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**An empirical application of the median voter model and of the interest group
influence model to the Portuguese and Galician municipalities**

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ABSTRACT:

In this paper the median voter hypothesis is revisited. Some weaknesses in its assumptions are discussed as well as some criticisms that have been made to the median voter model. It is argued that a more realistic comprehension of public choice might be achieved with the opening of the median voter model to the interest group influence hypothesis. A non-nested specification that combines the two models (MCOM) is estimated and its results are compared to the median voter model (MVM) and to the interest group influence model (IGM) results. The empirical analysis is developed for the Portuguese and the Galician municipalities. In addition, I tested the hypothesis of the relative political power of the median voter and of interest groups to vary with the dimension of the population of the municipalities. Finally, I analyse the existence of institutional and political differences between the two territories and their effects on the results. Fiscal illusion is compared for Portugal and Galicia.

1 – Introduction

The intervention of the public sector in the economic activity and the understanding of public decisions have been the object of many studies in Public Choice literature. These studies join the economic analysis to the analysis of the behaviour of political institutions in order to learn about the rationality of public choice.

The hypothesis of the median voter and the hypothesis of interest group influence are two approaches related to the demand side of the political market. So, I assume that, on the supply side, politicians and institutions are passive in the public choice process. They look for re-election and do not act with any other aim than the response to median voter or interest groups' demand. However, ideology is not out of my analysis, in the sense that politicians "feel" the demand of "ideological voters" (which can be represented by "ideological interest groups"), but not in the sense that politicians follow their own ideological purposes.

I empirically tested the MVM, the IGM and a combined form (MCOM) for local governments in Portugal and Galicia. Local public choice is represented by "per capita" current municipal expenditures.

Another feature of this work is the definition of two additional hypotheses:

a) Are interest groups more successful with their activities of lobbying when the municipalities are larger (in terms of population)? Theory and some empirical results indicate that it should be so. The larger the population, the lower the probability of a single voter affecting public decisions (Downs, 1957). In larger municipalities there are higher costs for the organisation of the majority (Olson, 1965; Meltzer and Richard, 1981). Murrell (1984) indicates that in large municipalities there are better conditions for the organisation of homogeneous interest groups to exert pressure on local governments. Romer, Rosenthal and Munley (1992) point that voters are more influential in small municipalities. In large municipalities it is easier to interest groups to be successful with their pressure activities without the perception of the majority.

b) Does the institutional shape of a political system influence the political power of the median voter and interest groups? I compared the results of the competing models for two countries (Portugal and Spain). In Spain there is an intermediate government between municipal governments and the central government (government of Autonomous Community); in Portugal this is not so. I expected that in the municipalities of Galicia (Autonomous Community of Spain) local interest groups would not exert so much pressure on the municipal governments as they do in Portuguese municipalities, because they can concentrate their efforts on the higher level government, whose action is closed related with the actuation of municipal governments (Hoyt and Toma, 1989, 1993).

2 – Median voter and interest group hypotheses

Bowen (1943), Downs (1957), Black (1958), Borcharding and Deacon (1972), Bergstrom and Goodman (1973), and Pommerehne and Schneider (1978) are some important references in respect to the formulation and application of the median voter model (MVM). The institutional basis of this model is democracy (direct or representative) under the simple majority rule (50% +1). Its most important feature is the fact that it permits the representation of the aggregate demand for public goods when the preferences of the voters are unknown. According to Black (1958) the median voter hypothesis sheds some light on the “darkness” of the “Arrow Paradox”, because, under a certain number of conditions, it postulates an equilibrium in collective decision making. The median voter paradigm postulates that if the preferences of the voters for levels of public good provision are continuously ordered (for example, increasing), for each level we can deduce the fraction of individuals who prefer an inferior level. The median voter is decisive because her preferred level of provision is in the middle, so 50% of the individuals prefer more and 50% want less public provision. Any proposal different from her preference is refused by a majority of voters. So, the demand of all the community is the demand of the median voter. This conclusion conferred to the model an enormous capacity of generating empirical studies about the levels of public expenditures, which until then were only analysed on an “ad hoc” basis. The median voter is usually represented as the family in the community, which has the median values of tax share, income or property.

The median voter model (MVM)¹ describes the aggregate demand in a community for the public good:

$$G^* = f(t_m, y_m, N, \sum_{i=4}^k \mathbf{b}_i \cdot Z_i) \quad (1)$$

Almost all empirical studies estimate the demand function in terms of logarithms, which implies that each \mathbf{b} coefficient of independent variables is elasticity:

$$\ln G^* = \mathbf{b}_0 + \mathbf{b}_1 \cdot \ln(tm) + \mathbf{b}_2 \cdot \ln(ym) + \mathbf{b}_3 \cdot \ln(N) + \sum_{i=4}^k \mathbf{b}_i \cdot Z_i + u_i \quad (2)$$

