

# Do electoral rules and elections matter for expenditure composition? An empirical analysis on Italian regions using the fragmentation index

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## Abstract

The literature shows that electoral systems and elections have a significant impact on the composition of public expenditure. Incumbent politicians move expenditure from one budget item to another under different electoral systems and in the run-up to elections, their purpose being to capture voter consensus and gain re-election. Changes in the categories of expenditure are reflected in different degrees of expenditure concentration. No attention has been paid in the literature to the concentration effect produced by the electoral system and the political budget cycle. However, analysis of this effect provides synthetic information on the entire change in the budgetary structure and offers a robust check on measurement of the effective strength of electoral institutions on expenditure composition. Additionally, it can be useful for the corroboration of theoretical models. The aim of this paper is to fill this gap by: *i*) showing the theoretical links between expenditure composition and fragmentation under different electoral systems and prior to elections; *ii*) measuring changes in the budgetary structure by means of the expenditure fragmentation index. Empirical investigation is conducted on a panel of 19 Italian regions from 1984 to 2004. The main finding is that regional public expenditure is distributed more evenly between current and capital spending when regional and/or national electoral systems move from a proportional electoral system to a mixed one. In regard to the electoral cycle, I find no robust evidence for a pre-electoral expenditure concentration on current expenditure.

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## 1 Introduction

The literature shows that electoral systems and elections have a significant impact on the composition of public expenditure. Incumbent politicians move expenditure from one budget item to another under different electoral systems (Persson and Tabellini, 1999, 2000; Lizzeri and Persico, 2001; Milesi-Ferretti et al. 2002; Ticchi and Vindigni, 2010) and in the run-up to elections (Rogoff and Sibert, 1988; Rogoff, 1990; Drazen and Eslava, 2010) in order to capture voter consensus and gain re-election.

Different electoral systems induce parties to compete in different ways to win elections. In particular, the number of candidates elected in the voting district (i.e., *district magnitude*) and the electoral formula for transforming votes into seats change parties' strategies to gain election. A large number of small voting districts (e.g., *single-member districts*) and the plurality rule characterize a *majoritarian system*.<sup>2</sup> The party candidate who obtains the largest number of votes ('*the winner takes all*') in the single-member district is elected. A *proportional system* is generally characterized by a small number of voting districts (e.g., *multi-member districts*) or a single nationwide district (as in the Netherlands) where all members of the legislature are elected by a proportional representation<sup>3</sup> (PR) rule. A different combination of electoral formula and district magnitude produces a *mixed-electoral system*. Electoral competition in a single nationwide voting district (or in multi-member districts) induces parties to seek a broad voter consensus to win elections.<sup>4</sup> In this case, the party's optimal electoral strategy is to satisfy a broad range of voters in the population by targeting expenditure programs on their preferences. By contrast, electoral competition in a single-member district induces parties to seek electoral support by pleasing a narrower coalition of voters located in the geographical constituency. In this circumstance, the optimal party strategy for winning the election is to target spending programs on the specific interests of the voters' coalition. Basically, under a majoritarian system, one may expect an expansion of geographically targeted expenditure to the detriment of broadly targeted expenditure. The opposite scenario is expected under a proportional system.

On the election side, various arguments have been put forward in the literature to explain the emergence of an electoral cycle in spending decision-making. According to the signalling-competence models (Rogoff and Sibert, 1988; Rogoff, 1990), an incumbent politician captures electoral consensus by signalling a high level of competences to voters in pre-electoral periods through a significant increase in public expenditure. The pre-electoral growth of expenditure can be realized by the incumbent in two different ways. The first is to increase fiscal deficit if taxes have been kept low in order to give an exaggerated signal of the incumbent's competency to voters (Rogoff and Sibert, 1988). The second way is to shift resources from the less visible type of expenditure to the more visible type with a significant change in expenditure composition (Rogoff, 1990). The visibility of expenditure is generally associated with public consumption expenditure because its benefits are immediately visible to voters (Rogoff, 1990). The benefits associated with public investments are instead visible after their completion and therefore in a longer time horizon. On accounting for the different time horizon, public consumption expenditure can be considered as '*short-term visibility*' spending and public investment expenditure as '*long-term visibility*' spending. A different argument on the emergence of electoral cycle in expenditure composition is offered by Drazen and Eslava (2010). In their model, the incumbent's

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<sup>2</sup> An example is the electoral system of the UK parliamentarians.

<sup>3</sup> The PR rule consists in a proportional distribution of seats according to the share of votes received by each candidate in a multi-member district or the single nationwide district.

<sup>4</sup> In a theoretical setting, under a proportional system characterized by a nationwide district and the PR rule, a party wins the election with over 50% of the total votes. Under a majoritarian system characterized by single-candidate districts and a plurality rule, a political party can win the election with only 25% of the total votes (i.e., 50% of total votes in half of the voting districts). See Persson and Tabellini (1999, 2000), Lizzeri and Persico (2001).

spending preferences affect voters' decisions rather than the incumbent's administrative competences. At the polls, voters reward the incumbent who shows striking preferences in favor of the category of expenditure that they prefer (so-called '*targetable*' expenditure). They infer the incumbent's preferences by observing his/her fiscal performance before election. The incumbent politician therefore has a strong incentive to manipulate the composition of expenditure in favour of the targetable expenditure so as to obtain voter consensus. In the literature, public capital expenditure is considered to be the more targetable type of expenditure because it is easily tailored to the preferences of a narrower interest group in a geographic constituency (Vergne, 2009; Drazen and Eslava, 2010). However, Vergne (2009) points out that some components of current expenditure (such as subsidies and wages) can also be geographically targetable on a narrow interest group.

The literature has shown that the composition of expenditure is sensitive to the type of electoral system and elections. Changes in the categories of expenditure are reflected in different degrees of expenditure concentration. No attention has been paid in the literature to the concentration effect produced by the electoral system and the political budget cycle. Previous empirical studies have only analyzed changes in spending composition by considering single categories of expenditure. Although these empirical tests are rightly intended to verify the theoretical predictions, there are some valid reasons for measuring changes in expenditure composition by means of expenditure fragmentation (or concentration) analysis.

Expenditure fragmentation measures the degree of dispersion of spending resources among the different categories. A larger dispersion in the expenditure fragmentation indicators indicates that resources are more evenly distributed among spending items.<sup>5</sup> The analysis of expenditure fragmentation has the advantage of providing synthetic information on the overall change in the budgetary structure. It provides answers to such basic questions as the following. What is the overall change in the budgetary structure after the introduction of a new electoral rule? What is the overall change in the expenditure composition in pre-electoral periods? A more precise picture of the effects of the political budget cycle (PBC) and electoral system on the budgetary structure is therefore provided by fragmentation analysis. Moreover, it enables a robust check to be made on measurement of the effective strength of electoral institutions on expenditure composition. In fact, if election and electoral system effects are so strong as to modify the composition of expenditure, one should expect a significant effect in expenditure fragmentation. If this happens, such an effect is an incisive determinant of the budgetary structure affecting spending redistribution among budget items. However, the presence of spending rigidities may strengthen the fragmentation effect. In this circumstance, the incumbent mainly manipulates the less rigid categories of expenditure, with an expected significant change in the degree of expenditure fragmentation.<sup>6</sup>

Testing the effects of the electoral system and the political budget cycle (PBC) on expenditure fragmentation can also be useful for the corroboration of theoretical models. In this regard, the

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<sup>5</sup> In the literature, the expenditure concentration index has been used for measuring the budgetary structure effects in the empirical literature of the median voter theorem (see Turnbull and Djoundourian, 1994; Turnbull and Mitias, 1999). In this context, a higher degree of expenditure concentration reveals that voters choose over a single dimensional issue in line with the Plott's (1976) median voter theorem. Moreover, the expenditure concentration index has been also used as a proxy for testing the fiscal illusion hypothesis providing a synthetic measure of the budget structure complexity (see for example Turnbull, 1993).

<sup>6</sup> In the presence of considerable budget spending rigidities, it is likely that the national legislator will choose an electoral system which favors the less rigid expenditure under electoral competition. An example can clarify this aspect. If some components of current expenditure are more rigid than those of capital expenditure, the national legislator may choose an electoral system which favors capital expenditure under electoral competition. In the example, the legislator would choose a majoritarian system. This could be a further explanation of endogenous constitutional changes (see Ticchi and Vindigni, 2010).

next section extracts some predictions from the literature. In light of the model of Milesi-Ferretti et al. (2002), I show that expenditure fragmentation is lower (higher) in a proportional system if transfer spending is large (low) relative to public good spending under both electoral systems. This implies that a shift from a proportional to a majoritarian system involves an increase (decrease) in the degree of expenditure fragmentation if the share of spending on broad programs is large (low) relative to geographical targetable expenditure. On the PBC side, expenditure should be directed much more towards the more targetable (or visible) expenditure (Rogoff, 1990; Drazen and Eslava, 2010). Accordingly, an expenditure concentration effect would be expected prior to elections.

Finally, the analysis of expenditure fragmentation can be useful for identifying the voters' most-preferred spending. In fact, this is not easy to identify. In the literature an attempt in this direction has been made by Drazen and Eslava (2010), who estimate the impact of fiscal performance on the (incumbent) party's vote share and the probability of the incumbent being re-elected. Considering two aggregate categories of expenditure, such as capital/investment and current/consumption, the analysis of expenditure fragmentation provides some useful indications on the category of expenditure favored under an electoral system or prior to an election. However, this implies that the share of each category of expenditure on the total is known. An example can help to clarify this point. Assuming that the share of capital/investment expenditure is lower than the share of current/consumption expenditure, an increase in the expenditure fragmentation index before election suggests that capital/investment expenditure has been more favored than current/consumption expenditure by incumbent. This would imply that capital expenditure is the voters' most-preferred spending.

The main aims of the paper are the following: *i*) to show the theoretical links between expenditure composition and fragmentation under different electoral systems and prior to elections; *ii*) to estimate the effects of electoral systems and elections on the expenditure composition through analysis of expenditure fragmentation. As regards the theoretical links, I show that a shift from a proportional system to a majoritarian one implies an increase in the degree of expenditure fragmentation if the share of spending on broad programs is larger than the share of spending on geographical targetable programs under both electoral systems. Moreover, I show that an increase in expenditure concentration towards the more targetable/visible expenditure can be expected in pre-electoral periods if the targetable/visible expenditure represents a larger share of the total expenditure. An empirical test is performed on a panel of 19 Italian regions from 1984 to 2004. Italy is a good case study because, in the 1990s, the electoral system moved from a proportional system towards a mixed-electoral system at both the national and regional levels of government. Additionally, the analysis of regional contexts is particularly interesting because a part of regional transfers is spent to implement specific policies enacted by the central government at the local level. Therefore, it is likely that the implementation of national policies via the distribution of regional transfers is also affected by the national electoral system and not only by the regional one. It is also interesting to study the regional context in regard to the PBC because in the past two decades they have become more fiscally autonomous<sup>7</sup> and more accountable towards voters-citizens after the introduction of the direct election of the Presidents of regional governments.<sup>8</sup>

In the empirical analysis I use the normalized version of the Hirschman-Herfindahl index of expenditure fragmentation. This indicator is computed accounts for current and capital expenditure. Measuring electoral system changes by means of the Gallagher (1991) index and a

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<sup>7</sup> Introduction of the IRAP (*Imposta regionale sulle attività produttive*) tax by D.Lgs. 446/1997. The IRAP is a regional flat-tax rate on the productive activities (Bordignon et al., 2001) mainly used to finance the regional health care expenditure. About the introduction of fiscal federalism see art. 5, Italian Constitutional law 3/2001, and L. 42/2009.

<sup>8</sup> Italian Constitutional law 1/1999.

dummy variable which captures the introduction of a majority bonus, I find that regional public expenditure is distributed more evenly between current and capital spending when regional and/or national electoral systems move from a proportional electoral system to a mixed one. This finding suggests that the choice of the national and regional electoral system is important because it significantly changes the budgetary structure of regional expenditure with a greater concentration of resources on capital expenditure under a mixed-electoral system.<sup>9</sup> Regarding the electoral cycle, I find no robust evidence in favor of a pre-electoral expenditure concentration towards current expenditure.

The rest of the paper is organized as follows. Section 2 introduces the theoretical links between expenditure composition and fragmentation. Section 3 illustrates the empirical background to the impact of the electoral system and electoral cycle on spending decisions. Section 4 presents an overview on the Italian electoral system. Section 5 illustrates the fragmentation index adopted in the empirical analysis. Section 6 describes the electoral indicators and the control variables. Section 7 illustrates the econometric analysis and estimation results. Section 8 concludes.

## 2 The theoretical links between expenditure composition and fragmentation

Starting from the theoretical predictions of the electoral system's effects on expenditure composition, I formulate a hypothesis concerning their impact on expenditure fragmentation. Persson and Tabellini (1999) compare the provision of a 'universal' public good and targeted transfers payments under a proportional and majoritarian regime. They show that under the majoritarian system, a party only competes in a key-marginal district made up of voters who are ideologically neutral (so-called '*swing*' voters). To win a majoritarian election, the party needs only 25% of the total votes in half of the voting districts because it has a high probability of winning a seat in the single-member district aligned with its ideology. This implies that the party needs only to compete in the key-marginal district by targeting transfers expenditure programmes on the preferences of the swing voters at the expense of the 'universal' public good provision. By contrast, under the proportional system, the party needs to please a larger number of voters in the population (*i.e.*, over 50%) by providing a larger share of the 'universal' public good expenditure. In equilibrium, Persson and Tabellini (1999) show that the level of the 'universal' public good expenditure is higher under the proportional system than the majoritarian one. Lizzeri and Persico (2001) obtain a similar result on comparing the provision of public good and monetary transfers under two different electoral formulas *i.e.*, the 'winner-takes-all' rule and a proportional rule. In their model, the public good cannot be targeted on groups of voters contrarily to monetary transfers. Their model predicts that, in the unique equilibrium, the probability that the public good is provided under a proportional rule is higher than under the 'winner-takes-all' rule when the public good is particularly desirable. In other circumstances, the electoral system does not make any difference. Milesi-Ferretti et al. (2002) start with a definition of expenditure different from the one used in previous studies. They consider only expenditure as targetable. In this regard, their model accounts for *transfers spending* (*e.g.*, *unemployment subsidies*, *pensions*) targetable on broad interests in the population and *public goods and services spending* targetable on narrow and local interest groups (*e.g.*, *local public investments*, *local public services*). Milesi-Ferretti et al. (2002) also develop a theoretical model in which the electoral system is only characterized by the number of electoral districts: a single national district in a proportional system and single-member districts in a majoritarian system. According to the electoral system in force, they show that the median voter directs the spending decisions of national government

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<sup>9</sup> Since the regional current expenditure represents the largest share of the total, more expenditure fragmentation indicates that the budget shift moves in favor of capital expenditure.

towards his/her preferred type of spending. This entails that, under the majoritarian system, the median voter prefers to elect government representatives who exhibit strong preferences for higher spending on local public good programs rather than for broad transfers spending. By contrast, in a single nationwide voting district, the median voter prefers to elect representatives with higher preferences for broadly targeted transfers expenditure. In equilibrium, Milesi-Ferretti et al. (2002) find a higher level of transfers spending in a proportional system and a higher level of spending on purchases of public goods and services in a majoritarian system.

