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INFORMATION ACQUISITION, PARTISANERY AND TURNOUT: THEORY AND EVIDENCE FROM BRITAIN

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Information acquisition, partisanery and turnout: theory and evidence from Britain

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Abstract

This paper studies the interactions between political partisanery, information acquisition and electoral turnout. We model information acquisition as a private production activity whose inputs are mass media and time devoted to their usage. Partisanery affects information acquisition, thus influencing turnout both directly and indirectly via information. Endogenous information is then linked to turnout and testable propositions about political awareness, turnout and observable characteristics of individuals and of the environment are derived. These results are then tested on British data: the theory of information acquisition provides instrumental variables to solve potential endogeneity problems. Empirical investigation supports quite comfortably our main theoretical predictions and our modelling strategy. Results confirm the importance of information and mass media for turnout.

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

Political information plays an important role in this context both on 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, costs and institutional arrangements. 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 ac-

quisition from a decision-theoretical perspective and to reconsider a rational choice theory of electoral turnout based on endogenous political information. We will model information acquisition 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.

Apart from gathering information from mass media (or other sources), most people have opinions on political issues: these are reflected on both political preferences and beliefs about how to reach given aims. These priors can be shaped by the influence of other people (e.g. parents), by personal knowledge and competence in political matters, by personal experiences etc. There is little doubt that those opinions or, in other terms, some form of partisanery, however formed, play an important role in voting decisions and on turnout itself. Moreover, and quite interestingly, it can have an influence on the decision to acquire political information; thus, when we introduce endogenous information acquisition, partisanery can influence voting both directly and indirectly via information. A second objective of this paper is to model these influences: the interaction between partisanery and information acquisition will lead us to new results on electoral turnout and will have implications for the way elections aggregate information: differently from previous works on this issue, information aggregation may be favoured not only by abstention of uninformed voters but by abstention of informed voters as well.

The second part of the paper will be devoted to test the validity of our modelling strategy and of the implied results. Also on the empirical side, modelling information acquisition turns out to be quite important. To see why this is the case suppose we want to estimate the effect of information on turnout. Let's then 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 decision to be undertaken and that in turn, this depends on some unknown parameter β; abbreviating we can write $B = B(\beta)$. If $\hat{\beta}_1$ is a more precise estimate than $\hat{\beta}_0$ of the true β, then we can say that the value of using $\hat{\beta}_1$ instead of $\hat{\beta}_0$ is given by

$$P[B(\hat{\beta}_1) - B(\hat{\beta}_0)] \tag{2}$$

where B now represents expected benefit. If the cost of passing from the estimate $\hat{\beta}_0$ to the estimate $\hat{\beta}_1$ is c (for example to acquire a larger sample of observations), then we have that such acquisition will take place if both

$$\begin{aligned} P[B(\hat{\beta}_1) - B(\hat{\beta}_0)] &> c \\ PB(\hat{\beta}_1) + D &> C \end{aligned} \tag{3}$$

As in the voting equation, we can also add a personal benefit b of acquiring information and re-write the (3) as

$$P[B(\hat{\beta}_1) - B(\hat{\beta}_0)] + b > c \tag{4}$$

b here reflects some psychic enjoyment of political information, orthogonal to political preferences and observable relevant variables.

The problem in testing the effect of information on turnout arises as in practice D and b are likely to be correlated, both being driven by some sense of civic duty or psychic enjoyment of politics. Finding a positive relation between information and turnout could therefore just reflect an occasional correlation, not revealing anything about, for example, information aggregation. Therefore the purpose of our theory will also be to provide instrumental variables for information acquisition in the empirical investigation, thus helping us to assess the role of information *per se* on turnout.

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 is 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 lead 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 The model

We consider a polity with two political parties I (incumbent) and O (opponent) and a set Ω of citizens who vote to elect a public decision-maker. The incumbent politician decides the value of a parameter $a \in [0, \overline{a}]$ representing the public policy. 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 consider an election in which the incumbent politician a^* faces an opponent selected by party O. When the politician in office implements her preferred policy a she reveals her type to citizens. Therefore, while a^* is common knowledge, citizens don't know the opponent's type: in other terms, the candidate selection process is unknown to citizens and is represented by a probability distribution function $F(a)$.

Citizens' preferences over policies are represented by a utility function $S(a)$. We assume that all citizens have the same preferences over a and that $S^{'}(a) > 0$. This is admittedly a strong assumption: people generally differ in their preferences over public policies. However, we can regard a not as a specific policy dimension but rather as a more general "good government". Indeed, it is very often the case that citizens, rather than differing on their final aims, have different opinions on the most appropriate way to reach those aims. Take the example of health care: not many politicians would claim they don't care much about people's health: however, different strategies to reach good healt services are rationalizable and are indeed rationalized during electoral campaigns. It turns out that in many cases heterogeneity is not as much a matter of preferences on final goods as it is in beliefs about the effectiveness of different policies. In this sense $S(a)$ can be taken as representing meta-preferences on good government. This is clearly a simplification: heterogeneous preferences can be introduced at the cost of extra technical complications and little new insights compared with the present analysis.

Heterogeneity is then introduced on prior beliefs. We assume that citizens have different prior distributions $F(a)$ about the opponent's type. This formulation is clearly non-orthodox, though, as discussed, heterogeneous prior beliefs are inevitably part of political life. For a discussion of this assumption, see Harrington (1993).

During the electoral campaign, however, citizens can gather information on the opponent's type. They are endowed with an information gathering technology that is representable by the probability $q(t, k|E, S)$ to learn the realization a. The inputs of this personal production function of information

are an information source of quality k (newspapers, television, radio etc.), and time t devoted to extract information from this source. The opportunity cost of time t is represented by w, the marginal cost of quality in the information source is p. 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. In empirical applications E will clearly include variables such as education and age.

At the same time, the probability to learn a depends on the concentration of news about a on the information source k; thus, q will also depend on a parameter S, that reflects information supply. There is however a difference between k (the newspaper's quality) and S (information supply). The first can be individually chosen, according to each individual's interests and capabilities. S instead reflects the salience of given issues or constituencies on the media and is therefore independent of citizens' willingness to acquire information.

At the time of the election citizens compare the benefits of the two candidates: informed citizens will compare $S(a^*)$ with the actual realization of the opponent candidate; uninformed citizens will instead use their prior beliefs on the opponent's type. The benefit from voting is defined as the (expected) difference in utility from the two candidates. Moreover, voting is costly: we represent the cost of voting with c and assume c is distributed across the population according to the density function $h(c)$. The distribution of c is independent of the distribution of prior beliefs about the opponent. Each agent knows his own c.

After the election, the elected politician implements her own preferred policy a. The sequence of events is represented in fig. 1.

4 Information acquisition and voting

In this section we will first characterize the value and demand for information. Then we will restrict our attention to the case of a non-polarized polity by introducing restrictions on prior beliefs and cost of voting

We start by solving the model backward and characterizing the information acquisition process.

At time 2 the winning candidate implements her preferred policy, that will be a^* if the incumbent is confirmed in office and a_O if the opponent candidate

wins. For brevity let's indicate $S(a^*)$ with $\overline{S}$. Abusing the notation we will also indicate with I the decision to cast a vote for the incumbent, with O a vote for the opponent and with A the decision to abstain. We will also indicate with $T = 1$ the decision to vote, $T = 0$ the decision to abstain. The decision problem of an uninformed citizen at the election stage is then

$$\max_{\{I,O,A\}} P| \quad [S(a) - \overline{S}]dF(a)| - c = \text{Pr} \tag{5}$$

where P is the (exogenous) probability to be a decisive voter. For a citizen who knows the type of the incumbent the problem is instead

$$\max_{\{I,O,A\}} P|[S(a) - \overline{S}]| - c = V^*(a) \tag{6}$$

The ex ante value of an informed versus an uninformed vote is then given by

$$\Delta = \quad [V^*(a) - \text{Pr}]dF(a) \tag{7}$$

At the beginning of period 1 citizens decide about information acquisition. They are endowed with an information gathering technology that is representable by the probability $q(t, k|E, S)$ to learn the realization a. We make the following assumption on the information gathering technology.

