Journal of Theoretical Politics 21(2): 237–276
DOI: 10.1177/0951629808100765
http://jtp.sagepub.com


# 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 partisanship. Moreover, the impact of increased political knowledge on turnout is asymmetric: new information increases the probability of voting of indifferent voters but decreases 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 (Heath et al., 1999). Our empirical findings are compatible with all the results of the theoretical exercise.

KEY WORDS • elections • ideology • information • mass media • partisanship • political knowledge • political participation • turnout

## 1. Introduction

Individual predispositions like party identification and ideology are pervasive predictors of voting behaviour. In their celebrated book *The American Voter*, Campbell et al. (1960: 121) claim that 'few facts are of greater importance for our national elections than the lasting attachment of tens of millions of

I wish to thank Oriana Bandiera, Tim Besley, Richard Blundell, Harold Clarke, John Ferejohn, Morris Fiorina, Guillaume Frechette, Cesar Martinelli, Maria Pia Monteduro, Ian Preston, Imran Rasul, David Strömberg, Leo Rizzo and Donald Wittman as well as participants in a number of meetings and seminars for their useful comments and suggestions. The usual caveat applies. Financial support from the European Commission under the TMR Scheme (Marie Curie Fellowship) and from ESRC is gratefully acknowledged.

Americans to one of the parties'. This basic finding has been more recently reiterated by Miller and Shanks (1996). Erikson et al. (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 resurgent 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, 2003). 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]

Another growing body of theoretical and empirical research has recently stressed the positive role of voter information on the quality of public decisions (Besley and Burgess, 2002; Besley and Prat, 2006). 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 characteristics (Delli Carpini and Keeter, 1996).[2] Recent evidence also shows that the correlation between voter political knowledge and turnout contains a strong causality component (Larcinese, 2007; 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.[3] Calvert (1985) presents a model with imperfect advice and shows that a rational decision-maker should often engage in selective exposure, in the sense that the value of information is not monotonic in the bias of the source. A recent paper by Feddersen and Sandroni (2006) considers ethical voters, i.e. agents that are motivated to vote and acquire costly information out of a sense of civic duty. Focusing on the issue of information

1. Heath et al. (1985: 107).

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

3. Gerber and Green (1998), however, show that stable party identification is not necessarily the consequence of rational learning when party platforms are not stable over time.

aggregation, they show that even ethical voters will not necessarily acquire costly information and that a certain level of political ignorance is socially desirable.

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 also their vote is more predictable, in the sense that they exhibit less randomness when voting behaviour is predicted using political preferences.[4]

In this article I study the link between political predispositions and incentives to acquire information and reconsider the relationship between prior beliefs, information and turnout under this new light.[5] I will generally refer to political predispositions by using the word ideology. This is admittedly a minimalist interpretation of this term, that is often used to indicate broad theoretical constructions and general values that can sometimes 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 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 beliefs.[6]

It is important to stress that this article does not attempt to provide a solution to the voting or rational ignorance 'paradoxes'. According to Downs, 'since the odds are that no election will be close enough to render decisive the vote of any one person, or the votes of all those he can persuade to agree with him, the rational course of action for most citizens is to remain politically uninformed'.[7] Our focus, however, is not the intrinsic motivations that may induce people to vote or to be informed but rather the behavioural changes corresponding to

4. Preferences 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 defence spending, inflation or government aid to minority groups.

5. On purely empirical grounds, 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 often been found to reinforce people's beliefs rather than persuade them (Lazarsfeld et al., 1944; Berelson et al., 1954).

6. Using the term 'ideology' also makes it clearer that, when I refer to partisanship, I am using only 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 often has 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 article.

7. Downs (1957).

exercises of comparative statics. In other words, we are interested in variations in behaviour induced by differing external constraints or a differentiated capability to absorb, process and retain information. This methodology is at the core of standard economic approaches to the study of society, whereby the focus is not on preferences (which are taken as given) but on the consequences of changes in observable variables. Although this approach ignores some fundamental issues on people's motivations, it can nevertheless provide answers to some important questions concerning political behaviour and participation.

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 modelling of individual production functions. Approaching voting behaviour by using the methodology of rational choice theory, as I do in this article, means that an attempt should be made to also explain political information acquisition using the same tools.[8] Therefore, I present 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 modelled as an individual production process, where inputs are mass media and time devoted to their 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 therefore represent 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 in 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 beyond 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

8. Alternative motivations for the rational acquisition of political information are provided by Larcinese (2005), who argues that information has a private decision-making value, and Aldashev (2006), who highlights its value for social interactions. Matsusaka (1995) considers instead the link between information and turnout when information acquisition is endogenous. 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.

beliefs about parties and/or candidates and it will be shown to be, other things equal, non-monotonic in ideological strength.[9] 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. This theoretical prediction is then found to be compatible with the analysis of data from the British Election Study (BES), especially when party identification 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-partisan voters but a negative effect on that of the partisans. 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 predictions of the theoretical exercise.

A possible criticism of the model is that I do not consider strategic behaviour. In this sense, this model can be regarded as 'behavioural': there is no reason to expect the behaviour described by decision-theoretical models to be part of a Nash equilibrium.[10] 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 jury)[11] this particular type 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 vast literature, started with the works of Tversky and Kahneman (1974, 1981) constantly finds large differences between objective and perceived probabilities. The subjective probability of casting a decisive vote makes no exception and is usually different from the objective probabilities that calculus would deliver (Uhlaner and Grofman, 1986). In this context, a simpler behavioural decision-

9. Issues related to the potential bias of information senders are left aside in this work. For a model with biased advisors, see Calvert (1985). Interestingly, Calvert also finds a non-monotonic pattern in the value of information, in his case with respect to the bias of the information source.

10. Austen-Smith and Banks (1996) make the point that sincere voting does not constitute a Nash equilibrium with majority voting.