Cruz (1998, 2000) reviewed the literature about the MVM and found that there is a contradiction between the strong empirical results and the restrictive assumptions of the model. There are many empirical studies that use the MVM to estimate the demand for public goods². In general the model fits well to data. The price elasticity of the demand is negative (as expected) and lower than one in terms of absolute value ($-1 < \mathbf{b}_1 < 0$). The income elasticity is positive (as expected), but lower than one ($0 < \mathbf{b}_2 < 1$). This means that public goods are normal goods. The analysis of the congestion parameter associated with variable Population reveals a high level of congestion in the demand for goods provided by local governmental authorities. The model is based on strong restrictions: passive role of supply; perfect and equal information between voters; single-peakedness of preferences; unidimensionality (only one issue is decided). It is also restrictive in its consequences: if the proposals tend to the median voter position, ideology is not important, and if the median voter is perfectly informed, the “flypaper effect” is not admitted. These assumptions and consequences are discussed in detail in Cruz (2000) and they point to the openness of the model to alternative hypotheses. On the demand side of the political market the interest group influence hypothesis is a strong alternative. According to it, a situation of imperfect competition can be represented: there is imperfect and unequal information among voters; the shape of voters’ preferences is not restricted; more than one issue can be under decision; ideological groups can lobby politicians and the “flypaper effect” can be explained (Dougan and Kenyon, 1988; Islam and Chondury, 1989).

There are several approaches to interest group influence: political power of bureaucracy; the regulation capture theory; the rent-seeking literature; the general model of Becker and developments; models that specific lobbying activities (contributions to candidates, composite utility functions, signalling models of information). The study of the role of interest groups in the political market is an issue of master importance in Public Choice literature (see Cruz, 2000, for a revision).

The most studied way of lobbying are the contributions to the campaigns of the competing candidates (parties) in elections. We can identify two types of models: “support models”; “exchange models”. In “support models” it is considered that interest groups contribute to candidates that are closer to their preferences (independently of their probability of winning elections), so, in this models ideology is important. In “exchange models” groups contribute to candidates with a higher probability of winning elections (if their proposals are distant from their preferences, this is a way of capturing their future actuation, after the elections)³. There is more empirical evidence that indicates that “exchange models” are more realistic (Welch, 1980; Austen-Smith, 1987; Baron, 1989; Grier and Munger, 1991). This result is concordant with the empirical combination of the MVM with the interest group influence model (IGM), because the most preferred candidate by the median voter would be elected, but she would deviate from her preferences, to favour interest groups (specially in “less visible” issues).

In addition, Denzau and Munger (1986), and Potters and Sloof (1996), who reviewed the empirical literature about the interest group lobbying indicate that higher levels of political competition, or of voter’s information reduce the political favours to interest groups. This is an important result because it shows that the IGM does not collide completely with the MVM and that it is important to compare and combine the two models (better information and more competition between voters, may be associated to less power of interest groups and more power of the median voter). A visible issue means that the voters are interested and informed about it. Politicians can combine in political platforms visible issues with less visible issues and favour the median voter as well as interest groups.

The empirical formulation of a model to describe interest group influence is not an easy task. Many lobbying activities are not measurable and frequently, secret is the “soul of business”. How can we measure the strength of a group? How can the conditions that incite groups to lobby be represented? There are several studies that use the number of interest groups to describe their power of influence. Others use the number of members as a proxy to their strength. Another alternative is the combination of the number of members or groups interested in one issue with the opposition voice to their aims (measured by the number of interest groups against, or with proxies to the level of information of voters, or to the degree of political competition). According to the existing information I used the number of members and the level of activity of interest groups as a proxy to its influence. I followed Congleton and Bennett (1995) in the specification of the IGM:

$$G^* = s(N_1 +, \dots, N_i +, N_{i+1} -, \dots, N_n -, I) \quad (3)$$

The level of provision of the public good depends on the competition between the pressure of groups that favour a higher level of provision ($N_{1, \dots, i+}$) and groups that favour a lower level of provision ($N_{i+1, \dots, n-}$), and also on some specific institutional factors (I). Normally N is the number of members of each group. Institutional factors are, for example, the existence of referenda or the existence of specific legislation.

I found in the literature some empirical studies that compared or combined the MVM with the IGM (MCOM is the combined specification): Congleton and Shughart II (1990); Shapiro and Papadakis (1993); Baumgardner (1993); Congleton and Bennett (1995); Ahmed (1998). These empirical studies reveal that the MVM seems to be stronger than the IGM when the tax system is simple (there is a tax that directly finance the provision of the public good), otherwise the IGM performs better. The majority does not control favours to interest groups when voters are not aware of public good provision costs. However, more research is necessary, namely in terms of other public goods.

The specification that combines the two models (MCOM) is represented in Congleton and Bennett (1995) as:

$$G^* = w_1 \bullet [f(t_m, y_m, N, Z_k)] + (1 - w_1) \bullet [s(N_{1+}, \dots, N_{i+}, N_{i+1-}, \dots, N_n-, I)] \quad (4)$$

with $0 \leq w_1 \leq 1$

The overall demand for the public good is a weighed sum of the median voter demand with the relative power of interest groups where w_1 can be seen as an index of democratisation of state politics. If $w_1 = 0$, then interest groups control public decisions. If $w_1 = 1$, the median voter is decisive and public decisions respond to her preferences. If $0 < w_1 < 1$, public choice results from the influence of both the median voter and interest groups.

w_1 cannot be estimated directly. However, I can test if its value is zero for the two models by using the J test (Davidson and MacKinnon, 1981). I did the J test to compare the two models. If both models cannot be rejected, MCOM is the better specification.

