to follow fiscal policies representative of a larger part of the population (see e.g. Lijphart and Crepaz, 1991). They might thus be less prone to threat of minor interest groups, limiting increases in expenditures and indebtedness.

With respect to the effect of the actual number of parties, it can be seen that the definition is important. If one uses the number of parties, there is a clear non-linear effect (column 2). Indebtedness rises with the number of parties *and* there is a surge in debt if there is an increase in the size of the coalition (and by inference a fall in debt if a coalition is replaced by a single party government).²¹ In the preferred regression (in terms of goodness-of-fit, though there is no significant difference from J-test), using the effective number of parties, the surge of indebtedness in changes in the size of the coalition remains (columns 5 and 6). Indeed, with this specification, the effect of the change in fragmentation becomes clearer, as without its inclusion the diagnostic tests fail (marginally) (column 7). This implies that the intertemporal change in fragmentation is important. The latter may indicate that governments that increase in fragmentation have 'start-up' problems of some kind (e.g. a desire to start an expenditure programme without the necessary revenue, and these are reflected in immediate debt accumulation). However, it is important to note that the effect of the size of the coalition is different. Relative to single party governments, there initially is a rise in debt for coalitions. A peak is reached for coalitions with 2 parties. The decrease after this peak, however, is such that the short-term increase in indebtedness for 3-party coalitions is still larger than for 1-party majorities.

Finally, examination of ideological effects on short-term debt indicates an unanticipated effect in that left-wing parties have lower debt. To the extent that left-wing governments have higher expenditure levels (though empirical evidence for such a relation appears inconclusive, see Imbeau, Pétry and Lamari, 2001), they appear to be able to compensate this through increased revenues. Importantly, however, the effect is statistically insignificant and so little should be read into this. On the other hand, there is some evidence, generally significant at 10%, that larger changes in ideological fragmentation lead to increasing levels of debt in the short-term; the greater the increase in ideological fragmentation, the greater the change in debt. This gives further support for the weak-government hypothesis. It is thus not the ideology of the parties that matter, but their fragmentation.

5. Conclusion

This paper has examined the effects of the political process—and in particular government fragmentation—on the debt development within local Flemish municipalities (1977–2000). The important time-dimension of our dataset allows a disentangling of short- and long-term effects in the evolution of municipal debt. This is important as it allows us to differentiate between the predictions regarding the effect of political fragmentation on indebtedness of various theoretical models. More specifically, models focussing on the inability of fragmented governments to respond quickly to changing circumstances (e.g. war of attrition models) imply that there should only be short-term effects of government fragmentation on indebtedness. However, 'common pool' models argue that government fragmentation leads to structural fiscal problems while 'strategic debt' models indicate that fragmented governments might well aim for higher levels of debt to compromise future governments' policy options. Hence, both these models contend that fragmentation effects on public debt will persist in the long term.

Our results show that there is evidence of a long-term relationship of debt to income, population and the cost of servicing the debt. Additionally, it is evident that the long-term debt income ratio diminishes with the wealth in per capita terms of the municipality. However, evidence of a long-term effect of political events and fragmentation is weak. Though the electoral cycle is known in advance, there is no significant effect on long-term indebtedness. Further, there is only tentative evidence on the margins of significance of a fragmentation effect.

In the short-term, however, the evidence is much stronger. There is strong evidence of an electoral cycle affecting debt with rises in debt occurring prior to elections and a claw-back afterwards. With respect to fragmentation, the evidence is in line with the notion that political decision-making under fragmented government is ‘less flexible’. Multi-party governments are less able to respond to exogenous shocks and attaining their ‘ideal’ (long-term) level of public debt takes more time. Given the fact that the movement towards equilibrium takes many years in all municipalities, our results indicate that adverse shocks to the municipal budgets lead to higher deficits that tend to persist longer under more fragmented government. Finally, we also find evidence of an immediate rise in debt upon a change in size of the coalition, and its ideological fragmentation.

Appendix

Table A.1. Effects of political fragmentation on budget deficits and debts.

