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ELECTORAL RULES AND PUBLIC EXPENDITURE COMPOSITION: EVIDENCE FROM ITALIAN REGIONS

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Electoral rules and public expenditure composition: Evidence from Italian regions

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The paper investigates the effects produced by the electoral system on expenditure composition by exploring the case of Italian regions over the period 1986-2009. Empirical analysis shows that the regional current expenditure transfers distributed to families and firms significantly decrease when the regional electoral system moves from being proportional to mixed. Particularly striking is the reduction in pre-electoral years under the regional mixed-regime. Although not robust across different empirical specifications, an increase in the regional expenditure on local public goods is found when the regional electoral system becomes mixed.

Keywords: local institutional design; public expenditure composition; regional government; panel data analysis

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1. Introduction

The literature has shown that electoral rules play a significant role in the composition of public expenditure (Persson and Tabellini, 1999, 2000; Lizzeri and Persico, 2001; Milesi-Ferretti et al., 2002; Ticchi and Vindigni, 2010). On the one hand, it has been shown that the architecture of the electoral system makes a difference in how political parties compete in voting districts via expenditure manipulation to obtain voters' consensus (Persson and Tabellini, 1999). In a pure majoritarian system, electoral competition takes place in a single-member district where the party candidate who obtains the largest number of votes is elected. This institutional design induces political parties to seek to please a narrower group of voters located in the geographical constituency where they compete to win elections by targeting spending programs on those voters' specific interests. Under a pure proportional system, electoral competition is spanned in a single nationwide district (or a small number of multi-member districts) where all members of the legislature are elected by a proportional representation rule.[1] To win an election under the proportional system, a political party must please a large number of voters in the nationwide district by targeting spending programs on broad interests. Accordingly, in proportional elections, one may predict an increase in the broad-type of expenditure to the detriment of the geographical type of expenditure. On the other hand, the influence of the electoral system on expenditure composition has been explained by the voters' intention to anticipate government expenditure decisions by electing representatives who exhibit stronger preferences for the category of expenditure that maximizes voters' benefits under the electoral regime in force (Miles-Ferretti et al., 2002). In a pure majoritarian system, voters elect representatives who have stronger preferences for geographically targeted expenditure, such as on local public goods, rather than for broad-based transfers expenditure. By contrast, in a pure proportional system, voters elect representatives with higher preferences for transfers expenditure targeted on specific social characteristics of voter groups in the population. The prediction derived from this framework is that the broad-based expenditure devoted to satisfying broader interests in the population may be lower (higher) than the geographical targeted expenditure under a majoritarian (proportional) system (Miles-Ferretti et al., 2002).

A growing number of empirical studies have tested these predictions by analysing the effects of national electoral systems (Persson and Tabellini, 1999, 2001; Milesi-Ferretti et al., 2002; Shelton, 2007, Baraldi, 2008; Gagliarducci et al., 2011). Little attention has been paid to the analysis of the effects produced by local electoral systems on the expenditure composition of

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[1] The proportional representation rule consists in a proportional distribution of seats according to the share of votes received by each candidate in the single nationwide district or a multi-member district.

sub-national governments. However, these effects may have stronger implications owing to the smaller distance between local government and voters, which may exacerbate political competition, making the effects of the local electoral system on subnational expenditure composition more pronounced. Moreover, analysis of the local context may be more accurate in testing the theory because of the homogeneity of within-country data in terms of the institutional setting, socio-economic and fiscal aspects. The within-country data on public expenditure are also more detailed, and this allows for better identification of the targetable nature of expenditure and a more reliable empirical test.

The paper intends to fill this gap by conducting an empirical analysis on the case of Italian regions. The Italian regional context is a good case study for examining the theory for several reasons. Firstly, it allows the analysis of the effects produced by a shift from a proportional system to a mixed-electoral system. Although the shift from the proportional system to the pure majoritarian system is only partial, the majority bonus would be fairly incisive in the regional votes-seats distribution, guaranteeing larger majorities and the long-term stability of the regional governments. In other words, the majority bonus makes the difference in the political set-up of Italian regional governments. The shift to a mixed-electoral system has also made Italian regional elections more competitive, exacerbating political competition at local level and, consequently, amplifying the effects of the regional electoral system on regional expenditure composition. Therefore, in spite of its hybrid nature and complex architecture, the Italian regional mixed-electoral system is an original and interesting case study for examining the theoretical issues. The second reason consists in the fact that the Italian regional context enables the analysis of the effects of the shift from proportional to a mixed-member system across different levels of government. In 1993 a new set of electoral rules was introduced at the national level of government[2] in concurrence with the notorious 'Tangentopoli' scandal, when many Italian parliamentarians were investigated for alleged involvement in bribery. In 1995 and 2001 reforms of the electoral system of Italian regions were enacted. They were mainly motivated by the intent to obtain larger majorities and greater stability of regional governments. The final reason is that Italian regions recovered fiscal autonomy in the 1990s and early 2000s, suggesting that rules of regional electoral competition may have played some role in the performance of the Italian regional spending policies during that time.

The empirical analysis is performed on a panel of 19 Italian regions from 1986 to 2009. I consider the current expenditure on local public goods and current transfers expenditure to families and firms as categories of regional public expenditure that most likely reflect geographically-targeted and broad-based spending at regional level, respectively. In line with the theoretical

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[2] Laws 276/1993, 277/1993.

predictions, the panel data analysis shows that the regional current transfers expenditure distributed to families and firms significantly decreases when the regional electoral system moves from being proportional to mixed. Particularly striking is the reduction in pre-electoral years under the regional mixed-regime. Although not robust across different empirical specifications, an increase in the regional expenditure on local public goods is found when the regional electoral system becomes mixed.

The rest of the paper is organized as follows. Section 2 illustrates the past empirical evidence. Section 3 illustrates the Italian regional context in terms of both electoral and fiscal federalism reform. Sections 4 describes the data and variables. Section 5 presents empirical models and results. Section 6 concludes.

2. Empirical evidence

In past empirical analyses the main difficulty encountered in testing the theoretical predictions has been the measurement of broadly and geographically targeted spending. Persson and Tabellini (1999) 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). They show, on a sample of about 50 countries, that expenditure on broad programs decreases significantly under a majoritarian system. 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 their 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. 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 observe a significant increase in transfers spending due to an increase in the average district magnitude. Shelton (2007) makes use of different categories of public expenditure (education, healthcare, social security, transport, defence, transfers, government consumption, etc.) on a sample of 100 countries from 1970 to 2000. Moreover, Shelton uses the same indicator as Persson and Tabellini (1999) to define the 'universal' public goods spending. 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). These studies have tested the theory using cross-country aggregate data in their empirical analyses. By performing a regression discontinuity design, Gagliarducci et al. (2011) use individual-level data on elections to the Italian House of Representatives. Their analysis shows that the representatives elected in the majoritarian system tend to target more bills on their constituency. Using Italian regional data, Baraldi (2008) shows a significant and negative relationship between the regional public consumption expenditure and the degree of votes-seats disproportionality in the national electoral system.[3] As additional evidence, she find that the categories of the regional public consumption expenditure related to health, housing and culture tend to grow faster when disproportionality increases in votes-seats distribution at national governmental level, whereas spending on general services diminishes significantly. 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 the cantons significantly increase their welfare and education expenditure targeted on broad social groups (mainly elderly and young people) in the population after the adoption of the proportional rule at the canton level, whereas the cantons significantly reduce their transfers expenditure on roads and agricultural subsidies targeted on local and narrower interest groups.

