

**The voting paradox and social networks:
An empirical analysis**

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Abstract

The level of abstention in elections has been increasing over the years in the majority of democratic countries, whether compulsory voting exists or not. We provide empirical evidence for the role of social networks as a main factor of influence in the turnout of an election. More intense social networks and wider social networks are associated with a lower abstention rate.

Keywords: abstention, social networks

1 Introduction

Each voter in an election has a negligible impact on the final outcome, and yet, many people take their time and make an effort to vote. This paradox has puzzled social scientists since Downs (1957). Several explanations have been given but it is essentially an empirical matter to identify the contribution of each one. This paper provides empirical evidence that social networking plays a significant role in the individual decision to vote or not to vote. By testing the empirical implications of a model that isolates the impact of the interaction between voters in the decision to vote (Amaro de Matos and Barros, 2003), this paper provides a number of factors that may help to understand the level of abstention. The empirical analysis is based on a set of recent data from the Portuguese political scene.

The study of voter behavior is as a topic of interest for Economic theory in at least two different dimensions. On one hand, it is a natural theoretical topic since by voting, people decide how to allocate scarce productive resources: those used by the government and those used in the voting process, namely, the time spent by electors. On the other hand, individuals in democracies determine who will be responsible to define the political, social and economic policies by voting. Elections define the governments and the legislative houses, and condition their decisions. Such decisions will affect all parties within the economic system. In turn, the economic performance may have an influence on the outcome of an election.

Before analyzing the composition of votes, it is wise to examine abstention. Democracies are legitimized by their people's vote. By voting, people choose those who will represent them in the decision-making bodies. When the abstention level is too high, the legitimacy of the regime may be questioned. As a result, the voting paradox has both economic and political implications.

Among the theories seeking to explain voting motivations, some have focused on the definition of the voting benefit, and, in particular, on identifying benefits that do not depend on the outcome of the election. Sieg and Schultz (1995) take a different route, by questioning the full rationality and the strong information requirements. Coate and Conlin (2002) present a distinct framework in which voting turnout results from a contest between two opposing groups. Their starting point was Harsanyi (1980), who suggested that voting turnout can be understood as people acting according to rule-

utilitarianism. That is, each individual takes the action that, if adopted by all society members, maximizes social welfare, defined as the sum of individuals' utilities. These explanations, implicitly or explicitly, view the act of voting as a consumption good.

The seminal work of Downs (1957) is closer to seeing voting as an investment. Downs relates income to turnout, arguing that the main cost of voting is usually the income lost by devoting time to it, and thus high-income people will tend to vote, as their marginal utility of income is lower. Moreover, his point of view reflects the fact that "if citizens act rationally on the basis of individually defined self-interest (...) they might very well abstain from voting in election".¹

Several empirical experiments have attempted to explain the relationship between income and voting. Frey (1971) argues that the jobs of high-income voters endow them with superior information, which motivates higher participation. Palfrey and Rosenthal (1983, 1985) argue that, in a world of rational voters, the crucial factor is the expected benefit from voting. They provide some empirical evidence that public bureaucrats will vote more than the private-sector workers, and that these workers vote more than the unemployed citizens.

Other works have complemented the above results: Guttman, Hilger and Schachmurove (1994) came to the conclusion that more educated individuals are expected to vote more frequently than less educated individuals. Based on Myerson (1994), Castanheira (1999) uses a generalized model of Poisson games to explain turnout rates and why such rates might be decreasing with population size. Castanheira (2001) verifies that turnout is regularly higher in richer classes of the population.

Fielding (2000) uses a theoretical framework in which voters' choices are the result of utility maximization decisions, and estimates constituency-level regression equations to explain how the electoral shares of each main party depend on conditions in the constituency. Baum and Freire (2002) tested the hypothesis that aggregate levels of turnout vary in relation to an election's degree of importance for the functioning of the political system, using data for Portugal during the democratic period between 1975-2002, and concluded in favor of different levels of abstention for each election's degree of importance.

More recently, Coupé and Noury (2004) used a questionnaire organized by the National Research Council to isolate the effect of being well informed on the

¹ See Goodin and Klingeman (1998: p. 225).

probability of participation in an election. They concluded that information is a major determinant of abstention, and that theoretical studies that assume that all voters have full information are likely to be unrealistic.

As an additional element to these explanations, Amaro de Matos and Barros (2003) argue the importance of the interaction between voters, and the capacity they have to influence each other, as a determinant factor for the abstention level. If a set of individuals has a positive attitude toward voting, they may influence the social network of people with whom they relate, each one of whom, in turn, will influence others, in a domino effect. The argument is based on mutual influences within the population, a kind of information sharing. By making explicit the channel by which social interactions influence voting behavior, empirical predictions are generated and taken to the data. We provide empirical evidence supporting this notion of social cascading. More recently, other works addressed the issue. Another line of approach is present in Blondel and Levy-Garboua (2008), where a generalization of the expected utility framework (cognitive consistency theory) is used. It has some similarities to the basic principle: receiving a message that one's vote is relevant leads to a revised probability on the value of voting. The origin of such messages is exogenous in Blondel and Levy-Garboua (2008), and the mechanism by which the effect takes place is completely different from Amaro de Matos and Barros (2003). Also, Feddersen and Sandroni (2006) present a model where high turnout rates at elections are obtained endogenously due to an extra benefit to voters from voting, associated with the process itself, which is a complementary, not competing, explanation.

This paper is organized in the following way. Section 2 presents the theoretical background and makes explicit the empirical implications of the theory. Section 3 describes the behavior of the Portuguese electoral system in recent decades and documents the evolution of the abstention rate in those years, namely in the different types of elections. Section 4 sets a reduced form model and presents the data used. Section 5 reports the econometric implementation. Section 6 discusses some robustness checks of the statistical results, and Section 7 concludes.

2 The theoretical framework

As pointed out in Amaro de Matos and Barros (2003), social interactions may have a determinant role on an election's outcome. The utility to each individual from voting was modelled as depending on the social influence to which each individual is subject. This social influence is decomposed into (1) direct social interaction between agents, (2) indirect social interaction between agents, and (3) personal values.