Study ^a	Measure	Sample	Dependent variable	Results ^b
Roubini and Sachs (1989a)*	– ToG ^c	13 OECD countries (1960–85)	Deficit	a) ToG: positive significant b) Effect stronger in “bad” times
Roubini and Sachs (1989b)*	– ToG	13 OECD countries (1960–85)	Deficit	a) ToG: positive significant
Edin and Ohlsson (1991)*	– ToG (dummies)	13 OECD countries (1960–85)	Deficit	a) ToG-effect due to minority governments
Grilli, Masciandaro and Tabellini (1991)	– % of years with majority Government	15 OECD countries (1970–89)	Deficit	a) No significant effect
Alt and Lowry (1994)	– Divided Government	48 US states (1968–87)	– Revenue – Expenditure	a) Divided Gov: less able to react to revenue shocks
Poterba (1994)	– Divided Government	27 US States (1988–92)	– Spending – Taxes	a) Divided Gov: smaller response to deficit shocks

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Table A.1. (Continued).

Study ^a	Measure	Sample	Dependent variable	Results ^b
de Haan and Sturm (1994)	– ToG – ToG (dummies)	12 EC countries (1981–89)	Deficit	a) ToG: non-significant b) ToG (dummies): non-significant
Clingermayer and Wood (1995)	– Divided Government	48 US states (1961–89)	Debt	a) No Significant effect
Borelli and Royed (1995)**	– Strength of Government index (3 el.)	16 OECD countries (1959–90)	Deficit	a) Weaker governments show a significant rise in debt only when GDP-change is low
Hahm, Kamlet and Mowery (1996)**	– ToG (adapted)	9 countries (1958–90)	Deficit	a) ToG (adapted): non-significant
de Haan and Sturm (1997)	– ToG – ToG (dummies)	21 OECD countries (1982–92)	Deficit	a) ToG: positive significant for net debt data, not for gross debt data b) ToG (dummies): non-significant
Kontopoulos and Perotti (1998)*	– NoP – NSM – ToG	20 OECD countries (1960–95)	– Deficit – Expenditure – Revenue	a) Relevance NoP and NSM depends on time period b) Effects stronger in “bad” times c) ToG-effect due to minority gov.
Hallerberg and Von Hagen (1999)	– Minority Government	15 European countries (1981–94)	Deficit	a) ToG (adapted): non-significant
Kontopoulos and Perotti (1999)*	– NoP – NSM	20 OECD countries (1960–95)	– Deficit – Expenditure	a) Relevance NoP and NSM depends on time period b) Effects stronger in “bad” times
Volkerink (1999)*	– ToG – ToG (dummies) – NoP	20 OECD countries (1965–95)	Deficit	a) ToG: non-significant b) ToG (dummies): non-significant c) NoP: non-significant
de Haan, Sturm and Beekhuis (1999)*/**	– ToG – ToG (dummies) – NoP	20 OECD countries (1979–95)	Deficit	a) ToG: non-significant b) NoP: positive significant for gross central government debt data
Krause (2000)	– Divided Government	US budget (1949–95)	Deficit	a) Divided Gov: non-significant

(Continued on next page.)

Table A.1. (Continued).

Study ^a	Measure	Sample	Dependent variable	Results ^b
Volkerink and de Haan (2001)**	– ENP (coalition) – NSM – ENP (council)	22 OECD countries (1971–96)	– Deficit – Expenditure	a) ENP and NSM: positive significant for deficit and expenditure b) Effects stronger in “bad” times
Franzese (2001)**	– NoP	20 OECD countries (1956–90)	Deficit	No significant effect
Padovano and Venturi (2001)**	– Herf (coalition and opposition) – Banzhaf-index	Italy (1948–94)	– Deficit – Expenditure	a) Fragmentation coalition (opposition) significantly raises (reduces) deficit
Balassone and Giordano (2001)	– NoP	8 European countries (1971–90)	Deficit	a) NoP: positive significant
Freitag and Sciarini (2001)	– NoP	14 EC countries (1978–97)	Deficit	a) No significant effect
Neto, Blanco and H. Borsani (2001)	– NoP (coalition) – ENP (council)	10 countries in South-America (1980–98)	Deficit	a) No significant effect
Tovmo (2001)	– Herf (coalition)	393 Norwegian municipalities (1991–96)	Deficit	a) No significant effect
Perotti and Kontopoulos (2002)*	– NoP – NSM – ToG	19 OECD countries (1970–95)	– Deficit – Expenditure – Revenue	a) Only NSM gives robust results (positive significant) b) Effects stronger in “bad” times
Rattsø and Tovmo (2002)	– Herf (coalition)	275 Danish municipalities (1984–96)	– Expenditure – Revenue	a) No significant effect
Galli and Padovano (2002)**	– Herf (coalition and opposition)	Italy (1950–98)	– Deficit	a) Fragmentation coalition (opposition) significantly raises (reduces) deficit
Huber, Kocher and Sutter (2003)*	– Banzhaf-index	21 OECD countries (1970–99)	Deficit	a) Deficits lower if 1 strong party exists in coalition, higher if parties are more equal in ‘political strength’