Table 1 summarizes the above empirical evidence, illustrating the indicators of expenditure composition and electoral rules employed and the main results.

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[3] A higher degree of votes-seats disproportionality is associated with mixed-electoral and majoritarian systems.

Tab. 1 Empirical evidence on the effects of the electoral system on expenditure composition

Author	Sample	Expenditure composition indicator	Electoral system	Electoral system indicator	Main results
Persson and Tabellini (1999)	54 countries, 1988-1992	The sum of central government expenditure on order and safety, transportation, education (and health as a broader measure) as a percentage of GDP.	National	Dummy variable (1= majoritarian system; 0= proportional system); {1/(average district magnitude)}∈ [0, 1].	More majoritarian system, lower central government expenditure.
Persson and Tabellini (2001)	64 democratic countries, 1960-1998	Central government expenditure on social security and welfare as a percentage of GDP.	National	Dummy variable (1= majority or plurality rule;0= otherwise).	More majoritarian system, lower central government expenditure on social security and welfare.
Milesi-Ferretti, Perotti & Rostagno (2002)	20 OECD countries for the period 1960-1995; 20 Latin American countries for the period 1991-1994	The sum of general government social security benefits to households and other transfers to households as a percentage of GDP; the sum of general government consumption and government investment, net of depreciation, as a percentage of GDP.	National	Average standardized district magnitude (SM); Average district magnitude (AM); The average deviation from proportionality (RAE).	More proportional system, higher transfers expenditure.
Shelton (2007)	44 (full sample: 101) countries, from 1970-2000	The sum of central government expenditure on order and safety, transportation, education in percentage of GDP (Persson and Tabellini, 1999); other categories of central government expenditure (consumption; wages and salaries; transfers; defence, general public services, healthcare).	National	Dummy variable (1= majoritarian system; 0= proportional system) (Persson & Tabellini, 1999)	More majoritarian system, lower central government expenditure on social security, transport, transfers and public good (i.e., the sum of expenditures on order & safety, transportation, education, health in percentage of GDP, Persson and Tabellini, 1999).

Author	Sample	Expenditure composition indicator	Electoral system	Indicators of electoral system	Main results
Baraldi (2008)	20 Italian regions, 1980-2003	Regional total public consumption expenditure scaled to GDP; subcategories of regional public consumption expenditure on health, education, social services and security, economic services, defense, housing and culture, general services (scaled to total public consumption expenditure).	National	Gallagher (1993) index of votes-seats disproportionality computed for national elections.	More votes-seats disproportionality, lower total public consumption expenditure and general services expenditure; More votes-seats disproportionality, higher health expenditure and social services and security expenditure.
Funk and Gathmann (2010)	Swiss cantons and local governments, 1890-2005	Canton welfare and education expenditure (per-capita); canton expenditure on roads and agricultural subsidies (per 1,000 inhabitants).	Canton	Dummy variable (=1 proportional rule for election of canton legislature; 0= plurality rule).	More proportional system, higher education and welfare expenditure; lower expenditure on roads and agricultural subsidies.
Gagliarducci, Nannicini and Naticchioni (2011)	Individual-level data on Italian House of Representatives, 1994-2001	Number of bills targeted on the election region in the total number of bills presented.	National	The margin of victory in the single-member district.	Representatives elected in majoritarian system, higher share of geographically targeted bills.

3. The case study on Italian regions

In Italy, the regional government is the highest level of local government, whereas the municipality is the lowest. The government of each region is divided into three bodies: 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. Each region has its own statute regulating the form of government and the basic principles of its organization and functioning. Most Italian regions approve their own statute by a regional law. For this reason they are known as the 'Ordinary Statute Regions'[4] (OSRs). Only 5 regions adopt a special statute approved by a constitutional law: Friuli Venezia-Giulia, Sardinia, Sicily, Trentino Alto-Adige[5], Valle D'Aosta. These regions are known as the 'Special Statute Regions' (SSRs). 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 greater autonomy in terms of legislative and fiscal powers than the OSRs.

In the 1990s Italian regions were subject to major reforms in regard to both the electoral system and financial autonomy. On the side of the electoral system reform, the members of the council of the OSRs were elected by a pure proportional system until 1995. The so-called 'Tattarella law' (L. 43/1995) reversed this trend by introducing a mixed-electoral system in these regions in 1995. The regional mixed-electoral system has been based on a two-tier system, where 4/5 of the regional council members are elected in constituencies (coinciding with Italian provinces) under a proportional rule, while 1/5 are elected from the coalition of parties (called the 'listino') which obtains the largest share of votes in the regional tier and is formed by a group of parties that obtains an overall percentage of seats below 50% under the proportional system.[6] Basically, the regional elections of the OSRs held from 1995 to 2009 were conducted in accordance with the 'Tattarella law', with the exception of some regions (Apulia, Calabria and Tuscany) which made some important changes to their own regional electoral systems and to the definition of the majority bonus during the mid-2000s.

The three SSRs of Friuli Venezia-Giulia, Sicily and Sardinia adopted the same

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[4] The OSRs are: Piedmont, Lombardy, Veneto, Emilia-Romagna, Tuscany, Liguria, Marche, Umbria, Abruzzo, Lazio, Molise, Basilicata, Campania, Apulia, Calabria.

[5] The Trentino-Alto Adige region comprises the two Autonomous Provinces of Trento and Bolzano.

[6] If this group of parties has a percentage of seats equal to or above 50%, the majority bonus is shared in the following way: 1/10 of seats are assigned to the 'listino' and 1/10 to the groups of parties not linked to the 'listino'.

electoral rule as the OSRs in 2001.[7] In practice, the election of the regional governing bodies of the Sardinia region took place under the same electoral rules as the OSRs from 2001 to 2009. The Sicily region adopted the OSRs electoral rule only in 2001. It reformed its regional electoral system in 2005, including rules for the assignment of the majority bonus. In 2007 the Friuli Venezia-Giulia region enacted a regional law to reform its mixed-electoral system and the rules concerning the majority bonus.

The mixed-electoral system was not imposed on the SSRs 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 approved regional law 22/2007 which provided for the introduction of a majority bonus. A proportional system has been adopted in the Trentino Alto-Adige region. Constitutional Law 2/2001 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.

On the side of fiscal autonomy, numerous fiscal reforms were introduced in the period 1990-2001, making regional governments more fiscally autonomous.[8] In the 1980s, the regional financial system was mainly based on State transfers constrained in their final uses. In the early 1990s, regions recovered a certain degree of tax autonomy by setting the rate of minor taxes.[9] A further acceleration towards regional financial autonomy was obtained by the introduction of a regional flat-tax rate on productive activities ('*imposta regionale sulle attività produttive*') and of a regional income tax ('*addizionale regionale all'imposta sul reddito delle persone fisiche*') by D.Lgs. 446/1997. A more incisive reform was carried out by dispositions of D.Lgs 56/2000 which imposed that State transfers to the OSRs must be partially replaced by the region's own tax revenue in order to fund regional public expenditure. These reforms have made it possible to consolidate fiscal decentralization at regional level, overcoming the financial dependence of regions on the State and increasing their own spending power (Baldi, 2010). The reform of Title V (art. 119) of the Italian Constitution[10] in 2001 embraced the cause of fiscal federalism, ascribing autonomy to Italian regions in regard to both tax and expenditure. However, the implementation of this reform came only eight years

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[7] Constitutional Law 2/2001.

