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Money and Votes. Incumbents in Mayoral Elections in Chile

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Money and Votes. Incumbents in Mayoral Elections in Chile

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Resumen

Ser incumbente es una importante ventaja en una elección. Este aspecto ha sido reconocido en numerosos estudios y ha sido formalizado en la hipótesis de la campaña permanente. Con esto queremos decir que los incumbentes, durante todo el período de su mandato, llevan a cabo una campaña electoral de mayor o menor intensidad. El estar ya en el cargo que eventualmente van a disputar en una elección pone a su disposición una serie de recursos, inaccesibles para los demás candidatos. En este documento de trabajo exploramos empíricamente esta hipótesis para la elección municipal de 2012 en Chile, utilizando una base de datos que cubre todas las comunas del país. Un punto central es el papel que juega el dinero gastado en la campaña por los incumbentes en la elección de alcaldes. El estudio empírico de estas cuestiones nos lleva a un modelo de regresión para el gasto de campaña y la votación obtenida.

La estimación de este modelo no es trivial, pues tenemos dos ecuaciones que determinan simultáneamente el gasto de campaña y la votación obtenida. Ambas variables son acotadas. Además una de las variables es latente: la votación esperada para 2012. Resolvemos estos problemas usando estimaciones máximo–verosímiles truncadas y variables instrumentales.

Nuestros resultados sugieren que los candidatos incumbentes programan su gasto de campaña con especial consideración a la votación esperada. Sin embargo, los resultados electorales son notablemente más aleatorios, sugiriendo que hay factores más importantes que el dinero que determinan los resultados electorales. Finalmente, parece ser que las conductas de ganadores y perdedores difieren significativamente.

Palabras claves: Incumbentes, Elecciones de Alcaldes, Gastos de Campaña, Ecuaciones Simultáneas, Regresiones Truncadas.

Abstract

Being an incumbent is an important advantage in an election. This issue has been discussed in numerous studies and has been formalized into the so called permanent campaign hypothesis. This means that the incumbents, during all the duration of their tenure, should be running a more or less intensive campaign. The tenure of the office, eventually disputed in the election, allows an elected officer to use some resources and opportunities that are no available for the other candidates. This study empirically explores this hypothesis for the mayoral election of 2012 in Chile, using a database covering all the Chilean municipalities. A central point is the money spent in the campaign by the incumbents in the mayoral election. We empirically study these issues with the help of a regression model for the campaign expenditures and the vote obtained by the incumbents.

The estimation of this model is not trivial because we have two equations determining simultaneously the expenditures and the vote. Additionally, we had to consider that both variables are bounded and that we have a latent variable: the expected vote for 2012. We solved these problems using maximum likelihood truncated estimations and instrumental variables.

Our results suggest that incumbent candidates plan their campaign expenditures based mostly in their expected vote. We also found empirical evidence suggesting that winners behave differently than losers.

Keywords: Incumbents, Mayoral Elections, Campaign Expenditures, Simultaneous Equations, Truncated Regressions.

JEL: D70, D72, C34.

1 Introduction

This paper will focus on the incumbents as candidates in mayoral elections in Chile. We are interested in exploring campaign expenditures and how these affect the electoral outcomes. We focus on incumbents because we can assume that they have a differentiated behavior as compared to the challengers. Incumbents, in fact, benefit of what has been called the ***permanent campaign*** hypothesis. That is, incumbents, in some sense, run a lower intensity campaign during the whole period of their tenure. This gives them an advantage over challengers. For the case of Chile's municipal elections we will try to explain how much money do the incumbent mayor candidates spend and why. That is, in this paper we try to find if there is personal characteristics of the incumbents and characteristics of the municipalities that could help to explain the electoral expenditures. Then we will try to see the importance of these expenditures for the electoral results.

There are some rules about campaign financing. The two most interesting for us is that there is a limit for campaign expenditures and the candidates are refunded by the state, ex-post, at a fixed rate in proportion to the votes obtained. Most of the candidates spend less than the allowed amount, while a few spend a bit more than the permitted limit. Candidates that overspend are fined, in proportion to the amount that exceeded the limit.

The dictatorship (1973-1989) left a clumsy and biased electoral law. The democratic governments that followed could only slowly change this legal framework, looking after a more democratic and unbiased system. This means that the electoral framework has been unstable during the last few decades. Thus, it is difficult to compare consecutive mayoral elections. Since 2004 we have separate election for council-people and mayors. These are directly elected by the voters in their municipalities, and the system seemed to become a bit more stable. The financial restrictions also date from 2004. We compiled a database with data from Chile's 345 municipalities for the elections of 2008 and 2012. We have some data on the municipalities and, in the case when an incumbent is running for mayor, we have data on this candidate and his or her main challenger. We will use these data in order to search and discuss how the decisions on campaign expenditures are made.

The empirical analysis of campaign financing and electoral outcomes is frequently present in the literature. However, there are a numbers of statistical and econometric issues that still remains open. In some sense this papers is also an exploratory attempt in this methodological field.

A section considering the relevant literature follows. In this section we focus our attention on different approaches presented in the literature in order to analyze problems similar to ours. Section 3 presents our basic model and

its theoretical foundations. Then, there is a section discussing the econometric problems that the estimation of the statistical version of our theoretical model presents. An estimation strategy is designed and discussed, including a few econometric elements that we have not found in the literature. This is, probably the main contribution of the paper. Our data is presented in the next section. A section presenting the main results of our estimations is then presented. The paper ends with a section on conclusions, both in terms of an appraisal of our estimations and their implications. A rather long appendix with detailed results, mostly auxiliary regressions, ends the paper.

2 Some selected previous results

In this section we present a number of papers that are relevant for our own study. Let us begin with a survey of the literature.

A survey of the literature about the effects of campaign expenditures in elections can be found in (Stratmann 2005). In particular, it reviews not only how campaign expenditures affect the election of candidates but also the effect on the polls. The main conclusion is that, despite some discussion about the magnitude of the effects, campaign expenditure does affect elections.

In (Jacobson 1978), using data that the Federal Elections Campaign Act obliged candidates to disclose, Jacobson noticed that marginal productivity of campaign expenditure is different for incumbents and challengers. Although the effect could be caused by the inherent bias in an estimation with endogenous regressors, it did not disappear after correcting the original Ordinary Least Squares estimation with a Two-Stage Least Squares approach. The argument goes as follows: if some unobserved characteristics make a good challenger, he or she should get both more money to finance his campaign and more votes in elections. By the same token, he would force the incumbent to spend more in his or her own campaign. However, this additional money does not buy new votes. Hence, the challenger's additional spending is more productive in terms of votes while the incumbent's spending is not. The paper considers the incumbent's spending as endogenous and uses the participation of both candidates in primaries, incumbent's time in power, and the challenger's previous experience in office as instruments. Moreover, when candidates are classified by their party ascription, and not by their incumbency, the results also suggest a difference between Democrats and Republican (possibly biased by the Watergate scandal). Additionally, the paper uses survey data to suggest that a large part of the results is explained by candidate recognition.

The above mentioned paper by Jacobson marked the beginning of an interesting discussion about the proper specification and estimation of a model on incumbents and campaign finance. Starting from the paper by Jacobson, (Welch 1981) proposes a different approach to identify the problem of endogeneity: simultaneous equations. This should solve the orthogonality problems of the instrumental variables used by Jacobson. Welch finds that (i) money influences elections although its effect is "small"; (ii) the contributors prefer to support likely winners; (iii) contributions depend on the characteristics of the districts ; and (iv) a huge expenditure change (150.000 USD at 1978 prices) would be needed in order to change the result of any election, which reinforces the result in (i),

Later on, Jacobson wrote a more detailed report, (Jacobson 1985), in

order to discuss the main three points in dispute among scholars: which should be the proper functional form of the models to be estimated, which are the relevant variables to consider, and which are the incumbency effects. His conclusion is that the simultaneity bias issue remained unsettled until we have more data and ***"perhaps, any possible model"***, and that ***"incumbents do not gain votes by spending in campaigns"***.