11. Before 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 the context in which the Condorcet-jury theorem can be proved.

theoretic approach can be appropriate since it limits the rationality of voters in a well-defined way. The alternative offered by models with bounded rationality often incurs in the problem of determining where rationality should end and how it should be replaced. Hence, it seems fair to argue that non-strategic decision-theory represents a powerful behavioural theory which can still deliver many insights into real world phenomena.

The article 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 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 $\Omega$ of citizens who vote to elect a public decision-maker. The incumbent politician decides the value of a public policy parameter $a \in [0, \overline{a}]$. 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 modelling voting, virtually any policy issue can be represented as a valence issue with heterogeneous beliefs; the most appropriate modelling 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 indeed are 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 increases 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 few new insights.

I assume, then, that citizens have different prior beliefs about the distribution $F_o(a)$. The set of admitted prior distribution functions is indicated with $\mathcal{F}$. During the electoral campaign, citizens can gather information on the opponent candidate.[12] 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 source.[13] The opportunity cost of time $t$ is represented 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. On the other hand, $M$ 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 assumption:

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

There are standard assumptions to be made on the production function to ensure the maximization process is well behaved. The first two state that the probability of being informed (that can also be interpreted as the amount of information) is increasing in, respectively, the time devoted to information acquisition and the quality of the source. The positive cross-derivatives mean that the return (in terms of information) generated by an increased time or quality is increasing in the level of education or information supply. These

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

13. Note that $k$ is just a quality index and does not represent in itself specific sources. We only assume that each specific newspaper, magazine, television channel or radio station can be mapped into the space $\mathcal{K}$.


0a = Incumbent implements $a_I$ and reveals her type
0b = Opponent selection from distribution $F$(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

**Figure 1.** Time Line

assumptions ensure diminishing marginal rates of substitution between inputs. Finally the last two assumptions are sufficient to ensure that $q(.)$ is a quasi-concave function (since the corresponding Hessian matrix is negative semi-definite) and, therefore, that our optimization process will have a unique maximum.

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 use only 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.[14]

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 $C$ and that 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 $F_O(a)$.

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

## 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 to the case of a non-polarized polity by introducing restrictions on prior beliefs and cost of voting.

14. The fact that civic duty can be treated as a constant for each individual in isolation does not mean that it is constant across the population. This can have important implications for our empirical predictions, especially if the sense of civic duty is, for any reason, correlated with ideology. I thank an anonymous referee for this important observation.

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

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

where $P$ is the (exogenous) probability of being a decisive voter.

For a citizen who knows the type of the incumbent the problem is instead

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

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

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

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

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

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

*Proof.* See the Mathematical Appendix.

Citizens decide whether to acquire information without knowing which piece of information they will get. In fact, information can turn out to be useless, in the sense of not changing the optimal decision of the voter. Lemma 1 states that the expected value of gathering information is positive and, therefore, that information acquisition may occur. 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 of knowing 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.* $P|\int[V(a) - V_I]dF(a)| \leq C,\ \forall F \in \mathcal{F},\ \forall C \in \mathcal{C}$.

It is now possible to link the probability of being 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 $P[V(\overline{a}) - V_I] > C$ 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 of knowing 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 candidate.[15]

15. It 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.

DEFINITION 1 (IDEOLOGY AND STRONG IDEOLOGY). *An I-leaning ideology (O-leaning ideology), or I-ideology (O-ideology), consists of prior beliefs F(a) s.t.* $\int[V(a)-V_I]dF(a)<0(\geq 0)$. *A strong I-ideology (O-ideology) consists, for given P and C, of prior beliefs F(a) s.t.* $P\int[V_I-V(a)]dF(a)\geq C$ ($P\int[V(a)-V_I]dF(a)\geq C$).

A citizen's ideology is defined in relation to her beliefs. This, however, does not guarantee that an ideological citizen votes if uninformed: our more stringent definition of strong ideology requires prior beliefs to be such that, ex ante, the distance between candidates is sufficient to overcome the cost of voting.

To compare different ideologies we introduce the following definition:

DEFINITION 2. *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*

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

It should be noted that Definitions 1 and 2 consider a generic utility function $V(a)$, imposing on it no restriction other than being monotonic non-decreasing. 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 non-decreasing utility function $V(a)$. Now notice that

$$\int[V(a)-V_I]dF(a)=\int V(a)dF(a)-V_I. \tag{5}$$

By requiring Definition 2 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 we can introduce an indicator of ideology that will be useful in the rest of this section.[16]

DEFINITION 3. *Define* $\pi$ *as an indicator of ideology s.t. an increase in* $\pi$ *indicates an increase of O-ideology.*

16. Defining ideological beliefs using first order stochastic dominance makes clearer the distinction between private interest and ideology. In a sense, an ideological belief must be independent of preferences (as long as we all agree on some basic premise, such as 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 non-decreasing 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 a person believes $F(a)$ to be better for everyone.

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 $\pi$ increases, agents become more *O*-ideological or, alternatively, less *I*-ideological. So, an increase in $|\pi|$ indicates a generic increase in ideology. It is then possible to divide the citizens' population $\Omega$ into three groups $\Omega_I, \Omega_O, \Omega_A$, depending on the decision they would take according to their priors. If uninformed about the true opponent's type, citizens in the set $\Omega_I$ vote for the incumbent, citizens in $\Omega_O$ vote for the opponent and those in $\Omega_A$ abstain. Analogously we can define the boundaries between these groups as those quantities $\pi_i$, $i \in \{-1,0,1\}$ such that $P\int[V_I - V(a)]dF_{\pi_i}(a)$ is equal to, respectively, $C$, 0, and $-C$. Citizens can then be defined as strongly *I*-ideological when $\pi < \pi_{-1}$, 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 $\pi > \pi_{+1}$. It is also useful to partition the set of possible realizations of the opponent's type depending on whether, with perfect information, they would induce a vote for I, a vote for O, or abstention. Let us call these sets respectively $\mathcal{A}_I, \mathcal{A}_\Theta, \mathcal{A}_O$.[17] 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 $\pi$ increases, the probability of realizations in $\mathcal{A}_I$ or $\mathcal{A}_\Theta$ decreases, thus rendering the possibility of uninformed mistakes less likely. Therefore the value of information should decrease as $\pi$ increases.

