The Instrumental Voter Goes to the News-Agent: Demand for Information, Marginality and the Media

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Abstract

This paper studies the impact of instrumental voting on information demand and mass media behaviour during electoral campaigns. If voters act instrumentally then information demand should increase with the closeness of an election. If mass media are profit-maximizing firms then information supply should be larger in electoral constituencies where the contest is expected to be closer, delivery costs are lower, and customers are on average more profitable for advertisers. The impact of the size of the electorate is theoretically undetermined. These conclusions are derived within a formal model of information demand and supply, and then tested with good results on data from the 1997 general election in Britain.

Keywords: Voting behavior, information demand, rational ignorance, mass media, media bias, newspapers, election closeness, British politics.

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1 Introduction

There is a vast literature that explains voting behaviour using the tools of rational choice theory. This approach to the study of elections assumes instrumental voting: citizens care about public policies and voting is the instrument used to influence policy choices, or at least to increase the probability of obtaining the preferred option.

This theory poses some problems, especially since the probability to be pivotal in large elections is normally so low that it could be considered negligible in an optimization process. This criticism can be overcome if we are ready to compromise on what we intend by a rational act. In a weak sense, agents behave rationally according to their perception of the reality, that could be different from the "objective" state of facts. The probability to be pivotal in a large election is clearly very low, but it is not zero, and the subjective perception of the probability of casting a decisive vote may not necessarily coincide with the infinitesimal numbers that appropriate but cumbersome calculations would deliver (see for example Uhlaner and Grofman 1986). Moreover, voting can be seen as a "low cost-low benefit" activity (Aldrich 1993): it is therefore possible that even small changes in this probability might have an effect on incentives to participate in an election.

If we accept this argument then turnout should be larger in closer elections, when the probability to cast the decisive vote is higher. Unfortunately, empirical analysis does not deliver any clearcut conclusion. Foster (1984), after reviewing a number of studies on the closeness-turnout linkage in US elections, concludes that "the perceived probability of a tied election at the state level is not a powerful or reliable factor in explaining across-state voter participation rates in presidential elections". Grofman, Collet and Griffin's (1998) study on US Senate and House of Representatives elections, instead, finds evidence of higher turnout among registered voters in closer contests. However, other recent studies based either on aggregate data (Kunce 2001) or on survey data (Matsusaka and Palda 1999) show a weak relationship between closeness and turnout. Using poll data, Kunce (2001) also shows how "the extent to which pre-election perceptions matter depends directly on how one measures the likelihood of a close contest". It seems fair to say that evidence is, at best, mixed.

This paper will consider another implication of instrumental voting: when elections are closer then information on candidates and platforms should be more valuable since the probability that a vote matters is higher. Although Downs (1957) himself hints both at the "paradox of voting" (low incentives to vote) and at "rational ignorance" (low incentives to gather political information) as closely related consequences of instrumental voting, the second of the two paradoxes has received less attention, in

particular for what concerns the predictive implications of comparative static analysis.

Thus, information acquisition should be related to the probability to be pivotal when voting. If the suppliers of political information are aware of this, we should expect their behaviour to be influenced by marginality. In this sense, the behaviour of the mass media will provide a different and new test of theories of instrumental voting and of the role of marginality as an incentive for participation in election. This allows us to exploit information not used so far for this purpose.

The second aim of this paper relates to the potential impact of political information and mass media on public policy. Recent theoretical and empirical research clearly points in this direction. Besley and Burgess (2002), for example, provide evidence on Indian states responsiveness to calamities and find that this is associated with the circulation of newspapers. Besley and Prat (2005) show how mass media pluralism can increase the availability of political information and therefore influence politicians' accountability. More generally, as information plays a key role in agency relations, it is reasonable to expect good information to be important for accountability when decision-making power is delegated to governments (see also Lohmann 1998). The distribution of political information may also have an impact on redistributive policy as office-seeking politicians will target their platforms at voters that are more likely to be aware of them (Larcinese 2005). In two seminal papers, Strömberg (2004a & 2004b) shows how policy platforms can be influenced by the fact that mass media disproportionately target some specific groups; he also shows how the diffusion of radio had a significant impact on the distribution of New Deal spending.

Indeed, most people seem to believe that mass media have a relevant impact on citizens' electoral choices. Politicians appear to struggle for media attention and tend to complain when they do not receive enough space on newspapers or airtime on television. Some politicians even blame the media for bad electoral performances. In some countries access to television and electoral advertising during electoral campaigns are regulated and even publicly funded. All this is based on the presumption that media are effective in influencing voters' behaviour. However, we still lack a formal analysis of the political information market: this paper aims at starting to fill this gap. An analysis of this sort clearly cannot pretend to identify the broad range of possible media effects. However, by restricting the attention on few observable variables, it is possible to make precise predictions on media's behaviour during electoral campaigns and on voters' motivation. This will clearly also have consequences for our understanding of the possible effects of mass media on voters and public policies.

The theoretical model presented in this paper builds on Strömberg's (2004a) model of mass media competition. Strömberg argues that "the increasing-return-to-scale technology and advertising financ-

ing of media firms induce them to provide more news to large groups, such as tax payers and dispersed consumer interests, and groups that are valuable to advertisers". Eventually, this information bias will be taken into account by politicians when proposing electoral platforms and will therefore translate itself into a policy bias. This paper will explicitly model information acquisition and how it relates with the closeness of elections as well as with observable individual and local characteristics. The unit of analysis (the correspondent of "groups" in Strömberg's model) is the British electoral college during the 1997 general election. The attention will be focussed on information supply by newspapers and on newspaper readership across electoral constituencies: this will allow us to derive testable predictions and to implement the empirical analysis.

The paper can be summarized as follows. The next section will present the theoretical model of information demand and supply. Political information can be demanded for a number of reasons, including instrumental voting. Hence, it will be higher in marginal constituencies. Higher demand will induce, in equilibrium, a larger supply of news by profit-maximizing media. The revenue per reader received by a newspaper is represented by the price paid for the newspaper plus the amount paid by advertisers per reader. This amount is not the same for all readers and can be expected to be higher for those that are more valuable to advertisers. The cost of producing newspapers is fixed and there is a variable delivery cost. In equilibrium, there is higher information supply about marginal constituencies, as well as about constituencies with a richer and more concentrated electorate. With regard to the size of the electorate, it is possible to identify two effects working in opposite directions, a "group size effect" (larger constituencies should get better coverage because there are more potential readers) and a "collective action effect" (the probability to be pivotal is smaller in larger constituencies and therefore information demand should be lower). In section 3 these predictions will be tested using data from the 1997 general election in the United Kingdom. The test consists of two parts. The first will use constituency-level data and focuses on the behaviour of the mass media. We will use data collected from a major national newspaper during the electoral campaign, as well as electoral data and data from the 1991 Census. The second part, instead, will look at voter behaviour using survey data from the 1997 British General Election Study. The results suggest a high degree of compatibility between the theoretical model and the data.

