Machiavellian Taxation?
Political and economic determinants of public service financing

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Abstract:

In this paper, we develop a simple theoretical model in order to explain how politicians choose between progressive and regressive tax schemes that serve to afford some local service production costs. It consists of a bipartisan model in which each party's preferences are lexicographic, giving priority to winning but following ideological preferences given that it wins. Concerning voters, this model distinguishes for the first time in the literature between pragmatic majorities and social ones, and predicts what happens when both majorities have the same ideological sign and what happens when these majorities are in conflict. "Pragmatic" refers to local-specific considerations regarding general performance of the government while "social" makes reference to issues related to voters' wealth status and social class. While party's identity follows from pragmatic considerations, tax policies becomes a moderate equilibrium between ideological ruling party's preferences and social majority's ones. A tax policy would be extreme (either progressive or conservative) if and only if both social majority and pragmatic majority (ruling party) are of the same ideological sign. These predictions are successfully tested by Tobit regression through the use of a wide sample of municipalities concerning waste collection and treatment service-specific deficits.

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Machiavellian Taxation? The political economy of public service financing

1. Introduction

Nowadays, there is abundant economic literature concerning fiscal deficit policies at national, regional and local level, within the field of Political Economics. Important references on this field are Roubini and Sachs (1989), Persson and Svensson (1989), Edin and Ohlsson (1990), Alesina and Tabellini (1990), Tabellini and Alesina (1990), Alt and Lowry (1994), de Haan and Sturm (1997), Feld (2002), Galli and Padovano (2002) and Woo (2003).

In our paper, we deal with deficits that are service-specific, at the municipal level. These are not proper deficits as they are bindingly covered thru other revenues earned by the municipality. Hence, our issue concerns also the way in which public services are financed in a global zero-deficit budget, i.e. the types and shares of different taxes that are to be used. Political Economics applied to taxation is found in, among others, Norstrand (1980), Hettich and Winer (1984, 1988), Blackley and DeBoer (1987), Biegeleisen and Sjoquist (1988), Stine (1998) and Leroy and Haurin (2001). A particularly interesting paper is Hettich and Winer (1984), who postulate a political cost function depending on the share of each possible tax on total revenues. Politician set shares as to minimize political costs, in such a way that marginal costs coincide among the different shares. This idea is formally refined in Hettich and Winer (1988), including administrative costs and concluding that their approach is consistent with the evidence of some diversity in the types of taxable activities.

We take a similar approach, yet we analyze a particular local public service, and we hypothesize that political organizations do not only aim to win elections, but also to implement their ideologically preferred policies once having won. This is in line with recent literature (Dixit and Londregan, 1998; Ortuño, 2002) that put into doubt the classical paradigm that politician only aims maintaining (or reaching) power. From our point of view, an ideological identification thru differentiated proposals is also necessary to maintain cohesion within the political organization. Besides, ideological considerations could enter politician's individual utility function.

We find that the tax structure is the result of an equilibrium between pragmatic majorities (ruling party) and social majorities. Pragmatic majorities reflect preferences in favor of the person who is in office, while social majorities are more related to socio-economic variables such as wealth. When pragmatic majorities and social majorities coincide, governing party implements its (ideologically) most preferred tax structure. When there is not such a coincidence, politician favored by the former majority can fix a tax structure that, by being more moderate, permits him to maintain the place in office.

The paper is organized in few sections. The second one presents a straightforward theoretical model that allows us to make some hypothesis concerning the way public services are finances thru taxes. The third section empirically tests our predictions thru a sample of Spanish municipalities, concerning solid waste collection and treatment services in 2000. Section four concludes. A short appendix summarizing complementary information is included.

2. Theoretical framework

We start with a simple model for voter's utility regarding preferences over tax policies. A public service (for instance, solid waste collection) is to be provided[1] by the local government. Whole public goods production generates an extra utility of *g* to any of the *N* citizens (voters). The specific public service costs an amount of *C* to be produced.

The public good is to be financed by a specific poll tax. However, the local government is able to decide whether to incur in some deficit, that is, it can choose some parameter $\lambda \in [0,1]$, which represents the percentage of service-specific deficit in financing the public good by the specific poll tax. But this deficit cannot be maintained at a global level, i.e., the sum of local government current revenues should not be below the sum of all local government current expenditures.[2]

This means that service deficit λC must be financed by the rest of local government revenues. The specific poll tax is an amount $(1-\lambda)C/N$ for any citizen.[3] If a specific deficit rate λ is chosen, then the rest of local government returns must be increased in a proportional amount $\mu\sum_{i=1}^{N} t(w_i) \equiv \lambda C$. Here, $t(w_i)$ represents the payments that citizen *i* must afford through the general local government tax scheme to finance other local expenses apart form the ones derived from the service under study. These other expenditures sum up an amount of *K*, so by definition $\sum_{i=1}^{N} t(w_i) \equiv K$ and hence $\mu \equiv \lambda \frac{C}{K}$. We assume that the tax scheme function basically depends on w_i, which could be voter *i*'s wealth indicator (for instance, real estate value). We take for granted that this payment function is increasing (and thus more progressive than the specific poll tax), that $t(0)=0$ and that its progressiveness cannot be changed by the local government.[4]

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[1] For the purposes of our paper, it does not matter whether the service is produced in-house or by contracting out.

[2] It is the usual case in most countries that either central or regional governments impose hard restrictions on municipal government's scope for incurring in global cash-flow deficits.

[3] Talking about households instead of citizens (voters) would be more realistic, but it makes little difference about our conclusions.

[4] In many countries, local authorities are restricted to zero current deficit. Taxes must fund at least current expenditures, not taking into account investments. Besides, service-specific superavits are only allowed to finance service-specific investments. But municipalities are free to some extent in choosing what weight is given to any possible tax among a menu of different own-managed ones.

So what government does is choosing some weight $\lambda \in [0,1]$ between two alternative ways of financing the service. For instance, $\lambda = 0.4$ means that the service has a specific 40% deficit financed by incrementing the general tax revenue, while 60% of the cost is financed by the specific poll tax. We study then a model whose timing is as follows. First, a political party aiming access to office propose a policy λ_k to citizens, while ruling party implements its policy λ_l, which at once is ruling party's proposal for the future. Knowing that, citizens vote,[5] the winning party becomes the ruling party, and ruling party's proposed policy is implemented.