(Continued on next page.)

Table A.1. (Continued).

Study ^a	Measure	Sample	Dependent variable	Results ^b
Woo (2003)	– NSM – ToG – Rae	57 countries (1970–90)	Deficit	a) Rae and TOG insignificant b) NSM positive significant
Borge (2003)	Herf (coalition)	376 Norwegian municipalities (1991–99)	Deficit	a) Fragmentation has very robust effect on the deficit
Fiorino and Triacca (2003)	– Shapley-Shubik index	Italy (1950–92)	Deficit	a) Significant in 1950–71 period only b) No long-run effect
Ricciuti (2004)	– Rae (coalition and opposition) – NSM	19 OECD countries (1975–95)	– Deficit – Expenditure	a) Only NSM consistently provides significant results (reducing the surplus and increasing expenditure)
Jochimsen and Nuscheler (2004)	– coalition dummy – NoP	10 German Länder (1960–2000)	Deficit	a) No significant effect
Schaltegger and Feld (2004)	– NoP – NSM	26 Swiss cantons (1980–1998)	– Debt – Expenditure – Revenue	a) NSM positive significant for revenue and expenditure, not for debt b) NoP no robust effect
Rumi (2004)	– Divided Government	24 Argentine provinces (1984–1999)	Deficit	a) Divided government increases budgetary imbalances
Hagen and Vabo (2005)	Herf (coalition)	434 Norwegian municipalities (1991–98)	Deficit	a) Fragmentation deteriorates fiscal performance

^aData for general government indicated by *, data for central government indicated by**.

^b'Significant' means a statistically significant result at least at the 95% confidence level.

^c'ToG' is the Type of Government, 'NoP' the number of parties in the coalition and 'Herf' the Herfindahl-Hirschman concentration index (of which ENP is the reverse). 'Rae' equals Rae's (1971) fractionalisation index and 'NSM' the number of spending ministers. Both the Shapley-Shubik and the Banzhaf indices are voting power indices (Shapley and Shubik, 1954; Banzhaf, 1965).

