

Information Acquisition, Ideology and Turnout: Theory and Evidence from Britain

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Abstract

The amount of political information that voters decide to acquire during an electoral campaign depends, among other things, on prior ideological beliefs about parties and/or candidates. Voters that are *ex ante* indifferent about the candidates attach little value to information because they perceive that voting itself will have little value. Voters that are *ex ante* very ideological also attach little value to information because they think that the news will hardly change their opinion. Thus, high incentives to be informed can be found at intermediate levels of ideological strength. Moreover, the impact of increased political knowledge on turnout is asymmetric: New information increase the probability of voting of indifferent voters but decrease that of very ideological voters. These results are derived within a decision theoretical model of information acquisition and turnout that combines the Riker-Ordeshook (1968) approach to voting behaviour with the Becker (1965) approach to "personal production functions". These predictions are then tested on survey data from the 1997 British Election Study. Our empirical findings are compatible with all the results of the theoretical exercise.

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1 Introduction

Individual predispositions like party identification and ideology are pervasive predictors of voting behavior. In their celebrated book *The American Voter*, Campbell et al. (1960, p.121) claim that "few facts are of greater importance for our national elections than the lasting attachment of tens of millions of Americans to one of the parties". This basic finding has been more recently re-iterated by Miller & Shanks (1996). Erikson, Wright & McIver (1993) have provided extensive evidence from exit polls data of the importance of both partisanship and ideology in voters' presidential choices during the 1984 and 1988 elections. Rosenstone and Hansen (1993) have shown that changes in partisanship determine corresponding variations in turnout while Bartels (2000) and Hetherington (2001) have provided evidence of resurging partisanship in the electorate, after a declining period that reached its minimum during the seventies. Other national studies reach very similar conclusions. In the UK, which will constitute the object of our empirical study, partisanship and ideology probably play an even greater role, both having historically strong links with social class and other economic and social variables (Bartle, 1998; Denver, 2004). Empirical research on Britain consistently finds that voters with strong predispositions tend to vote on the basis of their "general values and their overall perception of what the parties stand for"¹.

While partisanship and ideology tend to be correlated with interest in politics and turnout, they are also often associated with unconditional voting decisions. This makes it easier for politicians to abuse the trust they receive, making them less accountable and less responsive to the public interest². On a normative ground, therefore, partizan and ideological voters can be contrasted with independent citizens, who make informed and dependable decisions on policy issues (Feddersen and Pesendorfer, 1996 and 1999). A growing body of theoretical and empirical research has recently stressed the positive

¹Heath, Jowell and Curtis (1985), p.107.

²Some scholars, however, argue that a long term relationship between a party and specific constituents can help voters with little or ordinary political knowledge to take decisions that reflect their interests (Popkins,1991; Wittman, 1995; Lupia and McCubbins,1998) .

role of voter information on the quality of public decisions (Besley and Burgess, 2002; Besley and Prat, 2005). Better informed voters are both more responsive to platform announcements and more likely to vote (Palfrey and Poole, 1987). Political knowledge is also a very good predictor of electoral turnout, even controlling for a number of individual characteristics³ (Delli Carpini and Keeter, 1996). Recent evidence also shows that the correlation between voter political knowledge and turnout contains a strong causality component (Larcinese, 2005; Lassen, 2005).

In spite of the growing interest in the role of information in elections and the well established evidence on the impact of ideology and partisanship, relatively little attention has been devoted to the important interactions that occur between political predispositions and political knowledge. Among the few exceptions, Achen (1992) proposes a model of voter rational learning in the presence of exogenous information, assuming that partisan attitudes are formed within a Bayesian updating process: new information receives less weight when many pieces of information have already been received. This can explain the stability of partisan attitudes after a certain age.⁴ On the empirical side, Palfrey and Poole (1987) use ICPSR survey data from the 1980 US presidential election to show that information is significantly related to both political extremism and turnout. Voter information is positively correlated with ideological extremism and negatively correlated with indifference between candidates. Moreover, not only are more informed citizens more likely to vote, but their vote is also more predictable, in the sense that they exhibit less randomness when voting behaviour is predicted using political preferences⁵.

In this paper I study the link between political predispositions and incentives to acquire information and reconsider the relationship between prior beliefs, information and turnout

³Sanders (2001) studies the 1996 US presidential election and shows the importance for turnout of perceived uncertainty about candidates.

⁴Gerber and Green (1996), however, show that stable party identification is not necessarily the consequence of rational learning when party platforms are not stable over time.

⁵Preferences are recovered either by respondents' self-placement on a liberal-conservative scale, relative to their placement of candidates, or from self-placement on a number of issues like defense spending, inflation or government aid to minority groups.

under this new light⁶. I will generally refer to political predispositions by using the word ideology. This is admittedly a minimalistic interpretation of this term, that is often used to indicate broad theoretical constructions and general values that can often go beyond the realm of politics. Our purpose is comparatively limited but the simplification proposed captures an important aspect of ideology in politics: during elections, these complex set of principles are translated into beliefs about candidates. This simplification allows us to formalize an important point: That people with different prior beliefs about parties and candidates have also differentiated incentives to acquire information. In general, the instrumental value of political information depends on the possibility (ex ante) that new information may induce a change in behaviour and this, in turn, depends on existing beliefs⁷.

The starting point of our analysis is a formal model that tries to capture the determinants of citizens' political knowledge by combining the Riker and Ordeshook (1968) model of the calculus of voting with the Becker (1965) approach to the modeling of individual production functions. Approaching voting behaviour by using the methodology of rational choice theory, as I do in this paper, means that an attempt should be made to also explain political information acquisition using the same tools.⁸ I present therefore a decision-theoretical model where the demand for political information is the outcome of a rational process, with its costs and benefits. Information acquisition is modeled as an individual production process, where inputs are mass media and time devoted to their

⁶On a purely empirical ground, the fact that ideological factors influence information acquisition is not a new theme in empirical social science: voters tend to select their information sources on the basis of ideologies and partisanship and, for this reason, mass media have been often found to reinforce people's beliefs rather than persuade them (Lazarsfeld, Berelson and Gaudet (1944), Berelson, Lazarsfeld and McPhee, 1954).

⁷Using the term ideology makes also clearer that, when I refer to partisanship, I am only using a very narrow definition of the term, namely the belief that, prospectively, one party can satisfy one's preferences better than others. In the literature, the word partisanship has often a broader meaning that encompasses social identity, social class (especially in Britain) and sense of belonging to a given group. Although these elements can be very important for voting decision-making, they are not the focus of this paper.

⁸Matsusaka (1995) is, to my knowledge, the only work that considers the link between information and turnout with endogenous information acquisition. This is done in the context of a decision-theoretical model: increasing the "confidence" on the link between candidate choice and final outcome, information increases the probability of each voter to turn out in the election.

usage. Citizens are endowed with different capabilities to acquire and process news and are therefore able to grasp more or less information from the same exposure to media: In this sense, a number of observable individual and systemic characteristics act as internal and external constraints to the capability to be informed and represent therefore good predictors of political knowledge. In this way, the model rationalizes several positive correlations found in empirical research, like that between education and turnout (Wolfinger and Rosenstone, 1980; Matsusaka and Palda, 1999; Milligan et al., 2004).

Political dispositions are represented by prior beliefs about the quality of candidates. In general, most people have their own prior opinions on political matters: these are reflected on both policy preferences and beliefs about how to reach given aims. These priors can be shaped by the influence of other people (e.g. parents), by a sense of belonging to a certain group, by personal experiences and so on. It is out of question that such prior beliefs, however formed, play an important role in voting decisions and on turnout itself. Moreover, and more interestingly from our perspective, they can have an influence on the decision to be informed. The amount of political information that voters decide to acquire during an electoral campaign depends, among other things, on prior ideological beliefs about parties and/or candidates and it will be shown to be, other things equal, non-monotonic in ideological strenght. Voters that are *ex ante* indifferent about the candidates attach little value to information because they perceive that voting itself will have little value. Voters that are *ex ante* very ideological also attach little value to information because they think that the news will hardly change their opinion. Thus, high incentives to be informed can be found at intermediate levels of ideological strenght. This theoretical result is confirmed by an empirical analysis of data from the British Election Study (BES), especially when left-right self-placement is used as a measure of ideology.

The impact of ideology and information on voter turnout is then reconsidered within this extended framework. Ideology can now influence voting both directly (as a prior belief) and indirectly, via its impact on political knowledge. Nevertheless, the net effect

of ideology on turnout remains always positive. This is not the case for information, which has a positive impact on the voting probability of non-partizan voters but a negative effect on that of the partizans. Therefore, empirical estimations of turnout that want to gauge the relative impact of ideology and political knowledge should include an interaction term to unveil the significant heterogeneity of the impact of information. This result is also tested by using BES data: All empirical findings are again compatible with the results of the theoretical exercise.

The paper is organized as follows. The next section introduces the main features of the theoretical model while section 3 analyses the case of a non-polarized polity, when each voter has prior beliefs that make her substantially indifferent (ex ante) about the candidates. In section 4 I turn to the role of ideology, considering prior beliefs that attach different values to the candidates. Section 5 provides some empirical evidence from the British Election Study and and Section 6 concludes. Further details about both the model and the data can be found in the Appendices.

2 The model

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 public policy parameter $a \in [0, \bar{a}]$. We assume a one-to-one relationship between politicians and policies: in other terms (abusing the notation) candidate a delivers policy a . The incumbent policy-maker a_I faces an opponent selected by party O . The opponent candidate selection process is represented by a probability distribution function $F_O(a)$, with corresponding density function $f_O(a)$. On the other side, when the politician in office implements her preferred policy a_I she reveals her type to citizens: therefore, while a_I is common knowledge, citizens do not know the opponent's type a_O but only her distribution $F_O(a)$.