We establish a bipartisan model. We call *R* for the right-wing party, and *L* for the left-wing one. Both of them know how wealth is distributed among citizens, that is, they know its distribution function *F* (*F*(*x*) is the proportion of citizens whose wealth is equal to or lies below *x*). Parties have different utility functions, according to their different ideological preferences:

$$W_R = I\{P_R > 0.5\} \cdot (1 - \lambda_R)$$

$$W_L = I\{P_L > 0.5\} \cdot \lambda_L$$

Where *I* is an index function defined as usual. P_J is the percentage of votes that party *J* obtains in the election.[6] These functions indicate that the right-wing party is prone to a more regressive tax structure, while the left-wing party is averse to. Nevertheless, it is clear that the priority for both parties is to win the election, that is, to gain (or retain) the power. We are considering that parties have lexicographic preferences concerning electoral results and policy applied, giving priority to electoral results.

As we have explained, it is assumed that each party knows exactly the distribution function for wealth, and hence each one knows whether it will win or not with some tax policy proposal. This skips uncertainty about the median voter, which is studied, among others, in Ortuño (2002). However, Ortuño (2002) shares with us the fact that party's ideology is important though not necessarily crucial in determining party's behavior. We are aware that our approach departs from the mere political cost minimization postulated by Hettich and Winer (1984, 1988) and by Gill and Haurin (2001).

Additionally, notice that we are dealing with party member's utility instead of constituents. We consider that party members obtain positive utility only when that party wins the election. This

[5] We are aware that this is a single–issue model where the object of political competition is defined within the tax structure. Nonetheless, one-dimensional simplification is usual in political economics. We believe that the one-dimension approach here shows a decision-making method that is likely to be applied to other issues central for the political contest.

rides out some assumptions as the ones used in Persson and Svensson (1989). Their model predicts that a stubborn conservative politician who is sure of being losing next election would incur in deficits to constrain future government's deficit capacity. Other models as Tabellini and Alesina (1990) and Alesina and Tabellini (1990) consider similar results when parties likely alternate in government. In our case, and given the lexicographic utility function we postulate, a conservative politician incurs service-specific deficits in order to maintain the power in a left-wing-social-majority context. To our eyes, this seems a more rational behavior than surrendering to possible electoral adversity.

As a starting point, we can define the following voter's utility function:

$$U_i = u(w_i - (1+\mu)\cdot t(w_i) - (1-\lambda)\,{}^{C}\!/_{N}) + g =$$
$$= u(w_i - (1+\lambda\,{}^{C}\!/_{K})\cdot t(w_i) - (1-\lambda)\,{}^{C}\!/_{N}) + g$$

This is a function quite similar to the one with which Biais and Perotti (2002) start their seminal model on privatization as an instrument to reach and retain power. *u* is assumed as an increasing, concave, isoelastic function[7], such that $u(x) = \frac{x^{\sigma} - 1}{\sigma}$ [8]. Here, $0 < \sigma < 1$, in order to ensure concavity and monotonicity. Hence:

$$\frac{dU_i}{d\lambda} = u'(w_i - (1+\lambda\,{}^{C}\!/_{K})\cdot t(w_i) - (1-\lambda)\,{}^{C}\!/_{N})\cdot C\left[\frac{1}{N} - \frac{t(w_i)}{K}\right]$$

Define $\tilde{w} \equiv t^{-1}({}^{K}\!/_{N})$, and $\hat{w}$ as the median wealth (median voter's wealth, so that $F(\hat{w}) \equiv \frac{N+1}{2N}$ if we had an odd number of citizens). Any voter *i* with wealth $w_i > \tilde{w}$ would vote the minimum possible lambda, as the last derivative is always negative. The opposite happens when $w_i < \tilde{w}$. Therefore, it is clear that if $\hat{w} > \tilde{w}$ the unique policy proposal (implementation) that wins the election is $\lambda^* = 0$, while if $\hat{w} < \tilde{w}$, $\lambda^* = 1$ is the winning policy. This is a common solution that is found in the literature on median voter. The median voter votes for the tax structure that minimizes his tax burden, and the median voter determines the tax policy that wins the election (Blackley and DeBoer, 1987; Stine, 1998).

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[6] We do not take into account that voting is costly since we are not interested in voter turnout. Nonetheless, we are aware of the long tradition of assuming costly voting in the literature since Downs' (1957) work. See recent examples in Börgers (2004) and Coate and Conlin (2004).

[7] Isoelasticy only serves to simplify the way calculations are presented. It is not a necessary assumption.

[8] This functional form is commonly used in economic literature.

But such extreme solutions do not usually take place. Other matters have influence apart from these specific service-taxation considerations. We had assumed to this point that voter is only concerned on this service, that is, other issues do not give advantage for any party over the other. But, in fact, it usually happens that the ruling party has a mayor that has an advantage related to other factors. As pointed out by Groseclose [2001] most valence factors are associated with benefits conferred by incumbency. Among these benefits it is worth mentioning an established record of positions [Bernhardt and Ingberman, 1985], an established record of public services [Rogoff and Sibert, 1988; Cukierman, 1991] or better name recognition [Groseclose, 2001].

We shall impose thereafter that the left-wing party is currently governing, and that each voter has a preference for the left-wing party (we could have done the inverse, and the conclusions would be symmetrical). This preference is represented by an extra value $V_L>0$ attached to any voter's utility when the left-wing party candidate is the mayor. Assuming that this value is identical for every voter is quite strong[9], but this simplicity is good to see the point that we want to remark: *if the ruling party faces an electorate that tends to be prone to a tax policy different to the one most preferred by the party, then the resulting policy would be a moderate one.*

So we have slightly changed voter's utility function. The new one is

$$U_i = u(w_i - (1+\lambda C/K)\cdot t(w_i) - (1-\lambda)C/N) + g + I\{P_L > 0.5\}\cdot V_L \quad [10]$$

This incumbent left-wing party's advantage is enough to ensure that it will win the election. One can easily see that, if $\hat{w} < \tilde{w}$, then the left-wing party will undertake a *winning tax policy* $\lambda_L = 1$, however right-wing party does. This is because *at least* a $F(\tilde{w}) > 0.5$ proportion of citizens will vote the left-wing party for sure if it offers the most-progressive tax policy, and at the same time the left-wing party, given that it wins, prefers to implement the most-progressive policy.

What is interesting to see is what happens when the wealth distribution is such that $\hat{w} > \tilde{w}$. We will see that, in this "conservative" environment, the left-wing party still manages to win the election due to the candidate's advantage, but the tax policy becomes moderate.