A result shared by the above models is that, in a proportional system, expenditure on broad programs becomes higher than expenditure on geographically targetable programs. A cut of ‘broad’ expenditure in favor of ‘narrow’ expenditure can be expected when there is a move from a proportional to a majoritarian system. This may involve an increase in expenditure fragmentation if the ‘broad’ expenditure is higher than the ‘narrow’ expenditure under both electoral systems. It is possible to formalize a similar prediction from the Milesi-Ferretti et al. (2002) model. Figure 1 summarizes the results.<sup>10</sup> Given as constant the median voter’s preferences  $\alpha_m \in [0,1]$  and  $\beta_m \in [0,1]$  concerning the levels of transfers  $s$  and public goods  $g$  spending preferred by the representatives of central government, I show that, under a proportional system, expenditure fragmentation is higher than under a majoritarian system if  $\alpha_m < 1/(2 - \beta_m)$  (where  $0 \leq \beta_m < 1$ ). If the parameter  $\alpha_m$  assumes values higher than  $2/(3 - \beta_m)$ , the level of transfer spending is higher than public goods spending under both electoral regimes. In this case, I show that expenditure fragmentation is lower in a proportional system than in a majoritarian system. If  $\alpha_m < 1/(3 - 2\beta_m)$ , the level of transfer spending is lower than public goods spending under both electoral systems. In this circumstance, expenditure fragmentation is higher under a proportional system than under a majoritarian one. Basically, when spending on broad transfer programs represents the larger (smaller) share of the total primary expenditure (*i.e.*, the sum of transfer and public goods spending) under both electoral regimes, the level of expenditure fragmentation is lower (higher) under the proportional system than the majoritarian one. Accordingly, it is possible to formulate the following hypothesis:

*Hypothesis 1: A shift from a proportional system to a majoritarian system implies an increase (decrease) in the degree of expenditure fragmentation if the share of spending on broad programs is larger (lower) relative to the geographical targetable expenditure under both electoral systems.*

With regard to the impact of the PBC on the budgetary structure, in competence-signalling models (Rogoff and Sibert, 1988; Rogoff, 1990), the temporary information advantages held by the incumbent on his/her administrative competences<sup>11</sup> is a strong incentive to behave opportunistically before election. Voters, in fact, will know the incumbent’s competences only with a lag: they can infer them only by observing the recent levels of public goods spending and taxes. At the polls, the higher-utility voters will reward the higher-ability incumbent who provides them with a higher level of public goods spending than a potential challenger. The pre-electoral growth of expenditure can be funded by a fiscal deficit (Rogoff and Sibert, 1988) or a budget shift of resources from the less towards the more visible expenditures (Rogoff, 1990). In particular, increases in consumption expenditure before the election can be funded by a cut in investment expenditure (Rogoff, 1990). A recent study by Drazen and Eslava (2010) also shows that voters can be influenced via a change in the composition of budget expenditure which leaves the overall level of government expenditure and deficit unchanged. In their model, voters will

<sup>10</sup> The proof is reported in the appendix.

<sup>11</sup> In this theoretical setting, a competent incumbent is one who provides a higher level of goods and services with less tax revenue than an incompetent incumbent.

reward at the polls incumbents who will spend more resources on their preferred type of expenditure, called the *targetable expenditure*. This implies that the incumbent who dislikes this kind of expenditure (the so-called '*desks-type*' incumbent) needs to increase the targetable expenditure before the election so as to be re-elected to office. In this way, s/he will increase his/her re-election chances by signaling to voters that his/her spending preferences are in line with their own fiscal preferences. Drazen and Eslava (2010) identify capital expenditure as the targetable expenditure. Conversely, current expenditure is the non-targetable expenditure, although some of its components can be also targetable on a geographical constituency (Vergne, 2009).

According to PBC frameworks, electoral spending cycle can affect both the size and the composition of expenditure. It is interesting to enquire as to the effects of elections on expenditure fragmentation. According to the theoretical model of Drazen and Eslava (2010) an expenditure concentration effect can be expected prior to elections. In their framework, the electoral budget cycle is engaged by a *desks-type* incumbent who shows stronger preferences for the non-targetable good 'K', which is not preferred by voters. In equilibrium, they show that the optimal strategy for a *desks-type* incumbent to gain re-election in office is to mimic the pre-electoral fiscal policies of a *people-type* incumbent who prefers higher levels of the targetable good 'g' in line with voters' preferences. Under the condition that the utility gains of the *desks-type* incumbent from being in office in the second term are higher (*or equal to*) than his/her utility gains from his/her own preferred fiscal policies, there is a positive probability that the *desks-type* incumbent will provide a higher level of g at the expense of the non-targetable good K<sup>12</sup> before the election in order to please the swing voters.<sup>13</sup> In other words, before the election, the *desks-type* incumbent will choose a level of g equal to tax revenue T (fixed over the two periods) and a level of K equal to zero (i.e.,  $\underline{g}_1 = T$  ;  $\underline{K}_1 = 0$ ). In post-electoral periods, s/he will choose a level of g in line with his/her own fiscal preferences. This means that in post-electoral periods s/he will spend part of tax revenue on both targetable and non-targetable goods, i.e.  $\underline{g}_2 = \underline{g} < T$  and  $\underline{K}_2 = T - \underline{g}$ .

It is easy to show that the expenditure fragmentation computed by the Hirschman-Herfindahl index is lower in pre-electoral periods and higher in post-electoral ones. In the pre-electoral period, the degree of expenditure fragmentation is in fact zero, whereas in the post-electoral period it is positive and corresponds to  $2 \underline{g} (T - \underline{g}) / T^2$ .

On reformulating the model as a signalling-competence model (Drazen and Eslava, 2010, p. 44), a similar prediction on expenditure fragmentation can be made concerning the more visible type of expenditure instead of the targetable-type expenditure. In this case, a higher pre-electoral concentration in the more visible consumption expenditure can be expected prior to elections. However, these results are conditioned by the fact that the spending in more targetable or visible programs are relatively larger than the non-targetable or non-visible expenditure prior to election.

*Hypothesis 2: A higher (lower) concentration of expenditure on the targetable (or visible) expenditure is expected in the run-up to elections if the targetable (or visible) expenditure is higher (lower) than the non-targetable (non-visible) expenditure.*

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<sup>12</sup> This condition is summarized as  $\beta(\bar{p} \Delta H + \chi + \Delta \Pi) \geq \Delta H$ , where  $\beta$  is the discount factor,  $\bar{p}$  corresponds to the probability that the challenger will implement a fiscal policy different from the incumbent's,  $\Delta H$  is the incumbent's gains from his/her own preferred fiscal policy,  $\chi$  is the utility of being in office,  $\Delta \Pi$  is the incumbent's gains from policy reflecting his/her own preferred ideology.

<sup>13</sup> The incumbent will be chosen with a positive probability  $r(g_i = T)$  by the swing voters. For more details see Drazen and Eslava (2010).

### 3 The empirical background

In the literature, several empirical tests have been conducted on the impact of the electoral system and PBC on spending composition at both national and local levels of government. With regard to the electoral rule, Persson and Tabellini (1999) have shown, on a sample of 64 countries, that expenditure on broad programs decreases significantly under a majoritarian system. They measure the broad type of expenditure as the sum of expenditure on order and safety, transportation and education as a percentage of gross domestic product (GDP). Although Persson and Tabellini's findings are consistent with their theoretical predictions, they recognize that the "predictions from our models regarding public goods should thus be investigated further, perhaps with better measures of public good provision" (p. 732). In a subsequent study (Persson and Tabellini, 2001) on 61 democracies from 1960 to 1998, they use as indicator the share of central government expenditure on social security and welfare as a percentage of GDP and of central government current expenditure on goods and services. According to the authors, this indicator is better suited to measuring expenditure on broad-based policies: "the presumption is that broad transfer programs, like pensions and unemployment insurance, are much harder to target towards narrow geographic constituencies compared to spending on goods and services" (Persson and Tabellini, 2001, p. 12). The use of the more refined indicator also confirms the theoretical prediction that social transfers from central government are smaller under a majoritarian system. Measurement of broadly and geographically targeted spending is not an easy task. Milesi-Ferretti et al. (2002) use as their indicator of expenditure on broad programs the share of central government transfers expenditure on social security benefits for households and subsidies to firms as a percentage of GDP. The 'broad' nature of this kind of expenditure resides in the fact that the distribution of transfers from the central government to households and firms is made according to general eligibility criteria. All households in the country that meet these criteria will benefit from the central government transfers as well as firms which carry out their activities in the country. The central government transfers are tailored to a generic profile of households and firms providing a wider distribution of them across the country. By contrast, as an indicator of the geographically targetable expenditure, Milesi-Ferretti et al. (2002) use the sum of central government current and capital expenditure on goods and services as a percentage of GDP. They stress the local nature of the purchase of goods and services because citizens and firms in specific regions will be the main beneficiaries of this kind of spending. Using a sample of 20 OECD and 20 Latin American countries, they find, in line with the theory, a significant increase in transfers spending due to an increase in the average district magnitude.

Another contribution in the literature is by Shelton (2007) who estimates the impact of majoritarian system on several categories of public expenditure (education, healthcare, social security, transport, defence, transfers, government consumption, etc.) using a sample of 100 countries from 1970 to 2000. He finds that the majoritarian system is generally associated with a lower level of central government expenditure overall, concluding that: "Majoritarian governments do not display a clear bias towards or against any type of spending: they simply correlate with reduced expenditure across the board" (p. 2231). A more recent contribution is provided by Vergne (2009). Although his study focuses on the effects of PBC on expenditure composition, he finds that current expenditure significantly increases under a proportional system, whereas capital expenditure decreases significantly. The significant budget shift in favor of current expenditure and away from capital expenditure under a proportional system highlights that some sub-categories of current expenditure are used more for the implementation of broad-based policies. However, Vergne (2009) also points out that not all subcategories of current expenditure have this aim. An example is provided by wages and subsidies, which can be easily targeted on specific constituencies (Vergne, 2009).



The aforementioned studies have focused on empirical investigation at the country level. However, studies have also been conducted at the local level of government. Baraldi (2008) tests the impact of the national mixed-electoral system, corruption, and political competition on different categories of public consumption expenditure by 20 Italian regions from 1980 to 2003. She finds that an increase in the degree of votes/seats disproportionality<sup>14</sup> of the national electoral system dampens the regional growth of public consumption spending in terms of GDP. Moreover, she observes that the categories of expenditure related to health (+0.01), housing and culture (+0.02) tend to grow faster under a mixed-electoral system, whereas spending on general services (-0.01) diminishes significantly. In spite of these results, Baraldi (2008) concludes that the national electoral system seems to be a weak determinant of the growth of regional public consumption spending. A recent empirical study on Swiss state and local governments conducted by Funk and Gathmann (2010) on historical data from 1890 to 2005 shows that welfare and education expenditure targeted on broad social groups (mainly elderly and young people) in the population increases significantly after the adoption of the proportional rule (30% and 12%, respectively) whereas transfers expenditure on roads and agricultural subsidies targeted on local and narrower interest groups is significantly reduced (50% and 21%, respectively).

A finding common to the above empirical analyses is that the proportional electoral system can foster the growth of categories of expenditure targeted on broad social groups to the detriment of other expenditures targeted on local interest groups. In particular, under a majoritarian system, public investment expenditure and agriculture subsidies increase significantly. Expenditure on broad welfare-state programs, such as education, healthcare and social security programs, are generally penalized at both the national and local levels of government. National social transfers, like pensions and unemployment subsidies, are also penalized. A slowdown in the growth of public consumption expenditure is also observed when there is a shift from a proportional system to a majoritarian one at both the national and local level.

### *3.1 Evidence on the PBC*

Numerous empirical tests have found strong evidence for the validity of signalling-competence models in developing<sup>15</sup> and newly democratizing countries.<sup>16</sup> In particular, Shi and Svensson (2006) show that developing countries have a stronger electoral cycle in fiscal budget balance than do developed countries. Using a large panel sample of 106 countries for the longer period 1960-2001, Brender and Drazen (2005) show that the PBC is mainly caused by the new democratization process<sup>17</sup> rather than by the degree of economic development. Brender and Drazen (2005) observe that new democracies experience a stronger electoral cycle in spending and fiscal deficit decisions compared with old democracies. They explain this result by arguing that, in new democracies, voters are less informed and are less electorally experienced than voters in established democracies. They are also less 'fiscal conservative' (Pelzman, 1992) because they do not dislike spending-deficit policies. Therefore, pre-electoral spending-deficit policies cannot involve the risk of losing elections for incumbents in new democracies, who can adopt aggressive fiscal policies in order to capture larger electoral support. Alt and Lassen (2005) criticise the conclusions drawn concerning the democratization process as the means to remove PBC in

<sup>14</sup> A higher degree of votes-seats disproportionality is associated with a more majoritarian electoral system.

<sup>15</sup> Schuknecht (1996) finds a negative impact of electoral year on the overall fiscal balance on a panel of 35 developed and developing countries in period 1972-1992. The reduction in the fiscal deficit is almost 0.7% of GDP prior to elections. Block (2002) provides a test for 44 Sub-Saharan African countries from 1980 to 1995. He finds evidence of PBC in fiscal (deficit and spending) and monetary policies. Shi and Svensson (2006) using a sample of 85 countries for period 1975-1995 find that fiscal deficit increases by 1% of GDP in election.