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

This 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.

Therefore, period 1 optimization problem for a generic citizen can be expressed as:

$$\begin{aligned} & \max_{t,k} q(t, k|E, S)\Delta - wt - pk \\ s.t.\ t &\in \mathcal{T} \\ k &\in \mathcal{K} \end{aligned} \tag{8}$$

Our first step is to prove that the expected value of information is positive.

Lemma 1 $\Delta \geq 0$

Proof: See Appendix A

It is then straightforward to prove the following:

Proposition 1 *The optimal functions* $t^*(E, S, w, p)$ *and* $k^*(E, S, w, p)$ *are both increasing in* E, S *and decreasing in* w, p.

The demand for information, expressed as demand for mass media and time devoted to their usage, is then increasing in the technology parameter E and in the supply of relevant information by the media. The same will be true for the actual information acquired, expressed as the probability to know *a* $q(t^*, k^*|E, S) = Q(E, S, w, p)$.

In the following we will analyse the case in which ideologies and polarization are weak in terms of their effects in elections. This substantially translates in an assumption on prior beliefs and on the distribution on voting cost. Let's indicate with $\mathcal{C}$ the support of the voting cost distribution $h(c)$ and with $\mathcal{F}$ the set of distribution functions of prior beliefs on the opponent's type.

Assumption 2 $P|\int_{\mathsf{R}}[S(a) - \overline{S}]dF(a)| \leq c, \forall F \in \mathcal{F}, \forall c \in \mathcal{C}$.

This assumption substantially means that no citizen is partisan enough to overcome voting cost if uninformed. Uninformed agents will therefore always abstain.

We can now prove some results on electoral turnout. We will start by linking probability to be informed and ex ante probability to vote, i.e. the probability of voting before the actual type of the opponent is revealed. This ex ante perspective is indeed the only allowed for an external observer, at least if we want to maintain an agnostic view about the actual quality of candidates and their political distance.

Proposition 2 $\frac{Pr(T=1|q)}{\partial q} \geq 0$.

Proof. See Appendix A

The probability of voting for any candidate is increasing in information, i.e. on the probability to know the opponent's type.

It is also clear that our theory allows to link the probability of voting to a number of individual and environmental characteristics. This provides a theoretical foundation for a number of very well established stylized facts on turnout.

Proposition 3

$$\frac{Pr(T=1|p,w,E,S)}{\partial E} > 0, \frac{Pr(T=1|p,w,E,S)}{\partial S} > 0, \frac{Pr(T=1|p,w,E,S)}{\partial w} < 0, \frac{Pr(T=1|p,w,E,S)}{\partial p} < 0.$$

Proof. See Appendix A

The capability to acquire information, as well as the amount of information supplied, increase the probability that a citizen, ceteris paribus, will show up in the polls. Thus our theory can explain some of the most common findings of most empirical analysis, like a positive correlation between education and turnout probability.

5 Partisanery

In the following we will introduce partisanery. It is natural to think of partisanery in our model as deriving from prior beliefs about the opponent's type. This because we keep the incumbent's type as fixed. Of course in the real world partisanery has something to do with beliefs about all candidates. However this complication would add no real benefit to our analysis: it is clear that what really matters is the perceived position of one candidate relative to the other.

We will start by defining partisanery, according to citizens' beliefs and cost of voting.

Definition 1 *A citizen is first degree I-partisan (O-partisan) if his prior beliefs F(a) are s.t.*

$$\int_{\mathsf{Z}} [S(a) - \overline{S}] dF(a) < 0 \quad (\geq 0)$$

It is then possible to express the value of information in the following alternative way.

Lemma 2 *Consider an O-partisan (I-partisan) citizen. Then* $\Delta = 2\int_{\overline{\mathcal{A}}}[\overline{S} - S(a)]dFa$ *where* $\overline{\mathcal{A}} = \{a : \int [S(a) - \overline{S}]dF(a) < 0\}$ *(*$\Delta = 2\int_{\mathcal{A}}[S(a) - \overline{S}]dFa$ *where* $A = \{a : \int [S(a) - \overline{S}]dG(a) > 0\}$*).*

Proof. See Appendix A

In words, the ex ante value of information is equal to twice the expected loss from a wrong decision.

The value of information, and consequently its demand, clearly depends on the degree of partisanery. For simplicity we will restrict our attention to the set of prior beliefs such that the expected value of an informed decision is constant.

Assumption 3 Consider any two distribution functions $F(a) \in \mathcal{F}$ and $G(a) \in \mathcal{F}$ of prior beliefs about the opponent. We assume $\int |[S(a) - \overline{S}]|dF(a) = \int |[S(a) - \overline{S}]|dG(a)$.

It should be noted that first degree partisanery is defined only in relation to beliefs. This, however, does not guarantee that a partisan citizen will vote if uninformed: a more stringent definition of partisanery will require the beliefs to be such that they are sufficient to overcome the cost of voting. We will then have the following definition of partisanery:

Definition 2 A citizen is second degree I-partisan (O-partisan) if, for given P, his prior beliefs $F(a)$ and his cost of voting c are s.t.

$$P \int [\overline{S} - S(a)]dF(a) \geq c$$

$$(P \int [S(a) - \overline{S}]dF(a) \geq c)$$

We can then divide the set of possible beliefs into three groups

$$\mathcal{F}_I = \{F(a) : P \int [S(a) - \overline{S}]dF(a) > c\}$$

$$\mathcal{F}_O = \{F(a) : P \int [S(a) - \overline{S}]dF(a) > c\}$$

$$\mathcal{F}_{\mathcal{A}} = \{F(a) : |P \int [S(a) - \overline{S}]dF(a)| \leq c\}$$

and accordingly we can divide the citizens population Ω into Ω_I, Ω_O, Ω_A. So, if uninformed about the true incumbent's type, citizens in the set Ω_I will vote for the incumbent, citizens in Ω_O will vote for the opponent and finally those in $\Omega_{\mathcal{A}}$ will abstain. When informed about the incumbent's type then prior beliefs clearly do not matter anymore.For our purposes it is important to distinguish group Ω_A from the rest. We can define citizens in this group (second-degree) non-partisan.

Finally we would like to compare different degrees of partisanery. For this purpose we can use this simple definition:

Definition 3 Assume citizens i and j have prior beliefs represented respectively by the distribution functions $F(a)$ and $G(a)$. Then we say that citizen i is first degree more O-partisan (I-partisan) than citizen j if

$$\int [S(a) - \overline{S}]dF(a) > (<) \int [S(a) - \overline{S}]dG(a)$$

If i and j have the same c, then i is also second-degree more partisan than j.

When we don't want to distinguish between I-partisanery and O-partisanery we will simply say that agent i is more partisan than agent j.

Now notice that

$$\int [S(a) - \overline{S}]dF(a) = \int [S(a)dF(a) - \overline{S}$$

Then it is clear that the comparison of alternative distribution functions based on partisanery is equivalent to using first order stochastic dominance.

We will now define an indicator of partisanery that will be useful in what follows.

Definition 4 Consider two distribution functions $F_\pi(a)$ and $G_\pi(a)$. Then $\pi_F > \pi_G$ if and only if $F_\pi(a) \leq G_\pi(a)\ \forall a$ and we will define π as an indicator of O-partisanery.