Donald P. Green and Jonathan S. Krasno in their paper (Green and Krasno 1988) criticize Jacobson because he does not control for the challenger's quality. The model, thus, would be wrongly specified (because it does not consider interaction effects of variables), and the problem of simultaneity is not solved adequately. They construct a proxy for candidate's political quality and, by solving those errors in Jacobson, they find that incumbent's expenditure is negatively correlated with the challenger's vote.

Jacobson, in his rejoinder in (Jacobson 1990), answers Green and Krasno's comments mentioned above using new data from the ABC News/Washington Post Congressional District Poll about political preferences. Following Jacobson, Green and Krasno's study could be criticized because of multicollinearity, absence of diminishing returns of money as a cause of votes, and the fact that it only covers the election of 1978. He addresses instead the problem by counting how many people change their intention of vote on each district depending on the spending of candidates there, without the simultaneity problems of previous studies. His results confirm his previous arguments.

Steven D. Levitt, in a paper from 1994 (Levitt 1994) relates the difference in expenditure and votes between two elections. This difference is expected to eliminate two bias often suggested in previous literature: good candidates collect both more money and more votes, and candidates running in the ***"correct"*** district also collect both more money and more votes (imagine a very Republican district and the odds for a Democrat running there). This solution shows that ***"the impact of campaign spending on election outcomes, regardless of incumbency status, is small but positive"***. This should be in line with the ***"knowledge"*** argument of Jacobson in the sense that candidates spend to become better known in the district. If they are running for the second or third time, they should already be known. Moreover, if we add the diminishing return to the picture, it seems natural that the effect is small.

Robert S. Erikson and Thomas R. Palfrey address the problem of simultaneity in (Erikson and Palfrey 1998). This paper proposes a new way of identifying the simultaneous model by restricting the covariances of error terms instead of the parameters of the equations. In practice, they first estimate the expected vote using political, regional and time variables for districts with open seats, which is used as a benchmark. The first result of

the simultaneous equations is that incumbent spending matter but its importance is very strong at the beginning of the political carrier and it declines with seniority. Secondly, spending is persistent and its impact is persistent. Again, this is in line with our comments on (Levitt 1994).

Another paper addressing the issue of simultaneity is (Gerber 1998). This paper argues that it is possible to find instruments in order to estimate a Two Stages Least Square model of the effect of campaign expenditures on election outcomes. In particular, the specification adds variables reflecting the economic conditions and its interaction with the coincidence between the party of the incumbent and the party of the president, a measure of the experience of the challenger in other offices and other measures taken from (Abramowitz 1988), (like state partisanship, ideological distance, incumbent scandal, incumbent controversy, incumbent health and celebrity challenger). As instrumental variables, it uses a dummy for wealthy challengers, state population and lagged spending. The results are that the specification eliminates endogeneity bias and that the marginal effects of incumbent and challenger spending are statistically equivalent.

An interesting paper using data from Irish local elections in 1999 is (Benoit and Marsh 2003). This paper considers simultaneity problems and uses shares of the expenditures instead of the level of expenditures. The context is a little different from the usual cases based on American data because each district elects between three and seven members to the County Council. The authors use both the share of votes received and the probability of being elected as dependent variable and in both cases expenditures mattered. They also consider competition among all candidates and only within members of the same party. The results confirm that spending matters in elections, that it has decreasing returns and that there are differences between the behavior of incumbents and challengers.

A more recent paper by Jacobson (Jacobson 2006), insists on the idea that the incumbent's spending has (almost) no effect on elections while the challenger's spending does it. Moreover, this paper presents results showing that the effect of campaigning goes through recalling and name recognition of the candidate, which increases with the expenditure of the candidates. Incumbents always have an advantage in this field. In addition, using poll data, this paper solves the endogeneity problems and suggests new insights: vote decision starts with people's bias about the incumbent and their party identification and, then, they gather some information to make a vote decision.

The paper in (Rekkas 2007) includes a careful consideration of the econometric problems that appears when estimating this kind of models. The author presents a model that incorporates abstentions and accounts for het-

erogeneity of voter preferences and endogeneity of campaign expenditures. Using Canadian data, it shows that incumbents benefit more than challengers and that economic conditions affect candidates of the governing party. Moreover, the paper offers us an interesting conclusion: ***"Political campaign spending was found not only to redistribute voters across parties, but also to shrink the size of the abstaining group of the electorate, thus raising important policy issues with respect to campaign spending limits and their impact on voter participation."*** (Rekkas 2007[584–585]).

We can also comment on a few papers addressing Chilean elections. Let us begin by a chapter in a broader book on municipal democracy in Chile, (Edwards, Morales, and Schuster 2012). This chapter shows that there is incumbency advantage in municipal elections in Chile and that campaign spending also matters in local elections. These results and the methodological approach can be criticized, but it is easy to see that results in Chile are rather similar to analogous results elsewhere.

Acevedo and Navia in a paper from 2015, (Acevedo and Navia 2015),suggest that using campaign spending as a share of spending limits would account for the endogeneity bias. Their results are that campaign expenditures does affect electoral outcomes in the expected way, and that there is incumbency advantage. However, no results about the difference between the effects of incumbent's and challenger's spending are suggested.

Published results show that, although districts are represented by two members, there exists incumbency advantage in congressional elections in Chile. A paper by Christian Salas, (Salas 2016), uses the fact that the open list proportional representation system requires 2/3 of the (two party) votes to elect two instead of one seat and creates a regression-discontinuity framework. Having (just) won two seats instead of only one earns a 4.5 percent extra vote share in the next election and increases by 28 percent the probability of electing two candidates again.

3 The model

A central feature of a political system is its electoral architecture. This is the set of laws, rules, and institutions governing the elections where the elected public servants and authorities are chosen. It could be argued that an important goal for democratic societies is a neutral or unbiased electoral architecture. Neutral in the sense that no candidate can be favored over the others by some elements of this architecture. Controversial elements of the electoral architecture are the financing of the electoral campaigns and the role of the incumbents.

A possible theoretical framework for analyzing the financing of electoral campaigns is the production function approach. Thus, we assume that the candidates have an endowment of resources that they can use in order to get votes that, eventually, would allow them to be elected. Formally, we assume that there is a twice-differentiable function,

$$v = f(\mathbf{x}), \tag{1}$$

where v is the proportion of votes that a candidate gets. That is, we have $0 \leq v \leq 1$. The argument $\mathbf{x}$ is a $k \times 1$ vector representing the resource endowment of the candidate and the characteristics of his or her constituency. The main resource is the money that the candidate can spend during the campaign. We will focus on this resource.

Naturally, these resources are subject to a number of restrictions. Moreover, some characteristics of the candidates and the municipalities could influence the shape of this production function and should be considered in the empirical analysis. This theoretical approach assumes that the production function in (1) is concave. This implies that we have,

$$\frac{\partial f}{\partial x_i} > 0 \text{ and } \frac{\partial^2 f}{\partial x_i^2} \leq 0 \text{ for all } i \in \{1, 2, \ldots, k\}.$$

That is, there is a positive relationship between the used resources and the result in terms of votes. These conditions also imply that there should be decreasing marginal returns of the used resources in the campaign. The candidates try to maximize the electoral benefits, in terms of votes, given this production function and its associated restrictions. It should be noted that the marginal benefit of the votes should be decreasing and, in principle, it should tend to zero as the proportion of votes comes closer to 50 percent. However, it could be argued that there still is a value with votes beyond 50 percent, because together with the mayor a council is elected. We could assume a kind of ***pull effect***, where the votes for the mayor helps to elect

friendly councilpersons. Other restrictions in the case of Chile are the limit imposed on expenditures and the refund paid at a fixed rate per vote.

