

Intergovernmental fiscal transfers as pork barrel

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Received: 4 March 2010 / Accepted: 25 July 2011 / Published online: 19 August 2011
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Abstract This paper uses a simultaneous equations model to analyze increases in intergovernmental fiscal transfers and associated vote changes in Portuguese legislative elections. The results suggest that election year increases in transfers by the central government to municipalities secure added votes, and that these transfers are targeted at jurisdictions where the government faces the risk of losing support.

Keywords Intergovernmental transfers · Electoral competition · Pork-barrel politics

JEL Classification H77 · D72 · D78 · E62

1 Introduction

Intergovernmental fiscal transfers are financed by broad-based taxation but generate benefits that are limited geographically. Previous studies have demonstrated that governments take their own interests, specifically, electoral successes, into account when allocating grants to lower levels of governments (e.g., Johansson 2003; Ansolabehere and Snyder 2006; Solé-Ollé and Sorribas-Navarro 2008). The existence of political motivations in grant allocation may generate welfare losses, excessive government spending, and inequities (see Boadway and Shah 2006). However, there has been little empirical study of the political determinants of spikes in intergovernmental grants in pre-electoral periods or of the electoral benefits of grant-funded pork barrel for incumbent politicians (Fiorina 1981; Stein and Bickers 1994; Levitt and Snyder 1997).

This paper fills this gap in the literature by analyzing an extensive dataset that covers legislative elections in Portugal. The data set spans the period from the restoration of democracy

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in 1974 until 2005 and covers 278 mainland Portuguese municipalities. Portugal is an interesting case because transfers from the central government represent an important source of funding for municipalities and because all municipalities have identical institutional structures and policy concerns. Additionally, legislative elections dates are defined exogenously from the perspective of the government.

For the Portuguese case, Veiga and Pinho (2007) find strong evidence that intergovernmental fiscal transfers rise during election years, but investigated neither the political incentives that lay behind these increases nor the success of these transfers in attracting votes. In the run-up to Election Day, does the central government distribute pork barrel evenly across municipalities or is it more selective? Do voters reward national governments for increasing transfers to their jurisdictions? The present paper provides answers to these two questions. It analyzes the determinants of pork-barrel spending in the allocation of grants by the Portuguese central government to local jurisdictions and the efficacy of those grants in producing votes for the incumbent government. If grants are used strategically to enhance reelection probabilities, then the incentive to manipulate grants should be stronger when the incumbent trails opposition candidates. This suggests that reelection prospects should be taken into account when estimating the determinants of pork barrel spending; however, previous studies have not done so.

The paper is organized as follows. The next section presents a brief review of the literature between pork barrel spending and voting. Section 3 describes Portuguese governmental and electoral institutions. The data and the econometric model are described in Sect. 4. Section 5 presents the empirical results and, finally, Sect. 6 concludes the paper.

2 Review of the literature

An important question in political economy is how economic events affect voting behavior. Downs (1957) provided an early theoretical approach in offering the responsibility hypothesis, which asserts that voters hold the government to account for economic outcomes. The responsibility hypothesis has been embedded in voting functions, which explain voter support for incumbents with variables measuring economic and political conditions. Seminal contributions were provided by Kramer (1971) and Stigler (1973), with the latter suggesting that the economic bases for voter support must be sought in the area of income redistribution (Stigler 1973: 167). Many papers have followed, analyzing specific countries or panels of countries, but most studies use aggregate data.¹ Few studies have investigated whether electoral results, at sub-national levels, are conditioned by fiscal transfers to specific jurisdictions. Most research on this topic is restricted to the United States, with Fiorina (1981) providing an important early contribution. He claimed that congressional casework activity and electoral outcomes are intertwined since the resources allocated by the incumbent at time t are expected to produce an electoral outcome at time $t + 1$. He also argued that narrower victory margins (or expected victory margins) in preceding and subsequent elections increase the incentive to allocate more resources to casework. Using individual survey data, he concluded that voters can be bought. Following Fiorina (1981), Stein and Bickers (1994) found evidence that incumbents who are electorally vulnerable are more likely to seek increased funding for projects in their districts as a way of demonstrating their influence and enhancing their electoral margins. They also claim that the electoral gains from providing

¹For surveys of economic voting see Duch and Stevenson (2008), Paldam (2004), and Mueller (2003).

distributive benefits to voters varies according to the political attentiveness of voters, as well as their sources of political information and interest group affiliations. Levitt and Snyder (1997) found that federal spending benefits congressional incumbents. They argue that incumbents expecting tight reelection races are more likely to put greater effort into obtaining federal outlays.²

In the political business cycle literature, Frey and Schneider (1978) were the first to suggest that the government will behave more opportunistically when its popularity is low. When examining transfer payments in Great Britain, Schultz (1995) found a negative correlation between increases in transfers before elections and incumbent political security going into the election, as measured by popular opinion polls. They argue that when the government is relatively sure that it will be reelected, it has less incentive to manipulate the economy than when its prospects of reelection are more in doubt. This is especially true given that policy manipulation can damage the governing party's reputation and generate poor macroeconomic performance in the future. In a follow up paper, Price (1998) argues that Schultz's hypothesis that popular governments will behave less opportunistically due to the post-election costs of pre-election booms is over-simplified. He argues that there are good reasons to expect non-linearities in this relationship. Since the costs of restoring popularity are high for very unpopular governments, it is likely that they will not behave opportunistically. However, an unpopular government may also plan to leave a poisoned fiscal situation to its successor and therefore engage in extreme economic behavior. As predicted, Price (1998) found a non-linear, short-run relationship between real transfers and pre-election popularity levels of the governing party in the United Kingdom. Carlsen (1997) tested the Frey-Schneider-Schultz hypothesis in the context of US monetary policy. He found a negative relationship between reelection prospects and pre-election money growth.