Therefore, as π increases, agents become more O-partisan or, alternatively, less I-partisan. Also, as $|\pi|$ increases we will say that agets become more partisan (without specifying). We can now state the following result on the demand for information. We will state it for a first-degree O-partisan citizen; for I-partisans the result is just symmetric.

Proposition 4 Let's consider first-degree O-partisan citizens. Under Assumption 3 and for given E, S, w, p, c, we have that

$$
\begin{aligned}
&1)\ \pi \text{ s.t. } \int |[S(a)-\overline{S}]| dF_{\pi}(a) \leq c \Rightarrow q^{*}=0 \\
&2)\ \pi \text{ s.t. } \int |[S(a)-\overline{S}]| dF_{\pi}(a) \geq c \geq \left| \int [S(a)-\overline{S}] dF(a) \right| \Rightarrow q^{*}=q_{\max} \\
&3)\ \pi_F \text{ and } \pi_G \text{ s.t. } \pi_F > \pi_G \text{ and} \\
&\quad \int |[S(a)-\overline{S}]| dF_{\pi}(a) \geq \left| \int [S(a)-\overline{S}] dF_{\pi}(a) \right| \geq c \Rightarrow q_F^{*} < q_G^{*}
\end{aligned}
$$

Proof. See Appendix A

The intuition for this result is quite simple. Citizens that believe there is very little difference between the candidates (compared to the cost of voting) have no benefit from acquiring information: the expected utility of an informed choice does not overcome the cost of voting. We can refer to those citizens as the "indifferent": they will tend to attach little value to politics in general and therefore will remain generally uninformed. This can occour also for citizens that, in spite of being sufficiently first-degree partisan, have a very high cost of voting (think for example of citizens living outside their home country). In the second group the demand for information is at its peak: those are "independent" citizens, whose priors are not so strong to induce them to vote if uninformed but not so weak to make information useless.The third group is that of "partisans": in this group we include citizens whose prior are strong enough to induce them to vote if uninformed. In this case the demand for information decreases monotonically with the degree of partisanery: holding very strong beliefs means also to believe that it is not worth to acquire new information. It is clear that citizens who are very close to the indifference point between voting and not, are those whose demand for information is highest and that, ceteris paribus, can be expected to be more informed.

It is now possible to proceed, linking information and turnout.

Proposition 5

$\frac{Pr(T=1|q)}{\partial q} \geq 0$ for second-degree non-partisan and $\frac{Pr(T=1|q)}{\partial q} < 0$ for partisan citizens.

Proof. See Appendix A

For second degree non-partisan citizens the situation is analogous to that presented for a non-partisan polity in proposition 2: information can only increase the probability of voting for citizens that would otherwise abstain with certainty. Things are just the opposite for partisans: information could lead them to discover that candidates are not as distant as they perceived, thus inducing them not to incur the cost of voting.

Similarly to what we did in the previous section, we can link the probability of turnout to observable characteristics of individuals and the environment.

Proposition 6

For non-partisan citizens $\frac{Pr(T=1|p,w,E,S)}{\partial E} > 0, \frac{Pr(T=1|p,w,E,S)}{\partial S} > 0, \frac{Pr(T=1|p,w,E,S)}{\partial w} < 0, \frac{Pr(T=1|p,w,E,S)}{\partial p} < 0.$

For second-degree partisan citizens, $\frac{Pr(T=1|p,w,E,S)}{\partial E} < 0, \frac{Pr(T=1|p,w,E,S)}{\partial S} < 0, \frac{Pr(T=1|p,w,E,S)}{\partial w} > 0, \frac{Pr(T=1|p,w,E,S)}{\partial p} > 0.$

Proof. *See Appendix A.*

While for non-partisan citizens results are predictable and supported by well established empirical evidence, things are instead quite surprising for partisans. This calls for new empirical analysis on specific sub-populations, while the usual stylized facts are normally referred to whole populations.

Finally we can give results on the effects of partisanery on turnout: proposition 7 provides results taking into account of the existence of both a direct effect and an indirect (via information acquisition) effect. The indirect effect does not change the basic result that more partisan citizens are more prone to vote, though our result holds only within specific groups (in terms of partisanery) and does not allow a comparison between them.

Proposition 7

$$F(a) \in \Omega_i, G(a) \in \Omega_i, \pi_F > \pi_G \Rightarrow Pr(T=1)|_F \geq Pr(T=1)|_G,\ i = A, O.$$

$$F(a) \in \Omega_I, G(a) \in \Omega_I, \pi_F > \pi_G \Rightarrow Pr(T=1)|_F \leq Pr(T=1)|_F.$$

Proof. See Appendix A.

All the results presented in this and the previous section are given for a fixed cost of voting. We assumed that the cost c is distributed in the

population independently of other characteristics. The extensions of our results to the whole population are straightforward and will be omitted.

Before moving to empirical analysis, we can spend a few words on information aggregation. We proved that non-partisan citizens increase their likelihood to vote when informed, while partisan citizens increase their likelihood to abstain. It is then clear that more information increases the chances to win of the better politician and therefore information aggregation occours, at least in probabilistic terms. This also means that information aggregation in election should be related to a number of socio-economic observables as well as to the performances (in term of information supply) of the mass media.

However, we cannot test information aggregation directly as this would require an explicit evaluation of the candidates: moreover, as we observed previously, public policies also concern redistribution, while we are ignoring those issues in our model. What we will be able to test instead is our propositions about the likelihood to vote of different citizens. These results should have quite strong implications for information aggregation.

We have also reached some testable conclusions about information acquisition. We expect agents who are richer, better educated, with more networking activities etc. to be more informed. Those characteristics in turn will have, ceteris paribus, an effect on turnout.

6 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[1]. For each correct answer in this questions a score of 0.66 has been attributed to the agent[2]. The scores in the two set of questions have then been added up into 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 in fig. 2. 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.

Another problem arises with measuring partisanery. Disposition variables such as a person's interest in politics, sense of political efficacy etc. have been found to be quite important explanatory variables for electoral turnout. However, there are some reasons to be cautious about their usage. It is possible for example that respondents simply rationalize their behaviour by answering such questions; also, responses sometimes vary quite substantially with the question order (see for example Bishop, Oldendick and Tuchfarber, 1984, and Abramson, Silver, Anderson, 1987). However, to test some of our conclusions we will need to make use of this type of information. To build up the variable we will call "partisan", people were asked why did they vote the way they did; we define a respondent being partisan 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 will always vote in the same way. This will presumably affect both turnout and information acquisition. This variable, therefore, tries to capture this effect. We will return on this issue in the next section.

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

[1]Statements are reported in Appendix B.

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

on wage rates, that could be taken as a 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. In particular it is possible to distinguish between quality newspapers regular readers and the rest of the population. Details are reported in Appendix B. We also have information on canvassing and phone contacts 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 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[3] have been considered instead, all giving the same results.

[3]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

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 four instrumental variables that are assumed to affect information acquisition but not turnout directly. We will comment about them in the next section.

Data description and summary statistics are reported in Appendix B.

7 Estimation strategy and empirical specification

7.1 Information and Turnout without partisanery

As we discussed in the previous section, measuring partisanery is not an easy task and some scholars are skeptical about the validity of disposition variables. For this reason it is important to test the validity of the results we derived for a non-polarized polity. To test those results we don't need to use disposition variables. At the same time, an empirical analysis without partisanery is a first important step to test the validity of our theory of information acquisition and of its implications for turnout and information aggregation in elections.

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 $P|\int_0^R [S(a) - \overline{S}]f(a)da| - c$. We can also include the benefit deriving from fulfilling a civic duty D to define

$$U_V = P|\int_0^Z [S(a) - \overline{S}]f(a)da| + D - c \tag{9}$$

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

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

results are not sensitive to the changes.

