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Evidence from Portuguese elections”**

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NIPE WP 01/ 2012

NÚCLEO DE INVESTIGAÇÃO EM POLÍTICAS ECONÓMICAS  
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# Turnout and the modeling of economic conditions: Evidence from Portuguese elections

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## Abstract

This paper analyzes the impact of economic conditions on voter turnout at Portuguese legislative and municipal elections. We use four extensive datasets to estimate an economic turnout model in which local economic variables are included in quadratic form, so that non-linear effects can be taken into account. The first two datasets cover all mainland municipalities (currently 278), from 1979 to 2005. The other two are cross-sections of all 4037 mainland *freguesias*, used to analyze the determinants of turnout at the 2001 municipal elections and at the 2002 legislative elections. Empirical results indicate that the performance of the national economy is important only in legislative elections and that, in accordance with our expectations, the regional and local unemployment rates tend to have a non-linear relationship with turnout.

Keywords: Turnout, Local governments, Elections, Portugal, Economic conditions

JEL Classifications: D72, H7

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## 1. Introduction

The search for explanations as to why some people vote while others do not has attracted a significant amount of research, and the empirical literature has uncovered a long list of variables which affect voter turnout, such as education, age and the electoral design. However, a convincing picture of the relationship between the economy and voter turnout has eluded researchers, and little attention has been paid on the subject in comparison with the vast literature found analyzing how people vote. We find two valid theoretical explanations for the effect of economic conditions on turnout which suggest opposing effects, and the empirical evidence has provided mixed results. The question as to whether economic conditions foster or depress turnout remains unanswered and, in fact, many researchers believe that they do not affect turnout at all.

The main goal of this paper is to provide new insights and contribute to a better understanding of this relationship. Using four extensive datasets, we find robust empirical evidence indicating that economic conditions affect turnout rates in Portugal, not only at legislative elections, but also at municipal elections. Moreover, the results support the hypothesis that the economy has non-linear effects on turnout. That is, the presence and magnitude of mobilization or withdrawal effects on turnout depend on the severity of recessions. Concretely, mild recessions seem to have withdrawal effects, while more severe economic conditions have a mobilization effect.

We believe that the identification of non-linear effects of economic variables on turnout is a significant contribution to the literature. It is possible many previous studies obtained mixed results for the effects of economic performance on turnout because the possibility that those effects are non-linear effects was not properly taken into account. This study also investigates the effects of standard socio-demographic and institutional variables. Although there are some studies which examine turnout at Portuguese elections in a sociological perspective (see, among others, Freire and Magalhães 2002), to the best of our knowledge, there are no articles focusing on the economic dimension nor using panel data techniques. We simultaneously analyze legislative and municipal elections, using similar variables, models and estimation methods, thus permitting a clear assessment of the differences and similarities between turnout behavior at Portuguese first and second order elections.

The article is organized as follows. Section 2 discusses the relationship between turnout and economic conditions. Section 3 describes the model and dataset used. The

panel data results are presented in section 4, while section 5 reports the cross section results. Finally, conclusions are presented in section 6.

## **2. Turnout and the economy**

Since the 1980s, numerous studies analyzed the determinants of voter turnout and various theories emerged addressing the many different aspects of the theme (see Geys 2006 and Blais 2006 for encompassing surveys). As in stands, the existing research as established some robust patterns. Sociological characteristics, especially age and education, have been consistently referenced as important explanatory factors (see, among others, Blais 2000, Franklin 2004, Lijphart 1997). We also know relatively well why turnout is higher in some countries than in others. Comparative studies show that different Institutional arrangements embodied in electoral laws provide different turnout outcomes (Powell 1986, Jackman 1987, and Jackman and Miller 1995). In general, the more accountable and competitive the political systems are, the larger the electoral mobilization is.

However, regarding the effect of the economy on turnout, the literature provides mixed results and is far from reaching a consensus. Strong evidence is found supporting the idea that the economy affects how a person votes and a great deal of scholarly attention has been paid to the issue (see Paldam 2004). Comparatively, studies analyzing if (and how) the economy affects whether a person votes or not are scarce and we find conflicting theories and inconsistent results. There is, however, relatively strong support for the hypothesis that turnout is higher in economically advanced countries (Blais and Dobrzynska 1998, Norris 2002, Fornos et al. 2004).

The literature provides two competing theories regarding the expected relationship between turnout and the economy. The first argues that people under economic strain are more prone to vote, in what Schlozman and Verba (1979) called a “mobilization” effect. In

this view, people are encouraged to be more active politically (vote, protests participation, lobbying...) because they blame the government for their economic hardships and wish to manifest their discontentment regarding the government's policies. The "negative voting" theory (see Lau 1982) reinforces this argument as it posits that the motivation to politically punish is greater than the motivation to politically reward, therefore economic duress should foster turnout.

The second theory argues the opposite. It assumes that voters respond to adverse economic conditions by withdrawing from the political process. The reason is that people facing economic hardships face serious problems, therefore they tend to focus their efforts and attention on solving them and, as a result, pay less attention to external matters like politics. Rosenstone (1982) argues that this relationship holds, not only at the individual level, but also at the aggregate level, and some studies find evidence that especially the poor and the unemployed exhibit a strong reduction in their capacity to participate in politics (Wolfinger and Rosenstone 1980, Caldeira et. al. 1985).