Additionally, I estimated MCOM as the “non-nested” hypothesis, and did the F test to analyse if the addition of the explanatory variables of the competitor model to the MVM or to the IGM, would improve the fittings.

These proceedings indicate which is the best specification (MVM, MGI or MCOM) for local public choice.

3 – Hypotheses to be tested

The hypotheses I empirically tested come from the theoretical discussion presented before:

I - Public choice is controlled by the median voter (MVM). - **HI**

II - Public choice is controlled by interest groups (IGM). - **III**

III - Public choice is the result of the combined influence of the median voter and interest groups (MCOM). - **IIII**

IV - In highly populated communities, interest groups have more influence in the local provision of public goods, than in small communities (free riding, informational problems, scale

of provision and urbanisation which can create better conditions for the organisation or attraction of interest groups). - *HIV*

V - The price and income elasticity of the demand on public goods are small (usually lower than one) - *HV*.

VI - There is congestion in the consumption of locally provided public goods. - *HVI*

VII - The institutional shape of a political system affects public choice. Regarding that there are political and institutional differences between Portugal and Galicia, we can expect the existence of differences between the two territories in terms of the relative political power of the median voter and interest groups. - *HVII*

Hypotheses I, II and III describe the choice of the best competing specification (MVM, IGM, or MCOM).

Hypothesis IV follows the approaches of Olson (1965) and Becker (1983, 1985), who explained that small organised interest groups would obtain more success than large unorganised interest groups. Adding the approach of Meltzer and Richard (1981), we can look at the majority of voters as a large interest group, without the ability to proceed its interest, due to “free-riding” problems in getting organised (Olson’s argument). If this is true, the median voter would not be decisive, and interest group preferences would be dominating the demand side of the political market. In large municipalities the costs of organisation of the majority will be greater than in small municipalities, because each member of the latent group has stronger incentives to “free-ride”. Additionally, Murrell (1984) shows that, when the population increases, interest groups become fragmented into smaller and more homogeneous interest groups, with larger political power. The author also verified that some interest groups only appear when the dimension of the population is high enough.

Another perspective that can justify HIV comes from Downs (1957) and Tullock (1967), who concluded that individuals are less interested in gathering information and in voting, when their probability of influencing the electoral results is lower. The larger the dimension of the population of any municipality is, the lower will be the probability of one voter influencing the final result, “ceteris paribus”. If this causes asymmetric abstinence among the distribution of

voters (ordered according to their income), and if the politicians do not know the distribution of the abstinance, the median voter will not be decisive. Then, politicians will be more tempted to attend to the demand of interest groups (constituted by interested voters) than to an unknown decisive voter, or a non-interested (not-informed) majority.

Hypotheses V and VI are the result of various empirical applications of the MVM. They show that, normally, the price and income elasticity of the community demand on local public goods and services are low and that there is congestion in the consumption of locally provided public goods.

Hypothesis VII was defined to test if the existence of political and institutional differences between Portugal and Galicia generate differences between the two territories, in terms of median voter and interest group political influence. One important institutional difference between Portugal and Galicia is the fact that in Spain (where the Galician municipalities are located) there is an intermediate government between the municipal and the central government (the regional government). In Portugal, the municipal government is the level of government immediately below the central government. So, in Galicia, non-centralised intervention is shared between the regional and the municipal government. According to Hoyt and Toma (1989), the “proximity” of a superior level of government can deviate interest group pressure from the lower level of government. That’s why I would not be surprised if the interest group model fit better to Portugal than to Galicia.

4 - Results of the estimation of the MVM, the IGM and the MCOM

In order to guarantee some homogeneity across the observations that constitute the sample for the application of the models, I divided the Portuguese and Galician municipalities into three groups of population dimension: DIMSMA (population of 0 to 7499 inhabitants); DIMMEAN (population of 7500 to 49999 inhabitants); PORTUGAL or GALICIA (all the municipalities of the territory). I estimated the MVM, the IGM and the MCOM for Portuguese (275) and Galician municipalities (314) for “per capita” local current expenditures⁴ (1995 – Portugal;

1993 – Galicia⁵) using OLS regressions (in logarithm form – each independent variable coefficient is an elasticity)⁶.

Portuguese and Galician local political systems are of proportional representation (Hondt methodology) and “a priori” they are not indicated for the application of the MVM. However, in both, political candidates try to obtain a majority (50%+1), because otherwise, in practice, they have to share the executive power with the opposition.

Portuguese and Galician municipalities are extremely dependant on unconditional transfers from the central government (more than 50% of current revenues) and they have little capability in differentiating from the other municipalities in fiscal terms (those issues in which municipalities have autonomy to differentiate are residual in terms of revenues). This causes a problem with the construction of the price variable of the demand of the community (MVM). As in the municipalities of Portugal and Galicia, the main category of local revenues are property taxes, and as their capability to differentiate in this issue is small, I considered the relative frequency of owners as a proxy to local taxpayers’ sensitivity to the tax price involved in the provision of local public services.

The non-existence of data on the tax-share obliged me to consider in the MVM, the variable Transfers separately from the variable Income, which is equivalent to the introduction of the possibility of the “flypaper effect” in the configuration of the MVM regressions.