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

$$U_V = \gamma' \mathbf{x} + \varepsilon \tag{10}$$

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

$$\begin{aligned} \Pr[T &= 1|\mathbf{x}] = \Pr[U_V > 0] \\ &= \Pr[\gamma' \mathbf{x} + \varepsilon > 0|\mathbf{x}] \\ &= \Pr[\varepsilon < \gamma' \mathbf{x}|\mathbf{x}] = F(\gamma' \mathbf{x}) \end{aligned} \tag{11}$$

Assuming $F(.)$ is the cumulative normal distribution function, we can estimate $\Pr[T = 1|\mathbf{x}]$ 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 (11), 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.

Let's now introduce political information and indicate by q the realization of the random variable q after t and k have been acquired and before voting We can then say that

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

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

$$U_W = \gamma_1' \mathbf{x} + \gamma_2 q + \varepsilon \tag{12}$$

We then have that

$$\Pr[T = 1|\mathbf{x}, q] = F(\gamma_1' \mathbf{x} + \gamma_2 q) \tag{13}$$

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 is an important explanatory variable for turnout independently of the indicator used.

It should not be overlooked that estimating (13) 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. However the benefit D in equation (1) can be an important motivation for voting, in the same way b in (4) is for information acquisition. The two types of psychic benefit are very likely to be correlated.

Therefore information could be an endogenous explanatory variable and the coefficient estimates of (13) could be biased. We will then estimate the following triangular system:

$$\begin{aligned} \text{info}_i &= \beta_1^{\theta} X_i + \beta_2^{\theta} Z_i + u_{1i} && (14) \\ U_W &= \alpha_1 INFO_i + \alpha_2^{\theta} X_i + u_{2i} && (15) \\ T_i &= 1 \text{ if } U_W > 0 \\ T_i &= 0 \text{ if } U_W \leq 0 \end{aligned}$$

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 (15) 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 (14) is the reduced form containing all the exogenous covariates of our model. Define $Y = (X, Z)$ and consider the reduced form

$$U_W = \Pi Y_i + v_{2i} \tag{16}$$

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

$$T_i^* = \frac{U_W}{\sigma_2} = \frac{\Pi}{\sigma_2} Y_i + \frac{v_{2i}}{\sigma_2} \tag{17}$$

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

$$T_i^* = \frac{\alpha_1}{\sigma_2} INFO_i + \frac{\alpha_2^{\theta}}{\sigma_2} X_i + \frac{u_{2i}}{\sigma_2} \tag{18}$$

The first step consists of estimating the reduced form (14) by OLS and get the residuals $\hat{u}_1 = info - \hat{\beta}_1' X_i + \hat{\beta}_2' Z_i$.

We can then estimate the equation

$$T_i^* = \frac{\alpha_1}{\sigma_2} INFO_i + \frac{\hat{\alpha}_2'}{\sigma_2} X_i + \frac{\alpha_3}{\sigma_2} \hat{u}_1 + \frac{u_{2i}}{\sigma_2} \tag{19}$$

by probit maximum likelihood. This provides both consistent (though not efficient) estimates of $(\frac{\alpha_1}{\sigma_2}, \frac{\hat{\alpha}_2'}{\sigma_2})$, 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 four variables that are assumed to influence information acquisition but not directly turnout. The variables "salience1" and "salience2" try to capture the media salience of each constituency in the last month before the election. Salience1 is 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[4], 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. Salience2 is a dummy equal to 1 if an article specifically focussed on that constituency appeared on the same newspaper and for the same period. 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 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 an instrument on media usage: a dummy equal to 1 if the agent reads regularly a quality newspaper.

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

[4]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...).

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 (14) and (15) 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 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.

7.2 Information, turnout and partisanery

Coming to analyse the role of partisanery, first of all we want to estimate the information function in order to test the validity of proposition 4. As we noticed in the previous sub-section, estimating the (14) is interesting for its own sake as it provides insights on the demand for political information and represents a test of our proposition 1. In order to test proposition 4, thus taking into account the role of partisanery in determining the information demand, we need to divide the population into three groups: the indifferent, the independent and the partisans. Clearly there is no objective way of doing this. We will use both the variable "partisan" and information on present and past voting choice (general election 92). We define as "indifferent" (group 1 in proposition 4) those agents that abstained in both 92 and 97. Thus, the dummy variable "indifferent" is equal to 1 if we observe abstention in both election and 0 if the agent voted in at least one of the two events. The third group of proposition 4 is identified with "partisan"=1 (see section 5). Finally, the intermediate group is the residual one: it is composed by agents

who voted in at least one of the two events but did not declare to vote always in the same way. We then proceed to estimate the three equations

$$\begin{aligned} \text{info}_i &= \beta_1^k X_i + \beta_2^k Z_i + \beta_3^k U_i^k + u_{1i} \\ k &= \text{indifferent (1), independent (2), partisan (3)} \end{aligned} \tag{20}$$

by OLS. We expect $\beta_1^k < \beta_3^k < 0$ and $\beta_2^k > 0$.

We can then turn to test proposition 5, i.e. how the effects of information on turnout change depending on partisanery. Unfortunately for this purpose we cannot use information on past and current voting as this last one is the dependent variable. We can therefore only split the population using the variable "partisan". Following the results derived without partizanery (see next section) we can ignore endogeneity issues in this section. Therefore we estimate separately equation (13) for partisan and non-partisan. We expect $\gamma_2 > 0$ for non-partisan and $\gamma_2 < 0$ for partisans. Estimating equation (13) for the two groups also represents a test of proposition 6, about turnout probability and socio-demographic characteristics. This is particularly important in the case of education , that has been consistently found an important explanatory variable for turnout. Here instead we expect education to be negatively related to turnout for partisan citizens. To check the robustness of our conclusions we re-estimate equation (11) for the two groups (thus simply omitting information), as the presence of info affects quite heavily the education parameter. This simply amounts to estimating a standard turnout equation for the two groups separately.

Finally we would like to test proposition 7, that predicts turnout probability to be increasing in the degree of partisanery within the two groups. To test this proposition we should be able to both classify citizens and measuring the degree of their partisanery independently. As we cannot do this using only one variable (partisan) as a rough measure of partisanery, all we can do is to merge all the sample and estimate a turnout equation including "partisan" among the covariates. This can be done including information or without it; in this last case we would estimate a standard turnout equation including a disposition variable.

8 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 (11) are reported in table 3, columns 1 and 2. In column 2 income, education and churchgoer are considered as fixed effects, in column 1 they are single numerical variables (thus we impose a linear resctriction). 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. However, it is worth noting that results do not change in any substantial respect. 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. In column 3 and 4 we introduce ideological motivations, via the variable "partisan". Whether we introduce "partizan" 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 also that the introduction of "partisan" does not alter in any substantial way our results.

In table 4 we report estimates of (13), 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. Again, this result looks very robust to variations in the specification adopted. From both table 3 and 4 it is clear that "partisan" is positively and significantly related to turnout, as common wisdom would predict and as predicted in proposition

7.

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 (14) 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 (15), we do not make any attempt to correctly specify the demand for information for its own sake: equation (14) 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 are significant and show the expected sign. 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.

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, as shown by salience1 and salience2; 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. This will also allow to proceed in further estimations ignoring the endogeneity issue.

We can now analyse the impact of partisanery on information acquisition. Estimates of the (20) are reported in table 11. They fully support the predictions of our model. Being either "indifferent" ot "partisan" reduces the demand for information: this effect is stronger and more significant in the case of indifferent citizens. "Independent" citizens instead tend to acquire more information.

Coming to turnout, we again find strong support for our theoretical predictions. The first column of tab.12 reports estimates of the turnout equation for non-partisan agents: information has a strong and significant impact on turnout. In the second column we only consider partisan agents: information shows now a negative coefficient. Some variables have been omitted here as they perfectly predict the outcome: this also leads to dropping some

observations.