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

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

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 $\pi$ 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.

17. Formally these sets are defined as

$$\mathcal{A}_I = \{a: P[V(a) - V_I] < -C\}$$
$$\mathcal{A}_\Theta = \{a: -C \leq P[V(a) - V_I] \leq C\}$$
$$\mathcal{A}_O = \{a: P[V(a) - V_I] > C\}.$$

Being referred to realizations, and therefore to the case when the type of the opponent is observed, these sets do not depend on prior beliefs.

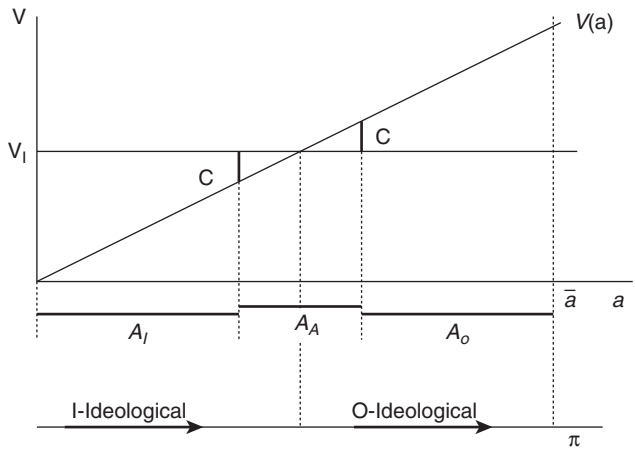


**Figure 2.** Partitioning the $\mathcal{A}$-space

Assumption 4 says that when an agent is $O$-ideological, as $\pi$ 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 $\Delta_F$ and $\Delta_G$ the value of information corresponding respectively to $\pi_F$ and $\pi_G$. 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.

The intuition for this result has a simple representation in Fig. 3. Citizens who believe there is little difference between the candidates (compared to the cost of voting) have also little benefit from acquiring information: the expected utility from an informed versus an uninformed choice is very limited since not much difference is expected. Citizens who are extremely *independent* in their evaluation of candidates

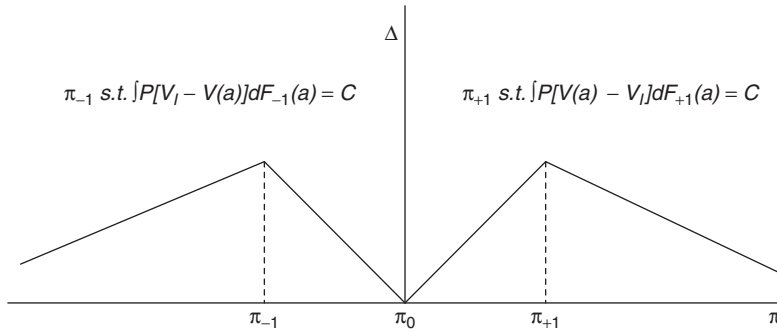


**Figure 3.** The Value of Information

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 who 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 extremely valuable. Citizens in the 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 they believe that it is not worth acquiring 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 who, 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 of voting 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 increase the probability

of voting only for citizens who 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 voters.[18]

At this point we could ask 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 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 according to our theory? 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, can we say anything about the impact of information on the quality of the elected candidate? Since information increases the likelihood of voting of weakly ideological citizens while it decreases that of the strongly ideological, it is obvious that more information increases the chances of winning of the better politician. This implication, 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, it can induce abstention of otherwise uninformed extremists: this increases the possibility of information aggregation occurring. At the same time, the possibility of reaching desirable outcomes depends on some (often observable) individual characteristics as well as on specific characteristics of the environment, mainly related to information supply by the mass media.

18. This 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 guidance for further empirical investigation. Attention will therefore be devoted to data analysis rather than to refining the model under different hypotheses.

## 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. This section there fore investigates the compatibility of the theoretical propositions with the data. For this purpose I use data from the British Election Study (BES).[19] The British system is parliamentarian 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 Party and the Conservative Party. 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.

### *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 on that occasion two sets of questions that can be used to establish how much they know about politics. In the first set of questions they were asked to write down as many names as they could remember of candidates in their constituency (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 sets of questions have been used to construct a variable (*INFO*) that is then adopted as a measure of political knowledge.[20] Details on this variable (and on the others) can be found in the Data Appendix (and see Table 1).

The other crucial variable is ideology. Two 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

19. I 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.

20. Delli Carpini and Keeter (1996: 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 relies 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).

**Table 1.** Summary Statistics

| *Variable* | N | *Mean* | *Std. Dev.* | *Min* | *Max* |
|---|---|---|---|---|---|
| Turnout | 3199 | 0.798 | 0.401 | 0 | 1 |
| Information | 3199 | 4.267 | 1.832 | 0 | 10.62 |
| Ideology | 2770 | 2.367 | 1.555 | 1 | 6 |
| Partisanship | 3199 | 2.752 | 0.951 | 1 | 5 |
| Hours worked | 3199 | 37.801 | 15.764 | 0 | 95 |
| News supply | 3196 | 0.984 | 2.633 | 0 | 24.288 |
| Age | 3199 | 49.266 | 17.855 | 18 | 95 |
| Education | 3199 | 3.515 | 2.162 | 1 | 7 |
| Married | 3199 | 0.589 | 0.492 | 0 | 1 |
| Sex | 3199 | 0.457 | 0.498 | 0 | 1 |
| Income | 2902 | 7.003 | 4.59 | 1 | 16 |
| Asian | 3199 | 0.021 | 0.142 | 0 | 1 |
| Black | 3199 | 0.008 | 0.088 | 0 | 1 |
| Church attendance | 3199 | 2.046 | 2.632 | 0 | 7 |
| Union member | 3199 | 0.58 | 0.494 | 0 | 1 |
| Length of residence | 3199 | 20.384 | 18.299 | 0 | 94 |
| Farmer | 3199 | 0.008 | 0.091 | 0 | 1 |
| House owner | 3199 | 0.684 | 0.465 | 0 | 1 |
| Canvasser | 3199 | 0.239 | 0.427 | 0 | 1 |
| Phone canvasser | 3199 | 0.075 | 0.263 | 0 | 1 |
| Voted in 1992 | 3199 | 0.806 | 0.396 | 0 | 1 |
| Quality paper reader | 3199 | 0.114 | 0.318 | 0 | 1 |
| Marginality | 3196 | 0.302 | 0.194 | 0.005 | 0.814 |
| % Degree in district | 3198 | 6.012 | 2.679 | 1.494 | 17.976 |
| % Unempl. in district | 3198 | 9.286 | 3.95 | 2.868 | 22.49 |