First, we deduce right-wing party's best tax policy proposal strategy. This party gains citizen *i*'s vote if

[9] Nevertheless, it should be remarked that the model keeps its conclusions unchanged when this value is decreasing in the wealth level as long as it remains positive for the median voter.

[10] In some sense, V_L can be understood as a "tolerance" parameter that measures to which extent voters allow a left-wing government to depart from majority's preferences concerning the tax structure. The use of this tolerance parameter is frequent in tax-setting literature concerning the level of fiscal pressure (e.g. Solé-Ollé, 2003).

$$G \equiv u(w_i - (1+\lambda_R C/K)\cdot t(w_i) - (1-\lambda_R) C/N) -$$
$$- u(w_i - (1+\lambda_L C/K)\cdot t(w_i) - (1-\lambda_L) C/N) > V_L$$

Where each subscript *J* following any lambda indicates *J*'s tax policy proposal. We make use of the following lemma:

Lemma 1. *G is increasing in* $w_i > \tilde{w}$ under mild assumptions[11], namely:

1) $\frac{t(w_i)}{w_i} \leq \sigma \frac{K}{K+C}, \forall w_i$. Average tax rate may not be excessive compared to the curvature of the utility function, being this condition more relaxed as specific service becomes less important in cost terms.

2) $t''(w_i) \geq 0, \forall w_i$ (weak progressiveness).

Proof. See Appendix 1.

We have seen that under some conditions the difference between utilities derived from two different tax policies, the first being more conservative than the second, is increasing in w_i, as long as $w_i > \tilde{w}$. Why were we looking for that result? Because *it directly follows that if the right-wing party achieves median voter's vote, it will win the election* [12]. So, given some left-wing party proposal λ_L, define the following set:

$$A \equiv \left\{ \lambda \in [0,1] : u(\hat{w} - (1+\lambda \frac{C}{K}) \cdot t(\hat{w}) - (1-\lambda)\frac{C}{N}) - u(\hat{w} - (1+\lambda_L \frac{C}{K}) \cdot t(\hat{w}) - (1-\lambda_L)\frac{C}{N}) > V_L \right\},$$

which is the set of lambdas that make right-wing party win.

Notice that if A is not empty, then it is an interval $[0, \hat{\lambda})$, where $\hat{\lambda} < \lambda_L$, as a lambda greater than the left-wing party proposal will obtain a vote share just below $F(\tilde{w}) < 0.5$.

So, given right-wing party's utility function, for any λ_L that do not make A to be empty, right-wing party's best (weakly dominating) tax policy proposal is

$$\lambda_R^* = \min_{\lambda \in A} \lambda = 0$$

Thus, right-wing party will desperately search for richest people's vote. At this point, the left-wing party has to be concerned on its best response against this conservative proposal in a

[11] These are sufficient but not necessary conditions. Besides, these conditions are easily met at the local level, because the average tax rate over real state value, for instance, is quite low but the marginal tax rate is non-decreasing on this value.

[12] Notice that this conclusion holds even when we think of V_L as a variable negatively correlated to wealth level.

conservative ambient. So its best policy is the highest lambda that makes it win the election even when right-wing party proposal is a total poll tax. So define the following set:

$$B \equiv \left\{ \lambda \in [0,1] : u(\hat{w} - t(\hat{w}) - C/N) - u(\hat{w} - (1+\lambda C/K) \cdot t(\hat{w}) - (1-\lambda) C/N) < V_L \right\}$$

This set is not empty as a lambda equal to zero always wins the election. Let's assume that

$$u(\hat{w} - t(\hat{w}) - C/N) - u(\hat{w} - (1 + C/K) \cdot t(\hat{w})) \geq V_L$$

This simple assumption implies that the specific tax policy matters in the election. Then, B is the interval $[0, \lambda^*)$, where the top value meets

$$u(\hat{w} - t(\hat{w}) - C/N) - u(\hat{w} - (1+\lambda^* C/K) \cdot t(\hat{w}) - (1-\lambda^*) C/N) = V_L$$

Notice that this top value is increasing in V_L. Then the *left-wing party winning tax policy* will be

$$\lambda_L^* = \max_{\lambda \in B} \lambda = \lambda^* - \varepsilon < 1$$

Were epsilon is a very little positive number. So, we have seen that left-wing party candidate's popularity, reflecting a left-wing party's pragmatic majority, is sufficient for this party to win the election. Yet, if social majority tends to be right-oriented, as when wealth level is high for a sufficiently high number of citizens, left-wing party mayor will moderate his tax policy with respect to his most-preferred, higher, more progressive one.

One could argue that wealth considerations are pragmatic rather than social. We suggest the reader take the following approach: "pragmatic" refers to local-specific considerations regarding general performance of the government or valence advantage, while "social" refers to preferences linked to voters' social class. All this allows us to develop some preliminary hypotheses, which are to be tested in further sections:

Hypothesis A: Left-wing party in government tends to undertake, ceteris paribus, progressive tax policies, while a right-oriented mayor tends to impose a regressive tax structure.

Hypothesis B: If both pragmatic and social majorities favor the same political party, the ruling party will undertake its most-preferred tax policy in order to afford public service production costs.

Hypothesis C: If pragmatic considerations favor one party but social ones favor the other one, the resulting tax policy will be moderate with respect to ruling party's most-preferred one.

3. Empirical implementation

In order to assess our hypotheses, we have obtained data concerning the waste collection service from a sample of 186 Spanish municipalities. These data have been collected thru the Local Service Production Survey (LSPS from now on), which has been elaborated and conducted by the "Public Policy and Economic Regulation" Research Unit at the University of Barcelona. The LSPS refers to the year 2000 concerning solid waste collection and treatment services, which are municipal competences in Spain. It asks whether the waste collection service was privatized by that year in the municipality. It also asks for information on total municipality payments to a private firm plus monitoring costs in case of concession/delegation, or total cost in case of public production. It also asks on service-specific poll taxes collected. 16 municipalities from the sample did not give enough information concerning these questions, or on other public finance data required in our empirical analysis, so our sample was reduced to 170 municipalities for the purposes of this paper.