As predicted by our model, the role of some variables is quite different in the two groups. We can see this in tab. 12 columns 3-4. As education tends to have low significance when we include information, we re-run the turnout equation for the two separate groups and without information. This substantially amounts to estimating a standard turnout equation, the innovation consisting in splitting the sample between partisans and non-partisans. For non-partisans, as expected, education increases the likelihood of turnout and is a significant explanatory variable. When we come to partisans education becomes a completely insignificant regressor, thus confirming that the positive effect commonly found in literature cannot be referred to the whole population. Even stronger is the evidence for age, that has a significant positive effect for non-partisans and a negative (still significant) effect for partisans. Another piece of evidence in support of our theory comes from the weekly number of hours; this constitutes a sort of cost of voting as those with less leisure available will probably face an higher opportunity cost of the time to go to the polls[5]. This hypothesis is confirmed by the sign of the correspondent parameter for the whole population. However, things are quite different when we split the sample. The strong and significant negative effect is confirmed for non-partisans while for the partisan sample the coefficient becomes insignificant.

9 Conclusion

In this paper we study the interactions between partisanery, 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 individual characteristics like education, age etc as well as by the supply of information, in the form of mass media coverage of political issues. This leads us to derive some testable propositions about political awareness and those variables.

[5]Remember that the election we are referring to took place on a thursday.

The demand for political information also depends on each individual's degree of political partisanery. In particular, the least informed citizens will be those with the weakest and the strongest prior beliefs. In the first case, agents are so indifferent that the expected benefit of acquiring information does not cover its costs: contrarily to common wisdom, "too much" independent individuals could not be "good citizens"; at the same time, people with extreme prior beliefs will be confident enough in their opinions and again will not (ex ante) find useful to acquire information. Thus, the most informed citizens should be expected to be partisan but not too much: some degree of partisanery can therefore be useful for the functioning of democratic systems.

We then link partisanery and information to turnout. While information has a positive effect on the likelihood of voting of non-partisan agents, it has instead a negative effect for partisans. Since partisans are more likely to vote in the "wrong" way, this result confirms the importance of information for good collective decision-making.

Our theory is capable of explaining most typical results of empirical analysis, like the positive effect of education on turnout. Moreover, through the interaction between partisanery and information acquisition, we can derive new predictions: of particular relevance is the fact that education should have a positive impact on turnout only for non-partisan citizens

Empirical evidence is provided using the 1997 British General Election Study. Using a number of questions about candidate names and British politics in general, we can build up a measure of political awareness that helps us to shed some light on the information-turnout relationship. We find that mass media are extremely important in determining individuals' political knowledge. Second, 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 information is relevant for turnout seems well supported. More generally, we can safely conclude that our theoretical model shows an high degree of compatibility with data analysis.

This analysis has some consequences for the way to think of the role of information and mass media in democratic systems. Politicians' accountability and the overall functioning of democratic institutions rely crucially on availability and quality of information on mass media as well as on having a well educated population. Thus, education and a plurality of independent and active information sources (and enough competition among them), is of vital importance to real democracy.

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10 Appendix A: proof of results

Proof of Lemma 1 $\Delta = \int [V^*(a) - \Phi] f(a)da.$

Remember that

$$\begin{aligned} V^*(a) &= \max_{\{I,O,A\}} P|[S(a) - \overline{S}]| - c \\ \Phi &= \max_{\{I,O,A\}} P|\int [S(a) - \overline{S}]f(a)da| - c \end{aligned}$$

and define

$$V^* = \max_{\{I,O,A\}} P \int |[S(a) - \overline{S}]|f(a)da - c$$

For Δ to be positive it is sufficient to prove that

$$\max\{\int |[S(a) - \overline{S}]|f(a)da - c, 0\} \geq |\int [S(a) - \overline{S}]f(a)da| - c$$

Let's start by proving that

$$\int |[S(a) - \overline{S}]|f(a)da \geq |\int [S(a) - \overline{S}]f(a)da| \qquad (*)$$

Let's define

$$\begin{aligned} \mathcal{A} &= \{a : \int [S(a) - \overline{S}]f(a)da \geq 0\} \\ \overline{\mathcal{A}} &= \{a : \int [S(a) - \overline{S}]f(a)da < 0\} \\ \mathcal{B} &= \{a : [S(a) - \overline{S}] \geq 0\} \\ \overline{\mathcal{B}} &= \{a : [S(a) - \overline{S}] < 0\} \end{aligned}$$

We then want

$$\begin{aligned} &\int_{\mathcal{B}} [S(a) - \overline{S}]f(a)da + \int_{\overline{\mathcal{B}}} [\overline{S} - S(a)]f(a)da \\ \geq &\int_{\mathcal{A}} [S(a) - \overline{S}]f(a)da + \int_{\overline{\mathcal{A}}} [\overline{S} - S(a)]f(a)da \end{aligned}$$

Notice that

$$\begin{aligned} \int_{\mathcal{B}} [S(a) - \overline{S}] f(a) da &\geq \int_{\mathcal{A}} [S(a) - \overline{S}] f(a) da \\ \int_{\overline{\mathcal{B}}} [\overline{S} - S(a)] f(a) da &\geq \int_{\overline{\mathcal{A}}} [\overline{S} - S(a)] f(a) da \end{aligned}$$

from which the (*) follows.

If

$$\int |[S(a) - \overline{S}]| f(a) da - c < 0$$

then $V^* = 0$. The (*) then implies that

$$\left| \int [S(a) - \overline{S}] f(a) da \right| - c < 0$$

which completes the proof. ¥

Proof of Proposition 2 For an uninformed citizen we have

$$Pr(T = 1)|_U = 0$$

while for an informed citizen, the probability to vote (*ex ante*) is

$$\begin{aligned} Pr(T = 1)|_{IN} &= \Pr(a | |[S(a) - \overline{S}]| - c > 0) \\ &= \int_{\mathcal{H}(c)} dF(a) \geq 0 \end{aligned}$$

where

$$\begin{aligned} \mathcal{H}(c) &= [0, a'] \cup [a'', \overline{a}] \\ a' \text{ and } a'' \text{ s.t.} \quad \int |[S(a) - \overline{S}]| &= c \end{aligned}$$

It is clear that if c is not extremely high then for an informed citizen $Pr(T = 1) > 0$.

The probability to vote is then given by the probability to be informed multiplied by the probability to vote when informed, i.e.

$$Pr(T = 1|q) = qPr(T = 1)|_{IN}$$

from which the result follows immediately. ¥

Proof of Proposition 3 In proposition 2 we proved that

$$Pr(T=1|q) = qPr(T=1)|_{IN}$$

If we link information acquisition to the parameters of the information production technology then we have

$$Pr(T=1|p,w,E,S) = q^*(E,S,w,p)Pr(T=1)|_{IN}$$

We also know from Proposition 1 that

$$\frac{\partial q^*(E,S,w,p)}{\partial E} > 0$$

from which it follows that

$$\frac{Pr(T=1|p,w,E,S)}{\partial E} = \frac{\partial q^*(E,S,w,p)}{\partial E} \times Pr(T=1)|_{IN} > 0$$

Similarly we can prove the rest of the proposition.¥

Proof of Lemma 2 For an O-partisan we have

$$\begin{aligned}
\Delta &= \int_{\mathcal{A}} |[S(a)-\overline{S}]|dF(a) - \left|\int_{\mathcal{A}} [S(a)-\overline{S}]dF(a)\right| \\
&= \int_{\mathcal{A}} [S(a)-\overline{S}]dF(a) + \int_{\overline{\mathcal{A}}} [\overline{S}-S(a)]dF(a) - \\
&\quad -\left[\int_{\mathcal{A}} (S(a)-\overline{S})dF(a) - \int_{\overline{\mathcal{A}}} (\overline{S}-S(a))dF(a)\right] \\
&= 2\int_{\overline{\mathcal{A}}} [\overline{S}-S(a)]dFa = 2[\overline{S_A} - \int_{\overline{\mathcal{A}}} S(a)dFa]
\end{aligned}$$

Analogously for an I-partisan.¥

Proof of Proposition 4 1) If $\int^R |[S(a)-\overline{S}]|dF_\pi(a) \le c$ then also $\left|\int^R [S(a)-\overline{S}]dF_\pi(a)\right| \le c$ by Lemma 1.

$$c \ge \int_{\mathcal{A}} |[S(a)-\overline{S}]|dF_\pi(a) \ge \left|\int_{\mathcal{A}} [S(a)-\overline{S}]dF_\pi(a)\right|$$

Since Φ is the ex ante utility of an uninformed choice, and since abstention always delivers zero utility, we have that the lower bound of Φ is zero and therefore $V^* = \Phi = 0$, which implies $\Delta = 0$ and therefore, since t and k are costly, $t_j^* = k_j^* = 0 \Rightarrow q(t^*, k^*|E, S) = 0$.