2 The model

Consider a polity divided into two electoral constituencies μ and o. Each constituency elects a member of parliament (MP). There are two competing parties L and R each presenting one candidate in all constituencies. MPs are elected in a first past the post system. With obvious notation we will indicate the candidates in each constituency with L_μ, R_μ, L_o, R_o.

Suppose the two candidates in each constituency are chosen independently by parties through a process that is unknown to citizens. This process can be represented for both parties by respective distribution functions $F_R(a)$ and $F_L(a)$ (with density functions $f_L(a)$ and $f_R(a)$) over the support $\mathcal{A} \subseteq \Re_+$ of candidates' type.

For simplicity we will assume that candidate a delivers policy a and, abusing notation, that voters' utility from policy a is a. Policies are determined by the parliament of the two MPs and affect both constituencies. If a_μ is the candidate elected in constituency μ and a_o is elected in constituency o, then the implemented policy will be $a^* = \frac{1}{2}a_\mu + \frac{1}{2}a_o$.

The net benefit to citizen in constituency μ from electing the preferred of the two candidates $a_{\mu L}$ and $a_{\mu R}$ is given by

$$\begin{aligned} B(a_{\mu L}, a_{\mu R}|a_o) &= |(\frac{1}{2}a_o + \frac{1}{2}a_{\mu L}) - (\frac{1}{2}a_o + \frac{1}{2}a_{\mu R})| \\ &= \frac{1}{2}|a_{\mu L} - a_{\mu R}|. \end{aligned} \tag{1}$$

Analogously

$$B(a_{oL}, a_{oR}|a_\mu) = \frac{1}{2}|a_{oL} - a_{oR}|. \tag{2}$$

Also assume that μ is marginal and this is common knowledge; i.e., if we indicate with P_i $(i = \mu, o)$ the (common) prior probability that a vote will result decisive, each agent knows that $P_\mu > P_o$. We can think of these probabilities as coming from different prior beliefs about the distribution of candidates (or preferences) in the two constituencies. For example in constituency μ the distribution functions $F_R(a)$ and $F_L(a)$ could be "more similar" than in o. However, also the population size in each constituency will clearly play a role as a larger electorate, with given priors, will reduce the probability of each single vote to be pivotal. This "collective action effect" will be considered in the empirical investigation. A simple way to introduce this effect in the model is to write $P_i = P_i(N_i)$ where N_i is the size (i.e. the number of voters) of constituency i.

2.1 Information demand

To avoid cumbersome notation we will focus on a generic constituency. A citizen's utility from voting when types are known is then $W(a_L, a_R) = PB(a_L, a_R)$. However, the expected utility from an informed voting choice before candidates are selected is given by

$$W^* = P \int \int B(a_L, a_R) dF_L(a) dF_R(a) \tag{3}$$

For simplicity, and without loss of generality, here we will assume that there is no cost of voting.

Assume voters are ex ante uninformed about candidates and indicate the expected utility from uninformed voting as $\widetilde{W}$. We can then define the ex post utility of an informed versus an uninformed vote as

$$\Delta(a_L, a_R) = W(a_L, a_R) - \widetilde{W} \tag{4}$$

Before gathering information, however, the candidate types are unknown. Thus, the ex ante utility of gathering information is

$$\Delta = \int \int [W(a_L, a_R) - \widetilde{W}] dF_L(a) dF_R(a). \tag{5}$$

Lemma 1 $\Delta = W^* - \widetilde{W} \geq 0$.

Proof.: See Appendix.

Political information can be demanded for a number of different purposes. Instrumental voting is just one possibility. A sense of civic duty, for example, may play a role since being informed can be regarded as an important duty for a "good citizen". Political information can also be demanded to understand or forecast public policies and this in turn can be useful for better private decision-making[1]. Finally, information can be enjoyed as a consumption good and therefore be directly included in the utility function. We represent all this "exogenous" utility from information with Λ and say that total utility from information is

$$\Phi = \Lambda + \lambda \Delta \tag{6}$$

Instrumental voting therefore implies that $\lambda > 0$. Otherwise we should expect $\lambda = 0$, i.e. no demand for political information arising from voting decision-making. Thanks to the following result, we will be able to test $\lambda > 0$ versus an alternative of $\lambda = 0$.

Proposition 1 *If* $\lambda > 0$ *then* Φ *is higher in constituency* μ.

Proof. Straightforward from the (1), as $\Delta = \Delta(P)$ with $\frac{\partial \Delta(P)}{\partial P} > 0$ and P is inversely related to expected margins of victory.

2.2 Information supply and mass media

Consider two newspapers X and Y. They supply political news about both constituencies. Assume they have a fixed space $\overline{s}$ to devote to these news and indicate with $s_{\mu}^{X} \in [0, \overline{s}\ ]$ the space devoted by newspaper X to news about μ; analogously we can define $s_{o}^{X}, s_{\mu}^{Y}, s_{o}^{Y}$. We will indicate a strategy (news profile) for newspaper j $(j = X, Y)$ by $s_j = [s_{\mu}^{j}, s_{o}^{j}]$ and the set of feasible strategies for newspaper j with $\Sigma_j = \{s_{\mu}^{j}, s_{o}^{j} |\ s_{\mu}^{j} + s_{o}^{j} = \overline{s}\}$.

Each citizen buys one newspaper. The probability for a citizen that buys newspaper j to be informed about platforms proposed in constituency i is $q(s_i^j)$, with $q^{'} \geq 0$ and $q^{''} \leq 0$. We will assume each citizen only cares about her own electoral constituency, thus simply ignoring news about the other. A citizen living in constituency μ gets from newspaper X a utility from news equal to

$$\Psi(s_{\mu}^{X}) = q(s_{\mu}^{X})\Phi_{\mu}. \tag{7}$$

Apart from politics, newspapers also report about other things, since coverage of various events, culture, sport and so on is also demanded by readers. Each paper has its own mix over these different forms of entertainment and also its own way of dealing with them. Also, the way politics in itself can be reported is not unique. The depth and the focus of news, as well as possible partizanship, all matter for the reader. We will therefore assume that editorial choices, entertainment content, partizanship etc. are fixed characteristics of each newspaper: this is not an unrealistic assumption in the short run and certainly within the space of an electoral campaign. Thus, we will indicate the expected utility from newspapers X and Y to citizen k in constituency μ with, respectively, $\Psi(s_{\mu}^{X}) + x_k$ and $\Psi(s_{\mu}^{Y}) + y_k$, where x_k is the utility that agent k derives from the fixed characteristics of newspaper X and y_k is the utility she derives from fixed characteristics of newspaper Y. Analogous notation will be used for citizens living in constituency o.

Then we have that citizen k in constituency μ buys newspaper X if

$$\Psi(s_{\mu}^{X}) + x_k \geq \Psi(s_{\mu}^{Y}) + y_k \tag{8}$$

and buys newspaper Y otherwise. Let us indicate with $\widehat{\Psi}_{\mu}$ the difference $\Psi(s_{\mu}^{X}) - \Psi(s_{\mu}^{Y})$ and with

z_k the difference $y_k - x_k$.