Citizens' preferences over policies are represented by a utility function $V(a)$. I assume

that all citizens have the same preferences over a and that $V'(a) > 0$. In other terms, a is considered as a valence issue, or a generally accepted measure of good governance. This allows us to focus explicitly on beliefs rather than preferences. The validity of such simplification rests, in the end, on the way the policy space is defined. In modeling voting, virtually any policy issue can be represented as a valence issue with heterogeneous beliefs: the most appropriate modeling choice depends then on the purpose of the model. This is to say that citizens, rather than differing on their final aims, can be represented as having different opinions on the most appropriate ways to reach their aims, if we redefine what we intend by aim. Let us take the example of health care: not many politicians would claim they don't care about public health. However, different strategies to reach good health services are rationalizable and are indeed rationalized during electoral campaigns. Another good example is gun control: both the supporters and the opposers of increasing gun regulation claim that their advocate policy is better for public order and in order to increase the average citizen's safety. Both cases are logically possible and evidence is often not clear or easily manipulable: When the citizens' utility function is defined in terms of meta-preferences over final private ends rather than over policies, then heterogeneity becomes more relevant for beliefs than for actual preferences. Heterogeneous preferences on policies can in this case be introduced at the cost of extra technical complications and little new insights.

I assume then that citizens have different prior beliefs about the distribution $F_O(a)$. The set of admissible prior distribution functions is indicated with \mathcal{F} . During the electoral campaign, citizens can gather information on the opponent candidate⁹. They are endowed with an information gathering technology that is represented by the probability $q(t, k|E, M)$ to learn the realization a_O . The inputs of this personal information production function are an information source of quality $k \in \mathcal{K} \subset \mathbb{R}_+$, and time $t \in \mathcal{T} \subset \mathbb{R}_+$ devoted to extract information from this source¹⁰. The opportunity cost of time t is rep-

⁹This simplification is also not necessary, although considering information gathering on both candidates would considerably complicate the model with little value added.

¹⁰Note that k is just a quality index and does not represent in itself specific sources. We only assume

resented by w , while the marginal cost of quality in the information source is r . This technology also depends on a vector of individual circumstances E that affect the ability to extract and process information or the capability to use more sophisticated information sources. In empirical terms E includes variables such as education and age and, for practical purposes, I will often refer to this parameter simply as "education". The probability to learn a_O finally depends on characteristics of the environment that may affect the availability and reliability of news on the media: I indicate this parameter of information supply with M . There is an important difference between k (the source's quality) and M (information supply). The first can be individually chosen, according to each individual's interests and capabilities. M instead is exogenous and determines, for each level of k , a shift in the supply of news. I assume that $q(t, k|\cdot)$ is always increasing in E and M and make the following assumption¹¹:

Assumption 1 $q_t > 0, q_k > 0, q_{tE} > 0, q_{tM} > 0, q_{kE} > 0, q_{kM} > 0, q_{tt} \leq 0, q_{tt} \times q_{kk} - (q_{tk})^2 \geq 0$

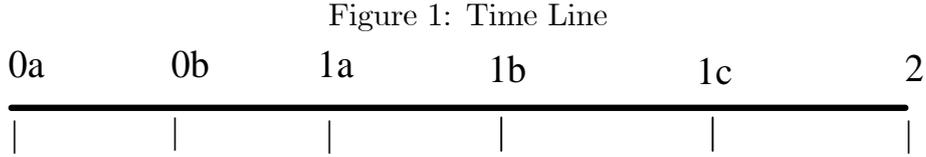
During the electoral campaign citizens acquire information and compare the benefits they would receive from the two candidates. Before the voting stage, citizens can either be informed, if they observe the realization a_O , or uninformed, if they don't. Informed citizens compare $V(a_I)$ with $V(a_O)$ while the uninformed can only use their prior beliefs $F_O(a)$. The benefit from voting is defined as the (expected) difference in utility from the two candidates, taking into account the probability that each voter has to be decisive. In the current analysis I do not consider non-instrumental motivations for either voting or acquiring information. These, however, can be represented as constants, and would therefore not alter our results.

that each specific newspaper, magazine, television channel or radio station can be mapped into the space \mathcal{K} .

¹¹These are standard assumption to be made on any production function to ensure the maximization process is well behaved.

Finally, voting is costly: I represent the cost of voting with $C \in \mathcal{C} \subset \mathbb{R}_+$ and assume that all voters have the same C . Each agent knows C . Nothing would change if we assumed that C was distributed across the population according to any distribution function, as long as the distribution of C remains independent of the distribution $F_O(a)$.

Finally, one of the two candidates is selected by majority rule and the elected politician implements her preferred policy a^* . The sequence of events is represented in Figure 1.



0a = Incumbent implements a_I and reveals her type

0b = Opponent selection from distribution $F(\mathbf{a})$

1a = Choice of t^* and k^* (utility in first period is determined)

1b = Realization of $q \rightarrow \hat{q}$

1c = Election

2 = Winning candidate implements her preferred policy: utility is realized

3 Information acquisition and voting

In this section I first characterize the value and demand for information by backward induction and then restrict the attention on the case of a non-polarized polity by introducing restrictions on prior beliefs and cost of voting.

At time 2 the winning candidate implements her preferred policy: that will be a_I if the incumbent is confirmed in office and a_O if the opponent candidate wins. For brevity I indicate $V(a_I)$ with V_I and eliminate the subscript from the functions $F(\cdot)$ and $f(\cdot)$, given that a_I is known with certainty; where there is no risk of confusion I also use a for the

opponent's type, eliminating the subscript. $T = 1$ indicates the decision to vote (either for I or for O) and $T = 0$ the decision to abstain.

The decision problem of an uninformed citizen at the election stage is then

$$\max_{T \in \{0,1\}} T(P| \int [V(a) - V_I] dF(a) | - C) = \widetilde{W} \quad (1)$$

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

$$\max_{T \in \{0,1\}} T(P|V(a) - V_I| - C) = W^*(a) \quad (2)$$

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

$$\Delta = \int [W^*(a) - \widetilde{W}] dF(a) \quad (3)$$

At the beginning of period 1 citizens decide about information acquisition. The optimization problem for a generic citizen is:

$$\begin{aligned} & \max_{t,k} q(t, k|E, M)\Delta - wt - rk \quad (4) \\ \text{s.t. } & t \in \mathcal{T} \\ & k \in \mathcal{K} \end{aligned}$$

Lemma 1 *The expected value of political information is positive, i.e. $\Delta \geq 0$*

Proof: See Appendix A.

It is then straightforward to prove the following:

Proposition 1 *The optimal functions $t^*(E, M, w, r)$ and $k^*(E, M, w, r)$ are both increasing in E, M and decreasing in w, r . In other terms, the demand for information*

(both the quality of the selected information source and the time devoted to information acquisition) is increasing in education and information supply and decreasing in the costs of time and mass media. It is then also true that the probability Q to know a , defined as $q(t^*, k^* | E, M) = Q(E, M, w, r)$ is increasing in E and M and decreasing in w and r .

Assumption 2 *Prior beliefs are such that the voters would not vote for any candidate if uninformed, i.e. $P \left| \int [V(a) - V_I] dF(a) \right| \leq C, \forall F \in \mathcal{F}, \forall C \in \mathcal{C}$.*

It is now possible to link the probability to be informed to the ex ante probability of voting, i.e. the probability of voting before the actual type of the opponent is revealed. This ex ante perspective is indeed the only one 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.

In the following I assume that $P[V(\bar{a}) - V_I] > C$ and $P[V_I - V(0)] > C$.

Proposition 2 $\frac{\partial \Pr(T=1|Q)}{\partial Q} \geq 0$. *In other terms, the probability of voting for any candidate is increasing in political knowledge, i.e. in the probability to know the opponent's type.*

Proof: see the Mathematical Appendix.

This model links in a very simple way the probability of voting and a number of individual and environmental characteristics, thus providing a theoretical foundation for well established stylized facts on turnout.

Proposition 3

$\frac{\partial \Pr(T=1|E, M, w, r)}{\partial E} \geq 0, \frac{\partial \Pr(T=1|E, M, w, r)}{\partial M} \geq 0, \frac{\partial \Pr(T=1|E, M, w, r)}{\partial w} \leq 0, \frac{\partial \Pr(T=1|E, M, w, r)}{\partial r} \leq 0$. *In other terms, the probability of voting is increasing in education and in information supply and decreasing in the cost of time and the cost of mass media.*

Proof: see the Mathematical Appendix.

The capability to acquire information and the amount of information supplied increase the probability that a citizen votes, *ceteris paribus*. This explains some common findings of empirical research, like the positive correlation between education and turnout, and at the same time provides a direct link between the probability of turnout and the (exogenous) cost of acquiring information.

4 Ideology

It is natural to think of ideology in our model in the form of prior beliefs about the opponent candidate¹². I start by defining ideology according to citizens' beliefs.

Definition 1 (Ideology) *An I-leaning ideology (O-leaning ideology), or I-ideology (O-ideology), consists of prior beliefs $F(a)$ s.t.*

$$\int [V(a) - V_I] dF(a) < 0 \quad (\geq 0)$$

A citizen's ideology is defined only in relation to her beliefs. This, however, does not guarantee that an ideological citizen votes if uninformed: a more stringent definition of ideology would require prior beliefs to be such that, *ex ante*, the distance between candidates is sufficient to overcome the cost of voting. I introduce therefore the following definition:

Definition 2 (Strong Ideology) *A strong I-ideology (O-ideology) consists, for given P*

¹²It is clear that in the real world ideology concerns beliefs about all candidates: however what matters for voting decisions is the perceived position of one candidate relative to the other and to the cost of voting.

and C , of prior beliefs $F(a)$ s.t.

$$\begin{aligned} P \int [V_I - V(a)]dF(a) &\geq C \\ (P \int [V(a) - V_I]dF(a) &\geq C) \end{aligned}$$

To compare different degrees of ideology we need a further definition:

Definition 3 *Assume citizens i and j have the same C and prior beliefs represented respectively by the distribution functions $F(a)$ and $G(a)$. Then citizen i is more O -ideological (I -ideological) than citizen j if*

$$\int [V(a) - V_I]dF(a) > (<) \int [V(a) - V_I]dG(a)$$

When we do not want to distinguish between I -ideology and O -ideology we can simply say that agent i is more ideological than agent j .