Suppose, for the moment, that agents do not interact directly, but that each individual faces an indirect social interaction, namely through some social pressure. By social pressure we mean social elements that are common to all the voters, and perceived by each of them in the same way, such as the existence of a majority, the presence of strong leaders, the influence of the media and factors such as ethical (or other social) values. Let h_c denote the intensity of this pressure, assumed to be felt equally by each agent. If there are no other reasons than this social pressure for each individual to vote or not to vote, then no matter how small the degree of pressure, it induces either massive voting or massive abstention. If the net effect of the pressure leads to a positive value of h_c , then everybody would vote. If the net effect leads to a negative h_c , then everybody abstains. This common element alone cannot explain different individual decisions regarding abstention.

Turning now to direct interaction between agents, it is assumed that, in the absence of social pressure, each individual chooses to vote or not to vote in order to maximize the degree of agreement between his social relations and himself. Let s_i express the voting attitude of individual i . If $s_i = +1$, individual i is willing to vote, if $s_i = -1$ individual i abstains. Consider a pair of voters i and j , who may either agree with respect to their voting attitude, or disagree. In the former case $s_i s_j = 1$, whereas in the latter $s_i s_j = -1$. The level of utility generated by agreement for a given pair of voters is given by $J s_i s_j$, with $J > 0$. It is assumed that, in the absence of social pressure, voter i chooses his/her attitude so that he/she maximizes the degree of agreement $J \sum_{j \in I_i} s_i s_j$,

where $l_i = \{i_1, i_2, \dots, i_n\}$ denotes the set of n voters with whom voter i interacts. As the total size of the voters' network N increases, both J and n may change.

To introduce the possibility that each person has his/her own idiosyncratic preferences that influence her attitude of voting, or not, a personal values variable $h_i s_i$ is added to the utility, where h_i reflects heterogeneity in the population, with density $p(h_i)$.

Taking all these factors together, individual i is assumed to choose the voting attitude (s_i) so as to maximize total utility,

$$H_i = h_c s_i + J \sum_{j \in l_i} s_i s_j + h_i s_i. \quad (1)$$

In this paper, we provide empirical support for the relevance of social direct interaction in the decision to vote. The results reported here are valid for arbitrarily large networks of voters. In particular, we assume that $J=O(1/N)$ and that $nJ=O(1)$, as the network size N grows without bound.

It can be shown that for a large network of voters, $m=E(s_i)$, the expected voting attitude, is given by the solution to

$$m = \int p(h_i) \tanh[(nJm + h_c + h_i)/D] dh_i \quad (2)$$

where D is a constant that may be interpreted as the degree of tolerance for different opinions.² We can isolate the effect of direct interaction by assuming that J is much larger than social pressure or personal values. Alternatively, we can make both $h \rightarrow 0$, to get the expected voting attitude in a very large population to satisfy in equilibrium

$$m = \tanh\left(\frac{nJ}{D} m\right) \quad (3)$$

A high D means that interacting agents may more freely express different attitudes. A value of D close to zero leads to consensus about voting ($m=1$), for fixed values of n and J .

From this equation it follows that a high number of social contacts, n , and a high J , reflecting the intensity of influence due to exchange among individuals, makes it easier to reach consensus for a fixed D as well.

In order to generate a high turnout equilibrium it turns out that at least a certain number of individuals must believe in the importance of voting rather than abstaining.

² For further details of the model and on the role of D as indirect social interaction, see Amaro de Matos and Barros (2003) and Galam and Moscovici (1991).

This minimum fraction of population with a positive attitude can be understood as a requirement for a minimum number of social interactions needed to trigger a general swing toward voting.

The model generates several empirical implications, namely a) the equilibrium turnout is smaller whenever the ability to accommodate divergence within society, increases. It becomes less important to follow the social norm, which results in a lower voting level; b) If the ability to allow for divergence is greater among young people, a higher level of abstention among younger voters is expected; c) An increase in the number of social contacts is expected to generate a higher turnout in elections; d) The abstention-dominant equilibrium (the $m < 0$ solution) disappears if the intensity of social coercion, h_c , is sufficiently large; e) The development of new information and communication technologies, may influence the turnout by increasing the number of social contacts, that is, the equilibrium turnouts become closer to 100% participation or 0% participation.

A final issue to explore empirically is whether or not a small sub-set of the population deciding to vote is sufficient to induce high turnouts at elections.³

3 Portuguese elections

We now briefly describe briefly now the context in which Portuguese elections took place in the last decades and document the evolution of the abstention rates in those years. Since 1975, 39 elections have taken place in Portugal: 7 presidential elections, 11 parliamentary elections, 7 local elections, 7 elections for the administrative bodies of Azores and Madeira, 4 European elections, and 2 referenda.

All the elections taking place in Portugal follow the d'Hont system of proportional representation, except the presidential elections, which follow a run-off majority system.⁴

The Portuguese abstention rate is related to the country's political evolution. At the end of the 1970's, participation in elections was very high, reflecting the revolutionary period that Portugal was going through. In the first election following the 1974 revolution (which restored democracy in Portugal) the abstention level was 10.3%.

³ This theoretical possibility is derived in Amaro-de-Matos and Barros (2003).

⁴ If no candidate gets the majority of votes in the first ballot, a second election takes place with only the two candidates who received the most votes.

This level has increased since then, following a general trend in developed countries (Lane and Ersson, 1999; Gray and Caul, 2000; Dalton and Wattenberg, 2000; Bartolini, 2001). All of the Western democracies not having compulsory vote, apart from Spain, have shown an increase in abstention levels from 1970 to 1990. The abstention rate in countries where voting is compulsory was compared with the abstention rate in other countries (Freire and Magalhães, 2002, pp.45) and the abstention rate of the second group exceeds by 14.8 pp the first group. Despite this fact, it is worth mentioning that there is wide variance in terms of the abstention levels between industrialized democracies. For instance, the average abstention level in local elections in the USA from 1946 until 1998 is 52.3%, while in Italy it was only of 7.5% (Freire and Magalhães, 2002, pp.44). Also within each country there is a significant dispersion. In the Portuguese local elections of 2001, the abstention level ranged from 32% to 52% at the level of the administrative regions.