Newspapers are uncertain about individual preferences, and in particular about the preferences for fixed characteristics. Assume z_k is distributed according to a distribution function H_i $(i = \mu, o)$, which is common knowledge. The corresponding density function is h_i. The probability that citizen k in constituency μ buys newspaper X is then given by $\Pr[z_k \leq \widehat{\Psi}_\mu] = H_i(\widehat{\Psi}_\mu)$.

The following assumption will ensure that the pay-off functions of the newspapers are concave[2].

Assumption 1 $\frac{|h_i^{'}(\widehat{\Psi}_i)|}{h_i(\widehat{\Psi}_i)} \leq \frac{|q_i^{''}(s_i^j)|}{\Phi[_i q_i^{'}(s_i^j)]^2}$, $i = \mu, o$; $j = X, Y$.

Newspapers maximize expected profits. Each reader provides the newspaper with a revenue ρ which is the sum of the price directly paid to buy the paper and the amount paid by advertisers per reader. Therefore total profits in the industry are given by $\Pi = n\rho - 2\overline{C}$, where n is the total number of citizens in the polity and $\overline{C}$ the fixed cost to produce each newspaper. For the moment, we only consider fixed costs and assume marginal costs are zero. In reality there are variable costs due to printing and delivery but it is also true that the "cost of the first copy" is normally the largest by far. Variable costs will be considered later.

Since we are interested in the market share of newspapers in each constituency we can rewrite the expected profit equation for newspaper X as

$$E(\Pi^X) = \rho[E(n_\mu^X) + E(n_o^X)] - \overline{C} \tag{9}$$

where n_i^j is the number of readers of newspaper j in constituency i. For newspaper Y we have $\Pi^Y = \Pi - \Pi^X$. Since fixed costs are sunk, newspapers are only interested in maximizing revenue: this implies that newspapers maximize the expected number of readers. Indicating with N_i the total number of voters in constituency i, we have

$$E(n^X) = N_\mu H_\mu(\widehat{\Psi}_\mu) + N_o H_o(\widehat{\Psi}_o) \tag{10}$$

$$E(n^Y) = N_\mu[1 - H_\mu(\widehat{\Psi}_\mu)] + N_o[1 - H_o(\widehat{\Psi}_o)] \tag{11}$$

This is a zero-sum game. Therefore a Nash equilibrium of the readership-maximizing game is given by a strategy profile $\{s_X^*, s_Y^*\}$ s.t. $s_X^* \in \Sigma_X, s_Y^* \in \Sigma_Y$ and

$$E(n^X|s_X^*, s_Y) \geq E(n^X|s_X^*, s_Y^*) \geq E(n^X|s_X, s_Y^*) \tag{12}$$

Proposition 2 *Suppose that Assumption 1 is satisfied,* $\lambda > 0$, *and* $N_\mu = N_o$. *Then an equilibrium strategy profile* $\{s_X^*, s_Y^*\}$ *must satisfy* $s_\mu^X = s_\mu^Y > s_o^X = s_o^Y$.

Proof: See Appendix.

This result tells us that the two newspapers converge on the same news profile and that the marginal constituency receives larger news coverage.

So far we focused on marginality. There are a number of other factors that can have an influence on information demand and supply and therefore should be used as control variables when trying to assess the effects of election closeness. On the media revenue side it is quite realistic to assume that not everyone has the same value for advertisers and that newspapers are capable of discriminating among different readers. The extent of this discrimination depends on the knowledge that newspapers and advertisers have of the market conditions and of the characteristics of their customers. Thus, we should expect this type of discrimination to become more and more relevant as new technologies improve the amount and quality of such information. Since price discrimination across different readers is rarely observed, discrimination will mainly occur through information supply.

Another consideration concerns costs. We assumed so far that the marginal cost of producing and delivering papers was zero. Although, as previously said, marginal costs have a relatively minor part in the production of newspapers, delivery costs could still be far from negligible and, more importantly, they could vary substantially across different areas. In particular, in areas which are densely populated, marginal delivery costs are quite low while they can be sizeable if newspapers intend to reach readers in remote parts of the country.

By modifying our assumptions, and introducing other differences in the characteristics of electoral constituencies, we obtain a rationale for control variables that will make the empirical test more reliable. At the same time this also allows us to implement a direct test of some of Strömberg's results discussed in the Introduction.

Heterogeneity is introduced at the constituency level. In other terms, we assume that the newspapers are not able to discriminate readers according to any other individual characteristic apart from the constituency they come from. Since constituencies are statistically different, this is the strategy that will be used to implement the empirical analysis.

Assumption 2 $\rho_\mu \neq \rho_o$.

Advertisers can induce from the constituency a number of other characteristics of interest and are therefore willing to pay differently for marginal readers coming from different constituencies.

Assumption 3 introduces marginal costs.

Assumption 3 *The newspaper cost function is* $TC = \overline{C} + N_\mu H_\mu(\widehat{\Psi}_\mu)\upsilon_\mu + N_o H_o(\widehat{\Psi}_o)\upsilon_o$, *where* υ_μ *and* υ_o *are the cost of marginal readers.*

For empirical purposes we will mainly identify υ_μ and υ_o with delivery costs.

Now we can define the net marginal revenue per-reader as

$$\widetilde{\rho}_i = \rho_i - \upsilon_i,\ i = \mu, o \tag{13}$$

The profit equation for newspaper j can be re-written as

$$E(\Pi^j) = \widetilde{\rho}_\mu E(n_\mu^j) + \widetilde{\rho}_o E(n_o^j) - \overline{C},\ j = X, Y \tag{14}$$

To ensure that every citizen buys one newspaper and that newspapers have an interest in reaching all citizens we assume the following:

Assumption 4 $\widetilde{\rho}_i > 0\ \forall i$.

Hence, each reader must be weighted by her "net value". The next proposition provides the Nash equilibrium condition in this case.

Proposition 3 *Suppose that Assumptions 1-4 are satisfied and that* $\lambda > 0$. *Then an equilibrium strategy profile* $\{s_X^*, s_Y^*\}$ *must satisfy* $s_\mu^X = s_\mu^Y, s_o^X = s_o^Y$ *and*

$$\frac{q'(s_\mu^*)}{q'(s_o^*)} = \frac{N_o \widetilde{\rho}_o \Phi_o}{N_\mu \widetilde{\rho}_\mu \Phi_\mu}.$$

Proof: See Appendix.

Other things equal, information supply is higher in the constituency with larger $\widetilde{\rho}_i(\cdot) = \rho_i(\cdot) - \upsilon_i(\cdot)$. On the revenue side we can relate the readers' value for advertisers to factors such as income, age, education etc. The net value of readers for newspapers will then take into account their location and be higher where readers are on average more valuable and lower where delivery costs are higher.

Finally, also the total size of the constituencies, N_μ and N_o (the number of voters, or the total population in a constituency) should play a role. On one side, an increase in N_j will attract more news on constituency j (groups size effect). On the other, an increase in N_j will reduce the value of

news for residents in constituency j, Φ_j, and therefore reduce supply on j (collective action effect). We will approach the empirical investigation with no prior about the sign of this variable.