It should be noted that in the Definitions 1-3, I consider a generic utility function $V(a)$, imposing no restriction on it other than being monotonic nondecreasing. The purpose of the previous definitions is to impose restrictions on the distribution functions rather than on the utility function. Given that we only want to characterize beliefs, independently of preferences, what is required on the functions $F(a)$ and $G(a)$ must be true for any nondecreasing utility function $V(a)$. Now notice that

$$\int [V(a) - V_I]dF(a) = \int V(a)dF(a) - V_I. \quad (5)$$

By requiring Definition 3 to be valid for every non-decreasing function $V(a)$, the comparison of alternative distribution functions based on our definition of ideology is equivalent to using first order stochastic dominance. Under this more restrictive requirement I

can introduce an indicator of ideology that will be useful in the rest of this section¹³.

Definition 4 Define π as an indicator of ideology s.t. an increase in π indicates an increase of *O*-ideology.

Assumption 3 Consider two distribution functions $F_{\pi_F}(a)$ and $G_{\pi_G}(a)$. Then $\pi_F > \pi_G$ if and only if $F_{\pi_F}(a) \leq G_{\pi_G}(a) \forall a$.

As π increases, agents become more *O*-ideological or, alternatively, less *I*-ideological. As $|\pi|$ increases we will say that agents become more ideological (without specifying).

It is then possible to divide the set of prior beliefs \mathcal{F} into three groups:

$$\begin{aligned}\mathcal{F}_I &= \{F(a) : P \int [V_I - V(a)]dF(a) > C\} \\ \mathcal{F}_O &= \{F(a) : P \int [V(a) - V_I]dF(a) > C\} \\ \mathcal{F}_A &= \{F(a) : |P \int [V(a) - V_I]dF(a)| \leq C\}.\end{aligned}\tag{6}$$

Accordingly, we can divide the citizens' population Ω into Ω_I , Ω_O , Ω_A , depending on their priors. If uninformed about the true opponent's type, citizens in the set Ω_I vote for the incumbent, citizens in Ω_O vote for the opponent and those in Ω_A abstain. It is important to distinguish this last group from the rest. I refer to citizens in Ω_A as *weakly-ideological*, as opposed to the strong ideological agents in Ω_I and Ω_O . We can also define

¹³Defining ideological beliefs using first order stochastic dominance seems to make clearer the distinction between private interest and ideology. In a sense, an ideological belief must be independent of preferences (at least as long as we all agree on some basic premise, like that a is a valuable thing). If an individual believes that $F(a)$ stochastically dominates $G(a)$ then he would recommend $F(a)$ to every person with a nondecreasing utility function $V(a)$. This captures the difference between the fact that $F(a)$ is better for the ideological person and the fact that such person believes $F(a)$ to be better for everyone.

π_{-1} , π_0 , and π_{+1} such that

$$\begin{aligned}
P \int [V_I - V(a)] dF_{\pi_{-1}}(a) &= C \\
P \int [V_I - V(a)] dF_{\pi_0}(a) &= 0 \\
P \int [V(a) - V_I] dF_{\pi_{+1}}(a) &= C.
\end{aligned} \tag{7}$$

Then citizens are defined as strongly *I*-ideological when they have $\pi < \pi_{-1}$, weakly *I*-ideological when $\pi_{-1} \leq \pi \leq \pi_0$, weakly *O*-ideological when $\pi_0 \leq \pi \leq \pi_{+1}$, and strongly *O*-ideological when $\pi > \pi_{+1}$. Finally, it is useful to define the following sets, corresponding to possible realizations of the opponent's type:

$$\begin{aligned}
\mathcal{A}_I &= \{a : P[V(a) - V_I] < -C\} \\
\mathcal{A}_\Theta &= \{a : -C \leq P[V(a) - V_I] \leq C\} \\
\mathcal{A}_O &= \{a : P[V(a) - V_I] > C\}
\end{aligned} \tag{8}$$

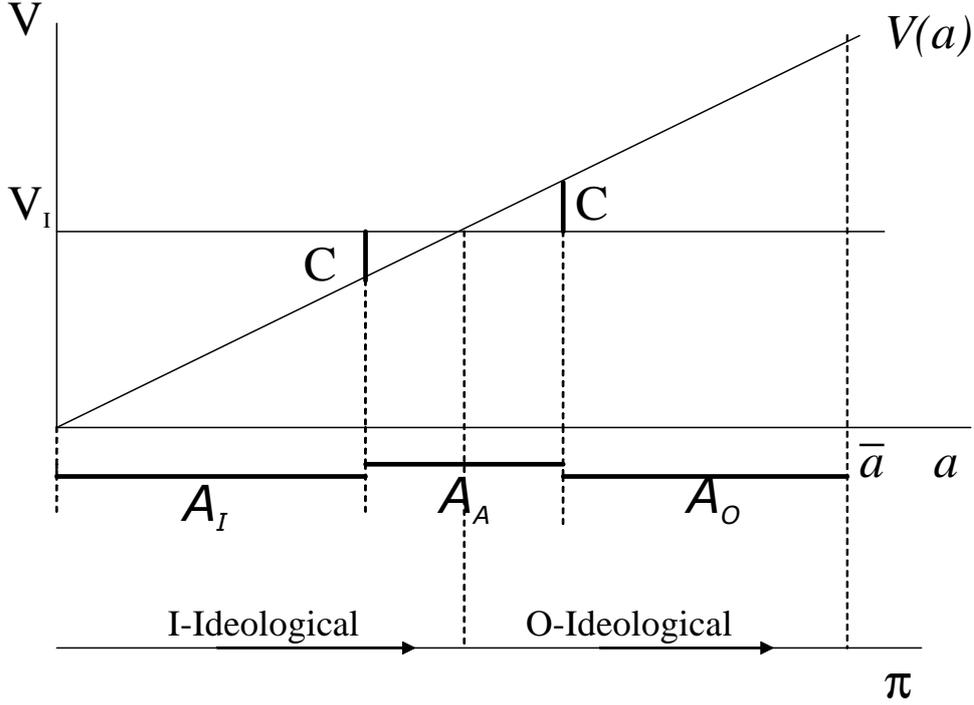
Being referred to realizations, and therefore to the case when the type of the opponent is observed, the sets in (8) do not depend on prior beliefs. Figure 2 shows the partitioning of the opponent's type support in the case in which $V(a)$ is a linear function.

The value of information depends on the decision the citizen would make following only her priors. In particular, information is valuable because it might change the decision taken when uninformed. Consider a strongly *O*-ideological agent. As π increases, the probability of realizations in \mathcal{A}_I or \mathcal{A}_Θ decreases, thus rendering the possibility of uninformed mistakes less likely. Therefore the value of information should decrease as π increases.

For weakly ideological agents we need to introduce a further assumption.

Assumption 4 $\pi_i > \pi_j \Rightarrow \int_{\mathcal{A}_I \cup \mathcal{A}_O} P|V(a) - V_I|[f_i(a) - f_j(a)]da \geq C \int_{\mathcal{A}_I \cup \mathcal{A}_O} [f_i(a) -$

Figure 2: Partitioning the \mathcal{A} -space



$$f_j(a)]da.$$

This assumption is at the same time both a restriction on the distribution functions considered, and a restriction on the possible partitions of the space \mathcal{A} . Now consider a weakly O -ideological agent, an agent that would abstain if uninformed. In this case an increase in π decreases the probability of events in \mathcal{A}_I ; On the other side now the probability of events in \mathcal{A}_O increases. We are left therefore with two opposite effects whose overall impact cannot be determined. Assumption 4 basically says that when an agent is O -ideological, as π increases we expect the increase of likelihood of events in \mathcal{A}_O to dominate the corresponding reduction of likelihood of events in \mathcal{A}_I (and symmetrically for I -ideological agents).

It is now possible to state our main result.

Proposition 4 *Indicate with Δ_F and Δ_G the value of information corresponding respectively to π_F and π_G . Under Assumptions 1, 3 and 4 and for given E, M, w, r, C , we have that*

$$1) \pi_G < \pi_F < \pi_{-1} \Rightarrow \Delta_G < \Delta_F$$

$$2) \pi_{-1} \leq \pi_G < \pi_F < \pi_0 \Rightarrow \Delta_G > \Delta_F$$

$$3) \pi_0 \leq \pi_G < \pi_F \leq \pi_{+1} \Rightarrow \Delta_G < \Delta_F$$

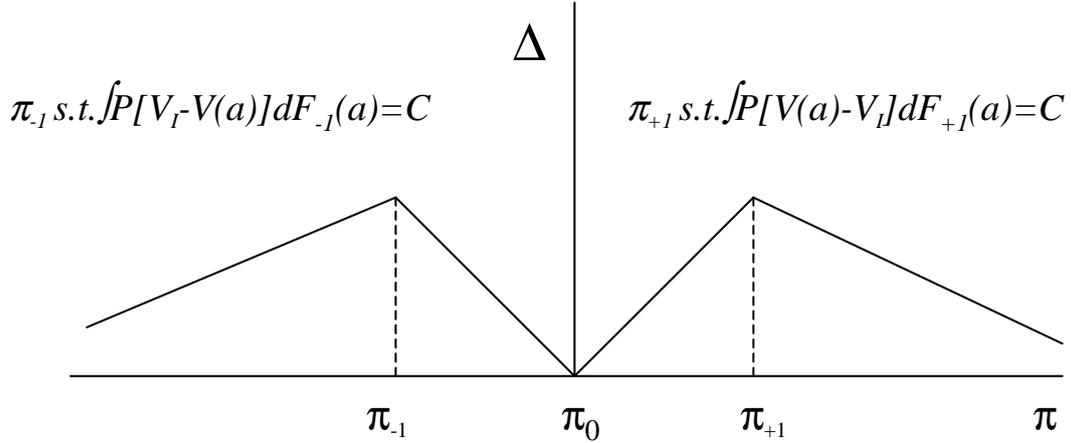
$$4) \pi_{+1} < \pi_G < \pi_F \Rightarrow \Delta_G > \Delta_F$$

In other terms, the value of information is first increasing and then, after a threshold, decreasing in ideology. As a consequence, political knowledge is low for extremists and indifferent voters and high at intermediate levels of ideology.

Proof. See the Mathematical Appendix.