Building on this literature, we investigate how changes in transfers to municipalities influence electoral results and whether pre-election transfers to them depend on the incumbent government's expectations about reelection. Additionally, we test two alternative theories that have been put forward in the literature on redistributive politics and have been applied to the study of intergovernmental grants.³ According to Lindbeck and Weibull (1987, 1993) and Dixit and Londregan (1998), upper-layer governments should allocate more money towards swing regions where voters do not have a strong attachment to either the government or opposition parties. In contrast, Cox and McCubbins (1986) argue that central governments are risk averse, and therefore invest where they already have strong support. Several papers have tested these two theories. For the United States, there is an extensive literature documenting political influences on the distribution of federal spending across states in the context of the New Deal, funds for building highways and other infrastructure, economic stimulus programs, and disaster relief. See, among others, Wright (1974), Couch and Shughart (1998), Wallis (1998), Fishback et al. (2003), Garrett and Sobel (2003), Shughart (2006), and Sobel and Leeson (2006). For the Swedish case, Dahlberg and Johansson (2002) and Johansson (2003) found robust support for the Lindbeck and Weibull (1987) hypothesis that politicians court swing voters. Case (2001) analyzed block grants from federal to sub-federal levels of government in Albania, and found that swing communes and those that

²In the voting equation, Levitt and Snyder (1997) instrument for spending in the district with spending outside the district, but inside the state containing the district. When analyzing the determinants of change in state government indebtedness in the United States, Clingermayer and Wood (1995) also found that, when incumbents are under electoral stress, they manipulate the public debt to increase their reelection chances.

³See Oates (1999) and Weingast (2009) for surveys on fiscal federalism and the political economy of fiscal federalism.

might be pivotal to winning a majority of seats in Parliament were favored in the allocation process. For the United States, Ansolabehere and Snyder (2006) found that states transfer more to local governments that provide them with the strongest electoral support, and found little or no evidence in favor of the swing voter model. The Portuguese case was investigated by Veiga and Pinho (2007). Their results are consistent with the prediction that intergovernmental grants increase during election years, and show that municipalities with many swing voters received more grants, particularly during the early years of democracy in Portugal.

Although the motivation behind pork barrel spending is to enhance the grantor government's electoral margins, none of the previous studies has investigated how citizens condition their vote choice on fiscal transfers to their electoral district. This paper improves on the previous literature by accounting for voter and politician behavior simultaneously. Using data for Portugal, we estimate a voting function for the central government to test whether incumbents are rewarded for increasing grants to specific municipalities. Furthermore, we test the political motivations that lie behind the empirical findings.⁴ Our baseline hypothesis is that politicians who are in greater danger of losing an election have stronger incentives to use transfers as a political tool to woo the electorate. Therefore, empirically, the relationship between increases in intergovernmental transfers during electoral years and reelection margins for the grantor government should be estimated as a system of equations.

3 Institutional background

Democracy was restored in Portugal on April 25, 1974, after 48 years of dictatorship. A new constitution came into effect on April 25, 1976, and elections for the Assembly of the Republic, the Portuguese unicameral parliament, were held on the same day. The first years of the democratic period were characterized by political instability, with coalition or minority governments falling before the ends of their prescribed four-year terms. The first government to gain a majority in parliament emerged in the 1987 elections, under the leadership of Cavaco Silva, from the Social Democratic Party (PSD). Then, the country experienced a period of political stability during which three single-party governments ruled over their entire terms.

Following the period of stability, poor results obtained by the socialist government in the municipal elections of December 2001 led to the resignation of the prime-minister. The social democrats led the voting in the 2002 election, and formed a coalition government with the Democratic and Social Center/People's Party (CDS/PP), under the leadership of Durão Barroso. In July 2004, Durão Barroso resigned to become president of the European Commission, and Santana Lopes (PSD) formed a new coalition government with the CDS/PP. Following several governmental controversies, the president dissolved the parliament and called for early elections in February 2005. The socialists won a majority of the parliamentary seats and, in the midst of an economic crisis, were again victorious in 2009, although they failed to retain a majority of deputies in parliament. (See Table 1.)

Since the constitutional revision of 1982, which eliminated the Council of the Revolution, the organs of sovereignty in Portugal have been the President of the Republic, the Assembly of the Republic, the government, and the courts. The government consists of the prime

⁴Note that while in Veiga and Pinho (2007) the dependent variable was transfers received by municipalities in each year (electoral or not), in this paper the dependent variable is the percentage change in transfers received by municipalities in the election year versus the prior year. While the former paper tests for the existence of opportunistic behavior, the current analysis investigates the economic and political incentives that lay behind it.

Table 1 Legislative elections and parties in government

Dates of elections	Winning party	% Votes	Prime-Minister	Form of government
April 25, 1976	PS	34.9%	Mário Soares	One party, minority
–	–	–	Mota Pinto	Presidential appointment (1978–1979)
–	–	–	M. L. Pintassilgo	Presidential appointment (1979–1980)
December 2, 1979	AD	42.2%	Sá Carneiro	Coalition (AD = PSD + CDS + PPM)
October 5, 1980	AD	44.4%	Pinto Balsemão	Coalition (AD = PSD + CDS + PPM)
April 25, 1983	PS	36.3%	Mário Soares	Coalition (PS + PSD)
October 6, 1985	PPD/PSD	29.7%	Cavaco Silva	One party, minority
July 19, 1987	PPD/PSD	50.1%	Cavaco Silva	One party, majority
October 6, 1991	PPD/PSD	50.4%	Cavaco Silva	One party, majority
October 1, 1995	PS	43.8%	António Guterres	One party, minority
October 10, 1999	PS	44.0%	António Guterres	One party, minority
March 17, 2002	PPD/PSD	40.1%	Durão Barroso Santana Lopes (July 2004)	Coalition (PSD + CDS/PP)
February 20, 2005	PS	45.0%	José Sócrates	One party, majority
September 27, 2009	PS	36.6%	José Sócrates	One party, minority

Source: Technical Staff for Matters Concerning the Electoral Process of the Internal Affairs Ministry

Notes: PPD/PSD—People's Democratic Party/Social Democratic Party; PS—Socialist Party; CDS/PP—Democratic and Social Center/People's Party; PPM—Monarchic People's Party

minister (generally the leader of the party that received the most votes in the last elections), the ministers, the secretaries of state, and the under-secretaries of state. The government formulates the general policy of the country and is the highest organ of public administration. It proposes the national budget to the Assembly of the Republic, where transfers to municipalities are set according to the Local Finance Law.