<sup>16</sup> For surveys see: Drazen (2001), Shi and Svensson (2003), Eslava (2011).

<sup>17</sup> No evidence of political cycle are found in the overall budget balance and in social-security and welfare expenditure on 60 democracies by Persson and Tabellini (2003).

advanced industrialized economies. They show that increasing the degree of fiscal policy transparency removes the electoral cycle in the fiscal balance of these countries.

In the literature, there is some evidence on PBC in advanced economies and in particular on fiscal deficit and revenue. Alesina et al. (1997) find an increase in fiscal deficit prior to elections on a sample of 13 OECD countries. However, they counsel caution about this result because, on controlling for the presence of the PBC in single countries, they find statistical evidence only for the Netherlands. They also report some evidence of a revenue and spending cycle. Persson and Tabellini (2003) find significant evidence of an electoral revenue cycle on 60 democracies. Mink and De Hann (2006) find a significant and positive impact of the electoral year on the budget deficit of countries in the euro area after the adoption of the Stability and Growth Pact. In a recent panel data analysis on OECD sample, Katsimi and Sarantides (2010) find a significant fall in revenue due to a cut in direct taxation before election. Direct taxation is considered to be more visible to a large mass of voters than indirect taxation and is therefore more sensitive to electoral competition.

In advanced economies, the electoral cycle can emerge much more in the budget composition than in the overall levels of public expenditure and tax revenue (see Katsimi and Sarantides, 2010). Since voters are more fiscal conservative in established democracies, incumbents can please them by increasing their preferred expenditure leaving the overall level of public expenditure unchanged. This implies a proportional cut in the categories of expenditure not preferred by voters. The PBC models have shown that, before elections, incumbent politicians take advantage to change the budgetary structure by increasing the categories of expenditure preferred by voters and/or most visible to the detriment of the other categories of expenditure. In other words, the composition of public expenditure is manipulated by incumbent politicians in favor of the most 'visible' (Rogoff, 1990) or 'targetable' (Drazen and Eslava, 2010) type of expenditure in order to obtain higher voter consensus and be re-elected. According to the 'competence' model (Rogoff, 1990), the budget shift favors public consumption (current) expenditure to the detriment of public investment (capital) expenditure. The opposite scenario can be predicted according to the 'targetable' model (Drazen and Eslava, 2010).

A growing amount of empirical evidence on the effects of the political budget cycle on the composition of expenditure is to be found in the literature. Schuknecht (2000) considers 24 developing countries from 1973 to 1992 to test the impact of the electoral cycle on current expenditure, capital expenditure (as a share of GDP), and the wage bill of the public sector (as a share of total expenditures). He finds evidence of an electoral cycle for public investment funded by a significant increase in fiscal deficit. Gonzalez (2002) tests the presence of an electoral cycle in Mexican central government infrastructure spending and current transfers (as a share of total expenditure) for the period 1957-1997. Estimation results show that investment expenditures are a more valid means to gain larger voter consensus than current transfers. Khemani (2004) performs the PBC test on the expenditure composition of 14 major states of India for the period 1960-1992. She finds a significant budget shift from current expenditure to investment expenditure without a significant increase in fiscal deficit. In line with Drazen and Eslava's (2010) finding, she remarks that "this happens because public investments projects are easier to target to critical constituencies, and hence political gains may be had through relatively small increases in spending using executive discretion" (p. 146). Vergne (2009) tests the presence of PBC in 42 developing countries from 1975 to 2001 on current expenditure and capital expenditure (as a share of GDP and total public expenditure). His analysis also includes expenditures on infrastructure and wages and subsidies. He finds empirical evidence in favor of a budget shift towards the more visible current expenditure and away from public investments, in line with Rogoff's (1990) predictions. Katsimi and Sarantides (2010) obtain a similar result for 19 high-income OECD countries for the period 1972-1999. They do not observe a significant increase in

the government deficit and overall expenditure. In these cases, the electoral spending cycle comes about only via a budget shift of resources.

Some studies have been conducted on the impact of elections on expenditure composition at the local governmental level as well.<sup>18</sup> Veiga and Veiga (2007) report an empirical test on the composition of public investment expenditure in Portuguese municipalities. They find a significant cut in the less visible investment expenditures, such as expenditure on machinery, equipment and transportation material, in favour of an increase in the more visible spending on building infrastructures, rural roads, streets, and other complementary works. Drazen and Eslava (2010) perform a test on a panel of Colombian municipalities. They identify some categories of public investment spending (construction of roads, water plants, schools, hospitals, etc.) as targetable, whereas some categories of current expenditure (general payments, personnel expenditure, current transfers) are non-targetable. Drazen and Eslava (2010) test the electoral effects on current and capital expenditure also controlling for changes in the total expenditure. Their empirical evidence supports their theoretical predictions, since they find a significant cut in some categories of current spending and a significant increase in investment spending.

#### 4 A brief overview on the Italian electoral system

The Italian Constitution provides for a central government and three local governments articulated into 20 regions, 109 provinces, and over 8,000 municipalities (art. 114). The highest level of local government is the region, whereas the lowest is the municipality. Each region has its own statute regulating the form of government and the basic principles of its organization and functioning (art. 123). Most Italian regions approve their own statutes by a regional law (art. 123). They are known as the '*Ordinary Statute Regions*'<sup>19</sup> (OSR). Only 5 regions adopt a special statute approved by a constitutional law (art. 116): Friuli Venezia-Giulia, Sardinia, Sicily, Trentino Alto-Adige<sup>20</sup>, Valle D'Aosta. These regions are well known as the '*Special Statute Regions*' (SSR). The institution of the Special Statute Regions is motivated by the presence of ethno-linguistic differences, geographical border problems and/or secessionist movements. By virtue of their special statutes, these regions have therefore greater autonomy in terms of legislative and fiscal powers than the Ordinary Statute Regions.

The government of each region is articulated into three bodies (art. 121): a *council*, which exercises legislative powers; an *executive committee*, which exercises executive powers; the *President of the executive committee*, who is accountable for the region's government. The electoral-system legislation of the regional governing bodies is quite different between the Ordinary and Special Statute Regions. Before the 1990s, members of the council of the Ordinary Statute Regions were elected by a proportional system and they remained in office for five years (L. 108/1968, art. 3). Law 43/1995 enacted a reform which introduced a mixed-electoral system.<sup>21</sup> This electoral system is based on two separate list tiers: party coalition-list tier and party-list tier. The party coalition-list is formed by a coalition of the party lists with a candidate to the leadership. Candidates in party-list run for election in the provincial constituencies of the region. Candidates in party coalition-list run for election in the regional constituency. The mixed-electoral system requires that voters have one ballot paper to cast their vote preferences for one provincial party-

<sup>18</sup> There is a large number of empirical studies devoted to investigate the presence of electoral budget cycle at the local level of government in different countries. See for example: Galli and Rossi (2002) for Germany; Blais and Nadeau (1992), Kneebone and McKenzie (2001) for Canada; Binet and Pentecote (2004) for France.

<sup>19</sup> Piedmont, Lombardy, Veneto, Emilia-Romagna, Tuscany, Liguria, Marche, Umbria, Abruzzo, Lazio, Molise, Basilicata, Campania, Apulia, Calabria.

<sup>20</sup> The Trentino-Alto Adige region comprises the two Autonomous Provinces of Trento and Bolzano (art. 116).

<sup>21</sup> Law 43/1995 (art. 7) has also introduced a legal threshold ('*sbarramento*'): the provincial party-lists group with a share of votes below 3% in the regional election cannot participate in seats distribution unless it is linked to a regional parties coalition-list which obtains a share of votes above 5%.

list and one regional parties coalition-list. Voters can also indicate one preference for a candidate in a provincial-party list. 4/5 of regional council seats are distributed to the provincial party-lists according to a proportional representation rule, while 1/5 are distributed to the regional parties coalition-list which obtains the largest share of votes (called the '*listino*') and is formed by a group of provincial party-lists with an overall percentage of seats under 50% (L. 43/1995, art. 15). In this circumstance, candidates belong to the '*listino*' are elected. If the group of provincial party-lists has an overall percentage of seats equal to or above 50%, the majority bonus is shared in the following way: 1/2 of extra-seats are assigned to the parties coalition-list belonging to the '*listino*'<sup>22</sup> and 1/2 to the other groups of provincial party-lists. This bonus should guarantee a larger majority and the greater stability of the regional government.

Another important reform of the electoral system of the Ordinary Statute Regions was made by Constitutional Law 1/1999. This law introduced the direct election of the President of the executive. The regional party coalition-list candidate who runs for the presidency of the regional executive committee is the elected President of the Region if he receives the largest share of votes in the region<sup>23</sup> (C.L. 1/1999, art. 5). This reform gives the President greater responsibility for executive decisions as well as the power to appoint and to remove members of the executive committee.<sup>24</sup> Another novelty introduced by Constitutional Law 1/1999 concerns implementation of a regional electoral system upon approval of a regional electoral law and new statutory dispositions in this regard. In the absence of the regional law and new statutory dispositions, elections in the Ordinary Statute Regions are held in accordance with laws 108/1968 and 43/1995. The regional elections of the Ordinary Statute Regions held in 2000<sup>25</sup> were conducted in accordance with these two national laws.

The election of the governing bodies of the Special Statute Regions requires separate discussion. The regional council and executive were elected according to a proportional system until 2000. After enactment of Constitutional Law 2/2001, the regions *Friuli Venezia-Giulia* (C.L. 1/1963), *Sardinia*<sup>26</sup> (C.L. 3/1948) and *Sicily* (Regio.D.L. 455/1946; C.L. 2/1948) adopted the same mixed-electoral system as the Ordinary Statute Regions (L. 108/1968, l. 43/1995). This law disposition is valid until these three regions have not approved their own regional electoral laws that include dispositions of C.L. 2/2001 concerning the direct election of the President of the Region. In practice, from 2001 to 2004, the election of the regional governing bodies of these three regions took place under the same electoral rules as those of the Ordinary Statute Regions.<sup>27</sup> The mixed-electoral system was not imposed on the regions of *Valle D'Aosta* and *Trentino Alto-Adige*. The legislator's intention was probably to guarantee ethnic-linguistic representation within the regional governing bodies of these two regions. However, Valle D'Aosta has recently approved regional law 22/2007 which provides for the introduction of a majority bonus. A proportional system has been adopted in the Trentino Alto-Adige region (C.L. 5/1948). Constitutional Law 2/2001 (art. 4, comma f) has introduced a significant change in the election of this region's council. Members of the regional council are the members elected from the two provincial councils of the special autonomous provinces of Trento and Bolzano. Since the election of 2003, therefore, regional elections of regional council members have been replaced by provincial elections.

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<sup>22</sup> Candidates in the '*listino*' are elected according to a preference order.

<sup>23</sup> One seat is assigned to the candidate as President of the executive who has obtained a number of valid ballots immediately below those of the candidate declared President elect (C.L. 1/1999, art. 5).

<sup>24</sup> Before this law, the President and the executive committee were appointed by the regional council.

<sup>25</sup> The election of the Molise region was annulled in 2000 and repeated in 2001.

<sup>26</sup> The Sardinia regional elections of 1994 and 1999 of were held in accordance with the provisions of regional law 16/1992. This law provides for a proportional distribution of seats accompanied by a second ballot.

<sup>27</sup> The Sardinia regional election of 2009 was also held in accordance with laws 108/1968 and 43/1995.

The complex electoral system of the Italian regions can be summarized as follows. Until 1995, the Ordinary Statute Regions adopted a proportional system for the election of regional councils; afterwards, a proportional system accompanied by a majority bonus was introduced in each of them. In the case of the Special Statute Regions, a proportional system was adopted until 2000; afterwards, the regional councils of Sicily and Friuli Venezia-Giulia were elected in 2001 and 2003, respectively, according to the same mixed-electoral system as the Ordinary Statute Regions. Similar provisions of the law applied to the election of the regional council of Sardinia in 2004 and 2009. The regions of Valle D'Aosta and Trentino Alto-Adige have adopted a proportional system, although the former region introduced a mixed-electoral system in 2007.

Overall, the 1990s represented a turning point in the Italian electoral system, not only for regional government but also for central government. Electoral reforms were introduced in concurrence with the notorious 'Tangentopoli' scandal when many Italian parliamentarians were investigated for alleged involvement in bribery. The scandal changed the Italian political scenario and important changes were made to the rules regulating the election of Italian members of parliament. Before the referendum of 18 April 1993, members of the Italian parliament, which consists of the Senate and the Chamber of Deputies, were *de facto* elected by a proportional electoral system. Deputies were elected according to a pure proportional system (l. 26/1948, art.1; D.P.R. 361/1957). Senators were elected on a regional basis by a voting majority rule (l. 29/1948, art. 17): the candidate obtaining more than 65% of votes was elected. Since this *quorum* was too much high, few senators were elected in this way, while most of them were elected by the proportional system (l. 29/1948, art. 19). In spite of some timid attempts to introduce the majoritarian system (law 148/1953), parliamentary seats were proportionally distributed among parties until 1992. Only after the referendum of April 1993 did the Italian electoral system move from a proportional system towards a mixed-electoral system. In particular, laws 276/1993 and 277/1993 introduced the mixed-electoral system in the following form: 3/4 of 315 senators were elected from regional districts by a majoritarian system and 1/4 by a proportional one; similarly, 75% of 630 deputies were elected by a majoritarian system and 25% by a proportional one. In the 2000s, a backwards step towards the proportional system was made for both chambers by law 270/2005, although it was accompanied by a majority bonus. Another interesting electoral reform in this period was intended to capture the votes of Italian citizens living abroad. Constitutional laws 1/2000 and 1/2001 provide that such citizens can vote for 12 deputies and 6 senators in foreign constituencies (Const., art. 56, 57).