Summary statistics for economic activity and standard region of the respondents are not reported.

ideological strength (*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, etc.[21] The second indicator (*Partisanship*) 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 *Partisanship* can be found in the Data Appendix.

Fig. 4 plots average information score by left–right self-placement. It mirrors with surprising similarity the two peaks we described theoretically in Fig. 3. In Fig. 5 I use the partisanship 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 partisanship mimics very well our theoretical findings.

21. '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 author on request.

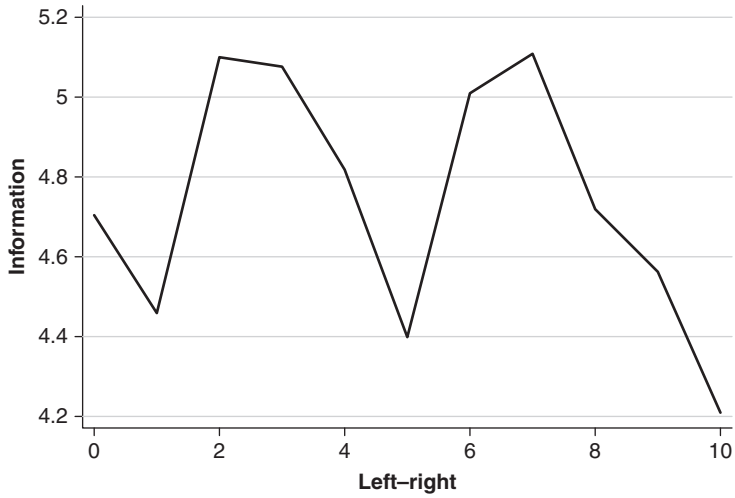


**Figure 4.** Information Score by Left–Right Self-Placement

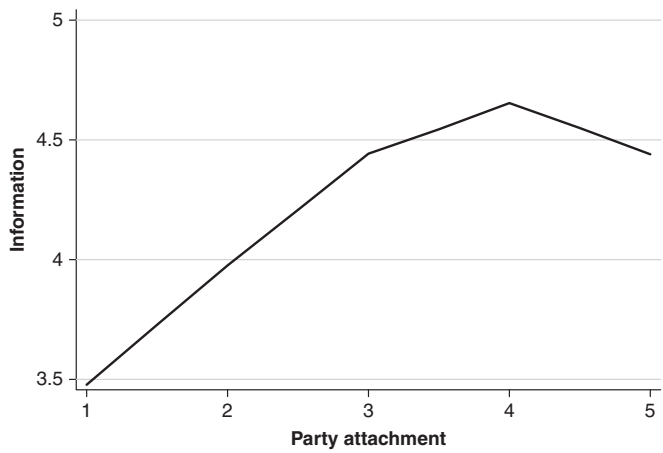


**Figure 5.** Information Score by Party Attachment

These plots seem to show that the distribution of information does interact with ideology and partisanship. Before jumping to conclusions, however, it is opportune 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

$$INFO_i = \alpha_1^{'}\mathbf{X}_i + \alpha_2 ID_i + u_i \tag{6}$$

where *ID* represents ideology or party identification. Suppose there are $K$ types of citizens ranked according to the strength 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 income.[22] The BES data have been matched with Census data to also control for characteristics of the electoral constituency such as socioeconomic conditions and electoral closeness.[23] $\mathbf{X}$ also includes proxies for information supply and the opportunity cost of time. This allows us to test the predictions of Proposition 1. Estimation is by OLS.

To test the predictions of our model for what concerns voter turnout, the following equation is estimated by probit:

$$T_i = \beta_1 INFO_i + \beta_2^{'}\mathbf{X}_i + \beta_3 ID_i + \beta_4 ID_i \times INFO_i + \varepsilon_i. \tag{7}$$

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 $\beta_2'$. For what concerns the interaction between ideology and information, indicating with $\overline{INFO}$ the average of *INFO*, we expect $\beta_3 + \beta_4 \times \overline{INFO} \geq 0$ (from Proposition 6), and $\beta_4 \leq 0$ (from Proposition 5). Legitimate concerns about the endogeneity of information in the turnout equation have been addressed by using instrumental variables. These are the same IVs that have been used in Larcinese (2007), which also uses the 1997 BES data. We will discuss this issue in the next section.

One important question 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 choosing the Prime Minister directly. The second is the fact that, although there

22. A 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.

23. In 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 main risk is instead that of underestimating the parameters of interest.

are only two contenders for the post 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 certainly have 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 the 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 Tables 2 to 6 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 (6). 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 the expected pattern in both columns: political knowledge increases with ideology, reaches its peak in correspondence with 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 again display a single-peaked shape, with the maximum reached at the fourth category in both columns. Using party attachment delivers stronger results than using ideology: in both column 2 and column 4 the coefficients of partisanship are statistically different from each other. In the case of left–right self-placement, this is the case only for column 1: when income is included as a control variable, an F-test cannot reject the hypothesis that the coefficients of *Ideology* are statistically indistinguishable. More detailed tests reveal that only the coefficient of *Ideology* 6 is statistically different from the rest and indistinguishable from *Ideology* 1. This gives a pattern which is still consistent with our theory but in a rather coarse way.