The production function theoretical setup suggest that we can also estimate a factor demand function. That is, we can estimate a model explaining the optimal level of money needed for the campaign,

$$d = g\left(\mathbf{z}\right), \tag{2}$$

where d is the amount of money (as proportion of the spending limit, for example) spent by the candidate in the campaign, and $\mathbf{z}$ is a $l \times 1$ vector of explanatory variables. The theoretical setup developed above suggests that the variable v in (1) and variable d in (2) are determined simultaneously.

4 Econometric specification

Our theoretical discussion in the previous section led us to specify the following model:

$$y_i = \alpha_y + \beta_y v_i^* + \mathbf{p}_{yi}\boldsymbol{\gamma}_y + \mathbf{m}_{yi}\boldsymbol{\delta}_y + \epsilon_{yi}, \tag{3}$$

$$v_i = \alpha_v + \beta_v y_i + \mathbf{p}_{vi}\boldsymbol{\gamma}_v + \mathbf{m}_{vi}\boldsymbol{\delta}_v + \epsilon_{vi}, \tag{4}$$

where

y_i : incumbent, expenditures (2012 campaign) as a share of the limit,
v_i : incumbent, votes in 2012 as a share of the total,
v_i^* : incumbent, expected votes in 2012 as a share of the total,
$\mathbf{p}_{ji}$: a $1 \times k$ vector of incumbent's characteristics, $j \in \{y, v\}$,
$\mathbf{m}_{ji}$: a $1 \times l$ vector municipal characteristics, $j \in \{y, v\}$.

Notice that both expenditures and votes are relative quantities in order to correct for the different size of the municipalities. We carefully corrected this problem using relative measurement units in all variables. For example, instead of the total number of neighborhood committees (*juntas de vecinos*) we used the number of such grass roots organizations per thousand inhabitants. Thus, the data of the different municipalities are comparable. The subindex i indicates the municipality, the subindex $j \in \{y, v\}$ indicates either the expenditures equation (y for equation (3)) or the votes equation (v for equation (3)), and α_j, β_j, $\boldsymbol{\gamma}_j$ and $\boldsymbol{\delta}_j$ are vectors of coefficients of appropriate dimension. Naturally, vectors $\mathbf{p}_{ji}$ and $\mathbf{m}_{ji}$ can include common variables. The term ϵ_{ji} represents a stochastic error.

The estimation of the model of equations (3) and (4) presents several econometric difficulties. First, we can see that the variable y_i has a support that is truncated at zero. That is, we know that we will always have $y_i \geq 0$. We did not consider a possible truncation at 1 because there are a few candidates with expenditures greater than the limit. Thus, we must consider a truncated probability distribution for this variable. In consequence, the Ordinary Least Squares estimator would be biased. We face similar difficulties in equation (4), where the dependent variable v_i is truncated at zero and one ($0 \leq v_i \leq 1$). Fortunately, a maximum-likelihood estimation based on a truncated distribution is possible. See, for example, (Greene 2008, Chapter 19).

The model in (3) still cannot be estimated because the variable v_i^*, the proportion of votes expected for the incumbent candidate in the election, is not observable. However, for the election in 2012 there is a way out for this problem because it is possible to instrument the unobserved variable v_i^* using data of the 2008 election. In fact, the percentage of votes obtained in 2008 by

the 2012 incumbent candidates could be used as a good proxy of the percentage of votes that they expected to obtain in the last election. Unfortunately, just a fraction of the incumbent candidates in 2012 were also incumbent candidates in 2008. Alternatively, we can use the data from election 2008, in order to fit the following model,

$$v_{08,i} = \mathbf{x}_{08,i}\boldsymbol{\eta} + u_i, \tag{5}$$

where $v_{08,i}$ is the proportion of votes that went to the incumbent candidate in municipality i during the 2008 election. $\boldsymbol{\eta}$ is a $m \times 1$ vector of coefficients and $\mathbf{x}_{08,i}$ is a $1 \times m$ vector of characteristics of the candidates and the municipalities in 2008. Notice that this is again a truncated regression with 0 as a lower limit and 1 as an upper limit. We use the estimated coefficients of the model in equation (5) in order to create a new variable, using data from the 2012 election.

$$\hat{v}_i = \mathbf{x}_{12,i}\hat{\boldsymbol{\eta}}, \tag{6}$$

The variable $\hat{v}_i$, thus constructed, is a consistent estimator of the unobservable variable v_i^*. Thus, we can rewrite the model in (3) as

$$y_{yi} = \alpha_y + \beta_y \hat{v}_i + \mathbf{p}_{yi}\boldsymbol{\gamma}_y + \mathbf{m}_{yi}\boldsymbol{\delta}_y + \epsilon_{yi}, \tag{7}$$

See (Moffit 1993) for more details of this use of instrumental variables.

An important variant of the model in equation (3) can be obtained using data about the difference of votes between the incumbent candidate and the challenger, instead of just the votes of the incumbent. In this manner we introduce the challenger as an important part of the model. Probably the incumbent is more focused on this difference than on the total absolute proportion of vote to be obtained. If the difference is too large, the marginal benefit of the votes decreases rapidly.

There is still another problem. Votes and financing are determined simultaneously. Thus, we can see that in equation (4) the regressor y_i is endogenous, leading to a simultaneity bias. Obviously, we could instrument this variable using data from the 2012 election once again.

An interesting possibility is testing the possibility of a differentiated behavior between winners and looser among the incumbents. This can be done using appropriate dummy variables or constructing a likelihood ratio test.

5 The Data

We have a database with information about the 2008 and 2012 mayoral elections at a municipal level. Mayors have been directly elected and aside from the council election during these two years. Moreover, this database also includes a number of characteristics for each of the 345 Chilean municipalities and some data about the candidates. During the 2008 election there were 272 incumbent candidates, and 174 (64 percent) won the election and kept their position as mayor. Usually, there are just two candidates in each mayoral contest: the incumbent and the challenger. In eleven cases there was more than two candidates. We will denote the most voted candidate among those competing with the incumbent as the challenger. In one case there was no candidates challenging the incumbent. During the 2012 election the number of incumbent candidates increased to 287 with 9 municipalities with more than one candidate challenging the incumbent and again just one case where nobody challenged the incumbent. In this election, 174 (61 percent) incumbents were elected once again. This percentage (61 percent) is somewhat lower than in the previous election because there were more incumbent candidates.

The following Table 1 presents the Basic Statistics of the variables in the election of 2012.