## 5 The expenditure fragmentation indexes

In this section I present some indicators with which to measure expenditure fragmentation. The first indicator is the total public expenditure fragmentation (*EXPFRAG*):<sup>28</sup>

$$EXPFRAG_{it} = 1 - \frac{n \sum_{j=1}^n \left( \frac{Exp_{ijt}}{TotExp_{it}} \right)^2 - 1}{(n-1)}$$

where *Exp* is the *j*-th type of public expenditure ( $j = 1, \dots, n$ ) in region *i* ( $i = 1, \dots, m$ ) and *TotExp<sub>i</sub>* corresponds to total public expenditure in region *i* at time *t*. The total expenditure fragmentation index assumes values between 0 and 1 inclusive. I chose this version of the index because its interpretation is clearer. When the index assumes value zero this means that only one type of

<sup>28</sup> For better interpretation of this index, it uses a normalised version of the Hirschman-Herfindahl index of fragmentation. For details see the Appendix.

spending is funded; *vice versa*, when the score of the index is close to one, this means that total public spending is equally distributed among  $n$  types of spending.

According to the regional budget classification, I computed the index of fragmentation considering the following five aggregate spending items in which the total public expenditure is shared: 1) total current expenditure; 2) total investment spending; 3) loans and borrowing refunding; 4) expected deficit; 5) payments on behalf of a third party (*i.e.*, ‘*partite di giro*’). Total current expenditure is the main component of total public expenditure in Italian regions, standing at about 65.1% in 2001. By contrast, capital expenditure is only 6.7%, while loans and borrowing refunding and expected deficit are 1.7% and 0%, respectively. The percentage of ‘*partite di giro*’ on total public expenditure is 26.5%.

Since this study considers time series cross-sectional data for 19<sup>29</sup> Italian regions from 1984 to 2004, figure 2 illustrates the tendency of the total expenditure fragmentation index for Italian regions for the full period. After the regional electoral reforms, the total expenditure fragmentation of the Italian regions tends to be more cyclical. A similar tendency is observed for the Ordinary Statute Regions, which represent the majority of the sample. Higher variability in total expenditure fragmentation after the introduction of a mixed electoral system could be consistent with the hypothesis of the exacerbation of electoral competition under a majoritarian system which strengthens the electoral cycle (Persson and Tabellini, 1999, 2003; Persson, 2002). As regards the Special Statute Regions, total expenditure fragmentation gradually decreases throughout the period analysed: in 1984, the total expenditure fragmentation of these regions was around 73% while in 2004 it was only 48%. Although before the 1990s these regions had a degree of total expenditure fragmentation higher than that of regions with an ordinary statute, they thereafter tended to concentrate spending in a few budget items.

*Insert Fig. 2 Total expenditure fragmentation index for Italian regions (1984-2004)*

In the empirical analysis I consider the index of fragmentation  $CC\_EXPFRAG$  computed only for total current ( $CurrExp$ ) and capital ( $CapExp$ ) expenditure. This index is more accurate than  $EXPFRAG$  because it includes only spending directly manipulated by regional governments. This indicator, therefore, seems to be more suitable for testing the theoretical hypotheses formulated in section 2.

$$CC\_EXPFRAG_{it} = 1 - \left\{ 2 \left[ \left( \frac{CurrExp_{it}}{CurrExp_{it} + CapExp_{it}} \right)^2 + \left( \frac{CapExp_{it}}{CurrExp_{it} + CapExp_{it}} \right)^2 \right] - 1 \right\}$$

Total current expenditure includes the following subcategories: personnel payments (4.4% of total current expenditure in 2001); purchase of goods and services (2.7%); current transfers (89.3%); interest payments (1.5%); other (2.1%). A large part of current transfers is devoted to health care (about 73% in 2001). Half of health expenditure by Italian regions is then used for the purchase of goods and services (57.8% in 2003) and one third for personnel payments (32.7% in 2003).<sup>30</sup> The subcategories of total capital expenditure are: goods and real estate (19% of total capital expenditure in 2001), furniture, machinery and equipment (0.5%), capital transfers (62.4%), shareholdings and contributions (5.5%), credit issues (3.6%), and others (9%). A substantial amount of regional capital transfers is addressed to firms, consortia of firms and

<sup>29</sup> Only the Trentino Alto-Adige region is excluded from the sample because the computation of the disproportionality index for this region is not easy for the years 2003 and 2004, and it is probably less comparable with those of the other regions. In fact, since 2003, the regional council has been formed by candidates elected from rounds of voting in the two Special Autonomous provinces of Trento and Bolzano (C.L. 2/2001, art. 4, comma f).

<sup>30</sup> For details see Istat, *Rapporto annuale – La situazione del Paese nel 2005*, Roma.

cooperatives (31% in 2001) whereas a smaller share is directed to households (5.4%) and non-profit organizations (2.4%). A comparison with current transfers expenditure shows that a lower percentage is devoted to these specific groups (e.g. 0.73% to firms, consortia of firms and cooperatives).

In the literature, capital expenditure is considered as more targetable expenditure than current expenditure. Basically, the composition of Italian regional capital and current expenditure shows that the latter is broad-based policy spending as a result of the larger component of health care expenditure. Regional capital expenditure exhibits a larger share of transfers devoted to private agents and which can be easily targeted on their specific preferences. In view of the fact that regional capital expenditure has represented the lower share of primary spending for the overall period considered in the empirical analysis, 1984-2004, this would imply an increase in the *CC\_EXPF* index when the electoral system moves from a proportional to a mixed-electoral system.

Figure 3 shows the tendency of the *CC\_EXPF* index for the Ordinary and Special Statute Regions. In general, the Special Statute Regions show a higher degree of current and capital expenditure fragmentation than do the Ordinary Statute regions. However, during the 20-year period, they tend to reduce expenditure fragmentation, allocating more resources to current expenditure (see Fig. 4). By contrast, the Ordinary Statute Regions exhibit an increase in expenditure fragmentation mainly after the introduction of electoral reforms in the mid-1990s (Fig. 3).

*Insert Fig. 3 Current and capital expenditure fragmentation index for Italian regions (1984-2004)*

*Insert Fig. 4 The percentage of capital expenditure on current and capital expenditure for Italian regions (1984-2004)*

It is not easy to detect the more targetable kind of expenditure through analysis of expenditure composition alone. A useful method of investigation can be the econometric analysis of the *CC\_EXPF* index, because it suggests the kind of expenditure favored under the electoral system or before elections. However, it may also be useful to perform an additional test. In this regard, I estimated the impact of fiscal performance on the highest party's vote share (Drazen and Eslava, 2010). I therefore estimated the dynamic panel data specification reported in equation (1). The dynamic panel model was preferred because a party's vote share remains constant for many years after elections, producing a persistence effect in the cross-sectional time series. Moreover, the introduction of the lag can solve the problem of serial correlation in the error term.

$$vote_{it} = c + f_i + \phi vote_{it-1} + \alpha fp_{it} + \beta z'_{it} + \varepsilon_{it} \quad (1)$$

As the dependent variable I considered the party with the largest share of votes. My intention was therefore to control how fiscal performances impact on the party winning the electoral competition in terms of votes. Since the party with the largest share of votes does not always correspond to the incumbent party, I replaced the dependent variable with the incumbent party's highest vote share. In this way, I controlled for the effective manipulation of fiscal policies. On the right-side of equation (1), I introduced variables of fiscal performance (*fp*). In this regard, I considered the per-capita values of both current and capital expenditure in order to control for the population size. Secondly, I used the percentages of current and capital expenditure on total expenditure, respectively, in order to control for the size of total public expenditure. A positive effect is expected in all these cases if expenditure has more geographically targeted components. I carried out an additional control by considering as an indicator the share of capital expenditure on current expenditure. A positive impact suggests that voters have a greater preference for capital expenditure than for current expenditure. Since voters may dislike incumbent politicians who

make loans and spend on borrowing refunding, I also included in the regression the share of spending on loans and borrowing refunding as a percentage of total expenditure and of current expenditure. A negative impact can be expected for both indicators. I also accounted for the budgetary structure by means of the *CC\_EXPF* index. A positive effect is coherent with the fact that capital expenditure is more preferred by voters. This inference is made knowing a priori that current expenditure is the largest share of the total primary expenditure.

As control variable ( $z$ ), I included in the panel regression the first order lag of the gross domestic product growth (GDP growth) that can affect voters' current beliefs about the incumbent's performance. I also controlled for the incumbent party by introducing a dummy variable which assumes value 1 if the party is in the regional executive committee and zero otherwise. The expected impact of this dummy on the vote share is positive because the incumbent party more likely has a higher share of votes. Fixed effects  $f_i$  and a constant term  $c$  were also included in the panel regression.

The estimation results presented in table 1 were obtained using the System GMM estimator (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998) described more in detail in section 7. They show that an increase in capital expenditure produces a significant increase in the party's votes share. By increasing the share of capital expenditure rather than current expenditure (the incumbent) party gains more votes. This evidence supports the hypothesis that Italian regional voters are more sensitive to an increase in capital expenditure than to one in current expenditure. Current expenditure is generally insignificant, with the exception of the per capita value (-0.19). This result confirms that capital expenditure is more preferred by voters than current expenditure. This implies that capital expenditure should be favored under a majoritarian electoral system and in electoral competition.

The negative impact of loans and borrowing refunding on the party's votes share confirms that voters do not reward parties which run high loans and borrowing spending. However, this evidence is not statistically significant for the incumbent party. An interesting result concerns the significant and negative impact of the past GDP growth level on the party's vote share and its significant and positive impact on the incumbent party's vote share. A plausible explanation for this mixed result is that voters attribute good economic performance to the party heading the regional government. The incumbent party should therefore gain a significant advantage from the good economic performance to the detriment of the challenger. Finally, the coefficient of the lag of the dependent variable is positive and significant, showing that the panel dynamic model is a valid econometric specification.

*Insert Tab. 1 The effects of current and capital expenditure on the party's vote share*

## 6 The electoral indicators

In order to measure the impact of electoral system changes on expenditure fragmentation, I used a dummy variable named *MAJ* which assumes value 1 when the regional mixed-electoral system is introduced and zero otherwise. The use of this dummy provides a measurement of the direct effect of electoral institutions on expenditure fragmentation. A positive impact of this dummy on expenditure fragmentation is expected.

Another indicator used in the empirical analysis is the Gallagher (1991) index of disproportionality. The Gallagher (GHI) index is a disproportionality index corresponds to:

$$GHI_i = \sqrt{\frac{1}{2} \sum_{j=1}^k (V_{ij} \% - S_{ij} \%)^2}$$



where  $V\%$  is the share of votes (*per cent*) obtained by party  $j$  ( $j=1, \dots, k$ ) in region  $i$  ( $i=1, \dots, m$ ) and  $S\%$  is the share of seats (*per cent*) assigned to party  $j$  in region  $i$ . The GHI index ranges from 0 to 100. It describes a pure proportional system when it is close to zero. By contrast, the degree of disproportionality increases when the GHI index tends to 100.

The GHI index was computed for national and regional elections. In particular, the disproportionality index was calculated in relation to Senate elections (*Senate GHI index*), because the seats of senators are distributed on a regional basis, and to regional elections (*Regional GHI index*). In this way, I evaluated the impact of both national and regional electoral system reform on regional expenditure fragmentation. However, computation of the GHI index at regional level is rather problematic because account must be taken of the majority bonus introduced in 1995. In fact, if the majority bonus is not included in the computation of the index, the degree of disproportionality may be underestimated. I remind that 4/5 of regional council seats is proportionally distributed among provincial lists. The majority bonus consists in 1/5 of seats assigned to the ‘listino’ under the condition that the provincial lists belonging to it have an overall share of seats below 50%. In fact, if the group of provincial lists obtains a share of seats of 50% or more by the proportional seats distribution, 1/2 of extra seats is assigned to the ‘listino’ and 1/2 is distributed among provincial lists not belonging to it. Since there are two lists (*i.e.*, provincial and regional), it is not trivial to compute the Gallagher index. I tried to solve this problem by calculating an extended version of this index which accounted for the majority bonus. Firstly, I computed the GHI index for the provincial lists ( $GHI^P$ ) and for regional lists ( $GHI^R$ ). In order to have a single disproportionality index, the  $GHI^R$  and  $GHI^P$  indexes were weighted for the percentage  $\alpha$  of seats distributed by regional lists and for the percentage  $(1-\alpha)$  of seats distributed by provincial lists, respectively. In this way, I obtained a single index that I call the *Adjusted Regional GHI index*. This accounts for a mixed electoral system based on a proportional system accompanied by a majority bonus. The formula of the revisited GHI index follows:

$$\begin{aligned} GHI_i^{ADJ} &= (1-\alpha) \cdot GHI_i^P + \alpha \cdot GHI_i^R = \\ &= (1-\alpha) \cdot \sqrt{\frac{1}{2} \sum_{s=1}^S (V_{is}^P \% - S_{is}^P \%)^2} + \alpha \cdot \sqrt{\frac{1}{2} \sum_{h=1}^H (V_{ih}^R \% - S_{ih}^R \%)^2} \end{aligned}$$

where

- $\alpha \in [0,1)$  corresponds to the percentage of seats distributed to the regional party coalition-list with the highest share of votes (*i.e.*, the ‘listino’) and  $(1-\alpha)$  to provincial party-lists;
- $V^P\%$  is the percentage of votes obtained by provincial party-list  $s$  ( $s=1, \dots, S$ ) in region  $i$  ( $i=1, \dots, m$ );
- $S^P\%$  is the percentage of seats assigned to provincial party-list  $s$  ( $s=1, \dots, S$ ) in region  $i$ ;
- $V^R\%$  is the percentage of votes obtained by regional party coalition-list  $h$  ( $r=1, \dots, H$ ) in region  $i$ ;
- $S^R\%$  is the percentage of seats assigned to regional party coalition-list  $h$  ( $r=1, \dots, H$ ) in region  $i$ .

The *Adjusted GHI index* ranges from 0 to 100. It describes a pure proportional system when the share of votes corresponds to the share of seats ( $V\%=S\%$ ) and  $\alpha$  is 0. By contrast, the degree of disproportionality increases when the *Adjusted Regional GHI index* moves towards 100.