Following the foregoing discussion, the intuition for this result has a simple representation in Fig. 3. Citizens that believe there is very little difference between the candidates (compared to the cost of voting) have little benefit from acquiring information: the expected utility from an informed versus an uninformed choice is very limited as not much difference is expected. Citizens who are extremely *independent* in their evaluation of candidates can therefore be better classified as *indifferent*: they tend to attach little value to politics in general and therefore remain generally uninformed. As priors become more and more ideological, the demand for information increases, as the value of an informed decision increases too. The value of information reaches its peak for those citizens that are exactly indifferent between voting or not: for such agents observing the realization of a carries a probability 1 of breaking the indifference. Assume for example that agents that are indifferent between abstaining and voting would abstain: there is then a very high probability of a realization occurring in, for example, \mathcal{A}_O , thus making information

Figure 3: The Value of Information



extremely valuable. Citizens in a neighbourhood of this indifference point can be called *independent* and correspond to the idealized view of a well informed citizen. Starting from this maximum, the value of information decreases monotonically for further increases in ideology. This happens when citizens' priors are strong enough to induce them to vote if uninformed: holding very strong priors means to believe that it is not worth to acquire new information. I will refer to those agents as *partisan*.

Proposition 4 is stated for a given C . However, as C increases we should expect the number of uninformed agents to increase: citizens that, in spite of being sufficiently ideological, have a high cost of voting (think for example of citizens living outside their home country) should remain rationally ignorant.

The remaining of this section links information to turnout.

Proposition 5

$\frac{\partial \Pr(T=1|Q)}{\partial Q} \geq 0$ for weakly-ideological voters and $\frac{\partial \Pr(T=1|Q)}{\partial Q} < 0$ for strongly ideological voters. In other terms, the impact of information on the probability to vote is positive for weakly-ideological voters and negative for strongly ideological voters.

Proof: see the Mathematical Appendix.

For weakly-ideological voters 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. Thus, the impact of information on turnout depends on the ideological priors of voters¹⁴.

It is important, at this point, to understand what is the effect of ideology on turnout. As discussed in the introduction, empirical studies tend to show that more ideological voters are more likely to vote and there are many theoretically good reasons to expect this correlation. Here, however, we found that ideology matters also for information acquisition and, in turn, that information matters for turnout. What is the final effect of ideology on turnout? Proposition 6 provides results that take into account the existence of both a direct and an indirect (via information acquisition) effect. Our conclusion is that the indirect effect is not enough to contradict the basic intuition that more ideological citizens are more prone to vote.

Proposition 6 $\pi_F > \pi_G > \pi_0 \Rightarrow Pr(O|F) > Pr(O|G)$; $\pi_F < \pi_G < \pi_0 \Rightarrow Pr(I|F) > Pr(I|G)$. *If the function $|V(a) - V_I|$ is symmetric around 0 then for any two prior distributions $F(\cdot)$ and $G(\cdot)$ $|\pi_F| > |\pi_G| \Rightarrow Pr(T = 1|F) > Pr(T = 1|G)$. In other terms, a more ideological voter is more likely to vote.*

Proof: see the Mathematical Appendix.

Before moving to the empirical analysis, it is opportune to spend a few words on the impact of information on the quality of the elected candidate. We proved that weakly ideological citizens increase their likelihood to vote when informed, while strongly ideological ones increase their likelihood to abstain. It is then clear that more information

¹⁴This result appears rather stark. This is due to the fact that, if the signal is received, citizens learn the true type of the opponent. The asymmetric pattern would, however, remain even if citizens could only observe a noisy signal. The important point here is that this result provides a guidance for further empirical investigation. Attention will therefore be devoted to data analysis rather than to refining the model under different hypotheses.

increases the chances to win of the better politician. This result, although derived in a decision-theoretical context, carries implications for the literature on information aggregation that associates better information with a higher likelihood of turnout. Our model delivers such a link but also makes it conditional on voters' prior beliefs. Information is good because, among other things, can induce abstention of otherwise uninformed extremists: this increases the possibility of information aggregation to occur. At the same time, it makes possible to argue that the possibility of information aggregation in elections should be related to a number of individual (often observable) characteristics as well as to specific characteristics of the environment, mainly related to information supply by the mass media.

5 Empirical evidence from a British election

Some of the results derived in the previous sections provide rationalizations of observed empirical regularities, others call for new empirical investigations. In this section I therefore provide empirical evidence that shows the compatibility of the theoretical propositions with data. For this purpose I use data from the British Election Study (BES)¹⁵. The British system is parliamentary and gives substantial powers to the Prime Minister; the electoral system is first past the post and the parties that realistically contend the possibility to govern are two, the Labour and the Conservative. In this sense, the British system fits our model better than most other political systems. There are nevertheless some features of the electoral system that are not adequately captured by the model and that will be discussed later.

¹⁵I use data on England, Scotland and Wales. The political situation in Northern Ireland is substantially different from the rest of the country as the main cleavage is between the Catholic and Protestant populations rather than on the usual left-right dimension.

5.1 Data and methods

I use data from the 1997 general election. The 1997 BES deals with information issues better than any other previous or subsequent BES. Among other questions concerning the election, respondents received in that occasion two sets of questions that can be used to establish 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). In a second set of questions, respondents received 7 statements on the British political and institutional system and were asked to say if they were true or false. Both set of questions have been used to construct a variable (*INFO*) that is then adopted as a measure of political knowledge¹⁶. Details on this variable (and on the others) can be found in the Data Appendix.

The other crucial variable is ideology. Two possible measures have been considered. One is the classical left-right self-placement, with zero being the extreme left and 10 the extreme right. I transform this variable by pulling together corresponding levels of extremism on both sides. This leads to a measure of ideological strenght (*Ideology*) that assumes a value of zero if the original left-right variable was 5 (i.e. the respondent places himself in the middle of the ideological spectrum), 1 if it was 4 or 6 etc¹⁷. The second indicator (*Party*) measures instead how close respondents feel to their preferred party (if any) and has been built up by combining four separate questions. A full description of the variable *Party* can be found in the Data Appendix.

Fig. 4 plots average information score by left-right self-placement. It mirrors with

¹⁶Delli Carpini & Keeter (1996, p.174), in presenting evidence on political knowledge of American voters, based their analysis on nearly 3700 questions collected in various surveys. They concluded that "researchers developing national or general political knowledge scales need not be overly concerned with the mix of specific topics covered by individual items. Scales made up of items tapping only knowledge of institutions and processes, substantive issues, or public figures are likely to serve as reasonable measures of the overarching construct". This is extremely important for us: the empirical analysis presented here is based on a much more limited set of questions and I rely on the assumption that correct answers to such questions are likely to be correlated with knowledge of other issues too. See also Delli Carpini and Keeter (1993).

¹⁷"Don't know" responses have been included among the least ideological category. All regressions have been repeated excluding these observations and the results show only minimal variations. These regressions are available from the authour on request.

surprising similarity the two peaks we described theoretically in Fig. 3. In Fig. 5 I use the partizanship measure where 1 indicates no attachment to any party and 5 maximum attachment to a party. Again, the simple plot of average political knowledge by partizanship mimicks very well our theoretical findings. These plots seem to show that the distribution of information do interact with ideology and partizanship. Before jumping to conclusions, however, it is oportune to use more sophisticated statistical tools and take into account potential correlations with other variables.

I will therefore use regression analysis to estimate both a political knowledge equation and a turnout equation. The first equation to be estimated is

$$INFO_i = \alpha_1' \mathbf{X}_i + \alpha_2 ID_i + u_i \quad (9)$$

where ID represents ideology or party identification. Suppose there are K types of citizens ranked according to the strenght of their ideological or party attachment. Then ID is a categorical variable and $K - 1$ dummies are introduced in the regression. We expect to find a non-monotonic pattern in such dummies, where estimated parameters should first increase with ideology and then decrease (Proposition 4). \mathbf{X} represents a vector of control variables including, among other covariates, education, age, sex and income¹⁸. The BES data have been matched with Census data to also control for characteristics of the electoral constituency such us socio-economic conditions and electoral closeness¹⁹. \mathbf{X} also includes proxies for information supply and the opportunity cost of time. This gives us an opportunity to test the predictions of Proposition 1. Estimation is by OLS.

To test the predictions of our model for what concens voter turnout the following

¹⁸A number of respondents in the BES refused to disclose their income, which forced us to drop a part of the observations. I present regressions both with and without income: in this last case the selection bias is eliminated but at the cost of omitting an important covariate.

¹⁹In general, I attempt to include most of the variables that, for different reasons, have been considered by the empirical literature on turnout (see for example Matsusaka and Palda, 1999). For this reason the list of variables is quite long, and the standard errors are often high because of multicollinearity. However, this strategy leads to robust results for what concerns our variables of interest and the only risk is that of underestimating the parameters of interest.

equation is estimated by probit:

$$T_i = \beta_1 INFO_i + \beta_2' \mathbf{X}_i + \beta_3 ID_i + \beta_4 ID_i \times INFO_i + \varepsilon_i \quad (10)$$

In this case ID is treated as a continuous variable, in order to interact it with $INFO$. Indicating with \overline{ID} the mean of ID , Proposition 2 requires that $\beta_1 + \beta_4 \overline{ID} > 0$ while Proposition 3 places a well defined sign on a number of elements of the vector β_2' . For what concerns the interaction between ideology and information, indicating with \overline{INFO} the average of $INFO$, I expect $\beta_3 + \beta_4 \times \overline{INFO} \geq 0$ (from Proposition 6), and $\beta_4 \leq 0$ (from Proposition 5). There could be a legitimate concern about the endogeneity of information in the turnout equation. I rely here on the findings of Larcinese (2005), who also uses the 1997 BES data and shows that, when standard controls are introduced in the turnout equation, the omitted variables problem should be of limited relevance and therefore a simple probit regression can be considered sufficiently reliable.