Portugal is a unitary state,⁵ comprising 278 municipalities in its mainland territory.⁶ Municipalities are responsible mainly for social policies, such as housing for the poor, cultural and recreational services, healthcare and education. They also share responsibilities in transport infrastructure, sewage, energy and water distribution, defense of the environment and protection of the civilian population.⁷

Budgeting rules and institutions are identical across Portuguese mainland municipalities, but the law regulating local public finances changed during the period considered. Although there has been an increase in the relative importance of local taxes and user charges over time, municipalities still have a low level of fiscal autonomy. The Portuguese Constitution establishes that municipalities have the right to share national fiscal revenues, and transfers from the central government are the main source of funding for them. In our sample, transfers represent (on average) 64% of real per capita municipal revenues. Municipalities receive conditional and unconditional transfers. The former are allocated by the central government and are usually regulated by contracts and often detailed programmatic rules. The central government has less discretionary power over unconditional transfers, since they are distributed among municipalities according to a formula that takes into account their needs and resources (namely population, area, number of *freguesias*—the lowest level of local government—taxes collected in the municipality, and the level of socio-economic development). The formula has changed over time, following revisions of the Local Finance Laws.⁸ However, even for formula transfers, until 1998 the central government could influence the total amount distributed, which means that it could use them for electoral purposes.

4 Data and econometric model

The dataset used in this study covers the 278 municipalities of continental Portugal, with annual data from 1979 to 2005. Legislative election dates and results were obtained from the Technical Staff for Matters Concerning the Electoral Process (STAPE) of the Portuguese Internal Affairs Ministry. Data on transfers from the central government to the municipalities and on municipal expenditures were obtained from the local authority's (*Direcção Geral das Autarquias Locais—DGAL*) annual publication *Finanças Municipais*. This report exists from 1979 to 1983 and from 1986 to 2006. For the two missing years, data were obtained directly from the municipalities' official accounts and are incomplete: we have 182 observations for 1984 and 189 for 1985. The national consumer price index, real GDP, and industrial production index were obtained from the IMF's *International Financial Statistics*, and the

⁵For an analysis of three decades of democratic local governments in Portugal, see Silva Costa (2008).

⁶There are also 30 municipalities in the Administrative Regions of Azores and Madeira, which are not considered in this study. While municipalities are the main local authorities in mainland Portugal, there are regional governments in Azores and Madeira. Thus, their municipalities are not perfectly comparable to those on the mainland.

⁷Laws 159/99 and 1969/99 modified by law 5-A/2002 define the attributions and competences of Portuguese local governments.

⁸There were four local finance laws: Law n. 1/79, Law n. 1/87, Law n. 42/98, and Law n. 2/07.

unemployment rate from the OECD's *Main Economic Indicators*. Finally, demographic data was obtained in the 1970, 1981, 1991 and 2001 *Census* and in the *Anuário Estatístico Regional* of the National Statistics Office (INE).

As in Fiorina (1981), we argue that transfers allocated by government to a municipality at time t are expected to generate a positive electoral outcome for the incumbent at time $t + 1$. Furthermore, there is also a reverse linkage between expectations about electoral outcomes at time $t + 1$ and the allocation of transfers at time t .

The main purpose of our empirical analysis is to test the following hypotheses: (1) election-year increases in grants transferred to a municipality lead to larger vote shares for the incumbent government; and, (2) increases in grants in election years are influenced by the expected change in vote shares from one election to the other. Hypothesis (1) will be tested by estimating a voting function in which the dependent variable, $\Delta Votes_{it}$, is the change, from one election to the next, in vote shares received in municipality i by the national government party ($\Delta Votes_{it} = Votes_{it} - Votes_{i,t-1}$). A *pork barrel* equation will be estimated in order to test Hypothesis (2), in which the dependent variable, $\Delta Grants_{it}$, is the percentage change in real total grants *per capita* in the election year.⁹

Our previous arguments imply that the dependent variable of one equation appears as an explanatory variable in the other equation. Given this endogeneity, the appropriate empirical strategy is to estimate a system of two simultaneous equations. As in Aidt et al. (2011), who also used this empirical methodology, the structural form of the model can be written as:

$$\Delta Votes = v(\Delta Grants, X) \quad (1)$$

$$\Delta Grants = g(\Delta Votes, Y) \quad (2)$$

where v and g are functions and X and Y are (possibly overlapping) vectors of other determinants of changes in vote shares and changes in grants.

In the voting function (1), election year increases in real *per capita* grants transferred by the central government to municipalities ($\Delta Grants$) are expected to improve reelection prospects. Transfers represent the main source of funding for municipalities and condition expenditure decisions that selectively benefit the citizens of the recipient jurisdictions. Equation (2) explains the growth rate of intergovernmental grants *per capita* in election years. If grants are used as *pork barrel*, during election years the central government will target municipalities where it faces larger risks of losing support. Therefore, a negative sign is expected for the coefficient associated with $\Delta Votes$, which proxies the expected change in votes, estimated in (1).

The definitions of vectors X and Y build on the previous literature and on our beliefs regarding the variables that should affect the distribution of grants, voter support, or both. Vector X includes the following variables hypothesized to influence voter support:

- Total grants (term mean) ($Grants_Mean_{it}$). If voters are not myopic, then larger average total grants *per capita* received by the municipality over the entire term of the government are also expected to increase votes.