The use of the GHI index to measure the impact of institutional changes is controversial in the literature because it measures the electoral outcome of the electoral law. Taagepera (2003) argues that the Gallagher index only accounts for indirect effects of electoral laws, and for this reason the ‘effective threshold’ or the district magnitude (Lijphart, 1994) should be preferred as direct measures of institutional designs. In effect, the degree of disproportionality of an electoral system is affected by various features of the electoral law, such as the magnitude of the electoral district

(i.e., *the number of seats allocated within an electoral district*) and the electoral formula (Taagepera and Shugart, 1989; Gallagher, 1991; Lijphart, 1994; Anckar, 1998; Powell and Vanberg, 2000; Anckar and Akademi, 2001). In general, a higher degree of disproportionality is associated with a smaller magnitude of the district. In the same way, plurality and majority rules produce greater distortions in the proportionality of votes/seats representation than do proportional rules, although not in all circumstances (Anckar and Akademi, 2001). Since votes/seats disproportionality depends on different features of electoral system, it may be inadvisable to establish a systematic association between votes/seats disproportionality and institutional design. This does not seem to be the point of view of Blais (1988), who argues that it is possible to classify electoral systems according to their electoral outcomes.<sup>31</sup> Empirical studies have shown that a majoritarian system produces a higher level of disproportionality than a proportional representation (PR) system (Lijphart, 1994; Anckar and Akademi, 2001), whereas a mixed-electoral system produces an intermediate level (Powell and Vanberg, 2000; Anckar and Akademi, 2001). Some studies have employed the Gallagher index to measure the impact of the electoral rule. Lijphart (1999) uses this indicator to map democratic countries according to the so-called ‘joint-power’ dimension. Iversen and Soskice (2006) use a composite index based on Lijphart’s measure and Gallagher’s index. They show that the values assumed by this index are consistent with the distinction of electoral systems between majoritarian and proportional. Moreover, Baraldi (2008) uses the Gallagher index to measure the impact of national electoral rules on the growth of public consumption spending by 20 regional governments from 1980 to 2003. Replacing a majoritarian-proportional dummy variable with the Gallagher index, Lupu and Pontusson (2008) do not find any relevant difference in their results.<sup>32</sup>

For the presence of electoral cycle I considered regional government elections. In detail, I used two dummy variables, *ELECTION* and *PRELECTION*, which assumed value 1 in the year of election and pre-election of the regional council and zero otherwise. There was no problem of endogenous elections in Italian regions because they are exogenously fixed by law.

Finally, in the panel data analysis, I also accounted for control variables which generally affect public expenditure decisions: *i*) the size of the population (POP); *ii*) young and elderly people aged 0-15 (%POP 0-15) and 65 and over (%POP 65+), respectively; *iii*) per capita gross domestic product (GDP); *iv*) per-capita State transfers<sup>33</sup> (GRANTS). Table 2 gives descriptive statistics for all variables.

*Insert Tab. 2 Data sources and descriptive statistics*

## 7 Econometric analysis

In this section I present econometric specifications to test the impact of electoral systems and elections on the regional budget structure by using the expenditure fragmentation index. Moreover, I present estimation results in this regard.

First, dynamic panel data model (2) with fixed  $v_i$  and time  $\tau_t$  effects is considered in the empirical analysis. The introduction of time effects captures undefined shocks common to regions, whereas fixed effects control for the omission of unobserved features of regions. The dependent variable *CC\_EXPFrag* is a  $N \times 1$  vector of the total public expenditure fragmentation index in region  $i$  ( $i=1, \dots, N$ ) at time  $t$  ( $t=1, \dots, T$ ). A  $1 \times K$  vector  $x'_{it} = (x^1_{it}, \dots, x^K_{it})$  of control

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<sup>31</sup> “it is entirely appropriate to characterize electoral systems as being more or less proportional, it should also be clear that the distinction ought to be made on the basis of the actual outcome and not on the basis of the rules themselves” (Blais, 1988, p. 105).

<sup>32</sup> See Lupu and Pontusson (2008), footnote 25.

<sup>33</sup> State transfer includes the following budget items: state revenue contributions; taxes revenue from the state and state transfers in lieu of tax revenues.

variables and a constant term  $a_0$  are included in the model, as well as an error term  $\mathcal{E}$  normally distributed with zero mean and constant variance. The key-variable  $ERULE$  accounts for the disproportionality index computed for national (*Senato GHI index*) and regional (*Region GHI index*, *Adjusted GHI index*) elections, and  $MAJ$  dummy. The  $ELECTION$  and  $PRE-ELECTION$  dummies are used to estimate the impact of the electoral cycle on the expenditure fragmentation index.

$$CC\_EXPFRAG_{it} = a_0 + v_i + \tau_t + \rho CC\_EXPFRAG_{it-1} + \delta ERULE_{it} + \varphi ELECTION_{it} + \delta PREELECTION_{it} + \beta x'_{it} + \varepsilon_{it} \quad (2)$$

Model (1) can be estimated using different estimators. The basic estimation approach is the least square with dummy variables estimator (LSDV). However, this estimator produces inconsistent estimations when  $N$  is large and  $T$  is fixed (Nickell, 1981). The potential inconsistency is of order  $O(1/T)$ . A bias-correction of the inconsistent LSDV estimator has been developed by Kiviet (1995).<sup>34</sup> In the literature other bias approximations of the LSDV estimator have been provided.<sup>35</sup> In particular, Bruno (2005) rearranges the bias approximation in Bun and Kiviet (2003) for the case of unbalanced dynamic panel data models. Judson and Owen (1999) have shown that the bias-corrected LSDV estimator derived in Kiviet (1995) performs quite well in short panels. However, a weakness of the (bias-corrected) LSDV estimators is that it requires strict exogeneity of regressors and homoschedasticity in the error terms. Bun and Carree (2006) solve the problem of heteroscedastic disturbances for balanced panels extending the bias-correction of the LSDV estimator (Bun and Carree, 2005) to the case of both time-series and cross section heteroschedasticity. When the conditions of strictly exogeneity of regressors and homoschedasticity in the error terms are not fulfilled, the IV estimators can represent an attractive alternative. Anderson and Hsiao (1981, 1982) develop an IV estimator accounting for a dynamic panel model with variables transformed into first differences. Anderson and Hsiao (1981, 1982) show that the dynamic process produces the problem of correlation between the first-differenced lagged dependent variable  $\Delta y_{it-1}$  and the first-differenced error term  $\Delta \varepsilon_{it}$ . To remedy this problem, they use  $\Delta y_{it-2}$  and exogenous variables in first-differences as instruments. Arellano (1989) has then shown that  $y_{it-2}$  is a better instrument than  $\Delta y_{it-2}$  for the Anderson and Hsiao estimator. The IV estimators based on the generalised method of moments (GMM) have been found to be more efficient than the Anderson and Hsiao (A-H) estimator (Arellano and Bond, 1991). In particular, I refer to the first-differenced (DIFF-) GMM developed by Arellano and Bond (1991), which uses the lagged levels of the dependent variable as instruments for the dynamic equation transformed into first differences. However, the DIFF-GMM estimator suffers from a weak instruments problem when the coefficient of the lagged depend variable is close to unity and when the relative variance of the fixed effects increases (Blundell and Bond, 1998). Therefore, the lagged levels can be poor instruments for the DIFF-GMM estimator. In this case, an extended version of this estimator helps solve the problem. It is called the System (SYS-) GMM estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). The SYS-GMM estimates equations in levels and in differences employing the lagged differences of the dependent variable as instruments for equations in levels and the lagged levels of the dependent variable as instruments for equations in first differences. Other valid instrumental variables are the one or more periods of the lagged differences/levels of exogenous and predetermined variables  $x$  for equations in levels/first differences.<sup>36</sup> Blundell and Bond (1998) show that the SYS-GMM

<sup>34</sup> Kiviet (1995) shown that this estimator is more efficient than some instrumental variables estimators (Anderson and Hsiao, 1981, 1982; Arellano and Bond, 1991).

<sup>35</sup> See Kiviet (1999); Hansen (2001); Hahn and Kuersteiner (2002); Bun and Kiviet(2003); Bun and Carree (2005).

<sup>36</sup> See Arellano and Bond (1991), Arellano and Bover (1995), Blundell and Bond (1998).

estimator is generally more efficient than the DIFF-GMM estimator. However, the consistency of both estimators depends on the presence of the second-order autocorrelation in the differenced residuals. This condition is detected with the specification test developed by Arellano and Bond (1991) and called the AB-AR2 test in current empirical analysis. The presence of the first order autocorrelation (Arellano and Bond, 1991) is also investigated by a test which this paper calls the AB-AR1 test.

In spite of these advantages, it has been shown in the literature that the DIFF- and SYS- GMM estimators can suffer from the instrumentation proliferation problem (Roodman, 2009). This problem is detected if the p-values of the Hansen test and the Difference-in-Hansen test are close to 1.00. The Hansen test checks the validity of the full set of instrumental variables, while the Difference-in-Hansen test checks the validity of the sub-set instruments used in the level equations. Although both tests are consistent in the presence of heteroschedasticity and autocorrelation in the error terms, they are weaker when too many instrumental variables are used in panel regressions. In this circumstance, although the validity of instruments is confirmed, «the potential for false-positive results is serious» (Roodman, 2009, p. 156). In order to remedy this problem, Roodman (2009, p. 156) suggests that: «results should be aggressively tested for sensitivity to reductions in the number of instruments [...]». The number of instrumental variables can be significantly reduced by collapsing instruments and limiting lag length (Roodman, 2009). However, it is difficult to select the optimal number of instruments. In empirical analysis, a thumb rule is generally employed for selection of the instruments. The rule imposes that the number of instruments be less than or equal to the number of cross sections (Roodman, 2009). However, the small dimension of panels makes this difficult.

Unfortunately, the instrument proliferation problem is not the only disadvantage that occurs when the DIFF- and SYS-GMM estimators are adopted in the dynamic panel data analysis. In fact, they perform poorly when a small number of cross-sectional units are considered in the empirical analysis. With a small  $N$  and large  $T$ , the estimation results may be more biased than the LSDVC estimation results (Judson and Owen, 1999). Nevertheless, a growing number of studies have estimated short panels with the GMM estimators.<sup>37</sup> Another weakness of the GMM estimators is that non-stationary data may make unbiased estimations. A signal of this problem occurs when the coefficient of the lagged dependent variable estimated by these estimators is close to unity.

As just discussed, dynamic panel data estimators for short panels have advantages and disadvantages. In my empirical analysis, the presence of group-wise heteroschedasticity<sup>38</sup> and the unbalanced panel data induces me to lean towards the adoption of the SYS-GMM estimator. Data are transformed in logarithmic form in order to partially remove the detected heteroschedasticity problems. In this case, the estimation results must be interpreted in terms of elasticity. Estimation results are reported in tables 3.1-3.2. Table 3.1 presents the estimation results with only fixed effects, whereas those in table 3.2 are with both fixed and time effects. Basically, estimation results show that the SYS-GMM estimator is consistent observing the p-values of the AB-AR2 test in tables.<sup>39</sup> The coefficient of  $CC\_EXPFRAG_{t-1}$  is always statistically significant, showing that the panel dynamic model is a correct specification. Moreover, it does not assume values close to 1, signalling the potential absence of non-stationary problems in the dependent variable.

Estimation results with the only inclusion of fixed effects (Tab. 3.1) show a significant increase in capital and current expenditure fragmentation when the national electoral system is characterized by a more disproportional electoral rule because of the introduction of a majority bonus. The coefficient of the *Senate GHI index* is positive and statistically significant (+0.14-0.16). This result shows that the allocation of resources between current and capital spending items

<sup>37</sup> For examples see the recent articles by Dreher et al. (2008) and Cassette and Paty (2010).

<sup>38</sup> Results on the Modified Wald group-wise heteroschedasticity test (Greene, 2000) are available from the author upon request.

<sup>39</sup> The null-hypothesis of the AB-AR2 test is the absence of the second-order autocorrelation in the differenced residuals.

seems to be more sensitive to national electoral system changes. However, this result is not robust because the coefficient associated with the *Senate GHI index* lost significance when instrumental variables are collapsed. Estimation results also show that the coefficient associated with *MAJ* dummy is statistically significant and assumes values between +0.16 and +0.22. However, the collapse of instrumental variables does not solve the problem of instrument proliferation detected by the p-value of the Difference-in-Hansen test closed to 1.00. Closing the number of instrumental variables to the number of regions (see Tab. 3.1 *continue*) to check more robustness results, I find a significant and positive impact of *MAJ* dummy (+0.15) on expenditure fragmentation.<sup>40</sup>

The inclusion of time dummies in panel regressions (see Tab. 3.2) does not subvert the results on the positive impact of a mixed-electoral system on expenditure fragmentation. However, I observe that it exacerbates the instrumental proliferation problem detected by the Hansen tests. In particular, I observe problems in the computation of the Hansen tests by keeping the number of instrumental variables close to the number of regions. Therefore, I relax the thumb rule considering a number of instrumental variables equal or below to the number of regions (*i.e.*,  $N=19$ ) and the number of years (*i.e.*,  $T=20$ ). In the empirical analysis, the number of instruments would be below 39. However, I make caution about the robustness of estimation results obtained with the relaxed thumb rule. They may be less robust than estimation results performed according to the standard thumb rule. Keeping this in mind, the collapse of instrumental variables and the inclusion of the one and more order lag of the regressors in the panel regressions help reduce the number of instruments with a loss of observations. Estimation results show that the coefficients associated with the *Senate GHI index* (+0.11-0.18) and the *Adjusted Regional GHI index* (+0.13-0.17) are positive and statistically significant in the case of collapsed and non-collapsed instrumental variables.<sup>41</sup> These results show that capital expenditure can be favoured more than current expenditure under a more disproportional electoral rule. A similar conclusion is drawn on observing the coefficient of the *MAJ* dummy. A shift from a proportional system to a mixed-electoral system produces an increase in capital and current expenditure fragmentation of 14%. Unfortunately, this result is not robust because the Hansen statistic values are close to 1.00 when instruments are collapsed (see Tab. 3.2).<sup>42</sup> However, it is interesting to observe that the regional electoral system has a similar impact on expenditure fragmentation when the direct (*MAJ* dummy) and indirect (*Regional GHI index*, *Adjusted Regional GHI index*) effects of electoral rules are considered in the dynamic panel regression. These results suggest that current expenditure is more broadly targeted expenditure and/or more rigid than capital expenditure. Probably, both explanations are plausible. On the contrary, they outline that capital expenditure is the voters' most-preferred expenditure targeted on narrower interest groups in the regional population.