2) If $\int |[S(a) - \overline{S}]| dF_\pi(a) \geq c \geq |\int [S(a) - \overline{S}] dF(a)|$ then $\Phi = 0$ and $V^* > 0$. This implies $\Delta > 0$ and $q^* > 0$. From assumption 3 $\int |[S(a) - \overline{S}]| dF_\pi(a)$ is independent of π and $\Delta = V^* - \Phi = V^* - 0 = \Delta_{\max}$. Being the value of information at its upper bound we have $q^* = q_{\max}$.

3) Since we refer to O-partisan citizens we have

$$\int [S(a) - \overline{S}] dFa > \int [S(a) - \overline{S}] dG(a) > c \qquad (**)$$

The value of information under the distributions F and G is in this case

$$\begin{aligned} \Delta_F &= \max\{0, \int |[S(a) - \overline{S}]| dF(a) - c\} - \{|\int [S(a) - \overline{S}] dF(a)| - c\} \\ \Delta_G &= \max\{0, \int |[S(a) - \overline{S}]| dF(a) - c\} - \{|\int [S(a) - \overline{S}] dF(a)| - c\} \end{aligned}$$

To prove that $q_G^* > q_F^*$ it is sufficient to prove that $t_G^* \geq t_F^*$ and $k_G^* \geq k_F^*$. Also, from the optimization problem (tot) it is clear that this occours if, ceteris paribus, we have that $\Delta_G \geq \Delta_F$ i.e. $\Delta_F - \Delta_G < 0$.

Now note that

$$\int [S(a) - \overline{S}] dF(a) = \int S(a) dF(a) - \overline{S}$$

and that (**) is equivalent to

$$\int S(a) dFa > \int S(a) dGa$$

Therefore, for O-partisan citizens we have

$$|\int [S(a) - \overline{S}] dF(a)| > |\int [S(a) - \overline{S}] dG(a)|$$

The first term of the (TOT) is unchanged by assumption. This proves that the value of information is larger under the distribution G.

Being E, S, w and p unchanged, the optimal values of $t$and k will depend only on the change in Δ.This completes the proof. ¥.

Proof of Proposition 5 The proof in the case of non-partisan citizens proceeds along the lines of the proof of proposition 2.

Things are different when citizens are second degree partisan. In this case agents are prone to vote when uninformed and information could actually reverse this decision.

For an uninformed citizen we have

$$Pr(T=1)|_U = 1$$

while for an informed citizen, the probability to vote (*ex ante*) is

$$\begin{aligned} 1 &> \Pr(T=1)|_{IN} = \Pr(a||[S(a)-\overline{S}]|-c>0) \\ &= \int_{\mathcal{H}(c)} dF(a) > 0 \end{aligned}$$

where

$$\mathcal{H}(c) = [0, a^{'}] \cup [a^{''}, \overline{a}]$$

$$a^{'} \text{ and } a^{''} \text{ s.t. } |[S(a)-\overline{S}]| = c$$

Note that the probability to vote conditional on being informed is the same both for partisan and non-partisan citizens.

Again, it is clear that if c is not extremely high then for an informed citizen $Pr(T=1)>0$.

The probability to vote is then given by the probability to be informed multiplied by the probability to vote when informed, i.e.

$$\begin{aligned} Pr(T &= 1|q) = qPr(T=1)|_{IN} + (1-q) \\ &= 1 - q(1-\Pr(T=1)|_{IN}) \end{aligned}$$

The results follows from the fact that $(Pr(T=1)|_{IN} < 1.$ ¥

Proof of Proposition 6 The probability to vote (conditional on observables) is given by the probability to be informed multiplied by the probability to vote when informed, i.e.

$$Pr(T=1|p,w,E,S) = q^*(E,S,w,p)Pr(T=1)|_{IN} + (1-q^*(E,S,w,p))$$

We also know from Proposition 1 that

$$\frac{\partial q^*(E,S,w,p)}{\partial E} > 0$$

from which it follows that

$$\begin{aligned} & \frac{\partial \Pr(T=1|p,w,E,S)}{\partial E} \\ = & \frac{\partial q^*(E,S,w,p)}{\partial E} \times Pr(T=1)|_{IN} - \frac{\partial q^*(E,S,w,p)}{\partial E} \\ = & \frac{\partial q^*(E,S,w,p)}{\partial E} Pr(T=1)|_{IN} - 1) < 0 \end{aligned}$$

Similarly we can prove that the probability of turnout of partisan citizens is decreasing in S and increasing in p and w.¥

Proof of Proposition 7 If both π_F and π_G are s.t. $\int |[S(a)-\overline{S}]|dF_\pi(a) \leq c$ then $Pr(T=1|q) = qPr(T=1)|_{IN}$ and $q_F^* = q_G^* = 0 \Rightarrow Pr(T=1|q)|_F = Pr(T=1|q)|_G = 0$.

If π_F and π_G are both s.t. $\int |[S(a)-\overline{S}]|dF_\pi(a) \geq c \geq |\int [S(a)-\overline{S}]dF(a)|$ then $Pr(T=1|q)| = qPr(T=1)|_{IN}$ and $q_F^* = q_G^* > 0 \Rightarrow Pr(T=1|q)|_F = Pr(T=1|q)|_G > 0$. If π_G s.t. $\int |[S(a)-\overline{S}]|dF_\pi(a) \leq c$ and π_F s.t. $\int |[S(a)-\overline{S}]|dF_\pi(a) \geq c \geq |\int [S(a)-\overline{S}]dF(a)|$ then $Pr(T=1|q)|_F > Pr(T=1|q)|_G = 0$. This proves the result for distributions in Ω_A.