With all this information,[13] it has been possible to construct, estimate and test a simple econometric model in order to assess to which extent our hypotheses are right. We start from a Tobit likelihood equation:

$$
\begin{aligned}
&L(SSDEF_i \mid PREDERR_i, FINDIF_i, PROD_i, POL_i, SOC_i, CONTROL_i) = \\
&= \left[1 - F(1 - g(PREDERR_i, FINDIF_i, PROD_i, POL_i, SOC_i, CONTROL_i))\right]^{I\{SSDEF_i=1\}} \cdot \\
&\cdot f\left[SSDEF_i \mid g(PREDERR_i, FINDIF_i, PROD_i, POL_i, SOC_i, CONTROL_i)\right]^{I\{0<SSDEF_i<1\}} \cdot \\
&\cdot F\left[-g(PREDERR_i, FINDIF_i, PROD_i, POL_i, SOC_i, CONTROL_i)\right]^{I\{SSDEF_i=0\}}
\end{aligned}
$$

Here, F is the normal distribution function with zero mean variance σ^2 (to be estimated), f is the associated density function and g is an affine function whose parameters are to be estimated.

For each municipality i in 2000, this equation tries to explain the Service-Specific Deficit (*SSDEF*) as a function of variables regarding expenditure Prediction Errors (*PREDERR*), variables related to Financial Difficulties (*FINDIF*), the mode of Production (*PROD*), Political variables (*POL*) and Social variables (*SOC*). *CONTROL* defines Control Variables that help us obtain unbiased estimates.

SSDEF is measured as 1 minus the ratio between service-specific collected poll tax and total service cost. This is a value that, according to Spanish legislation, must lie between 0 and 1, as

[13] Other useful data have been obtained from the Catalonian Waste Treatment Agency, as the total number of tones collected both during the period under consideration and during the previous one in each municipality. From the Audit Commission of Catalonia, we have got data on municipalities' financial difficulties by that year, and on the nature of tax returns by the same period.. From the Spanish Statistical Institute (INE) and the Catalonia Statistical Institute (Idescat), data have been obtained on some important political (electoral results) and social variables.

specific-service tax returns should never be higher than service-specific production costs[14]. *PREDERR* is approached by a simple ratio between total solid waste collected in 2000 and total solid waste collected in 1999. This variable constitutes a proxy as it is assumed that prediction errors are positively correlated with the growth ratio of solid waste generation. The more service production grows, the more likely a politician would have errors in predicting service costs. *FINDIF* is approached via the Global Financial Burden Index (*GFBI*), which is the percentage of municipal debt expenses over current returns[15]. This index is a good indicator for municipal financial difficulties. It is presumed that higher difficulties may force the mayor to search for a lower service-specific deficit level. Variable *PROD* is expressed as a dummy that takes value 1 if the service was already privatized from the beginning of 2000 and 0 otherwise. It could be the case that the service-specific deficit level be lower in municipalities that have privatized the service, since they may have used this reform as a way to increase service-specific raised revenues.

Concerning political and social variables, which are the crucial ones in our study, we have developed some alternative approaches in trying to reflect the political and social context that the ruling mayor has to face when taking decisions concerning service funding. These approaches refer to a double dimension of the political context. One of them is the dilemma between whether the ideological identity of the ruling mayor matters or, on the contrary, social majority is what rules the service-specific deficit decision. The other one concerns the fact that the mayor could be conditioned by other parties when taking this kind of decisions, due to the fact that governing party may need to rule in coalition.

In order to address these different dimensions of the socio-political context, we have undertaken different estimations. In a first one, variables *MAY* (Mayor's ideology) and *MIN* (Minority) are used. *MAY* is a dummy variable that takes value 1 if the mayor is a member of a left-wing party or organization, and 0 otherwise. Following our Hypothesis A, this dummy should be positively correlated to the service-specific deficit degree. *MIN* is another dummy that takes value one if there is neither a party nor a stable coalition that achieves majority in the municipal council.

In a second approach, variables *MAY* and *RS* (the Roubini and Sachs index) are used. The Roubini and Sachs index is a discrete variable that takes value 0 if one party is governing the municipality with majority, 1 if two parties are needed form a coalition in order to rule the

[14] By this reasoning, all service-specific deficit levels that, after being calculated from reported responses to the LSPS, resulted in negative numbers have been considered as either measurement errors or policymaker's ones and therefore converted into zero values.

[15] Data for this variable refer to the year 1999, as the politician may react only to known variables. Data for 2000 becomes known only at the mid-end of 2001. At the same time, by choosing that year we skip some probable endogeneity problems induced by the *GFBI* variable.

municipality, 2 if three or more parties are needed to form a governing coalition and 3 if there is a minority government[16]. According to Roubini and Sachs (1989), the presence of many political parties in a governing coalition could be associated with a low ability to reduce deficits (Edin and Ohlsson, 1991). But Edin and Ohlsson find that the Roubini and Sachs effects could be better captured by a simple minority dummy. Edin and Ohlsson conclude that governing in minority is even harder than and needs as least as negotiation effort as governing in coalition[17]. That is the reason why we address the weakness of the governing party by means of two approaches, that is, the minority dummy and the *RS* variable, in order to compare both hypotheses.

In a third approach, we use variables *CON* (left-wing Constituency) and *MIN*. *CON* is a dummy that takes value 1 if the average proportion of votes in favor of left-wing parties, for the two Spanish national elections taken place in 1996 and 2000, is above 0.5. These elections are the ones surrounding 1999 local elections. This variable is conceived as a proxy to the social majority that is underlying mayor's policy possible choice set. It is commonly thought that national election vote is related to ideological, social class considerations. A simple regression of *CON* on local income per capita confirms this idea for our sample, and their results are shown in the Appendix. So, in contrast to the first approach, with this one we are trying to take a first assessment to Hypothesis C. It is expected that this variable is also going to be positively correlated to service-specific deficit levels. A fourth approach uses *CON* and *RS*.

A fifth approach combines *MAY* and *CON* variables, hence creating the following dummies: *LL* (Left-wing governing party – Left-wing social majority), *LR* (Left-wing governing party – Right-wing social majority), and *RL* (Right-wing governing party – Left-wing social majority). These dummies are easy to understand and may not be explained. We just make clear that we consider that there is a left-wing social majority whenever *CON* = 1. This model is much more complete and useful from our point of view, as it allows us to check all the hypotheses that were developed in the preceding section. According to them, one could expect the following inequalities:

Coefficient (*LL*) > Coefficient (*RL*) > Coefficient (*LR*) > 0

[16] Hence, value 3 in *RS* has the same meaning as value 1 in *MIN*.

[17] Feld's (2002) results show that the *RS* approach does not explain either government expenditure or government debt, while other studies as de Haan and Sturm (1997) find that neither the *RS* approach nor the *MIN* approach explain government debt at a cross-country level. In a recent and broad study, Ricciuti (2003) finds no substantial evidence in favor of the use of these variables. Galli and Padovano (2002), however, find evidence for Italy in favor of government fragmentation as a variable that influences deficit policies.