Along with these two competing explanations, the alternative of no effect is also possible. This idea seems to be dominant, either by omission or empirically supported, as we find a considerable amount of literature not addressing the issue of economic effects, and significant evidence supporting the notion that economic conditions do not affect turnout (see, among others, Fiorina 1978, Blais and Dobrzynska 1998, Blais 2000, Kostadinova 2003, Fornos et al. 2004).

However, a nil effect of the economy on turnout, as some studies report, is considerably different from a null effect. Radcliff (1992) points out that, as the two contestant theories exhibit solid arguments but contradictory claims regarding the expected effect of the economic environment on turnout, the most likely scenario is a nil overall effect, because both withdrawal and mobilization effects may indeed occur simultaneously.

The null effect hypothesis raises the question of whether economic variables are being properly introduced in the turnout function. Radcliff (1992) provides a first insight on the matter when observing that in developed countries adverse economic conditions tend to depress turnout, as Rosenstone (1982) suggests, but in the developing countries the opposite occurs. He argues that “the difference may be attributable to the stakes involved. In the absence of security programs the potential human costs of poor economic performance are much greater.”(Radcliff 1992: 446) He found evidence that the effect of the economy is best modeled when interacted with a measure of security programs and using a polynomial form.

In this paper we try to go further by testing the hypothesis that both withdrawal and mobilization effects exist simultaneously and that different degrees of adverse economic conditions provide different stimuli to voters. We posit that scenarios of mild recession may generate a strong dominance of the withdrawal effect, while more severe economic hardships may cause the mobilization effect to be dominant. Whatever the intensity of a recession, the poor and the unemployed will be extremely concerned with their personal situation and probably behave as Rosenstone (1982) proposes, so the question is how the middle and upper class voters react to recessions? As they constitute the majority of voters, their response will be critical to the dominant effect of the economy on turnout. It is common to find that people react to bad economic conditions with concern, and the intensity of this feeling is obviously tied with each voter’s personal situation, which depends on labor status, available security programs, and other factors. Although each person’s reaction is unique, there is a probable common trend: as economic conditions worsen, the concern with one’s welfare increases. For the middle class voter, an increase in unemployment means that the probability of losing her job increases, and although she may not be currently unemployed, she will become more concerned and react by, for instance,

watching more news on economic issues, attending meetings, and in general, becoming more involved in political activities. It is then plausible to assume that, as economic conditions worsen, the increasing concerns with the economy increase the chances for mobilization and the importance of the economy in the decision to participate.

In periods of mild recession or stagnation, one may expect a dominance of the withdrawal effect. All those facing critical financial problems probably behave as Rosenstone (1982) suggests. For others, alienation from the political process is a strong possibility, as they may not exhibit enough concern about the economy to actually participate. Furthermore, the economy may not be a sufficiently important issue to be relevant for the decision of whether to vote or not.

One way of modeling these effects is to use the economic variables in a quadratic form, as it allows the identification of increasing or decreasing marginal effects. We use this alternative in our analysis of turnout for the Portuguese elections. To conform to theoretical expectations the coefficients associated with economic variables must result in an inverted U-shaped quadratic form for variables such as income or GDP and exhibit the opposite shape for variables such as unemployment or inflation.



### 3. Data and model specification

We use four extensive datasets to analyze the economic determinants of turnout. The first two are comprised of panel data for all mainland Portuguese municipalities<sup>1</sup> (currently 278), ranging from 1979 to 2005. One dataset covers 10 electoral periods for legislative elections and the other covers 8 electoral periods for municipal elections. The second group of datasets is cross-sectional and regards the 2001 municipal elections and the 2002 Legislative elections. They comprise all mainland *freguesias*<sup>2</sup> (a total of 4037). Yearly unemployment data is not available at the level of *freguesias*, but because 2001 was a census year, data for the unemployment rate at both municipal and *freguesia* levels are available. This enables us to investigate the salience of the local unemployment rate at a much more disaggregated level than previous studies have attempted. Electoral results and political data used were all obtained from the Technical Staff for Matters Concerning the Electoral process (STAPE).

The empirical model used has an autoregressive component and is of the following form:

$$TURN_{i,E} = \alpha_1 TURN_{i,E-1} + \alpha_2 ECO_{i,E} + \alpha_3 ECO^2_{i,E} + \alpha_4 Social_{i,E} + \alpha_5 Institucional_{i,E} + \nu_i + u_{i,E} \quad (1)$$

where  $TURN_{i,E}$  is the number of votes in municipality/freguesia  $i$  at election year  $E$  as a share of the eligible population<sup>3</sup> and  $ECO_{i,E}$  is a set of economic variables. Then, to control for non-economic determinants of turnout, we include one set of institutional variables and one set of socio-demographic regressors. Finally,  $\nu_i$  is the fixed effect for municipality  $i$ , and  $u_{i,E}$  is the error term.

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<sup>1</sup> Mainland Portugal is divided into 278 municipalities (*municípios* or *concelhos*). Usually, a municipality has the name of its biggest town or city or, in some cases, of its historically most important town or city. The municipality is, usually, considerably larger than the city or town after which it is named.

<sup>2</sup> Each Municipality is subdivided into a variable number of *freguesias*. These are the lowest administrative units in Portugal.

<sup>3</sup> For municipal elections we use the turnout regarding Town Council elections, which are the ones that determine the mayor. Voters also cast their votes on the same day for the Municipal Assembly and for the Assembly of the *freguesia*.