⁹Since the elections of 1983, 2002, and 2005 occurred in the first two quarters of the respective years, changes in grants in the election year did not affect votes. Thus, for those three elections, we consider changes in grants in the year prior to the elections, instead of changes in the election year. Nevertheless, it is worth mentioning that the empirical results do not change significantly if we always use the changes in the election year (these results are available from the authors upon request).

- Share in votes in the previous election ($Votes_{i,t-1}$). This variable is expected to exert a negative effect on $\Delta Votes$ since it is more difficult to increase vote shares when they already are high.
- Mayor belongs to a government party ($Same_Party_{i,t-1}$). Dummy variable which takes the value of one when the mayor's party is in the national government (alone or as a member of a coalition government) prior to the election, and equals zero otherwise. As suggested by Alesina and Rosenthal (1996), voters may prefer not to concentrate power in one party. Thus, a negative coefficient is expected for this variable.
- Vote margin in the previous election ($VMargin_{i,t-1}$): absolute difference¹⁰ in the vote shares of the governing party and of the largest opposition party, obtained in municipality i in the previous election. This variable indicates how close the previous election was and captures the concept of “swing municipality”.
- Population (Pop_{it}), population squared (Pop_{it}^2), and percentage of the population over 65 years old ($Pop65_{it}$). It is possible that the degree of political competition is correlated with the size of municipalities and the age structure of their populations. We have no prior concerning the sign of the coefficients associated with these variables.

Vector Y includes all the variables mentioned above, except for *Total grants (term mean)*, which is replaced by lagged *Total grants*; we find that variable to be more appropriate as a control for the persistence in grants in the pork barrel equation. Thus, vector Y is composed of:

- Lagged Total grants ($Grants_{i,t-1}$). Since significant increases in grants are harder both fiscally and politically when they already are generous, a negative sign is expected for the coefficient associated with real total grants per capita in the year prior to the election.¹¹
- Share in votes in the previous election ($Votes_{i,t-1}$) and mayor belongs to a government party ($Same_Party_{i,t-1}$). These variables are included to test Cox and McCubbins's (1986) hypothesis that electoral spikes in grants are larger for municipalities where the government has stronger political support. A positive sign is therefore expected for the coefficients.
- Vote margin in the previous election ($VMargin_{i,t-1}$): absolute difference¹² in the vote shares of the government party and of the strongest opposition party, obtained in municipality i , in the previous election. This variable indicates how close the previous election was and captures the concept of “swing municipalities”. Following Lindbeck and Weibull (1993), who suggest that politicians target swing voters, a positive estimated coefficient is expected.
- Population ($Pop_{i,t-1}$) and population squared ($Pop_{i,t-1}^2$). $Pop_{i,t-1}$ represents a municipality's population, in thousands. The larger the population of a municipality is, the costlier it is for the government to increase grants *per capita* transferred to it. Thus, a negative coefficient is expected. Population squared ($Pop_{i,t-1}^2$) is also included to allow for non-linear effects.
- Percentage of the population over 65 years old ($Pop65_{i,t-1}$). Because voter awareness may reduce the electoral pay-off of pork barrel measures, we introduced $Pop65_{i,t-1}$, as a proxy

¹⁰The results do not change significantly if the difference in vote shares is used instead of its absolute value.

¹¹Another possibility would be to include $Grants_Mean_{it}$, as in vector X . But, since we are considering the increase in grants since the previous year, it is more appropriate to control for lagged grants. In fact, the usual information criteria (AIC or SBIC) improve when we use lagged grants instead of mean grants.

¹²The results do not change significantly if the difference in vote shares is used instead of its absolute value.

for low levels of educational attainment. Elderly population may also impose heavier demands on municipally supplied social services. A positive coefficient is expected.¹³

Based on the discussion above concerning the variables to include in vectors X and Y , we can expand (1) and (2) as follows:

$$\begin{aligned} \Delta \text{Votes}_{it} = & \alpha + \beta_1 \Delta \text{Grants}_{it} + \beta_2 \text{Grants_Mean}_{it} + \beta_3 \text{Votes}_{i,t-1} \\ & + \beta_4 \text{Same_Party}_{i,t-1} + \beta_5 \text{VMargin}_{i,t-1} \\ & + \beta_6 \text{Pop}_{it} + \beta_7 \text{Pop}_{it}^2 + \beta_8 \text{Pop65}_{it} + v_i + \delta_t + \varepsilon_{it} \end{aligned} \quad (3)$$

$$\begin{aligned} \Delta \text{Grants}_{it} = & \gamma + \phi_1 \Delta \text{Votes}_{it} + \phi_2 \text{Grants}_{i,t-1} + \phi_3 \text{Votes}_{i,t-1} \\ & + \phi_4 \text{Same_Party}_{i,t-1} + \phi_5 \text{VMargin}_{i,t-1} \\ & + \phi_6 \text{Pop}_{i,t-1} + \phi_7 \text{Pop}_{i,t-1}^2 + \phi_8 \text{Pop65}_{i,t-1} + \lambda_i + \phi_t + \mu_{it} \end{aligned} \quad (4)$$

where $i = 1, \dots, 278$ is the index for municipalities, t indicates time, α and γ are constants, $\beta_1 - \beta_8$ and $\phi_1 - \phi_7$ are parameters to be estimated, v_i and λ_i are the individual effects of municipality i , δ_t and ϕ_t are dummy variables for the election in year t , and ε_{it} and μ_{it} are the errors terms.

Descriptive statistics for the variables referred to above are presented in Table 2. The mean of the growth in total grants per capita from the pre-electoral year to the electoral year is 9.78 euros (base year 2000), while that for the whole sample is 5.11, supporting the hypothesis that central governments behave opportunistically. A positive value is also observed for growth in current and capital grants, with the latter more than doubling the former. This suggests more political manipulation of capital grants than of current grants, which accords with evidence reported by Veiga and Veiga (2007b) of political business cycles that have higher frequency and greater amplitude in municipal capital expenditures than in current expenditures.