For distributions in Ω_O $Pr(T=1|q) = 1 - q[1 - \Pr(T=1)|_{IN}]$ and $q_F^* \leq q_G^* \Rightarrow Pr(T=1|q)|_F > Pr(T=1|q)|_G$.¥

Figure 1: Time Line

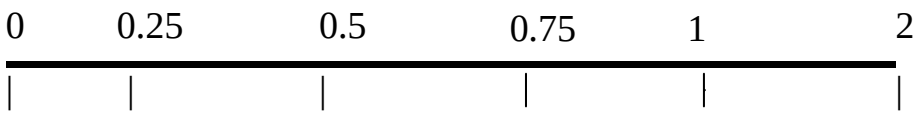

Figure 1:

0 = Incumbent implements $a^*$and reveals her type
0.25 = Opponent selection from distribution F(a)
0.5 = Choice of t^* and k^* (utility in first period is determined)
0.75 = realization of q
1 = election
2 = winning candidate implements her preferred policy: 2nd period utility is realized

Fig.2 : the value of information

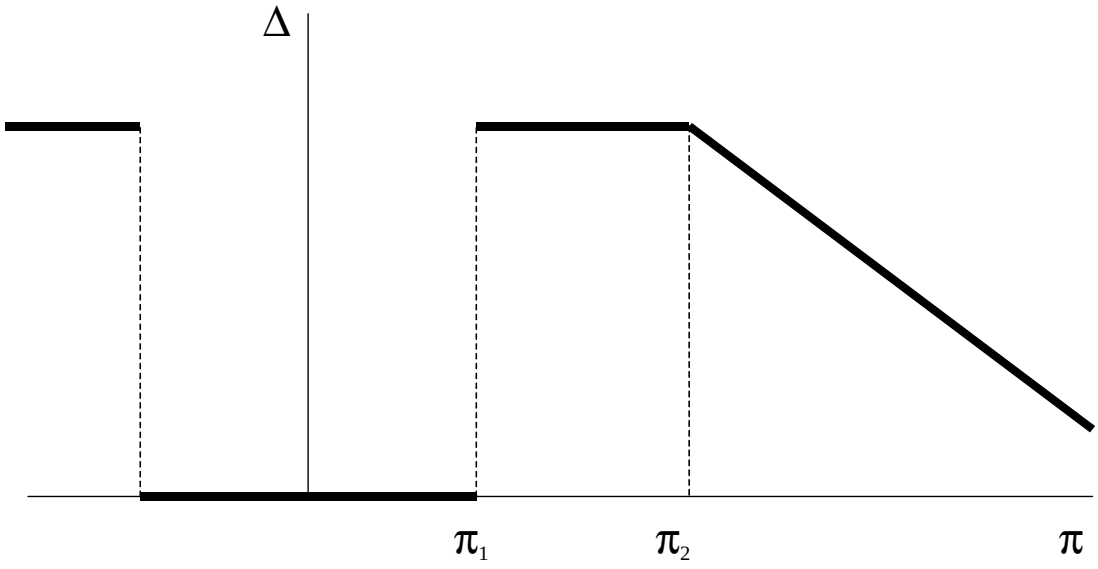

Figure 2:

$$\begin{aligned} \pi_1 \text{ s.t. } \left| \int [S(a) - \overline{S}] dF(a) \right| &= c \\ \pi_2 \text{ s.t. } \int \left| [S(a) - \overline{S}] \right| dF(a) &= c \end{aligned}$$

11 Appendix B: description of variables and regression results

11.1 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).

• **partisan:** "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.

• **indifferent** = 1 if abstained in both 1992 and 1997.

• **independent** = 1 if not indifferent and not partisan.

• **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

• **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"

• **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

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

11.2 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

11.3 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

11.4 Information from The Guardian

• **salience1:** 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.

• **salience2:** dummy = 1 if an article specifically focussed on a costituency electoral campaign appears on the Guardian between 1st and 30th April 1997 .

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
partisan	2813	0.231426	0.421819	0	1
indifferent	2813	0.077497	0.267427	0	1
independent	2813	0.691077	0.462131	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
O level or equivalent	493	17.53	62.64
A level or equivalent	356	12.66	75.29
higher education 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
varies too much to say	35	1.24	58.91
less often than once a year	124	4.41	63.31
at least once a year	172	6.11	69.43
at least twice a year	296	10.52	79.95
at least once a month	140	4.98	84.93
at least once in two weeks	70	2.49	87.42
once 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
government training	64	2.28	55.85
unemployed	127	4.51	60.36
permanently sick or disabled	131	4.66	65.02
retired	642	22.82	87.84
looking after the home	324	11.52	99.36
doing something else	18	0.64	100
region			
North	153	5.45	5.45
North-West	204	7.27	12.72
Yorkshire & 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

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)
partisan					.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)
partisan					.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	.0999	(8.691)	.0994	(8.641)
age2	-.0805	(-7.086)	-.0798	(-7.017)
married	.0161	(0.226)	.0193	(0.271)
sex	.5793	(8.043)	.5770	(8.013)
asian	-.6888	(-3.455)	-.6874	(-3.441)
black	-.1710	(-0.624)	-.1515	-(0.555)
union	.1895	(3.009)	.1877	(2.977)
length of residence	.0059	(3.056)	.0061	(3.153)
farmer	.3660	(0.688)	.3549	(0.670)
hours	-.0055	(-2.357)	-.0054	(-2.344)
houseowner	.1500	(1.992)	.1464	(1.945)
registered	0.3981	(1.806)	0.4046	(1.834)
canvasser	.0936	(1.266)	.0933	(1.262)
phoned	.3537	(2.714)	.3526	(2.704)
voted 92	.5104	(6.669)	.5257	(6.762)
partisan			-.0907	(-1.267)
marginality	-.0110	(-4.001)	-0.0110	(-3.997)
aggregate turnout	.0007	(0.070)	0.0008	(0.087)
high qualifications %	-.0011	(-0.064)	-0.0011	(-0.067)
unemployed %	.0141	(0.498)	0.0132	(0.468)
employers %	-.0015	(-0.226)	-0.0015	(-0.226)
population density	-.0010	(-0.559)	-0.0009	(-0.521)
constant	-0.9993	(-1.228)	-0.9947	(-1.223)
Instrumental variables				
salience1	.0056	(1.447)	.0056	(1.442)
salience2	0.2200	(1.899)	.2219	(1.914)
quality-paper reader	.7036	(7.044)	.7075	(7.076)
party effort in constituency	.4942	(1.635)	.4893	(1.618)
categorical variables (p-values of F-test)				
education		0		0
income		0.0007		0.0006
churchgoer		0.1174		0.1331
economic activity		0		0
region		0.0029		0.0023
Observations:		2807		2807
R2		0.3103		0.3107

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	.3782	(2.789)	.3806	(2.807)
6000-7999	.5283	(3.524)	.5325	(3.554)
8000-9999	.4726	(2.831)	.4759	(2.848)
10000-11999	.4544	(2.737)	.4545	(2.736)
12000-14999	.7931	(4.759)	.7979	(4.786)
15000-17999	.6990	(3.843)	.7075	(3.892)
18000-19999	.7804	(4.027)	.7773	(4.016)
20000-22999	.8711	(4.773)	.8753	(4.802)
23000-25999	.8132	(4.266)	.8168	(4.283)
26000-28999	.9026	(4.420)	.9060	(4.442)
29000-31999	.7893	(3.414)	.7908	(3.427)
32000-34999	0.6879	(2.850)	0.6885	(2.854)
35000-37999	.7883	(3.106)	.7924	(3.117)
38000-40999	.9352	(3.596)	.9471	(3.641)
41000 £ or more	1.0699	(5.330)	1.0765	(5.371)
Observations:		2807		2807
F-test		2.59		2.63

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	.7575	(1.732)	.7488	(1.714)
CSE or equivalent	.2001	(1.924)	.2006	(1.928)
O level or equivalent	.4609	(4.925)	.4561	(4.873)
A level or equivalent	.7623	(6.849)	.7519	(6.744)
higher education below degree	.9390	(9.094)	.9320	(9.027)
degree	1.388	(11.950)	1.3781	(11.816)
Observations:		2807		2807
F-test		29.5		28.75

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	.3094	(2.294)	0.022	.3267	(2.493)	0.013
fitted residuals	-0.1821	(-1.337)	0.181	-.2034	(-1.535)	0.125
Observations:	2807			2807		
Log-L	-1219.23			-1164.39		
Pseudo R2	0.1659			0.2032		