Regarding the economic variables used, the national unemployment rate was obtained from the OECD's *Main Economic Indicators*. Data for the regional GDP (at the NUTS III level), and the unemployment rate at the *freguesia* and NUTS III levels<sup>4</sup> were obtained from the Portuguese National Institute of Statistics (INE). The regional NUTS III unemployment rate was available only for 1991 and from 1999 onwards, thus reducing time variability and the number of observations in our sample. To overcome this difficulty, we estimated a *proxy* of the unemployment rate for the remaining years of the 1990's using the multiple imputation algorithm developed by Honaker and King (2010). There are no consistent time series data for unemployment available at the municipal level, however. To control for the labor market at the municipal level we use data on employment in private firms seeded in each municipality, which is available on the "Quadros de Pessoal" database of the Portuguese Ministry of Labor and Social Solidarity (MTSS).<sup>5</sup> Also from this source, we use the average municipal wage growth rate, available since 1985. As a measure of municipal income, we use the *Marktest's* Sales Index, which reflects municipalities' wealth by taking into consideration the population, fiscal burden, electricity consumption, automobiles sales, and the number of bank agencies and of retail stores.

To control for the municipalities' socio-demographic characteristics we include some of the typical explanatory variables found in empirical studies: population density, the illiteracy rate, the share of the resident population above 65 years old, and the percentage of the municipality's population employed in the tertiary sector. Data on Municipal population were obtained from the local authority's (*Direcção Geral das Autarquias Locais - DGAL*) annual publication called *Finanças Municipais* (Municipal Finances). The illiteracy rate

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<sup>4</sup> NUTS is a geocode standard for referencing the subdivisions of countries for statistical purposes, used within the European Union. In Portugal, a hierarchy of three NUTS levels is established. Continental Portugal corresponds to a NUTS I region, which is subdivided into 5 NUTS II regions. These 5 regions are then subdivided into 28 sub regions (NUTS III) each one comprised of several municipalities.

<sup>5</sup> This is a yearly mandatory employment survey that covers almost all privately owned firms employing paid labor in Portugal (public servants and own employment are not included).

and the data on the percentage of the population in the tertiary sector were obtained from the *Census* operation of the Portuguese National Institute of Statistics (INE). Data were available for 1981, 1991 and 2001. As the evolution of this type of variables over time is generally based on a stable trend, a constant growth rate was assumed to fill in the missing data. Data on population by age was obtained by assuming a constant growth rate for the period 1979-1989, on the basis of the 1970 and 1981 census; for the remaining years annual data was acquired from INE's resident population estimates. A larger population is expected to be associated with lower electoral turnout. Population measures are often used to check Downs' (1957) claim of a direct relationship between turnout and the probability of casting the decisive vote. In general, studies show that higher education is linked with higher participation (see Blais 2000). Therefore, one should expect the illiteracy rate to be negatively correlated with turnout.<sup>6</sup> Regarding age, studies generally report it having a positive effect on turnout. However, as we use the population over 65 years old, this effect may be mitigated because, for older people, health issues may inhibit some from going to the ballots.

The percentage of the population employed in the tertiary sector may be viewed as a *proxy* for urbanization and, simultaneously, a measure of education, as white collar workers tend to be more educated than the average worker. We have no prior regarding the sign of the coefficient associated with this variable. On the one hand, the sociological theory posits that urbanization tends to weaken interpersonal bounds (Hoffman-Martinot 1994), therefore depressing turnout but, on the other hand, higher levels of education seem to be related with higher turnout.

The empirical model also includes a set of institutional variables traditionally found in turnout studies. We use a standard measure of closeness of the elections defined as the

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<sup>6</sup> However, some comparative studies report the opposite relationship. For instance Franklin (2004) found a negative effect on turnout of the percentage of the population with a college degree.

difference in vote percentages between the largest party and its closest challenger. There is ample evidence regarding the importance and the positive effect of competitiveness on turnout (Geys 2006). In our empirical model, for legislative elections this is a district measure, as deputies in Portugal are elected by district, while for local elections it is constructed by municipality, as all local government branches are elected for the municipality. With similar geographical differences between local and national elections, we introduce the Laakso and Taagepera (1979) index for the effective number of political parties. Theoretically, there is no consensus whether fragmentation can be expected to increase or decrease political participation. Geys (2006) reviews the aggregate-level literature on turnout and concludes that on this matter results are clearly inconclusive.

Another political indicator used is a dummy variable that takes the value of 1 when a local government is controlled by the party that holds power at the national level, and zero otherwise. This simultaneous government variable pinpoints the municipalities that exhibit the maximum clarity regarding the responsibility hypothesis, therefore enabling us to check if the reward/punishment mechanism associated with government voting also affects turnout. If so, the expected sign is negative, and reinforces the idea that turnout and government voting are linked. We also link past government vote with current turnout by introducing in the empirical model for the legislative elections the votes received by the government in the previous election. We expect a negative effect on turnout, as some of the people that supported the government may be discontent with its performance and find no credible alternative, therefore opting to abstain in the coming election. This means that the more overwhelming an electoral victory is the more it tends to depress future turnout.

Finally, one particular point of difference between local and national elections in Portugal is the possibility to find groups of citizens running alongside with parties in municipal elections. We introduce a dummy variable to control for the presence of these

groups in local elections. Descriptive statistics for all variables used are found in the appendix.