Regarding the number of registered voters, in 1973 only 21% of the total population were registered voters, in 1975 growing to 66%, in 1978 to 71%, and in the 1990s to 80% (Espírito-Santo, 2005). This is common to all elections.

Our data set comprises the results of the 2001 local elections, although data from European Parliament elections are used as well (in a way described below).⁵

Portugal is divided into administrative units called *distritos*. These units are subdivided into municipalities (*municípios*), one per each township within each *distrito*. The municipalities are subdivided into parishes (*freguesias*) for voting and administrative purposes. The main elected officials are at the municipality level, which commands both the political and financial decision-making at local level. There are no officials elected at the level of the administrative unit (*distrito*), and those elected at the parish level are subject to financial and administrative rule by the municipality.

Local elections are held within municipalities and choose the bodies that govern the cities (or the areas dominated by the cities). We must distinguish between three governing bodies in these elections: the municipal executive (*câmara municipal*); the municipal assembly (*assembleia municipal*) and the assembly of the parish (*assembleia de freguesia*). Elections for these bodies take place into the 308 municipalities in which the country is divided. The average abstention rate in all local elections from 1974 until 1999 was less than 40%, (Espírito-Santo, 2005).⁶ Silva and Costa (2006) and Veiga and

⁵ Information on Presidential and Parliamentary elections in Portugal is presented in the Appendix.

⁶ See Figure A1 in the Appendix.

Veiga (2004) also use Portuguese elections data. Using data from the 1997 local elections, Silva and Costa (2006) look at the hypothesis of rational ignorance, but do not find conclusive evidence. Veiga and Veiga (2004) document how economic conditions affect voting outcomes. None of these researchers address the specific issue of determinants of the abstention rate.

There are also the European Parliament elections. They began only in 1987, as Portugal became a member of the European Union in 1986. Looking at the European scenario, we see that almost half of the citizens do not vote in the European elections, and Portugal is not an exception, reaching an abstention level in these elections of 62.2% in the 1990s.⁷ To justify this level of abstention, it is commonly observed that the result of these elections has no direct impact on the daily life of the European citizens, as do the presidential, national and local elections.

4 Data and Methodology

We use a reduced-form model for the abstention rate, A_k , where k labels the local municipalities and e_k is a (normally distributed) random error, accounting for neglected and non-specified factors. The basic relationship (2) is linearized to be expressed as,

$$A_k = \alpha_0 + \alpha_1 n_k + \alpha_2 J_k + \alpha_3 D_k + \alpha_4 p_k + e_k \quad (4)$$

To empirically assess the implications of the model, we use as dependent variable the rate of abstention in the local elections of 2001 in Portugal (*ABST*). We do not observe direct or indirect social interactions, or personal values of voters. Therefore, we use proxies for these variables in order to test the model. We take independent variables clustered into three groups: the *political density group*, corresponding to proxies for the indirect social interaction; the *fraction of loyal electors' group*, to proxy for the personal values; and the *social networks group*, to proxy for the direct social interaction.

⁷ See Figure A2 in the Appendix.

4.1 The abstention rate

The abstention rate in an election can be defined in different ways according to different methods of computation. We will restrict ourselves to the concept of legal abstention, defined as the difference between the number of registered electors, at a certain moment of time, and the number of registered voters who actually participate in elections.

The use of the legal abstention method could be a problem since municipalities with high mortality rate would present a higher abstention rate than those with a low mortality rate (as electoral records have a lag in the registration of valid voters). Knowing that the electoral registers were all revised in 1998 and that the registry law changed in 1999, specifically to avoid these mistakes, this type of issue should not be a major problem. The argument is reinforced when noting that the data used in this work are from the European Parliament elections of 1999 and the local elections of 2001.

4.2 Political Density

We understand political density variables to be those related to social pressure. This group of variables comprises the following: percentage of voting obtained by each of the major parties in previous (1997) local elections (*MP*), the purchasing power per capita index (*PPI*) by municipality in Portugal in the year 2000, and the annual number of periodical publications by municipality in 2002 (*PUB*).⁸ We now describe each variable in detail.

The variable *MP* is composed of the percentage of votes in the four major political parties in Portugal, the *Social Democratic Party* (PSD), the *Socialist Party* (PS), the *Popular Party* (PP), and the *Communist Party* (which is the major party in a left-wing coalition, termed CDU). To allow for a more flexible characterization, we also consider each party separately. Since 1985, these parties have accounted for almost 90% of all the votes in every legislative election.⁹ In order to measure the impact of the concentration of votes in a limited number of political parties we use a variant of the *Herfindahl-Hirschman Index* (*HHI*), defined as the sum of the squares of the shares of each party. As such, it can range from 0 to 1. As the *HHI* tends to one, there would be a greater domination by one party, a clear source of social pressure.

⁸ The use of data of the year 2002 is explained at the end of Section 5.2.

⁹ For further information see Veiga and Veiga (2004).

As a proxy for income we use a purchasing power index per capita (*PPI*). As argued by Downs (1957) and Frey (1971), higher income motivates greater participation. As the level of income per capita increases, people show higher awareness of the political and economic issues that surround them, the Government's performance, and local issues, and will tend to vote, rather than not. Thus, the wealth level of a community would be a source of social pressure. However, we can also argue that, as the purchasing power increases, economic well-being is guaranteed and, as a result, there is less motivation to vote, since no substantial improvement is expected from the election of a specific party. A voter must sacrifice some working/leisure time, implying an opportunity cost of voting that increases with income. Whether abstention increases with wealth or not is essentially an empirical issue. As there are no data on the income per capita in each municipality, in order to identify the sign of this effect we opt to use a purchasing power index as a proxy.¹⁰ A possible alternative is to use the unemployment rate per municipality, but the purchasing power index gives a more representative idea of the financial power throughout the country.