We can therefore summarize our findings in the following testable proposition:

Theoretical Results *Other things equal, information supply is higher in constituencies with a closer electoral race, lower delivery costs, and where citizens are on average more valuable to advertisers. The effect of the size of the electorate in a given constituency is uncertain.*

3 Evidence

3.1 The Data

We will now proceed to verify the compatibility of the theoretical model with data. The empirical investigation will be carried out on the 1997 general election in the United Kingdom[3]. For the purpose of this analysis we will use data from England, Scotland and Wales. The political situation in Northern Ireland is substantially different from the rest of the country as the main divide is between Catholic and Protestants rather than on the traditional left-right dimension. Evidence provided is of two types. First, we will focus on information supply, using the electoral constituency as unit of observation. We will then move to individual level analysis to assess whether there is higher information demand in marginal constituencies.

There were 641 constituencies in England, Scotland, and Wales in 1997. Three main sources of data will be used. First of all we need data about information supply. For this purpose we will use a major national newspaper, "*The Guardian*", defining information supply for each constituency as the number of articles that mention such constituency or one of its candidates during the last 30 days of the electoral campaign. This variable is indicated as $News$. We will then use information about electoral results[4] to measure the marginality of a constituency. A first possibility is to focus on the percentage difference between the winner and the runner up. We will therefore use the following formula:

$$1 - \frac{W - R}{W + R} \tag{15}$$

where W is the percentage of votes for the winning candidate and R the percentage for the runner up. The smaller is such indicator the lower the degree of marginality of the constituency. However, to

capture the idea of marginality as the probability of casting a decisive vote, the absolute difference in votes between candidates might be a more appropriate indicator. We will consider both possibilities.

One problem with such indicators is that they measure election closeness *ex post*. This could be justified by a rational expectations assumption: in general, when using aggregate data, there is no reason to expect a systematic bias in expectations within a constituency. Nevertheless, voters' swings are not always well predicted by opinion polls, and this could generate non-random biases in voters' expectations[5].

One alternative possibility is to use past election results[6]. The main obstacle in this direction is that in between 1992 (year of the previous general election) and 1997 most constituency borders were changed. Notional 1992 results are reported in Hening and Baston (2002). They reconstruct the borders of the new constituencies and impute 1992 votes accordingly. Although the possibility of strategic voting could make the use of such reconstruction not entirely reliable, this problem should have only a limited impact on the results. Moreover, there are very high spatial correlations in UK electoral results: including or excluding small parts of confining constituencies can hardly cause major variations. However, in 1997 there were expectations of a large swing from the ruling party (Conservatives) to opposition parties (mainly the Labour): thus, previous election closeness do not necessarily represent a good measure of expected election closeness as this would crucially depend on who held the constituency. Thus, we will also focus on Conservative held constituencies as a further check of our results.

We will also use data on the total number of registered voters in each constituency and on the turnout percentage. With the first variable we try to gauge the relative importance of the "group size effect" and of the "collective action effect". The percentage of turnout indicates the extent of political participation (in the form of voting) and therefore can broadly be intended as a measure of interest and mobilization by the citizens of a given area.

Other possibly relevant characteristics of the constituency will be taken from the 1991 Census[7]. To capture the role of delivery costs, one of the key variables in the theoretical analysis, we also include population density in the regressions. It seems reasonable to assume that the marginal cost of readers is higher where population density is lower. To capture the value of customers to advertisers, we include variables that can represent the social and economic conditions of the districts. Information on income is not available but proxies have been used, namely the unemployment rate and the percentage of citizenship with high qualifications (degree and higher). Age can also have an influence on propensity to consume and consumption patterns (thus affecting how valuable a reader is to advertisers) and

therefore has been included. Also, the percentage of inactive population (mainly retired, but also students and permanently sick) has been included: there are reasons (as well as anecdotal evidence[8]) to think that inactive population, in particular old or sick individuals, should be less valuable to advertisers, since they tend to consume less than average, or are less responsive to advertising.

One possible concern might derive from the fact that *The Guardian*, like most national newspapers in the U.K., is based in London. This could bias the news in favour of London constituencies both because of a lower cost of news collection and, more generally, because of a larger sensitivity to a nearer environment. This could be particularly relevant for our results on population density, given that this variable is clearly higher in London than elsewhere. For this reason we include a Greater London control dummy, equal to 1 for the Greater London constituencies.

Finally, we include a "big-shot" control. Since some candidates have naturally a prominent position and bigger visibility during the electoral campaign, it is necessary to single out this effect from what we intend to test. Therefore we introduce a dummy variable equal to 1 for constituencies where "big-shots" are candidates. By big-shot we intend all the candidates who have been ministers in the current and any past government, the members of the current "shadow-cabinet", and the current leader of the Liberal Democratic Party.

In the second part of the empirical analysis we provide evidence on citizens' usage of newspapers across different constituencies. This helps us isolating the hypothesis that differentiated supply is a consequence of differentiated demand from the competing possibility that all citizens are interested in marginal constituencies. For this purpose we use the 1997 British General Election Study, a post-election survey consisting of individual observations on people that were interviewed a short time after the election. Our sample consists of 2807 observations. Among other questions, respondents were asked whether and how frequently they used to read newspapers during the electoral campaign, and which paper. In the U.K. the distinction between high quality and low quality (tabloid) newspapers is quite clear-cut and commonly accepted. It is therefore possible to separate regular users of quality papers during the electoral campaign from the rest of the population and try to assess the impact of marginality (as well as of other characteristics) on the demand for political information. The same exercise has then been repeated for regular readers of local newspapers. Data include a number of demographic and economic characteristics of the interviewed individuals, as well as a measure of ideological motivation.

All variables are described in more detail in the Appendix and summary statistics are reported in table 1.

(TABLE 1 APPROX. HERE)

3.2 Empirical Specification

Preliminary data analysis suggests that a very limited number of constituencies get a disproportionate attention from media (see Tab. 2). For example almost 90% of constituencies have $News \leq 5$ while only 3 constituencies have $News > 100$. This suggests that the relationship we want to estimate could be highly non-linear.

(TABLE 2 APPROX. HERE)

A linear regression would indeed deliver quite poor results. We will instead present estimates for the following equation:

$$\ln(News_i) = \alpha_0 + \alpha_1 D_i + \alpha_2^{'} X_i + \alpha_3^{'} Z_i + u_i, \ i = 1, ..., 641 \tag{16}$$

where:

$\ln(News_i)$ is the natural logarithm of $News$[9], D is a measure of marginality, X is a three-dimensional vector containing the population density, the size of the electorate, and turnout (therefore $\alpha_2^{'} = [\alpha_{21,}\alpha_{22}, \alpha_{23}]$), and Z represents a set of control variables from the 1991 Census, plus the "big-shot" dummy ($\alpha_3^{'} = [\alpha_{31,}\alpha_{32}, ...\alpha_{3k}]$). As usual, u_i represents independent disturbance terms that have zero mean and are uncorrelated with the exogenous variables of the model. Estimation will be by OLS. Stricly speaking, the dependent variable is neither censored nor truncated: the feasible number of articles about a constituency cannot assume negative values and the zeros are not the consequence of observability problems. Hence, there is no reason to use censored regression and the most trasparent estimation method is OLS, where the zeros represent just the actual value of an observed nonnegative variable. However, to be able to use logarithms, we need to approximate the zeros, and this could be intepreted as a sort of censoring, although at an infinitesimal value[10]. Moreover, the large number of zeros (as well as the presence of a few outliers) might constitute a possible cause for concern. It is then reasonable to ask how robust the results are to the usage of alternative estimation methods. For this reason simple probit[11] and ordered probit[12] models have also been estimated: these deliver results very similar to those reported here. These estimates are therefore not reported but are available from the author upon request.