In regard to the electoral cycle, table 3.1 shows a significant concentration of expenditure before elections. The entire change in current and capital spending composition ranges from -10% to -8%. A greater concentration of expenditure on current spending implies that it is more targetable or more visible than capital expenditure. However, evidence on the expenditure fragmentation produced by the electoral system excludes *a priori* that current expenditure is more targetable than capital expenditure. This means that current expenditure is a more broad-based policy expenditure and more visible than capital. The combination of both features may have had a more incisive effect during elections.<sup>43</sup> However, this result is not robust when the instruments

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<sup>40</sup> Some instrumental variables have been dropped in order to implement the thumb rule.

<sup>41</sup> However, using different combinations of instrumental variables, I observe that statistical significance of the coefficient of the *Senate GHI index* is more robust than the coefficient of the *Adjusted Regional GHI index*.

<sup>42</sup> Moreover, I frequently observed a loss of statistical significance of the dummy variable when I changed the set of instrumental variables.

<sup>43</sup> A recent study on the political budget cycle and the spread of news in the Italian Ordinary Statute Regions (PetRARCA, 2011) from 1984 to 2008 finds an increase in total and capital expenditure in election years. More detailed investigation of electoral effects

are collapsed, and also when time effects are included in the panel regressions (see Tab. 3.2). Therefore no robust and clear conclusion can be drawn.

As regards the demographic control variables, an increase in *POP* leads to a concentration of resources in current expenditure. An increase in the size of the population is reflected in a higher demand for public goods and services which is satisfied much more with current (consumption) than capital (investment) expenditure. The age structure of the population is significantly and negatively correlated with expenditure fragmentation. A positive and significant effect for young people is only found on *CC\_EXPFrag* when the instruments are collapsed and time dummies are not included in the regressions (see Tab. 3.1). In fact, when time dummies are introduced, the coefficient associated with *YOUNG* becomes negative and significant. The introduction of time effects captures undefined common shocks on regions and yields more robust estimation results. However, the relaxed thumb rule adopted in the empirical analysis should reduce this robustness. Keeping this issue in mind, I comment the results with time effects.<sup>44</sup> When the share of elderly and young people increases in the population, Italian regions tend to redistribute more spending in their favour in order to satisfy their demand for public services and goods. In particular, results on *CC\_EXPFrag* suggest that the growth of elderly and young people in the regional population favors current rather than capital expenditure. This evidence is in line with the regional current expenditure composition, mainly devoted to welfare spending (like health, education and social assistance) strongly polarized towards these two population groups.

On the side of the economic control variables, results on the *CC\_EXPFrag* index show that state transfers (*GRANTS*) produce a significant concentration of expenditure. The lower tax autonomy of local governments induces transfers from the central government to be mainly directed to financing the large amount of personnel payments (74.2% of current education spending and 32.7% of current health expenditure in 2003, respectively) and the purchases of goods and services (57.8% of current health spending in 2003).

Finally, *GDP* has a significant negative impact on *CC\_EXPFrag*. An increase in *GDP* produces an increase in the public revenues of regional governments which is largely employed to fund current expenditure. A possible explanation for this result is that, in the presence of rigidities on the side of current expenditure (*e.g.*, a high share of interests spending or of personnel payments on the total expenditure), low tax autonomy and scarcity of state transfers, it is plausible that public revenues increases due to a positive economic conjuncture are mainly devoted to funding the more rigid current expenditure.

## 8 Conclusion

In this paper I have investigated the effects of the electoral system and political budget cycle on the expenditure composition by means of the expenditure fragmentation index. Firstly, I have shown the theoretical links existing between expenditure composition and fragmentation under different electoral regimes and when elections are forthcoming. In particular, I have shown that a shift from a proportional system to a majoritarian system produces an increase (decrease) in the degree of expenditure fragmentation if the share of spending on broad programs is larger (smaller) than the expenditure on geographically targetable programs. As regards the theoretical links under electoral cycle, I have shown that electoral fragmentation is lower in pre-electoral

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before and after the introduction of the regional electoral system reform (1995) shows that that current expenditure increases significantly in pre-electoral and electoral years before the reform, while capital expenditure only increases in electoral years in the whole period analysed. Probably, evidence on the expenditure concentration effect in pre-electoral periods can be also linked to the proportional system which favors a much more broad-based policy spending than a more geographically targetable expenditure under electoral competition (Persson and Tabellini, 2002).

<sup>44</sup> In the current study a positive impact of elderly and young people on current and capital expenditure fragmentation is consistent with higher spending in public investments devoted to these two population groups.

periods and higher in post-electoral ones. These hypotheses have been tested on a panel of 19 Italian regions from 1984 to 2004, focusing on the degree of current and capital expenditure fragmentation. The empirical findings are in line with the theoretical links. In particular, the estimation results show a significant increase in expenditure fragmentation when a proportional system moves to a mixed-electoral system. The fragmentation effect could be strengthened by the presence of current spending rigidities. The result suggests that capital expenditure is the voters' most-preferred expenditure under a mixed-electoral system. Moreover, it also implies that regional capital expenditure is more geographically targetable than regional current expenditure. Summing up, electoral system has an effective strength on regional expenditure composition. On the side of the electoral cycle, the results provide weak evidence in favour of a pre-electoral regional expenditure concentration. This result could be driven by the past proportional electoral system which may have fostered the growth of current spending before election. Although this result is not robust, it suggests that regional elections do not have an effective strength on the budgetary structure and that regional current expenditure is more visible than capital expenditure.

## Appendix

**A)** The Hirschman-Herfindahl expenditure fragmentation index  $e$  under a majoritarian ( $e^M$ ) and proportional ( $e^P$ ) system is computed from equations (7) and (13), respectively, in Milesi-Ferretti et al.'s (2002) model. The index ranges from 0 (min expenditure fragmentation) to 0.5 (max expenditure fragmentation), including. Holding constant the values of the median voter's parameters  $\alpha_m \in [0,1]$  and  $\beta_m \in [0,1]$  on the levels of transfers  $s$  and public goods  $g$  spending preferred by the representatives of central government, the indexes of expenditure fragmentation under the two electoral systems are:

$$e^P = 1 - \left[ \frac{s^P}{s^P + g^P} \right]^2 - \left[ \frac{g^P}{s^P + g^P} \right]^2 = 1 - \left[ \frac{2\alpha_m(1 - \beta_m)}{1 + \alpha_m(1 - 2\beta_m)} \right]^2 - \left[ \frac{1 - \alpha_m}{1 + \alpha_m(1 - 2\beta_m)} \right]^2$$

$$e^M = 1 - \left[ \frac{s^M}{s^M + g^M} \right]^2 - \left[ \frac{g^M}{s^M + g^M} \right]^2 = 1 - \left[ \frac{\alpha_m(1 - \beta_m)}{2 - \alpha_m(1 + \beta_m)} \right]^2 - \left[ \frac{2(1 - \alpha_m)}{2 - \alpha_m(1 + \beta_m)} \right]^2.$$

$$\text{If } \alpha_m = 1/(3 - 2\beta_m) \Rightarrow e^P = 0.5 \ (\Rightarrow s^P = g^P).$$

$$\text{If } \alpha_m = 2/(3 - \beta_m) \Rightarrow e^M = 0.5 \ (\Rightarrow s^M = g^M).$$

The equation  $e^P = e^M$  is solved for:

- $\alpha_m = 0, 0 \leq \beta_m \leq 1 \Rightarrow e^P = e^M = 0$ ;
- $\alpha_m = 1/(2 - \beta_m), 0 \leq \beta_m < 1 \Rightarrow e^P = e^M = 4/9$ ;
- $\alpha_m = 1, 0 \leq \beta_m < 1 \Rightarrow e^P = e^M = 0$ .

The level of expenditure fragmentation is higher under the proportional system than the majoritarian one when  $\alpha_m < 1/(2 - \beta_m)$  :

$$e^P > e^M \Leftrightarrow \alpha_m < 1/(2 - \beta_m).$$

In Milesi-Ferretti et al.'s (2002) model,  $s > g$  under both electoral regimes (*i.e.*,  $s^P > g^P$ ,  $s^M > g^M$ ) if  $\alpha_m > 2/(3 - \beta_m)$  and *vice versa*. Considering two regions with different electoral systems, the

degree of expenditure fragmentation is lower in the region with a proportional system than in the region with a majoritarian system (i.e.,  $e^p < e^m$ ) if  $s > g$  in both regions since  $1/(2 - \beta_m) < 2/(3 - \beta_m)$ . By contrast, it follows that  $e^p > e^m$  if  $s < g$  in both regions because  $1/(3 - 2\beta_m) < 1/(2 - \beta_m)$ .

Summing up, expenditure fragmentation is lower (higher) in a region with a proportional regime than in a region with a majoritarian regime when the level of transfer spending  $s$  is higher (lower) than public goods  $g$  spending under both electoral regimes. This implies that a move from a proportional system to a majoritarian system produces an increase (decrease) in the degree of expenditure fragmentation if the share of transfer spending is larger (smaller) relative to the public good expenditure.

**B)** Since the Hirschman-Herfindahl index (HHI) of fragmentation HHI-F is equal to  $(1 - \text{HHI})$  and  $\text{HHI} \in \left[ \frac{1}{n}, 1 \right]$ , it follows that  $\text{HHI-F} \in \left[ 0, \frac{(n-1)}{n} \right]$ . Subtracting  $\frac{1}{n}$  from HHI and dividing it by

$\frac{n-1}{n}$ , we obtain the normalised version of  $\text{HHI}^* = \frac{\text{HHI} - \frac{1}{n}}{\frac{n-1}{n}} = \frac{n\text{HHI} - 1}{n-1} \in [0, 1]$ . Replacing HHI\* in

HHI-F, it follows that:  $\text{HHI-F}^* = 1 - \text{HHI}^* = 1 - \frac{n\text{HHI} - 1}{n-1} \in [0, 1]$ .

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Fig. 1 Expenditure fragmentation under proportional and majoritarian electoral systems

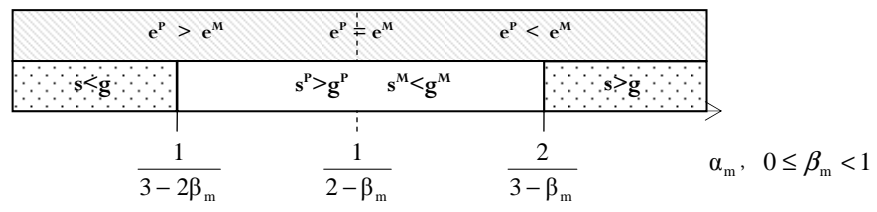
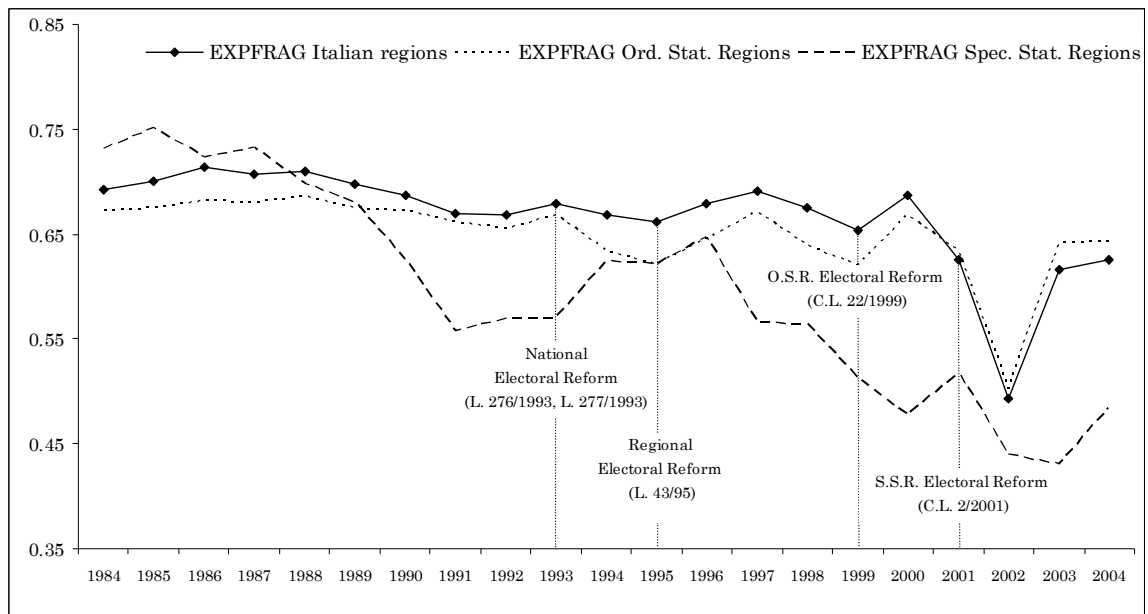


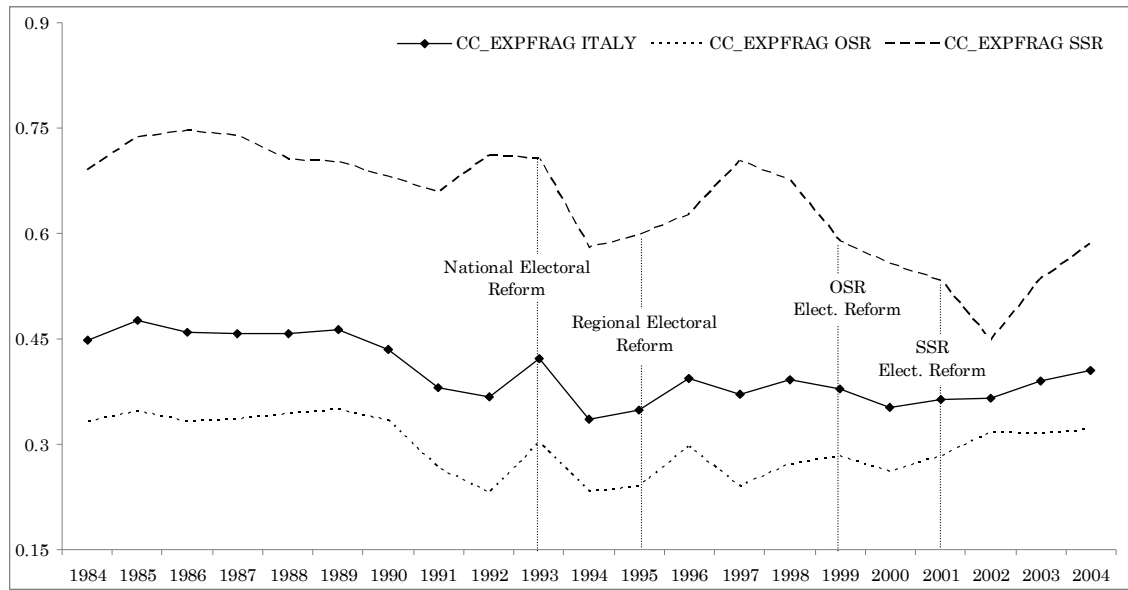
Fig. 2 Total expenditure fragmentation index for Italian regions (1984-2004)



Note: The index is calculated on aggregate data for 20 Italian regions.