Given the dynamic structure of the model, it is not appropriate to estimate equation (1) using OLS. In both the fixed and random effects settings, the lagged dependent variable is correlated with the error term, even if we assume that the disturbances are not themselves autocorrelated. According to Arellano and Bond (1991), this implies inconsistent estimates of the model, when, as in both our two samples, there is a clear dominance of cross sections (278 municipalities) over time periods (10 legislative or 8 municipal elections). These authors developed a Generalized Method of Moments (GMM) estimator that solves the problems referred to above. First differencing (1) removes the individual effects ( $v_i$ ) and produces an equation that is estimable by instrumental variables. In this paper, we use the extended version of the GMM estimator proposed by Arellano and Bover (1995) and Blundell and Bond (1998), the System-GMM estimator for linear dynamic panel data models.

#### 4. Panel data empirical results

Table 1 reports the results of system-GMM estimations<sup>7</sup> for turnout at legislative and municipal elections, from 1979 to 2005. Since data for economic variables at the municipal and regional levels start later than 1979, we begin our analysis by estimating regressions without those variables, so that the entire sample period could be considered and the number of observations would be maximized. Thus, in the estimations whose results are reported in Table 1, only lagged turnout and the vectors of social and institutional variables described in the previous section were considered.

**-- Insert Table 1 about here --**

The results for legislative elections (see Column 1) indicate that turnout tends to be smaller in municipalities with higher illiteracy rates, where the mayor belongs to the party that leads the national government, and where the national government obtained higher shares of votes in the previous elections. They also show that turnout is persistent, that is, turnout at previous elections is strongly and positively related with turnout in the current elections (the estimated coefficient is 0.8). All these results conform to our expectations. Finally, turnout does not seem to be affected by demographic variables, competitiveness, and the number of effective parties. The lack of effects of the last two variables may be due to the fact that, for legislative elections, they are calculated at the district level.

Column 2 reports the results of the estimation for municipal elections. Results are similar to those obtained in Column 1 for all variables that were statistically significant, except simultaneous government, which is no longer significant. Now, all demographic variables seem to affect turnout, which is negatively related with population density and

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<sup>7</sup> Two-step results using robust standard errors corrected for finite samples are reported. The number of observations, municipalities and instruments, and the results of the Hansen and autocorrelation tests are reported at the foot of the table. It is worth noting that, in all estimations of tables 1, 2 and 3, the Hansen test never rejects the validity of the over-identifying restrictions, and autocorrelation of second order is always rejected. Thus, all our system-GMM estimations meet the requirements set forth by Arellano and Bond (1991) for the validity of GMM estimations of dynamic panel data models.

with the percentage of the population in the tertiary sector, and increases with greater percentages of the population over 65 years old. Finally, the results found for competitiveness point to an increase in turnout when elections are more competitive (smaller vote difference between the two most voted parties), a result in accordance with theoretical expectations and general empirical evidence. As to fragmentation, there are strong theoretical arguments supporting both positive and negative effects. Our results are supportive of the latter, as they show that higher effective number of parties reduces turnout in Portugal. Jackman (1987) argues that, under given electoral rules, more fragmentation increases the need for coalition formation, thus decreasing the influence voters have in government formation. Additionally, more parties increase the complexity of the electoral choice (Blais and Dobroczynska, 1998) and add extra information costs (Hoffman-Martinot, 1994) which can discourage voters from going to the polls.

Economic variables are included in the estimations of Table 2 (legislative elections) and Table 3 (municipal elections). Each estimation of columns 1 to 3 includes the national unemployment rate and two municipal/regional economic variables in quadratic form. Column 1 of Table 2 reports the results obtained for turnout at legislative elections when regional (NUTS III) unemployment and real GDP are included.<sup>8</sup> Higher national unemployment rates are associated with higher turnout, which provides evidence in favor of the mobilization approach (Schlozman and Verba 1979, Lau 1982, Rosenstone 1992). The regional (NUTS III) unemployment rate seems to have a U-shaped relationship with turnout (negative sign for the level and positive sign for the squared level). Thus, lower rates of regional unemployment have a negative effect on turnout but, as unemployment increases, the effect becomes positive. The turning point is at an estimated unemployment rate of

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<sup>8</sup> Since regional GDP data is available only from 1991 onwards, the number of observations is considerably smaller than in the estimation of Column 1 of Table 1 (about one half).

7.46%. Real GDP does not seem to affect turnout, when unemployment is taken into account.

**-- Insert Table 2 about here --**

In the estimation of Column 2 of Table 2, regional unemployment and GDP were replaced with the employment rate and real wages in the municipality.<sup>9</sup> As expected, there is evidence of an inverted U-shaped relationship between employment and turnout. The growth rate of real wages in the municipality does not seem to affect turnout. The regional (NUTS III) unemployment rate and the municipal sales index were used in the estimation of Column 3.<sup>10</sup> As expected, the former has a U-shaped relationship with turnout (as in Column 1), while the latter has an inverted U-shaped relationship. Finally, the estimation of Column 4 includes the linear terms of all economic variables. Regional real GDP and municipal employment seem to be positively related with turnout. The absence of statistical significance for the regional unemployment rate may be due to the omission of the squared term, as the results of columns 1 and 3 clearly support the existence of a U-shaped relationship between the regional (NUTS III) unemployment rate and turnout.