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)			.3226	(2.389)		
salience1			0.0013	(0.38)			-.0033	(-0.802)
salience2			0.1598	(1.391)			.2552	(2.116)
quality-paper reader			0.036	(1.776)			.2033	(1.816)
party effort in constituency			.1688	(0.556)			.1635	(0.527)
partisan	No		No		Yes		Yes	
other control variables	Yes		Yes		Yes		Yes	
Observations:		2807		2807		2807		2807
Log-L		-1238.8767		-1237.5144		-1184.462		-1183.2912
Pseudo R2		0.1524		0.1534		0.1897		0.1905
L-Ratio test	chi2(3)=2.7246				chi2(3)=2.34			

Table 10: Testing the overidentification restrictions (II)

Dependent Variable: Residuals from 2nd stage

	coeff	t	coeff	t	coeff	t	coeff	t
salience1	-0.0008	(-0.965)	0.0010	(1.107)	-0.0011	(-1.207)	-0.0010	(-1.055)
salience2	0.0331	(1.385)	.0351	(1.430)	.0379	(1.480)	.0355	(1.421)
quality-paper reader	0.001	(0.055)	.0006	(0.029)	-.0010	(-0.045)	-.0018	(-0.085)
party effort in constituency	0.0034	(-0.063)	-.0016	(-0.029)	.0003	(0.005)	.0096	(0.134)
partisan	No		Yes*		No		Yes	
other control variables	No		No		Yes		Yes	
Observations:		2807		2807		2807		2807
R2		0.0006		0.0006		0.0009		0.0010
Sargan		1.6842		1.6842				
F-test on IV (p-value)						0.62 (.6473)		0.55 (.696)

*Partisan in the two step procedure only, not in the test

Table 11: Information and Partizanery: OLS coefficients

(t-statistics in parentheses)

Dependent Variable: Information

	coeff	t	coeff	t	coeff	t
age	.1027	(8.931)	.0995	(8.673)	.0994	(8.641)
age2	-.0835	(-7.340)	-.0798	(-7.034)	-.0798	(-7.017)
married	.0134	(0.188)	.0228	(0.320)	.0193	(0.271)
sex	.5755	(8.013)	.5725	(7.965)	.577	(8.013)
asian	-.7331	(-3.739)	-.7010	(-3.523)	-.6874	(-3.441)
black	-.186	(-0.672)	-.1298	-(0.479)	-.1515	(-0.555)
union	.1834	(2.924)	.1831	(2.907)	.1877	(2.977)
length of residence	.0057	(2.958)	.0063	(3.254)	.0061	(3.153)
farmer	.3822	(0.719)	.3452	(0.655)	.3549	(0.670)
hours	-.0049	(-2.114)	-.0052	(-2.242)	-.0054	(-2.344)
houseowner	.1461	(1.953)	.14	(1.864)	.1464	(1.945)
registered	0.2538	(1.115)	0.3627	(1.629)	0.4046	(1.834)
canvasser	.088	(1.194)	.091	(1.232)	.0933	(1.262)
phoned	.3516	(2.7)	.3505	(2.686)	.3526	(2.704)
abstainer	-0.613	(5.091)				
independent			.2160	(3.385)		
partisan					-0.0907	((-1.267)
marginality	-.0111	(-4.065)	-0.011	(-4.016)	-0.011	(-3.997)
aggregate turnout	-.0007	(-0.079)	0.0005	(0.059)	0.0008	(0.087)
high qualifications %	-.0017	(-0.102)	-0.0014	(-0.085)	-0.0011	(-0.067)
unemployed %	.0095	(0.335)	0.0104	(0.367)	0.0132	(0.468)
employers %	-.0027	(-0.403)	-0.0019	(-0.288)	-0.0015	(-0.226)
population density	-.0010	(-0.575)	-0.0009	(-0.474)	-0.0009	(-0.521)
salience1	.0058	(1.458)	.0056	(1.451)	.0056	(1.442)
salience2	.2081	(1.806)	.2204	1.904	.2219	(1.914)
broadsheet-reader	0.6968	(7.079)	.7104	(7.15)	.7075	(7.076)
party effort in constituency	.4946	(1.639)	.4827	(1.598)	.4893	(1.618)
constant	-0.4881	(-0.593)	-1.0243	(-1.262)	-0.9947	(-1.223)
categorical variables						
education		0		0		0
income		0.0016		0.0006		0.0006
churchgoer		0.1030		0.1498		0.1331
economic activity		0		0		0
region		0.0044		0.0018		0.0023
Observations:		2807		2807		2807
R2		0.3155		0.3131		0.3107

Note: Robust standard errors

Table 12: Turnout, information and partizanery: probit coefficient estimates

(z-statistics in parentheses)

Dependent Variable: Turnout

	non-partisans		partisans		non-partisans		partisans	
	coeff	**z**	**coeff**	**z**	**coeff**	**z**	**coeff**	**z**
information on individuals								
info	.169	(7.699)	-.0936	(-1.809)				
age	.0022	(0.176)	-.0655	(-1.838)	.0180	(1.493)	-.0752	(-2.226)
age2	-0.0051	(-0.413)	.0562	(1.665)	-.0171	(-1.393)	.0651	(2.020)
education	.0061	(0.331)	.0522	(1.007)	.0439	(2.484)	.0215	(0.420)
income	.0041	(0.390)	-.0112	(-.331)	.0154	(1.515)	-.0126	(-0.389)
married	.1896	(2.618)	.3497	(1.816)	.1942	(2.725)	.3415	(1.779)
sex	-.018	(-0.234)	-.1266	(-0.564)	.0781	(1.045)	-.1844	(0.833)
asian	.2763	(1.096)			.2153	(0.868)		
black	.1425	(0.374)	-.3455	(0-.565)	.1219	(0.319)	-.3692	(-0.606)
union	.0566	(0.818)	.1943	(0.973)	.0751	(1.094)	.1602	(0.792)
length of residence	.0016	(0.697)	.0026	(0.5)	.0025	(1.154)	.0022	(0.431)
farmer	.3363	(0.4141)			.4055	(0.992)		
hours	-.0066	(-2.773)	-.0014	(-0.223)	-.0077	(-3.313)	-.0015	(-0.231)
houseowner	.1590	(2.028)	.2623	(1.249)	.1719	(2.224)	.2347	(1.124)
registered	1.981	(4.928)			1.998	(5.201)		
canvasser	.1709	(2.204)	.3698	(1.662)	.1875	(2.443)	.3543	(1.648)
phoned	.3014	(2.058)	.5898	(1.229)	.3191	(2.235)	.5041	(1.082)
voted 92	.6918	(9.135)	-.0508	(-.109)	.7639	(10.213)	-.11	(-232)
information on constituencies								
marginality	-.0043	(-1.471)	-0.003	(-0.376)	-.0063	(-2.230)	-.0022	(-0.282)
aggregate turnout	-.0088	(-0.913)	0.0259	(1.13)	-.0076	(-0.805)	.0236	(1.019)
high qualifications %	-.0092	(-.519)	-0.0891	(-1.458)	-.0038	(-0.22)	-.0875	(-1.441)
unemployed %	-0.0002	(0.006)	0.0483	(0.687)	.0122	(0.435)	.0604	(0.870)
employers %	.0104	(1.451)	-0.0025	(-0.135)	.0115	(1.613)	-.0023	(-0.123)
population density	.0018	(0.927)	0.0106	(1.964)	.002	(1.032)	.0109	(2.04)
constant	-1.7043	(-1.826)	1.7564	(0.788)	-2.0422	(-2.246)	1.8946	(0.828)
categorical variables (p-values of chi-test)								
churchgoer		0.2182		0.8056		0.1186		0.7562
economic activity		0.3915		0.0287		0.1996		0.0274
region		0.6654		0.3368		0.7451		0.2338
Observations:		2156		503		2156		503
Log-L		-1031.80		-104.06		-1063.57		-105.15
Pseudo R2		0.1714		0.1637		0.1459		0.1549

Note: Robust standard errors