The influence of the media is common to all the voters in an election, and as such is a source of social pressure or a way to form common ethical and social values. People will tend to vote more when the pressure exerted by media in electoral times, especially radio, television and newspapers is greater. The variable *PUB*, defined as annual number of prints of periodical publications by municipality in 2002, seeks to proxy the intensity of media activity across municipalities. The more information people obtain, the more the interaction within the social network, as people get to know what the other voters think. For this reason, this variable should also belong to the social networks group. Note that local periodical publications and radio tend to focus on local issues as well, while television is more national in scope (only in the Azores and Madeira Islands does Portugal have regional television broadcasts). To avoid comparing a publication with restricted circulation to one with wide dissemination in another municipality, the total yearly number of prints of periodical publications (per inhabitant) is taken as our variable of interest to capture the role of regional press. No data for the influence of the different type of media are available, and we must rely on *PUB* to capture this effect.

¹⁰ To calculate this index, Instituto Nacional de Estatística (INE), uses 18 variables, such as consumption of electricity per capita and the number of basic digital telephone accesses per capita. For more details see INE.

4.3 Loyal Voters

In order to proxy for personal values, we also allow for a role to be played by loyal electors. We consider as loyal electors those who have an idiosyncratic preference toward voting. As a proxy for the fraction of such loyal electors we use the abstention rate in the 1999 European Parliament elections, *EURO*. European Parliament elections are usually regarded those that have the least direct impact on voters' everyday lives. Thus, it is expected that the higher the level of abstention in the European elections in a given location, the lower the number of loyal electors, and hence, the higher the level of abstention in the local elections.

The hypothesis that aggregate levels of turnout vary in relation to an election's degree of importance for the functioning of the political system has already been tested by Baum and Freire (2002) (using data for Portugal) for the period 1975-2001. These authors found empirical support for the belief that electors give differential importance to different types of elections, providing support for our assumption that voters in the European Parliament elections are loyal voters.

4.4 Social Networks

Finally, the role of social networks is evaluated using several proxy variables: the population living in each municipality in 2001 segmented by age groups; the geographic density of each municipality in 2002; the percentage of people within each municipality with a university degree/college education completed; and the number of attendances to primary health care centers.

Regarding the age segmentation, the reasoning is the following. People experience different motivations toward their participation in the political decisions according to the stage of their lives, their cultural, social, economic status and employment situation. The partition of the total population according to age subgroups is related to the fact that people tend to interact with peers, namely people of the same age, sharing the concerns of their generation. Our intention is to capture a measure of this type of social interaction intensity for each municipality. We proxy this social

interaction effect by obtaining the data for population living in each municipality in three age brackets: 15 to 24; 25 to 64; and more than 64 years old.¹¹

Citizens younger than 25 in the year 2001 (*YG*) have lived their entire life in the current democratic regime. Also, this age group may reflect the enthusiasm of voting for the first time. As such, they may attach less weight to whether or not their friends vote. The fact that they have always lived in a stable democratic regime, may lead them to underestimate the importance of voting, as if their rights are guaranteed by social construction. Which of these effects dominates their voting attitude is a purely empirical matter.

For the group between 25 and 64 years of age in 2001 (*ADULT*) it would be optimal to have further discriminated data, distinguishing individuals between 25 and 45 (who have experienced only the democratic regime) and older than 45 (who had a political life before the 1974 revolution). People over 45 are therefore expected to be politically more active in any election, with a relatively low abstention rate. However, these data are not publicly available and we shall deal with the broader group.

The population living in each municipality with more than 65 years of age in 2001 (*SENIOR*) is the group of Portuguese voters more affected by health and therefore mobility problems. A high level of abstention is expected for this group. It is worth mentioning that this age group is characterized by the fact that each of its members was politically active before 1974.¹²

Similar hypotheses, regarding voting behavior according to age group, were tested by Baum and Freire (2002). They concluded that older citizens tend to vote much more regularly.

The geographic density of each municipality in 2002 (*GDEN*), defined as population per squared km, seeks to measure the extent to which the voters' characteristics of a given municipality are urban or rural. The higher the geographic density, the denser the social networks are and the lower the level of abstention in a certain municipality should be. A counter effect would be that in small towns people more often know, and discuss politics, with neighbours than in large towns. We let the data speak on this issue.¹³

¹¹ The legal age for voting purposes is 18, but data available consider only the age group 15-24 at the local level of disaggregation.

¹² The use of data of the year 2002 is explained at the end of Section 5.2.

¹³ The use of data of the year 2002 is explained at the end of Section 5.2 and the way this variable is defined can be found in INE.

The percentage of people with university degree/college education in each municipality (*UNIV*) attempts to capture the degree to which a person tends to express and discuss their opinion about politics and social issues with peers. It would then be expected that social networks are clustered by degree of education. Therefore, we also use this variable as a potential explanatory variable of abstention rate. In fact, Guttman, Hilger and Schachmurove (1994) provided evidence that the more educated individuals are, the more they are expected to vote. However, Baum and Freire (2002) tested the influence of education in the abstention level and the conclusion was that education is an inconsistent predictor in Portuguese elections; this may be due to the very low levels of education among older citizens, who tend to vote much more than the younger.

The number of attendances to primary health care centers, (*HC*), captures in a different way the role of social networks. It is a proxy for the number of people with whom each person may discuss any sort of question (including political issues). In a primary health care center, people may have to wait for a long time before they are seen by a doctor. During elections periods, exchange of ideas and mutual influence may occur. As the number of attendances increases, the social network tends to develop more.

4.5 Sources of information

The variable used as dependent variable is collected from the institution that oversees the voting process, National Election Commission (*Comissão Nacional de Eleições - CNE*). The variables used as independent variables are collected either from the National Institute of Statistics (*Instituto Nacional de Estatística - INE*) or from the CNE. From the INE, we obtain data for the purchasing power index per capita (*PPI*); the population living in each municipality with ages between 15 and 24 years (*YG*); the population living in each municipality with ages 25 to 64 years old (*ADULT*); the population living in each municipality with more than 65 years of age in 2001 (*SENIOR*); the percentage of people with university degree/college education in each municipality (*UNIV*); the number of attendances to primary health care center (*HC*); the annual number of printed issues of periodical publications by municipality in 2002 (*PUB*); and the geographic density for each municipality in 2002 (*GDEN*). From the CNE, we obtain data for the percentage of votes won by each of the major parties in

1997 (*MP*); the rate of abstention in the European elections in 1999 (*EURO*); and the rate of abstention in the local elections of 2001 (*ABST*).