	Obs.	**Mean**	**Std. Dev.**	**Min.**	**Max**
incpc	287	0.4574	0.2728	0.0000	1.5115
chapc	286	0.3831	0.2516	0.0000	1.0356
iv	287	0.4704	0.1322	0.0086	0.8976
isex	287	0.1289	0.3357	0.0000	1.0000
csex	286	0.1783	0.3835	0.0000	1.0000
lpcasen	287	0.1721	0.0820	0.0020	0.4460
mjvnoix	266	2.3744	1.9024	0.0000	13.3256
rurix	287	0.3915	0.2999	0.0000	1.0000
incgan	287	0.6063	0.4894	0.0000	1.0000
edinc	262	54.1298	8.6036	31.0000	75.0000
eddes	119	55.5966	9.7982	33.0000	80.0000

Table 1: **Incumbents. Basic Statistics 2012**

There is a legal limit for the campaign expenditures and the variable `incpc` was defined as the share of this limit actually spent by the incumbent candidate, while `chapc` is the share of the limit actually spent by the

challenger. This limit seems to be generous because, on average, the candidate spent less than 50 percent of it. At least one incumbent candidate exceeded the legal limit of expenditures by 50 percent. On average, incumbent candidates spent more than challengers. Notice that these are declared or registered expenditures. We can assume that actual expenditures are larger by an unknown amount. The variable `iv` is the share of the votes obtained by the incumbent candidate. The variable `isex` is a gender indicator, equal to 0 for male incumbent candidates and equal to 1 for female candidates. Variable `csex` is a similar gender indicator for challengers. Notice that female challengers are more frequent (18 percent) than is the case for incumbents (13 percent). Variable `lpcasen` is a poverty index (in fact, it is a head count index). The extension of grass root social organizations is measured by `mjvnoix`, the number of *"juntas de vecinos"*, or neighbors committees, per thousand inhabitants in the municipality. These are quite frequent associations in Chile. Variable, `rurix` is the percentage of rural population in the municipality. The dummy variable `incgan` equals one when the incumbent actually wins the election and zero otherwise. Finally, variables `edinc` and `eddes` stand for the age of the incumbent ad the challenger, respectively. Notice that incumbents are, on average, somewhat younger then the challengers.

We could not find these data for all the municipalities. Thus, several variables present missing values and we lost a few observations in the data base actually used for the estimation of our regressions. However, these missing values apparently have no systematicity and our final data base can be considered a large stochastic sample of the universe of Chilean municipalities. The corresponding result for the election of 2008 can be seen in the Statistical Appendix, Table 12. The data for 2008 is similar to the data for 2012.

6 Results

In this section we present the main results from a series of regressions suggested by the model discussed above in Section 4, ***Econometric Specification***, especially in equations (5) and (6). Later on, we explore a series of variations of these regressions that could give us a deeper insight of the mayoral election.

6.1 Basic Regressions

In order to estimate an equation for the expenditures in the electoral campaign depending on the expected percentage of votes, we used the instrumental variables approach discussed above in Section 4, ***Econometric Specification***, especially in equations (5) and (6). Thus, we regressed the percentage of votes obtained by the incumbents in the 2008 election on several variables with data from the municipalities and candidates included in the sample for the same year. This estimation can be seen in the Statistical Appendix, in Table 13. We used these estimated parameters together with data from the 2012 election to create a new variable, `ivhat`, a consistent proxy for the expectations of the incumbents about the results of the 2012 election. It should be noted that this procedure produced no out of range values for the variable `ivhat`. In fact, the estimated range varies between 0.332 and 0.605. We can assume that the outcomes of the 2008 election are the best set of information that can be used for building expectations about the 2012 election.

Then, we estimated our equation for the electoral expenditure of the incumbents depending `ivhat`, our proxy for the vote expectations. Table 2 shows the results of these estimations.

The dependent variable in this regression, `incpc`, is the percentage of the limit actually spent by the candidate. The variable `ivhat` is a proxy or instrument for the expectations of the total of votes to be obtained by the incumbent candidate.

Most of the coefficients were estimated with a level of statistical significance better than one percent. However, there are some exceptions. The coefficient of `rurix`, the percentage of rural population, was estimated at 15.5 percent level of significance. The coefficients of `mjvnoix`, a social organizations indicator, and `edinc`, the incumbent's age, were estimated with a level of significance better than 5 percent. Notice that the expectations about the result of the election (`ivhat`) clearly have the strongest effect on the electoral expenditures. This is not surprising because a higher percentage of votes means a higher refund after the election, improving the financial

incpc	Coef.	Robust Std. Err.	z	P>|z|
ivhat	6.64071	0.259462	25.59	0.000
isex	0.35162	0.021620	16.26	0.000
lpcasen	1.24427	0.120808	10.30	0.000
mjvnoix	0.00970	0.004666	2.08	0.038
rurix	-0.04743	0.033327	-1.42	0.155
edinc	-0.01687	0.008523	-1.98	0.048
edinc2	0.00030	0.000082	3.67	0.000
cons	-2.75673	0.242884	-11.35	0.000
σ	0.12587	0.0055397	22.72	0.000

Log. pseudolikelihood = 167.20846 | Nr. of obs. = 243
Wald $\chi^2(7)$ = 784.70 | Prob > χ^2 = 0.0000

Table 2: **Instrumented estimation of the expenditure in 2012**

framework of the campaign, thus increasing the probability of winning the election. On the other hand, remembering that the monetary return per vote is constant, this strong result suggests that the marginal cost of the votes is decreasing. More interesting is that gender has a role in the financing of the campaign. Thus, our result suggests that female incumbent candidates tend to spend a bit more during the electoral campaign. This a somewhat strong and highly significant effect. It is possible that this result could be linked to some cultural pattern of gender discrimination. The poverty index has a statistically significant and positive effect on the campaign expenditures. A possible explanation is that reaching poor voters is more expensive than reaching to richer ones.

The effect of the number of neighbor committees is small and positive. This is a bit surprising because the incumbent is assumed to have a closer and easier access and contact with these popular organizations. This parameter is somewhat ambiguous and difficult to understand. Obviously, the net of neighbor committees is a quite adequate space for political activism and campaign work. The incumbent has an advantage accessing this network, but still it is also open to the challenger. Thus, the sign of the parameter could indicate who is using best this social network; the incumbent, when it is positive, or the challenger, when it is negative. A small positive parameter, as it is in this case, suggests that the incumbents are not getting much from their advantage in access to the network of neighbor committees. In many

municipalities the mayor send Christmas cards, birthday greetings, flowers and other small presents to the members of these committees. Naturally, these are paid by the municipality and do not appear as campaign expenditures. Finally, the percentage of rural population have a negative effect, but estimated at a rather low level of significance. An explanation could be the relatively small size of the rural population in the Chilean municipalities. We could easily assumed that the campaign costs should be higher for the rural population then for the rest. However, we could also assume that given their small relative size, the campaigns tend to disregard these groups.

The effect of age in the financing of the campaign is quite interesting. There is a negative effect of age and the positive second degree parameter, `edinc2`, suggests that there is a non-lineal relationship approximated by a U-shaped curve. The minimum of this curve is reached at 28.1 years. This is close to the lower limit of the range of the age variable. Thus, the net effect becomes a small positive effect of age on the level of expenditures, for most of the range of the age variable. Therefore older incumbent candidates need increasingly more campaign expenditures.

Let us compare the regressions presented Table 2 with those in Table 15 in the Statistical Appendix, where the campaign expenditures are regressed on the votes actually obtained by the incumbent candidate in the same election. It is easy to see that the instrumental variables approach gave us an estimation with a much better fit than an estimation using the actual vote of the candidate. Moreover, the instrumental variables approach lead us to a generalized increase in the level of signification of the estimates of the parameters. It is also worth noting that the parameter affecting the vote was estimated with the same sign in both regressions, but with a much higher value, suggesting a stronger effect in the instrumented case. Thus, it seems that the use of the actual vote would underestimate the effect of the vote in the financing of the campaign.