Equations (3) and (4) are estimated as a system of simultaneous equations, using Generalized Method of Moments (GMM), a robust estimator that does not require information on the exact distribution of the disturbances.¹⁴ GMM estimation is based on the assumption that the disturbances in the equations are uncorrelated with a set of instrumental variables. The set of instrumental variables of each equation used in our estimations includes all exogenous right-hand side variables entered in both equations (including municipal and time dummies).¹⁵ The GMM estimator selects parameter estimates so that the correlations between the instruments and disturbances are as close to zero as possible, as defined by a criterion

¹³Demographic variables are lagged one year in order to avoid endogeneity problems that could result from the fact that larger transfers to a municipality could induce people to move to it. Furthermore, the governmental decision of how much to transfer to each municipality may take into account the demographic characteristics of the latter. Since the information available at the time of decision will be previous year's values of demographic variables, it is more appropriate to use lagged values than contemporaneous ones.

¹⁴This is an advantage relative to Full Information Maximum Likelihood (FIML), an alternative method for the estimation of systems of simultaneous equations, which assumes that the contemporaneous errors have a joint normal distribution. Another caveat of FIML is that it propagates to the system any specification error in the structure of the model.

¹⁵Concretely, since several variables and the municipality and time dummies are included in both equations the excluded instruments in the estimations of columns 1 and 3 of Tables 3-A and 3-B are as follows. Equation (3): $\text{Grants}_{i,t-1}$, $\text{Pop}_{i,t-1}$, $\text{Pop}_{i,t-1}^2$, and $\text{Pop65}_{i,t-1}$. Equation (4): Grants_Mean_{it} , Pop_{it} , Pop_{it}^2 , and Pop65_{it} .

Table 2 Descriptive statistics

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Change in vote shares	2106	−3.74	11.63	−49.38	36.35
Share in votes in the previous election	2106	0.44	0.15	0.05	0.85
Growth in total grants relative to the previous year	2106	9.78	33.54	−100.00	539.00
Total grants	2106	347.48	323.36	0.00	3079.16
Total grants (term mean)	2106	318.01	251.42	48.95	1785.88
Mayor belongs to a government party	2106	0.43	0.50	0.00	1.00
Population (thousands)	2106	35.03	59.56	1.77	770.90
% Population over 65 years old	2106	18.34	6.07	5.59	42.02
Vote margin	2106	20.59	15.64	0.02	77.20
Growth in capital grants relative to the previous year	2105	16.76	65.62	−95.82	1158.20
Capital grants	2105	191.97	224.13	5.55	2791.43
Capital grants (term mean)	2105	171.32	145.65	19.74	1171.90
Growth in current grants relative to the previous year	2103	6.59	10.88	−86.66	148.60
Current grants	2103	155.83	122.48	0.03	972.32
Current grants (term mean)	2103	146.94	114.79	0.03	930.63
Change in employment—municipality	1654	5.48	16.47	−63.24	231.07
Change in average real wages—municipality	1654	3.13	5.11	−26.96	26.07
Change in income index—municipality	1100	−1.43	6.26	−50.00	60.76

Sources: DGAL, Expresso, IMF, INE, OECD, MTSS, Markttest, STAPE and municipal official accounts

Note: Grants are measured in euros per capita at 2000 prices

function. By choosing the weighting matrix in the criterion function appropriately, GMM can be made robust to heteroscedasticity, autocorrelation of unknown form, or both.¹⁶

The exogeneity of the explanatory variables included in vectors X and Y was tested using a difference-in-Hansen test for each variable. The difference-in-Hansen statistic is the difference between the Hansen J Statistic of the original model (which assumes that the variable in question is exogenous) and the Hansen J Statistic of the transformed model (which treats the variable as endogenous). The difference-in-Hansen statistic is distributed as chi-squared with degrees of freedom equal to the number of variables tested (one, in the present case). The results indicate that all explanatory variables except *Total Grants* (−1) are exogenous. Based on these results, we treat this variable as endogenous in all estimations reported in this paper.

¹⁶In the presence of heteroscedasticity, the GMM estimator brings efficiency gains relative to Three-Stage Least Squares (3SLS), an alternative method for estimating systems of simultaneous equations.

Table 3-A Pork barrel and votes (political outcome equation)

	1	2	3	4
	GMM	GMM	GMM 2S	GMM 2S
Equation (3): <i>Political outcome</i>				
(Dependent variable: <i>Change in vote shares</i>)				
Growth in total grants relative to the previous year	0.013 (4.67)***	0.014 (5.86)***	0.007 (2.28)**	0.008 (2.46)**
Total grants (term mean)	−0.0006 (−1.22)		−0.002 (−4.12)***	−0.002 (−6.02)***
Share in votes in the previous election	−0.088 (−8.76)***	−0.086 (−8.61)***	−0.075 (−7.16)***	−0.075 (−7.17)***
Mayor belongs to a government party (−1)	0.314 (1.80)*	0.298 (1.70)*	−0.029 (−0.16)	−0.021 (−0.11)
Vote margin in the previous election	0.020 (2.56)***	0.019 (2.46)**	0.021 (2.49)**	0.021 (2.54)**
Population	−0.004 (−2.08)**	−0.004 (−2.32)**	−0.014 (−5.56)***	−0.013 (−6.07)***
Population squared	0.000001 (1.51)	0.000001 (1.59)	0.00002 (4.76)***	0.00002 (4.78)***
% Population over 65 years old	0.009 (0.45)		−0.018 (−0.85)	
# Observations	2106	2106	2106	2106
Adjusted R ²	0.90	0.89	0.90	0.89
Hansen J Test (<i>p</i> -value)			0.89	0.97
Partial R ² of the First Stage			0.61	0.61
F-test of the First Stage (<i>p</i> -value)			0.00	0.00

Notes: Columns 1 and 2 show the results of GMM estimations of systems of simultaneous equations (using Eviews 6.0). Columns 3 and 4 show the results of single equation GMM two-stage estimations (using the *ivreg2* command for Stata 11). Models were estimated with municipal and election-year dummies. Robust *t*-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: *** 1%; ** 5%; and * 10%.

