Information acquisition and electoral turnout: theory and evidence from Britain

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Abstract

This paper studies electoral turnout and political information acquisition. We model information acquisition as a private production whose input are mass media and time devoted to their usage. Political information is considered in its relevance both in the political competition process and in private decision-making. Endogenous information is then linked to turnout and testable propositions about political awareness, turnout and observable socio-economic characteristics are derived. These results are then tested on British data. Empirical investigation supports our modelling of information acquisition. Moreover we find that political awareness substantially increases the probability of turnout.

1 Introduction

To convince the majority in an electoral campaign might not be enough to win an election; politicians are therefore aware of the upmost importance

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of convincing supporters to go out and cast their votes on the day of the election. That's why sometimes low turnout has been blamed by politicians for bad electoral performance. Understanding turnout is therefore clearly an important aspect of our understanding of public policy formation through the political process.

Political information plays an important role in this context; to try to shed some light on the role of information in determining turnout is important for our understanding of public policies in both the efficiency and the redistributive dimensions. On efficiency grounds, if more informed citizens are more likely to show up in elections, then some form of "information aggregation" occours through the political process: better politicians and better political platforms should have more chances of being selected by the electoral mechanism, as those voters who are less certain about the quality of the options would be more likely to abstain, then giving more power to the better informed. On the redistributive ground the implications could be of a quite different nature: better informed citizens will be more able to extract their desired policies from politicians as political platforms will tend to be targeted at voters that are more likely to be aware of them.

Current theoretical literature seems to agree that, one way or another, information matters for turnout. However, one important question has so far received little attention: what determines the degree of awareness about politics? If we approach voting behaviour from a rational choice point of view then there is no reason to leave political information acquisition out of our investigation. It is possible indeed to model the demand for political information as the outcome of a rational process, with its costs and its benefits. This does not mean that we can completely "explain", in a strict sense, information acquisition: this is a difficult task the same way it is difficult to explain voting in large elections. On this I would rather take an agnostic view. However, as for any good, our purpose is not much to explain why people prefer something to something else, but rather how their demand and supply varies in accordance with relevant observables like prices and institutions. Although we will try to spell out the basic motivations driving information acquisition, this approach constitutes the starting point of this work.

The first purpose of this paper will be therefore to model information acquisition from a decision-theoretical perspective and to reconsider a rational choice theory of electoral turnout based on endogenous political information. We will then proceed with empirical investigation, trying to assess on British data the effect of being more or less informed on the likelihood to show up in elections.

As widely recognized among rational choice theorists, there is no obvious economic reason for any type of political participation involving a large number of agents. This applies also to the decision to acquire information on candidates and monitor their behaviour when elected. Since in this work we will take an instrumental voting perspective (i.e. we take the view that people vote because they care about policies), to model information acquisition is not a straightforward task. As recognized since the early stages of the economic theory of politics, "since the odds are that no election will be close enough to render decisive the vote of any one person, or the votes of all those he can persuade to agree with him, the rational course of action for most citizens is to remain politically uninformed" (Downs, 1957).

This line of reasoning is correct if people gather political information only in order to undertake better voting decisions. Actually, voting is not the only reason to acquire information on politics: citizens have incentives to gather information on policies to make better private decisions when a politician is in office and to form better expectations during electoral campaigns. For example, information on fiscal policies can be relevant for investment decisions or labour supply, but at the same time convey information on the incumbent's preferred policies and can therefore be relevant when an election comes; even the simple decision about filling or not one's car tank has this flavour on the day before the annual budget is announced. In this sense political information can be a purely private good and can provide substantial returns, therefore we should expect people to acquire some information on politics independently of the political process.

We will model information acquisition (both for voting and for private decision-making) as an individual production *a la* Becker, where inputs are represented by mass media and time devoted to their usage. Also, different agents can be expected to have different "technologies" to process information and therefore to be able to grasp more and better information from the same exposure to information sources: in this sense we should expect experience and education to be positively related to the capability to be informed.

Since information cannot simply be put in the commodity space, this strategy will pose some specific technical problems and will require restrictions on preferences to obtain clear-cut results. I do not attach any specific meaning to those results apart from showing that a demand for information exists and that it will depend on observables characteristics of the environment. As for example in the case of labour supply, a theoretical model in this case helps in identifying the different incentives, but results will inevitably be very sensitive to specific assumptions. Only empirical investigations can shed some light is such cases.

The second part of the paper will therefore be devoted to provide some evidence about information acquisition and its relation to electoral turnout. Actually, modelling information acquisition turns out to be quite important for our capability of implementing empirical investigations on the issue. To see why this is the case let's consider a simple model of turnout. A theory of instrumental voting takes as starting point the idea that people vote in elections because they are interested in policies: the act of voting may then help to obtain the preferred policy choice. In the classical formulation of Riker and Ordeshook (1968), a citizen votes if

$$PB + D > C \tag{1}$$

where P is the probability to cast a decisive vote, B is the gain in benefit derived from the victory of the preferred candidate as compared with the opponent, D is a psychic benefit to voting and C is its cost. Unfortunately, as it stands, this expression represents just a small progress from the tautological proposition that people vote if they like to do so. This consideration extends to information acquisition. Political information helps in having a more precise idea about B, the difference in utility between, let's say, two candidates. Other elements in (1) can be influenced by information: the perception of P can for example be affected by published polls during the electoral campaign. We will focus on B, as the element that reflects the political platforms (or candidates characteristics), and can therefore be related to political information in a stricter sense.

Let's then assume that B depends on some unknown parameter β, i.e. $B = B(\beta)$. If $\widehat{\beta}$ is a more precise estimate than $\widetilde{\beta}$ of the true β, then we can say that the value of using $\widehat{\beta}$ instead of $\widetilde{\beta}$ is given by

$$P[B(\widehat{\beta}) - B(\widetilde{\beta})] \tag{2}$$

ahere B now represents expected benefit. If the cost of passing from the estimate $\widetilde{\beta}$ to the estimate $\widehat{\beta}$ is c (for example to acquire a larger sample of observations), then we have that such acquisition will take place if both

$$\begin{aligned} P[B(\widehat{\beta}) - B(\widetilde{\beta})] &> c \\ PB(\widehat{\beta}) + D &> C \end{aligned} \tag{3}$$

Empirical evidence on the effect of P on turnout is rather unconclusive. When the analysis is carried out at the micro-unit level, there seems to be little evidence of the impact of the probability to be pivotal (however measured) on the probability to vote. If this is case, i.e. if people perceive P to be very small, then acquiring information on politics is pointless as this information will be used for irrelevant decisions: citizens should then remain rationally ignorant on politics: but this is something we don't observe in reality.

As an alternative we can add a private benefit b of acquiring information and re-write the (3) as

$$P[B(\widehat{\beta}) - B(\widetilde{\beta})] + b > c \tag{4}$$

By private benefit of information here (and in what follows) we intend benefits not related to instrumental voting. Strictly speaking, all benefits are private in this model. However, this is still a quite weak theory: b can only reflect some psychic enjoyment of political information, orthogonal to political preferences and observable relevant variables. Moreover, in practice D and b are likely to be correlated. Thus, in this case we are left with a rather useless theory of voting (vote if $D > C$) and a non-identifiable theory of information acquisition: indeed, people will acquire information to vote and will vote because of their sense of civic duty; political information acquisition can only be related to individual tastes and would be rather undistinguishable from voting behaviour, both being driven by some sense of civic duty or psychic enjoiment.

Voting can be considered (see Aldrich, 1993) an activity with low costs and low benefits: this would explain why small changes in the environment (e.g. weather conditions) may have large effects on aggregate turnout. According to equation (4) we could consider also information acquisition a low cost - low benefit activity, if both b and c are not very high. However, voting is a one-off event, in the sense that elections do not take place every day. Information acquisition is instead a daily activity for most people: it is then hard to believe that the costs and benefits of it are on the same scale as those of voting.

In the following theoretical model we will add a different (not alternative) explanation for information acquisition. As mentioned previously, we will argue that, much more than voting, political information can provide immediate and tangible benefits, independently of preferences for information.

We can then say that agents will acquire information if

$$P[B(\widehat{\beta}) - B(\widetilde{\beta})] + b_1 + b_2 > c \tag{5}$$

where b_2 is an idiosyncratic shock reflecting individual tastes and b_1 is the benefit derived by privately using political information. An important aspect of equation (5) is that the magnitude of b_1 could be substantially larger than that of $P[B(\widehat{\beta}) - B(\widetilde{\beta})]$. At the same time it is possible to relate b_1 to some observable characteristics independently of voting behaviour (this is instead much more difficult for b_2). This consideration can provide us with instrumental variables for information acquisition in the empirical investigation, thus helping us to assess the role of information, *per se*, on turnout decision-making.

2 Related literature

Electoral turnout is probably one of the most extensively debated phenomena in the social sciences. It is therefore not our purpose to attempt to survey this vast literature. For a synthesis of different explanations and of the debate about rational choice theory and turnout see Aldrich (1993) and the references therein. The empirical literature is even more vast; it delivers a number of well established stylized facts such as the positive correlation between turnout and some socio-demographic characteristics like education, age, sex, marital status etc. On some issues conclusions are far less clear, as for example about the impact on turnout of election closeness. A recent example of this ongoing empirical research, as well as an assessment of the overall explaining power of current empirical analysis is Matsusaka-Palda (1999).