**Table 2.** Voter Information (OLS Coefficients)

| Dep. Variable | (1) Information | (2) Information | (3) Information | (4) Information |
|---|---|---|---|---|
| Ideology 2 | 0.467*** | | 0.434*** | |
| | (5.00) | | (4.48) | |
| Ideology 3 | 0.555*** | | 0.520*** | |
| | (6.05) | | (5.34) | |
| Ideology 4 | 0.434*** | | 0.407*** | |
| | (3.97) | | (3.56) | |
| Ideology 5 | 0.281 | | 0.288 | |
| | (1.44) | | (1.48) | |
| Ideology 6 | 0.092 | | 0.171 | |
| | (0.64) | | (1.12) | |
| Partisanship 2 | | 0.090 | | 0.077 |
| | | (0.67) | | (0.53) |
| Partisanship 3 | | 0.367*** | | 0.245* |
| | | (2.70) | | (1.65) |
| Partisanship 4 | | 0.567*** | | 0.491*** |
| | | (3.42) | | (2.77) |
| Partisanship 5 | | 0.402** | | 0.360* |
| | | (2.14) | | (1.77) |
| Hours worked (weekly) | − 0.003 | − 0.002 | − 0.005* | − 0.006** |
| | (1.08) | (0.95) | (1.76) | (2.09) |
| News supply | 0.031*** | 0.022* | 0.031*** | 0.022 |
| | (2.66) | (1.71) | (2.59) | (1.64) |
| Age | 0.084*** | 0.105*** | 0.090*** | 0.116*** |
| | (5.98) | (8.22) | (6.11) | (8.52) |
| Age squared | − 0.065*** | − 0.087*** | − 0.070*** | − 0.096*** |
| | (4.51) | (6.75) | (4.67) | (7.05) |
| Education (foreign or other) | 1.310* | 1.194** | 1.615** | 1.507** |
| | (1.77) | (2.23) | (2.08) | (2.37) |
| Education (CSE or equiv.) | 0.221* | 0.325*** | 0.159 | 0.263** |
| | (1.92) | (3.10) | (1.32) | (2.37) |
| Education (O level or equiv.) | 0.462*** | 0.556*** | 0.469*** | 0.557*** |
| | (4.70) | (5.94) | (4.39) | (5.48) |
| Education (A level or equiv.) | 0.820*** | 0.906*** | 0.738*** | 0.858*** |
| | (6.38) | (7.77) | (5.36) | (6.74) |
| Higher educ. below degree | 0.836*** | 0.920*** | 0.764*** | 0.858*** |
| | (7.69) | (8.53) | (6.52) | (7.33) |
| Education (degree) | 1.291*** | 1.431*** | 1.186*** | 1.407*** |
| | (10.32) | (11.98) | (8.69) | (10.63) |
| Income | no | no | yes | yes |
| F-test for $ID_i = ID_j \; \forall \; i_j$ | 2.52 | 8.16 | 1.29 | 4.64 |
| ($p$-value) | (0.0397) | (0.0000) | (0.2725) | (0.0031) |
| R2 | 0.31 | 0.31 | 0.32 | 0.33 |
| 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 3.** Voter Turnout (Probit Marginal Effects)

| Dep. Variable | (1) Turnout | (2) Turnout | (3) Turnout | (4) Turnout |
|---|---|---|---|---|
| Information | 0.045*** | 0.064*** | 0.042*** | 0.058*** |
| | (4.77) | (4.34) | (4.24) | (3.88) |
| Ideology | 0.039** | | 0.038** | |
| | (2.38) | | (2.15) | |
| Information × Ideology | − 0.006 | | − 0.005 | |
| | (1.47) | | (1.18) | |
| Partisanship | | 0.115*** | | 0.109*** |
| | | (4.85) | | (4.40) |
| Information × Partisanship | | − 0.012** | | − 0.011* |
| | | (2.13) | | (1.92) |
| Hours worked (weekly) | − 0.001** | − 0.001** | − 0.002*** | − 0.002*** |
| | (2.20) | (1.98) | (2.75) | (2.62) |
| News supply | − 0.002 | − 0.001 | − 0.003 | − 0.001 |
| | (0.79) | (0.36) | (0.87) | (0.17) |
| Age | − 0.000 | − 0.002 | 0.002 | − 0.002 |
| | (0.04) | (0.70) | (0.49) | (0.53) |
| Age squared | − 0.001 | 0.001 | − 0.002 | 0.001 |
| | (0.28) | (0.37) | (0.63) | (0.39) |
| Education (foreign or other) | 0.107 | 0.140** | 0.075 | 0.122* |
| | (1.54) | (2.41) | (0.85) | (1.65) |
| Education (CSE or equiv.) | 0.022 | 0.030 | 0.032 | 0.038 |
| | (0.84) | (1.17) | (1.13) | (1.37) |
| Education (O level or equiv.) | 0.031 | 0.041* | 0.027 | 0.035 |
| | (1.28) | (1.75) | (1.02) | (1.36) |
| Education (A level or equiv.) | 0.013 | 0.025 | 0.009 | 0.015 |
| | (0.44) | (0.88) | (0.27) | (0.49) |
| Higher educ. below degree | 0.029 | 0.031 | 0.034 | 0.033 |
| | (1.03) | (1.14) | (1.17) | (1.13) |
| Education (degree) | − 0.000 | 0.009 | 0.007 | 0.013 |
| | (0.01) | (0.26) | (0.17) | (0.34) |
| Income | no | no | yes | yes |
| Pseudo − R2 | 0.15 | 0.17 | 0.17 | 0.19 |
| 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%.