5 Empirical results

The systems of simultaneous equations were estimated using the Generalized Method of Moments (GMM) on a panel of 278 municipalities, over ten national legislative elections (1979, 1980, 1983, 1985, 1987, 1991, 1995, 1999, 2002, and 2005). Estimations were performed including both municipality and election-specific fixed effects. The results of the estimation of (3) are shown in Table 3-A, and those of (4) in Table 3-B. The number of observations and the adjusted R² of each equation are reported at the foot of each table. The *p*-value of the Hansen J Test for the validity of the over-identifying restrictions, of the entire system is reported at the foot of Table 3-B.

The results shown in Table 3-A provide strong evidence that increases in intergovernmental grants in election years improve political outcomes. According to the results of column 1, a one standard deviation increase in the growth of real total grants *per capita* increases the vote share of the government party by approximately 0.44 (= 0.013 * 33.54) percentage

Table 3-B Pork barrel and votes (pork barrel equation)

	1	2	3	4
	GMM	GMM	GMM 2S	GMM 2S
Equation (4): <i>Pork barrel</i>				
(Dependent variable: <i>Growth in total grants relative to the previous year</i>)				
Change in vote shares	-1.039 (-4.74)***	-1.128 (-6.00)***	-1.105 (-6.41)***	-1.085 (-6.94)***
Total grants (-1)	-0.017 (-2.62)***	-0.015 (-2.55)***	-0.010 (-2.29)**	-0.010 (-2.47)**
Share in votes in the previous election	14.549 (1.24)		-0.401 (-0.05)	
Mayor belongs to a government party (-1)	2.154 (1.31)	2.259 (1.67)*	2.881 (1.95)**	1.583 (1.36)
Vote margin in the previous election	-0.150 (-1.56)		-0.087 (-1.25)	
Population (-1)	-0.388 (-3.34)***	-0.298 (-3.42)***	-0.188 (-4.50)***	-0.191 (-4.58)***
Population squared (-1)	0.0005 (3.08)***	0.0003 (3.09)***	0.0002 (3.73)***	0.0002 (3.86)***
% Population over 65 years old (-1)	0.649 (3.05)***	0.508 (2.66)***	0.493 (2.70)***	0.458 (2.56)**
# Observations	2106	2106	2106	2106
Adjusted R ²	0.10	0.10	0.05	0.04
Hansen J Test (<i>p</i> -value)	0.66	0.58	0.46	0.47
Partial R ² of the First Stage			0.31	0.36
F-test of the First Stage (<i>p</i> -value)			0.00	0.00

Notes: Columns 1 and 2 show the results of GMM estimations of systems of simultaneous equations (using Eviews 6.0). Columns 3 and 4 show the results of single equation GMM two-stage estimations (using the *ivreg2* command for Stata 11). Models were estimated with municipal and election-year dummies. Robust *t*-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: *** 1%; ** 5%; and * 10%

points, which is not a negligible effect. Because there are many cases in which total grants more than double in the election year, the opportunistic manipulation of intergovernmental transfers could often determine the outcome of close elections.

The average level of grants received by a municipality over the government's complete term does not seem to influence electoral outcomes, suggesting that voters only reward increases in spending close to elections, not governmental spending over a full election cycle. As expected, governments lose more votes in municipalities where they had larger vote shares in previous elections. Party similarity between the mayor and the government is marginally statistically significant with a positive sign, contrary to our expectations. Since population is statistically significant, with a negative sign, while population squared is not significant, the share of votes received by the incumbent government diminishes as the population increases, suggesting a larger degree of political competition in more populous municipalities. Finally, the percentage of the population over 65 years old does not seem to affect votes.

The results for the determinants of pork barrel measures, shown in Table 3-B, reveal that in municipalities where the government expects its vote share to increase less, or to decrease more, (lower ΔVotes_{it}) benefit from larger increases in grants in election years. That is, grants are used strategically to win elections. A one standard deviation reduction in the vote share leads to an increase in total grants *per capita* of approximately 12 ($= -1.039 * 11.63$) percentage points.

We also find evidence that governments target municipalities where the population percentages of persons 65 years of age or older are relatively large (with lower education and voter awareness). There is a U-shaped statistical relationship between changes in grants and municipal population, with the turning point at about 388,000 inhabitants. The negatively sloped part of this relationship is due to financial constraints: it is costlier to increase grants *per capita* in more populous municipalities. The positively sloped part reveals that central governments assign more political importance to winning votes in Lisbon, the Portuguese capital, which is the only municipality consistently with more than 388,000 inhabitants. As expected, changes in grants depend negatively on the amount transferred in the pre-election year. Finally, percentage changes in grants do not seem to depend on the vote margin of the previous election,¹⁷ on whether the mayor belongs to a central government party or not, or on the vote margin in the previous election.

The results of a more parsimonious model are shown in column 2 of Tables 3-A and 3-B. This model excludes the explanatory variables that were not statistically significant in the estimation of column 1,¹⁸ and the empirical results are similar. The only difference is that party similarity between the mayor and the national government (the mayor's party heads the national government or is a member of the ruling coalition), is marginally statistically significant, with a positive sign, providing weak support for the hypothesis that governments target municipalities where they have stronger political support.¹⁹

To check the robustness of the results to a change in the estimation method, we also estimated the regressions, equation by equation, using two-stage instrumental variables estimation by GMM.²⁰ We started by testing the exogeneity of the variables included in vectors X and Y and, again, only *Total grants* (-1) was found to be endogenous in the pork barrel equation. Thus, we treated this variable as endogenous when estimating (4). Finally, orthogonality tests performed on the excluded instruments of each equation never rejected the null hypothesis.