Regarding the remaining explanatory variables, the most robust results are that turnout is persistent and that simultaneous governments reduce turnout. Greater competitiveness now seems to decrease turnout in columns 2 to 4, a result lacking theoretical explanation but that some studies report (see Kischgassner and Himmern, 1997).<sup>11</sup> The votes obtained by the national government in the previous election seem to increase turnout in the current election (see columns 1, 3 and 4). This result is a bit strange, as it is the opposite of the one obtained in Table 1. Finally, the remaining independent

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<sup>9</sup> Data is available from 1985 onwards. Relative to the estimation of column 1, we gain one election for 275 municipalities.

<sup>10</sup> Since the municipal sales index is available only from 1992 onwards, this is the estimation with the smallest number of observations: we lose one election relative to column 1, and two elections relative to column 2.

<sup>11</sup> As our results seem to be in accordance with theoretical expectations at municipal elections, this surprising result for legislative elections may be due to the fact that we are using municipal data, but our measure of competitiveness is district based.



variables are only statistically significant in one or two estimations, which may indicate that their relationship with turnout is not robust.

Table 3 shows the results obtained for municipal elections. Contrary to what happened for legislative elections, the national unemployment rate does not seem to affect voter participation. Although some voters may wish to reward/penalize the national government in municipal elections, it is not likely that the mobilization effect is of a magnitude comparable to that at legislative elections, when voters are directly judging the national government.

**-- Insert Table 3 about here --**

As happened for legislative elections, there is evidence of a U-shaped relationship between regional unemployment rates and turnout (see columns 1 and 3). Thus, in municipal elections, voters tend to pay more attention to regional (NUTS III) unemployment, which is more closely related to municipal economic performance than national unemployment rates. The absence of statistical significance for the regional unemployment rate in column 4 may be due to the omission of the squared term. The regional real GDP, municipal employment, municipal real wages, and the municipal sales index do not seem to affect turnout, as none of these variables is statistically significant in the estimations of Table 3. Concerning the other explanatory variables, there is robust evidence that turnout is persistent, that it increases with greater shares of the population over 65 years old, greater competitiveness, and in municipalities where lists of independent citizens run for office. Turnout decreases with greater percentages of workers in the tertiary sector, higher effective number of parties, and with simultaneous governments. Population density and the illiteracy rate are only statistically significant in column 2, both with a negative sign.

In an overall assessment, although unemployment seems to matter in both first and second order elections, our results for the economic variables are generally more robust for

legislative elections. The contrary occurs regarding institutional and socio-demographic variables; they seem to play a larger role in municipal elections. In light of the responsibility hypothesis, the first assessment makes sense, and, as to the second, it seems that different elections provide different stimuli to voters.

## 5. Cross-section empirical results

This section uses different datasets in order to test for the effects of *freguesia* and municipal level unemployment rates in turnout at the 2001 municipal elections and at the 2002 legislative elections. Yearly unemployment data is not available at the *freguesia* level, but because 2001 was a census year, it is possible to obtain this data and test the effect of this important economic variable at the lowest level of aggregation.

We made two changes to the model used in the previous section. First, the percentage of the municipal population in the tertiary sector was replaced by a dummy variable, *Urban Areas*, which takes the value of one for the *freguesias* that are mainly urban areas, and zero otherwise. Second, instead of the percentage of the municipal population over 65 years old, we use the percentage of retired people in each *freguesia*. They are very similar measures, and the swap was made because these were the closest proxies we could find in the census data. In the regressions for legislative elections, we omitted the closeness measure and the number of parties because, as they are measured at the district level, their variability would be very small in a cross section of *freguesias* (there would be only 18 different values for each of these variables).

We use three alternative estimation methods that deal with the typical problem of heteroscedasticity found in cross section analysis.<sup>12</sup> The first is the standard OLS regression with robust standard errors. The second is the weighted least squares (WLS) method

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<sup>12</sup> It is necessary to account for heteroscedasticity because both the Breusch-Pagan and the White tests rejected the homoscedasticity assumption in our model.

proposed by Madalla (1983) which identifies the heteroscedastic process and proposes a logistic transformation to the dependent variable.<sup>13</sup> This method takes into account the differences in population between *freguesias*, thus reporting more efficient estimators than OLS. In the third method, after the WLS, we use a Feasible Generalized Least Square (FGLS)<sup>14</sup> in order to control for other unknown causes of heteroscedasticity. These last two methods are less vulnerable to heteroscedasticity than OLS.

The results of cross-section regressions for turnout at the *freguesia* level in Portuguese legislative elections are reported in Table 4. Since OLS results are less reliable than WLS and WLS/FGLS results, our comments concentrate on the latter two methods. WLS results provide evidence of a U-shaped relationship between unemployment rates at the *freguesia* level and turnout. Considering that the turning point is at an unemployment rate of 17,87%, for most cases only the negative effect matters. This is what the WLS/FGLS results indicate, as squared unemployment is not statistically significant in column 3. Thus, higher unemployment at the *freguesia* level had essentially a demobilizing effect in the 2002 legislative elections.

**-- Insert Table 4 about here --**

WLS/FGLS results indicate that growth in wages at the *freguesia* level has an inverted U-shaped relationship with turnout, with a turning point at around 3%. Concerning the other independent variables, turnout is persistent, and it decreases in urban areas, with higher illiteracy rates, and with the votes obtained by the national government in the previous election. WLS/FGLS estimation results also indicate that turnout may increase with simultaneous governments and with greater percentages of retired people.

**-- Insert Table 5 about here --**

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<sup>13</sup>  $Turn = \log(Turn_i / (1 - Turn_i))$ . See Dubin and Kaslow (1996) for an application of this method.