In Portugal, it was not possible to acquire data on local median voter income. So, I had to use mean income (income “per capita” on the basis of income tax). For Galicia I found median income from data on municipal income distribution. I also found a high correlation (0,97) between median and mean income. I expect that the same occurs in Portugal and so, the substitution of median income by mean income will not cause relevant damage on the estimation results.

As I have already mentioned, the proxies to capture interest group influence are rather simplistic, so the IGM only captures a little of what might be bureaucratic and interest group influence.

The independent variables of the MVM are, the income of the median voter (INCOME – expected signal +), the tax price (PRICE⁷ - sensitivity of owners to local tax burden – expected signal -), congestion in consumption (α parameter obtained from variable POPULA – population – expected signal -)⁸ and unconditional current transfers from the central government (TRANSF – expected signal +). In the IGM the strength of each group is measured by the number of members, or by weighing the expenditures the municipality has with group members on current expenditures of local government. I considered the following interest groups: bureaucracy, described as the salaries of public employees on public expenditures (BUREAU – expected signal +), proportion of elderly people in the jurisdictions (PPOP65 – expected signal +) and groups with interests related to tourism (INDTUR - tourist activity in the municipality – expected signal +).

For Bergstrom and Goodman (1973), with the same income and tax-share, the elderly people will probably demand more public goods than young people, assuming that the demand for public goods does not fall with the age. So, elderly people can be seen as an interest group (organised or latent) that prefers more public provision. Additionally, a high proportion of elderly people are retired and have more time, during each day, to enjoy some public goods like parks and public gardens, libraries, and cultural activities⁹.

In Portugal and Galicia the tourist sector is of extreme importance. The firms that develop activities related to tourism are spread across the municipalities according to their tourist attractiveness. In each municipality, the attraction of tourists interacts with the existence of quality in the provision of public services (water distribution, management of urban waste, provision of cultural services, maintenance of good roads, public lighting, parks and public gardens, municipal swimming-pools, cleaning of the beaches). For this reason I think that companies in tourist sector are interested in the improvement (quantity and quality) of the provision of public services (the expected signal is +).

In order to avoid problems of heteroscedasticity, I applied the correction of White to the results of standard deviations associated with the estimates of the coefficients of independent variables.

In order to test the MVM against the IGM (and the IGM against the MVM) I did the *J* test (Davidson and McKinnon, 1981)¹⁰.

4.1 – Results of the estimation of the MVM

Table 1 describes the results from the estimation of the MVM for Portugal and Galicia.

Table 1 - Results from the estimation of the MVM for Portugal and Galicia

VARIABLES	DIMSMA		DIMMEAN		Municipalities	
	PORTUGAL	GALICIA	PORTUGAL	GALICIA	PORTUGAL	GALICIA
IND. TER.	0,84 (0,44)	-8,36** (-3,33)	0,50 (0,60)	-9,18* (-2,60)	-0,43 (-0,72)	-9,60** (-4,85)
INCOME	0,48** (5,85)	0,73** (4,83)	0,45** (7,93)	0,64** (2,38)	0,51** (13,56)	0,77** (7,76)
PRICE	-0,03 (-0,22)	-0,42* (-2,15)	-0,56** (-4,57)	-0,45 (-1,33)	-0,44** (-4,80)	-0,49** (-3,36)
POPULA	-0,87** (-9,90)	-0,60** (-16,08)	-0,69** (-20,55)	-0,53** (-7,52)	-0,71** (-19,08)	-0,57** (-32,51)
TRANSF	0,65** (6,18)	0,56** (13,15)	0,55** (10,76)	0,68** (8,88)	0,61** (20,78)	0,60** (34,62)
α	0,77	0,93	0,68	1,27	0,82	1,06
Adjus. R ²	0,72	0,38	0,53	0,49	0,70	0,46
F	35,13	32,24	50,14	15,95	164,57	58,72
Nr OBSER	55	203	174	64	275	274

** Statistically significant for a level of confidence of 99%

* Statistically significant for a level of confidence of 95%

t values in parentheses

Results from Table 1 indicate that for Portugal and Galicia, the MVM provides a good fitting to explain municipal current expenditures for the three groups of municipalities. Comparing the results for the two territories, it is possible to see that the demand income elasticity is higher in Galicia than in Portugal, and that the price elasticity is similar. They are always inferior to one. Consumption congestion exists and it seems to be a little bit superior in Galicia.

Another interesting difference between the territories is the existence of “flypaper effect” in Portuguese municipalities (transfers elasticity is larger than income elasticities), but not in

Galician municipalities. An explanation for this phenomenon may be the different interest group political power between the territories.

The results obtained for the price elasticity, for the income elasticity and for the congestion parameter are in harmony with the MVM empirical literature.

In order to have a better understanding of local public choice, I tried to find out if politicians can affect the expenditure levels, deviating public choice from median voter preferences. I included, in the MVM, two dummies to capture two political characteristics. Following Frey and Schneider (1978), Baum (1989) and Santos (1995), I included the variable DINCUMB, which is equal to one, when the president of the local government was re-elected and equal to zero, otherwise. I do not know the expected signal of the estimated coefficient for this variable might be, because it depends on the interest of the politician in spending more or less in the municipality. In Santos (1995) the variable was statistically significant for 95% of confidence and its relationship with current expenditures was negative. The inclusion of this variable can be justified by the “à priori” advantage of the incumbents to win the municipal elections, because new candidates are riskier for the electorate (not as well known) and because the incumbents have more opportunities to prepare and pass their messages.