The middle inequality is even more restrictive than predictions strictly stemming from our hypotheses and might not be met[18]. In this fifth approach, *MIN* is used as the indicator of political weakness. Finally, in a sixth and last approach, variables *LL*, *LR*, *RL* and *RS* are used.

In all the combinations we have tried, we have controlled for the general progressiveness of the municipal tax structure. By doing so, we avoid a bias risk that stems from the fact that service-specific deficit could be higher simply because the tax structure of the municipality is generally less based on poll taxes. Our Progressive Structure Index (*PSI*) is calculated as the percentage of direct taxation returns with respect to the total of tax returns, comparing finally collected taxes[19].

The different models we estimate are characterized by the following affine functions *g*:

$$g_i = \alpha_0 + \alpha_1 PREDERR_i + \alpha_2 GFBI_i + \alpha_3 PROD_i + \alpha_4 MAY_i + \alpha_5 MIN_i + \alpha_6 PSI_i \quad (1)$$

$$g_i = \beta_0 + \beta_1 PREDERR_i + \beta_2 GFBI_i + \beta_3 PROD_i + \beta_4 MAY_i + \beta_5 RS_i + \beta_6 PSI_i \quad (2)$$

$$g_i = \gamma_0 + \gamma_1 PREDERR_i + \gamma_2 GFBI_i + \gamma_3 PROD_i + \gamma_4 CON_i + \gamma_5 MIN_i + \gamma_6 PSI_i \quad (3)$$

$$g_i = \delta_0 + \delta_1 PREDERR_i + \delta_2 GFBI_i + \delta_3 PROD_i + \delta_4 CON_i + \delta_5 RS_i + \delta_6 PSI_i \quad (4)$$

$$g_i = \varphi_0 + \varphi_1 PREDERR_i + \varphi_2 GFBI_i + \varphi_3 PROD_i + \\ + \varphi_4 LL_i + \varphi_5 LR_i + \varphi_6 RL_i + \varphi_7 MIN_i + \varphi_8 PSI_i \quad (5)$$

$$g_i = \phi_0 + \phi_1 PREDERR_i + \phi_2 GFBI_i + \phi_3 PROD_i + \\ + \phi_4 LL_i + \phi_5 LR_i + \phi_6 RL_i + \phi_7 RS_i + \phi_8 PSI_i \quad (6)$$

These different models are estimated by TOBIT estimation procedure, using Stata statistical software. Results for the whole sample are shown in table 1. Likelihood Ratio Stability Tests are conducted for each equation. These tests are justified by the fact that political decisions concerning service-specific deficits are motivated by different factors depending on the municipality size. In small municipalities, decisions could be related to personal rather than ideological motivations. Service-specific deficits are presumably most explained by cost prediction errors in low-populated municipalities than in high-populated ones. In the latter municipalities, social and political factors could have much more influence on mayor's decisions. Besides, variable *PREDERR* could perform well for low-populated municipalities, with less skilled bureaucrats on average and hence more simple prediction mechanisms, while high-populated municipalities have more complex prediction

[18] Strictu sensu, Hypothesis C justifies a double prediction: coef(*LL*)>coef(*LR*) and coef(*RL*)>0. By Hypothesis B, we can also predict coef(*LL*)>>0. By Hypothesis A, coef(*LL*)>coef(*RL*) and coef(*LR*)>0.

[19] We tried the same estimations with budgeted data, and results are almost identical. We can report them upon reader's request.

formulas non-reflected by our proxy variable. The possible population breakpoint is approximated by 5,000 inhabitants.

Table 1: Factors explaining service-specific deficit level. Whole sample.

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
PREDERR	0.2708 (1.39)	0.2778 (1.43)	0.2839* (1.86)	0.2959* (1.93)	0.2293 (1.53)	0.2390 (1.59)
GFBI	0.0007 (0.15)	0.0010 (0.22)	-0.0007 (-0.19)	-0.0009 (-0.25)	-0.0006 (-0.17)	-0.0007 (-0.21)
PROD	-0.0929 (-1.59)	-0.0936 (-1.61)	-0.1079** (-2.35)	-0.1125** (-2.44)	-0.0987** (-2.20)	-0.1024** (-2.28)
MAY	0.1737*** (3.89)	0.1790*** (4.00)				
CON			0.4091*** (10.11)	0.4086*** (10.03)		
LL					0.4756*** (10.08)	0.4766*** (10.06)
LR					0.0515 (1.32)	0.0533 (1.34)
RL					0.2719*** (3.38)	0.2690*** (3.32)
MIN	0.0050 (0.05)		0.1037 (1.45)		0.0844 (1.20)	
RS		-0.0163 (-0.68)		0.0167 (0.90)		0.0122 (0.66)
PSI	0.0056*** (2.80)	.0056*** (2.79)	0.0035** (2.18)	0.0034** (2.13)	0.0024 (1.54)	0.0024 (1.49)
Constant	-0.5381** (-2.09)	-0.5375** (-2.09)	-0.3982* (-1.96)	-0.4069** (-2.00)	-0.3109 (-1.54)	-0.3171 (-1.56)
LR test full model	27.92+++	28.39+++	93.44+++	92.16+++	100.70+++	99.71+++
Pseudo R^2	0.2069	0.2104	0.6924	0.6829	0.7462	0.7388
N	170	170	170	170	170	170
Stability Test	17.84++	20.06+++	14.01+	13.54+	13.09	13.64
coef(*LL*)-coef(*RL*)					0.2038** (2.37)	0.2076** (2.41)
coef(*LL*)-coef(*LR*)					0.4241*** (8.85)	0.4232*** (8.71)
coef(*RL*)-coef(*LR*)					0.2203*** (2.74)	0.2156*** (2.68)

Notes: *** significant at 1% level, ** at 5%, * at 10%.
+++ null hypothesis rejected at 1% level, ++ at 5%, + at 10%.
In parenthesis, t-statistic values (null hypothesis: value equal to zero).
The sample has 45 left-censored observations and 3 right-censored ones.