<sup>14</sup> Starting with the estimated logistic model, we correct for other potential sources of heteroscedasticity using the feasible generalized least square method proposed by Wooldridge (2003).

The cross-section results for municipal elections are reported in Table 5. WLS and WLS/FGLS support the existence of a U-shaped relationship between unemployment and turnout, which is in line with the panel data results reported in Table 3. There is also evidence that higher wages increase turnout. In this case, the mobilization effect would be to reward the local government. Furthermore, turnout is persistent, it increases with simultaneous governments, with greater percentages of retired people, and when lists of independent citizens run alongside parties. Finally, turnout seems to decrease in urban areas and increase with competitiveness.

## **6. Conclusion**

There is an extensive literature focusing on voter participation, and empirical studies have been able to identify a long list of variables which affect turnout. Nevertheless, the effect of economic performance on turnout is still an unsettled issue. There are two theoretical explanations for the effect of economic conditions on turnout which suggest opposing effects (mobilization vs. withdrawal effects), and the empirical evidence has provided mixed results. Thus, there is still no consensus as to whether worse economic performance fosters or depresses turnout. In fact, several researchers argue that the economy does not affect voter participation at all.

This paper's main contribution to the literature is to test the hypothesis that both withdrawal and mobilization effects exist simultaneously, and that different degrees of adverse economic conditions provide different stimuli to voters. Concretely, we hypothesize that, for relatively small rates, unemployment has essentially withdrawal effects, while more severe economic conditions resulting in higher unemployment rates, have mobilization effects (more people will want to penalize the incumbent government).

Using four extensive datasets, we perform system-GMM panel data estimations and OLS, WLS and WLS/FGLS cross section estimations for turnout at Portuguese legislative and municipal elections. Our results provide robust empirical evidence indicating that economic conditions affect voter participation rates in Portugal. Moreover, the results support the

hypothesis that the economy has non-linear effects on turnout. That is, the presence and magnitude of mobilization or withdrawal effects depend on the severity of economic conditions. Concretely, there is a U-shaped relationship between unemployment rates and turnout: at low rates, unemployment seems to have withdrawal effects, while for higher rates (above 7.5%) it has mobilization effects. Employment rates and real wages are also found to have non-linear effects on turnout, with the expected signs (inverted U-shaped relationship).

We believe that the identification of non-linear effects of economic variables on turnout is a significant contribution to the literature. It is possible previous studies obtained mixed results for the effects of economic performance on turnout because non-linear effects were not tested for or were not properly taken into account.

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**Table 1. Turnout: GMM Panel Estimates 1979-2005**

	Legislative (1)	Municipal (2)
Population density	0.006 (0.817)	-0.044*** (-2.807)
%pop. over 65	0.037 (1.568)	0.152*** (5.405)
%pop. Tertiary sector	0.003 (0.403)	-0.059*** (-6.245)
Illiteracy rate	-0.065*** (-3.049)	-0.053* (-1.957)
Competitiveness	0.002 (0.368)	-0.106*** (-8.805)
Effective Number of Parties	-0.308 (-1.309)	-2.178*** (-5.629)
Simultaneous government	-0.485*** (-4.210)	-0.216 (-1.197)
Turnout (previous election)	0.800*** (42.123)	0.772*** (47.130)
Gov. votes (previous election)	-0.036*** (-7.763)	
Groups of citizens		3.616*** (4.924)
Observations	2748	2199
Municipalities / Instruments	275/262	275/243
Hansen Test	266.4[0.145]	241.8[0.225]
AR(1) Test	-8.911[0.00]	-9.854[0.00]
AR(2) Test	-0.517[0.605]	-0.793[0.428]

NOTES: Two step results using robust standard errors corrected for finite samples. All estimations include a constant term and a complete set of time-dummies, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Numbers in parenthesis are t-statistics and those in squared brackets are p-values. All estimations include a complete set of time-dummies.

**Table 2. Turnout: Legislative Elections - GMM Panel Estimates**

	(1)	(2)	(3)	(4)
National unemployment rate	0.031 (0.239)	0.061 (0.583)	0.051 (0.381)	-0.132 (-1.003)
Unemployment	-0.407* (-1.756)		-0.488** (-2.210)	0.008 (0.183)
Squared unemployment	0.027* (1.783)		0.034** (2.337)	
Real GDP	-0.061 (-1.162)			0.009 (0.608)
Squared real GDP	0.002 (1.64)			
Employment rate		-0.047 (-1.611)		0.022 (1.384)
Squared employment rate		0.001 (1.316)		
Growth in wages		-0.004 (-0.216)		0.002 (0.131)
Squared growth in wages		-0.001 (-0.443)		
Sales index			0.025 (1.006)	-0.018 (-1.617)
Squared sales index			-0.000 (-1.246)	
Population density	-0.006 (-0.544)	-0.026*** (-3.026)	-0.003 (-0.370)	0.001 (0.094)
%pop. over 65	0.076* (1.930)	0.133*** (4.647)	0.090** (2.296)	0.113** (2.521)
%Tertiary sector	-0.035*** (-2.711)	-0.066*** (-5.882)	-0.039*** (-3.013)	-0.033*** (-2.716)
Illiteracy rate	0.008 (0.192)	-0.055* (-1.748)	-0.000 (-0.007)	-0.013 (-0.283)
Competitiveness (municipality)	-0.087*** (-10.165)	-0.085*** (-6.528)	-0.072*** (-5.671)	-0.087*** (-9.697)
Eff. Number of Parties (municipality)	-1.972*** (-5.963)	-1.765*** (-4.880)	-1.536*** (-4.224)	-2.113*** (-6.426)
Simultaneous government	-0.613*** (-2.903)	-0.171 (-0.883)	-0.582*** (-2.741)	-0.693*** (-3.258)
Groups of citizens	3.099*** (5.251)	3.210*** (5.807)	2.915*** (4.868)	2.953*** (4.933)
Turnout (previous election)	0.779*** (26.238)	0.805*** (40.819)	0.803*** (25.570)	0.789*** (23.654)
Observations	1100	1375	1100	1100
Municipalities / Instruments	275/237	275/269	275/242	275/229
Hansen Test	239.4[0.164]	264.6[0.266]	244.9[0.161]	221.8[0.275]
AR(1) Test	-7.723[0.00]	-8.186[0.00]	-7.699[0.00]	-7.687[0.00]
AR(2) Test	-0.188[0.851]	-0.863[0.388]	-0.429[0.668]	-0.315[0.753]