The results of the MVM in the regressions for “per capita” current expenditures in Portuguese and Galician municipalities, with the inclusion of DINCUMB¹¹ (with and without the explanatory variable “unconditional transfers”, to avoid duplication with the “flypaper effect”), in all groups of municipalities, show that DINCUMB did not improve the MVM fitting. For the sample and the year of the analysis, the “incumbent political advantage” was not statistically significant.

The other political dummy that I have included in the MVM in Portuguese and Galician municipalities, is DPODER, that takes value one when the president of the municipality was elected by the same party elected to rule the central government (party coincidence in political power between the local government and the central government)¹², and value of zero, otherwise. The inclusion of this variable is found in Bosch and Suárez-Pandiello (1994, 1995) and is justified by the fact that in political campaigns for municipal elections, it is frequent to see

municipal presidents that were elected by a political party different from the one that won the elections to the central government, to complain about not having as much support from central government aid as those where there is political party coincidence between central and local governments. I tried to find out if where there is political party coincidence, the “per capita” current expenditures are higher than in the other municipalities. The expected signal for DPODER is positive.

The inclusion of DPODER in the MVM (with or without “unconditional transfers”) did not improve the fitting quality. DPODER was never statistically significant for the level of confidence of 95% (the same occurred in the studies of Bosch and Suárez-Pandiello (1994, 1995)).

The weak results obtained from the inclusion of DINCUMB and DPODER in the MVM are not a surprise, because a more adequate perception of these effects demands for the introduction of time in the analysis and the consideration of capital expenditures. The interaction of the central government with local governments is important mainly in relation to long term projects, which involve the sharing of capital funds.

4.2 – Results of the estimation of the IGM

Table 2 - Results from the estimation of the IGM for Portugal and Galicia

VARIABLES	DIMSMA		DIMMEAN		Municipalities	
	PORTUGAL	GALICIA	PORTUGAL	GALICIA	PORTUGAL	GALICIA
IND. TER.	5,30** (10,84)	3,41** (15,20)	4,94** (21,40)	2,80** (6,96)	5,21** (36,12)	3,32** (18,54)
BUREAU	0,67 (1,78)	0,10 (0,73)	0,68** (4,96)	0,34 (1,52)	0,60** (4,97)	0,17 (1,51)
PPOP65	0,67** (4,51)	0,13 (0,94)	0,54** (5,09)	-0,26 (-1,21)	0,72** (11,56)	0,06 (0,79)
INDTUR	0,02 (1,90)	0,07 (1,36)	0,02* (2,42)	0,14* (3,63)	0,02* (2,40)	0,12** (6,90)
Adjus. R ²	0,23	0,00	0,22	0,22	0,42	0,15
F	3,15	1,04	14,11	6,65	49,90	10,59
Nr OBSER	22	97	137	60	202	163

** Statistically significant for a level of confidence of 99%

* Statistically significant for a level of confidence of 95%

t values in parentheses

Table 2 shows the results of the empirical application of the IGM to Portugal and to Galicia. For the municipalities of Galicia the model is not adequate. For DIMSMA, none of the independent variables are statistically significant and in DIMMEAN only INDTUR is

statistically significant with the expected signal. For the municipalities of Portugal, in the group DIMSMA only PPOP65 is statistically significant, but in DIMMEAN all the interest groups produce significant influence on “per capita” current expenditures of the municipalities. For both Portugal and Galicia the IGM performs better in larger municipalities.

Comparing the two territories, we see that the IGM is clearly stronger for Portuguese municipalities. This result helps to understand the existence of flypaper effect in Portuguese municipalities and is in harmony with Hoyt and Toma (1989) hypothesis. The existence in Spain of an intermediary level of government disperses the pressure of local interest groups.

As for the MVM, I estimated the IGM with the political institutional variables DINCUMB and DPODER, to infer if, in addition to interest group influence, politicians can affect local public choice. The results I obtained to the IGM estimation are similar to those of the MVM estimation.