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Notes

1. The delay in decision-making in the model by Alesina and Drazen (1991) thus is due to uncertainty about the size of the cost borne by the other party (parties). Fernandez and Rodrik (1991) show that the same result—inaction—may also occur if there is uncertainty about who gains/loses from the change in policy.
2. Though this is frequently presented as politicians aiming to deliver projects to a specific geographic area (e.g. Weingast, Shepsle and Johnson, 1981), geography is not crucial to the model (see Tullock, 1959). The argument also holds if one assumes each representative to have a preferred policy area (instead of a region).
3. Previous empirical studies on this “commitment effect” (Glazer, 1989, p. 1207), however, provide somewhat ambiguous results. Petersson-Lidbom (2001) finds that the level of debt increases with the probability of electoral defeat in Swedish local governments and Sutter (2003) provides experimental evidence that deficits are used strategically. Franzese (2001) and Lambertini (2003), on the other hand, show that the predictions of strategic debt models are hardly supported in a sample of OECD countries.
4. Several studies have found support for the notion that government fragmentation increases government spending levels (see e.g., Volkerink and de Haan, 2001; Ricciuti, 2004). Some studies, however, fail to find a significant association (see e.g., Kalseth and Rattsø, 1998; Jones, Sanguinetti and Tommasi, 2000).
5. We consider only those loans for which the financial burden falls entirely on the municipality. These so-called ‘own share’ loans (‘leningen eigen aandeel’) take up around 95% of municipal long-term debt. Two other types of loans can be distinguished. For ‘government share’ loans (‘leningen ten laste van de staat’) the burden of interest and amortization is borne by a higher-level government, while ‘third party’ loans (‘leningen ten laste van derden’) are arranged for and repaid by a third party (e.g. church fabrics). In neither of these two cases are there any budgetary consequences for the municipality itself. Data were collected from the municipal budgets and, for the period since 1995, from Dexia Bank. Ten municipalities were removed from the dataset due to incomplete data-series. In Figure 1, moreover, Antwerp and Ghent were removed as the size of their debts distorts the diagram (though not the empirical analysis—see also note 7).
6. Importantly, it should be observed that the balanced budget rule does not imply that the municipality’s budget should be balanced each year. Nor does it say that budget deficits are prohibited under all circumstances. It merely specifies that there is to be a balance between revenues and expenditures, taking into account the accumulated surpluses generated in previous years (a balance on the “general” budget). Hence, when a given municipality has built up a positive budgetary balance in previous years, it can present a budget in deficit for the present fiscal year under the condition that the overall balance remains non-negative.
7. As mentioned above, Antwerp and Ghent received considerable ‘reorganization loans’ during the 1980’s. To see whether this affects our results, the model was estimated with and without Ghent and Antwerp. In general, this makes little difference to the tenor of the results such that only results with all 298 municipalities are presented. Other results are available from the authors on request.
8. This assumes that there will continue to be rules on borrowing by municipalities (imposed by the central government). Effectively, this means that there will be an imperfect capital market with restricted funds and thus (a form of) quantity rationing. The level of debt that can be held will be determined by the relative wealth of the municipality, captured by its (residents’) permanent income.
9. The data concerning a party’s ideological position were obtained from Deschouwer (1996). They are based on a self-placement survey asking presidents and spokesmen of the parties in the municipalities to locate their party on an ideological scale between 0 (Left) and 10 (Right). The figures range from 2.6 (Agalev) to 6.1 (VLD).
10. However, there is a further complication in terms of how income should play a part in the model. As noted above, however, it is (the stock of) permanent income that affects the level of debt that can be held, yet the data available is on income. Nonetheless, if it is assumed that there is a relationship between INC^* and INC such that $\ln INC_t^* = (1 - \gamma) \ln INC_t + \gamma \ln INC_{t-1}^*$, and assuming a log-linear relationship between the variables in (1), it can be seen that it is possible to substitute INC for INC^* and this creates a “natural” set of dynamics for the evolution of debt involving income (INC).
11. There is a deal of debate as to the precision of these tests (see Harris and Sollis, 2003), in particular about how cross-section independence is treated. To accommodate this, we checked the results using tests proposed by Breitung (2000) and Hadri (2000). No change in inference with respect to the levels of integration of

the variables was observed. The Hadri test is a sensible check as it assumes a null hypothesis of stationarity (whereas the others assume a null hypothesis of non-stationarity).