One important question I have left aside at the beginning of this section is how well the model describes the British electoral system. There are at least two important features that are not captured by the model: the first is the division in electoral constituencies, which makes voters choose one of many MPs rather than directly the Prime Minister. The second is the fact that, although there are only two contenders for the place of Prime Minister, there are nevertheless third and local parties that are quite strong in some areas. This means that it is possible to vote strategically; also, it may happen that one of the main contenders on a national scale is not a credible contender at the local level. These features of British elections have certainly an impact on incentives to both be informed and vote. For a number of respondents, incentives might have worked quite differently from how they are depicted in the model. To deal with this possibility I have repeated all the regressions by using a reduced sample in which only observations coming from two-way contests between Labour and Conservatives have been retained. In electoral constituencies where the two main candidates are from the parties that are fighting for the

government there is little incentive to vote for third parties and the process of information acquisition should be approximately what the model describes. This leads us to exclude more than one third of the observations but, as it will be shown later, has only minor implications for the results.

A more detailed description of the variables is provided in the Data Appendix.

5.2 Results

Regression results are reported in the tables from 2 to 5 and provide a rather comfortable picture for what concerns their compatibility with the theoretical model.

Table 2 reports OLS estimates of various specifications of equation (9). In columns 1 and 2 I do not control for income, which gives a larger sample, while in columns 3 and 4 income has been introduced. Columns 1 and 3 use the measure of ideological strength derived from the respondent's left-right self-placement. The ideology dummies display in both columns the expected pattern: political knowledge increases with ideology, reaches its peak in correspondence of the third group, for which it is also strongly statistically significant, and then declines and becomes statistically indistinguishable from the omitted category (the least ideological). Columns 2 and 4 use party attachment instead of ideological self-placement. The patterns of the coefficients display again a single-peaked shape, with the maximum reached at the fourth category in both columns.

The coefficient of other variables of interest are also reported. First, in conformity with previous findings, better educated and older voters are better informed. To capture the opportunity cost of time, I have used the only piece of information available from the survey, the total number of hours worked, on the assumption that people who work longer hours have a higher cost of devoting time to gathering news. The coefficient obtained for this variable comes with the expected negative sign and is statistically significant (at the 10% level in column 3 and at the 5% level in column 4) when I control for income, which is a rather important variable in this case, being obviously correlated with the number of

hours worked. The effect is not extremely large: an increase of one standard deviation in the number of working hours decreases the information score by less than 0.2 in both columns 3 and 4 of Table 2.

The supply of news also turns out to have a positive effect on political knowledge, with a coefficient which is statistically significant at the 1% level in columns 1 and 3 and at the 10% level in columns 2 and 4. On the aggregate, the effect does not appear to be large: one standard deviation in news supply determines an increase in the information score of 0.05 at most. The standard deviation is, however, not particularly high in this case. The difference between the constituencies with maximum and minimum news supply appears instead sizeable, being equal to 3.3 in the information score.

Table 3 reports the probit estimates of the turnout equation. In all columns both information and ideology come with expected signs and are significant. We intend, however, to have a more stringent test of the model, which consists in a negative sign for the coefficient of the interaction between information and ideology ($\beta_4 \leq 0$). The expected sign is obtained in all specifications, although the coefficient is statistically significant only when party identification is used. In this case we also obtain a larger Pseudo- R^2 , indicating that this variable is better capable at explaining turnout than ideological strenght.

By using the coefficients and the information reported in table 1 (summary statistics) it is also easy to verify that the sign of $\beta_3 + \beta_4 \times \overline{INFO}$ is positive in all cases, which confirms once more the important role of ideology in fostering turnout and the fact that its net impact should always be positive.

One important question concerns the impact of information on turnout. Again, it is easy to verify that the sign of $\beta_2 + \beta_4 \times \overline{ID}$ is positive in all columns: other things equal, information increases turnout on average even when controlling for ideology. This result corresponds to the common finding of a positive association between political knowledge and turnout. However, having estimated the interaction term we can now uncover the heterogeneity that hides behind this aggregate result. In fact, while the positive impact of

information on turnout is rather strong for non-ideological and non-partizan respondents, it becomes negligible or even negative when ideological strength or party identification reach their peak.

In Tables 4 and 5 I use only observations coming from constituencies with a Conservative-Labour race. Table 4 shows some variations when compared with Table 2 but we still obtain the same non-monotonic patterns in the impact of ideology and partizanship on information. In fact, in this case the impact of party attachment appears stronger, in the sense that everybody is now better informed if compared with the least partizan types. Moreover, the decline associated with the most partizan group is now less pronounced. The weekly number of working hours displays again a negative sign but this time is not statistically significant while the impact of news supply is stronger in columns 1 and 3 and weaker and insignificant in columns 2 and 4. The turnout estimates in Table 5 only show minimal variations when compared with the results of Table 3, but once again the impact of party attachment on turnout appears stronger. Overall, it appears that party attachment has a larger relevance in Conservative-Labour constituencies while other factors become less important.

6 Concluding remarks

People learn if they have the motivation, the ability, and the opportunity to do so. There seems to be little motivation for political information acquisition by voters: as for many other situations involving collective action problems, voter turnout and information acquisition in elections are complex social phenomena that are hard to explain with any single-handed approach. It is, nevertheless, possible to make some progress when the focus on motivation is replaced by a focus on opportunity and ability: although motivations to vote and to be informed clearly come from individual, often unobservable, characteristics, the opportunity and the ability to learn will eventually leave their mark on the amount and the type of political knowledge that citizens possess. Although not

an exhaustive explanation, this methodology allows us to perform some interesting comparative statics in order to derive novel testable propositions. This is the approach taken in this work, where I try to link political knowledge and turnout with observable constraints and individual characteristics by developing a testable decision-theoretical model of information acquisition and voting.

In this model citizens “produce” their own information by using mass media and time according to a personal technology that reflects their ability to acquire, process and retain information. The parameters that determine different productivities in information acquisition are then represented by relevant individual characteristics (like education, income and age) as well as by the supply of information, in the form of mass media coverage of political issues. This theoretical analysis leads to testable propositions about the links of individual and environmental characteristics with citizens’ political knowledge.

It is important, however, to distinguish the flow of information received during an electoral campaign from the prior stock of political “knowledge” (prior beliefs). Such knowledge is the outcome of individual history, from parents’ influence to other forms of socialization and direct personal experiences. Not surprisingly, the perception of political matters is generally very diverse across the population. I show that such diversity also plays a role in the decision to acquire information and, then, in the impact that political knowledge may have on turnout. In particular, the least informed citizens are, other things equal, those with the weakest and the strongest ideological beliefs. In the first case, agents are *ex ante* so indifferent between the candidates that the expected benefit of acquiring information does not cover its costs: Thus, in contrast to what intuition would suggest, extremely “independent” citizens can be far from the ideal that a participative vision of democracy requires. On the other side, people with extreme prior beliefs are confident enough in their opinions and do not find it useful to acquire information. Thus, slightly ideological citizens turn out to be the most informed: This is a way in which a moderate amount of ideological polarization can be useful to the functioning of democratic

institutions.

The model presented is compatible with most typical results of empirical research, like the positive effect of education on participation. Moreover, through the interaction between ideology and information, we are able to derive new testable predictions: of particular relevance is the fact that information should have a positive impact on turnout only for non-ideological voters.

Finally, since voters with strong priors make less-dependable choices, this result argues in favour of the importance of information for good collective decision-making and the accountability of public officials. One possible objection to this step is that this model avoids the complications that arise when strategic voting is considered. However, whether the vast literature on strategic turnout has delivered any practical insight into our understanding of political elections remains still unclear. This literature relies on the idea that voting decisions should be made conditional on the probability of each voter to be pivotal: In large elections (as opposed, for example, to a committee or a jury²⁰) this sort of strategic behaviour appears very unlikely and would require a degree of sophistication that no voter has any incentive to develop in the first place. A simpler decision-theoretical framework seems more appropriate in that it limits the rationality of voters in a well defined way. The alternative offered by models with bounded rationality often incur in the problem of determining where rationality should end and how it should be replaced.

Some empirical evidence on these theoretical results is provided from the 1997 general election in the United Kingdom. The results confirm most of the theoretical intuitions. Individual and environmental characteristics generally come with the expected signs. For some variables (like age and education) this is just a further confirmation in a well established empirical literature. Other variables have instead been identified thanks to

²⁰Before being extended to large electorates, the literature on information aggregation aimed at explaining the decision-making process of a jury with a common objective function. This is context in which the celebrated Condorcet-jury theorem can be proved. Austen-Smith and Banks (1996) make the point that sincere voting does not constitute a Nash equilibrium with majority voting. Persico (2004) provides the first model of this sort with information acquisition and compares the properties of different decision rules.

the model: People who work longer hours are, *ceteris paribus*, less informed on political matters and information supply on the press tends to increase political knowledge. As predicted by our model, the relationship between political knowledge and ideological strength has an inverted U-shape. The empirical analysis also confirms that ideology and information interact in significant ways in their impact on turnout. Both ideology and information display positive correlations with turnout. However, these well established empirical regularities hide an important heterogeneity which, in the empirical analysis, is captured by an interaction term: For more ideological voters the positive impact of information on turnout is reduced. This effect is found in the case of party identification but not when left-right self-placement is used. Further investigation, beyond the scope of this paper, should explore the reason for this difference, probably due to the relationship between ideology and partisanship in the British context.

This analysis has consequences for the way to think of the role of information and mass media in democratic systems. Overall, our findings show that information matters for electoral behavior. However, because of its relation with ideology, information acquisition in a polarized polity is limited, and ideology rather than information determine policy outcomes. The same can happen to an extremely non-polarized population, with a prevalence of indifferent voters. Thus, a limited amount of polarization helps reaching informed outcomes. In this process, mass media and voters' personal resources play a crucial role: Formally democratic institutions might be emptied of substantial content if accurate political information is either unavailable or beyond most voters' reach.