Table 2: Factors explaining service-specific deficit level. >5,000 inhabitants.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PREDERR	-0.4469	-0.4444	-0.2363	-0.2442	-0.3404	-0.3576
	(-1.22)	(-1.22)	(-0.87)	(-0.88)	(-1.25)	(-1.30)
GFBI	-.0019	-0.0015	0.0002	-0.0001	0.0003	0.0001
	(-0.27)	(-0.22)	(0.04)	(-0.02)	(0.07)	(0.07)
PROD	-0.0609	-0.0446	-0.0349	-0.0459	-0.0212	-0.0265
	(-0.53)	(-0.39)	(-0.40)	(-0.52)	(-0.25)	(-0.31)
MAY	0.2348***	0.2389***				
	(3.42)	(3.54)				
CON			0.4256***	0.4204***		
			(8.93)	(8.61)		
LL					0.4984***	0.5025***
					(8.23)	(8.22)
LR					0.0860	0.0991*
					(1.44)	(1.66)
RL					0.3531***	0.3448***
					(3.47)	(3.35)
MIN	-0.0477		0.1342		0.0959	
	(-0.39)		(1.50)		(1.06)	
RS		-0.0473		0.0071		-0.0005
		(-1.48)		(0.29)		(-0.02)
PSI	0.0034	0.0031	0.0047*	0.0042*	0.0029	0.0023
	(0.99)	(0.92)	(1.90)	(1.67)	(1.05)	(0.84)
Constant	0.3920	0.4223	0.0195	0.0814	0.1926	0.2575
	(0.77)	(0.85)	(0.05)	(0.22)	(0.51)	(0.68)
LR test full model	16.71++	18.75+++	63.79+++	61.69+++	67.57+++	66.47+++
Pseudo R^2	0.2064	0.2316	0.7880	0.7621	0.8348	0.8211
N	95	95	95	95	95	95
coef(*LL*)-coef(*RL*)					0.1451	0.1577
					(1.38)	(1.48)
coef(*LL*)-coef(*LR*)					0.4124***	0.4034***
					(7.20)	(6.94)
coef(*RL*)-coef(*LR*)					0.2672***	0.2457**
					(2.63)	(2.41)

Notes: *** significant at 1% level, ** at 5%, * at 10%.
+++ null hypothesis rejected at 1% level, ++ at 5%, + at 10%.
In parenthesis, t-statistic values (null hypothesis: value equal to zero).
The sample has 18 left-censored observations and 2 right-censored ones.

Estimations perform quite well for models 5 and 6 since the pseudo R^2 lies above 0.70 in the respective tables. They also perform well for equations 3 and 4, with pseudo R^2 lying slightly below 0.70. Performance is definitely worse for equations 1 and 2, with pseudo R^2 around 0.20. These results suggest that service-specific deficit level decision depends more on social majorities than on mayor's declared ideology. They also suggest that a combination of mayor's party and social majorities is what explains deficit decision best.

Table 3: Factors explaining service-specific deficit level. <5,000 inhabitants.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PREDERR	0.3611**	0.3620**	0.4245***	0.4329***	0.3854**	0.3745**
	(2.17)	(2.21)	(2.68)	(2.78)	(2.35)	(2.31)
GFBI	-.0052	-0.0054	-0.0041	-0.0044	-0.0039	-0.0042
	(-1.11)	(-1.16)	(-0.95)	(-1.02)	(-0.91)	(-0.99)
PROD	-0.1282**	-0.1246**	-0.1252***	-0.1202**	-0.1232***	-0.1166**
	(-2.62)	(-2.54)	(-2.72)	(-2.61)	(-2.74)	(-2.58)
MAY	0.0661	0.0598				
	(1.48)	(1.29)				
CON			0.2519***	0.2520***		
			(3.08)	(3.09)		
LL					0.3395***	0.3451***
					(3.43)	(3.48)
LR					0.0371	0.0221
					(0.85)	(0.48)
RL					0.1250	0.0935
					(0.90)	(0.65)
MIN	0.0156		0.0417		0.0346	
	(0.14)		(0.41)		(0.35)	
RS		0.0152		0.0246		0.0271
		(0.56)		(1.01)		(1.03)
PSI	0.0019	0.0019	0.0010	0.0010	0.0012	0.0011
	(1.04)	(1.01)	(0.58)	(0.57)	(0.69)	(0.62)
Constant	-0.3530	-0.3556	-0.3676*	-0.3869*	-0.3521	-0.3411
	(-1.53)	(-1.56)	(-1.71)	(-1.82)	(-1.57)	(-1.55)
LR test full model	15.95++	16.25++	22.64+++	23.49+++	25.16+++	26.12+++
Pseudo R^2	0.5406	0.5507	0.7673	0.7961	0.8528	0.8855
N	75	75	75	75	75	75
coef(*LL*)-coef(*RL*)					0.2146	0.2516
					(1.30)	(1.47)
coef(*LL*)-coef(*LR*)					0.3025***	0.3230***
					(2.98)	(3.12)
coef(*RL*)-coef(*LR*)					0.0879	0.0714
					(0.64)	(0.51)

Notes: *** significant at 1% level, ** at 5%, * at 10%.
+++ null hypothesis rejected at 1% level, ++ at 5%, + at 10%.
In parenthesis, t-statistic values (null hypothesis: value equal to zero).
The sample has 27 left-censored observations and 1 right-censored one.

The stability tests do not leave us with a clear conclusion. While models 1 and 2 are obviously unstable, in models 3 and 4 the stability hypothesis is rejected only at the 10% significance level, while in models 5 and 6 this hypothesis is not even rejected (although the resulting test is not very conclusive). Sub-sample estimations are just in case reported in tables 2 and 3.

Consequently, regarding the whole sample, it is worth it to comment on results of models 5 and 6 only, which in turn are the ones with more explanatory power. The positive effect of *PREDERR* is not significant at the 10% level. As we see further, this effect is only (and highly) significant for

small municipalities. Financial difficulties have no effect on the service-specific deficit[20]. This make some sense, since funding shortcomings tend to induce an increasing effort in raising returns rather than in redistributing the source of these returns. The minority effects are not significant at all however the way they are measured, suggesting that they may be more important when deciding global deficit than when deciding service-specific one. The control variable regarding the general progressiveness of the tax structure has a non-significant effect at the 10% level.[21]

There is a control variable that performs quite well, though. Evidence shows that waste collection service privatization has had a significant, negative effect on service-specific deficit. Ceteris paribus, privatization reduces this deficit in a 10 per cent. This suggests that policymakers have used privatization as a means to reduce the political cost of increasing service-specific taxes.