In this section we will focus more specifically on the role of information. On information aggregation, Feddersen-Pesendorfer (1997) consider and environment with n agents, two fixed alternatives A and B and two possible states of the world 1 and 2. Some voters always prefer either A or B independently of the state of the world (partisans). Others (independents) prefer A in state 1 and B in state 2. Agents are also exogenously and costlessly endowed with a noisy signal about the state of the world and decisions are undertaken by voting. In general, when vote is strategical, it is not optimal for agents to vote only on the basis of their priors: voting decisions should instead be conditional on being pivotal in the election and voting against one's prior can then be perfectly rational (see also Young, 1988 and Austen-Smith, 1990). Feddersen-Pesendorfer (1997) allow abstention among the voting options. They then predict a positive link between information and turnout even if turnout is costless: less informed independent voters have an incentive to delegate their vote to the better informed ones to increase the chances of an informed aggregate decision; delegation is via abstention. Moreover, they show that in large elections with strategic voters, information aggregation is perfect, in the sense that the chosen option is the same that a fully informed electorate would choose. Feddersen-Pesendorfer (1998) show instead that information aggregation does not occour under unanimity rule. Caillaud-Tirole (1998) limit the power of these results by showing how they rely on identical preferences of the independent voters. Allowing for some heterogeneity reduces the capability of electoral systems of aggregating information.

This literature takes the information structure as exogenous. In a recent paper Persico (1999) re-considers the optimality of different plurality rules when information acquisition is instead endogenous. A decision-theoretical model of turnout with endogenous information acquisition is developed by Matsusaka (1995); better informed voters get larger expected benefits from voting and therefore tend to show up in the polls with higher likelihood.

The role of political information on the redistributive ground are studied in Stromberg (1997): mass media derive their revenue from advertising and some people are more valuable than others to advertisers. These people will then be targeted by mass media and rational politicians will also design policies more favorable to media users, as those are more likely to be informed on platforms and policies. Equilibrium policies can therefore be substantally influenced by the way the media market operates. In Larcinese (1999) I study the impact of information acquisition on income redistribution. Agents are considered in both their economic and political environment. Political information is used by citizens for private decision-making and if information is a normal good then equilibrium redistributive policies will be bounded away from the median voter preferred policy; this provides a microfoundation for the idea that the rich are more influencial on the political process. Moreover an increase in gross income inequality does not necessarily leads to more redistribution, as most literature on income redistribution tends to take for granted.

Some recent empirical studies have tried to ascertain the role of information and mass media on the political market, both for redistribution and for politicians' accountability. Stromberg (1999) considers a New Deal relief programme implemented in a period of rapid expansion in the use of radio. He found that, controlling for variables that reflect the needs of different counties, radio had a large and significant impact on funds allocation. Besley and Burgess (2000) test an agency model of policy decision-making on Indian data; media diffusion creates a more informed public opinion and therefore strenghtens the incentives of politicians to be responsive to voters' preferences. They consider how responsive state governments in India have been in relieving famine after calamities and find that they have been substantially more responsive in states with more widespread media diffusion.

3 Modelling the demand for political information

3.1 The model

We start considering a generic citizen in both his economic and political environment. Preferences on private goods can be represented by a state-contingent utility function

$$U(x|a) \tag{6}$$

where x is a n-dimensional bundle of private commodities and a (which can also be a vector) is a public policy parameter (for example, the amount of a public good).

We suppose there are two political parties I (incumbent) and O (opponent). The incumbent decides the value of a and therefore her decisions are relevant for citizens' private choices. Also, there is a one-to-one relationship between politicians and policies: in other terms (and abusing the notation) candidate a delivers policy a. We suppose that, though citizens can distinguish the two parties, they cannot distinguish the candidates: in other terms, the candidate selection process is unknown to citizens and is represented by a probability distribution $f(a)$ which is instead common knowledge. We divide the time into two administrative periods divided by an election. At time 1 there is an (exogenously given) incumbent, which is randomly selected from $f(a)$. Citizens' utility over period 1 can then be represented as

$$\int U(x|a)f(a)da \tag{7}$$

Information on a is useful as it helps in the optimization over x. Moreover, it reveals something about the incumbent's "type". Under standard assumptions on (6), from the maximization of (7) under the constraint that $px \leq M$ (M = initial endowment) we can derive the optimal functions $\widetilde{x}_i(M,p)$ $i = 1,...n$, and the indirect utility function $\widetilde{V}(p,M,a)$. If instead a is known with certainty then the maximization of (6) under $px \leq M$ will deliver the functions $x_i^*(M,p,a)$, $i = 1,...n$, and the indirect utility function $V^*(p,M,a)$. Let's also define

$$\begin{aligned} v^*(M,p) &= \int V^*(p,M,a)f(a)da \\ \widetilde{v}(M,p) &= \int \widetilde{V}(p,M,a)f(a)da \end{aligned}$$

Now suppose that, once the incumbent is in place, it is possible to gather information on her type. Citizens are endowed with an information gathering technology that is representable by the probability $q(t,k|E)$ to learn the realization a. The inputs of this personal production function of information are an information source k (newspapers, television, radio etc.), and time t devoted to extract information from this source. This technology will also depend on a vector of parameters E that affect the ability to extract and process information or the capability to use more sophisticated information sources. We will not specify these parameters at this stage and for the moment we will consider an agent in isolation, thus simply writing $q(t,k)$. However, it is clear that factors such as education or innate ability play an important role in the production function of information.

Assumption 1 $q_t > 0$, $q_k > 0$, $q_{tt} < 0$, $q_{kk} < 0$, $q_{tk} > 0$.

Assumption 1 is just a simple assumption on the relationship between inputs and output. Indeed, we can treat $q(t,k)$ not differently from any standard production function.

At the end of period 1 an election takes place in which the current incumbent faces an opponent drawn from the distribution $f(a)$. In the second period there is no action to be undertaken by the citizen; utility in the second period is determined by the outcome of the election and represented by a function $S(a)$. We will not be specific on the meaning of this function. In particular, it does not need to be related to the utility on commodities (6). It is indeed clear that social values, i.e. preferences over a, are not always consistent with preferences over private goods. For example some highly productive agents sometimes may prefer more income redistribution than what their endowment would suggest in a one shot game; however, once the tax rate is in place, those agents can still be expected to maximize over their supply of productive inputs. In other terms, the fact that agents maximize the function (6) (or (7)) does not imply that they will choose their preferred policy maximizing their one-period indirect utility function. However, nothing prevents the possibility of interpreting $S(a)$ as simply the indirect utility function derived from the maximization of (6) (or (7)) over x.

We can then summarize the ex ante maximization problem for our citizen in the following:

$$\begin{aligned} W(t,k,T) &= \{q(t,k)v^*(p,M) + (1-q(t,k))\widetilde{v}(M,p)\} + \\ &\quad +T\left\{q(t,k)P\left|\int [S(a)-\overline{S}]f(a)da\right| - c\right\} \\ s.t.\ px^* &\leq M \\ M &= m_0 + w(1-t) - p_k k \\ x^* &= \left\{\begin{array}{c} \arg\max_{px\leq M} U(x|a) \text{ if } a \text{ is known} \\ \\ \arg\max_{px\leq M} \int U(x|a)f(a)da \text{ if } a \text{ is unknown} \end{array}\right\} \end{aligned} \tag{8}$$

where
$T \in \{0,1\}$ = electoral turnout decision;
P = perceived probability to be pivotal in election;
m_0 = the exogenous initial endowment;
w = the opportunity cost of time devoted to information gathering;
p_k = the monetary cost of using mass media
c = cost of voting ≥ 0
$\overline{S} = \int S(a)f(a)da$.
It is now useful to separate the two components of the utility function.

3.2 The private value of political information

We will start by focussing only on the first part of the problem, namely on the decision to acquire information for private purposes. We will then have the following:

$$\max_{t,k} \{q(t,k)v^*(p,M) + (1-q(t,k))\widetilde{v}(p,M)\} \tag{9}$$
$$\begin{aligned} s.t.\ px &\leq M \\ M &= m_0 + w(1-t) - p_k k \end{aligned}$$

Solving this problem we expect to find the set of maximizing arguments $t^{\#}(m_0, w, p_k)$ and $k^{\#}(m_0, w, p_k)$. Solving the problem (9) we find the following proposition:

Proposition 1 *Assume $U(x|a)$ is quasi-concave in x. Then the correspondences $t^{\#}(m_0, w, p_k)$ and $k^{\#}(m_0, w, p_k)$, solution to problem (9), are compact-valued and upper hemi-continuous.*

Proof: See Appendix A.

Notice that this result has been derived not from straight maximization of an objective function with the desired characteristics, but from a derived optimization problem. In this sense it is a result in itself. However, we would like to get some testable propositions and therefore to be able to reduce the optimal correspondences to optimal functions. To procede, we will then focus on a more specific class of utility functions: this will guarantee a well-behaved maximization problem and clear-cut results.

Assumption 2 $U(x|a)$ is homogeneous of degree 1 in x.

This restriction is quite useful for the simplifications it induces and at the same time is still quite mild in terms of its implications for behaviour. Notice that the class of utility functions we are considering is still fairly general, including some of the most commonly used functional forms like the Cobb-Douglas or the CES functions. It should also be noted that assumption 2 essentially amounts to assume that preferences over commodities are homothetic. This also implies that information is a normal good, as proved in the following lemma.

Lemma 1 *Assume $U(.) \in \Re_{+}$ is quasi-concave and homogeneous of degree 1 in* x. *Then the value of information on* a *is increasing in M.*

Proof: See Appendix A.

We can now prove the following:

Lemma 2 *Under Assumption 2, the maximization problem (9) admits a unique maximum. The functions $t^{\#}(m_0, w, p_k)$ and $k^{\#}(m_0, w, p_k)$ are continuous and continuously differentiable with $t_{m_0} \geq 0$, $t_{p_k} \leq 0$, t_w $\top$ 0, $k_{m_0} \geq 0$, $k_{p_k} \leq 0$, k_w $\top$ 0*

Proof: see Appendix A.

Mass media demand and time spent in their usage are then both increasing in the initial endowment of agents and decreasing in the cost of mass media. We cannot reach a definite conclusion instead for the role of the opportunity cost of time. On one hand, an increase in the opportunity cost of time should decrease time devoted to information gathering and mass media usage (substitution effect); on the other side it increases the initial endowment, thus increasing the value of information (income effect): the overall effect will therefore depend on many parameters and is not predictable withouth further restrictions.