Almost all the parameters have an expected sign in terms of our model. However, the main parameter of interest is α_1. In general, we want to assess if α_1 is significantly different from zero. As discussed previously, we will consider several possible measures for the marginality of constituencies, and we expect a positive impact of marginality on news supply.

The other variables serve as controls with respect to this aim; at the same time they are of interest for their own sake as we can use these estimates to assess the overall reliability of the theoretical model.

It is important to distinguish alternative competing possibilities from the hypothesis that larger news supply is a consequence of higher demand. This task will be accomplished by estimating an equation of newspaper readership at the individual level. The equation to be estimated in this case is given by

$$NR_i = \beta_0 + \beta_1 D_i + \beta_2^{'} W_i + u_i,\ i = 1, ..., 2807 \tag{17}$$

where NR stands for "newspaper readership" and is a binary variable equal to 1 for, respectively, a quality paper reader (results reported in Tab. 4) or a local paper reader (Tab. 5). W is a vector of individual control variables including, among other covariates, income, education, sex and age. We expect β_1 to display a positive sign indicating that newspaper readership is larger in marginal constituencies, as predicted by the model.

3.3 Results

OLS estimates of equation (16) are reported in Table 3. In column 1 and 2 we use *ex post* indicators of marginality (based on percentage distance in column 1 and absolute distance in column 2). In both cases *ex post* distance has the expected sign and is significant at 5% level. When we use past closeness (as captured by the notional 1992 results of Hening and Baston, 2002) this result disappears (Tab. 3, column 3). However, as discussed previously, the 1997 general election witnessed a large generalized shift of votes away from the Conservative party. This was to some extent expected and therefore the most interesting constituencies were the previously Conservative-held ones, while virtually no Labour constituency was in fact contestable. In fact, some constituencies may have been *ex post* very close just because the swing of votes has probably been larger than expected, making the Labour candidates winning (marginally) also in constituencies that never were marginal or Labour-held before. In a sense, it was clear that the final outcome of the election would have been decided mainly in Conservative constituencies and this should have increased the demand for information about them[13]. Hence, in column 4 we consider a dummy variable equal to 1 for constituencies held by the Conservatives

and where the margin of victory in 1992 was equal or smaller than 10%. The results show that information about marginal Conservative-held constituencies was substantially higher than average. The corresponding coefficient is significant at 1% level.

(TABLE 3 APPROX. HERE)

Other variables also display the expected signs. Population density has a positive impact and is significant in specifications (1), (2) and (3). The signs of other control variables show good support for some of the Strömberg-type conclusions. In particular, and differently from Strömberg, we saw that the effect of group's magnitude is not necessarily uncontroversial. However, empirical evidence seems to suggest that the effect of the group size should overcome the potential collective action problem generated by size. In particular, in column 2, where we use the absolute distance between candidates and therefore isolate the potential "group size effect", both the magnitude and significance of the electorate size are larger than in the other cases.

Results are different for Turnout, also a potential signal of attention to political matters. It is in fact rather puzzling that its coefficient, although never significant, assumes a negative sign. One obvious concern is that Turnout is also an *ex post* variable. Moreover, it can be correlated with marginality. Therefore we repeat all estimations dropping Turnout and verifying that none of our results is affected in any substantial way. In column 5 we report the estimation of column 4 when Turnout is dropped; the other cases are not reported but they also show basically no variation.

Good support for our model also comes from other indicators like the unemployment rate: we use this variable as a proxy for the level of well-being in a given constituency (and therefore for the value of its inhabitants to advertisers). Other covariates give a less clear-cut picture. As previously mentioned, anecdotal evidence has been reported of television programmes that have been suspended because watched mainly by the elderly, who were judged not valuable by advertisers. However we find that constituencies with larger inactive population (mainly represented by retired people) receive more attention from newspapers. In fact, inactive people might have more time to devote to information gathering and, during election times, the retired might also have all the incentives to put a disproportionate attention to political platforms. On the other hand, there is little evidence that variables like age and qualifications matter: average age and the percentage of people with high degrees do not seem to have significant effects. Finally, there is clear evidence of a positive and significant "Greater London effect". A pure control variable is *Big-Shot*. Both the magnitude and the significance of *Big-Shot* are relevant but this does not come as a surprise nor it is the consequence of any theoretical advance made

in this paper.

In table 4 we turn to micro-level analysis and report probit estimates of quality newspaper readership, i.e. equation (17). In column 1, to gauge the magnitude of their effects, education, income and church attendance are considered as numerical variables. Most parameters display the expected sign, with education and income being overall the best explanatory variables. Sex and church attendance also show sizeable and significant effects. The size of the electorate has instead no significant impact: this, once again, contradicts the hypothesis of a sizeable collective action effect in information gathering. A somehow puzzling result is that the length of residence in a given constituency has always a negative and significant impact on quality newspaper readership. It is possible for mobility to be associated with characteristics that make individuals more attentive to political matters, although one could have expected that other control variables (like income and education) should have captured this effect.

(TABLE 4 APPROX. HERE)

The main variable of interests, however, is marginality. While for the significance of most other variables several explanations are possible, marginality has a strong relationship with voters' instrumental behaviour[14]. Marginality has the expected sign, whether considered as percentage (column 2) or absolute (column 3) distance between the winner and the runner up. Significance levels are in both cases definitely reassuring. When we turn to past marginality the result follows quite closely what obtained for information supply: column 4 shows that closeness in the 1992 election has basically no impact on newspaper readership in 1997[15]. Considering marginal Conservative constituencies, however, does not alter this conclusion (column 5).

In table 5 we consider local newspaper readership. The demand for political information is in fact in many instances satisfied by local papers, and this seems especially likely when information demand concerns the electoral race in a given constituency. Readership of local papers can therefore be used as another indicator of interest in political matters. Once again, marginality in the 1997 election has a positive impact on the dependent variable. Moreover, this time we also find a positive impact of past marginality (almost significant at the 5% level), while living in a marginal Conservative constituency does not seem to increase the probability of reading a local newspaper. Among other things, it is worth noticing that the probability of reading a local newspaper is not significantly affected by income and church attendance (both instead show a strong impact on quality papers); it is instead significantly higher for black citizens (who show instead no substantial difference in their consumption of quality

papers) and, perhaps not surprisingly, for residents of Scotland and Wales (the opposite is true for residents in Greater London).