[8] A recent study by Pellegrino and Piperno (2012) confirms this picture.

[9] D.lgs. 398/1990, L. 421/1992, L. 549/1995.

[10] Const. law 3/2001.

later (L. D.ga 42/2009) and it has not yet been completed.

The examination of two indicators of regional tax autonomy gives a picture of the evolution of the Italian regional financial system over the period 1990-2009. The first indicator corresponds to the share of the regional tax revenue on the sum of State revenue contributions to regions and the regional tax revenue. Basically, it measures the degree of financial autonomy of the regions from State transfers. Figure 1 shows that the Italian regional financial system became more autonomous in the mid-1990s because of the introduction of the flat-tax rate on productive activities and the regional income tax, accompanied by a significant reduction in State transfers to the OSRs in the 2000s. The second indicator corresponds to the share of the regional tax revenue on the regional total revenue. Figure 2 shows that this indicator rose from 6% in 1990 to 34% in 2009, confirming that the fiscal federalism reforms made the regional tax revenue a major source of finance for regional public expenditure. Moreover, both figures suggest that since the mid-1990s there has been a sufficient degree of regional financial autonomy for it to be likely that the regional electoral rules played some role in the Italian regional spending decisions during the period under examination.[11]

Fig.1 Italian regional tax revenue autonomy from 1990 to 2009
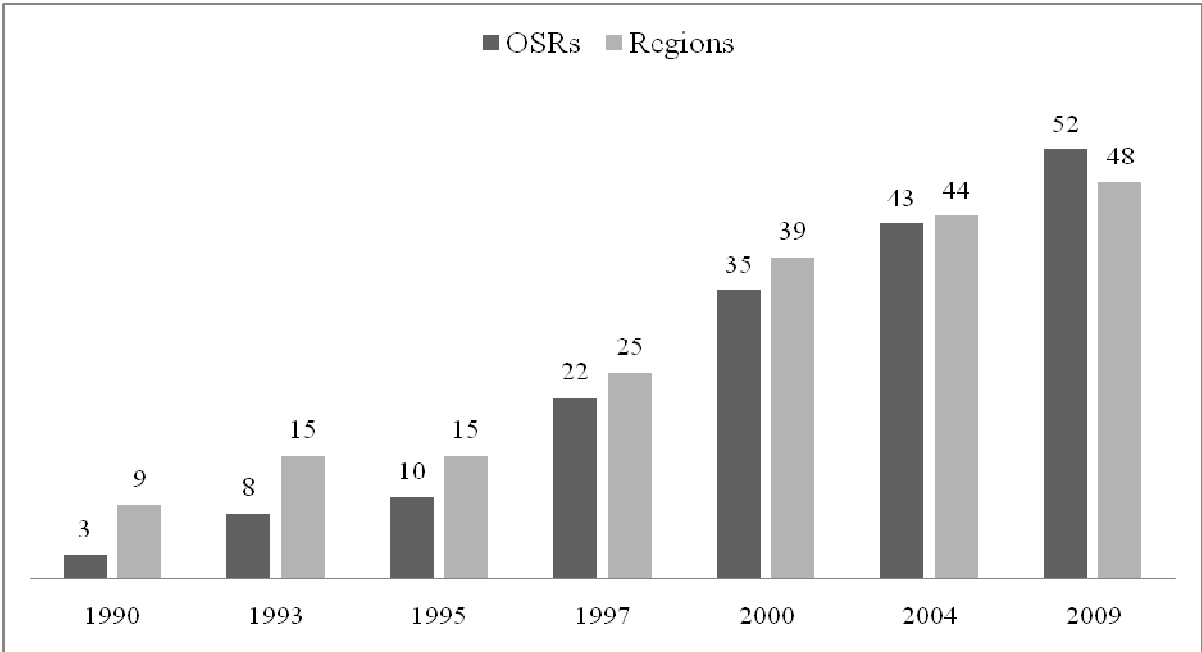
Note: regional tax revenue ('*tributi propri*')/(State revenue contributions to regions + regional own tax revenue)%. This indicator is computed for 20 Italian regions and the data source is Istat, *Bilanci consuntivi delle regioni e delle province autonome*, various years.

[11] This aspect is questioned by Baraldi (2008) who considers only the effects of the national electoral system on the Italian regional total public consumption expenditure.

Fig. 2 Italian regional tax revenue (% total regional revenue) from 1990 to 2009
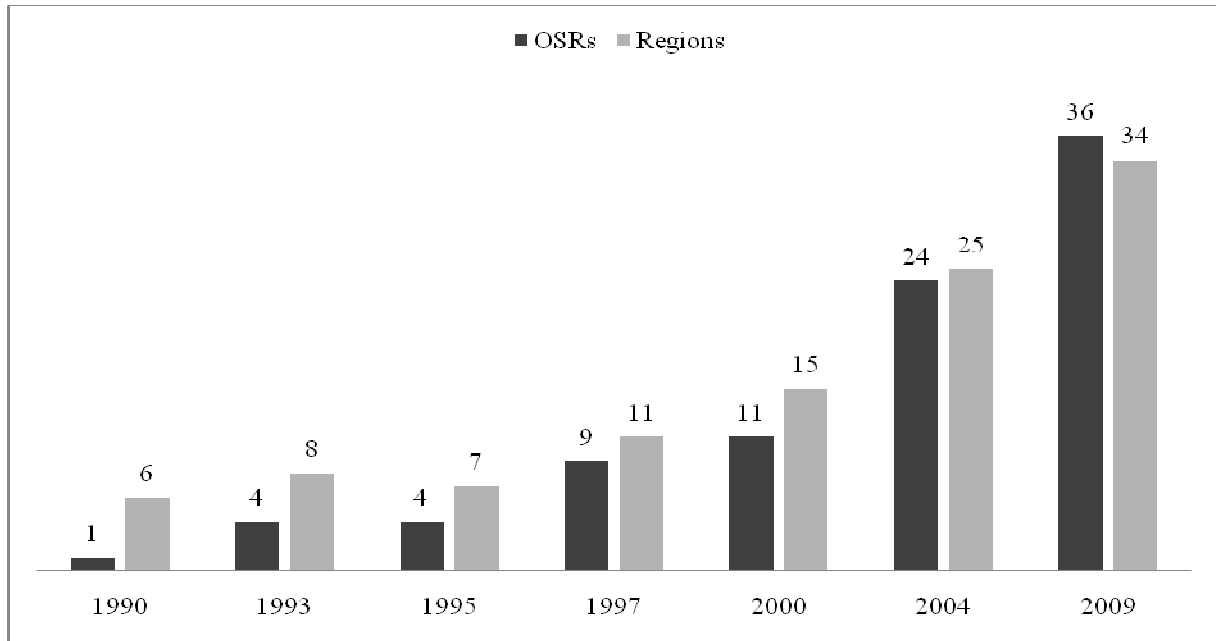
Note: regional tax revenue/ total regional revenue%. This indicator is computed for 20 Italian regions and the data source is Istat, *Bilanci consuntivi delle regioni e delle province autonome*, various years.