3.3 The demand for political information

Let's now turn to the second part of the utility function. What is the utility of acquiring information to vote? Marginal utilities of mass media and time devoted to them are given by

$$\begin{aligned} q_t P \left| \int [S(a) - \overline{S}] f(a) da \right| \\ q_k P \left| \int [S(a) - \overline{S}] f(a) da \right| \end{aligned} \tag{10}$$

if $T = 1$ and are zero otherwise. The cost, on the other hand, is a reduction in $V^*$and $\widetilde{V}$. It is immediate to see that an (ex post) uninformed citizen will not vote since if it is impossible to know the type of the incumbent then $\int [S(a) - \overline{S}| f(a) da| = 0$.

Also, for a certain range of possible realizations of a, it is not worth voting in the sense that the difference between the incumbent and the expected opponent is too low: this clearly happens when the realization of the incumbent is "very close" to its expected value. If this is the case, then, even an informed voter can choose to abstain. Let's define

$$\overline{\mathcal{A}}(P, c) = \left\{ a \text{ s.t. } P| \int [S(a) - \overline{S}] f(a) da| > c \right\}$$

Then we can rewrite the (10) as

$$\begin{aligned} & q_t P| \int_{\overline{\mathcal{A}}} [S(a) - \overline{S}| f(a) da| \\ & q_k P| \int_{\overline{\mathcal{A}}} [S(a) - \overline{S}| f(a) da| \end{aligned} \tag{11}$$

Let's now define t^* and k^* as the maximizing arguments over the whole optimization problem (8). It is now straightforward to prove the following:

Lemma 3 $(t^*, k^*) \geq (t^\#, k^\#)$ *for each given value of* m_0 , w *and* p_k.

Indeed, the quantities in (11) are positive and, adding them into the FOCs will necessarily give an higher value for t^* and k^* with respect to $t^\#$ and $k^\#$.

Let's now define $Q(m_0, w, p_k|E) = q(t^*, k^*|E)$, where with E we indicate a generic factor that increases the ability to extract information from given sources and time[1]; let's also indicate with $Pr(T = 1|m_0, p_k, w, E)$ the probability of citizen with given endowment, education etc. to vote in an election. Then we have the following testable results:

Proposition 2 *If assumption 2 is satisfied then:*

$$\begin{aligned} \frac{\partial Q(m_0, w, p_k|E)}{\partial m_0} &\geq 0; \quad \frac{\partial \Pr(T = 1|m_0, w, p_k, E)}{\partial m_0} \geq 0 \\ \frac{\partial Q(m_0, w, p_k|E)}{\partial p_k} &\leq 0; \quad \frac{\partial \Pr(T = 1|m_0, w, p_k, E)}{\partial p_k} \leq 0 \\ \frac{\partial Q(m_0, w, p_k|E)}{\partial E} &\geq 0; \quad \frac{\partial \Pr(T = 1|m_0, w, p_k, E)}{\partial E} \geq 0. \end{aligned}$$

[1] E stands for education but of course there are other examples of such factors.

Proof: see Appendix A.

It is clear that, for each given probability to be a pivotal voter, an higher probability to be informed increases the utility of casting the vote. Our agent will choose $T = 1$ only if $P|S(a^*) - \overline{S}| \geq c$ where a^* is the realized value of a for the incumbent, provided she knows a^*.

We then have reached some testable conclusions about information acquisition and electoral turnout. First of all we expect agents who are richer, better educated, with more networking activities etc. to be more informed. Then we should also expect more informed agents to be more likely to vote and therefore all the characteristics that increase the likelihood to be informed should also increase the probability of voting. Finally, it is also important to distinguish between the private and the voting motivations for information acquisition: this will also be an aim of the following empirical analysis.

4 The data

We will use the British General Election Study (BGES) for the year 1997; this includes a few questions that can be exploited to infer how much respondents know about politics and candidates. The survey consists of 3615 individual observations about people that were interviewed a short time after the election took place. For our purposes we will use a sample of 2807 observations.

The first problem to solve is of course to find a way to measure information. This dataset is particularly suited for this purpose. Among other questions concerning the election, respondents received two sets of questions that are useful in establishing how much they know about politics. In a first set of questions they were asked to write down as many candidates' names in their constituency as they could remember (with a maximum of 6). These names have then been checked and a point has been given for each correct answer. In a second set of questions, respondents received 7 statements on British political and institutional system and were asked to say if they were true or false[2]. For each correct answer in this questions a score of 0.66 has been attributed to the agent[3]. The scores in the two set of questions have

[2]Statements are reported in Appendix B.

[3]The different weight is derived by Bayes rule: see appendix B for details.

then been added up in a variable (info) and we will take this as a measure of how much people know about British politics. This ranges from 0 to 10.62. An approximate graphical representation of the distribution of info is reported. The continuous density function reported is normal with mean and variance of the observed info (see tab. 1 in Appendix B). It is possible to combine the questions in different ways or to use only one of the two sets of questions to derive different indicators of political awareness. Those variations do not affect in any substantial way our results.

The survey also includes information on households' income (see tab. 2); this information is grouped, with 1 being the lowest and 16 the highest category. A few hundred of the interviewed refused to disclose information on income and that is the main reason for dropping part of the observations.

Another problem arises since the dataset does not contain information on wage rates, that could be taken as proxi for the opportunity cost of information gathering. We can use insted the number of hours spent on work. Indeed, information acquisition from the media and time spent at work normally shouldn't be competitive ways of allocating time. We are probably used to think in those terms because much of the literature on time allocation has referred to labour supply. In our case we are much closer to consider instead the choice of how to allocate a given leisure time, and in this sense the number of hours worked gives enough information. Of course in this way we are not much capturing a substitution effect but rather an endowment (of leisure) effect. Although we have not found it considered in empirical literature on turnout, "hours" has also been used as an explanatory variable in the turnot equation to take into account the opportunity cost of voting on the day of the election, as this took place in a normal working day (thursday).

The survey also contains information on other socio-economic characteristics that can be taken as representing the parameters on each agent's information production function. We have then data on education, sex, age, marital status etc. These are clearly important control variables for our analysis and in some cases may provide information on the different networking possibilities faced by agents.

Information on the use of mass media has also been used. We know if the respondent uses to read newspapers and which one, as well as their attention to political news etc. We also have information on canvassing and phone contact between the interviewed and party representatives.

The BGES reports the constituency of each observation. It is then possible to match this dataset with electoral results to measure the effect of election "closeness" on turnout probability. Closeness is measured as the percentage difference at the constituency level between the winning candidate and the runner up (pmaj97) in the same election. Of course this requires some kind of rational expectations assumption or, simply, the fact that people know about pre-electoral polls and that those polls are substantially correct. Other possibilities[4] have been considered instead of "pmaj97", all giving the same results.

Information on the provenience of each observation has been used to match the BGES data with the Census (1991) data, in order to have information on some relevant characteristics of the local environment at the constituency level, like unemployment rates etc.

Finally, to test for potential endogeneity of information in the turnout equation, we will use six instrumental variables that are assumed to affect information acquisition but not turnout. We will comment about them in the next section.

Data description and summary statistics are reported in Appendix B.

5 Estimation strategy and empirical specification

Let's for the moment start from a situation in which citizens perfectly know their benefits from voting. We can then define the utility from voting as $P|\int[S(a)-\overline{S}]f(a)da|-c$. We can also include the benefit deriving from fulfilling a civic duty D to define

$$U_V = P|\int[S(a)-\overline{S}]f(a)da| + D - c \tag{12}$$

U_V is a latent (unobservable) variable and turnout T is a binary indicator such that

$$\begin{aligned} T &= 1 \text{ if } U_V > 0 \\ T &= 0 \text{ if } U_V \leq 0 \end{aligned}$$

[4] Instead of using the results of the current election (using then a rational expectation argument), it is possible to use past elections. Moreover, it can be argued that constituencies' size matters for the probability to be pivotal and therefore absolute and not percentage differences should be used. We have tried these different alternatives and the results are not sensitive to the changes.

We can approximate U_V by using a linear random utility model:

$$U_V = \gamma' \mathsf{x} + \varepsilon \tag{13}$$

where $\mathbf{x}$ is a vector of characteristics of the individual and of the environment (including P) and ε is a white noise disturbance including the sense of civic duty D (some imperfect indicators of civic duty can however be included in $\mathbf{x}$). We can then say that

$$\begin{aligned} \Pr[T &= 1|\mathsf{x}] = \Pr[U_V > 0] \\ &= \Pr[\gamma' \mathsf{x} + \varepsilon > 0|\mathsf{x}] \\ &= \Pr[\varepsilon < \gamma' \mathsf{x}|\mathsf{x}] = \mathsf{F}(\gamma' \mathsf{x}) \end{aligned} \tag{14}$$

Assuming $F(.)$ is the cumulative normal distribution function, we can estimate $\Pr[T = 1|\mathsf{x}]$ by maximum likelihood probit.

In most empirical literature turnout has been estimated using some analogous procedure. We will start by using our data to estimate equation (14), including the variables that have traditionally been identified as relevant. Results are reported in tab. 3 and do not show any surprise when compared with previous studies.

Disposition variables such as a person's interest in politics, sense of political efficacy etc.are normally quite important explanatory variables for electoral turnout. However, there are enough reasons to be skeptical about their usage. It is possible for example that respondents simply rationalize their behaviour by answering such questions; also responses often vary quite substantially with the question order (see for example Bishop, Oldendick and Tuchfarber, 1984, and Abramson, Silver, Anderson, 1987). We will therefore ignore such variables apart from one, that will be called "ideology". People were asked why did they vote the way they did; we define a respondent being ideologized if her answer is that she always votes for the same party. Of course information is relevant only when it can induce a behavioural shift; for example people with extreme preferences or extreme priors beliefs on the environment will always vote in the same way independently of their updating process. This will presumably affect both turnout and information acquisition. This variable, therefore, tries to capture this effect. However, since it could suffer of the problems common to other disposition variables, we will always report results both with and without "ideology".