Now we will estimate an equation for the vote in 2012. The main problem is that variable `incpc`, the campaign expenditure, is an endogenous regressor in this model. Once again we found a way out in the instrumental variables approach. We used the results in Table 2 to estimate a new variable `incpchat`, which we used as a regressor in a new regression for the vote in 2012, `iv`. The results are shown in Table 3. This variable `incpchat` are the predicted values of the campaign expenditure following the above mentioned regression. It should be mentioned that all the values were predicted within range. In fact, the minimum value for this new variable is $0.004 > 0$. We also estimated this equation using the endogenous variable `incpc` as a regressor. Table 14 in the Statistical Appendix presents the results of this estimation. Comparing both results we conclude that the endogeinity of the regressor

most possibly causes a negative bias in the coefficient of the campaign expenditures.

iv	Coef.	Robust Std. Err.	z	P>|z|
incpchat	0.11743	0.0438193	2.68	0.007
chapc	-0.03772	0.0396879	-0.95	0.342
isex	-0.06502	0.0238644	-2.72	0.006
lpcasen	-0.17498	0.1055588	-1.66	0.097
mjvnoix	-0.00506	0.0039826	-1.27	0.204
rurix	0.00218	0.0317376	0.07	0.945
edinc	-0.00365	0.0084898	-0.43	0.667
edinc2	0.00001	0.0000769	0.19	0.850
cons	0.63781	0.2357158	2.71	0.007
σ	0.11890	0.0057343	20.73	0.000

Log. pseudolikelihood =	172.86074	Nr. of obs. =	243
Wald $\chi^2(8)$ =	39.08	Prob > χ^2 =	0.0000

Table 3: **Instrumented estimation of the vote in 2012**

The coefficient of the expenditures, `incpchat`, was estimated at a level of statistical significance better than one percent. This is a clear positive effect as expected, but much weaker than the opposite relationship that explain the expenditures depending on the expected vote. The gender variable, `isex`, was also estimated with a level of significance somewhat better than one percent, suggesting a small negative effect on the vote of the incumbent. Female incumbent candidates must try harder to be reelected. This is coherent with the previous result suggesting a gender discrimination effect against female candidates. The poverty index, `lpcasen`, was estimated with a significance level slightly worse than ten percent and suggests a negative effect on the vote for the incumbent candidates. It is easier for an incumbent candidate to be reelected in a richer municipality than in a poorer one. Other coefficients were estimated at a too low level of significance. In particular, note that the coefficient of the challenger's expenditure was estimated at a rather low level of significance, though the sign is intuitively right.

6.2 Vote Difference

An alternative approach to the model estimated above is to consider a new variable, `difv`, representing the vote difference between the incumbent and the challenger, as a proportion over the total vote. There are two main reasons for exploring this alternative approach. The first reason is that by considering the vote difference we are, to some extent, enhancing the role of the challenger in the model. The second reason is a bit more complex. Just one more vote for a candidate over his or her opponent is enough to win the election, which allows us to assume a small and decreasing marginal benefit of positive vote differences. On the other hand, there is an incitement to get as many votes as possible, because they are rewarded at a fixed rate by the electoral authorities. We can also assume that the mayoral candidates have some kind of pull effect on the candidates to the council from the same party or friendly candidates.

The estimations follow the same pattern than those for the basic regressions. That is, we regress the vote in 2008 on a number of variable for the same year in order to get the necessary coefficients for estimating the variable `difvhat`, a proxy for the expected vote difference in 2012, using data from this election. This regression can be found in Table 16 of the Statistical Appendix. Now we used this new variable for the estimations presented in the following Table 4.

incpc	**Coef.**	**Robust Std. Err.**	**z**	**P>|z|**
difvhat	2.86245	0.206651	13.85	0.000
isex	0.37961	0.035898	10.57	0.000
lpcasen	0.42352	0.159643	2.65	0.008
mjvnoix	0.00352	0.006436	0.55	0.584
rurix	0.16145	0.055204	2.92	0.003
edinc	-0.01929	0.012322	-1.57	0.117
edinc2	0.00023	0.000116	1.99	0.046
cons	0.39385	0.319202	1.23	0.217
σ	0.17583	0.008171	21.52	0.000

Log. pseudolikelihood = 92.619446	Nr. of obs. = 243
Wald $\chi^2(7)$ = 251.66	Prob > χ^2 = 0.0000

Table 4: **Instrumented vote difference estimation of the expenditure in 2012**

We can see that the fit of this equation is somewhat worse than in the case of the basic regression presented in Table 2. The parameters were estimated, in general, at a worse level of statistical significance than in the case of the basic regressions. Notice that, as expected, the coefficient of the vote difference variable is smaller than the coefficient for the vote in the basic regressions case. However, the vote difference seems to have a surprisingly large effect on the campaign expenditure. Possibly the incumbents are maximizing their vote, rather than just winning the election. The gender effect seems to be significant and robust. The coefficient of the poverty index, `lpcasen` was estimated as smaller but still significant. The index for social organizations, `mjvnoix`, became smaller and estimated at a rather low level of significance. The effect of the rural population became positive and significant. The age parameters were also estimated at a lower level of significance.

In order to estimate the equation for the vote difference, we constructed first the instrumental variable `incpchat` using the regression presented in Table 18 in the Statistical Appendix. The vote difference equation estimated using this new variable is presented in the following Table 5.

		Robust		
difv	**Coef.**	**Std. Err.**	**z**	**P>|z|**
incpchat	0.17333	0.104892	1.65	0.098
chapc	-0.15104	0.078956	-1.91	0.056
isex	-0.10282	0.035709	-2.88	0.004
lpcasen	-0.45314	0.170359	-2.66	0.008
mjvnoix	-0.00490	0.006459	-0.76	0.448
rurix	-0.06880	0.052529	-1.31	0.190
edinc	0.00170	0.013907	0.12	0.903
edinc2	-0.00005	0.000125	-0.37	0.713
cons	0.23694	0.382926	0.62	0.536
σ	.18915	0.008332	22.70	0.000

Log. pseudolikelihood = 59.867735 | Nr. of obs. = 243
Wald $\chi^2(8)$ = 49.66 | Prob > χ^2 = 0.0000

Table 5: **Instrumented vote difference estimation of the vote in 2012**

Both estimations, with total vote and with vote difference, are rather close. The only changes of sign observed are for the rural population and the age variables, but in both cases for parameters estimated at a rate low level of statistical significance. It should be noted that our basic regressions show

a better fit.

6.3 Winners and losers

The results above suggested the idea of comparing the behavior of the incumbents that actually won the 2012 election and those that lost it. In order to do this we created a new dummy variable, `incgan`, that equals one for the winners and zero otherwise. The following Table 6 and Table 7 present the results of the estimations including this dummy variable. The auxiliary estimations can be found in the Statistical Appendix, at Tables 21, 19, and 20.

incpc	**Coef.**	**Robust Std. Err.**	**z**	**P>|z|**
ivhat	13.88777	0.126636	109.67	0.000
isex	0.20794	0.005237	39.71	0.000
lpcasen	1.57286	0.028255	55.67	0.000
mjvnoix	-0.05142	0.001269	-40.52	0.000
rurix	-0.02196	0.008378	-2.62	0.009
edinc	-0.02798	0.002145	-13.05	0.000
edinc2	0.00039	0.000020	19.22	0.000
incgan	-2.28382	0.022159	-103.07	0.000
cons	-4.14471	0.067812	-61.12	0.000
σ	0.03071	0.001304	23.55	0.000

Log. pseudolikelihood = 501.66577 | Nr. of obs. = 243
Wald $\chi^2(8)$ = 14297.85 | Prob > χ^2 = 0.0000

Table 6: **Instrumented dummy winner–loser estimation of the expenditure in 2012**

We can see that in both equations, the inclusion of the dummy variable improves the fit and the parameters are estimated, in general, with a higher precision. This improvement is larger in the case of the expenditure equation than in the case of the vote equation.