4. Data and variables

The empirical analysis was conducted on a panel of 19 Italian regions in the period 1986-2009.[12] In order to capture the effective changes in the regional expenditure composition, I used public expenditure indicators scaled on the regional total public expenditure. As categories of public expenditure, I employed those that most likely reflect broad-based and geographically targeted spending. In particular, I considered the share of the regional current transfers expenditure distributed to households and firms as a measure of broad-based expenditure because it is mainly devoted to satisfying broad interests at the regional level. In the empirical analysis, I called this indicator *FCurrtr*. As a measure of geographically targetable expenditure I used the share of the regional current expenditure on local public goods on total public expenditure. This kind of regional expenditure is easily

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[12] Only the region of Trentino Alto-Adige was excluded from the sample because computation of the votes-seats disproportionality index for this region is difficult for elections held in the 2000s, and it is probably less comparable with those of the other regions. In fact, Constitutional law 2/2001 (art. 4, comma f) introduced a significant change in the election of this region's council. Members of the regional council are elected from the two provincial councils of the special autonomous provinces of Trento and Bolzano. Since 2003, therefore, regional elections of regional council members have been replaced by provincial elections.

targetable on particular interests groups in voting districts because of their geographic and sector specificity. I called this indicator *PGoods*.

In order to measure regional institutional changes, I used a dummy variable named *Majbonus* which assumed value 1 when the majority bonus is introduced in the regional proportional system and zero otherwise. This dummy variable varied across regions and over time. It captured changes in expenditure decisions after the introduction of the regional mixed-electoral system without distinction between electoral and off-electoral periods. It made it possible to test the theoretical model of Milesi-Ferretti et al. (2002), which predicts that under a majoritarian system, geographically targeted expenditure becomes higher than broad-based expenditure. I also considered a dummy variable named *Majprele* which assumed value 1 when the regional pre-election year was under a regional mixed-system, and zero under a regional proportional system. This variable made it possible to test Persson and Tabellini's (1999) model that predicts that the electoral system affects the way in which political parties engage in electoral competition via changes in expenditure composition. Accordingly, in majoritarian elections one may expect the geographically targeted expenditure to increase to the detriment of the broad-type expenditure.

The effects of the regional institutional design are also captured by the effective district magnitude computed for constituencies with unequal magnitude (Taagepera, 1998). The indicator is computed for the lower-proportional tier in the following way:

$$DM_i = \frac{\sum_j \left(S_{ij}^p\right)^2}{S_i^p}$$

where S_{ij}^p is the number of seats allocated in the *j*-th constituency of the *i*-th region and S^p is the total number of seats in the lower-proportional tier. This indicator is taken in logarithmic form (Milesi-Ferretti et al., 2002).[13]

As a further indicator I used the percentage of seats assigned in the upper-tier (i.e. at the regional level) according to the majoritarian rule. Basically, the regional mixed-electoral rule has established that about 1/5 of seats are distributed according to the majoritarian rule. In reality, the mechanism of seats distribution according to the regional majoritarian rule is more complex and the share of seats does not always coincide with 1/5. The index is the following:

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[13] This indicator was computed only for 18 regions because data on seats distribution in the single voting district of the Friuli-Venezia Giulia region in election year 2008 do not make a clear distinction between seats allocated in the single voting district according to the proportional rule and the majority bonus.

$$\text{Upper - tier seats}_i \ \% = \frac{S_i^m}{S_i} \cdot 100$$

where S_i^m is the share of seats assigned according to majoritarian rule in the i-th region and S is the total number of seats.

The indicator used in the empirical analysis to capture the indirect effects of electoral system was the Gallagher (1991) index. The Gallagher (GHI) index of votes-seats disproportionality computed at regional level of government (*Regional GHI index*) corresponds to the following formula:

$$\text{GHI}_i = \sqrt{\frac{1}{2}\sum_k \left(V_{ik}\% - S_{ik}\%\right)^2}$$

where V% is the share of votes (*per cent*) obtained by party k in region i and S% is the share of seats (*per cent*) assigned to party k 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 Gallagher index is intended to capture the indirect effects since 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, 1997; 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 the electoral system, it may be inadvisable to establish a systematic association between votes-seats disproportionality and institutional design. However, this does not seem to be the point of view of Blais (1988), who argues that it is possible to classify electoral systems also accounting for their electoral outcomes. This issue is controversial in the literature and is still unresolved.[14]

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[14] Empirical studies have shown that a majoritarian system produces a higher level of

Computation of the Gallagher index at regional level is rather problematic because of the two-tiers. The *Regional GHI index* underestimates the degree of votes-seats disproportionality because it mainly accounts for the seats allocated among parties in the proportional-tier.[15] Thus, it can produce misleading results in the empirical analysis. Recently, Alfano and Baraldi (2012) have adopted an adjusted version of the GHI index to measure electoral outcomes of the Italian regional mixed-electoral system. Basically, I used the disproportionality version of this index. I call it the *Adjusted (Adj.) Regional GHI index*. The formula of the revisited GHI index follows:

$$Adj.\ Regional\ GHI\ index_i = \frac{S_i^m}{S_i}\sqrt{\frac{1}{2}\sum_K \left(V_{i_K}^m\% - S_{i_K}^m\%\right)^2} + \frac{S_i^p}{S_i}\cdot\sqrt{\frac{1}{2}\sum_k \left(V_{i_k}^p\% - S_{i_k}^p\%\right)^2}$$

where
- $V^p\%$ is the percentage of votes obtained by party k in region i in the proportional-tier;
- $S^p\%$ is the percentage of seats assigned to party k in region i in the proportional-tier;
- $V^m\%$ is the percentage of votes obtained by coalition of parties K in region i in the majoritarian-tier;
- $S^m\%$ is the percentage of seats assigned to coalition of parties K in region i in the majoritarian-tier.

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

Since a part of regional current transfers spending is allocated by central government to implementing its policies at local level, it may be expected that this category of the regional expenditure is affected by the national electoral system and not only by the regional one. The national electoral system moved from a proportional system towards a mixed-member majoritarian system in the mid-

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disproportionality than does a proportional representation 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. For example, Baraldi (2008) used the Gallagher index to measure the impact of national electoral rules on the growth of Italian regional public consumption spending. On replacing a majoritarian-proportional dummy variable with the Gallagher index, Lupu and Pontusson (2008) did not find any significant difference in their results.

[15] It can also account for about 1/10 of extra-seats distributed across parties not linked to the 'listino'. See footnote 6.

1990s. After the referendum of 18 April 1993, the mixed-electoral system was introduced. Accordingly, most Italian parliamentarians were elected by mixed rule in the following form: 3/4 of 315 senators were elected for 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 step back towards the proportional system was made for both chambers by law 270/2005, although it was accompanied by a majority bonus.

To capture changes in the national electoral rules I used the standard formula of the GHI index. In particular, the votes-seats disproportionality index was calculated in relation to Senate elections, because the seats of senators are distributed on a regional basis. I call this indicator *National GHI index*.

In the empirical analysis I used control variables widely employed in this kind of literature. I controlled for the size of the population (*Pop*). A positive effect of population size on public expenditure is consistent with congestion effects in the provision of public services. A significant negative impact of population size on public expenditure is associated with the presence of scale economies in public goods and services provision. The demographic structure of population was also considered by means of the percentage of young people aged 0-15 (*%Pop 0-15*) and elderly people aged 65 and over (*%Pop 65+*). A positive effect of both control variables on current public expenditure was expected.