Let's now introduce political information. Back in equation (8) let's indicate by $\widehat{q}$ the realization of the random variable q after t and k have been acquired and before voting We can then say that

$$\begin{aligned} T &= 1 \text{ if } \ U_V > 0 \text{ and } \widehat{q} = 1 \\ T &= 0 \text{ if } \ \{U_V > 0 \text{ and } \ \widehat{q} = 0\} \text{ or } U_V \leq 0 \end{aligned}$$

For simplicity we will define a new latent variable $U_W(U_V, \widehat{q})$ and choose a linear representation of the form

$$U_W = \gamma_1^{'}\mathsf{x} + \gamma_2\widehat{q} + \varepsilon \tag{15}$$

We then have that

$$\Pr[T = 1|\mathsf{x},\widehat{q}] = \mathsf{F}(\gamma_1^{'}\mathsf{x}+\gamma_2\widehat{q}) \tag{16}$$

As discussed in the previous section, the way information is measured matters and we can derive more than one indicator from our dataset. However, results are quite reassuring in showing that information (info) is an important explanatory variable for turnout independently of the indicator used.

It should not be overlooked that estimating (16) is a correct procedure only if information acquisition is orthogonal to turnout. In Feddersen-Pesendorfer (1997), for example, people are randomly informed or uninformed about the true state of the world. In terms of the model presented in the previous section, simple probit estimation of (16) would be correct if private motivations were the only relevant for information acquisition. Being the probability to be pivotal extremely low, this possibility could actually be not too far away from reality if voting was only an instrument for obtaining policies. However the benefit D in equation (1) can be an important motivation for voting, in the same way b_2 in (5) is for information acquisition. The two types of psychic benefit are very likely to be correlated: so we don't need a theory of purely instrumental voting in order to have turnout and information acquisition related.

Therefore info could be an endogenous explanatory variable and the coefficient estimates of (16) could be biased. We will then estimate the following triangular system:

$$\begin{aligned} \text{info}_i &= \beta_1^{'}X_i + \beta_2^{'}Z_i + u_{1i} && (17) \\ U_W &= \alpha_1 INFO_i + \alpha_2^{'}X_i + u_{2i} && (18) \\ T_i &= 1 \text{ if } U_W > 0 \\ T_i &= 0 \text{ if } U_W \leq 0 \end{aligned}$$

where X is a vector of covariates representing both individual and constituency characteristics and assumed to affect both turnout and information acquisition. Our identifying covariates are represented by the vector Z: these explanatory variables are assumed to affect information acquisition but not directly the turnout decision.

It is clear that if this is the structural model, then simple probit estimates of (18) will suffer of endogeneity bias as the two error terms u_{1i} and u_{2i} are correlated . By using instrumental variables we should also be able to assess the relevance of this bias. Treating info as a continuous variable, the system is estimated in two steps.

Equation (17) is the reduced form containing all the exogenous covariates of our model.

Define $Y = (X, Z)$ and consider the reduced form

$$U_W = \Pi Y_i + v_{2i} \tag{19}$$

then indicating $Var(v_2) = \sigma_2^2$ we can write

$$T_i^* = \frac{U_W}{\sigma_2} = \frac{\Pi}{\sigma_2} Y_i + \frac{v_{2i}}{\sigma_2} \tag{20}$$

The estimable structural turnout equation is then based on the following latent variable:

$$T_i^* = \frac{\alpha_1}{\sigma_2} INFO_i + \frac{\alpha_2^{'}}{\sigma_2} X_i + \frac{u_{2i}}{\sigma_2} \tag{21}$$

The first step consists of estimating the reduced form (17) by OLS and get the residuals $\widehat{u}_1 = \text{info} - \widehat{\beta}_1^{'} X_i + \widehat{\beta}_2^{'} Z_i$.

We can then estimate the equation

$$T_i^* = \frac{\alpha_1}{\sigma_2} INFO_i + \frac{\alpha_2^{'}}{\sigma_2} X_i + \frac{\alpha_3}{\sigma_2} \widehat{u}_1 + \frac{u_{2i}}{\sigma_2} \tag{22}$$

by probit maximum likelihood. This provides both consistent (though not efficient) estimates of $(\frac{\alpha_1}{\sigma_2}, \frac{\alpha_2^{'}}{\sigma_2})$, as well as an endogeneity test: if $\frac{\alpha_3}{\sigma_2}$ is insignificant we can't reject the null hypothesis that info is weakly exogenous in the turnout equation.

The vector Z is composed by six variables that are assumed to influence information acquisition but not directly turnout. The variable "salience" represents the media salience of each constituency in the last month before the election. This is measured as the number of articles on a major national newspaper mentioning either the name of the constituency or that of one of its candidates. For this purpose I have used the Guardian[5], but there is no specific reason for this apart from the fact that this paper's archive is easily accessible: any newspaper could be used instead, and the only purpose is to capture the salience on the media of the electoral competition in each constituency. Our assumption is of course that people living in more salient constituencies are more exposed to political information and therefore will know more about politics in the day of the election. A second instrument is a dummy variable equal to 1 if the subject own shares in the stockmarket; this instrument is directly derived from our theory of the demand for information, and tries to capture one important aspect of private decision-making that is linked to political decisions. A third istrument is represented by the party effort in the constituency: we should expect people to be more informed in those constituencies where parties have been more active in their campaigning. For this purpose we use the information we have about canvassing and phoning during the electoral campaign and build up a variable that averages those activities at the constituency level (see appendix B). Finally, we include three more instruments on media usage: a dummy equal to 1 if the agent reads regularly a quality newspaper, a dummy equal to 1 if she reads regularly any local newspaper and a measure of attention to political news on newspapers directly derived from the survey.

It should be noted that the estimated standard errors from this method are not correct and should therefore be corrected following the procedure described in Maddala (1983); however, Monte Carlo results tend to show that the asymptotically correct standard errors are no more effective in large finite samples than the conditional standard errors (see Guilkey, Mroz, Taylor, 1992).

Associated with this two-step probit regression model there is an endogeneity test to determine whether the set of unobservables affecting equations (17) and (18) do overlap. The test consists in a simple t-test for significance of the coefficient $\frac{\alpha_3}{\sigma_2}$ of the estimated error term.

Finally we will test the validity of the instrument. This can be done in several different ways. A first possibility is to compare a probit regression of

[5] This variable could be enriched by considering more papers, as I am planning to do. However I do not expect any major change as newspapers tend to vary more in the way they report news than in the subjects chosen (see for example...).

turnout on all exogenous variables and instruments (unrestricted model) with the same regression where instruments are excluded but fitted values from the first stage regression are included (restricted model); ideally, we would like the two to be not "too different": we can then perform a chi-square test based on the likelihood function. A second possibility is to perform a Sargan test, regressing residuals from the second stage regression on instruments: we can then perform a chi-square test based on the R-square of this regression multiplied by the number of observations. Finally, residuals from the second stage can be regressed on instruments and other exogenous variables: it is then possible to perform an F-test on the joint significance of the instruments.

6 Results

We start by running a probit regression of turnout on a set of variables that both theoretical and empirical literature have identified as relevant. Estimations of (14) are reported in table 3. In columns 3 and 4 we also included an indicator of ideological motivation but the results do not change in any substantial respect. The same is true wheater we include "income", "education", and "churchgoer" as fixed effects or as single numerical variables. Although we can accept such a restriction for any of these variables in isolation, this is not true for the three together, as a comparison of the log-likelihood scores would formally show. Therefore in the subsequent analysis we will only consider the case where fixed effects for all three variables are included. The signs of coefficients do not show any surprise if compared with previous findings of empirical literature on turnout. z-statistics are sometimes low as this represents a quite comprehensive list of explanatory variables, thus introducing some multicollinearity. Whether we introduce "ideology" or not, past voting behaviour is a very important explanatory variable; this seems to reinforce the idea that there are important individual-specific unobservables in driving turnout behaviour. It should be noticed our result about the constituency marginality, an issue that has absorbed most of the efforts in explaining turnout, with quite controversial results. We find that the closeness of the election tend to increase participation probabilities; the coefficient is significant at the 5% significance level. In particular, looking at the marginal effect at the average, an increase by 1% of the distance between the winner and the runner up will decrease by 0.0014 the probability of a voter to show up in the election, other things constant. This result is also quite robust to the use of different specifications. It should be noted that the introduction of "ideology" does not alter in any substantial way our results. Since this is true also in what follows, we will not comment anymore on "ideology".

In table 4 we report estimates of (16), thus introducing information. Both the magnitude and the significance level of the variable "info" seem to suggest that information is one of the most important explanatory variables for turnout. The marginal effect at the average is about 0.0338 which means that a person who score near the maximum in the info variable is more than 30% more likely to show up in the election than a person at the bottom. Again, this result look very robust to variations in the specification adopted.

We still need to take care of the potential endogeneity problem that might occour when regressing turnout on information. We then apply the procedure described in the previous section.

Results of the first stage regressions (17) are shown in tab.5. These regressions are also of interest for their own sake, as they can be seen as estimates of the demand for information, thus allowing us to test some of the assumptions and of the results of our theoretical analysis. Since we are mainly interested in equation (18), we do not make any attempt to correctly specify the demand for information for its own sake: equation (17) is then just a reduced form equation that makes use of all available exogenous variables, as this may affect efficiency but not consistency of estimates. Let's first start by noting that our instruments show the expected signs and four of them are significant at the 1% significance level. Owning shares performs quite robustly in the expected direction. Income turns out to be strongly and significantly linked to political information (see tab.5), in spite of the fact that we are controlling for the most important covariates that normally are assumed to explain income. We can then safely conclude from this that political information can be treated as a normal good and that data analysis is compatible with our model of the demand for information.

It should also not be overlooked the fact that people are substantially more informed in constituencies with closer competitions. The effect of closeness on information acquisition seems also to be more robust than that on turnout (compare tab 5 and tab 3). This result could simply be due to the fact that politicians and parties put more effort in marginal constituencies (as suggested for example in Aldrich, 1993 and more formally in Shachar and Nalebuff, 1999). However, we control for this by one of our istruments: this could then constitute evidence that the demand for political information increases when the probability to be a pivotal voter is higher, thus providing more evidence of another form of rational behavior of voters.