It is worth to note that in both equations the coefficient of the dummy variable was estimated at a higher level of statistical significant and suggesting an important effect, negative in the case of expenditures and positive in the case of the vote equations. This results could be read in the following manner. Winners need less money in order to win the election and have a

iv	Coef.	Robust Std. Err.	z	P>|z|
incpchat	0.04154	0.024317	1.71	0.088
chapc	-0.02744	0.024535	-1.12	0.263
isex	-0.04563	0.015865	-2.88	0.004
lpcasen	-0.02712	0.081987	-0.33	0.741
mjvnoix	-0.00506	0.003111	-1.63	0.104
rurix	0.00909	0.024284	0.37	0.708
edinc	-0.00499	0.006335	-0.79	0.431
edinc2	0.00004	0.000058	0.64	0.519
incgan	0.17183	0.011797	14.57	0.000
cons	0.53508	0.171349	3.12	0.002
σ	0.08949	0.004527	19.77	0.000

Log. pseudolikelihood = 241.74493 | Nr. of obs. = 243
Wald $\chi^2(9)$ = 269.99 | Prob > χ^2 = 0.0000

Table 7: **Dummy winner–loser estimation of the vote in 2012**

bit easier in collecting the necessary votes. Both of these effects seem to be coherent with each other. In any case it seems that the behavior of winners and losers is different.

In order to further explore this different behavior of winners and losers we estimated the model separately for both groups. These results were informed at the Statistical Appendix in Tables 22–31. We used these results to perform a likelihood–ratio test, where the null hypothesis is that the parameters of the model with only winners equal the parameters of the model with only losers. Table 8 presents the result of the test.

equation	LR–$\chi^2_{(9)}$	Prob> χ^2
Expenditures	23.59	0.0050
Vote	160.34	0.0000

Table 8: **Likelihood–Ratio test, winners and losers, 2012**

We can see that the test rejects the null hypothesis both for the Expenditures equation and for the vote equation. The test is especially strong for this latter equation.This result once again supports the hypothesis of different behavior for winners and losers. But how different these parameters

are?

Table 9 presents a comparison of the parameters estimates for the expenditures equation for both winners and losers. We can see a small change in the coefficient of the proxy for expected votes and larger changes for the poverty index, the social organizations index and the rural population index. All these coefficient changed sign. These results suggest that both winners and losers manage the financing problems in a quite similar manner. The real difference seems to be in the implications for financing of some campaign issues; for example, poverty and the relationship with social organizations.

Var.	**Winners**	**Losers**	**Diff.**	**Pc. change**
ivhat	9.84731	10.02547	-0.17816	-1.78
isex	0.12237	0.22038	-0.09802	-44.48
lpcasen	2.25793	-0.51984	2.77777	-534.35
mjvnoix	-0.12133	0.06551	-0.18685	-285.20
rurix	0.26510	-0.67298	0.93808	-139.39
edinc	0.00905	-0.05203	0.06107	-117.39
edinc2	-0.00005	0.00058	-0.00063	-108.15
constant	-5.12072	-1.72399	-3.39673	197.03

Table 9: **Comparing parameters winners and losers, expenditures, 2012**

Table 10 presents a comparison of the parameters estimates for the vote equation for both winner and losers. We can see that the gender and social organizations index show small changes. Several of the other parameters change sign.

Finally, Table 11 addresses a frequently asked question. Are incumbents with more than one previous period (vintage incumbents) more successfully than those that face reelection after the first period? It is easy to see that new incumbents become reelected at mores or less the same rate, a bit under 40 percent, than older incumbents.

Var.	Winners	Losers	Diff.	Pc. change
incpchat	0.06308	0.02254	0.04054	179.87
chapc	-0.06943	0.05209	-0.12152	-233.28
isex	-0.04167	-0.05084	0.00916	-18.03
lpcasen	-0.14076	0.18888	-0.32965	-174.52
mjvnoix	-0.00521	-0.00462	-0.00059	12.79
rurix	0.00044	0030191	-0.02975	-98.54
edinc	-0.00297	-0.00452	0.00155	-34.30
edinc2	0.00001	0.00004	-0.00003	-68.27
constant	0.69530	0.42213	0.27318	64.71

Table 10: **Comparing parameters winners and losers, Vote, 2012**

	Incumbent		
	Only once	**Twice +**	**Total**
Winner	26	87	113
	23.01	76.99	100.00
	38.81	39.55	39.37
	9.06	30.31	39.37
Loser	41	133	174
	23.56	76.44	100.00
	61.19	60.45	60.63
	14.29	46.34	60.63
Total	67	220	287
	23.34	76.66	100.00
	100.00	100.00	100.00
	23.34	76.66	100.00

Table 11: **Winners an losers by incumbent vintage, 2012**

7 Conclusions

We can draw both econometric and empirical conclusions from this paper. First, the truncated regression approach is an adequate approach when we have dependent variables with a truncated support. Moreover, our empirical results suggest that the bias implicit in an estimation that not consider the truncation of the distribution of the variable could be considerable. Additionally, endogeinity problems could be solved using an instrumental variables approach, avoiding the bias caused by using stochastic regressors.

Secondly, the electoral behavior of Chile's mayoral elections seems to follow the same patterns of other countries and other elections, commented broadly in the literature. Our main result is that there exists some kind of rationality and systematicity in the financing of the electoral campaign, which could be captured in our regressions. The expected outcome seems to play a central role in the planning of the campaign financing. However, the election result seems to be quite more stochastic and hard to be captured by our regressions. I fact the level of expenditures of the incumbent matters but with a rather small effect. The message is that more important than the money is to have a good candidate in the right municipality and a good campaign. The most important results seem to be robust when we change from the vote variable to the difference of vote variable.

The comparison of winners and losers strongly suggest that the individual characteristics, and possibly the characteristics of the campaigns, are quite important for the outcome of the election. We hope that in the future we could take account of these effects; with the help of a panel estimation, for example.

It is surprising, and disappointing, the small size of the estimates of the parameters of some critical variables as the index of poverty, the network of neighbors committees, and the degree of rurality of the municipalities. We expected stronger and larger effects in these cases

There are still some open econometric issues. We hope that in the future we could consider the individual effects with more data about the candidates and a panel data approach. On the other hand, we have maximum-likelihood estimations and we would like to have more information about possible bias in small samples, in spite that estimators are asymptotically consistent. Finally we would like a simultaneous maximum-likelihood estimation.

A Statistical Appendix

A.1 Basic Statistics

	Obs.	Mean	Std. Dev.	Min.	Max
incpc	272	0.5443	0.3128	0.0000	1.0000
chapc	271	0.4351	0.2864	0.0000	1.9290
iv	272	0.4541	0.1269	0.0000	0.8235
isex	272	0.1176	0.3228	0.0000	1.0000
csex	271	0.1661	0.3728	0.0000	1.0000
lpcasen	264	0.1644	0.0882	0.0000	0.5090
mjvnoix	249	2.3176	1.7963	0.0000	11.1214
rurix	272	0.3958	0.3059	0.0000	1.0000
edinc	272	53.8529	8.6272	33.0000	77.0000
eddes	271	49.4354	9.7366	25.0000	75.0000

Table 12: **Incumbents. Basic Statistics 2008**

A.2 Basic Regressions

iv	Coef.	Robust Std. Err.	z	P>|z|
incpc	0.10911	0.024805	4.40	0.000
chapc	-0.06806	0.024633	-2.76	0.006
isex	-0.04862	0.023396	-2.08	0.038
lpcasen	-0.21019	0.076254	-2.76	0.006
mjvnoix	-0.00206	0.006032	-0.34	0.733
rurix	0.00648	0.030924	0.21	0.834
edinc	0.00368	0.007594	0.49	0.628
edinc2	-0.00006	0.000069	-0.80	0.423
cons	0.43516	0.210673	2.07	0.039
σ	0.11259	0.005217	21.58	0.000

Log. pseudolikelihood =	184.57685	Number of obs. =	241
Wald $\chi^2(8)$ =	52.80	Prob > χ^2 =	0.000