The geographic density of a region is a very stable parameter between 2001 and 2002. As we could not find the data for the geographic density in 2001, we opt for using the geographic density of each municipality in 2002.

The data for the number of attendances to primary health care center (*HC*) and the annual number of periodical publications by municipality (*PUB*) are also dated from 2002. For *HC*, the total population that attended primary health care centers is the same; there was no increase in the number of centers available per municipality and no significant change in the health-problems panorama in the country. Hence, *HC* should be stable. For *PUB*, there is no evidence of any increase or decrease in the number of periodical publications by municipality in this period of time. In addition, it is not reasonable to think that election results imply any sort of impact on these variables. It therefore seems that using 2002 data for the year 2001 produces little change.

The variable *PUB* introduces an additional issue: this information is only available for only some of the municipalities. Whenever *PUB* is included we have a reduction in the sample size available for estimation. In addition, we also consider the values of *PUB* and *HC* normalized by total population in each municipality.

There was a risk of a bias since an explanatory variable is not necessarily independent of shocks in the dependent variable. In this specific case a rise in the abstention rate could affect each of the parties involved in the election differently, taking into account that the data for the abstention rate (*ABST*) and the data for the percentage of voting obtained by each of the major parties in previous elections (*MP*) were initially from the same election, that is, the local elections of 2001. To avoid any reverse causality problem we prefer to use the data for the percentage of voting obtained by each of the major parties in the previous elections (*MP*).

Information on each variable is presented in Table A2 in the Appendix.

5 What determines abstention rates?

Estimation was performed using simple OLS. The estimated values for the coefficients in equation (5) and respective t-statistics can be found in Table 1 below, with column I holding the baseline regression.

Table 1: Empirical determinants of abstention rates

	(I)	(II)	(III)	(IV)	(V)	(VI)
<i>PSD</i>	-0.311	-0.106	-0.399			-0.340
	(-2.36)	(-1.81)	(-3.66)			(-2.61)
<i>PS</i>	-0.366	-0.135	-0.462			-0.403
	(-2.59)	(-2.29)	(-3.99)			(-2.89)
<i>CDU</i>	-0.191	-0.043	-0.282			-0.194
	(-1.37)	(-0.73)	(-2.40)			(-1.41)
<i>PP</i>	-0.356	-0.132	-0.454			-0.412
	(-2.58)	(-2.12)	(-4.07)			(-3.01)
<i>PSD+PP+P S</i>				-0.152		
				(-4.41)		
<i>IND</i>					3.238	
					(2.16)	
<i>PPI</i>	0.089	0.152	0.097	0.084	0.104	0.095
	(3.66)	(7.20)	(4.04)	(3.45)	(4.06)	(3.68)
<i>PUB</i>	-0.060			-0.105	-0.154	-0.028
	(0.24)			(-2.50)	(-3.54)	(-0.55)
<i>EURO</i>	0.586	0.458	0.578	0.596	0.578	0.596
	(5.76)	(7.50)	(5.68)	(5.86)	(5.34)	(5.63)
<i>YG</i>	-1.358	-1.129	-1.291	-1.432	-1.908	
	(-3.24)	(-2.38)	(-3.11)	(-3.45)	(-4.47)	
<i>ADULT</i>	0.459	0.562	0.445	0.509	0.659	
	(3.78)	(4.11)	(3.67)	(4.32)	(5.50)	
<i>SENIOR</i>	0.319	0.371	0.249	0.265	0.409	
	(1.47)	(1.82)	(1.19)	(1.27)	(1.84)	
<i>POP</i>						0.070
						(1.74)
<i>UNIV</i>	0.044	-0.563	-0.045	0.097	0.018	0.219
	(0.25)	(-3.35)	(-0.28)	(0.55)	(0.10)	(1.28)
<i>HC</i>	-34.595	-43.856	-30.800	-40.036	-46.372	-28.251
	(-2.96)	(-3.38)	(-2.73)	(-3.54)	(-3.87)	(-2.48)
<i>GDENS</i>	0.936	1.084	0.989	0.952	0.926	0.754
	(1.60)	(1.56)	(1.69)	(1.64)	(1.50)	(1.24)
<i>const.</i>	25.537	6.848	34.637	7.498	-7.629	27.913
	(1.77)	(1.04)	(2.82)	(1.06)	(-1.12)	(1.94)
obs.	117	295	117	117	117	117
Adj. R ²	0.619	0.495	0.618	0.618	0.567	0.582
RESET test (P-value)	0.79 (0.50)	7.58 (0.00)	1.19 (0.32)	0.90 (0.44)	2.63 (0.05)	1.26 (0.29)
White's test (P-value)	101.88 (0.54)	131.62 (0.00)	87.30 (0.56)	78.17 (0.13)	89.45 (0.02)	81.24 (0.35)

Regarding the number of observations used, it is important to note that only 117 of the 300 observations were included in the regression above. This is due to the fact

that the variable *PUB* is available only for 117 municipalities. As a check on the results we have also estimated using the total number of observations and the 117 observations used above, but now excluding the variable *PUB*. There is no qualitative changes in the results, as we can see by comparing columns II and III with column I in Table 1.

The statistical significance of the individual coefficients shows that the regression results for the political density group did not confirm the expected effects.

Concerning the percentage of votes obtained by each of the main parties (MP), we came to the surprisingly conclusion that, with a significance level of 5%, the (previous) votes for the Communist Party (CDU) are irrelevant in the determination of the abstention rate. The undoubtedly significant results are the Socialist Party (PS), the Social-Democrats (PSD) and the Popular Party (PP), with coefficients indicating a negative relationship between the percentage of votes in these two political parties and the level of abstention. In other words, whenever any of these political parties is relatively more influential, the abstention rate is lower. This is somewhat surprising, especially when compared with the situation of the Communist Party. It is generally argued by political commentators that the Communist Party has highly loyal voters and therefore, there should be a negative association between abstention votes and the share of votes by the Communist Party.