It should also be noted the significant negative correlation between information and the number of hours devoted to work. As we said before here we face a choice about leisure allocation rather than the traditional income-leisure trade off. For this reason there could hardly be any significant effect of the demand of information on the number of hours devoted to work. However, it is reasonable to assume that, being the leisure time of full time workers lower, the opportunity cost of time devoted to information gathering is higher, as confirmed by the sign of the coefficient.

Citizens are also more informed in constituencies that get more extensive newspaper coverage; media overall seem to be quite effective in improving the knowledge citizens have about political matters. Finally, the individual technology used in receiving, elaborating and remembering news plays a crucial role in information acquisition. Those are the parameters that in the model we indicated by E. This was actually meant to stand for education, which indeed turns out to be probably the most important explanatory variable for information (see tab. 7). Age and sex play a similar role; the first probably because more experienced citizens have attained a larger "stock" of political knowledge, the second probably reflecting the different networking possibilities normally faced by males and females, as well as different forms of socialization in general.

Let's then turn to the endogeneity issue. For this purpose we run a probit regression of turnout including among the covariates both observed information and fitted residuals from the first stage regression. In table 8 we can see that the sign of info is unchanged; its magnitude is even larger than before; though the z-statistics are now substantially lower, information is still significant at the 5% significance level. However, even more importantly, residuals are not significant in the turnout equation; thus, on the basis of this evidence, we cannot reject the null hypothesis that information is weakly exogenous in turnout estimation. All overidentification tests mentioned in the previous section are passed quite comfortably by our instruments, as shown in tables 9 and 10. Therefore the endogeneity test reported in tab. 8 is valid. It is clear from the first stage regression that there are several variables driving both information and turnout, as one would expect. However, we can safely assume that none of them has been omitted and therefore we can refer to the estimates of table 3 as substantially correct.

7 Conclusion

In this paper we model political information acquisition and electoral turnout and provide empirical evidence about their links. Information acquisition is modeled as an individual production function: citizens "produce" their own information by using mass media and time. Different people are endowed with different technologies, reflecting their ability to acquire, process and remember information. The parameters that determine those different productivities are then represented by a series of socio-demographic characteristics like education, age etc. This leads us to derive some testable propositions about political awareness and those characteristics. We also consider the fact that political information is not only relevant in politics but can have important consequences for the way people undertake their purely private decisions, as those may often depend on public policy parameters. This means that people who have more at stake with such decisions should be expected to be more informed on political matters, in spite of having the same probability to be pivotal in elections as any other citizen.

We then link awareness about political matters to turnout. This is now a quite well established link in theoretical literature. Our contribution here consists in the fact of being able to link the parameters that drive information acquisition to turnout. In fact, in spite of well established empirical regularities, there is no theoretical explanation (in rational choice terms) for the correlation between turnout and most of such individual characteristics, such as education, age, sex etc. Our theory provides a possible way to organize the causality links.

Empirical evidence is provided using the 1997 British General Election Study. Using a number of questions about candidates names and political institutions we build up a measure of political awareness that helps us to shed some light on the information-turnout relationship. Information turns out to be one of the most important and robust explanatory variables for turnout. We estimate this relationship using both a simple probit and a two-step instrumental variables probit: in both cases the idea that political awareness increases turnout seems well supported.

Several improvements and extensions are possible and some are certainly due. On a theoretical ground modelling ideological motivations could give us more insights on both turnout and information acquisition. We assumed that the distribution function from which candidates are drawn is the same for both parties. This could fit situations in which parties' borders are neither strong nor well defined; in this case the distribution function of types could rather reflect some ability dimension and be referred to the population as a whole. In most circumstances, however, people have different expectations on the type of politician put forward by different parties. In this case we should consider several different type distributions, one for each party. This might have implications for both the way information affects turnout and the way information is gathered. Although ideological motivations are not easy to account for both theoretically and in empirical studies, it is difficult to neglect the role of ideologies in the political arena.

There is much to be done on the empirical side too. The analysis presented in this paper can certainly be improved, for example collecting more data for the variable "salience". Improvements of this type will be carried out shortly and presented in next versions of the current paper. At a deeper level, a better estimation of the information equation for its own sake is certainly possible. Indeed, it should be considered the fact that information can be acquired also to undertake better voting, thus including turnout in the information equation. This will not affect the results presented here, as the reduced forms would be unchanged, but could give us a more precise idea about the different incentives driving information acquisition.

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8 Appendix A: proof of results

Proof of Proposition 1 Since $U(x|a)$ is continuous in x then $\int U(x|a)f(a)da$ is a continuous function. The choice set defined by $px \leq M$ is non-empty and compact and therefore, from Berge's maximum theorem, we have that the indirect utility functions $v^*(p, M)$ and $\widetilde{v}(p, M)$ are also continuous. Notice that $M = m_0 + w(1-t) - p_k k$ is continuous in t and k. Being also $q(t, k)$ a continuous function we will have that

$$q(k,t)v^*(p, M(t,k)) + (1 - q(k,t))\widetilde{v}(p, M(t,k))$$

is also continuous in t and k. The above expression is maximized under the constraint that

$$wt + p_k k \leq m_0 + w$$

which again delivers a non-empty and compact choice set. Therefore, applying again Berge's maximum theorem we get that $t^{\#}(m_0, w, p_k)$ and $k^{\#}(m_0, w, p_k)$ are non-empty, compact valued and upper hemi-continuous correspondences. ¥

Proof of Lemma 1 Let's consider the objective function $\int \{U(x|a)f(a)da$. Note that $U(.)$ is a continuous function and never changes its sign, and $f(a)$ is a continuous function. Then we can apply the weighted mean value theorem for integrals to say that $\exists\ \widehat{a}$ s.t.

$$\int U(x|a)f(a)da = U(x|\widehat{a}) \int f(a)da = U(x|\widehat{a})$$

. Then we can express the solution to the problem of maximizing $\int U(x|a)f(a)da$ under $px \leq M$ as $\mathsf{x}^*(M, p, \widehat{a})$.

2) Note that under assumption 1 we have $\mathsf{x}^*(M, p) = M\mathsf{x}^*(p)$ and therefore, $V(M, p, a) = MV(p, a)$. Let's define by $\widetilde{V}(m, p, a)$ the maximum utility attainable when platforms are not observed. Suppose we have a given realization a^*. The indirect utility function (ex post. if a^* is observed) is then $V(m, p, a^*)$. We can express the solution when a^* is not observed as

$\mathsf{x}^*(m,p,a^{''})$ for some $a^{'} \in A$. Then the ex post value of information for the realization a^* is given by:

$$\begin{aligned} G(m|a^*) &= U(x^*(M,p,a^*)|a^*) - U(x^*(M,p,a^{'})|a^*) \\ &= M[V^*(p,a^*) - \widetilde{V}(p,a^*)] \geq 0 \end{aligned}$$

which implies that $\frac{\partial G(m|a^*)}{\partial M} \geq 0$.

Finally, note that the ex ante value of information is given by

$$\gamma(M,p) = \int G(m|a)f(a)da$$

and therefore

$$\frac{\partial \gamma(M,p)}{\partial M} = \int \frac{\partial G(m|a)}{\partial M} f(a)da \geq 0$$

Proof of Lemma 2 (sketch) From assumption 1 we have that

$$x^*(M,p) = Mx^*(p)$$

if a is not observed and

$$x^*(M,p,a) = Mx^*(p,a)$$

if a is observed. We can then define

$$\begin{aligned} U(x^*(M,p,a)|a) &= MV^*(p,a) \\ U(x^*(M,p)|a) &= M\widetilde{V}(p,a) \end{aligned}$$

and

$$\begin{aligned} v^* &= \int V^*(p,a)f(a)da \\ \widetilde{v} &= \int \widetilde{V}(p,a)f(a)da \\ \gamma &= v^* - \widetilde{v} \end{aligned}$$

We can rewrite the objective function in (?) as

$$[m_0 + w(1-t) - p_k k]\widetilde{V} + q(t,k)[m_0 + w(1-t) - p_k k]\gamma \tag{23}$$

The FOCs derived from the new maximization problem are then

$$\begin{aligned}\frac{\partial V}{\partial t} &= -w\widetilde{V} + q_t M\gamma - wq(t,k)\gamma = 0\\ \frac{\partial V}{\partial k} &= -p\widetilde{V} + q_k M\gamma - wq(t,k)\gamma = 0\end{aligned}$$

Notice that the FOCs are of class C^1. The corresponding Hessian matrix is given by:

$$\begin{bmatrix} q_{tt}M\gamma - q_t\gamma w - wq_t\gamma & q_{tk}M\gamma - q_t\gamma p_k - wq_k\gamma \\ q_{kt}M\gamma - q_k\gamma w - p_k q_t\gamma & q_{kk}M\gamma - q_k\gamma p_k - p_k q_k\gamma \end{bmatrix} \qquad (*)$$

It is possible to calculate the determinant associated with such matrix and to see that it is always positive. Thus we can apply the implicit function theorem to the FOCs to derive that there exists continuous functions $t^{\#}(m_0, w, p_k)$ and $.k^{\#}(m_0, w, p_k)$. Moreover, being the FOCs of class C^1, $t^{\#}(m_0, w, p_k)$ and $k^{\#}(m_0, w, p_k)$ are continuously differentiable and the sign of the derivatives can again be calculated applying the implicit function theorem.