Table 13: **Estimation of the vote in 2008**

iv	Coef.	Robust Std. Err.	z	P>|z|
incpc	0.08509	0.031750	2.68	0.007
chapc	-0.09079	0.032965	-2.75	0.006
isex	-0.06164	0.023655	-2.61	0.009
lpcasen	-0.19278	0.104063	-1.85	0.064
mjvnoix	-0.00553	0.003962	-1.40	0.163
rurix	0.00166	0.031743	0.05	0.958
edinc	-0.00276	0.008455	-0.33	0.744
edinc2	0.00000	0.000077	0.09	0.931
cons	0.65343	0.235419	2.78	0.006
σ	0.11890	0.005734	20.73	0.000

Log. pseudolikelihood = 172.86074 | Nr. of obs. = 243
Wald $\chi^2(8)$ = 39.08 | Prob > χ^2 = 0.0000

Table 14: **Estimation of the vote in 2012**

incpc	Coef.	Robust Std. Err.	z	P>|z|
iv	0.32272	0.135497	2.38	0.017
isex	0.11421	0.052427	2.18	0.029
lpcasen	-0.36507	0.233120	-1.57	0.117
mjvnoix	-0.00720	0.010583	-0.68	0.496
rurix	-0.20306	0.080293	-2.53	0.011
edinc	0.03325	0.018506	1.80	0.072
edinc2	-0.00033	0.000171	-1.94	0.052
cons	-0.33893	0.502499	-0.67	0.500
σ	0.244441	.015760	15.51	0.000

Log. pseudolikelihood = 20.893225 | Nr. of obs. = 244
Wald $\chi^2(7)$ = 38.01 | Prob > χ^2 = 0.0000

Table 15: **Estimation of the expenditure in 2012**

A.3 Difference of vote

difv	Coef.	Robust Std. Err.	z	P>|z|
incpc	0.17000	0.038477	4.42	0.000
chapc	-0.18291	0.039593	-4.62	0.000
isex	-0.11416	0.037557	-3.04	0.002
lpcasen	-0.23950	0.120299	-1.99	0.046
mjvnoix	-0.00345	0.009054	-0.38	0.703
rurix	-0.07460	0.048456	-1.54	0.124
edinc	0.01190	0.013831	0.86	0.390
edinc2	-0.00013	0.000123	-1.06	0.289
cons	-0.08714	0.394703	-0.22	0.825
σ	0.17904	0.008186	21.87	0.000

Log. pseudolikelihood = 72.903533	Number of obs. = 242
Wald $\chi^2(8)$ = 71.58	Prob > χ^2 = 0.000

Table 16: **Vote difference estimation of the vote in 2008**

difv	Coef.	Robust Std. Err.	z	P>|z|
incpc	0.08435	0.051043	1.65	0.098
chapc	-0.24179	0.055245	-4.38	0.000
isex	-0.09367	0.034509	-2.71	0.007
lpcasen	-0.49856	0.164139	-3.04	0.002
mjvnoix	-0.00601	0.006344	-0.95	0.344
rurix	-0.07783	0.052311	-1.49	0.137
edinc	0.00426	0.013707	0.31	0.756
edinc2	-0.00007	0.000123	-0.57	0.567
cons	0.26197	0.382134	0.69	0.493
σ	0.18915	0.008332	22.70	0.000

Log. pseudolikelihood = 59.867735 | Nr. of obs. = 243
Wald $\chi^2(8)$ = 49.66 | Prob > χ^2 = 0.0000

Table 17: **Vote difference estimation of the vote in 2012**

incpc	Coef.	Robust Std. Err.	z	P>|z|
difv	0.13451	0.079388	1.69	0.090
isex	0.10534	0.053297	1.98	0.048
lpcasen	-0.38762	0.239519	-1.62	0.106
mjvnoix	-0.00718	0.010798	-0.67	0.506
rurix	-0.20427	0.083184	-2.46	0.014
edinc	0.02812	0.018942	1.48	0.138
edinc2	-0.00029	0.000174	-1.66	0.097
cons	-0.03839	0.507333	-0.08	0.940
σ	0.24630	0.0162078	15.20	0.000

Log. pseudolikelihood = 19.180175 | Nr. of obs. = 243
Wald $\chi^2(7)$ = 35.80 | Prob > χ^2 = 0.0000

Table 18: **Vote difference estimation of the expenditure in 2012**

A.4 Dummy for winners and losers

difv	Coef.	Robust Std. Err.	z	P>|z|
incpc	0.07076	0.018050	3.92	0.000
chapc	-0.00937	0.018872	-0.50	0.619
isex	-0.01487	0.017781	-0.84	0.403
lpcasen	-0.11534	0.056264	-2.05	0.040
mjvnoix	0.00366	0.004142	0.88	0.377
rurix	0.00242	0.023588	0.10	0.918
edinc	0.00204	0.006033	0.34	0.735
edinc2	-0.00003	0.000054	-0.52	0.605
incgan	0.16370	0.011130	14.71	0.000
cons	0.30208	0.168345	1.79	0.073
σ	0.08540	.004310	19.82	0.000

Log. pseudolikelihood = 251.03351 | Nr. of obs. = 241
Wald $\chi^2(9)$ = 322.27 | Prob > χ^2 = 0.0000

Table 19: **Dummy winner–loser estimation of the vote in 2008**

iv	Coef.	Robust Std. Err.	z	P>|z|
incpc	0.04082	0.023896	1.71	0.088
chapc	-0.03285	0.024202	-1.36	0.175
isex	-0.04557	0.015858	-2.87	0.004
lpcasen	-0.02833	0.081911	-0.35	0.729
mjvnoix	-0.00508	0.003111	-1.63	0.102
rurix	0.00958	0.024289	0.39	0.693
edinc	-0.00497	0.006334	-0.79	0.432
edinc2	0.00004	0.000058	0.64	0.520
incgan	0.17140	0.011837	14.48	0.000
cons	0.53717	0.171478	3.13	0.002
σ	.08949	0.004527	19.77	0.000

Log. pseudolikelihood = 241.74493 | Nr. of obs. = 243
Wald $\chi^2(9)$ = 269.99 | Prob > χ^2 = 0.0000

Table 20: **Dummy winner–loser estimation of the vote in 2012**

incpc	Coef.	Robust Std. Err.	z	P>|z|
iv	0.24972	0.177521	1.41	0.160
isex	0.11213	0.052383	2.14	0.032
lpcasen	-0.35245	0.233378	-1.51	0.131
mjvnoix	-0.00741	0.010460	-0.71	0.479
rurix	-0.20175	0.079831	-2.53	0.011
edinc	0.03242	0.018460	1.76	0.079
edinc2	-0.00032	0.000169	-1.90	0.057
incgan	0.02922	0.046938	0.62	0.534
cons	-0.30334	0.503683	-0.60	0.547
σ	0.24427	0.015700	15.56	0.000

Log. pseudolikelihood = 21.071649 | Nr. of obs. = 244
Wald $\chi^2(8)$ = 38.22 | Prob > χ^2 = 0.0000

Table 21: **Dummy winner–loser estimation of the expenditure in 2012**

incpc	Coef.	Robust Std. Err.	z	P>|z|
iv	0.30880	0.213000	1.45	0.147
isex	0.10687	0.072662	1.47	0.141
lpcasen	-0.26242	0.313541	-0.84	0.403
mjvnoix	-0.00531	0.012211	-0.44	0.663
rurix	-0.15078	0.107281	-1.41	0.160
edinc	0.03614	0.024145	1.50	0.134
edinc2	-0.00037	0.000227	-1.61	0.107
cons	-0.41836	0.658275	-0.64	0.525
σ	0.25500	0.020991	12.15	0.000

Log. pseudolikelihood = 4.8008918 | Nr. of obs. = 156
Wald $\chi^2(7)$ = 16.20 | Prob > χ^2 = 0.0233