We proceed to comment on the effects of sociopolitical variables. Since *RL* has a highly significant, positive coefficient, and since the difference between the coefficients of *LL* and *LR* is positive and again highly significant, Hypothesis C appears correct. Social majorities moderate mayor policies, when mayor's ideology and social majority disagree. Hypothesis B is also clearly confirmed: when mayor's ideology and social majority coincide, the policy tend to be extreme. Nonetheless, only weak evidence supports Hypothesis A, which a priori could have sounded as the most evident. While the difference in coefficients between *LL* and *RL* is positive and significant, the *LR* coefficient, although positive, is not significant at the 10% level. Mayor ideological discretion is more evident in municipalities with left-wing social majorities.

The main source of municipality-size-related instability is clearly the Prediction Error variable. While its attached coefficient is positive and significant in any model for the small-municipalities sub-sample, its sign is negative and not significant for the big-municipalities sub-sample. The result observed for the big-municipalities sample should not be very astonishing. It is explained, on the one hand, by the fact that largely populated municipalities have high-skilled bureaucrats that could use prediction mechanisms much more sophisticated than the simple one-lag system. Therefore, our prediction error variable does not perfectly approach real prediction error in the big-municipalities sub-sample, so that the attached coefficient is meaningless to some extent. Low-populated municipalities with low-skilled bureaucrats use simple prediction mechanisms and hence our prediction error variable performs much better on the respective sub-sample.

[20] We tried some estimations without variable *GFBI*, and results remained unchanged. These are available upon request.

[21] Nevertheless, the control variable effect is significant in models 1 to 4, and the non-significance in models 5 and 6 is not undoubtedly clear. To our point of view, this justifies the use of this variable as a control that make us sure we are not biasing our results.

Another source of discrepancy between effects on big municipalities and effects on small municipalities is the privatization of the service. While the mode of production has systematically no effect on big municipalities' service-specific deficit, it already has an important and significant effect on the deficit in small municipalities. Then, notwithstanding the general explanation for the positive effect of this variable, privatization can additionally be thought as a way to avoid the consequences of recurrent cost prediction errors in small municipalities.

It is also seen that variables *MIN* and *RS* fail in explaining service-specific deficit levels in any sub-sample. Neither Roubini and Sachs (1999) nor Edin and Ohlsson (1991) predictions are met in our study. A reason for this finding could be that we are not studying proper deficit decisions but the way in which a specific service is funded. Also, it could simply be that Haan and Sturm (1997) critique against both approaches is right.

We turn attention to the crucial variables in our study, and we see that our hypotheses work quite well. We first see that sociopolitical variables are much more important in big municipalities than in small ones. As an example, in models 1 and 2, we see that a left-wing mayor is prone to higher service-specific deficit levels than a right-wing one, but this effect is only significant for big municipalities. This gives only weak support to Hypothesis A. The left-wing-mayor effect lies between 6% and 24%, being lower in small municipalities. In equations 3 and 4, we see that a higher proportion of left-wing vote in national elections (left-wing social majority) is connected to higher service-specific deficit levels, at a 1% level in any estimation, and regardless the municipality size. The effect is lower in small municipalities, around 25%.. It is more pronounced in big municipalities, roughly above 42%.

In models 5 and 6, differences between coefficients are in many cases more intense in the big-municipalities sub-sample than in the small-municipalities one. We can observe the following facts:

1) It is clear, for any sub-sample, that the *LL* coefficient is significantly positive, at the 1% level. Service-specific deficit level is between 34% and 50% higher (in absolute terms) in municipalities with left-wing mayor and left-wing social majority than in municipalities with right-wing mayor and right-wing social majority. This gives support to Hypothesis B. Although a 100% absolute gap was theoretically predicted, empirical data shows that our model partially suits with the fact that the deficit gap between these two types of municipality is huge.

2) The *RL* coefficient is positive and significant in the big-municipalities sub-sample, while it is not so in the small-municipalities sub-sample. Nevertheless, it should be noted that there is only one observation in the latter sub-sample that takes value 1 for this dummy,

so that coefficient estimation in this case comes difficult to be evaluated. Thus there is some support to the idea, reflected in Hypothesis C, that social majority matters on the policy design even when it does not coincide with mayor's political sign. Right-wing mayors adopt more left-wing funding schemes when they face a left-wing social majority.

3) There is a positive difference between the *RL* coefficient and the *LR* one. This difference is significant in the big-municipalities sub-sample but not in the small-municipalities sub-sample. Once again, the latter result is not conclusive as the *RL* variable does not vary enough in the latter sub-sample. We have then a new partial evidence in favor of the idea that social majority is even more important than mayor's ideological positioning when designing policies concerning public service funding.

4) There is a positive difference between the *LL* coefficient ant the *LR* one. This difference is significant at the 1% level in any of the estimations, and quite similar in any of them, lying between 30% and 41%. This constitutes heavy support to our Hypothesis C.

5) There is a positive difference between the *LL* coefficient and the *RL* one. This difference is nevertheless non-significant in any sub-sample estimation (recall the problems with the *RL* coefficient in this sub-sample). Also, the *LR* coefficient is positive, although with scarce signification (only one estimation gives a 10% signification). This evidence does not run in favor of the idea that ceteris paribus a left-wing government tends to a more left-wing finance scheme, that is, Hypothesis A.

What we have observed in models 5 and 6 supports our previous hypotheses, though some evidence should be taken cautiously. First of all, the full sample estimation passes the stability test, though maybe not convincingly enough. Secondly, sometimes the dummies generated have scarce variability, so that coefficients obtained are not as precise as desired. Nevertheless, hypotheses that were not undoubtedly supported in these equations have been strongly checked in equations 1 to 4, which provide the evidence that is not heavily found in the last equations. All equations estimated are then useful to conclude in favor of the ideas that are defended in our study. Notwithstanding this conclusion, we have noticed that our hypotheses perform better in big municipalities than in small ones. This may be certainly due to the fact that small government structures follow a more personal relationship with the community, hence making ideological differences smooth among the different political organizations competing for a place in office.

4. Conclusions

In this paper, we have developed a simple theoretical model in order to explain how politicians choose between progressive and regressive tax schemes that serve to afford local service

production costs. It is a bipartisan model in which party's preferences are lexicographic, giving priority to winning but following ideological preferences given that it wins. Concerning voters, this model distinguishes between pragmatic majorities and social ones, and predicts what happens when both majorities have the same ideological sign and what happens when these majorities are in conflict. Ruling party's identity follows from pragmatic considerations, but tax policy becomes a moderate equilibrium between ideological ruling party's preferences and social majority's ones.