4.3 – Results of the estimation of MCOM and from the *J* test

Table 3 - Results from the estimation of the MCOM for Portugal and Galicia

VARIABLES	DIMSMA		DIMMEAN		Municipalities	
	PORTUGAL	GALICIA	PORTUGAL	GALICIA	PORTUGAL	GALICIA
IND. TER.	4,18 (0,98)	-13,10** (-3,52)	1,92 (1,71)	-5,07 (-1,08)	1,73* (2,02)	-9,99** (-3,85)
INCOME	0,28* (2,46)	1,03** (5,22)	0,39** (6,87)	0,38 (1,64)	0,43** (11,45)	0,81** (7,08)
PRICE	0,27 (1,52)	-0,45 (-1,71)	-0,65** (-5,03)	-0,67* (-2,14)	-0,53** (-6,14)	-0,34* (-2,12)
POPULA	-0,89** (-11,35)	-0,58** (-11,33)	-0,59** (-18,34)	-0,52** (-8,88)	-0,52** (-35,34)	-0,61** (-34,16)
LTCGC	0,51** (3,26)	0,63** (9,20)	0,42** (7,75)	0,62** (8,01)	0,37** (13,01)	0,63** (31,98)
BUREAU	0,13 (0,54)	-0,02 (-0,20)	0,24* (2,22)	0,25 (1,54)	0,10 (1,18)	0,06 (0,68)
PPOP65	0,20* (2,30)	0,25* (2,52)	0,24** (3,18)	-0,11 (-0,71)	0,31** (6,69)	0,12* (2,11)
INDTUR	0,01 (1,30)	-0,01 (-0,24)	0,02** (3,39)	0,09** (3,09)	0,02** (4,17)	0,04** (2,68)
Adjus. R ²	0,63	0,45	0,58	0,57	0,69	0,52
F	6,21	12,13	28,21	12,33	65,70	26,31
Nr OBSER	22	97	137	60	202	163

** Statistically significant for a level of confidence of 99%

* Statistically significant for a level of confidence of 95%

t values in parentheses

In Table 3, we can see that the results from the estimation of MCOM are in harmony with the individual estimation of the MVM and the IGM. In Portuguese municipalities of the group DIMSMA, the MVM explanatory variables are stronger than the IGM explanatory variables. In the DIMMEAN group of municipalities both the MVM and the IGM explanatory variables are statistically significant. The results for Galicia are similar, but just one explanatory variable of the IGM, in DIMMEAN, is statistically significant (INDTUR).

For Galicia, *J* test results indicate that in the DIMSMA group the IGM shall be rejected and the MVM shall not ($t_{IGM} = 0,16$ and $t_{MVM} = 8,87^{**}$). For DIMMEAN, the MVM and the IGM are not rejected ($t_{IGM} = 3,50^{**}$ and $t_{MVM} = 7,19^{**}$). The same occurs for Portuguese municipalities (DIMSMA - $t_{IGM} = 0,94$ and $t_{MVM} = 5,28^{**}$; DIMMEAN - $t_{IGM} = 4,04^{**}$ and $t_{MVM} = 10,87^{**}$). This similarity of results between Portugal and Galicia raises some doubts about the non-rejection of HVII.

5 - Analysis of the defined hypotheses according to the estimation results of the MVM, the IGM and the MCOM

HI; HII; HIII: Who controls local public choice: The median voter, interest groups or both? The results indicate that in small municipalities the median voter is decisive on “per capita” current expenditures of the municipalities in Portugal and Galicia (*HI* is not rejected). In larger municipalities both the median voter and interest groups influence local public choice (*HIII* is not rejected). *HII* is rejected for “per capita” current expenditures.

HIV: Is interest group influence on local provision more effective in the more populated municipalities than in the small municipalities? *HIV* is not rejected for municipal “per capita” current expenditures (Portugal and Galicia). I tried to see if the predicted values of local “per capita” current expenditures are closer to their observed values, as the population increase (continuous test to the non-rejection of *HIV*). Population exhibit the expected signal, but the variable was not statistically significant for the level of 95% of confidence.

HV: Price and income elasticity of the demand estimated according to the MVM are small? The results indicate that *HV* shall not be rejected.

HVI: Is there congestion in the consumption of locally provided public goods? The results indicate that *HVI* shall not be rejected.

HVII: Are there differences between the two territories, in terms of the relative political power of the median voter and of interest groups, as a result of differences between their political and institutional configuration?

In small municipalities, in both territories, the MVM performs better than the other models. The results of their estimation are similar in Portugal and in Galicia (*HVII* is rejected). In mean and large municipalities the IGM performs better in Portugal than in Galicia, but the *J* test indicates that in both territories the MCOM shall not be rejected (*HVII* is rejected).

Are these results expressing that there aren't relevant political and institutional differences between the territories? The analysis of the "per capita" current expenditures indicates that they are very much superior in Portuguese municipalities than in the Galician municipalities, but the median income is much superior in Galicia. On average, "per capita" current expenditures in Portuguese municipalities are superior to the Galician municipalities by more than 50%¹³ (more than 100% in DIMSMA municipalities). Portuguese municipalities receive more than two times the unconditional transfers from the central government that the Galician municipalities receive. These indicators show that the relative power of public intervention in Portuguese municipalities is substantially greater than in the Galician municipalities. The explanation of this difference can be found in the different political-institutional configuration of the two territories.

I estimated the models, joining the municipalities of Portugal and Galicia, for all the groups of municipalities, with the inclusion of the "dummy" DTERRITO (that has the value one if the municipality belongs to Galicia and the value zero otherwise). The statistical significance of this variable indicates that, in addition to the power of the median voter or of interest groups, there are differences between the two territories (political, institutional, socio-economical) that affect the levels of municipal "per capita" current expenditures. The results of all the regressions indicate that DTERRITO is always statistically significant for 95% of confidence and its

estimated coefficient is negative (Galician municipalities show lower “per capita” current expenditures - the estimated coefficient of DTERRITO varies between -1,08 and -0,21). These results produce more evidence about the rejection of *HVII*, because they make it clear that it is not the lack of institutional differences between the territories that creates similar results in the competition between the median voter and interest groups.