The results of the estimation of the political outcome equation are shown in column 3 of Table 3-A. They provide additional support for the hypothesis that election-year increases in grants improve political outcomes. Results regarding the other explanatory variables are similar to those of column 1, except for mean total grants, which are now statistically significant, and party similarity with the national government, which is no longer significant. Although population squared is now statistically significant, the coefficient is very small, implying a turning point in the U-shaped relationship at 40 million people, which is four times the Portuguese total population. Thus, only the negative part of the relationship matters. The results of the more parsimonious model, presented in column 4, are essentially the

¹⁷A similar result is obtained when we use as a proxy for swing voters the standard deviation of the difference in the vote shares of the two main parties in the previous elections.

¹⁸Wald tests allow for the exclusion of those variables.

¹⁹The excluded instruments in the estimations of columns 2 and 4 of Tables 3-A and 3-B are as follows. Equation (3): $\text{Grants}_{i,t-1}$, $\text{Pop}_{i,t-1}$, $\text{Pop}_{i,t-1}^2$, and $\text{Pop}_{65i,t-1}$. Equation (4): $\text{Votes}_{i,t-1}$, $\text{VMargin}_{i,t-1}$, Pop_{it} and Pop_{it}^2 .

²⁰We used the Stata command *ivreg2* to produce two-step GMM estimation with robust standard errors.

same. The statistics reported at the foot of Table 3-A indicate that the instruments are valid, as the Hansen J Test does not reject the validity of the overidentifying restrictions, and that they have explanatory power (see the partial R^2 and the F-test of the first-stage regression).²¹

The results obtained by estimating single-equation, two-stage GMM models (see Table 3-B) are also consistent with those obtained when estimating the system of simultaneous equations, as the pattern of statistical significance and the signs of the coefficients are very similar to those of columns 1 and 2. Thus, there is additional support for the hypothesis that governments increase transfers to municipalities where they expect votes to increase less, or to decrease more. Again, the statistics reported at the foot of Table 3-B indicate that the instruments are valid and have explanatory power.

As noted above, we believe that it is more appropriate to estimate (3) and (4) simultaneously, in order to take into account the effects of pork barrel spending on votes, and the effects of expected votes on pork barrel spending. Thus, our main results are those of columns 1 and 2 of Tables 3-A and 3-B. Nevertheless, it is reassuring that the results obtained when estimating single-equation two-stage GMM are similar, providing additional support for our main hypothesis and indicating that results are robust.²²

The results of additional robustness tests are reported in Tables 4-A and 4-B. The specifications reported in these tables modify those of column 2 of Tables 3-A and 3-B by including additional explanatory variables. One drawback of adding these variables is that they shorten the sample period, as none is available since 1979.

Explanatory variables that account for local economic performance were included in the political outcome equation, in the estimations of columns 1 to 3: the annual change in employment in the municipality (column 1); the annual change in average real wages in the municipality (column 2); and the annual change in the income index of the municipality (column 3).²³ These variables were all lagged one year in order to avoid simultaneity problems. Since none of these variables turned out to be statistically significant, we cannot conclude that Portuguese voters attach great importance to local economic performance when rewarding or punishing incumbent governments in legislative elections.

All estimations reported above were run using real total grants *per capita*. It is interesting to check if similar results are obtained when considering only capital grants or current grants.²⁴ Since Veiga and Veiga (2007b) found empirical evidence of political business cycles in municipal capital expenditures, namely in investment expenditures highly visible to the electorate, but not in current expenditures, we anticipate that the strategic allocation

²¹These statistics concerning the first-stage regression are not available for the estimations of the system of simultaneous equations, whose results are reported in columns 1 and 2 of Tables 3-A and 3-B. Only the Hansen J Statistic for the entire system is available. The p -value of the Hansen J test is reported at the foot of Table 3-B.

²²We also estimated the system of simultaneous equations using Full Information Maximum Likelihood (FIML). The results obtained are similar to those of the GMM estimations of columns 1 and 2 of Tables 3-A and 3-B, and are not reported here in order to economize on space. They are available from the authors upon request.

²³Data on employment and real wages in each municipality, available since 1985, were taken from the *Quadros de Pessoal* database of the Portuguese Ministry for Labor and Social Solidarity (MTSS). The municipal income index, available only from 1992 onwards, was obtained in Marktest's *Sales Index* database. This index assumes a value of 100 for the national average. Additional municipal variables taken from the *Sales Index* database were used in the estimations, but never were statistically significant.

²⁴In order to take into account that the dates of legislative elections vary between February and December, we proceed for capital grants and current grants as for total grants. That is, for the elections of 1983, 2002, and 2005, that occurred in the first two quarters of the respective years, changes in grants refer to the year prior to the elections, while for the remaining elections they refer to the election year.