Table 22: **Winners only estimation of the expenditure in 2012**

iv	Coef.	Robust Std. Err.	z	P>|z|
incpc	0.07450	0.022318	3.34	0.001
chapc	-0.05065	0.028224	-1.79	0.073
isex	-0.01113	0.029017	-0.38	0.701
lpcasen	-0.23609	0.073304	-3.22	0.001
mjvnoix	0.01186	0.005197	2.28	0.022
rurix	-0.02562	0.029123	-0.88	0.379
edinc	0.00078	0.008190	0.09	0.925
edinc2	-0.00001	0.000075	-0.16	0.873
cons	0.51220	0.223550	2.29	0.022
σ	0.08973	0.005698	15.75	0.000

Log. pseudolikelihood = 153.75804 | Nr. of obs. = 155
Wald $\chi^2(8)$ = 30.25 | Prob > χ^2 = 0.0002

Table 23: **Winners only estimation of the vote in 2008**

iv	Coef.	Robust Std. Err.	z	P>|z|
incpc	0.04628	0.030171	1.53	0.125
chapc	-0.10089	0.035310	-2.86	0.004
isex	-0.04087	0.020059	-2.04	0.042
lpcasen	-0.14499	0.111160	-1.30	0.192
mjvnoix	-0.00550	0.003568	-1.54	0.123
rurix	0.00125	0.032643	0.04	0.969
edinc	-0.00191	0.007977	-0.24	0.810
edinc2	0.00000	0.000076	0.03	0.973
cons	0.69045	0.209098	3.30	0.001
σ	0.09180	0.005661	16.22	0.000

Log. pseudolikelihood = 150.2305 | Nr. of obs. = 155
Wald $\chi^2(8)$ = 19.58 | Prob > χ^2 = 0.0120

Table 24: **Winners only estimation of the vote in 2012**

incpc	Coef.	Robust Std. Err.	z	P>|z|
ivhat	9.84731	0.493352	19.96	0.000
isex	0.12237	0.031717	3.86	0.000
lpcasen	2.25793	0.190823	11.83	0.000
mjvnoix	-0.12133	0.008371	-14.49	0.000
rurix	0.26510	0.046596	5.69	0.000
edinc	0.00905	0.011689	0.77	0.439
edinc2	-0.00005	0.000110	-0.43	0.667
cons	-5.12073	0.404928	-12.65	0.000
σ	0.12574	0.007356	17.09	0.000

Log. pseudolikelihood = 105.52248 | Nr. of obs. = 155
Wald $\chi^2(7)$ = 437.96 | Prob > χ^2 = 0.0000

Table 25: **Instrumented winners only estimation of the expenditure in 2012**

iv	**Coef.**	**Std. Err.**	**z**	**P>|z|**
incpchat	0.06308	0.041712	1.51	0.130
chapc	-0.06943	0.040362	-1.72	0.085
isex	-0.04167	0.023005	-1.81	0.070
lpcasen	-0.14076	0.101488	-1.39	0.165
mjvnoix	-0.00521	0.004308	-1.21	0.226
rurix	0.00044	0.030638	0.01	0.988
edinc	-0.00297	0.008496	-0.35	0.727
edinc2	0.00001	0.000080	0.16	0.871
cons	0.69530	0.220104	3.16	0.002
σ	0.09180	0.005215	17.60	0.000

Log. pseudolikelihood = 150.2305	Nr. of obs. = 155
Wald $\chi^2(8)$ = 22.28	Prob > χ^2 = 0.0044

Table 26: **Instrumented winners only estimation of the vote in 2012**

incpc	**Coef.**	**Robust Std. Err.**	**z**	**P>|z|**
iv	0.16201	0.365556	0.44	0.658
isex	0.11800	0.058680	2.01	0.044
lpcasen	-0.41404	0.345315	-1.20	0.231
mjvnoix	-0.01912	0.017355	-1.10	0.271
rurix	-0.27525	0.095804	-2.87	0.004
edinc	0.03933	0.025699	1.53	0.126
edinc2	-0.00037	0.000234	-1.58	0.114
cons	-0.42588	0.689423	-0.62	0.537
σ	0.21537	0.019358	11.13	0.000

Log. pseudolikelihood = 19.105482	Nr. of obs. = 88
Wald $\chi^2(7)$ = 24.34	Prob > χ^2 = 0.0010

Table 27: **Losers only estimation of the expenditure in 2012**

iv	Coef.	Robust Std. Err.	z	P>|z|
incpc	0.07024	0.031207	2.25	0.024
chapc	0.03693	0.027197	1.36	0.174
isex	-0.02000	0.019636	-1.02	0.308
lpcasen	0.05523	0.076257	0.72	0.469
mjvnoix	-0.00692	0.004780	-1.45	0.148
rurix	0.05519	0.032725	1.69	0.092
edinc	0.00699	0.008538	0.82	0.413
edinc2	-0.00008	0.000074	-1.03	0.304
cons	0.13230	0.241489	0.55	0.584
σ	0.06789	0.005618	12.08	0.000

Log. pseudolikelihood = 109.30029 | Nr. of obs. = 86
Wald $\chi^2(8)$ = 23.42 | Prob > χ^2 = 0.0029

Table 28: **Losers only estimation of the vote in 2008**

iv	Coef.	Robust Std. Err.	z	P>|z|
incpc	0.01587	0.045690	0.35	0.728
chapc	0.06044	0.031543	1.92	0.055
isex	-0.05039	0.025024	-2.01	0.044
lpcasen	0.18965	0.108312	1.75	0.080
mjvnoix	-0.00471	0.006719	-0.70	0.483
rurix	0.02749	0.037835	0.73	0.467
edinc	-0.00411	0.008080	-0.51	0.611
edinc2	0.00004	0.000073	0.51	0.612
cons	0.41317	0.218982	1.89	0.059
σ	0.07524	0.005652	13.31	0.000

Log. pseudolikelihood = 102.80151 | Nr. of obs. = 88
Wald $\chi^2(8)$ = 10.45 | Prob > χ^2 = 0.2348

Table 29: **Losers only estimation of the vote in 2012**

incpc	**Coef.**	**Std. Err.**	**z**	**P>|z|**
ivhat	10.02547	0.701951	14.28	0.000
isex	0.22038	0.035283	6.25	0.000
lpcasen	-0.51984	0.148443	-3.50	0.000
mjvnoix	0.06551	0.010768	6.08	0.000
rurix	-0.67298	0.060625	-11.10	0.000
edinc	-0.05203	0.015918	-3.27	0.001
edinc2	0.00058	0.000147	3.95	0.000
cons	-1.72399	0.414753	-4.16	0.000
σ	0.10873	0.008583	12.67	0.000

Log. pseudolikelihood = 73.482816	Nr. of obs. = 88
Wald $\chi^2(7)$ = 266.18	Prob > χ^2 = 0.0000

Table 30: **Instrumented winners only estimation of the expenditure in 2012**

iv	**Coef.**	**Std. Err.**	**z**	**P>|z|**
incpchat	0.02254	0.056926	0.40	0.692
chapc	0.05209	0.039565	1.32	0.188
isex	-0.05084	0.023968	-2.12	0.034
lpcasen	0.18888	0.100847	1.87	0.061
mjvnoix	-0.00462	0.006074	-0.76	0.447
rurix	0.03019	0.037912	0.80	0.426
edinc	-0.00452	0.010310	-0.44	0.661
edinc2	0.00004	0.000093	0.44	0.660
cons	0.42213	0.276481	1.53	0.127
σ	0.07524	0.005673	13.26	0.000

Log. pseudolikelihood = 102.80151	Nr. of obs. = 88
Wald $\chi^2(8)$ = 12.58	Prob > χ^2 = 0.1271

Table 31: **Instrumented losers only estimation of the vote in 2012**

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