NOTES: Two step results using robust standard errors corrected for finite samples. All estimations include a constant term, a complete set of time-dummies and the third lag of the dependent variable, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Numbers in parenthesis are t-statistics and those in squared brackets are p-values. All estimations include a complete set of time-dummies.

**Table 3. Turnout: Municipal Elections - GMM Panel Estimates**

	(1)	(2)	(3)	(4)
National unemployment	0.935*** (11.867)	0.869*** (12.486)	1.065*** (13.151)	0.979*** (11.835)
Unemployment	-0.403*** (-3.408)		-0.820*** (-6.095)	-0.046 (-0.987)
Squared unemployment	0.027*** (3.346)		0.054*** (5.771)	
Real GDP	0.007 (0.218)			0.034*** (2.978)
Squared real GDP	0.000 (0.672)			
Employment rate		0.070*** (2.835)		0.022* (1.862)
Squared employment rate		-0.001** (-1.982)		
Growth in wages		-0.000 (-0.028)		0.016 (0.686)
Squared growth in wages		0.001 (1.426)		
Sales index			0.068*** (3.015)	-0.008 (-1.055)
Squared sales index			-0.0001*** (-2.831)	
Population density	-0.004 (-0.583)	0.015 (1.409)	0.002 (0.208)	0.005 (0.348)
%pop. over 65	0.042 (1.624)	0.079*** (3.034)	-0.037 (-1.191)	-0.001 (-0.025)
%Tertiary sector	-0.007 (-0.782)	-0.027*** (-3.311)	-0.012 (-1.303)	-0.020** (-1.998)
Illiteracy rate	-0.031 (-1.046)	-0.040 (-1.422)	0.058* (1.674)	0.024 (0.609)
Competitiveness (district)	0.007 (1.036)	0.015** (2.037)	0.037*** (4.529)	0.036*** (3.978)
Eff. Number of Parties (district)	-0.180 (-0.778)	-0.852*** (-3.180)	-0.193 (-0.808)	-0.464 (-1.542)
Simultaneous government	-0.584*** (-4.477)	-0.269** (-2.085)	-0.320** (-2.282)	-0.369** (-2.532)
Turnout (previous election)	0.702*** (26.186)	0.599*** (23.022)	0.650*** (19.194)	0.616*** (17.987)
Gov. votes (previous election)	0.017*** (2.685)	0.002 (0.320)	0.026*** (4.451)	0.025*** (4.059)
Observations	1375	1650	1100	1100
Municipalities / Instruments	275/259	275/269	275/262	275/252
Hansen Test	263.3[0.144]	268.2[0.192]	254.7[0.306]	252.9[0.177]
AR(1) Test	-6.112[0.00]	-6.783[0.00]	-5.30[0.00]	-5.347[0.00]
AR(2) Test	-0.0955[0.924]	-0.422[0.192]	-0.922[0.357]	-1.473[0.141]

NOTES: Two step results using robust standard errors corrected for finite samples. All estimations include a constant term, a complete set of time-dummies and the third lag of the dependent variable, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Numbers in parenthesis are t-statistics and those in squared brackets are p-values. All estimations include a complete set of time-dummies.

**Table 4. Turnout: 2002 Legislative Elections**

VARIABLES	OLS (1)	WLS (2)	WLS/FGLS (3)
Growth in wages	0.0241 (0.437)	0.00263 (1.419)	0.00454* (1.923)
Squared growth in wages	-0.0038 (-0.517)	-0.00038 (-1.471)	-0.00075** (-2.282)
Unemployment	-0.0153 (-0.363)	-0.00572*** (-2.600)	-0.00640* (-1.762)
Squared unemployment	0.0007 (0.460)	0.00016** (2.046)	0.00009 (0.586)
Urban areas	-0.2095 (-1.272)	-0.01329* (-1.930)	-0.01458* (-1.705)
Illiteracy rate	-0.0982*** (-5.354)	-0.00380*** (-3.863)	-0.00485*** (-5.017)
Simultaneous government	0.0028 (0.013)	0.01228 (1.634)	0.01521* (1.878)
Population density	0.0525* (1.745)	0.00164* (1.670)	0.00061 (0.955)
%Retired people	-0.0320** (-2.509)	0.00049 (0.572)	0.00198** (2.195)
Turnout (previous election)	0.7714*** (40.980)	0.03522*** (41.513)	0.03681*** (49.417)
Gov. votes (previous election)	-0.0316*** (-4.527)	-0.00235*** (-6.330)	-0.00268*** (-6.127)
Observations	4,019	4,019	4,019
Adjusted R-squared	0.776	0.824	0.857

NOTES: All estimations include a constant term. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Numbers in parenthesis are t-statistics.