Data source: ISTAT, Bilanci consuntivi delle regioni e delle province autonome; ISTAT, Finanza locale: entrate e spese dei bilanci consuntivi (comuni, province e regioni)-anni 2001-2002.

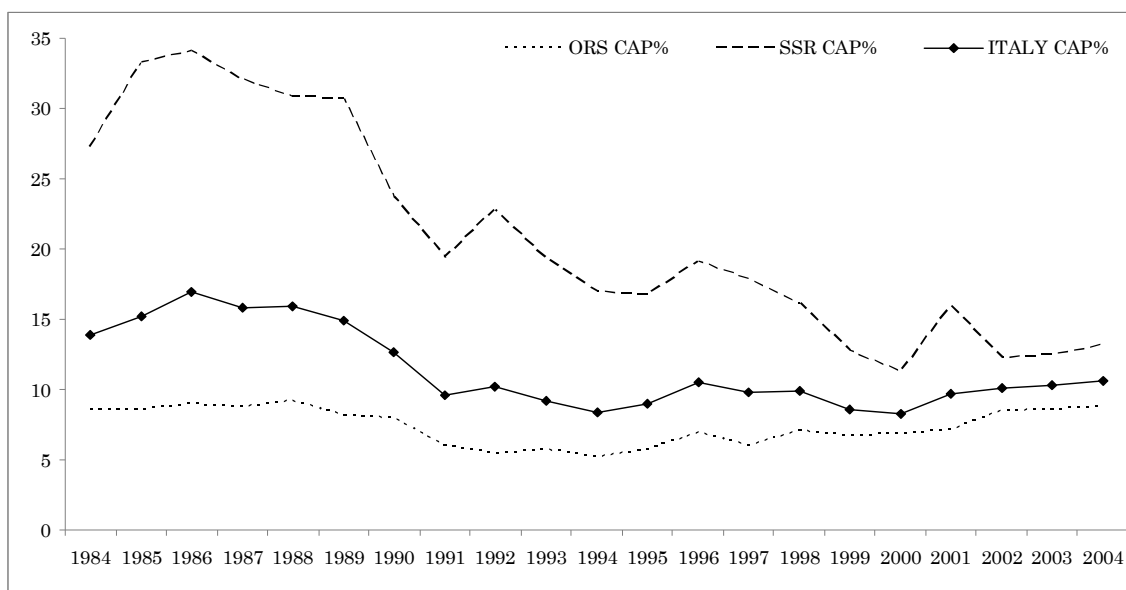
Fig. 3 Current and capital expenditure fragmentation index for Italian regions (1984-2004)



Note: The index is calculated on aggregate data for 20 Italian regions.

Data source: ISTAT, Bilanci consuntivi delle regioni e delle province autonome; ISTAT, Finanza locale: entrate e spese dei bilanci consuntivi (comuni, province e regioni)-anni 2001-2002.

Fig. 4 The percentage of capital expenditure on current and capital expenditure for Italian regions (1984-2004)



Note:  $CAP\% = \frac{CapExp}{CurrExp + CapExp} * 100$  is calculated on aggregate data for 20 Italian regions.

Data source: ISTAT, Bilanci consuntivi delle regioni e delle province autonome; ISTAT, Finanza locale: entrate e spese dei bilanci consuntivi (comuni, province e regioni)-anni 2001-2002.

Tab. 1 The effects of current and capital expenditure on the highest party's vote share

	Party's vote share					Incumbent party's vote share				
Current exp. (per capita)	-0.19**					-0.05				
	(-2.53)					(-0.75)				
Capital exp. (per capita)	0.06					0.07				
	(1.11)					(1.35)				
Current exp. (% total public exp.)		0.002					0.03			
		(0.03)					(0.32)			
Capital exp. (% total public exp.)		0.06*					0.08**			
		(1.73)					(1.98)			
Loans & borrowing refunding (% total public exp.)		-0.06**					-0.02			
		(-2.10)					(-0.60)			
Capital exp. (% current exp.)			0.12**	0.06*				0.07	0.10**	
			1.96	1.80				(1.35)	(2.19)	
Loans & borrowing refunding (% current exp.)				-0.06**					-0.01	
				-2.03					(-0.41)	
CC_EXPFrag					0.11*					0.09
					(1.66)					(1.46)
GDP growth <sub>t-1</sub>	-0.02***	-0.02**	-0.01**	-0.02**	-0.01*	0.04	0.04*	0.03	0.04*	0.03
	(-2.97)	(-2.57)	(-2.05)	(-2.29)	(-1.92)	(1.55)	(1.78)	(1.62)	(1.79)	(1.61)
Government party	0.19***	0.20***	0.07**	0.20***	0.08***					
	(2.65)	(2.83)	(2.17)	(2.76)	(3.05)					
Party's vote share <sub>t-1</sub>	0.72***	0.45***	0.90***	0.45***	0.91***	0.82***	0.66***	0.80***	0.73***	0.81***
	(11.04)	(3.38)	(26.87)	(3.43)	(36.21)	(5.52)	(3.10)	(6.26)	(3.47)	(6.30)
cons	1.85***	1.59***	0.02	1.60***	0.35***	0.54	0.83	0.44	0.61	0.68
	(3.42)	(2.85)	(0.13)	(4.43)	(3.20)	(0.69)	(1.31)	(1.09)	(0.84)	(1.54)
Wald $\chi^2$ (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB-AR1 test	0.01	0.03	0.005	0.024	0.005	0.006	0.014	0.003	0.015	0.003
AB-AR2 test	0.335	0.594	0.182	0.597	0.156	0.444	0.311	0.438	0.360	0.446
Hansen J test	0.262	0.524	0.288	0.393	0.265	0.552	0.616	0.400	0.640	0.372
Difference Hansen test	0.916	0.489	0.839	0.531	0.819	0.988	0.778	0.123	0.218	0.101
Instruments No.	19	19	19	19	19	19	19	19	19	19
Observation No.	357	341	357	341	357	336	323	336	323	336

Note: All variables are in logarithmic form with the exception of Government party and GDP growth. Fixed effects are included in regressions; coefficient significant at level \*\*\* 1%, \*\* 5%, \* 10%; z-value in p-; parenthesis; results of the tests are reported in p-value; Instruments for first differences equation: EXPFRAG dated t-3 and earlier; Instruments for levels equation:  $\Delta$ EXPFRAGt-3, constant term; instrumental variables are collapsed. Group Nr. 19.

Tab. 2 Data sources and descriptive statistics

Variable	Data source	Obs.	Mean	Std. Dev.
CC_EXPFRAF	ISTAT, Bilanci consuntivi delle regioni e delle province autonome; ISTAT, Finanza locale: entrate e spese dei bilanci consuntivi (comuni, province e regioni) anni 2001-2002.	390	0.41	0.24
Current exp. (per capita)		390	1233.1	1100.4
Capital exp. (per capita)		390	222.9	415.1
Current exp. (% Tot exp.)		390	53.6	19.7
Capital exp. (% Total pub.)		390	8.7	8.6
Capital exp. (% Cur. exp.)		390	17.2	18.9
Loans & Borrow (% Tot exp.)		390	1.4	3.8
Loans & Borrow (% Cur. exp.)		390	2.7	7.2
GRANTS (per capita; euros)	Ministero dell'Interno, the Regions of Friuli Venezia-Giulia, Sardegna, Sicilia, Valle D'Aosta.	390	949.1	953.1
Regional GHI		399	3.41	1.23
Adjusted Regional GHI	Ministero dell'Interno, the Regions of Friuli Venezia-Giulia, Sardegna, Sicilia, Valle D'Aosta.	399	5.87	4.08
Senate GHI	Ministero dell'Interno.	399	13.98	10.57
MAJ (1=mixed system for regional election; 0=otherwise)		399	0.39	0.49
ELECTION (1= if regional government is in election year; 0= otherwise)		399	0.20	0.40
PRE-ELECTION (1= if regional government is in pre-election year; 0= otherwise)		399	0.23	0.42
Government party (1= if the highest vote share party is at regional executive; 0 otherwise)		370	0.84	0.36
Party's vote share		399	33.7	9.4
Incumbent party's vote share		366	31.9	10.2
POP	ISTAT, <a href="http://demo.istat.it/">http://demo.istat.it/</a>	399	2944742	2244889
% POP 65 +	ISTAT, <a href="http://demo.istat.it/">http://demo.istat.it/</a>	399	16.89	3.93
% POP 0-15	ISTAT, <a href="http://demo.istat.it/">http://demo.istat.it/</a>	399	16.92	3.51
GDP (per capita; euros; constant price)	ISTAT, Conti Economici Regionali 1980-2004, Ed. 2005.	399	15425	4192
GDP growth	ISTAT, Conti Economici Regionali 1980-2004, Ed. 2005.	399	1.84	1.80



Tab. 3.1 The SYS-GMM estimation results on the impact of electoral system and election on current and capital expenditure fragmentation

Senato GHI index	<b>0.16**</b> <b>(2.00)</b>				<b>0.15*</b> <b>(1.94)</b>	<b>0.15**</b> <b>(1.98)</b>	<b>0.14*</b> <b>(1.86)</b>	0.06 (0.84)			0.06 (0.83)	0.06 (0.82)	0.05 (0.69)	
Region GHI index		0.11 (0.97)			0.07 (0.67)					0.03 (0.15)	0.03 (0.14)			
Adjusted GHI index			0.10 (1.52)			0.09 (1.47)				0.07 (1.21)		0.07 (1.25)		
MAJ				<b>0.22*</b> <b>(1.68)</b>			0.21 (1.60)				<b>0.17*</b> <b>(1.77)</b>		<b>0.16*</b> <b>(1.76)</b>	
POP	<b>-0.08*</b> <b>(-1.73)</b>	<b>-0.13***</b> <b>(-2.93)</b>	<b>-0.15***</b> <b>(-3.90)</b>	<b>-0.18***</b> <b>(-3.89)</b>	<b>-0.08*</b> <b>(-1.85)</b>	<b>-0.10**</b> <b>(-2.56)</b>	<b>-0.13***</b> <b>(-2.71)</b>	<b>-0.17***</b> <b>(-2.61)</b>	<b>-0.19***</b> <b>(-3.15)</b>	<b>-0.21***</b> <b>(-3.69)</b>	<b>-0.24***</b> <b>(-3.92)</b>	<b>-0.17***</b> <b>(-2.65)</b>	<b>-0.19***</b> <b>(-2.89)</b>	<b>-0.22***</b> <b>(-3.07)</b>
% POP 0-15	0.37 (0.65)	0.44 (0.74)	0.50 (0.94)	-0.004 (-0.01)	0.37 (0.66)	0.44 (0.83)	-0.03 (-0.04)	<b>1.24*</b> <b>(1.91)</b>	<b>1.29*</b> <b>(1.90)</b>	<b>1.46**</b> <b>(2.19)</b>	1.06 (1.60)	<b>1.25*</b> <b>(1.92)</b>	<b>1.42**</b> <b>(2.19)</b>	1.03 (1.62)
% POP ≥ 65	-0.005 (-0.01)	0.10 (0.21)	-0.20 (-0.31)	-0.87 (-0.87)	-0.13 (-0.30)	-0.46 (-0.74)	-1.06 (-1.09)	0.65 (1.39)	0.72 (1.04)	0.45 (0.69)	-0.11 (-0.14)	0.60 (1.04)	0.33 (0.57)	-0.21 (-0.27)
GDP	0.12 (0.59)	0.09 (0.48)	0.22 (1.09)	0.18 (0.89)	0.14 (0.71)	0.27 (1.29)	0.22 (1.14)	0.26 (0.84)	0.25 (0.72)	0.39 (1.00)	0.36 (1.01)	0.27 (0.78)	0.42 (1.05)	0.38 (1.05)
GRANTS	<b>-0.21***</b> <b>(-2.93)</b>	<b>-0.17***</b> <b>(-2.68)</b>	<b>-0.15***</b> <b>(-2.68)</b>	<b>-0.16***</b> <b>(-2.77)</b>	<b>-0.20***</b> <b>(-2.78)</b>	<b>-0.18***</b> <b>(-2.71)</b>	<b>-0.19***</b> <b>(-2.80)</b>	<b>-0.16***</b> <b>(-2.84)</b>	<b>-0.14**</b> <b>(-2.43)</b>	<b>-0.12**</b> <b>(-2.16)</b>	<b>-0.13**</b> <b>(-2.29)</b>	<b>-0.15**</b> <b>(-2.53)</b>	<b>-0.13***</b> <b>(-2.28)</b>	<b>-0.14***</b> <b>(-2.38)</b>
ELECTION	0.002 (0.04)	0.01 (0.13)	-0.01 (-0.27)	-0.02 (-0.53)	-0.004 (-0.08)	-0.02 (-0.55)	-0.03 (-0.78)	-0.01 (-0.29)	-0.01 (-0.24)	-0.03 (-0.69)	-0.04 (-0.92)	-0.02 (-0.43)	-0.04 (-0.85)	-0.04 (-1.02)
PRE-ELECTION	<b>-0.10**</b> <b>(-2.08)</b>	-0.07 (-1.28)	-0.05 (-1.12)	-0.04 (-0.97)	<b>-0.09*</b> <b>(-1.84)</b>	<b>-0.08*</b> <b>(-1.68)</b>	-0.07 (-1.54)	-0.05 (-1.05)	-0.03 (-0.68)	-0.02 (-0.37)	-0.01 (-0.15)	-0.04 (-0.86)	-0.03 (-0.57)	-0.02 (-0.35)
CC_EXPFrag <sub>t-1</sub>	<b>0.75***</b> <b>(6.25)</b>	<b>0.72***</b> <b>(5.98)</b>	<b>0.70***</b> <b>(6.15)</b>	<b>0.71***</b> <b>(5.86)</b>	<b>0.75***</b> <b>(6.18)</b>	<b>0.73***</b> <b>(6.32)</b>	<b>0.73***</b> <b>(6.09)</b>	<b>0.52***</b> <b>(3.45)</b>	<b>0.49***</b> <b>(3.21)</b>	<b>0.46***</b> <b>(3.23)</b>	<b>0.45***</b> <b>(3.23)</b>	<b>0.52***</b> <b>(3.47)</b>	<b>0.48***</b> <b>(3.40)</b>	<b>0.47***</b> <b>(3.39)</b>
constant	-0.31 (-0.08)	0.16 (0.04)	-0.20 (-0.06)	4.06 (0.79)	-0.28 (-0.07)	-0.59 (-0.17)	3.39 (0.65)	-4.93 (-1.00)	-4.83 (-0.99)	-5.91 (-1.18)	-2.42 (-0.51)	-5.00 (-1.00)	-6.09 (-1.18)	-2.63 (-0.53)
Wald $\chi^2$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB-AR1 test	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.012	0.013	0.015	0.016	0.012	0.015	0.016
AB-AR2 test	0.896	0.993	0.977	0.970	0.896	0.911	0.917	0.881	0.905	0.887	0.880	0.886	0.873	0.870
Hansen J test	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.297	0.383	0.582	0.519	0.330	0.522	0.484
Diff-in-Hansen	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.043	0.672	0.248	1.000	0.581	0.296	1.000
Time effects	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>
Instr. collapsed	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>no</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>	<i>yes</i>
Instruments Nr.	58	58	58	58	58	58	58	24	24	24	24	24	24	24