As socio-economic variables, I considered the per capita gross domestic product (*GDP*), in logarithmic form, and per-capita *State transfers*, which include State revenue contributions, tax revenues from the State, and State revenue transfers in lieu of tax revenues. It can be expected that both control variables have a positive impact on the regional public expenditure. However, a negative effect is also likely. Richer people ask for fewer subsidies from central and sub-national governments. Moreover, they can substitute the provision of local public services with a more efficient private goods provision. A negative relationship between *State transfers* and public expenditure may be consistent with the explanation that other forms of financial resources may be used to fund public expenditure. This relationship may be expected on analyzing Italian regional spending. In fact, since the 2000s, State revenue transfers to the OSRs (D.Lgs. 56/2000) have been partially replaced by regional own tax revenues in order to fund regional expenditure. In this sense, the control variable of *State transfers* is able to capture the effects produced by fiscal federalism reforms introduced at regional level on the public revenue side.

The electoral cycle was captured by means of two dummy variables, *Election year* and *Pre-election year*, which assumed value 1 in the year of election and pre-election of the regional council, respectively, and zero otherwise. The timing of the regional election is not the same across regional governments. Moreover, there is no problem of endogenous elections in Italian regions because they are

exogenously fixed by law.

Table 2 sets out the descriptive statistics of all the variables used in the empirical analysis.

Tab. 2 Descriptive statistics

Variable	Obs. No.	Mean	Std.Dev.	Min	Max
FCurrtr	448	1.53	1.87	0.00	10.08
PGoods	448	1.27	1.32	0.09	8.06
Majbonus	456	0.56	0.50	0	1
Majprele	456	0.09	0.28	0	1
DM	432	15.91	7.36	6.05	35.00
Upper-tier seats%	456	9.53	9.45	0.00	23.34
Adj. Reg. GHI index	456	6.56	3.97	1.14	14.06
Reg. GHI index	456	3.58	1.31	1.14	11.90
National GHI index	456	13.94	10.30	2.39	51.80
Election year	456	0.18	0.39	0	1
Pre-election year	456	0.18	0.39	0	1
Pop	456	2961452	2268718	112560	9545515
%Pop65+	456	18.00	3.58	9.57	27.14
%Pop0-15	456	16.06	3.43	10.85	26.94
GDP (per capita; euros)	456	17427.38	7122.77	4800.73	35358.02
State transfers (per capita; euros)	448	1079.99	1146.91	110.24	8815.31

4. Empirical analysis

The static panel data model (1) was estimated to test the impact of local electoral system reforms on the regional spending composition:

$$E_{i,t} = c + \varphi ERULE_{i,t-1} + \beta x'_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t} \tag{1}$$

where E_{it} is the public expenditure indicator for region i ($i=1,...,N$) at time t ($t=1,...,T$) illustrated in the previous section. $ERULE_{it-1}$ corresponds to the indicators of electoral system at time $t-1$. Following Baraldi (2008), I considered the past values of electoral system variables because the effects of fiscal policies implemented by regional governments become significant at least one year later. A $1xK$ vector $x'_{it}=(x^1_{it}, ..., x^K_{it})$ of control variables is included in the model. Time effects τ_t are introduced to capture undefined shocks common to regions. Finally, μ_i controls for the omission of unobserved features of regions and ε is an error term normally distributed with zero mean and constant variance.

The Hausman test results set out in Tables 3-4 suggested that model (1) can be estimated as a fixed-effects model. I estimated the fixed-effect model with the ordinary least squares (OLS) estimator with panel corrected standard errors (PCSEs) (Beck and Kats, 1995) since I detected the presence of heteroschedasticity (Breusch and Pagan, 1979; Cook and Weisberg, 1983) and the first-order autocorrelation (Arellano and Bond, 1991) in the error term structure by performing tests. To increase the robustness of my results, I also estimated the fixed-effects (Within) model with Driscoll and Kraay (1998)[16] standard errors robust to heteroschedasticity, first-order autocorrelation and cross-sectional dependence.[17]

In Table 3, I examine the impact of the regional electoral system on *FCurrtr*. I find that the shift from proportional to mixed-electoral system at the regional level of government produces a significant reduction in the share of regional current transfers expenditure distributed to households and firms. Going into details, the 'Within' estimates show that the coefficient of *Majbonus* is negative and statistically significant at 5% level of significance. This result signals that this subcategory of regional current expenditure may be targeted by regional government on broad interests in the population by means of general eligibility criteria. Moreover, it confirms Milesi-Ferretti et al.'s (2002) prediction that the broad-type of expenditure decreases under a majoritarian system. The reduction in *FCurrtr* occurs particularly in pre-electoral years under the regional mixed-regime (see column 2, 3 and 9). This evidence is consistent with Persson and Tabellini's (1999) prediction that the broad-type (or the 'universal-type') of expenditure is reduced in majoritarian elections. Taking into account the indirect effects of the electoral system by means of the Gallagher indicators, I find that *FCurrtr* is significantly reduced when the regional electoral system becomes more disproportional in terms of votes-seats distribution (see columns 5-6 and 12-13). By contrast, a higher degree of votes-seats disproportionality in the national electoral system is accompanied by an increase in *FCurrtr* of about 3-5%. Although the effects of the national and regional votes-seats disproportionality go in opposite directions, they highlight that the regional current expenditure on families and firms may have a different degree of spending targetability across levels of government. This may be consistent with the adoption of different eligibility

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[16] See Hoechle (2007).

[17] In order to verify that the OLS estimator yields consistent estimates, I checked for the presence of endogeneity problems in the electoral system by running the Davidson-MacKinnon (1993) test. As shown in Tables 3-4, this test showed the exogeneity of the electoral rule indicators with the sole exception of *Majprele* in column 9 of Table 4, where the test rejects the null at 10% level of significance. However, the endogeneity of this indicator is less reliable because of the exogeneity of regional elections and the Davidson-MacKinnon test results in column 10 of Table 4.

criteria by the central and regional government to distribute current transfers to families and firms in order to capture local electoral consensus.

As a next step, I estimated the static panel data model using as dependent variable the indicator based on the regional current expenditure on local public goods. The OLS-PCSEs estimates in Table 4 show that the coefficients of electoral rule indicators are not statistically significant. The reverse is the case when considering the 'Within' estimates. These show that *PGoods* increases significantly by about 50% after the introduction of a majority bonus in the regional proportional system (see columns 8, 10 and 12). This evidence underlines the geographical targetability of this category of regional current expenditure. Considering the other indicators of the regional electoral system, I found that *PGoods* increases by about 1.7% when the percentage of regional seats allocated in the majoritarian-tier increases (see column 11), whereas it significantly decreases when the effective district magnitude becomes larger (see column 14). The Gallagher indicators show that *PGoods* grows faster when the regional electoral rule becomes more disproportional in terms of votes-seats distribution (see column 13). By contrast, *PGoods* decreases by about 2% when the national electoral rule becomes more votes-seats disproportional (see columns 8-13). The opposite effects of regional and national electoral disproportionality highlight that the regional current expenditure on local public goods may be targeted in a different way by regional and central government to capture votes at local level.