I tried to identify if the level of visibility of the local tax system is a relevant institutional difference between the territories (fiscal illusion hypothesis). One hypothesis to explain the strong significance of DTERRITO could be the differences between the territories in terms of fiscal institutional system. That would originate different levels of tax visibility in Portugal and in Galicia. Maybe this could explain the disparities in local “per capita” current expenditures between the territories. Several authors used Herfindahl indexes to measure the fiscal visibility of the tax system (see for instance, Pommerehne and Schneider, 1978; Baker, 1983; Turnbull and Djoundourian, 1994; and Ahmed, 1998). The procedure consists in weighing each local tax revenue on total local tax revenues, squaring each parcel, and adding them. When almost all the local tax revenue comes from just one fiscal source, the index (that varies between zero and one) takes a value near a unit; in this case fiscal complexity is low and, so, fiscal visibility is high. In municipalities where local tax revenues are fragmented through many taxes, the value of the index is low; fiscal visibility is also low. In this case we expect more “per capita” current expenditures, than in the case where visibility is high, “*ceteris paribus*”.

I constructed the Herfindahl indexes for Portugal and Galicia, including the maximum fiscal fragmentation that the published information permitted (property taxes, taxes on the circulation of vehicles, other local taxes). In Portugal and Galicia a problem comes from the parcel “other taxes”, which is not a residual category, but one that includes more local taxes revenues (on average 62% in Portuguese municipalities and 41% in Galician municipalities). When the parcel “other taxes” is very high, the value of the Herfindahl index will also be high. This indicates that the system is not very complex, so the fiscal visibility will be high. However, if the tax revenue represented in “other taxes” is very fragmented across many fiscal sources (as it happens in Portugal and Galicia), this means that the tax system is complex. This paradox can be overtaken by analysing the fiscal visibility by the weight of the residual category of taxes. As

the parcel “other taxes” includes many types of less important fiscal fonts (taxes on economic activities, revenues from water provision, tariffs on the use of car-parks, receipts from the concession of licences for the construction of buildings, or the opening of businesses...), the more the local revenues are born in a large range of fiscal fonts, represented in the proportion of “other taxes” (LPESORCM), the greater is the local fiscal complexity.

After some proceedings to allow the simultaneous estimation of the models to Portugal and Galicia¹⁴ I obtained the results expressed in Table 4.

Table 4 - Results of the estimation of the MVM, the IGM and the MCOM, simultaneously for the two territories, with the inclusion of the level of local fiscal visibility

Explanat. Variables.	MVM			IGM			MCOM		
	DIMSMA	DIMMEAN	ALL	DIMSMA	DIMMEAN	ALL	DIMSMA	DIMMEAN	ALL
Ind. Term	-1,20 (-0,78)	-2,31 (-1,79)	-3,20** (-4,13)	11,37** (79,32)	11,51** (64,74)	11,53** (116,11)	-1,84 (-1,16)	-0,87 (-0,63)	-2,75** (-3,25)
Income	0,53** (4,82)	0,48** (8,62)	0,53** (11,38)	-----	-----	-----	0,51** (4,82)	0,42** (7,38)	0,50** (10,72)
Price	-0,23 (-1,37)	-0,55** (-4,49)	-0,42** (-4,65)	-----	-----	-----	-0,29 (-1,72)	-0,47** (3,74)	-0,42** (-4,62)
Populat.	-0,62** (-12,00)	-0,72** (-13,11)	-0,68** (-23,36)	-----	-----	-----	-0,59** (-9,54)	-0,77** (-11,85)	-0,70** (-19,74)
Transf	0,57** (10,75)	0,69** (10,33)	0,69** (19,72)	-----	-----	-----	0,59** (10,59)	0,68** (9,57)	0,69** (18,21)
Bureau.	-----	-----	-----	-0,14 (-1,89)	0,52** (4,34)	0,13 (1,95)	-0,27** (-4,34)	0,25** (2,65)	-0,11* (-2,24)
Elderly	-----	-----	-----	0,24** (2,83)	0,29** (3,26)	0,38** (7,44)	0,07 (0,80)	-0,08 (-0,93)	0,03 (0,56)
Tourism	-----	-----	-----	0,09** (3,46)	0,08** (2,98)	0,11** (5,15)	0,05* (2,48)	0,07** (3,17)	0,08** (4,48)
Territory	-0,99** (-6,24)	-0,71** (-8,52)	-0,78** (-11,66)	-0,80** (-13,19)	-0,20** (-4,03)	-0,41** (-11,46)	-1,01** (-6,67)	-0,64** (7,63)	-0,81** (-12,15)
LPESORCM	0,23** (3,21)	-0,02 (-0,22)	0,19** (4,19)	0,40** (4,66)	0,24* (2,55)	0,51** (8,90)	0,21** (3,08)	-0,00 (-0,06)	0,20** (4,27)
α	0,94	0,93	1,02	-----	-----	-----	-----	-----	-----
Adjust. R ²	0,73	0,56	0,67	0,61	0,23	0,39	0,76	0,58	0,68
F	116,16	50,52	183,67	76,92	15,22	70,74	85,40	37,91	127,95
Observat..	257	238	548	248	238	538	248	238	538

** Statistically significant for a level of confidence of 99%

* Statistically significant for a level of confidence of 95%

t values in parentheses

Table 4 shows that IPESORCM is statistically significant for 95% of confidence and its estimated coefficient exhibits the expected signal in seven of the nine regressions. Table 4 indicates that we should not reject that the level of local fiscal visibility influences the levels of “per capita” current expenditures in each municipality, especially in DIMSMA municipalities.