Looking more closely at PP and CDU - two small parties of a similar dimension - the clear difference concerning their association with the abstention level is surprising. One possible interpretation is that where PP (right-wing party) has a higher share of votes, local society feels that more is at stake and participation in elections increases.

As mentioned above, the expected effect of the purchasing power index per capita (PPI) in the rate of abstention (*ABST*) is ambiguous. On the one hand, as the level of income per capita increases, people are more aware of the political issues and, as such, they will tend to vote rather than not to (Downs, 1957, Frey, 1971 and Castanheira, 1999). On the other hand, people's economic security is guaranteed for high levels of income and, as a result, people should feel no need to vote. (Downs, 1957 and Castanheira, 1999) Our empirical results above support the latter view, namely that as the PPI increases, the abstention rate will tend to increase as well. In richer local communities, abstention is higher on average.

With regard to the political density group we conclude in favor of a negative impact of the annual number of periodical publications by municipality (*PUB*) in the abstention rate. That is, the more active the local media is, the greater the negative

influence in the level of abstention it seems to have, showing, in our interpretation, that social pressure conveyed in this way does not affect abstention rates. This result is not robust, as under slightly different specifications (as reported in columns IV – VI of Table 1, described below), the coefficient is negative and statistically significant, suggesting that a more active local press results in lower abstention rates.

Since the coefficients values for PSD, PS and PP seem to be similar at the significance level of 7%, we ran an equality test for these coefficients. The results do not reject the null hypothesis of equality of coefficients (see column IV in Table 1).

Next, we address the effect associated with significant concentration of votes in a limited number of political parties. In order to check for this effect, we use a *Herfindahl Index* computed over voting shares (*IND*) replacing parties' shares of the total vote. The estimates are in column V of Table 1.

The positive and statistically significant coefficient on *IND* shows that as the concentration of votes in one or more political parties increases, the abstention rate does too. One possible explanation for this positive relationship is as follows. Realizing the massive influence of one party, an elector may feel that the vote has even less weight than in normal circumstances in the local municipality, reinforcing the reasons not to vote.

The impact of loyal electors is in accordance with expectations: the level of abstention in the European Parliament elections is positively correlated with the rate of abstention in the local elections. Local municipalities facing a 1% increase in the abstention rate in the European Parliament elections will see a rise the abstention level in the local elections by 0.59%. The fact that the European elections do not have any direct impact on the lives of the voters and that Portugal has a small influence on the European Parliament lead to a situation where people have a reduced incentive to vote in these elections. Those who do turn out are voters who feel their social and political obligations very strongly. As such, they will most likely vote in the local elections as well, which have a greater impact on their everyday lives, and influence others to vote as well. The relevance of social interaction matters more in local elections.

With respect to the social network group of variables, evidence was found that the younger the population, the lower the level of abstention, and that the share of the population with more than 65 years of age does not seem to influence the level of abstention across municipalities. To make our analysis more directly related to Castanheira (1999), we replace age groups by the municipal population itself. The

regression results are reported in Table 1, column VI. We conclude for a positive impact in the abstention level as the total population per municipality increases, which matches the results obtained by Castanheira (1999).

We also find the expected effect on the abstention rate of the number of attendances to primary care health center (*HC*): as the number of attendances increase, there is a negative impact on the rate of abstention. An increase in the number of social contacts is expected to generate a higher turnout in elections.

Neither the percentage of people with university degree/college education in each municipality variable (*UNIV*) nor the geographic density variable (*GDEN*) do not have a significant impact on the abstention level.

6 Robustness of results

A relevant issue is heteroskedasticity. The 117 municipalities used in the main estimations are of similar size. However, we have used two independent variables to capture the dimension of each municipality, namely the geographic density and the total population living in each municipality. There is no evidence of heteroskedasticity, therefore the usual assumption that the random error term was uncorrelated and identically distributed is admissible. The White test and the RESET test for model misspecification do not reject the standard OLS assumption, except for the variants of the basic model reported in columns II and V in Table 1, which are rejected in favor of other models.

The nature of the data also suggests that a proportions data model could be used as the basis for the estimation strategy. The grouped data approach implies estimation with a dependent variable given by:¹⁴ $\ln(ABST_k / (1 - ABST_k))$. The results for the estimates of this new dependent variable on the same set of covariates (as described in previous sections) are in Table 2 below. The variables impacting in the abstention level, for a significance level of 5%, are exactly the same in this model and in the OLS estimates produced earlier. In both models the signs of the effects of the independent variables in the abstention are the same: *PSD*, *PS*, *PP*, *YG*, *PUB* and *HC* have a negative impact in the level of abstention; on the other hand, *PPI*, *EURO* and *CDU*

¹⁴ See Greene (1993).

contribute to an increase in the abstention in elections. Again, the variables representing the interactions between the variables, *GDEN*, *EURO*, *HC* and *UNIV*, have no impact in the abstention rate.

Our final set of estimates, in column I of Table 3, normalizes absolute values by population size, yielding the same qualitative results.

As a further robustness check on our results we allow for the existence of interaction effects between independent variables. Namely, we analyze the relationship between the density of social contacts and the existence of a positive attitude toward the participation in elections. We evaluate the effect of age groups on the marginal effect in the abstention level of *GDEN*, *EURO*, and *HC* variables in the abstention level. From the estimation, we conclude from Table 3, column II, that the variables representing the interactions between the above-mentioned variables have no impact on the abstention rate (for a significance level of 5 %).