(TABLE 5 APPROX. HERE)

The picture that emerges from these regressions seems to show that higher consumption of quality and local newspapers has occurred in marginal constituencies, although this result does not hold for all the definitions of marginality adopted. We can regard this as further evidence that mass media behaviour during that electoral campaign was actually driven, at least in part, by instrumental demand for information rather than a broad and non-instrumental interest in the election.

4 Conclusion

A central implication of instrumental voting behaviour is the existence of a positive linkage between election closeness and political participation. So far, both the theoretical and the empirical literature have mainly identified participation with electoral turnout. We focus instead on information acquisition: rational decision-making should induce voters to demand more political information when elections are expected to be closer. On the other side of the information market, profit maximizing mass media should discriminate between different electoral constituencies according to their expected marginality. However, price discrimination is hard to implement in the media market: this paper shows, both theoretically and empirically, that the media have a different way to discriminate, namely targeting their attention (in terms of reported news) to marginal constituencies. This can be due to a genuine higher demand for information arising in marginal constituencies as well as to other reasons, like a general interest of the public in marginal constituencies, or the effort of party leaders to target marginal constituencies. To discriminate between these hypotheses we also provide evidence on voters' usage of newspapers and find that quality papers and local papers tend to be more demanded by voters that live in marginal constituencies. Thus, the empirical analysis suggests a high degree of compatibility between the hypothesis of instrumental voting and behaviour in the information market.

Marginality is obviously only one of the many determinants of information supply. Recent research, and in particular Strömberg (2004), have pointed out that the media can be expected to target customers who are more valuable to advertisers, i.e. those that are wealthier, better educated and younger. The model presented here gives an explicit empirical content to those predictions: by using

the electoral constituencies in the 1997 British election as units of observation, we can test these conclusions. Evidence on Strömberg's hypothesis is overall satisfactory: although not all the estimates are compatible with his theoretical predictions, we can safely conclude that there is enough evidence of newspapers targeting their news according to characteristics of the electorate. The results also provide empirical support for the idea that larger groups should receive more attention from the media, although having shown that this conclusion does not necessarily follow from the theory.

If we think that the media introduce a bias in the way people are informed about politics, an issue that has not been explored in this paper, and if this bias can be exploited by politicians, then we can have a "media-driven-bias" in public policy-making. In the context of the model presented here, this bias is combined with an "attention-bias" that should substantially drive politicians to target marginal and affluent constituencies[16].

This analysis does not pretend to be conclusive. It raises instead many questions that further research should try to address. On the theoretical side, the model of media competition is still quite simple. New insights could come from explicitly considering the advertising market and the possibility for newspapers to select the combination of political information, advertising and other news they publish. Introducing in the model the possibility of new entry and, more in general, of different industry structures, could also deliver interesting results, as well as normative implications for regulating the media market. On the empirical side, of particular importance will be the collection of new data about both the voters and the media. More data, possibly from different countries, could lead us to a better understanding of media bias and possibly to isolate the relevant institutional characteristics that induce differentiated mass media behaviour.

Notes

[1] A model of information acquisition based on this idea is presented in Larcinese (2005).

[2] This is an adaptation of condition C1 in Lindbeck and Weibull (1987). Interpretations of this condition in the context of probabilistic voting are also discussed in their paper.

[3] The U.K. is a parliamentary system where members of parliament (MPs) are elected in single-member constituencies using a first past the post system. Party leaders are candidate to become prime minister, but they still need to win in their own constituency to become MP. There are two major parties, Conservative and Labour, although other parties regularly manage to win in some constituencies. In particular, the Liberal-Democratic party is well established as a national third party. In the 1997 the Labour party obtained a neat victory after 18 years of Conservative ruling.

[4] Boothroyd (2002).

[5] See Cox (1988) or Kunce (2001) for some problematic aspects of *ex post* indicators.

[6] The best independent variable to capture expected closeness would clearly be poll data. Unfortunately there are no poll data available on each single constituency.

[7] The data were recorded at the level of districts, local administration entities with no direct link with electoral constituencies. Most constituencies are contained within the borders of a single district and these posed no problems. Others (around 25% of them) span over parts of different districts and in such cases data referred to districts have been weighted in order to get approximated constituency data. The weighting factors have been reconstructed by using the detailed description of constituencies (and their relations with districts and wards) contained in Rallings and Thrasher (1995).

[8] See for example Strömberg (2004a).

[9] When $News = 0$ the logarithm of 0.0001 has been used.

[10] To make sure that the results do not depend on this approximation, different values have been used. These changes induce only minimal differences in the estimates.

[11] Where the dependent variable is zero if $News = 0$ and 1 if $News > 0$.

[12] Where the dependent variable assumes 4 values: Zero (if $News = 0$), Low (if $News = 1$), Medium (if $1 < News < 6$) and High (if $News \geq 6$).

[13] In terms of the model, in general elections citizens care about final policies: thus, marginality in one constituency is more relevant when it matters for the whole outcome of the election.

[14] Since we do not want to place a linear restriction on the effects of education, income and church attendance (which are, in fact, categorical variables in our dataset), in columns 2-5 we replace those variables with their categorical counterpart: this obviously generates an improvement in pseudo-R^2.

[15] We only report the estimates when percentage closeness is used. Using absolute closeness delivers the same result.

[16] Recent empirical research on the US (Larcinese et al. 2005; Larcinese et al. 2006), shows that this is not the case. This opens an interesting avenue for future research since, as shown here, the pre-policy links between marginality and voting behaviour appear instead more solid.

5 Appendix

5.1 Proof of theoretical results

Proof of Lemma 1 Let us consider a generic constituency and introduce the following notation:

$$\begin{aligned}\mathcal{A}_L^2 &= \left\{a_L, a_R \text{ s.t. } P\int\int(a_L - a_R)dF_L(a)dF_R(a) > 0\right\}\\ \mathcal{A}_R^2 &= \left\{a_L, a_R \text{ s.t. } P\int\int(a_L - a_R)dF_L(a)dF_R(a) < 0\right\}\end{aligned}$$

Suppose now that $F_L(a)$ and $F_R(a)$ are s.t. candidate L is preferred, i.e.

$$\int\int(a_L - a_R)dF_L(a)dF_R(a) > 0$$

An uninformed voter in this case votes for candidate L. Her ex ante utility is

$$\begin{aligned}\widetilde{W} &= \frac{1}{2}P_i\int\int_{\mathcal{A}_L^2}(a_L - a_R)dF_L(a)dF_R(a) -\\ &\quad \frac{1}{2}P_i\int\int_{\mathcal{A}_R^2}(a_R - a_L)dF_L(a)dF_R(a)\end{aligned}$$

The ex ante (i.e. before knowing the realization of candidates) utility of an informed vote is instead

$$\begin{aligned}W^* &= \frac{1}{2}P_i\int\int_{\mathcal{A}_L^2}(a_L - a_R)dF_L(a)dF_R(a) +\\ &\quad P_i\int\int_{\mathcal{A}_R^2}(a_R - a_L)dF_L(a)dF_R(a).\end{aligned}$$

The second term in the right-hand side is positive by definition, therefore $W^* - \widetilde{W} \geq 0$.■