We then have

$$t_{m_0} = -\frac{\det \frac{\partial(\frac{\partial V}{\partial t}, \frac{\partial V}{\partial k})}{\partial(k, m_0)}}{\det \frac{\partial(\frac{\partial V}{\partial t}, \frac{\partial V}{\partial k})}{\partial(k,t)}}$$

The denominator is the determinant of the matrix (*) and is therefore positive. The matrix at the nominator is instead

$$\begin{bmatrix} q_t\gamma & q_{kt}M\gamma - q_t\gamma p_k - wq_k\gamma \\ q_k\gamma & q_{kk}M\gamma - q_k\gamma p_k - p_k q_k\gamma \end{bmatrix}$$

whose determinant is

$$\begin{aligned} & q_{kk}M\gamma^2 q_t - q_k\gamma^2 p_k q_t - p_k q_k q_t\gamma^2 - [q_{tk}M\gamma^2 q_k - q_t\gamma^2 p_k q_k - w\gamma^2 q_k^2] \\ = \ & M\gamma^2[q_{kk}q_t - q_{tk}q_k] + \gamma^2[wq_k^2 - p_k q_k q_t] \leq 0 \end{aligned}$$

since $[wq_k^2 - p_k q_k q_t] = 0$ (being, from the FOCs $wq_k = pq_t$).

Therefore

$$t_{m_0} = -\frac{(-)}{(+)} \geq 0$$

Analogously, it is possible to derive the sign of the other derivatives reported in the proposition.¥

Proof of Proposition 2 The FOCs for the whole optimization problem are now:

$$\begin{aligned}\frac{\partial W}{\partial t} &= -w\widetilde{V} + q_t M\gamma - wq(t,k)\gamma + q_t P| \int [S(a) - \overline{S}| f(a)da| = 0 \\ \frac{\partial W}{\partial k} &= -p\widetilde{V} + q_k M\gamma - wq(t,k)\gamma + q_k P| \int [S(a) - \overline{S}| f(a)da| = 0\end{aligned}$$

Defining

$$P| \int [S(a) - \overline{S}| f(a)da| = \Delta \geq 0$$

we can rewrite the FOCs as

$$\begin{aligned}\frac{\partial V}{\partial t} &= -w\widetilde{V} + q_t(M\gamma + \Delta) - wq(t,k)\gamma = 0 \\ \frac{\partial V}{\partial k} &= -p\widetilde{V} + q_k(M\gamma + \Delta) - wq(t,k)\gamma = 0\end{aligned}$$

We can now repeat the steps of the proof of Proposition 2 to obtain that $t_{m_0} \geq 0$, $k_{m_0} \geq 0$, $t_{p_k} \leq 0$, $k_{p_k} \leq 0$, $t_E \geq 0$, $k_E \geq 0$ and therefore $Q_{m_0} \geq 0$, $Q_{p_k} \leq 0$, $Q_E \geq 0$.

For the turnout decision we have

$$\Pr(T = 1 | m_0, p_k, w, E, P, c) = Q(m_0, p_k, w, E) \int_{\mathcal{A}(P,c)} [S(a) - \overline{S}| f(a)da$$

In other terms, each citizen will vote only if informed on platforms and if the distance between the two types is enough to compensate the cost of voting, for a given probability to be a pivotal voter. The rest of the proposition follows then immediately.¥

Figure 1: Time Line

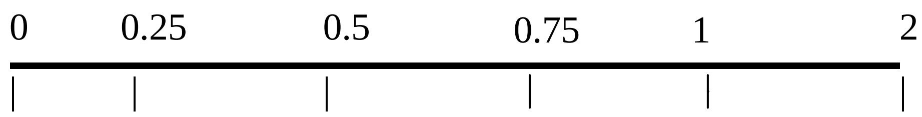

Figure 1:

0 = Incumbent realization from distribution f (a)
0.25 = Choice of t^* **and** k^* **(utility in first period is determined)**
0.5 = realization of q
0.75 = private decisions are undertaken
1 = election
2 = 2nd period utility is realized

9 Appendix B: description of variables and regression results

9.1 Information derived from British General Election Study 1997

• **info**

The variable info has been based on the following two questions:

1. Do you happen to remember the names of any candidates who stood in your constituency in the general election this year?

Please write in all the names of candidates that you can remember (6 spaces provided) or tick box: I can't remember any of the candidates' names.

Note: the names of candidates written in by respondents were checked against official lists of candidates.

2. Political knowledge quiz (answers: true/false/don't know)

a: Margaret Thatcher was a Conservative Prime Minister

b: The number of MP is about 100

c: The longest time allowed between general elections is four years

d: Britain's electoral system is based on proportional representation.

e: MPs from different parties are on parliamentary committees.

f: Britain has separate elections for the European parliament and the British parliament.

g: No-one may stand for parliament unless they pay a deposit.

Let's define with cand the number of candidates correctly reported and with quiz the number of correct answers in question 2. Info is then given by

$$\text{info} = cand + 0.66 \times quiz$$

The reason quiz has been downweighted is due to the fact that being true /false questions, it was possible for respondents to guess the answer without really knowing it, while this is not possible for cand. Therefore, using Bayes' rule we have

$$\Pr(know|correct) = \frac{\Pr(correct|know)}{\Pr(correct|know) + \Pr(correct|don't)} = \frac{1}{1+0.5} = 0.66$$

•**TNT** (official turnout or declared turnout for those whose register was unavailable)

1=yes

• **income**: total household income from all sources before tax. Categorical variable from 1 to 16 (see tab 5)

• **age:** respondent's age (>18)

• **age2**=age^2×0.01

• **sex:** 1 = male

• **edu:** respondent's education level. Categorical variable from 1 to 7 (see tab. 6)

• **married.** 1=yes (= 1 also if "living as married")

• **ethnicity**: "To which of these groups do you consider you belong?". **asian =** 1 if answer one of "Indian, Pakistani, Bangladeshi, Chinese, Other Asian".

black = 1 if answer one of "Black African, Black Caribbean, Other Black".

• **churchgoer.** Categorical variable. " Apart from such special occasions as weddings, funerals and baptisms and son on, how often do you attend services or meetings connected with your religion?"

1. Never or practically never;
2. Varies too much to say;
3. less often than once a year;
4. at least once a year;
5. at least twice a year;
6. at least once a month;
7. at least once in two weeks;
8. once a week or more.

• **length of residence.** "How long have you lived in this neighbourhood?" (range 0-97)

• **farmer.** 1 if yes.

• **hours:** "how many hours (do/will/did) you normally work a week in your main job, including any paid or unpaid overtime?"

• **houseowner.** "does your household own or rent this accommodation". =1 if owns (leasehold etc.)

• **registered:** "As far as you know, is your name on the electoral register?". 1=yes.

• **canvasser** : "did a canvasser from any party call at your home to talk to you during the elctoral campaign?". 1=yes.

• **phoned:** **"**Were you contacted by anyone on the telephone during the electoral campaign asking how you might vote?". 1=yes.

• **voted92.** =1 if voted in 1992 general election (self reported).

• **ideology:** **"**Which one of the reasons on this card comes closest to the main reason you voted for the party you chose?". 1 if answer "I always vote that way", 0 otherwise.

• **broadsheet-reader** =1 if

a: "do you regularly read one or more daily morning newspapers?" Answer: yes

b: "which daily morning newspaper do you read most often?". Answer:

- The Daily Telegraph
- The Financial Times
- The Guardian
- The Independent
- The Times

•**attention to politics in papers:** **"**When reading paper**,** how much attention do you pay to stories about politics?"

1=no attention at all,..., 5= agreat deal of attention

•**local newspapers reader:** **"**About how often, if at all", do you read a morning, evening or weekly local newspaper?"

1 if "once a week or more often", 0 otherwise.

• **economic activity.** categorical variable:

1. "in paid work for at least 10 hours in week" or "waiting to take up paid work already accepted";
2. "in full time education (not paid for by employer, including on vacation)";
3. "on government training/employment programme";
4. "unemployed"
5. "permanently sick or disabled";
6. "wholly retired from work";
7. "looking after the home";
8. "other"

• **share-owner:** "do you (or your wife/husband/partner) own any shares quoted on the Stock Exchange, including unit trusts and PEPs?". 1=yes.

• **union**

Respondent or his/her partner is or has been member of a union. 1 if yes

• **reg-i**

General Standard Regions: i=1..11.

• **party effort in constituency.** Let's indicate with K the number of respondents in constituency j. For each respondent we know if she has been contacted by parties (information in "canvasser" and "phoned"). Then for agent i in constituency j we have $cv_{ij} \in \{0,1\}$ and $ph_{ij} \in \{0,1\}$. We define party effort in constituency j as

$$pe_j = \frac{\sum_{i=1}^{K}(cv_{ij} + ph_{ij})}{2K} \in [0,1]$$

9.2 Information about constituencies from Census 1991

• **high qualifications:** % of population with higher qualifications (diploma and degree)

• **unemployed:** % unemployed

• **employers:** % head of household employers and managers

• **population density:** persons per hectare

9.3 Information from http://www.election.demon.co.uk/

• **aggregate turnout**: at the constituency level.

• **marginality.** Percentage difference between the winning candidate and the runner-up in the constituency in the current election

9.4 Information from The Guardian

• **salience:** number of articles on the Guardian between 1st and 30th April 1997 containing either the name of the constituency or that of one of its candidates for the 1997 election.