Table 2 – Dependent variable $\ln(A/(1-A))$

	(I)	(II)	(III)
PSD	-0.013	-0.005	-0.017
	(-2.32)	(-1.79)	(-3.63)
PS	-0.158	-0.006	-0.020
	(-2.56)	(-2.29)	(-3.97)
CDU	-0.008	-0.002	-0.012
	(-1.38)	(-0.81)	(-2.44)
PP	-0.015	-0.006	-0.019
	(-2.55)	(-2.07)	(-4.06)
PPI	0.004	0.007	0.004
	(3.66)	(7.19)	(4.05)
PUB	-0.003		
	(-1.22)		
EURO	0.025	0.020	0.025
	(5.62)	(7.38)	(5.53)
YG	-0.062	-0.051	-0.059
	(-3.40)	(-2.41)	(-3.26)
ADULT	0.021	0.025	0.019
	(3.85)	(4.04)	(-3.74)
SENIOR	0.015	0.018	0.012
	(1.56)	(1.94)	(1.27)
UD	0.002	-0.026	-0.002
	(0.22)	(-3.42)	(-0.33)
HC	-1.484	-1.914	-1.323
	(-2.91)	(-3.26)	(-2.67)
GDENS	0.038	0.044	0.041

	(1.49)	(1.40)	(1.59)
const.	-1.021	-1.887	-0.611
	(-1.61)	(-6.35)	(-1.13)
obs.	117	295	117
Adj. R ²	0.609	0.459	0.607
RESET test (P-value)	1.02 (0.39)	7.58 (0.00)	1.34 (0.27)
White's test (P-value)	103.99 (0.48)	117.80 (0.03)	91.14 (0.45)

Table 3: Robustness checks

	(I)	(II)		
<i>PSD</i>	-0.267 (-3.16)	-0.381 (-2.38)	EURO x YOUNG	0.013 (0.12)
<i>PS</i>	-0.324 (-3.57)	-0.384 (-2.25)	EURO x ADULT	0.006 (0.15)
<i>CDU</i>	-0.145 (-1.60)	-0.269 (-1.60)	EURO x SENIOR	0.020 (0.25)
<i>PP</i>	-0.310 (-3.45)	-0.379 (-2.28)	HC x YOUNG	-5.628 (-1.25)
<i>PPI</i>	0.056 (1.65)	0.030 (0.94)	HC x ADULT	1.272 (0.75)
<i>PUB</i>	0.001 (0.17)	0.188 (1.63)	HC x SENIOR	2.150 (0.58)
<i>EURO</i>	0.601 (5.75)	0.319 (1.42)	UD x YOUNG	0.112 (1.10)
<i>YG</i>	-109.97 (-2.64)	-4.125 (-0.58)	UD x ADULT	-0.041 (-1.38)
<i>ADULT</i>	-30.57 (-1.89)	0.866 (0.36)	UD x SENIOR	0.010 (0.27)
<i>SENIOR</i>	-3.010 (-0.12)	-1.793 (-0.38)	GDENS x YOUNG	1.042 (0.82)
<i>UNIV</i>	-1.852 (-3.24)	0.74 (1.75)	GDENS x ADULT	-0.173 (-0.62)
<i>HC</i>	1.117 (1.97)	-52.382 (-2.29)	GDENS x SENIOR	-0.362 (-1.05)
<i>GDEN</i>	52.082 (3.80)	0.694 (0.40)	Constant	50.063 (2.36)
obs.	117	117		
Adj. R ²	0.602	0.642		
RESET test (P-value)	0.57 (0.64)	0.41 (0.75)		
White's test (P-value)	92.90 (0.39)			

7 Concluding Remarks

We document the importance of social interaction in elections turnout providing empirical support for the role of social networks in determining the level of abstention in elections. The weight of social pressure in the decision to vote (or to abstain) is clearly revealed by the analysis. Besides social pressure, other factors that facilitate contacts between the individual voters, allowing them to have more extensive networks, also seem to reduce abstention levels. One needs to be careful in the interpretation of these indicators, as they result from indirect inference. One limitation of the empirical application was the absence of direct measures on the average social network and on valuations of common opinions with members of one's social network. Also, we find a significant role for idiosyncratic (or personal) values in the decision to vote or not to vote.

Besides reporting the direct measure of the proxies for these three main forces underlying the decision to vote or not to vote, we can add a discussion of some of the empirical implications of the model. First, recall that the equilibrium turnout is supposed to be smaller whenever the ability to accommodate divergence within society increases. The more democratic a society is, the more room there should be for the expression of different opinions, the social pressure effect becoming less relevant. Our results clearly reveal that younger people tend to abstain less than older citizens, implying that more mature voters are more able to accommodate different opinions within their network of social contacts. Younger voters may be less open to different opinions, probably due to the enthusiasm typical of their age, and lack of the required experience to listen and to understand others.

Second, we obtain results similar to those of Castanheira (1999), with higher abstention levels as the total population per municipality increases. Abstention is higher in more populated areas, meaning that the networking effect is possibly less diluted in smaller population centres. Alternatively, we may think that more populous centers are more open to different ideas, decreasing the impact of social pressure, thus leading to a higher abstention according to the model. This suggests that there may be a correlation between the dilutions of the social network effects and the increase in the ability to accommodate divergence within society – a subject for further empirical analysis.

Regarding the social pressure effects, in contrast to the conclusion reached by Downs (1957) and Frey (1971), we found, surprisingly, that as the purchasing power increases, the abstention level increases. As explained above, this may be the result of an increase in individuals' opportunity cost of voting as their incomes rise.

There are many different directions for future theoretical and empirical research, namely to explain why both the percentage of people with university degree/college education in each municipality variable and the geographic density variable have no significant impact on the abstention level.

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Appendix

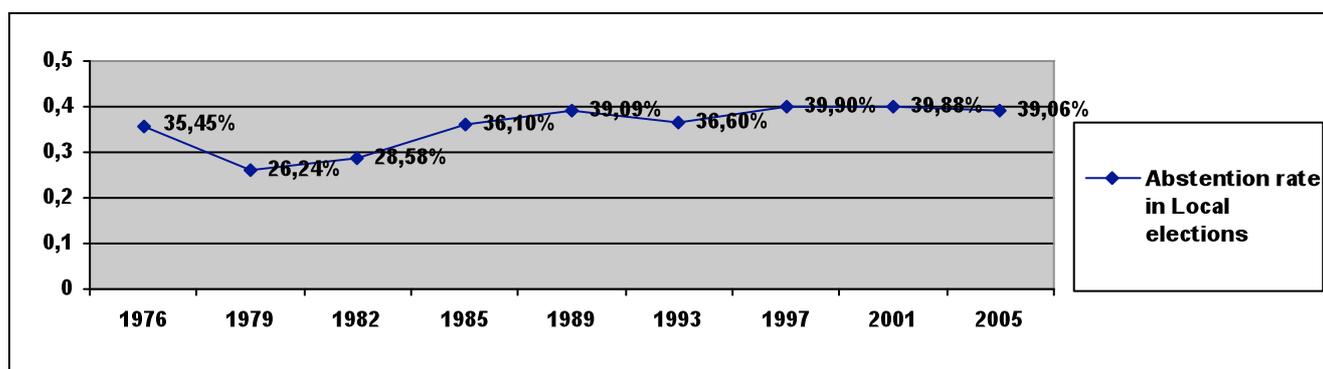
Table A1. Expected Effect in the rate of abstention in Local elections