Given that the public expenditure has high degrees of persistence, I estimated dynamic panel data model with the inclusion of the lagged dependent variable $E_{i,t-1}$ on the right hand side of equation (2).

$$E_{i,t} = c + \alpha E_{i,t-1} + \varphi ERULE_{i,t-1} + \beta x'_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t} \tag{2}$$

First differences transformation of all variables was used to remove the individual fixed-effects from the panel model (Anderson and Hsiao, 1981, 1982) because of the correlation between the first-order lagged of the dependent variable and the fixed-effects, involving the correlation between the first-order lagged of the dependent variable and the error term (Wawro, 2002; Baltagi, 2005).

$$\Delta E_{i,t} = \rho \Delta E_{i,t-1} + \varphi \Delta ERULE_{i,t-1} + \beta \Delta x'_{i,t} + \Delta \tau_t + \Delta \varepsilon_{i,t} \tag{3}$$

This transformation is not devoid of problems because of the correlation between the first-differenced lagged dependent variable and the first-differenced error term. To remedy this problem, the instrumental variable approach is implemented using the lagged of the dependent variable (Anderson and Hsiao, 1981, 1982).

Accordingly, I estimated empirical specification (3) with the two-stage least squares estimator.[18] In Table 5 I report the estimation results with the second-order lag of the dependent variable as instrumental variable. However, to check for robustness results, I re-estimated model (3) with the third-order lag of the dependent variable (i.e., $E_{i,t-3}$).

Columns 2 and 3 in Table 5 show that the effects of the regional electoral system on *FCurrtr* remain negative and particularly pronounced in pre-electoral years under the regional mixed-system. Re-running the regression with *FCurrtr*$_{t-3}$ as instrument, this result remains robust. The coefficients of the Gallagher index computed for regional elections loses statistically significant (see columns 5-6). However, when the dynamic panel regression is performed with *FCurrtr*$_{t-3}$ as instrument, the coefficient of the *Adjusted Regional GHI index* is now statistically significant at 10% level and about 7%. As in the static panel analysis, *FCurrtr* increases significantly by about 3-4% when the national electoral rule is more votes-seats disproportional. The remaining indicators of electoral rule do not show any statistical significant coefficient, also when *FCurrtr*$_{t-3}$ is used as instrument in the regressions.

Turning to the effects of the regional mixed-member system on *PGoods*, Table 5 shows that the introduction of the mixed-electoral system does not statistically change the growth of regional current spending on local public goods. In the dynamic setting, both the direct and indirect effects of the regional mixed-electoral system do not play any significant role on *PGoods*. No significant evidence of the national electoral system is found either. However, only few control variables are found to be statistically significant, implying a low performance of the dynamic panel data specification for this category of regional current expenditure. No' significant change in estimation results is observed when the dynamic panel regressions are performed with *PGoods*$_{t-3}$ as instrument.

Finally, I estimated the dynamic panel data model with Han and Phillips's (2010) estimator. The estimates in Table 6 show results analogous to those obtained by estimating the dynamic panel model in first-differences (Anderson and Hsiao, 1981, 1982). The effects of electoral system remain statistically significant only on the side of the regional current transfers expenditure to families and firms. This category of current expenditure is significantly reduced during pre-electoral years under the regional mixed-regime and when the regional electoral rule is more

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[18] Other estimators based on the generalised method of moments (GMM) can be implemented to estimate the panel dynamic model efficiently. In particular, I refer to the so called first-differenced GMM developed by Arellano and Bond (1991) and the system GMM estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). However, I did not use these because of the instrument proliferation problem (Roodman, 2009).

votes-seats disproportional. The national electoral rule continues to exert a positive effect on this subcategory of regional current expenditure.

5. Conclusion

The purpose of the paper has been to analyse the effects produced by the electoral system on expenditure composition by exploring the local context. Study of the local dimension may offer stronger empirical evidence owing to the smaller distance between local politician incumbents and voters, which intensifies political competition, strengthening the effects of the local electoral system on subnational expenditure decision-making. The empirical investigation was conducted on the Italian regional context since it has undergone electoral system reforms in the past two decades, making it possible to study the effects of the shift from a proportional to a mixed-electoral system across hierarchical levels of government. The static panel data analysis showed that, when the regional electoral system moves from proportional to mixed, the regional current expenditure shifts towards public goods expenditure and away from the current transfers expenditure distributed to families and firms. Although this evidence matched the theoretical predictions, it became less robust when the dynamic panel data analysis was performed. Particularly robust was the reduction in the regional current transfers expenditure to families and firms in pre-electoral years under the regional mixed-system. This result is consistent with Persson and Tabellini's (1999) prediction that broad-type expenditure tends to be reduced in majoritarian elections. The empirical analysis also showed that changes in the regional and national degree of votes-seats disproportionality affect the regional current transfers expenditure to families and firms, but in opposite directions. This robust finding may be consistent with the existence of a different degree of spending targetability and fiscal policies implementation across levels of governments in order to capture larger voter consensus at local level.

Tab. 3 The estimation results of the static panel data analysis on the impact of the electoral system on the regional total current transfers expenditure to families and firms

	OLS-PCSEs							Within						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Majbonus$_{t-1}$	-0.571		-0.517		-0.447			-0.964**		-0.844**		-0.874**		
	(-1.43)		(-1.35)		(-1.11)			(-2.62)		(-2.50)		(-2.30)		
Majprele		-0.870***	-0.856***						-0.875*	-0.641				
		(-3.19)	(-3.20)						(-1.80)	(-1.40)				
Upper-tier seats%$_{t-1}$				-0.001							-0.006			
				(-0.07)							(-0.20)			
Reg. GHI index$_{t-1}$					-0.172**							-0.234**		
					(-2.00)							(-2.18)		
Adj. Reg. GHI index$_{t-1}$						-0.083**							-0.102**	
						(-2.18)							(-2.44)	
DM$_{t-1}$							-0.521							0.001
							(-0.69)							(0.00)
National GHI index$_{t-1}$	0.036**	0.035**	0.039**	0.032**	0.034*	0.035**	0.032**	0.045**	0.037**	0.046*	0.035*	0.040*	0.040**	0.034**
	(2.60)	(2.55)	(2.78)	(2.26)	(2.46)	(2.52)	(2.30)	(2.80)	(2.23)	(2.83)	(2.02)	(2.17)	(2.48)	(2.12)
F-test								0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman test								0.000	0.000	0.000	0.000	0.000	0.010	0.001
BP-CW test								0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB-AR1 test								0.000	0.000	0.000	0.000	0.000	0.000	0.000
D-MK test								0.353	0.189	0.500	0.192	0.484	0.298	0.145
Obs. No.	430	430	430	430	430	430	407	430	430	430	430	430	430	407
Groups. No.	19	19	19	19	19	19	18	19	19	19	19	19	19	18

Notes: the dependent variable is *FCurrtr*; z-statistics in parentheses for the OLS-PCSEs estimates; t-statistics in parentheses for the Within estimates; the BP-CW test is Breusch-Pagan/Cook-Weisberg test for heteroskedasticity; the AB-AR1 test is Arellano and Bond's (1991) first-order autocorrelation test; the D-MK test is the Davidson-MacKinnon (1993) test of exogeneity; robust-clustered standard errors; p-value is reported for the diagnostic tests; coefficient significant at level ***1%, **5%, *10%.