The coefficients 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

**Table 4.** Voter Information in Conservative–Labour races (OLS Coefficients)

| Dep. Variable | (1) Information | (2) Information | (3) Information | (4) Information |
|---|---|---|---|---|
| Ideology 2 | 0.448*** | | 0.372*** | |
| | (3.57) | | (2.87) | |
| Ideology 3 | 0.563*** | | 0.484*** | |
| | (4.86) | | (3.89) | |
| Ideology 4 | 0.363** | | 0.322** | |
| | (2.45) | | (2.08) | |
| Ideology 5 | 0.365 | | 0.387 | |
| | (1.39) | | (1.50) | |
| Ideology 6 | 0.054 | | 0.077 | |
| | (0.27) | | (0.37) | |
| Partisanship 2 | | 0.269* | | 0.303* |
| | | (1.69) | | (1.71) |
| Partisanship 3 | | 0.569*** | | 0.475*** |
| | | (3.50) | | (2.60) |
| Partisanship 4 | | 0.764*** | | 0.744*** |
| | | (3.73) | | (3.33) |
| Partisanship 5 | | 0.684*** | | 0.652** |
| | | (2.87) | | (2.48) |
| Hours worked (weekly) | − 0.004 | − 0.002 | − 0.005 | − 0.004 |
| | (1.16) | (0.78) | (1.28) | (1.22) |
| News supply | 0.047*** | 0.019 | 0.037** | 0.014 |
| | (2.97) | (0.96) | (2.22) | (0.72) |
| Age | 0.090*** | 0.110*** | 0.094*** | 0.119*** |
| | (4.78) | (6.59) | (4.78) | (6.63) |
| Age squared | − 0.068*** | − 0.091*** | − 0.072*** | − 0.099*** |
| | (3.60) | (5.44) | (3.69) | (5.52) |
| Education (foreign or other) | 0.640 | 0.646 | 0.898 | 0.876* |
| | (0.98) | (1.62) | (1.20) | (1.70) |
| Education (CSE or equiv.) | 0.105 | 0.180 | 0.014 | 0.097 |
| | (0.69) | (1.30) | (0.09) | (0.68) |
| Education (O level or equiv.) | 0.459*** | 0.529*** | 0.448*** | 0.506*** |
| | (3.61) | (4.42) | (3.26) | (3.88) |
| Education (A level or equiv.) | 0.935*** | 0.966*** | 0.853*** | 0.904*** |
| | (5.40) | (6.19) | (4.62) | (5.36) |
| Higher educ. below degree | 0.838*** | 0.862*** | 0.783*** | 0.806*** |
| | (5.69) | (5.86) | (4.95) | (5.02) |
| Education (degree) | 1.375*** | 1.480*** | 1.273*** | 1.447*** |
| | (8.60) | (9.86) | (7.16) | (8.52) |
| Income | no | no | yes | yes |
| F-test for $ID_i = ID_j \; \forall \; i_j$ | 1.60 | 5.38 | 0.87 | 3.18 |
| ($p$-value) | (0.1722) | (0.0011) | (0.4813) | (0.0231) |
| R2 | 0.32 | 0.33 | 0.34 | 0.36 |
| Observations | 1506 | 1754 | 1345 | 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%.

**Table 5.** Voter Turnout in Conservative–Labour races (Probit Marginal Effects)

| Dep. Variable | (1) Turnout | (2) Turnout | (3) Turnout | (4) Turnout |
|---|---|---|---|---|
| Information | 0.053*** | 0.077*** | 0.052*** | 0.066*** |
| | (4.10) | (3.81) | (3.85) | (3.19) |
| Ideology | 0.041* | | 0.044* | |
| | (1.92) | | (1.92) | |
| Information × Ideology | − 0.007 | | − 0.007 | |
| | (1.35) | | (1.29) | |
| Partisanship | | 0.136*** | | 0.128*** |
| | | (4.22) | | (3.83) |
| Information × Partisanship | | − 0.016** | | − 0.014* |
| | | (2.16) | | (1.78) |
| Hours worked (weekly) | − 0.002** | − 0.002** | − 0.002*** | − 0.002*** |
| | (2.27) | (2.28) | (2.79) | (2.84) |
| News supply | − 0.005 | − 0.004 | − 0.005 | − 0.001 |
| | (1.10) | (0.76) | (1.07) | (0.25) |
| Age | 0.002 | − 0.001 | 0.006 | 0.001 |
| | (0.40) | (0.18) | (1.40) | (0.22) |
| Age squared | − 0.003 | 0.000 | − 0.007 | − 0.001 |
| | (0.80) | (0.01) | (1.62) | (0.34) |
| Education (foreign or other) | 0.121* | 0.155** | 0.093 | 0.137* |
| | (1.65) | (2.57) | (0.96) | (1.79) |
| Education (CSE or equiv.) | 0.062* | 0.063* | 0.067* | 0.074** |
| | (1.90) | (1.94) | (1.91) | (2.19) |
| Education (O level or equiv.) | 0.047 | 0.062** | 0.029 | 0.037 |
| | (1.46) | (1.97) | (0.83) | (1.13) |
| Education (A level or equiv.) | 0.044 | 0.061 | 0.047 | 0.053 |
| | (1.10) | (1.63) | (1.09) | (1.34) |
| Higher educ. below degree | 0.025 | 0.045 | 0.032 | 0.047 |
| | (0.67) | (1.21) | (0.82) | (1.21) |
| Education (degree) | 0.057 | 0.074* | 0.060 | 0.070 |
| | (1.28) | (1.75) | (1.18) | (1.47) |
| Income | no | no | yes | yes |
| Pseudo − R2 | 0.16 | 0.19 | 0.19 | 0.22 |
| 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%.