Variable	Expected effects in rate of abstention in local elections
Percentage of voting obtained by each of the major parties (<i>MP</i>)	Positive
Purchasing power parity per capita index (<i>PPI</i>)	Uncertain
Annual number of periodical publications by municipality in 2002 (<i>PUB</i>) (million prints)	Negative
Rate of abstention in the European elections (<i>EURO</i>)	Positive
Population with ages between 15 and 24 years old (<i>YG</i>)	Positive
Population with ages between 25 and 64 years old (<i>ADULT</i>) ('000)	Negative
Population more than 65 years old in 2001 (<i>SENIOR</i>) ('000)	Positive
Geographic density of each municipality in 2002 (<i>GDEN</i>) (population per squared km)	Negative
The percentage of people with university degree/college education in each municipality (<i>UNIV</i>).	Negative
Number of attendances to primary health care center (<i>HC</i>) (millions of cases)	Negative

Table A2. Descriptive Statistics

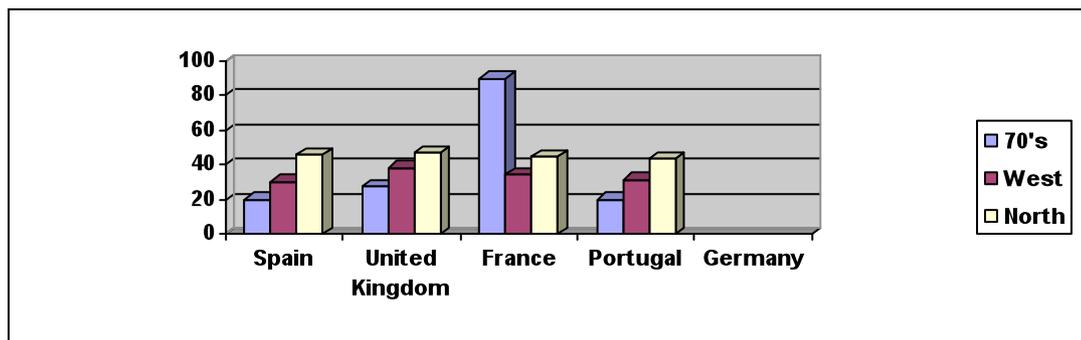
Variable	Mean	Std. Dev.	Min	Max
Abstention rate	38.051	7.363	21.700	54.640
PSD	37.277	14.825	0.000	67.440
PS	40.589	13.159	0.000	6.97
PP	8.097	11.527	0.000	61.170
CDU	10.071	13.433	0.000	52.630
EURO	60.358	4.346	50.400	73.540
YG	9.422	10.522	0.906	71.634
ADULT	35.459	42.331	2.812	294.171
SENIOR	10.016	13.909	1.380	133.304
UNIV	8.002	15.809	0.117	139.182
HC	0.177	0.220	0.000	173.679
PUB	5.872	34.915	0.000	355.525
PPI	80.532	37.051	33.380	305.190
GDENS	0.611	1.198	0.015	7.587
IND	0.419	0.306	0.271	3.621
POP	62.899	80.658	5.428	63.829
%YOUNG	0.155	0.023	0.107	0.243
%ADULT	0.564	0.040	0.447	0.657
%SENIOR	0.185	0.055	0.104	0.397
HC/POP	2.982	0.841	0.001	4.590
PUB/POP	26.682	70.281	0.008	556.994
UD/POP	0.095	0.040	0.004	0.234
POP	54.898	65.610	5.098	499.109

Figure A1. Evolution of the abstention rate in Local elections



Source: CNE

Figure A2. Abstention rate in European Parliament elections



Source: CNE

Presidential elections

In contrast to other countries, such as Spain, where elections had a determinant role in bringing down authoritarian regimes, in Portugal democracy began with the 1974 revolution. The first free and democratic elections took place on April 25th, 1975, with an outstanding turnout of 92%.

The President is elected for a term of 5 years, after which can (s)he be re-elected for a second term, and then cannot be re-elected. Since the 1974 Revolution the Portuguese have elected 4 Presidents (the first 3 being re-elected).

Since the 1982 revision of the Constitution, Portugal has had a semi-presidential system. This means that (a) the President is elected by universal suffrage; (b) the President possesses considerable powers; (c) the President nominates a Prime Minister who heads a government with executive power and can stay in office only if the parliament does not declare its opposition. (Duverger, 1980, p. 166)

The abstention rate in presidential elections tends to be lower in countries with semi-presidential systems. (Freire and Magalhães, 2002) On the other hand, the existence or not of compulsory voting in these elections is another issue that contributes to a lower or higher rate of abstention.

The abstention rate in the Portuguese presidential elections was 24.6% in the 1970s and 26.5% in the 1990s. Bearing in mind that Portugal has a semi-presidential system with no compulsory voting, one can conclude for a low rate of abstention in these Portuguese elections.

Parliamentary elections

The Portuguese Parliament is composed of 230 members. The members of Parliament are elected for a term of four years, after which they can be re-elected. The Parliamentary elections are considered to be the most important ones, since they determine the basis of support of the Prime Minister and his or her Government, who will be responsible for the executive power.

As mentioned above, the Portuguese abstention rate is intimately related to Portugal's historical and political evolution. Once this political transition took place, the abstention level started to increase: in the 1983 elections it was 20%, increasing to 20.9% in 1995, 30.7% in 1999 and 37.7% in 2002, as illustrated in Figure A1.