Table 4-A Robustness tests (political outcome equation)

	1	2	3	4	5
	GMM	GMM	GMM	GMM	GMM
	Total grants	Total grants	Total grants	Capital grants	Current grants
<i>Equation (3): Political outcome</i>					
<i>(Dependent variable: Change in vote shares)</i>					
Growth in grants relative to the previous year	0.046 (19.5)***	0.069 (28.4)***	0.037 (15.3)***	0.014 (4.39)***	0.065 (1.83)*
Share in votes in the previous election	-0.059 (-5.29)***	-0.057 (-4.95)***	-0.121 (-12.7)***	-0.216 (-11.9)***	-0.202 (-11.9)***
Mayor belongs to a government party (-1)	0.238 (1.21)	0.203 (0.98)	0.405 (2.17)**	0.978 (2.1)**	1.097 (2.47)**
Vote margin in the previous election	0.005 (0.60)	0.003 (0.44)	0.046 (5.77)***	0.066 (4.53)***	0.062 (4.47)***
Population	0.006 (2.84)***	0.008 (3.66)***	0.007 (2.71)**	-0.017 (-2.41)**	-0.023 (-3.12)***
Population squared	-0.000001 (-1.76)*	-0.00001 (-2.04)**	-0.00001 (-1.18)	0.00003 (2.03)**	0.00003 (2.63)***
Change in employment—municipality (-1)	0.008 (1.01)				
Change in average real wages—municipality (-1)		-0.016 (-0.82)			
Change in income index—municipality (-1)			0.001 (0.01)		
# Observations	1654	1654	1100	2105	2103
Adjusted R ²	0.89	0.87	0.81	0.34	0.34

Notes: Systems of simultaneous equations estimated with municipal and election-year dummies. Robust t-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: *** 1%; ** 5%; and * 10%

Table 4-B Robustness tests (pork barrel equation)

	1	2	3	4	5
	GMM	GMM	GMM	GMM	GMM
	Total grants	Total grants	Total grants	Capital grants	Current grants
<i>Equation (4): Pork barrel</i>					
<i>(Dependent variable: Growth in grants relative to the previous year)</i>					
Change in vote shares	-0.217 (-5.07)***	-0.228 (-5.34)***	-1.528 (-1.71)*	-1.181 (-1.18)***	-0.538 (-14.8)***
Grants (-1)	-0.012 (-2.00)**	-0.011 (-1.95)*	-0.028 (-3.51)***	-0.052 (-3.84)***	-0.026 (-7.03)***
Mayor belongs to a government party (-1)	1.529 (1.08)	1.549 (1.11)	1.621 (0.64)	1.624 (0.57)	0.507 (0.66)
Population (-1)	-0.236 (-2.38)**	-0.231 (-2.42)**	-0.732 (-4.48)***	-0.632 (-4.60)***	-0.204 (-5.98)***
Population squared (-1)	0.0003 (2.15)**	0.0003 (2.17)**	0.001 (4.25)***	0.0008 (4.46)***	0.0002 (4.91)***
% Population over 65 years old (-1)	0.304 (1.50)	0.342 (1.74)*	0.674 (2.33)**	0.915 (2.72)***	0.483 (5.03)***
# Observations	1654	1654	1100	2105	2103
Adjusted R ²	0.10	0.10	0.07	0.09	0.08
Hansen J Test (<i>p</i> -value)	0.25	0.20	0.27	0.39	0.28

Notes: Systems of simultaneous equations estimated with municipal and election-year dummies. Robust t-statistics are in parenthesis. Significance level at which the null hypothesis is rejected: *** 1%; ** 5%; and * 10%

of grants by the national government is more electorally salient for capital grants than for current grants.²⁵ The results obtained when considering capital grants only are reported in column 4 of Tables 4-A and 4-B. They are similar to those of column 2 of Tables 3-A and 3-B. Thus, we reach the same main conclusions when using capital grants instead of total grants. Nevertheless, it is notable that the growth in grants is only marginally statistically significant in the political outcome equation (column 5 in Table 4-A), indicating that there is only weak evidence that changes in current grants affect votes. It is also worth noting that, in the pork barrel equation (column 5 of Table 4-B) the estimated coefficient for the *Change in vote shares* is less than half of the absolute values of that obtained for capital grants. This indicates that governments use increases in capital grants to a much larger extent than current grants for electoral purposes.

These results are consistent with those of Veiga and Veiga (2007a), who show that the opportunistic election-year behavior of mayors pays off in terms of increased vote shares when spending consists of investment items such as overpasses, streets, rural roads, and other capital projects. Furthermore, they do not find evidence that increases in municipal current expenditures lead to larger vote shares. Thus, it is no surprise that there is only marginal evidence that governments gain votes by strategically manipulating transfers of current grants, but do profit from manipulating the transfers of capital grants.

Our results are also consistent with other contributions to the public choice literature (e.g., Shughart 2006 and Sobel and Leeson 2006) which find evidence that politicians tend to allocate funds to “visible” infrastructure projects rather than to “invisible” spending on repair and maintenance of existing public capital.

6 Conclusion

Several studies have demonstrated that intergovernmental grants tend to increase during election years. However, the determinants of the distribution of these pork barrel grants, as well as their political return, have received little attention. Elections provide a mechanism for citizens to express their preferences and to hold politicians accountable for economic conditions. However, in centralized countries like Portugal, democracy also creates political incentives for central governments to distribute more “pork” during electoral periods, particularly to jurisdictions where they are in greater danger of losing votes.

Using a sample of all Portuguese mainland municipalities, and covering ten elections (1979–2005), we find evidence that election year increases in intergovernmental grants pay off in terms of electoral support. We also find that the central government targets municipalities where it expects greater losses of votes. Therefore, a policy recommendation that can be extracted from our research is that it would be desirable to attribute more financial independence to local governments; that is, to adopt decentralization measures that reduce the degree of fiscal discretion of central governments to use transfers as a political tool to win elections.

A possible opportunity for future research would be to implement a strategy similar to that of Carlsen (1997). By calculating reelection probabilities it would be possible to more directly test whether increases in transfers are larger to municipalities where the incumbent’s reelection prospects are poor. Further research could also focus on other economic policy instruments and on other countries.

²⁵Veiga and Veiga (2007b) also show that larger capital transfers from the central government lead to increases in municipal capital expenditures of municipalities.

Acknowledgements The authors thank Henry Chappell and two anonymous referees for very useful comments, and the financial support provided by the European Regional Development Fund through the Operational Program Factors of Competitiveness—COMPETE and by national funds through the Portuguese Foundation for Science and Technology (FCT) under research grants PTCD/ECO/65711/2006 and PEst-C/EGE/UI3182/2011.

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