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7 Mathematical Appendix

Proof of Lemma 1 $\Delta = \int [W^*(a) - \widetilde{W}]f(a)da.$

Remember that

$$W^*(a) = \max_{\{T\}} T(P|V(a) - V_I| - C)$$

and define

$$W^* = \max\{0, P \int |V(a) - V_I|f(a)da - C\}$$

Also

$$\widetilde{W} = \max_{\{T\}} TP \left| \int [V(a) - V_I]f(a)da \right| - C$$

which means

$$\widetilde{W} = \max\{0, P \left| \int [V(a) - V_I]f(a)da \right| - C\}$$

For Δ to be positive it is sufficient to prove that

$$\max\{0, \int |V(a) - V_I|f(a)da - C, 0\} \geq \max\{0, \left| \int [V(a) - V_I]f(a)da \right| - C\}$$

If we define

$$\mathcal{A}_- = \{a : [V(a) - V_I] < 0\}$$

$$\mathcal{A}_+ = \{a : [V(a) - V_I] \geq 0\}$$

then it is clear that

$$\begin{aligned} \int |V(a) - V_I|f(a)da &= \int_{\mathcal{A}_+} [V(a) - V_I]f(a)da + \int_{\mathcal{A}_-} [V_I - V(a)]f(a)da \\ \left| \int [V(a) - V_I]f(a)da \right| &= \left| \int_{\mathcal{A}_+} [V(a) - V_I]f(a)da - \int_{\mathcal{A}_-} [V_I - V(a)]f(a)da \right| \end{aligned}$$

from which

$$\int |V(a) - V_I|f(a)da - C \geq | \int [V(a) - V_I]f(a)da | - C \quad (\text{A1})$$

If $P \int |V(a) - V_I|f(a)da \leq C$ then $W^* = 0$. But then A1 implies that $| \int [V(a) - V_I]f(a)da | \leq C$ and therefore $\widetilde{W} = 0$. ■

Proof of Proposition 2 Let us indicate with $\widehat{q} \in \{0, 1\}$ the fact of being ex post informed ($\widehat{q} = 1$) or not ($\widehat{q} = 0$). For an uninformed citizen we have

$$Pr(T = 1 : \widehat{q} = 0) = 0$$

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

$$\begin{aligned} Pr(T = 1 : \widehat{q} = 1) &= Pr(a : |[V(a) - V_I]| - C > 0) \\ &= \int_{\mathcal{A}_I} dF(a) + \int_{\mathcal{A}_O} dF(a) \geq 0 \end{aligned}$$

where \mathcal{A}_I and \mathcal{A}_O are the sets defined in (8).

If $P[V(\bar{a}) - V_I] > C$ and $P[V_I - V(0)] > C$ then $Pr(T = 1|\widehat{q} = 1) > 0$.

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

$$Pr(T = 1|Q) = Q Pr(T = 1|\widehat{q} = 1) \quad (\text{A2})$$

from which the result follows immediately. ■

Proof of Proposition 3 From the A2 we have that

$$Pr(T = 1|E, M, w, r) = Q(E, M, w, r) Pr(T = 1|\widehat{q} = 1)$$

We also know from Proposition 1 that

$$\frac{\partial Q(E, M, w, r)}{\partial E} \geq 0$$

from which it follows that

$$\frac{Pr(T = 1|E, M, w, r)}{\partial E} = \frac{\partial Q(E, M, w, r)}{\partial E} \times Pr(T = 1|\hat{q} = 1) \geq 0$$

Similarly we can prove the rest of the proposition. ■

Proof of Proposition 4 Let us focus on the positive part of the diagram in Figure 3.

Cases 3) and 4) refer respectively to weak and strong O -ideologies. This analysis applies symmetrically to cases 1) and 2) (respectively strong and weak I -ideologies). Consider first a weakly O -ideological citizen. The value of information in such case is given by the probability information will induce a switch to a vote for I plus the probability it will induce a vote for O , i.e.

$$\Delta = \int_{\mathcal{A}_I} (P[V_I - V(a)] - C)dF(a) + \int_{\mathcal{A}_O} (P[V(a) - V_I] - C)dF(a)$$

Given two distributions F and G we want to prove that $\pi_F > \pi_G \Rightarrow \Delta_F > \Delta_G$ i.e.

$$\begin{aligned} & \int_{\mathcal{A}_I} (P[V_I - V(a)] - C)dF(a) - \int_{\mathcal{A}_I} (P[V_I - V(a)] - C)dG(a) + \\ & \int_{\mathcal{A}_O} (P[V(a) - V_I] - C)dF(a) - \int_{\mathcal{A}_O} (P[V(a) - V_I] - C)dG(a) \quad (\text{A3}) \\ & > 0 \end{aligned}$$

Define $s(a) = [V(a) - V_I]$. Assumption 4 implies

$$\begin{aligned}
& - \int_{\mathcal{A}_I} Ps(a)[f(a) - g(a)]da - \int_{\mathcal{A}_I} C[f(a) - g(a)]da \\
& + \int_{\mathcal{A}_O} Ps(a)[f(a) - g(a)]da - \int_{\mathcal{A}_O} C[f(a) - g(a)]da \\
& > 0
\end{aligned}$$

\Rightarrow

$$\begin{aligned}
& - \int_{\mathcal{A}_I} Ps(a)dF(a) - \int_{\mathcal{A}_I} CdF(a) \\
& + \int_{\mathcal{A}_I} Ps(a)dG(a) + \int_{\mathcal{A}_I} CdG(a) + \\
& \int_{\mathcal{A}_O} Ps(a)dF(a) - \int_{\mathcal{A}_O} CdF(a) \\
& - \int_{\mathcal{A}_O} Ps(a)dG(a) + \int_{\mathcal{A}_O} CdG(a) \\
& > 0
\end{aligned}$$

\Rightarrow A3.

Now consider a strongly O -ideological citizen. The value of information is in this case given by:

$$\Delta = \int_{\mathcal{A}_I} 2P[V_I - V(a)]dF(a) + \int_{\mathcal{A}_\Theta} (P[V_I - V(a)] + C)dF(a)$$

i.e. the value due to a potential shift to a change in favour of I plus the value due to a shift in favour of abstention. Now we want to prove that $\pi_F > \pi_G \Rightarrow \Delta_F < \Delta_G$ i.e.

$$\begin{aligned}
& \int_{\mathcal{A}_I} 2P[V_I - V(a)]dF(a) + \int_{\mathcal{A}_\Theta} (P[V_I - V(a)] + C)dF(a) - \\
& - \int_{\mathcal{A}_I} 2P[V_I - V(a)]dG(a) - \int_{\mathcal{A}_\Theta} (P[V_I - V(a)] + C)dG(a) \quad (\text{A4}) \\
& < 0
\end{aligned}$$

It is useful to adopt the following notation:

$$\mathcal{A}_I = [\underline{a}, \widehat{a}]$$

$$\mathcal{A}_\Theta = [\widehat{a}, \widehat{a}]$$

$$\mathcal{A}_O = [\widehat{a}, \bar{a}]$$

Integrating the A4 by parts we get:

$$\begin{aligned} & 2P[V_I - V(\widehat{a})]F(\widehat{a}) - 2P[V_I - V(\underline{a})]F(\underline{a}) + \int_{\mathcal{A}_I} 2PV'(a)F(a)da + \\ & +(P[V_I - V(\widehat{a})] + C)F(\widehat{a}) - (P[V_I - V(\widehat{a})] + C)F(\widehat{a}) + \int_{\mathcal{A}_\Theta} PV'(a)F(a)da - \\ & -2P[V_I - V(\widehat{a})]G(\widehat{a}) + 2P[V_I - V(\underline{a})]G(\underline{a}) - \int_{\mathcal{A}_I} 2PV'(a)G(a)da - \\ & -(P[V_I - V(\widehat{a})] + C)G(\widehat{a}) + (P[V_I - V(\widehat{a})] + C)G(\widehat{a}) - \int_{\mathcal{A}_\Theta} PV'(a)G(a)da \end{aligned}$$

Now notice that

$$2P[V_I - V(\underline{a})]F(\underline{a}) = 2P[V_I - V(\underline{a})]G(\underline{a}) = 0$$

$$P[V_I - V(\widehat{a})] = C$$

$$P[V_I - V(\widehat{a})] = -C.$$

We are left with

$$\begin{aligned} & 2CF(\widehat{a}) + \int_{\mathcal{A}_I} 2PV'(a)F(a)da \\ & -(C + C)F(\widehat{a}) + \int_{\mathcal{A}_\Theta} PV'(a)F(a)da - \\ & -2CG(\widehat{a}) - \int_{\mathcal{A}_I} 2PV'(a)G(a)da - \\ & +(C + C)G(\widehat{a}) - \int_{\mathcal{A}_\Theta} PV'(a)G(a)da \end{aligned}$$

Therefore

$$\begin{aligned}\Delta_F - \Delta_G &= \int_{\mathcal{A}_I} 2PV'(a)[F(a) - G(a)]da + \\ &\quad \int_{\mathcal{A}_\Theta} PV'(a)[F(a) - G(a)]da\end{aligned}$$

But $F(a) \leq G(a) \forall a$ which implies $\Delta_F \leq \Delta_G$. ■

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

When agents are strongly-ideological we have, for uninformed citizens

$$Pr(T = 1 | \hat{q} = 0) = 1$$

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

$$\begin{aligned}1 &> Pr(T = 1 | \hat{q} = 1) = Pr(a | a \in \mathcal{A}_I \cup \mathcal{A}_O) = \\ &= \int_{\mathcal{A}_I \cup \mathcal{A}_O} dF(a) > 0\end{aligned}$$

Note that the probability to vote conditional on being informed is the same both for strongly and weakly ideological citizens.

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

$$\begin{aligned}Pr(T = 1 | Q) &= Q Pr(T = 1 | \hat{q} = 1) + (1 - Q) Pr(T = 1 | \hat{q} = 0) \\ &= 1 - Q(1 - Pr(T = 1 | \hat{q} = 1))\end{aligned}$$

Proposition 5 follows from the fact that $Pr(T = 1 | \hat{q} = 1) < 1$. ■

Proof of Proposition 6 The probability of voting under the distribution function F is:

$$Pr(T = 1|F) = Q_F Pr(T = 1|\hat{q} = 1) + (1 - Q_F) Pr(T = 1|\hat{q} = 0)$$

Consider two weakly O -ideological distributions F and G s.t. $\pi_F > \pi_G$. Then $\Delta_F > \Delta_G$ and $Q_F > Q_G$. Thus

$$Pr(T = 1|F) = Q_F Pr(T = 1|\hat{q} = 1) > Q_G Pr(T = 1|\hat{q} = 1) = Pr(T = 1|G)$$

If instead $F, G \in \mathcal{F}_O$ then

$$\begin{aligned} Pr(T = 1|F) &= 1 - Q_F[1 - Pr(T = 1|\hat{q} = 1)] \\ Pr(T = 1|G) &= 1 - Q_G[1 - Pr(T = 1|\hat{q} = 1)] \end{aligned}$$

Now $\pi_F > \pi_G \Rightarrow Q_F < Q_G$. Since $1 - Pr(T = 1|\hat{q} = 1) > 0$ we get that $Pr(T = 1|F) > Pr(T = 1|G)$.