Tab. 4 The estimation results of the static panel data analysis on the impact of electoral system on the regional current expenditure on local public goods

	OLS-PCSEs							Within						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Majbonus$_{t-1}$	0.142		0.144		0.134			0.498**		0.520**		0.500**		
	(0.46)		(0.47)		(0.43)			(2.34)		(2.14)		(2.26)		
Majprele		-0.055	-0.057						0.025	-0.120				
		(-0.29)	(-0.29)						(0.10)	(-0.40)				
Upper-tier seats%$_{t-1}$				-0.001							0.017*			
				(-0.12)							(1.94)			
Reg. GHI index$_{t-1}$					0.016						-0.005			
					(0.34)						(-0.09)			
Adj. Reg. GHI index$_{t-1}$						0.006							0.032**	
						(0.26)							(2.41)	
DM$_{t-1}$							0.249							-1.148*
							(0.42)							-1.98
National GHI index$_{t-1}$	-0.005	-0.004	-0.005	-0.004	-0.005	-0.004	-0.001	-0.023**	-0.018*	-0.023**	-0.020**	-0.024**	-0.019**	-0.013
	(-0.50)	(-0.37)	(-0.49)	(-0.38)	(-0.49)	(-0.42)	(-0.15)	(-2.71)	(-2.03)	(-2.68)	(-2.71)	(-2.82)	(-2.33)	(-1.63)
F-test								0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman test								0.000	0.000	0.000	0.000	0.000	0.000	0.000
BP-CW test								0.000	0.000	0.000	0.000	0.000	0.000	0.000
AB-AR1 test								0.000	0.000	0.000	0.000	0.000	0.000	0.000
D-MK test								0.298	0.066	0.207	0.341	0.294	0.524	0.362
Obs. No.	430	430	430	430	430	430	407	430	430	430	430	430	430	407
Groups. No.	19	19	19	19	19	19	18	19	19	19	19	19	19	18

Notes: the dependent variable is *PGoods*; z-statistics in parentheses for the OLS-PCSEs estimates; t-statistics in parentheses for the Within estimates; the BP-CW test is Breusch-Pagan/Cook-Weisberg test for heteroskedasticity; the AB-AR1 test is Arellano and Bond's (1991) first-order autocorrelation test; robust-clustered standard errors; the D-MK test is the Davidson-MacKinnon (1993) test of exogeneity; p-value is reported for the diagnostic tests; coefficient significant at level ***1%, **5%, *10%.

Tab. 5 Estimation results of the Anderson and Hsiao dynamic panel data model

	$\Delta FCurrtr$							$\Delta PGoods$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
ΔMajbonus$_{t-1}$	0.187		0.142		0.211			-0.099		-0.104		-0.097		
	(0.40)		(0.29)		(0.43)			(-0.98)		(-1.00)		(-0.91)		
ΔMajprele$_{t-1}$		-1.130**	-1.129**						-0.127	-0.128				
		(-2.15)	(-2.15)						(-0.53)	(-0.53)				
ΔUpper-tier seats%$_{t-1}$				-0.012							-0.018			
				(-0.84)							(-1.42)			
ΔReg. GHI index$_{t-1}$					-0.051							-0.003		
					(-0.44)							(-0.04)		
ΔAdj. Reg. GHI index$_{t-1}$						-0.069							-0.025	
						(-1.60)							(-0.70)	
ΔDM$_{t-1}$							-0.894							1.693
							(-0.60)							(1.43)
ΔNational GHI index$_{t-1}$	0.032	0.038*	0.037*	0.034*	0.032*	0.035*	0.031	0.001	0.001	0.001	0.002	0.001	0.001	0.003
	(1.70)	(1.82)	(1.82)	(1.78)	(1.76)	(1.84)	(1.59)	(0.04)	(0.05)	(0.09)	(0.16)	(0.04)	(0.07)	(0.20)
ΔDep.Var.$_{t-1}$	0.617*	0.617*	0.618*	0.623*	0.612*	0.610*	0.560*	0.470**	0.468**	0.469**	0.501***	0.469**	0.471**	0.475**
	(1.91)	(1.92)	(1.90)	(1.94)	(1.93)	(1.93)	(1.94)	(3.29)	(3.38)	(3.37)	(3.81)	(3.24)	(3.29)	(2.98)
F-test	0.001	0.017	0.001	0.008	0.000	0.047	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs. No.	404	404	404	404	404	404	382	404	404	404	404	404	404	382
Groups. No.	19	19	19	19	19	19	18	19	19	19	19	19	19	18

Notes: t-statistics in parentheses; the second-order lag of the dependent variable is the instrumental variable; finite-sample adjustment for cluster-robust standard errors; p-value is reported for the F-test; coefficient significant at level ***1%, **5%, *10%.

Tab. 6 Estimation results of the Han-Phillips linear dynamic panel data model

	FCurrtr							PGoods						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Majbonus$_{t-1}$	-0.321		-0.277		-0.298			0.080		0.081		0.079		
	(-0.72)		(-0.63)		(-0.68)			(0.34)		(0.50)		(0.33)		
Majprele$_{t-1}$		-0.975***	-0.969***						-0.100	-0.101				
		(-3.36)	(-3.34)						(-0.70)	(-0.70)				
Upper-tier seats%$_{t-1}$				0.001							-0.008			
				(0.04)							(-0.73)			
Reg. GHI index$_{t-1}$					-0.162*							0.002		
					(-1.88)							(0.04)		
Adj. Reg. GHI index$_{t-1}$						-0.071*							0.007	
						(-1.67)							(0.761)	
DM$_{t-1}$							-0.905							0.748
							(-0.84)							(1.31)
National GHI index$_{t-1}$	0.039**	0.042**	0.043**	0.036**	0.038**	0.040**	0.037**	-0.000	0.001	0.0004	0.003	-0.000	0.001	0.003
	(2.22)	(2.43)	(2.49)	(2.00)	(2.21)	(2.27)	(2.02)	(-0.00)	(0.12)	(0.05)	(0.32)	(-0.00)	(0.07)	(0.31)
Dep.Var.$_{t-1}$	0.654***	0.646***	0.656***	0.790***	0.596***	0.655***	0.660***	0.754***	0.762***	0.753***	0.827***	0.754***	0.753***	0.779***
	(3.48)	(3.37)	(3.44)	(4.10)	(3.19)	(3.46)	(3.42)	(4.77)	(4.73)	(4.77)	(5.27)	(4.77)	(4.81)	(5.35)
Wald-test	0.023	0.001	0.002	0.017	0.013	0.013	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs. No.	425	425	425	425	425	425	402	425	425	425	425	425	425	402
Groups. No.	19	19	19	19	19	19	18	19	19	19	19	19	19	18

Notes: z-statistics in parentheses; p-value is reported for the Wald test; coefficient significant at level ***1%, **5%, *10%.