Proof of Proposition 2 The best response function for newspaper j is defined implicitly by the first order conditions

$$\begin{aligned}N_\mu h_\mu(\widehat{\Psi}_\mu)\Phi_\mu q^{'}(s_\mu^j) &= \varphi\\ N_o h_o(\widehat{\Psi}_o)\Phi_o q^{'}(s_o^j) &= \varphi\\ j &= X, Y\end{aligned}$$

where φ is the Lagrange multiplier associated with the problem. This implies

$$\begin{aligned} q^{'}(s_{\mu}^{X}) &= q^{'}(s_{\mu}^{Y}) \\ q^{'}(s_{o}^{X}) &= q^{'}(s_{o}^{Y}) \end{aligned}$$

and therefore

$$\begin{aligned} s_{\mu}^{X} &= s_{\mu}^{Y} \\ s_{o}^{X} &= s_{o}^{Y} \end{aligned}$$

Now remember that

$$\begin{aligned} \Phi_{\mu} &= \Lambda + \lambda\Delta(P_{\mu}) \\ \Phi_{o} &= \Lambda + \lambda\Delta(P_{o}) \\ \frac{\partial\Delta(P_i)}{\partial P_i} &\geq 0,\ i = \mu, o. \end{aligned}$$

Being $\Phi_{\mu} > \Phi_{o}$ from the first order conditions we get that $s_{\mu}^{j} > s_{o}^{j}$, $j = X, Y$.

To satisfy the second order conditions we need the Hessian matrix

$$\begin{bmatrix} N_{\mu}h_{\mu}^{'}(\widehat{\Psi}_{\mu})[\Phi_{\mu}q^{'}(s_{\mu}^{j})]^{2} + & 0 \\ +N_{\mu}h_{\mu}(\widehat{\Psi}_{\mu})\Phi_{\mu}q^{''}(s_{\mu}^{j}) & \\ 0 & N_{o}h_{o}^{'}(\widehat{\Psi}_{o})[\Phi_{o}q^{'}(s_{o}^{j})]^{2} + \\ & +N_{o}h_{o}(\widehat{\Psi}_{o})\Phi_{o}q^{''}(s_{o}^{j}) \end{bmatrix}$$

to be negative semi-definite. A sufficient condition is, in this case, that each element on the main diagonal is non-positive. Assumption 1, therefore, guarantees that the second order conditions are satisfied.■

Proof of Proposition 3 The profit equation for newspaper j can be expressed as

$$E(\Pi^{j}) = \widetilde{\rho}_{\mu}N_{\mu}H_{\mu}(\widehat{\Psi}_{\mu}) + \widetilde{\rho}_{o}N_{o}H_{o}(\widehat{\Psi}_{o}) - \overline{C},\ j = X, Y.$$

The result follows immediately from the first order conditions

$$\begin{aligned} \widetilde{\rho}_{\mu} N_{\mu} h_{\mu}(\widehat{\Psi}_{\mu}) \Phi_{\mu} q^{'}(s_{\mu}^{j}) &= \varphi \\ \widetilde{\rho}_{o} N_{o} h_{o}(\widehat{\Psi}_{o}) \Phi_{o} q^{'}(s_{o}^{j}) &= \varphi \\ j &= X, Y. \end{aligned}$$

where φ is the Lagrange multiplier associated with the maximization problem.

Proceeding as in the proof of Proposition 2, it is straightforward to show that Assumption 1 is sufficient for the second order conditions to be satisfied.■

5.2 Description of variables

5.2.1 Constituency level

- *News*. It is the number of articles appeared on the newspaper "The Guardian" during the last 30 days before the poll date and containing either a reference to the electoral constituency or the name of one of its candidates.

- *Marginality*97. Indicator of marginality of constituencies in the 1997 election given by the formula

$$1 - \frac{(W - R)}{(W + R)}$$

  where W = percentage of votes for the winning candidate, R = percentage of votes for the runner up.

- *Abs.Marginality*97. Distance between the winning candidate and the runner up in each constituency in the 1997 election, divided by 1000.

- *Marginality*92. The same as *Marginality*97 calculated for the 1992 election using the constituency reconstruction of Henig and Baston (2002).

- *Marginal Conservative Const.* Dummy variable equal to 1 for constituencies that were held by the Conservative party before the 1997 election and where the margin of victory in the last election was equal or lower than 10%.

- *Density*. Population density expressed as the number of residents per square mile divided by 1000.

- *Electorate*. Total electorate in the constituency divided by 1000.
- *Big shot*. Dummy variable equal to 1 if one of the candidates in the constituency has been classified as a "big-shot". This means the candidate is either a current or former minister, or a current member of the "shadow cabinet", or the leader of the Liberal-Democratic Party.
- *Unemployment%*. Percentage of unemployed, expressed as total unemployed over active population multiplied by 100.
- *Inactive%*. Percentage of inactive population. This is the total of retired, students, permanently sick and other inactive over total residents multiplied by 100.
- *Average Age*. Average age in the electoral constituency.
- *HighD*. Percentage of residents with high qualifications, defined as the number of residents with degree or higher title over the total residents, multiplied by 100;
- *GLondon*. Dummy variable equal to 1 for the Greater London constituencies.

5.2.2 Individual level

- *Quality Paper*. Dummy variable equal to 1 if the respondent is a regular reader of The Daily Telegraph, The Times, The Guardian, The Independent, The Financial Times or The Scotsman.
- *Local Paper*. Dummy variable equal to 1 if the respondent is a regular reader of a local daily newspaper.
- *Education*. Respondent's education level. Categorical variable from 1 to 7.
- *Income*. Total household income from all sources before tax. Categorical variable from 1 to 16.
- *Age*. Respondent's age (>18).
- *Sex*. Dummy variable equal to 1 for male respondents.
- *Married*. Dummy variable equal to 1 for married respondents (=1 also if "living as married")
- *Asian*. Dummy variable equal to 1 if Indian, Pakistani, Bangladeshi, Chinese, Other Asian.
- *Black*. Dummy variable equal to 1 if Black African, Black Caribbean, Other Black

- *Churchgoer*. Derived from answers to the question: "Apart from such special occasions as weddings, funerals and baptisms and so on, how often do you attend services or meeting connected with your religion?". Categorical variable from 1 (never or practically never) to 8 (once a week or more).

- *Length of Residence*. Answer to the question: "How long have you lived in this neighbourhood?".

- *Ideology*. Derived from individual placement on a left (0) to right (10) scale. Ideology=0 if left-right=5, Ideology=1 if left-right=4 or 6 etc.

- *Registered*. Dummy variable equal to 1 if respondent was on the electoral register on time to participate in the 1997 election.

- *Voted*92. Dummy variable equal to 1 if respondent voted in 1992 general election (self reported).

- *GLondon*. Dummy variable if respondent is resident in Greater London.

- *Wales*. Dummy variable equal to 1 if respondent is resident in Wales.