The same applies to I -ideological agents. Now notice that, if $|V(a) - V_I|$ is symmetric around zero, then we can compare I -ideological with O -ideological agents and derive that $|\pi_F| > |\pi_G| \Rightarrow Pr(T = 1|F) > Pr(T = 1|G)$. ■

8 Data Appendix

In all regressions I use some control variables whose coefficients are not reported in the tables and whose denomination is sufficiently self-explanatory: these variables are **age**, **married**, **sex**, **church attendance** (categorical variable), **income**(categorical variable), **farmer**, **asian**, **black**, **length of residence in the constituency**, **houseowner**, **contacted by a canvasser during the electoral campaign**, **contacted by phone**, **voted in the previous election**, **regular reader of a quality newspaper**, **type of economic activity** (categorical variable), **union member**, **UK standard region** (categorical variable). The precise definition of these variables can easily be found in the British Election Study 1997 (BES) and therefore will not be discussed in this appendix. Other standard controls are taken from the 1991 Census and include **district unemployment rate** and **population percentage in the district with a university degree**. Finally, I include in all regressions the **marginality** of the constituency, calculated as $\frac{W-R}{W+R}$, where W and R are the percentage of votes reported respectively by the winning candidate and the runner up (the original data are taken from Pippa Norris' British Constituency Database).

I report below the precise definition of the the most important variables used in the regressions.

• Information

The variable **Information** has been constructed by using the following two BES 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 us define with *names* the number of candidates correctly reported and with *quiz* the number of correct answers in question 2. *INFO* is then given by

$$INFO = names + 0.66 \times quiz$$

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 *names*. Therefore, using Bayes' rule we have (assuming the prior probability of a correct answer is 0.5):

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

• **Turnout.** Dummy variable equal to 1 if the responded voted in the 1997 election (verified for most observations).

• **Hours.** Derived from answers to the following question: "How many hours (do/will/did) you normally work a week in your main job, including any paid or unpaid overtime?"

• **Ideology.** Derived from answers to the following question:

"In politics people sometimes talk of left and right. Where would you place yourself on a scale from 0 to 10, where 0 means the left and 10 means the right?"

Ideology is then equal to 1 if the answer is 5, to 2 if the answer is 4 or 6, to 3 if the answer is 3 or 7 etc. Respondents who answered “can’t choose” are excluded.

• **Party-identification.** Based on three questions.

1. “Do you generally think of yourself as a little closer to one of the parties than the others? If yes, which party?”. Outcome: a) no; b) yes → [party named].

2. “Would you call yourself [party named] very strong, fairly strong or not very strong?”

3. “Which one of the reasons on this card comes closest to the main reason you voted for the party you chose?”

Then Party-identification is a categorical variable that assumes the following values:

Party-identification = 1 if the answer to question 1 is “no” or “don’t know”.

Party-identification = 2 if the answer to question 2 is “not very strong” or “don’t know”.

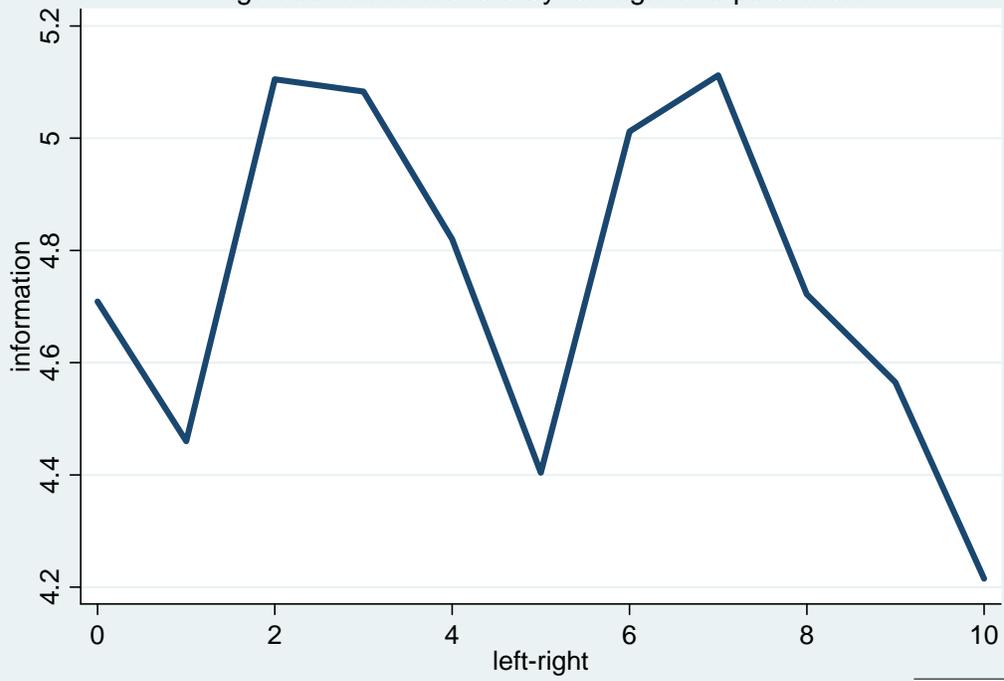
Party-identification = 3 if the answer to question 2 is “fairly strong”.

Party-identification = 4 if the answer to question 2 is “very strong”.

Party-identification = 5 if the answer to question 2 is “very strong” and the answer to question 3 is “I always vote that way”.

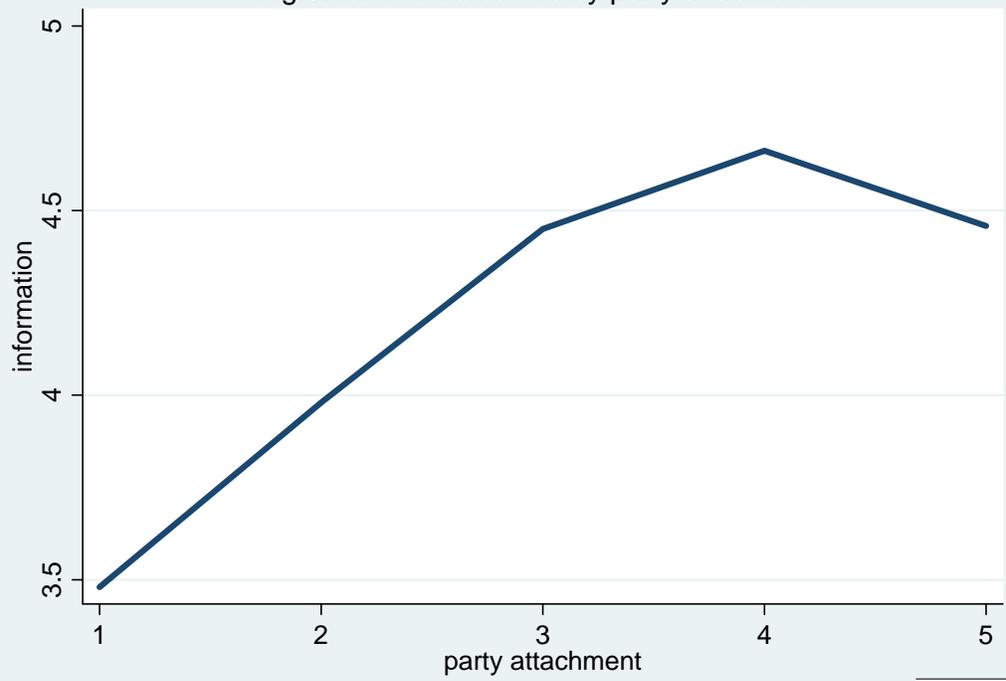
• **Saliency.** This variable is based on articles collected from three national newspapers (The Guardian, The Independent and The Times) during the last 30 days of the electoral campaign. First, the total number of articles mentioning one of the candidates has been collected (by newspaper and by electoral constituency). These numbers have been weighted by the inverse of the total political articles appeared in each newspaper during the same period. The variable Saliency is then the average (across the three newspapers) of the weighted number of articles appeared about a candidate in the electoral constituency.