When LPESORCM was included separately in the regressions of Portugal and Galicia, I found an interesting difference between the territories. In Portuguese municipalities the variable, either wasn't statistically significant, or, despite its significance, the signal was opposite to what I expected¹⁵ In Galician municipalities, the variable was always statistically significant, with its estimated coefficient exhibiting the expected signal¹⁶. According to these results, the level of fiscal complexity affects the "per capita" current expenditures of Galician municipalities, but not those of Portuguese municipalities. Alternative measures of fiscal illusion and improvements in the discrimination of local fiscal fonts would certainly contribute to a better understanding of the phenomenon.

6 - Conclusions

I estimated the median voter model, the interest group influence model and a combined form to the municipalities of Galicia and Portugal. The results are in harmony with the empirical literature about the tested models. They provide some empirical evidence on the ability of interest groups in influencing public choice, but they also indicate that voters (namely the median voter) are important and avoid strong "deviations" to their preferences. The results also indicate that interest groups are more influential in more populated municipalities.

On the contrary to what I expected, differences in the institutional shape of the political systems I have examined, do not affect the "trade-off" between the median voter and interest groups political power.

The inclusion in the models of a "proxy" for fiscal visibility revealed the existence of some differences between Portugal and Galicia. While in the first territory, the complexity of the tax system does not seem to affect municipal "per capita" current expenditures, in Galicia the same does not occur. Differences in terms of the institutional configuration of the "fiscal machine" between the territories may explain the phenomenon. The use of alternative measures of fiscal illusion may be required to clarify these results.

Future research on these issues shall involve time and capital expenditures, because the possibility of time lags in agents' reactions or the existence of political cycles was not captured in the models. Additionally, the direct inquiry of politicians about the level of pressure they feel from interest groups and media can be useful for future empirical specification of interest group models. Additional emphasis on supply conditions is also required.

¹ The variable G^* is the output level of provision of the public good in each community. Normally it is difficult to measure the output of public goods, so almost all empirical studies use the “per capita” spending (input) which finance the provision of the good. The variable tm is the tax share of the median voter and captures the tax price the median voter has to pay for the provision of the public good. The variable ym is the income of the household with median income in each community. The variable N is the population of the community and captures the level of congestion in the consumption of the good. If there is congestion the good is not a pure public good, if not, there is no rivalry in its consumption, which reveals that it is a pure public good. The variables Z_k are a range of socio-economic variables that capture the influence of specific characteristics of each community.

² For example: Borchering and Deacon (1972), Bergstrom and Goodman (1973), Pommerehne and Frey (1976), Pommerehne and Schneider (1978), Costa (1982), Deno and Mehay (1987), Holcombe (1989), Turnbull and Mitias (1995), Turnbull and Chang (1998), among many others.

³ There are also studies that combine the two ways of contributing to the campaigns of the candidates (see Grier and Munger, 1991, and Krozner and Stratmann, 1998).

⁴ Capital expenditures are not adequate for cross-sectional analysis of expenditures (based on the analysis of only one year).

⁵ Most recent years with available data.

⁶ Data for the variables can be seen in Cruz (2000).

⁷ % of property occupied by owners.

⁸ α varies from 0 to 1. If $\alpha = 0$, there is not rivalry in consumption; if $\alpha = 1$, the good is “private”.

⁹ Ahmed (1998) refers to some empirical studies where the variable was used as a “proxy” to interest group influence

¹⁰ The test J was done to DIMSMA and DIMMEAN.

¹¹ For Galician municipalities we did not find information about the name of the “alcaide” (president) of each municipality. So we used the dummy DREPPVEN, that is equal to 1 if the party that won the municipal elections had also been the winner in the preceding electoral cycle, and to zero, otherwise. For the Portuguese municipalities the correlation between DINCUMB and DREPPVEN is positive and equal to 0,60. For Galician municipalities we do not expect such a strong correlation, because if the most voted party did not get majority, a coalition between the other parties can elect the president of the local government (“alcaide”).

¹² In Galician municipalities, DPODERGC apprehends the coincidence between the political winner party in municipal elections and the central government political winner party; DPODERCA, indicates coincidence between the political winner party in municipal elections and the regional government (Autonomous Community government) political winner party. Note, however, that the winner party in municipal elections may not elect the president of the municipality, if it did not obtain the majority of votes and if the minority parties ally themselves to elect the “alcaide”.

¹³ Corrected for the same year of analysis (1995) and according to the “Purchasing Power Parities” in 1995 between “escudos” and “pesetas”.

¹⁴ See Cruz (2000: pag. 561 nt. 187).

¹⁵ It happens in the MVM and in the MCOM for DIMMEAN - this explains the non-significance of the variable in these regressions represented in Table 4.

¹⁶ This is in harmony with the results of Bosch and Suárez-Pandiello (1994, 1995) for the Spanish municipalities.

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