**Table 5. Turnout: 2001 Municipal Elections**

VARIABLES	OLS (1)	WLS (2)	WLS/FGLS (3)
Growth in wages	0.0512 (0.834)	0.0116* (1.773)	0.01706** (2.033)
Squared growth in wages	0.0086 (1.013)	-0.0012 (-0.791)	-0.00233 (-1.239)
Unemployment	-0.1202* (-1.659)	-0.0215*** (-3.123)	-0.02888*** (-3.270)
Squared unemployment	0.0032 (1.164)	0.0007*** (3.053)	0.00101*** (3.025)
Urban areas	-2.2410*** (-6.458)	-0.0828*** (-5.118)	-0.08354*** (-4.908)
Illiteracy rate	0.0121 (0.485)	0.0003 (0.173)	0.00078 (0.379)
Simultaneous government	-0.4977 (-1.193)	0.0478** (1.988)	0.06515*** (2.711)
Population density	-0.0423 (-0.210)	0.0005 (0.108)	-0.00012 (-0.030)
%Retired people	0.0432** (2.424)	0.0084*** (3.110)	0.01025*** (3.762)
Competitiveness (municipality)	-0.0615*** (-6.976)	-0.0018*** (-3.762)	-0.00129** (-2.368)
Groups of citizens	2.3326*** (3.878)	0.1517*** (3.254)	0.18143*** (3.219)
Turnout (previous election)	0.8300*** (41.931)	0.0368*** (28.901)	0.03500*** (26.439)
Observations	4,009	4,009	4,009
Adjusted R-squared	0.685	0.798	0.796

NOTES: All estimations include a constant term. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Numbers in parenthesis are t-statistics.

## Appendix

**Table A1. Descriptive statistics: Panel Data (Legislative elections)**

Variable	Obs	Mean	Std. Dev.	Min	Max
Turnout	3033	71.9642	10.12391	48.06974	94.1557
National unemployment rate	2780	6.693509	1.518209	4.07	8.86
Unemployment rate	1390	5.972381	2.454735	1.57	14.3
Real GDP	1390	3.687086	6.205422	0.242127	40.50569
Employment rate	1934	16.03878	10.02724	1.029703	87.61473
Growth in wages	1656	1.759789	4.826512	-26.9679	26.07056
Sales Index	1103	3.626564	10.24918	0.2	160.14
Population density	2758	2.868164	8.895024	0.058178	96.35504
% population over 65 years old	2757	17.38805	5.961829	5.326595	42.02425
% Tertiary sector	2750	41.91003	15.61383	9.155093	85.56738
Illiteracy rate	2750	19.05551	8.725882	3.728859	54.98336
Competitiveness	2758	16.99795	11.81036	0.047844	45.81835
Effective Number of Parties	2759	3.156304	0.639557	2.035882	5.080246
Simultaneous government	2755	0.408349	0.491618	0	1
Government share of votes	3033	37.01825	15.5527	5.453149	85.45291

**Table A2. Descriptive statistics: Panel Data (Municipal elections)**

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Turnout	2480	66.97211	7.358434	36.7938	92.64069
National unemployment rate	2224	6.450909	1.522798	4.08	8.86
Unemployment rate	1112	6.249824	2.445535	1.67	12.03128
Real GDP	1112	3.703672	6.223877	0.247569	40.50569
Sales Index	1103	3.626618	10.1494	0.19	151.85
Growth in wages	1381	0.463713	5.166349	-41.1102	21.24216
Employment rate	1656	16.26608	10.05406	1.029703	90.1767
Population density	2205	2.8496	8.804773	0.058178	96.36732
% population over 65 years old	2205	17.62704	6.012745	5.353324	42.02425
% Tertiary sector	2203	42.82315	15.4991	9.155093	84.91925
Illiteracy rate	2203	18.52168	8.560274	3.728859	54.98336
Competitiveness	2206	19.86058	14.66725	0.018191	87.92598
Effective Number of Parties	2206	2.654976	0.512906	1.186214	4.68719
Simultaneous government	2223	0.421503	0.493911	0	1
Groups of citizens	2221	0.021612	0.145445	0	1

**Table A3. Descriptive statistics: Cross section**

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>
Turnout (Municipal Elections)	4035	68.58307	9.713741	32.45	95.84
Turnout (Legislative Elections)	4037	61.37206	7.7184	20.41	88.62
Growth in wages	4037	1.445557	2.358816	-7.95722	10.33196
Unemployment rate	4037	7.007629	4.831338	0	38.3
Urban Areas	4037	0.239039	0.426549	0	1
Illiteracy rate	4037	14.97067	7.946764	1.3	53.6
Simultaneous government	4037	0.482537	0.499757	0	1
Population density	4036	0.521825	1.872446	0.0014	35.54
% of retired people	4037	25.09507	10.54528	0	85.6
Competitiveness (municipal elections)	4035	25.42264	18.28788	0	93.62
Groups of citizens	4035	0.109046	0.311735	0	1
Government votes (previous election)	4020	42.05093	12.90834	2.94	88.39

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