Table1: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
employers%	2807	12.03245	6.045795	1.1	34.5
unemployment %	2813	5.688541	1.646076	3.123415	10.33598
higher qualifications %	2813	13.19294	2.817763	8.990578	20.01444
share-owner	2813	0.353359	0.478098	0	1
party effort in constituency	2813	0.155803	0.123951	0	1
turnout	2813	0.78315	0.412173	0	1
broadsheet-reader	2813	0.119801	0.324786	0	1
local newspaper reader	2813	0.741913	0.43766	0	1
attention to politics in papers	2813	1.769285	1.654476	0	5
canvasser	2813	0.240668	0.427565	0	1
phoned	2813	0.073942	0.261724	0	1
union	2813	0.596161	0.490753	0	1
asian	2813	0.018486	0.134723	0	1
black	2813	0.008887	0.093869	0	1
registered	2813	0.984358	0.124107	0	1
length of residence	2807	19.52476	17.93782	0	94
ideology	2813	0.231426	0.421819	0	1
cand	2813	0.922147	1.114681	0	6
quiz	2807	5.100463	1.700244	0	7
info	2807	4.290424	1.802592	0	10.62
sex	2813	0.464273	0.498811	0	1
age	2807	48.30353	17.51704	18	94
age2	2807	26.39968	18.20688	3.24	88.36
married	2813	0.587273	0.492412	0	1
hours	2807	38.11329	15.91646	-1	95
farmer	2813	0.005688	0.075217	0	1
house	2813	0.677568	0.46749	0	1
voted92	2813	0.795592	0.40334	0	1
education	2813	3.596516	2.164718	1	7
churchgoer	2813	2.901529	2.682972	0	8
salience	2807	3.183826	9.425991	0	85
aggregate turnout	2807	71.64854	5.07043	51.7	80.21
marginality	2807	24.43328	16.29108	0.45	74.4

Table2: Categorical Variables

Variable	Freq.	Percent	Cumulative
income			
less than 3999 £	221	7.87	7.87
4000-5999	353	12.58	20.45
6000-7999	250	8.91	29.36
8000-9999	191	6.8	36.16
10000-11999	215	7.66	43.82
12000-14999	241	8.59	52.4
15000-17999	195	6.95	59.35
18000-19999	138	4.92	64.27
20000-22999	179	6.38	70.64
23000-25999	164	5.84	76.49
26000-28999	132	4.7	81.19
29000-31999	96	3.42	84.61
32000-34999	79	2.81	87.42
35000-37999	54	1.92	89.35
38000-40999	65	2.32	91.66
41000 or more	234	8.34	100
education			
no qualification	953	33.88	33.88
foreign or other	17	0.6	34.48
CSE or equivalent	299	10.63	45.11
level or equivalent	493	17.53	62.64
level or equivalent	356	12.66	75.29
ation below degree	384	13.65	88.94
degree	311	11.06	100
churchgoer			
no religion	232	8.25	8.25
never	1390	49.51	57.66
es too much to say	35	1.24	58.91
n than once a year	124	4.41	63.31
t least once a year	172	6.11	69.43
t least twice a year	296	10.52	79.95
east once a month	140	4.98	84.93
once in two weeks	70	2.49	87.42
ce a week or more	354	12.58	100
economic activity			
paid work	1498	53.25	53.25
full time education	9	0.32	53.57
overnment training	64	2.28	55.85
unemployed	127	4.51	60.36
tly sick or disabled	131	4.66	65.02
retired	642	22.82	87.84
king after the home	324	11.52	99.36
ng something else	18	0.64	100
region			
North	153	5.45	5.45
North-West	204	7.27	12.72
hire & Humberside	208	7.41	20.13
West Midlands	243	8.66	28.79
East Midland	176	6.27	35.06
East Anglia	109	3.88	38,94
South West	196	6.98	45.92
South East	467	16.64	62.56
Greater London	234	8.34	70.89
Wales	135	4.81	75.7
Scotland	682	24.3	100

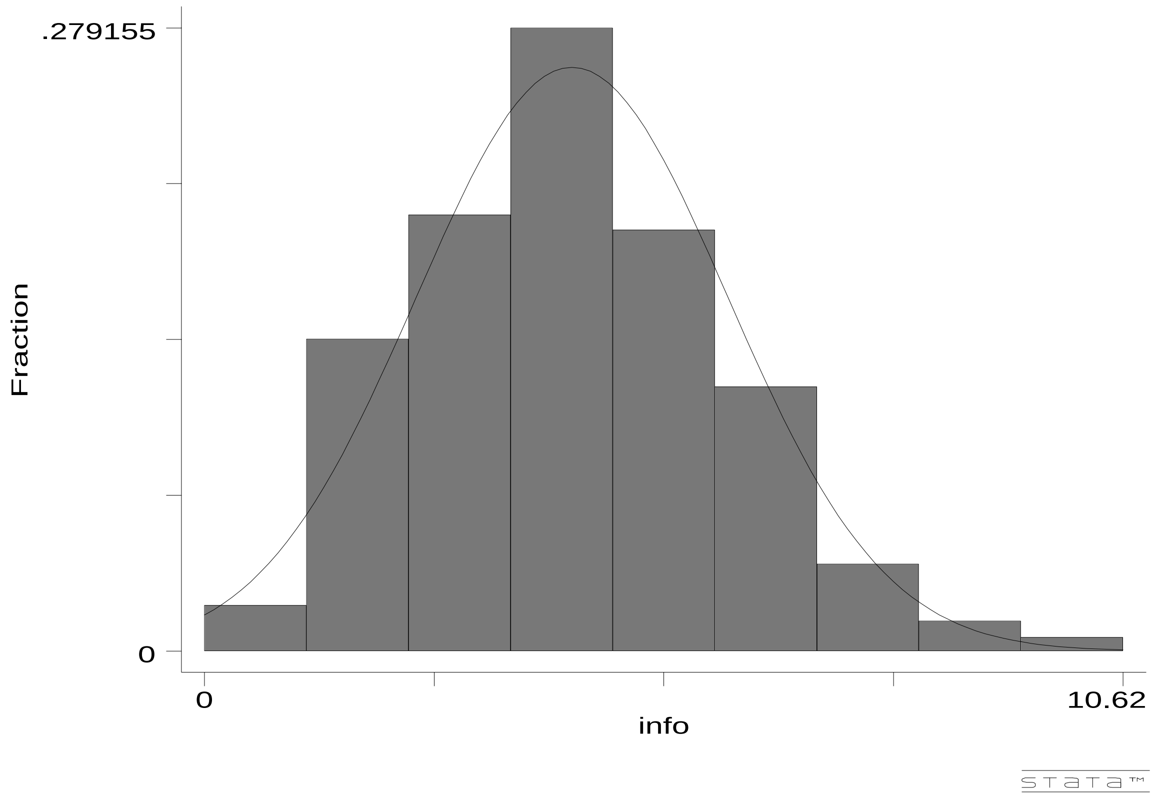
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Table 3: Turnout: probit coefficient estimates

(z-statistics in parentheses)

Dependent Variable: Turnout

	coeff	z	coeff	z	coeff	z	coeff	z
information on individuals								
age	.0102	(0.939)	.0082	(0.75)	.0125	(1.132)	.0111	-0.994
age2	-.0083	(-0.76)	-.0069	(-0.626)	-.0119	(-1.08)	-.0111	(-0.993)
education	.0286	(1.758)			.0416	(2.513)		
income	.0134	(1.422)			.0108	(1.118)		
married	.228	(3.538)	.1981	(2.961)	.2093	(3.149)	.1769	(2.562)
sex	.0264	(0.388)	.0192	(0.279)	.0437	(0.625)	.0367	(0.52)
asian	.3315	(1.373)	.3011	(1.293)	.2988	(1.282)	.2792	(1.228)
black	.2236	(0.69)	.189	(0.584)	.0297	(0.088)	-.0087	(-0.025)
churchgoer	.0269	(2.304)			.03	(2.495)		
union	.0627	(1)	.0517	(0.817)	.0777	(1.204)	.0667	(1.027)
length of residence	.0043	(2.254)	.0046	(2.376)	.0029	(1.472)	.0032	(1.596)
farmer	.2911	(0.743)	.2499	(0.636)	.4125	(1.031)	.3652	(0.911)
hours	-.0061	(-2.922)	-.0064	(-3.061)	-.0064	(-2.982)	-.0067	(-3.108)
houseowner	.1194	(1.716)	.1209	(1.662)	.1579	(2.212)	.1588	(2.141)
registered	1.897	(6.13)	1.9489	(6.242)	1.9014	(5.953)	1.9398	(5.986)
canvasser	.1809	(2.588)	.168	(2.389)	.1872	(2.607)	.1767	(2.456)
phoned	.2909	(2.222)	.3098	(2.353)	.3151	(2.344)	.3412	(2.519)
voted 92	.8633	(12.075)	.838	(11.852)	.7359	(10.320)	.7622	(10.544)
ideology					.9003	(9.396)	.9006	(9.365)
information on constituencies								
marginality	-.0056	(-2.199)	-0.0053	(-2.054)	-.0058	(-2.231)	-.0054	(-2.046)
aggregate turnout	-.0014	(-0.166)	-0.0024	(-0.286)	-.0023	(-0.261)	-.003	(-0.348)
high qualifications %	-.0129	(-.812)	-0.0157	(-0.981)	-.0133	(-0.809)	-.0148	(-0.895)
unemployed %	.0129	(0.517)	0.0088	(0.347)	.228	(0.886)	.02	(0.765)
employers %	.0082	(1.28)	0.008	(1.229)	.0086	(1.306)	.0083	(1.236)
population density	.0027	(-1.628)	0.0028	(1.666)	.0025	(1.433)	.0026	(1.487)
constant	-2.0414	(-2.546)	-1.9932	(-2.435)	-2.1651	(-2.593)	-2.1473	(-2.516)
categorical variables (p-values of chi-test)								
education		No		0.2122		No		0.0905
income		No		0.0438		No		0.0381
churchgoer		No		0.1302		No		0.1958
economic activity		0.1897		0.1233		0.2341		0.1668
region		0.7394		0.699		0.7019		0.6351
Observations:		2807		2807		2807		2807
Log-L		-1256.24		-1242.03		-1203.36		-1187.29
Pseudo R2		0.1406		0.1503		0.1767		0.1877

Note: Robust standard errors

Table 4: Turnout and information: probit coefficient estimates

(z-statistics in parentheses)