Fig.4: Information score by left-right self-placement



STATA™

Fig.5: Information score by party attachment



STATA™

Fig. 1. Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Max
Turnout	3199	0.7983745	0.4012767	0	1
Information	3199	4.267033	1.831907	0	10.62
ideological strenght	2770	2.367148	1.554779	1	6
party attachment	3199	2.751797	0.951436	1	5
hours worked	3199	37.80119	15.76359	0	95
news supply	3196	0.984336	2.632574	0	24.28772
age	3199	49.26602	17.8535	18	95
education	3199	3.515161	2.161623	1	7
married	3199	0.5886214	0.4921605	0	1
sex	3199	0.4573304	0.4982539	0	1
income	2902	7.002757	4.589678	1	16
asian	3199	0.0206314	0.1421693	0	1
black	3199	0.0078149	0.0880698	0	1
church attendance	3199	2.045639	2.631966	0	7
union member	3199	0.5804939	0.4935553	0	1
length of residence	3199	20.38387	18.29934	0	94
farmer	3199	0.0084401	0.091496	0	1
house owner	3199	0.6836511	0.4651235	0	1
canvasser	3199	0.2391372	0.4266234	0	1
phone canvasser	3199	0.0750234	0.2634704	0	1
voted in 1992	3199	0.8055642	0.3958276	0	1
quality paper reader	3199	0.1137856	0.3176003	0	1
marginality	3196	0.3024487	0.1939868	0.0051282	0.8140044
% degree in district	3198	6.011545	2.67873	1.494145	17.97613
% unempl. in district	3198	9.28633	3.949836	2.867953	22.48957

Note: summary statistics for economic activity and standard region of the respondents are not reported

Table 2: Voter Information (OLS Coefficients)

Dep. Variable	(1) Information	(2) Information	(3) Information	(4) Information
Ideological strenght 2	0.467*** (5.00)		0.434*** (4.48)	
Ideological strenght 3	0.555*** (6.05)		0.520*** (5.34)	
Ideological strenght 4	0.434*** (3.97)		0.407*** (3.56)	
Ideological strenght 5	0.281 (1.44)		0.288 (1.48)	
Ideological strenght 6	0.092 (0.64)		0.171 (1.12)	
Party attachment 2		0.090 (0.67)		0.077 (0.53)
Party attachment 3		0.367*** (2.70)		0.245* (1.65)
Party attachment 4		0.567*** (3.42)		0.491*** (2.77)
Party attachment 5		0.402** (2.14)		0.360* (1.77)
Hours worked (weekly)	-0.003 (1.08)	-0.002 (0.95)	-0.005* (1.76)	-0.006** (2.09)
News supply	0.031*** (2.66)	0.022* (1.71)	0.031*** (2.59)	0.022 (1.64)
age	0.084*** (5.98)	0.105*** (8.22)	0.090*** (6.11)	0.116*** (8.52)
age squared	-0.065*** (4.51)	-0.087*** (6.75)	-0.070*** (4.67)	-0.096*** (7.05)
education (foreign or other)	1.310* (1.77)	1.194** (2.23)	1.615** (2.08)	1.507** (2.37)
education (CSE or equiv.)	0.221* (1.92)	0.325*** (3.10)	0.159 (1.32)	0.263** (2.37)
education (O level or eq.)	0.462*** (4.70)	0.556*** (5.94)	0.469*** (4.39)	0.557*** (5.48)
education (A level or eq.)	0.820*** (6.38)	0.906*** (7.77)	0.738*** (5.36)	0.858*** (6.74)
higher educ. below degree	0.836*** (7.69)	0.920*** (8.53)	0.764*** (6.52)	0.858*** (7.33)
education (degree)	1.291*** (10.32)	1.431*** (11.98)	1.186*** (8.69)	1.407*** (10.63)
Income	no	no	yes	yes
Observations	2769	3196	2459	2798
R-squared	0.31	0.31	0.32	0.33

All regressions include a constant and the following control variables: married, sex, church attendance (categorical variable), income(categorical variable), farmer, asian, black, lenght of residence in the constituency, houseowner, contacted by a canvasser during the electoral campaign, contacted by phone, voted in the previous election, regular reader of a quality newspaper, type of economic activity (categorical variable), union member, UK standard region (categorical variable), marginality, district unemployment rate, district population percentage with a university degree.

Robust t statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Voter Turnout (Probit Marginal Effects)

	(1)	(2)	(3)	(4)
Dep. Variable	Turnout	Turnout	Turnout	Turnout
Information	0.045*** (4.77)	0.064*** (4.34)	0.042*** (4.24)	0.058*** (3.88)
Ideological strength	0.039** (2.38)		0.038** (2.15)	
Information x Ideology	-0.006 (1.47)		-0.005 (1.18)	
Party attachment		0.115*** (4.85)		0.109*** (4.40)
Information x Party		-0.012** (2.13)		-0.011* (1.92)
Hours worked (weekly)	-0.001** (2.20)	-0.001** (1.98)	-0.002*** (2.75)	-0.002*** (2.62)
News supply	-0.002 (0.79)	-0.001 (0.36)	-0.003 (0.87)	-0.001 (0.17)
age	-0.000 (0.04)	-0.002 (0.70)	0.002 (0.49)	-0.002 (0.53)
age squared	-0.001 (0.28)	0.001 (0.37)	-0.002 (0.63)	0.001 (0.39)
education (foreign or other)	0.107 (1.54)	0.140** (2.41)	0.075 (0.85)	0.122* (1.65)
education (CSE or equiv.)	0.022 (0.84)	0.030 (1.17)	0.032 (1.13)	0.038 (1.37)
education (O level or eq.)	0.031 (1.28)	0.041* (1.75)	0.027 (1.02)	0.035 (1.36)
education (A level or eq.)	0.013 (0.44)	0.025 (0.88)	0.009 (0.27)	0.015 (0.49)
higher educ. below degree	0.029 (1.03)	0.031 (1.14)	0.034 (1.17)	0.033 (1.13)
education (degree)	-0.000 (0.01)	0.009 (0.26)	0.007 (0.17)	0.013 (0.34)
Income	no	no	yes	yes
Pseudo-Rsquared				
Observations	2769	3196	2459	2798

All regressions include a constant and the following control variables: married, sex, church attendance (categorical variable), income(categorical variable), farmer, asian, black, length of residence in the constituency, houseowner, contacted by a canvasser during the electoral campaign, contacted by phone, voted in the previous election, regular reader of a quality newspaper, type of economic activity (categorical variable), union member, UK standard region (categorical variable), marginality, district unemployment rate, district population percentage with a university degree.

Robust t statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Voter Information in Conservative-Labour races (OLS Coefficients)

Dep. Variable	(1) Information	(2) Information	(3) Information	(4) Information
Ideological strenght 2	0.448*** (3.57)		0.372*** (2.87)	
Ideological strenght 3	0.563*** (4.86)		0.484*** (3.89)	
Ideological strenght 4	0.363** (2.45)		0.322** (2.08)	
Ideological strenght 5	0.365 (1.39)		0.387 (1.50)	
Ideological strenght 6	0.054 (0.27)		0.077 (0.37)	
Party attachment 2		0.269* (1.69)		0.303* (1.71)
Party attachment 3		0.569*** (3.50)		0.475*** (2.60)
Party attachment 4		0.764*** (3.73)		0.744*** (3.33)
Party attachment 5		0.684*** (2.87)		0.652** (2.48)
Hours worked (weekly)	-0.004 (1.16)	-0.002 (0.78)	-0.005 (1.28)	-0.004 (1.22)
News supply	0.047*** (2.97)	0.019 (0.96)	0.037** (2.22)	0.014 (0.72)
age	0.090*** (4.78)	0.110*** (6.59)	0.094*** (4.78)	0.119*** (6.63)
age squared	-0.068*** (3.60)	-0.091*** (5.44)	-0.072*** (3.69)	-0.099*** (5.52)
education (foreign or other)	0.640 (0.98)	0.646 (1.62)	0.898 (1.20)	0.876* (1.70)
education (CSE or equiv.)	0.105 (0.69)	0.180 (1.30)	0.014 (0.09)	0.097 (0.68)
education (O level or eq.)	0.459*** (3.61)	0.529*** (4.42)	0.448*** (3.26)	0.506*** (3.88)
education (A level or eq.)	0.935*** (5.40)	0.966*** (6.19)	0.853*** (4.62)	0.904*** (5.36)
higher educ. below degree	0.838*** (5.69)	0.862*** (5.86)	0.783*** (4.95)	0.806*** (5.02)
education (degree)	1.375*** (8.60)	1.480*** (9.86)	1.273*** (7.16)	1.447*** (8.52)
Income	no	no	yes	yes
Observations	1506	1754	1345	1546
R-squared	0.32	0.33	0.34	0.36

All regressions include a constant and the following control variables: married, sex, church attendance (categorical variable), income(categorical variable), farmer, asian, black, lenght of residence in the constituency, houseowner, contacted by a canvasser during the electoral campaign, contacted by phone, voted in the previous election, regular reader of a quality newspaper, type of economic activity (categorical variable), union member, UK standard region (categorical variable), marginality, district unemployment rate, district population percentage with a university degree.

Robust t statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Voter Turnout in Conservative-Labour races (Probit Marginal Effects)

Dep. Variable	(1) Turnout	(2) Turnout	(3) Turnout	(4) Turnout
Information	0.053*** (4.10)	0.077*** (3.81)	0.052*** (3.85)	0.066*** (3.19)
Ideological strength	0.041* (1.92)		0.044* (1.92)	
Information x Ideology	-0.007 (1.35)		-0.007 (1.29)	
Party attachment		0.136*** (4.22)		0.128*** (3.83)
Information x Party		-0.016** (2.16)		-0.014* (1.78)
Hours worked (weekly)	-0.002** (2.27)	-0.002** (2.28)	-0.002*** (2.79)	-0.002*** (2.84)
News supply	-0.005 (1.10)	-0.004 (0.76)	-0.005 (1.07)	-0.001 (0.25)
age	0.002 (0.40)	-0.001 (0.18)	0.006 (1.40)	0.001 (0.22)
age squared	-0.003 (0.80)	0.000 (0.01)	-0.007 (1.62)	-0.001 (0.34)
education (foreign or other)	0.121* (1.65)	0.155** (2.57)	0.093 (0.96)	0.137* (1.79)
education (CSE or equiv.)	0.062* (1.90)	0.063* (1.94)	0.067* (1.91)	0.074** (2.19)
education (O level or eq.)	0.047 (1.46)	0.062** (1.97)	0.029 (0.83)	0.037 (1.13)
education (A level or eq.)	0.044 (1.10)	0.061 (1.63)	0.047 (1.09)	0.053 (1.34)
higher educ. below degree	0.025 (0.67)	0.045 (1.21)	0.032 (0.82)	0.047 (1.21)
education (degree)	0.057 (1.28)	0.074* (1.75)	0.060 (1.18)	0.070 (1.47)
Income	no	no	yes	yes
Pseudo-Rsquared				
Observations	1506	1754	1336	1546

All regressions include a constant and the following control variables: married, sex, church attendance (categorical variable), income(categorical variable), farmer, asian, black, length of residence in the constituency, houseowner, contacted by a canvasser during the electoral campaign, contacted by phone, voted in the previous election, regular reader of a quality newspaper, type of economic activity (categorical variable), union member, UK standard region (categorical variable), marginality, district unemployment rate, district population percentage with a university degree.

Robust t statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%