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

**Table 6.** Voter Turnout IV (Two-Step Probit Marginal Effects)

| Dep. Variable | (1) Turnout | (2) Turnout | (3) Turnout | (4) Turnout | (5) Turnout | (6) Turnout | (7) Turnout | (8) Turnout |
|---|---|---|---|---|---|---|---|---|
| Information | 0.079 | 0.190*** | 0.039 | 0.181*** | 0.068 | 0.173*** | 0.028 | 0.168** |
| | (1.45) | (3.47) | (0.65) | (2.96) | (1.38) | (2.88) | (0.50) | (2.54) |
| Ideology | 0.085*** | | 0.077** | | 0.078** | | 0.076* | |
| | (2.91) | | (2.55) | | (2.07) | | (1.91) | |
| Ideology × information | − 0.015** | | − 0.013* | | − 0.015* | | − 0.013 | |
| | (2.44) | | (1.92) | | (1.73) | | (1.45) | |
| Partisanship | | 0.150*** | | 0.171*** | | 0.141*** | | 0.197*** |
| | | (3.62) | | (4.21) | | (2.74) | | (3.98) |
| Partisanship × information | | − 0.023** | | − 0.028*** | | − 0.021* | | − 0.033*** |
| | | (2.50) | | (3.07) | | (1.76) | | (2.91) |
| Income | no | no | yes | yes | no | no | yes | yes |
| Pseudo − R2 | 0.13 | 0.16 | 0.15 | 0.18 | 0.14 | 0.18 | 0.17 | 0.21 |
| Sample | all | all | all | all | Lab–Con Races | Lab–Con races | Lab–Con races | Lab–Con races |
| Observations | 2769 | 3196 | 2459 | 2798 | 1506 | 1754 | 1336 | 1546 |

The instrumental variables are news supply, bigshot candidate and bbc100. The validity of the instruments has been checked using the methods illustrated in Larcinese (2007). All regressions include a constant and the following control variables: age, education (categorical variable), hours worked per week, 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%. Robust z − statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

column 3 and at the 5% level in column 4) when controlling 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 left–right self-placement.

This result, together with those of Table 2, points to a clear difference between our measure of ideology and our measure of partisanship. Their correlation (the coefficient is equal to 0.28) is positive but probably lower than what one could have expected. Such discrepancy (or less-than-expected correlation) can be interpreted in many ways, including the possibility that the representation of ideologies by the British parties does not correspond to that of the electorate. For example, 49.5% of the 'centrist' respondents (i.e. in the categories 4, 5 and 6 in the left–right placement) claim to have either a very strong or a fairly strong attachment to one of the parties. This compares with a corresponding figure of 73% for the remaining respondents, but it is nevertheless a rather substantial figure, especially if we consider that more than half of the valid responses place themselves in those centrist locations (in left–right terms). It is also worth noting that the 1997 election has been portrayed as one of the least ideological in British history (Budge, 1999). In the first election that saw so-called New Labour engaged in a general election, it is not surprising to observe some re-shuffling in terms of party attachment that would not easily conform to traditional left–right identification. In a political context that was in the process of removing ideologies from the main stage, and in an electoral campaign centred on issues and personalities, left–right self-placement could ultimately represent a rather noisy signal, which would explain why party identification performs better in our test. Discussing this issue further goes beyond the purpose of this article, but the difference in the

results obtained with the two measures is certainly suggestive and deserves further investigation.

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 (Larcinese, 2007; Lassen, 2005). 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-partisan respondents, it becomes negligible or even negative when ideology or party identification reach their peak. This result is completely novel in the literature on information and turnout, where the research has been predominantly focused on mean effects. Among the few exceptions, Horiuchi, et al. (2007), in an internet-based field experiment held during the 2004 Japanese election, find that the positive impact of information on the probability of voting is higher for voters who were planning to vote but were undecided. This is consistent with our findings since ideological and partisan voters are less likely to be undecided at any given stage before an election.

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 partisanship 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 partisan types. Moreover, the decline associated with the most partisan group is now less pronounced. The coefficients are statistically different from each other only in the case of party attachment, while in both column 1 and column 3 they are not. As in Table 2, more detailed tests reveal that only the coefficient of *Ideology* 6 is statistically different from the rest and indistinguishable from *Ideology* 1, while *Ideology* 2−4 are statistically indistinguishable. Once again, party attachment appears to fit our model better than ideological self-placement.

The weekly number of working hours again displays a negative sign but this time it 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 show only minimal variations when compared with the results of Table 3, but once again the impact of party attachment on turnout appears stronger. Overall, party attachment assumes a larger relevance in Conservative–Labour constituencies while other factors become less important.

Finally, I address the endogeneity concern about information in the turnout equation. Table 6 reports the results of a two-step probit estimation that makes use of three instrumental variables. The first instrument is a dummy variable (*bigshot*) equal to 1 when a nationally famous politician is a candidate in the constituency. Big shots are the current and past members of cabinet, the members of the Labour 'shadow cabinet' and the leader of the third major party (Liberal Democratic). These politicians are obviously better known to the public than the other candidates and therefore voters from those electoral constituencies should be better informed on their candidates. The second instrument is a dummy variable (*bbc*100) equal to 1 for citizens living in constituencies that the BBC defined as 'the battleground' and on which it decided to focus its attention on the night of the election: they were the expected closest 100 Conservative-held constituencies (and therefore the decisive ones, because a swing against the Conservatives was expected in 1997). It is legitimate to expect these constituencies to get larger media coverage during the electoral campaign and, possibly, a more intense effort by parties in making candidates and platforms known to the public.[24] The third instrument is the news-supply variable already described. Similarly to Larcinese (2007), the use of IVs does not substantially alter the conclusions that have been reached with simple probit. It is therefore possible to reiterate that the inclusion of standard control variables commonly used in turnout equations should be enough to render minimal the risk of an omitted variables problem. However, it is worth noting some important differences. First of all, the magnitude of the IV estimates is substantially larger (between two and three times). Again, this conforms to the previous findings of Lassen (2005) and Larcinese (2007), and it is probably due to the attenuation bias introduced by possible errors in the measurement of information. Second, while the statistical significance of the interaction between information and partisanship is substantially confirmed, we now have that the interaction with ideology also becomes statistically significant in most cases, although only once (when all the sample is used and income is not included) at the 5% level. Hence, it is probably fair to conclude that correcting potential endogeneity problems does not change our main conclusions and, if anything, it reinforces the support that this section provides for the theory.