Appendix: Data source and variables definitions

Variable	Data description	Data source
FCurrtr	Regional current transfers expenditure to households and firms (% of the total regional public expenditure).	ISTAT, Bilanci consuntivi delle regioni e delle province autonome (various years); ISTAT, Finanza locale: entrate e spese dei bilanci consuntivi (comuni, province e regioni) anni 2001-2002.
PGoods	Regional current expenditure on local public goods (% of the total regional public expenditure).	ISTAT, Bilanci consuntivi delle regioni e delle province autonome (various years); ISTAT, Finanza locale: entrate e spese dei bilanci consuntivi (comuni, province e regioni) anni 2001-2002.
State transfers	Per-capita state transfers which include state revenue contributions, tax revenues from the state and state transfers in lieu of tax revenues (euros).	ISTAT, Bilanci consuntivi delle regioni e delle province autonome (various years); ISTAT, Finanza locale: entrate e spese dei bilanci consuntivi (comuni, province e regioni) anni 2001-2002.
Majbonus	1=introduction of a majority bonus in the regional proportional system; 0=otherwise.	Author's compilation.
Majprele	1= pre-election year under the regional mixed-electoral system, 0= under the regional proportional system.	Author's compilation.
Upper-tier seats%	Seats assigned under the regional majoritarian rule (% of the total seats)	Ministero dell'Interno; the Regions of Friuli Venezia-Giulia, Sardegna, Sicilia, Toscana, Valle D'Aosta.
DM (log)	Sum of the square of the number of seats allocated in the *j*-th constituency in the lower proportional-tier/Total number of seats in the lower proportional-tier. It is in logarithmic form.	Ministero dell'Interno; the Regions of Friuli Venezia-Giulia, Sardegna, Sicilia, Toscana, Valle D'Aosta,
Reg. GHI index	Gallagher index of votes-seats disproportionality computed for regional government elections.	Ministero dell'Interno; the Regions of Friuli Venezia-Giulia, Sardegna, Sicilia, Toscana, Valle D'Aosta;
Adj. Reg. GHI index	Adjusted version of the Gallagher index of votes-seats disproportionality computed for regional government elections.	Ministero dell'Interno; the Regions of Friuli Venezia-Giulia, Sardegna, Sicilia, Toscana, Valle D'Aosta.
National GHI index	Gallagher index of votes-seats disproportionality computed for the Italian Senate elections.	Ministero dell'Interno.
Election year	1= if the regional government is in an election year; 0= otherwise.	Author's compilation.
Pre-election year	1= if the regional government is in an pre-election year; 0= otherwise.	Author's compilation.

Variable	Data description	Data source
Pop	Population, total.	ISTAT, http://demo.istat.it/.
%Pop65+	Population aged 65 and over (% of the total population).	ISTAT, http://demo.istat.it/.
%Pop0-15	Population age 0-15 (% of the total population).	ISTAT, http://demo.istat.it/.
GDP (log)	Per-capita gross domestic product (euros). It is in logarithmic form.	ISTAT, Conti Economici Regionali.

REFERENCES

Alfano, M.R., Baraldi, A.L., (2012). The impact of the mixed electoral representation on economic growth: The case of the Italian regions. *Practical Ideas in Economics and Finance 1*, 1-27.

Anckar, C. (1997). Determinants of disproportionality and wasted votes. *Electoral studies 16*, 501–515.

Anckar, C., Akademi, A. (2001). Effects of electoral systems. A study of 80 countries. *Working Paper presented at the SNS Seminar in Stockholm*.

Anderson, T.W., Hsiao, C. (1981). Estimation of dynamic models with error components. *Journal of the American Statistical Association 76*, 598–606.

Anderson, T.W., Hsiao, C. (1982). Formulation and estimation of dynamic models using panel data. *Journal of Econometrics 18*, 47–82.

Arellano, M., Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies 58*, 277–297.

Arellano, M., Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics 68*, 29–51.

Baltagi, B.H. (2005). *Econometric analysis of panel data 3rd Edition*, John Wiley & Sons Ltd.

Baldi, B. (2010). I "numeri del federalismo fiscal": un confronto fra le regioni. *Istituzioni del federalismo 5/6*, 495–515.

Baraldi, L. (2008). Effects of electoral rules, political competition and corruption on the size and composition of government consumption spending: An Italian regional analysis. *The B.E. Journal of Economic Analysis & Policy 8*, 1–35.

Blais, A. (1988). The classification of electoral systems. *European Journal of Political Research 16*, 99-110.

Blundell, R., Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics 87*, 115–143.

Breusch, T.S., Pagan, A.R. (1979). A simple test for heteroscedasticity and random coefficient variation. *Econometrica 47*, 1287–1294.

Cook, R.D., Weisberg, S., (1983). Diagnostics for heteroscedasticity in regression. *Biometrika 70*, 1–10.

Davidson, R., MacKinnon, J. (1993). *Estimation and Inference in Econometrics*, New York: Oxford University Press.

Drazen, A., Eslava, M. (2010). Electoral manipulation via voter-friendly spending: Theory and evidence. *Journal of Development Economics 92*, 39–52.

Driscoll, J.C., Kraay, A.C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics 80*, 549–560.

Enikopolov, R., Zhuravskaya, E. (2007). Decentralization and political institutions, *Journal of

Public Economics 91, 2261-2290.

Funk, P., Gathmann, C. (2010). How do electoral systems affect fiscal policy? Evidence from state and local governments, 1890 to 2005. *CESifo Working Paper* No. 2958.

Gagliarducci, S., Nannicini, T., Naticchioni, P. (2011). Electoral rules and politicians' behavior: A micro test. *American Economic Journal: Economic Policy 3*, 144–174.

Gallagher, M. (1991). Proportionality, disproportionality and electoral systems. *Electoral studies 10*, 33–51.

Han, C., Phillips, P.C.B. (2010). GMM estimator for dynamic panels with fixed effects and strong instruments at unity. *Econometric Theory 26*, 119–151.

Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence, *The Stata Journal 7*, 281–312.

Kyriacou, A.P., Roca-Sagalés, O. (2011). Fiscal decentralization and government quality in the OECD, *Economics Letters 111*, 191-193.

Lijphart, A. (1994). *Electoral system and party systems: A study of twenty-seven democracies, 1945-1990*. New York: Oxford University Press.

Lizzeri, A., Persico, N. (2001). The provision of public goods under alternative electoral incentives. *American Economic Review 91*, 225–239.

Lupu, N., Pontusson, J. (2008). Income Inequality, electoral rules and the politics of redistribution. *Mimeo*.

Milesi-Ferreti, G.M., Perotti, R. and Rostagno, M. (2002). Electoral system and public spending. *Quarterly Journal of Economics 117*, 609–657.

Pellegrino, S., Piperno, S. (2012). L'autonomia tributaria delle regioni e degli enti locali alla luce dei più recenti provvedimenti: "L'albero è più dritto", *Centro studi sul federalismo research paper*.

Persson, T., Tabellini, G. (1999). The size and scope of government: Comparative politics with rational politicians. *European Economic Review 43*, 699–735.

Persson, T., Tabellini, G. (2001). Political institutions and policy outcomes: What are the stylized facts?. *CEPR Discussion Paper* No. 2872.

Powell, G.B., Vanberg, G.S. (2000). Election laws, disproportionality and median correspondence: Implications for two visions of democracy. *British Journal of Political Science 30*, 383–411.

Roodman, D. (2009). Practitioners' corner. A note on the theme of too many instruments. *Oxford Bulletin of Economics and Statistics 71*, 135–158.

Shelton, C.A. (2007). The size and composition of government expenditure. *Journal of Public Economics 91*, 2230–2260.

Stock, J.H., Yogo, M. (2005). Testing for weak instruments in linear IV regression. In '*Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg*', ed. D.W. Andrews and J. H. Stock, 80–108. Cambridge University Press.

Taagepera, R. (1998). Effective magnitude and effective threshold, *Electoral studies*, 17, 393-404.

Taagepera, R. (2003). Arend Lijphart's dimensions of democracy: Logical connections and institutional design, *Political Studies 51*, 1–19.

Taagepera, R. Shugart, M.S., (1989). *Seats and Votes: The effects and determinants of electoral systems*, New Haven: Yale University Press.

Ticchi, D., Vindigni, A. (2010). Endogenous Constitutions. *Economic Journal 120*, 1–39.

Wawro, G. (2002). Estimating dynamic panel data models in political science. *Political Analysis 10*, 25-48.

Vergne, C. (2009). Democracy, elections and allocation of public expenditures in developing counties. *European Journal of Political Economy 25*, 63–77.