This model is tested thru a wide sample of Spanish municipalities, concerning waste collection and treatment funding schemes. A service-specific deficit level, constructed from the difference between service costs and service-specific poll tax revenues, which is funded by the use of the general, more progressive municipal tax scheme, is regressed over explanatory variables including variables reflecting pragmatic and social majorities. We use the Tobit procedure. Our empirical estimation arrives to particular conclusions for very small municipalities, given that policymakers in that case follow personal more than either ideological or pragmatic motivations when setting the funding scheme. This is also due to the fact that small municipalities' service-specific deficits respond more to prediction errors and difficulties to control for public accounts.

For the whole sample and above all for big municipalities, our estimations perform quite well regarding our hypotheses. There is a clear difference between the funding schemes of a left-wing-pragmatic-majority, left-wing-social-majority municipality and a right-wing-pragmatic-majority, right-wing-social-majority one. Nevertheless, divergence between pragmatic majorities and social majorities tends to moderate service funding policies. The result is an equilibrium between social majority's preferences and political party's ones.

By means of a simple model incorporating both private interests and ideology in parties' utility functions, we have devised an alternative tool that contributes to explain why sometimes tax policies become more moderate than what a simple median voter model could predict. We are aware that there are other approaches that also could explain part of this phenomenon. One of them refers to the uncertainty about median voter's preferences. Another one explains tax scheme diversity thru a tax policy political cost minimization problem. Further research will try to combine different assumptions in order to develop and test a more integrated model.

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Appendix 1

Proof of Lemma 1. Differentiate *G* with respect to the wealth level, to obtain the condition:

$$\frac{\partial G}{\partial w_i} = u'(w_i - (1+\lambda_R \,C\!/_K)\cdot t(w_i) - (1-\lambda_R)\,C\!/_N)\cdot(1-(1+\lambda_R \,C\!/_K)\cdot t'(w_i)) -$$
$$-u'(w_i - (1+\lambda_L \,C\!/_K)\cdot t(w_i) - (1-\lambda_L)\,C\!/_N)\cdot(1-(1+\lambda_L \,C\!/_K)\cdot t'(w_i)) \geq 0$$

Given that $\lambda_R \leq \lambda_L$ (otherwise the right-wing party never wins, as we shall see below), this is met if (sufficient condition) the first derivative of

$$g(\lambda) \equiv u'(w_i - (1+\lambda \,C\!/_K)\cdot t(w_i) - (1-\lambda)\,C\!/_N)\cdot(1-(1+\lambda \,C\!/_K)\cdot t'(w_i))$$

is non-positive. That is:

$$-\frac{u''(w_i - (1+\lambda \,C\!/_K)\cdot t(w_i) - (1-\lambda)\,C\!/_N)}{u'(w_i - (1+\lambda \,C\!/_K)\cdot t(w_i) - (1-\lambda)\,C\!/_N)} \leq \frac{t'(w_i)}{\left[1-(1+\lambda C/K)\cdot t'(w_i)\right]\cdot\left[t(w_i) - K/N\right]}$$

By the definition of *u*, $-\frac{u''(x)}{u'(x)} = \frac{1-\sigma}{x}$, so we have

$$1-\sigma \leq (w_i - (1+\lambda \,C\!/_K)\cdot t(w_i) - (1-\lambda)\,C\!/_N)\frac{t'(w_i)}{\left[1-(1+\lambda C/K)\cdot t'(w_i)\right]\cdot\left[t(w_i) - K/N\right]}$$

As $w_i(1-(1+\frac{C}{K})\cdot t(w_i)\!/_{w_i}) = w_i - (1+\frac{C}{K})\cdot t(w_i) \leq w_i - (1+\lambda\frac{C}{K})\cdot t(w_i) - (1-\lambda)\frac{C}{N}$ for any $w_i > \tilde{w}$, as $1 \geq 1-(1+\lambda C/K)\cdot t'(w_i), \forall w_i$, and as *C/N* is positive, the right-hand side of this inequality is higher than

$$\left(1-(1+C/K)\frac{t(w_i)}{w_i}\right)\cdot\frac{t'(w_i)}{t(w_i)}w_i$$

(Weak) tax progressiveness (condition 2) implies $t'(w_i)\cdot w_i \geq t(w_i)$, so it is newly sufficient to have $1-\sigma \leq 1-(1+C/K)\frac{t(w_i)}{w_i}$, but this is equivalent to condition 1. **QED**

Appendix 2:
Relation between national election vote and individual wealth considerations.

To support the idea that national election vote is related to individual wealth, we have regressed the average proportion of leftist vote in the 1996 and 2000 national elections on per capita income. As exact data on local income per capita is not available, we have used estimated per capita income index (*PCII*) that is elaborated by "La Caixa" financial institution, referring to year 2000. This index lies in a range from 0 thru 10, where 10 is the maximum level of (estimated) local income per capita. Results are shown in table A-1.

Table A-1: Relation between left-wing constituency and income per capita.

	Explained variable: %Leftist Vote
PCII	-0.0335927 (-5.86)***
Constant	0.7056736 (15.72)***
F	34.36+++
R-squared	0.1657
Adjusted R-squared	0.1609
N	175

Notes: *** significant at 1% level, ** at 5%, * at 10%.
+++ null hypothesis rejected at 1% level, ++ at 5%, + at 10%.
In brackets, t-statistic values (null hypothesis: value equal to zero).

There is a clear negative relation between national election vote and individual income, as it is seen in the results of the estimation. Besides, we are to empirically prove that this relation is stronger at a national election level than at a local election one, which is a critical issue of our paper. To do so, we estimate probit models relating governing party's ideological identity and social majorities with the income per capita index. Results are shown in table 5.

Table A-2: A comparison of the influence of per capita income on national and local election vote.

	Explained dummy: Left-wing mayor	**Explained dummy: Left-wing majority (>50% votes) in national election.**
PCII	-0.2025349 (-2.32)**	-0.6692689 (-4.92)***
Constant	1.666457 (2.44)**	4.259356 (4.29)***
F	5.45++	32.48+++
Log likelihood	-118.09257	-79.028506
Pseudo R-squared	0.0226	0.1705
N	175	175

Notes: *** significant at 1% level, ** at 5%, * at 10%.
+++ null hypothesis rejected at 1% level, ++ at 5%, + at 10%.
In brackets, z-statistic values (null hypothesis: value equal to zero).

It is readily seen that the relation between income per capita and mayor's ideological identity is much weaker than the one between income and social majority (national election vote). For instance, the log likelihood and the Pseudo R-squared are much higher in the latter model.