24. *Bigshot* and *bbc*100 have not been included in the estimates of the information equation reported in Tables 2 and 4. Their inclusion does not alter, even minimally, the pattern found in the relationship between information and ideology or information and partisanship. They are, however, correlated with *News supply*, that would then become statistically insignificant. The specification reported has been preferred only to emphasize the impact of the supply of news on the information held by voters. If, however, one included also *bigshot* and *bbc*100 (which are also indicators of news supply), then a log-likelihood test would strongly reject the hypothesis that these variables are not jointly significant.

## 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 (such as 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 sufficiently confident 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, such as the positive effect of education on participation. Moreover, through the interaction between ideology and information, we are able to derive new testable predictions on voter turnout. In particular, the model unveils an important heterogeneity in the impact of information on turnout: while information should increase participation for voters with weak priors, it should instead have a negative impact for strongly ideological voters.

Some empirical evidence on the theoretical results is provided from the 1997 general election in the United Kingdom. Although I do not intend to make claims about causality in the empirical analysis, the results are certainly compatible with most of the theoretical intuitions. Individual and environmental characteristics generally come with the expected signs. For some variables (such as age and education) this is just a further confirmation in a well-established empirical literature. Other variables have also been identified thanks to 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 article, should explore the reason for this difference, which is possibly due to the relationship between ideology and partisanship in the British context.

Overall, our findings show that information matters for electoral behaviour. However, because of its relation with ideology, information acquisition in a polarized polity is limited, and ideology rather than information determines policy outcomes. In the opposite case of an extremely non-polarized population, with a prevalence of indifferent voters, information acquisition is also low. Thus, a limited amount of polarization helps in having a more informed population and, possibly, in reaching informed outcomes and keeping politicians accountable. Also, since information reduces the participation of ideological voters (who tend to make non-dependable choices) while fostering that of independent voters, our results provide support for the idea that information is important 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. This criticism has been addressed in the introduction and will not be re-discussed here. It is obvious that our results cannot be directly compared with current models of information

aggregation[25] and therefore represent neither an extension nor a critique of existing results on that issue. They provide instead an alternative perspective on information acquisition, on which possible extensions can be built.

## 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

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

which means

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

For $\Delta$ to be positive it is sufficient to prove that

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

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

$$\int |V(a) - V_I| f(a) da = \int_{\mathcal{A}_+} [V(a) - V_I] f(a) da + \int_{\mathcal{A}_-} [V_I - V(a)] f(a) da$$

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

25. Persico (2004) provides the first model of this sort with information acquisition and compares the properties of different decision rules. Other works that analyse information aggregation issues considering endogenous information acquisition are Martinelli (2006) and Feddersen and Sandroni (2006).

from which

$$\int |V(a) - V_I| f(a) da - C \geq \left| \int [V(a) - V_I] f(a) da \right| - C \tag{A1}$$

If $P \int |V(a) - V_I| f(a) da \leq C$ then $W^* = 0$. But then A1 implies that $\left| \int [V(a) - V_I] f(a) da \right| \leq C$ 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 of voting (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 $P[V(\overline{a}) - V_I] > C$ and $P[V_I - V(0)] > C$ then $Pr(T = 1 | \widehat{q} = 1) > 0$.

The probability of voting is then given by the probability of being informed multiplied by the probability of voting when informed, i.e.

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

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

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

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 a case is given by the probability that 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.

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

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.

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

It is useful to adopt the following notation:

$$\mathcal{A}_I = [\underline{a}, \widehat{a}]$$
$$\mathcal{A}_\Theta = [\widehat{a}, \widehat{\widehat{a}}]$$
$$\mathcal{A}_O = [\widehat{\widehat{a}}, \overline{a}]$$

Integrating the A4 by parts we get:

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

Now notice that

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

We are left with

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

Therefore

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

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

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

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

$$1 > \Pr(T=1|\widehat{q}=1) = \Pr(a|a \in \mathcal{A}_I \cup \mathcal{A}_O)$$
$$= \int_{\mathcal{A}_I \cup \mathcal{A}_O} dF(a) > 0$$

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

The probability of voting is then given by the probability of being informed multiplied by the probability of voting when informed, i.e.

$$Pr(T=1|Q) = Q\Pr(T=1|\widehat{q}=1) + (1-Q)Pr(T=1|\widehat{q}=0)$$
$$= 1 - Q(1 - \Pr(T=1|\widehat{q}=1))$$

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

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

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

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

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

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

$$Pr(T=1|F) = 1 - Q_F[1 - Pr(T=1|\widehat{q}=1)]$$
$$Pr(T=1|G) = 1 - Q_G[1 - Pr(T=1|\widehat{q}=1)]$$

Now $\pi_F > \pi_G \Rightarrow Q_F < Q_G$. Since $1 - Pr(T=1|\widehat{q}=1) > 0$ 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 Norrs's British Constituency Database Norris, 2001).

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 MPs 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 that as they were 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 respondent voted in the 1997 election (verified for most observations).
- **Hours worked.** 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.

- **Partisanship.** 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'.

- **News supply**. 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 number of political articles that appeared in each newspaper during the same period. The variable 'News supply' is then the average (across the three newspapers) of the weighted number of articles that appeared about a candidate in the electoral constituency.
- **Bbc100.** Dummy equal to 1 if the constituency was included among the 100 decisive constituencies ('the battleground') according to the BBC (source: BBC web page).
- **Big shot.** Dummy equal to 1 if one of the candidates in the constituency is a current or former member of cabinet, a current member of the shadow cabinet or the leader of the Liberal Democratic party.

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