12. These are Dickey-Fuller (DF) type tests in a two-step procedure akin to the traditional Engle-Granger tests for single time-series. Specifically, we employ four DF tests. These tests differ from one another in how they deal with exogeneity: two of them assume strong exogeneity in the regressors and the errors and two make non-parametric corrections for any endogenous relationships. All four tests also make non-parametric adjustments for any serial correlation. Additionally, we perform a fifth test that includes lagged changes in the residuals—much like the standard Augmented Dickey-Fuller (ADF) tests. Note that all five tests impose homogeneity such that the slope coefficients are not allowed to vary across the municipalities. Pedroni (1995, 1999) relaxes the assumption of homogeneity and the results were checked using a number of his tests. The same holds for the reverse test of McCoskey and Kao (1999) with cointegration as the null hypothesis (indicating the robustness of our results).
13. To the authors' knowledge, there are no real tests such as those of Perron (1988) for single time-series that accommodate for structural breaks in panel data. The fact that the tests overwhelmingly indicate a long-run relationship with and without account of the break is taken as evidence of a long-run target that has been adapted in the light of the new rules.
14. There is also a case for considering the electoral cycle as this is well known and unchanging. Thus, it is possible that a pattern, a form of seasonality, should be taken into account. Examining this gives an insignificant effect, so the cycle is only reported for the short-run. It should also be noted that the results of a direct estimation via an ECM using Arellano and Bond techniques provides broadly similar results to those presented in the paper.
15. The results were also examined using the dynamic OLS (DOLS) estimation. The difference between these estimation techniques is in their approach to dealing with serial correlation: the former taking a non-parametric approach and the latter a parametric approach where lagged first differences are estimated. The preference for one or other estimation rests on judgements with respect to the data (see Harris and Sollis, 2003, for more). In this case, given the differential sizes of the municipalities, the FMOLS is probably to be preferred and these are the results presented in Table 3. The results from both estimation techniques are, however, very much in line; the major difference being in the relative importance of the income and population variables. The DOLS results available on request.
16. Roubini and Sachs (1989a) use the change in the debt-to-GDP ratio as their dependent variable. Employing our own notation, this would translate our model, in its most basic form, to: $\ln(\text{DEBT}/\text{INC}) = a + b \ln(\text{INC}/\text{POP})$. As can be seen, this is a restricted version of the basic model estimated, i.e. $\ln \text{DEBT} = a + (b + 1) \ln \text{INC} - b \ln \text{POP}$ with the parameters on income and population constrained to sum to unity. Thus the model presented in the paper relaxes the constraint and tests if it can be imposed. As is seen, the constraint probably applies in the long run but does not in the short run. To the knowledge of the authors, there is no direct test for this within the panel cointegration tests. However, it is clear that coefficients are close to a unity sum in the cointegrating equation. For space reasons, results with the restriction imposed are reported only for one definition of fragmentation.
17. Three other factors are of note. Firstly, examination of the periods before and after the introduction of the balanced budget rule indicates that there was no change in the effects of the other variables. This absence of a structural break in the data implies that the shift alone is permissible. Secondly, policy decisions by higher levels of government (e.g., on grants) may create important vertical externalities on local fiscal policy. However, a strong test of such effects in our setting is prevented because data on grants are limited to the later part of the period (1986 onwards). Hence, the introduction of this variable severely shortens the series, making it hard to argue that there is a real test for a long-run effect. Nonetheless, a test on the shorter time period provides tentative evidence that grants have a negative effect (at a 10% significance level) on long-run debt. This suggests that debt is mainly used to finance projects for which central government grants are not forthcoming. Crucially, there is no change in the fragmentation effects reported and the speed of adjustment remains slow so the short-run still dominates. Finally, in order to examine if there was differential effect depending upon the debt position relative to the BBR constraint, various measures of the effect of this constraint were tried. As an example, consideration was given as to whether there was a differential effect on debt evolution for authorities in the relatively (the "top" 20%) worst debt position in a given time-period both before and after the imposition of the "Balanced-Budget Rule". In all cases that were examined, such tests indicated that there was no significant differential effect.

18. The estimation of short-run effects via an ECM is well established in individual time-series but less prevalent in panels where the papers dealing with cointegration have tended to consider only the long-run. The authors can see no reason why the $I(0)$ variable of the residuals from the cointegrating relationship cannot be added to a standard short-run regression.
19. There is no evidence that standard panel techniques such as fixed or random effects are needed and a simple pooling of the data can occur. This would be expected from the differencing (which essentially eliminates municipality effects). Nonetheless, tests indicated no significant difference between simple pooling and fixed effects. Also, the Hausman test showed that if municipality effects were accounted for, these would be by random effects. Note, finally, that diagnostic tests of the functional form (RESET tests) are satisfactory.
20. The overall effect of having the quadratic term, as opposed to just the linear version, was to diminish the effects of political fragmentation. Davidson and MacKinnon (1981) J-tests did not discriminate the appropriate specification though a consideration of the R^2 in the pooled regressions indicated a preference for non-linearity in both the electoral cycle and fragmentation.
21. It should be noted that this is not a simple election effect, which is captured by the electoral cycle.

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