Note: CC\_EXPFrag is the dependent variable; Fixed effects are included in all regressions; coefficient significant at level \*\*\* 1%, \*\* 5%, \* 10%; z-value in parenthesis; results of the Instruments for tests are reported in p-value. First differences equation: CC\_EXPFrag<sub>t-3</sub>; Instruments for levels equation: ΔCC\_EXPFrag<sub>t-2</sub>, POP<sub>t-1</sub>, GDP<sub>t-1</sub>, constant, time Nr. 19.dummies. Observations Nr. 366; Groups.

Tab. 3.1 (continue) The SYS-GMM estimation results on the impact of electoral system and election on current and capital expenditure fragmentation

Senato GHI index	0.09 (1.17)				0.09 (1.16)	0.09 (1.19)	0.08 (1.05)
Region GHI index		0.07 (0.38)			0.07 (0.41)		
Adjusted GHI index			0.06 (1.19)			0.07 (1.31)	
Majority Bonus				<b>0.15*</b> <b>(1.69)</b>			<b>0.15*</b> <b>(1.67)</b>
POP	<b>-0.41*</b> <b>(-1.93)</b>	<b>-0.41**</b> <b>(-2.13)</b>	<b>-0.37**</b> <b>(-1.97)</b>	<b>-0.39*</b> <b>(-1.94)</b>	<b>-0.39*</b> <b>(-1.93)</b>	<b>-0.35*</b> <b>(-1.74)</b>	<b>-0.38*</b> <b>(-1.78)</b>
% POP 0-15	<b>1.22**</b> <b>(2.18)</b>	<b>1.23**</b> <b>(2.29)</b>	<b>1.31**</b> <b>(2.55)</b>	0.97 (1.59)	<b>1.24**</b> <b>(2.25)</b>	<b>1.33**</b> <b>(2.46)</b>	0.98 (1.58)
% POP ≥ 65	0.60 (1.14)	0.64 (0.95)	0.44 (0.72)	-0.06 (-0.08)	0.46 (0.77)	0.23 (0.43)	-0.22 (-0.30)
GDP	0.30 (0.60)	0.27 (0.63)	0.36 (0.96)	0.34 (0.91)	0.33 (0.72)	0.44 (1.05)	0.40 (0.94)
GRANTS	<b>-0.15***</b> <b>(-2.93)</b>	<b>-0.13**</b> <b>(-2.23)</b>	<b>-0.12**</b> <b>(-2.26)</b>	<b>-0.13**</b> <b>(-2.49)</b>	<b>-0.14**</b> <b>(-2.42)</b>	<b>-0.14**</b> <b>(-2.47)</b>	<b>-0.14***</b> <b>(-2.63)</b>
ELECTION	-0.03 (-0.40)	-0.02 (-0.44)	-0.04 (-0.69)	-0.05 (-0.87)	-0.03 (-0.63)	-0.05 (-0.90)	-0.06 (-1.02)
PRE-ELECTION	-0.06 (-1.25)	-0.04 (-0.70)	-0.03 (-0.54)	-0.02 (-0.33)	-0.06 (-1.02)	-0.05 (-0.87)	-0.04 (-0.65)
EXPPFRAGt-1	<b>0.59***</b> <b>(3.28)</b>	<b>0.57***</b> <b>(3.25)</b>	<b>0.54***</b> <b>(3.10)</b>	<b>0.53***</b> <b>(3.00)</b>	<b>0.58***</b> <b>(3.28)</b>	<b>0.55***</b> <b>(3.12)</b>	<b>0.54***</b> <b>(3.04)</b>
constant	-1.61 (-0.30)	-1.64 (-0.35)	-2.88 (-0.65)	0.06 (0.01)	-2.05 (-0.40)	-3.39 (-0.67)	-0.35 (-0.06)
Wald $\chi^2$	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB-AR1 test	0.008	0.008	0.010	0.011	0.008	0.010	0.011
AB-AR2 test	0.867	0.932	0.915	0.910	0.883	0.861	0.87
Hansen J test	0.245	0.279	0.302	0.315	0.235	0.259	0.28
Diff-in-Hansen test	0.469	0.982	0.909	0.907	0.728	0.807	0.731
Time effects	no	no	no	no	no	no	no
Instr. collapsed	yes	yes	yes	yes	yes	yes	yes
Instruments Nr.	19	19	19	19	19	19	19

Note: Fixed effects are included in regressions; coefficient significant at level \*\*\* 1%, \*\* 5%, \* 10%; z-value in parenthesis; results of the tests are reported in p-value. Instruments for first differences equation: EXPFRAGt-2; Instruments for levels equation:  $\Delta$ EXPFRAGt-1,  $GDP_{t-1}$ , constant, time dummies (t1989, t1990,...,t2003) Observations Nr. 366; Groups Nr. 19.

Tab. 3.2 The SYS-GMM estimation results on the impact of electoral system and election on current and capital expenditure fragmentation

Senato GHI index	<b>0.17**</b> (2.20)				<b>0.18**</b> (2.46)	0.05 (0.72)	0.04 (0.56)	0.08 (1.43)				<b>0.11*</b> (1.68)	0.02 (0.23)	0.02 (0.16)
Region GHI index		-0.01 (-0.06)			0.06 (0.66)				0.06 (0.59)			0.10 (0.90)		
Adjusted GHI index			<b>0.15*</b> (1.88)			<b>0.13*</b> (1.73)				<b>0.17**</b> (1.99)			<b>0.17**</b> (2.04)	
MAJ				<b>0.14*</b> (1.74)			0.11 (1.53)				<b>0.14**</b> (2.01)			0.12 (1.15)
POP	-0.05 (-1.26)	<b>-0.10**</b> (-2.35)	<b>-0.06**</b> (-1.96)	-0.04 (-1.45)	-0.05 (-1.17)	-0.05 (-1.58)	-0.03 (-1.08)	-0.02 (-0.64)	-0.05 (-1.57)	-0.06 (-1.26)	-0.04 (-0.63)	-0.02 (-0.64)	-0.06 (-0.98)	-0.03 (-0.55)
% POP 0-15	<b>-1.41***</b> (-2.65)	<b>-0.70*</b> (-1.86)	-0.41 (-1.12)	-0.39 (-1.13)	<b>-1.52***</b> (-3.18)	-0.64 (-1.30)	-0.57 (-1.27)	<b>-0.74**</b> (-2.08)	<b>-0.41*</b> (-1.69)	-0.61 (-1.12)	-0.50 (-1.02)	<b>-0.97***</b> (-2.67)	-0.68 (-1.49)	-0.58 (-1.31)
% POP ≥ 65	<b>-1.41***</b> (-3.04)	<b>-1.03**</b> (-2.43)	<b>-0.72**</b> (-2.54)	<b>-0.60**</b> (-2.07)	<b>-1.52***</b> (-3.59)	<b>-0.85**</b> (-2.34)	<b>-0.71**</b> (-2.03)	<b>-0.75**</b> (-2.40)	<b>-0.63**</b> (-2.01)	-0.87 (-1.60)	-0.65 (-1.13)	<b>-0.98***</b> (-2.94)	<b>-0.91*</b> (-1.92)	-0.70 (-1.48)
GDP	<b>-0.55***</b> (-2.61)	<b>-0.20*</b> (-1.86)	<b>-0.24**</b> (-2.20)	<b>-0.24**</b> (-2.33)	<b>-0.60***</b> (-3.20)	<b>-0.35*</b> (-1.95)	<b>-0.33*</b> (-1.89)	<b>-0.39**</b> (-2.33)	<b>-0.22**</b> (-2.41)	<b>-0.30*</b> (-1.83)	<b>-0.26*</b> (-1.73)	<b>-0.49**</b> (-2.47)	<b>-0.34**</b> (-2.19)	-0.31 (-1.55)
GRANTS	<b>-0.13*</b> (-1.82)	<b>-0.13*</b> (-1.77)	0.01 (0.11)	0.04 (0.59)	<b>-0.13*</b> (-1.90)	0.003 (0.04)	0.03 (0.40)	-0.02 (-0.36)	-0.02 (-0.49)	-0.0002 (-0.00)	0.03 (0.38)	-0.03 (-0.62)	-0.0005 (-0.01)	0.03 (0.36)
ELECTION	-0.03 (-0.16)	0.004 (0.02)	0.18 (1.38)	0.10 (0.80)	0.01 (0.04)	0.14 (0.86)	0.07 (0.42)	0.02 (0.11)	0.12 (0.53)	0.28 (1.37)	0.14 (0.77)	0.12 (0.50)	0.25 (0.99)	0.11 (0.42)
PRE-ELECTION	0.11 (0.53)	0.13 (0.68)	0.12 (0.96)	0.10 (0.66)	0.11 (0.56)	0.08 (0.64)	0.06 (0.40)	0.03 (0.13)	0.08 (0.27)	0.25 (1.08)	0.25 (0.97)	0.03 (0.12)	0.24 (1.00)	0.23 (0.84)
CC_EXPPFRAG <sub>t-1</sub>	<b>0.84***</b> (14.49)	<b>0.85***</b> (14.49)	<b>0.84***</b> (14.29)	<b>0.85***</b> (14.80)	<b>0.84***</b> (14.22)	<b>0.84***</b> (14.5)	<b>0.84***</b> (14.44)	<b>0.85***</b> (12.64)	<b>0.85***</b> (11.29)	<b>0.86***</b> (9.13)	<b>0.87***</b> (8.59)	<b>0.84***</b> (10.07)	<b>0.85***</b> (9.59)	<b>0.87</b> (9.52)
constant	<b>14.18***</b> (2.97)	<b>8.88***</b> (2.32)	<b>5.87**</b> (1.96)	<b>5.25*</b> (1.84)	<b>15.15***</b> (3.60)	<b>7.73*</b> (1.89)	<b>6.85*</b> (1.82)	<b>8.05**</b> (2.38)	<b>5.75**</b> (2.12)	7.32 (1.37)	5.76 (1.05)	<b>10.19***</b> (2.93)	<b>7.91*</b> (1.84)	6.50 (1.45)
Wald $\chi^2$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB-AR1 test	0.000	0.001	0.002	0.002	0.001	0.002	0.001	0.010	0.011	0.006	0.005	0.009	0.005	0.003
AB-AR2 test	0.424	0.439	0.963	0.919	0.426	0.888	0.855	0.679	0.621	0.981	0.889	0.679	0.997	0.881
Hansen J test	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.865	0.949	0.999	1.000	0.520	0.990	0.932
Diff-in-Hansen	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.258	0.397	0.773	1.000	0.133	0.735	0.507
Instruments Nr.	63	63	62	62	63	62	63	33	33	33	34	33	33	33
Instr. collapsed	no	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes
Time effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: CC\_EXPPFRAG is the dependent variable; Fixed effects are included in all regressions; coefficient significant at level \*\*\* 1%, \*\* 5%, \* 10%; z-value in parentheses; results of the tests are reported in p-values; Instruments for first differences equation: CC\_EXPPFRAG<sub>t-3</sub>; Instruments for levels equation:  $\Delta$ CC\_EXPPFRAG<sub>t-2</sub>, Region GHI index<sub>t-1</sub>, Senato GHI index<sub>t-2</sub>, POP<sub>t-2, ..., t-7</sub>, OLD<sub>t-1, ..., t-6</sub>, YOUNG<sub>t-2, ..., t-7</sub>, GDP<sub>t-2, ..., t-7</sub>, GRANTS<sub>t-2, ..., t-7</sub>, constant. For estimations in columns 4-5, 7-8, 11-12, 14-15: Instruments for first differences equation: CC\_EXPPFRAG<sub>t-4</sub>; Instruments for levels equation:  $\Delta$ CC\_EXPPFRAG<sub>t-3</sub>, Adj. Reg. GHI index<sub>t-1</sub>, Senato GHI index<sub>t-1</sub>, POP<sub>t-2, ..., t-7</sub>, OLD<sub>t-2, ..., t-7</sub>, YOUNG<sub>t-2, ..., t-7</sub>, GDP<sub>t-2, ..., t-7</sub>, GRANTS<sub>t-2, ..., t-7</sub>, constant. Observations Nr. 240; Groups Nr. 18.