Dependent Variable: Turnout

	coeff	z	coeff	z	coeff	z	coeff	z
information on individuals								
info	.1262	(6.394)	.1278	(6.427)	.1297	(6.396)	.1315	(6.432)
age	-.0028	(-0.250)	-.005	(-0.445)	-.0004	(-0.038)	.002	-0.179
age2	.0018	(0.167	.0035	(0.314)	-.0019	(-0.168)	-.0008	(-0.067)
education	-.0004	(-0.021)			.0122	(0.711)		
income	.0049	(0.514)			.002	(0.2)		
married	.2287	(3.508)	.1997	(2.955)	.2095	(3.116)	.1782	(2.555)
sex	-.0487	(-0.697)	-.0556	(-0.79)	-.0331	(-0.463)	.039	(0.539)
asian	.3755	(1.536)	.3427	(1.455)	.3488	(1.476)	.3261	(1.417)
black	.2588	(0.785)	.2313	(0.707)	.0526	(0.154)	.0209	(-0.06)
churchgoer	.0221	(1.874)			.0253	(2.079)		
union	.0441	(0.699)	.0346	(0.546)	.0587	(0.904)	.0492	(0.757)
length of residence	.0038	(2.002)	.004	(2.085)	.0024	(1.185)	.0025	(1.271)
farmer	.2463	(0.629)	.1777	(0.465)	.3531	(0.883)	.2758	(0.715)
hours	-.0053	(-2.535)	-.0056	(-2.643)	-.0056	(-2.57)	-.0058	(-2.664)
houseowner	.1036	(1.472)	.1064	(1.453)	.1437	(1.992)	.1459	(1.953)
registered	1.8782	(5.91)	1.932	(6.011)	1.8838	(5.713)	1.9242	(5.761)
canvasser	.173	(2.458)	.1623	(2.295)	.1762	(2.442)	.1681	(2.332)
phoned	.262	(1.972)	.2795	(2.091)	.2901	(2.117)	.3149	(2.281)
voted 92	.7861	(11.062)	.813	(11.327)	.6781	(9.466)	.7056	(9.729)
ideology					.9040	(9.146)	.9055	(9.127)
information on constituencies								
marginality	-.0043	(-1.639)	-0.0041	(-1.539)	-.0044	(-1.641)	-.0041	(-1.539)
aggregate turnout	-.0019	(-0.222)	-0.0036	(-0.414)	-.0027	(-0.303)	-.0041	(-0.456)
high qualifications %	-.0161	(-.997)	-0.0184	(-1.128)	-.0174	(-1.041)	-.0184	(-1.098)
unemployed %	.0083	(0.33)	0.005	(0.194)	.0171	(0.656)	.015	(0.567)
employers %	.0074	(1.158)	0.0074	(1.147)	.0077	(1.171)	.0077	(1.142)
population density	.0028	(-1.635)	0.0029	(1.661)	.0025	(1.429)	.0026	(1.48)
constant	-1.823	(-2.225)	-1.9932	(-2.435)	-2.1651	(-2.593)	-1.9111	(-2.195)
categorical variables (p-values of chi-test)								
education		No		0.6205		No		0.6678
income		No		0.0878		No		0.0558
churchgoer		No		0.1578		No		0.252
economic activity		0.3581		0.2842		0.3638		0.2982
region		0.6218		0.5674		0.5221		0.4358
Observations:		2807		2807		2807		2807
Log-L		-1237.8		-1220.33		-1181.28		-1165.25
Pseudo R2		0.1532		0.1651		0.1919		0.2028

Note: Robust standard errors

Table 5: First stage regressions: OLS coefficients

(t-statistics in parentheses)

Dependent Variable: Information

	coeff	t	coeff	t
age	.0912	(7.962)	.0906	(7.93)
age2	-.0748	(-6.65)	-.0741	(-6.59)
married	.0124	(0.176)	.0155	(0.219)
sex	.5251	(7.363)	.5229	(7.332)
asian	-.621	(-3.128)	-.6198	(-3.117)
black	-.1881	(-0.71)	-.1702	-(0.645)
union	.1676	(2.685)	.1661	(2.659)
length of residence	.0058	(3.004)	.0059	(3.094)
farmer	.3198	(0.604)	.3096	(0.587)
hours	-.0051	(-2.216)	-.005	(-2.205)
houseowner	.1212	(1.604)	.1180	(1.569)
registered	0.3643	(1.636)	0.3705	(1.664)
canvasser	.0879	(1.202)	.0877	(1.199)
phoned	.3425	(2.645)	.3416	(2.637)
voted 92	.4708	(6.206)	.4849	(6.296)
ideology			-.0838	(-1.181)
marginality	-.0114	(-4.182)	-0.0114	(-4.178)
aggregate turnout	.0002	(0.019)	0.0003	(0.035)
high qualifications %	-.0003	(-0.017)	-0.0003	(-0.02)
unemployed %	.0141	(0.504)	0.0132	(0.475)
employers %	-.0016	(-0.244)	-0.0016	(-0.243)
population density	-.0007	(-0.372)	-0.0006	(-0.336)
constant	-0.7387	(-0.905)	-0.7331	(-0.899)
Instrumental variables				
salience	.0101	(3.085)	.0101	(3.093)
broadsheet-reader	0.4684	(4.434)	.472	(4.461)
attention to politics in papers	.1168	(5.81)	.1168	(5.808)
local newspapers reader	.1166	(1.775)	.1148	(1.749)
party effort in constituency	.521	(1.731)	.5169	(1.717)
share-owner	.2169	(3.201)	.2163	(3.193)
categorical variables (p-values of F-test)				
education		0		0
income		0.0127		0.0111
churchgoer		0.1172		0.134
economic activity		0		0
region		0.0111		0.0092
Observations:		2807		2807
R^2		0.3216		0.3219

Note: Robust standard errors

Table 6: First stage regressions: OLS coefficients of Income

(t-statistics in parentheses)

Dependent Variable: Information

Other covariates: see tab. 3

	withouth "ideology"		with "ideology"	
	coeff	**t**	**coeff**	**t**
less or equal to 3999 £	omitted		omitted	
4000-5999	.3791	(2.801)	.3813	(2.819)
6000-7999	.4966	(3.332)	.5003	(3.359)
8000-9999	.4085	(2.465)	.4115	(2.482)
10000-11999	.3945	(2.402)	.3948	(2.402)
12000-14999	.7056	(4.259)	.7101	(4.285)
15000-17999	.6101	(3.366)	.618	(3.411)
18000-19999	.6783	(3.512)	.6754	(3.502)
20000-22999	.7429	(4.076)	.747	(4.104)
23000-25999	.6851	(3.608)	.6886	(3.626)
26000-28999	.7845	(3.843)	.7877	(3.864)
29000-31999	.655	(2.84)	.6565	(2.851)
32000-34999	0.5257	(2.175)	0.5261	(2.178)
35000-37999	.65	(2.583)	.6538	(2.596)
38000-40999	.7637	(2.924)	.7746	(2.966)
41000 £ or more	.9119	(4.53)	.9180	(4.567)
Observations:		2807		2807
F-test		1.99		2.02

Note: Robust standard errors

Table 7: First stage regressions: OLS coefficients of Education

(t-statistics in parentheses)

Dependent Variable: Information
Other covariates: see tab. 3

	withouth "ideology"		with "ideology"	
	coeff	**t**	**coeff**	**t**
no qualification	omitted		omitted	
foreign or other	.6731	(1.543)	.6652	(1.527)
CSE or equivalent	.1753	(1.698)	.1759	(1.703)
O level or equivalent	.4129	(4.429)	.4084	(4.381)
A level or equivalent	.7005	(6.369)	.6909	(6.271)
higher education below degree	.8964	(8.702)	.8899	(8.638)
degree	1.365	(11.859)	1.3556	(11.733)
Observations:		2807		2807
F-test		28.5		27.79

Note: Robust standard errors

Table 8: Turnout and information: 2-step probit coefficient estimates

(z-statistics in parentheses)

Dependent Variable: Turnout

Other Covariates not reported (see tab.3)

	without "ideology"			with "ideology"		
	coeff	**z**	**p-value**	**coeff**	**z**	**p-value**
info	.2173	(2.28)	0.023	.2082	(2.127)	0.033
fitted residuals	-0.934	(-0.969)	0.333	-.001	(-0.809)	0.419
Observations:	2807			2807		
Log-L	-1219.93			-1164.96		
Pseudo R2	0.1532			0.2030		

Table 9: Testing the overidentification restrictions (I)

(Likelihood-ratio test)

Dependent Variable: Turnout

	coeff	z	coeff	z	coeff	z	coeff	z
fitted values from first stage	.2306	(2.426)			.224	(2.294)		
salience			0.0013	(0.38)			.0018	(0.513)
broadsheet-reader			0.1598	(1.391)			.1443	(1.194)
attention to politics in papers			0.036	(1.776)			.0355	(1.704)
local newspapers reader			.0571	(0.865)			.0775	(1.15)
party effort in constituency			.1688	(0.556)			.21	(0.676)
share-owner			-.1056	(-1.528)			-.1169	(-1.639)
ideology	No		No		Yes		Yes	
other control variables	Yes		Yes		Yes		Yes	
Observations:		2807		2807		2807		2807
Log-L		-1239.37		-1236.4426		-1184.86		-1181.61
Pseudo R2		0.1521		0.1541		0.1894		0.1916
L-Ratio test	chi2(5)=5.86				chi2(5)=6.5			

Table 10: Testing the overidentification restrictions (II)

Dependent Variable: Residuals from 2nd stage

	coeff	t	coeff	t	coeff	t	coeff	t
salience	-0.0001	(-0.069)	0.00003	(0.044)	-0.0001	(-0.169)	-0.00004	(-0.056)
broadsheet-reader	0.01415	(0.679)	.0127	(0.614)	.0108	(0.462)	.0076	(0.745)
attention to politics in papers	0.003	(0.669)	.0036	(0.831)	.0028	(0.576)	.0033	(0.49)
local newspapers reader	0.0078	(0.475)	.0123	(0.769)	.0072	(0.423)	.012	(0.468)
party effort in constituency	0.0118	(-0.213)	.0154	(0.286)	.0183	(0.248)	.0254	(0.724)
share-owner	-0.0302	(-2.066)	-.0312	(-2.189)	-0.372	(-2.203)	-.0402	(0.015)
ideology	No		Yes*		No		Yes	
other control variables	No		No		Yes		Yes	
Observations:		2807		2807		2807		2807
R2		0.0018		0.0022		0.0023		0.0031
Sargan		5.05		6.17				
F-test on IV						1.02		1.27

*Ideology in the two step procedure only, not in the tes