- *Scotland*. Dummy variable equal to 1 if respondent is resident in Scotland

- *Economic Activity*. Categorical variable:

1. "in paid work for at least 10 hours in week" or "waiting to take up paid work already accepted"; 1498 obs.;
2. "in full time education (not paid for by the employer, including on vacation". 9 obs.;
3. "on government training/employment programme". 64 obs.;
4. "unemployed". 127 obs.;
5. "permanently sick or disabled". 131 obs.;
6. "wholly retired from work". 642 obs.;
7. "looking after the home". 324 obs.;
8. "other". 18 obs.

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Table 1: Summary statistics

	Obs	Mean	Std. Dev.	Min	Max
News	641	5.1825	31.5908	0	637
Marginality97	641	0.7028	0.2006	0.1781	0.9988
Abs. Marginality	641	10853.15	6848.72	2	30708
Marginality92	641	0.7426	0.1631	0.2207	1
Marginal Cons. Const.	641	0.1217	0.3271	0	1
Density	641	4.5988	5.2845	0.0168	30.7634
Electorate/1000	641	66.5437	8.0574	22.983	101.68
Turnout%	641	71.3165	5.6359	51.4	82.2
Big Shot	641	0.078	0.2684	0	1
Average Age	641	37.8866	1.881	32.8793	46.533
Inactive%	641	51.32	3.2413	38.858	61.0908
Unemployment%	641	9.45	3.8	2.868	22.4896
HighD%	641	7.0963	3.743	1.4891	25.084
GLondon (const.)	641	0.1154	0.3198	0	1
Quality Paper Reader	2807	0.1336	0.3403	0	1
Local Paper Reader	2807	0.0577	0.2332	0	1
Education	2807	3.6021	2.1637	1	7
Income	2807	7.0495	4.587	1	16
Age	2807	48.3035	17.517	18	94
Sex	2807	0.4653	0.4989	0	1
Married	2807	0.5885	0.4922	0	1
Asian	2807	0.0185	0.1349	0	1
Black	2807	0.0089	0.094	0	1
Churchgoer	2807	1.9882	2.6079	0	7
Length of Residence	2807	19.5248	17.9378	0	94
Ideology	2807	1.9291	1.7758	0	6
Registered	2807	0.9865	0.1156	0	1
Voted92	2807	0.7973	0.4021	0	1
GLondon (indiv.)	2807	0.0794	0.2705	0	1
Wales	2807	0.0481	0.214	0	1
Scotland	2807	0.243	0.4289	0	1
Economic activity	2807	see description of variables			

Table 2: The variable "News"

News	Frequency	Percent	Cumulate
0	262	40.87	41,34
1	163	25.43	67.08
2	74	11.54	78.63
3	28	4.37	83
4	19	2.96	85.80
5	24	3.74	89.55
6-10	25	3.9	93.45
11-20	20	3.12	96.41
21-30	9	1.40	97.97
31-40	5	0.78	98.44
41-50	3	0.47	98.91
51-100	4	0.62	99.53
>100	5	0.78	100

Table 3: Information Supply (OLS)

Dependent Variable = Ln(News)

	1	2	3	4	5
Marginality97	2.9645**				
	(2.15)				
Abs. Marginality97		-0.0734**			
		(2.08)			
Marginality92			1.3230		
			(1.07)		
Marginal Conservative Const.				1.9753***	1.7727***
				(3.54)	(3.31)
Density	0.1440**	0.1469**	0.1294*	0.1102	0.1463**
	(2.00)	(2.04)	(1.76)	(1.49)	(2.20)
Electorate/1000	0.0478*	0.0613**	0.0581**	0.0541**	0.0541**
	(1.89)	(2.52)	(2.37)	(2.24)	(2.23)
Turnout	-0.0553	-0.0379	-0.0260	-0.0616	
	(1.02)	(0.73)	(0.50)	(1.19)	
Big shot	5.2560***	5.2253***	5.3121***	5.3408***	5.3453***
	(8.82)	(8.69)	(8.97)	(9.10)	(9.06)
Average Age	-0.2058	-0.2036	-0.1270	-0.1097	-0.1183
	(1.37)	(1.35)	(0.85)	(0.73)	(0.79)
Inactive	0.2603**	0.2525**	0.2099*	0.2098*	0.2127*
	(2.06)	(2.00)	(1.66)	(1.67)	(1.70)
Unemployment	-0.2975***	-0.2961***	-0.3047***	-0.3200***	-0.2903***
	(2.58)	(2.58)	(2.64)	(2.79)	(2.57)
HighD	0.0506	0.0424	0.0481	0.0631	0.0506
	(0.74)	(0.62)	(0.69)	(0.92)	(0.75)
GLondon	1.5948**	1.6131**	1.8055**	1.9040**	1.7684**
	(2.10)	(2.13)	(2.42)	(2.55)	(2.41)
Constant	-8.9036	-7.8142	-10.8558	-7.8509	-12.3878**
	(1.35)	(1.16)	(1.66)	(1.20)	(2.37)
Obs	641	641	641	641	641
R-squared	0.1363	0.1359	0.1314	0.145	0.1432

Note: robust standard errors. T-statistics in parenthesis.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: Newspaper readership (quality papers) (Probit marginal effects)

Dependent Variable = Quality Paper Reader

	1	2	3	4	5
Marginality97	0.0947*** (2.62)	0.1091*** (3.09)			
Abs. Marginality97			0.0033*** (3.53)		
Marginality92				0.0195 (0.53)	
Marginal Conservative Const.					0.0115 (0.51)
Electorate/1000	0.009 (0.84)	0.009 (0.88)	0.0014 (1.33)	0.0016 (1.55)	0.0017* (1.65)
Age	0.0063** (2.46)	0.0065*** (2.62)	0.0065*** (2.61)	0.0069*** (2.74)	0.0069*** (2.73)
Age2	0.0027 (1.09)	0.0032 (1.32)	-0.0032 (1.30)	-0.0035 (1.42)	-0.0035 (1.41)
Sex	0.045*** (3.36)	0.049*** (3.73)	0.0482*** (3.69)	0.0503*** (3.79)	0.0507*** (3.80)
Married	-0.0189 (1.24)	-0.0124 (0.83)	-0.0115 (0.77)	-0.0157 (1.03)	0.0157 (1.02)
Asian	0.0617 (1.07)	0.0593 (1.11)	0.0613 (1.16)	0.0505 (0.95)	0.0516 (0.96)
Black	0.0241 (0.38)	0.0438 (0.69)	0.0406 (0.65)	0.0193 (0.32)	0.0190 (0.32)
Length of Resid.	-0.0012*** (2.69)	-0.0010** (2.41)	-0.001 **(2.40)	-0.0011*** (2.61)	-0.0012*** (2.65)
Registered	-0.1311* (1.78)	-0.0833 (1.16)	-0.0831 (1.16)	-0.0839 (1.16)	-0.0835 (1.16)
Voted92	-0.015 (0.82)	-0.0193 (1.08)	-0.0192 (1.07)	0.0198 (1.08)	-0.0204 (1.12)
Ideology	0.0186*** (5.16)	0.018*** (5.20)	0.018*** (5.20)	0.018*** (5.15)	0.0181*** (5.18)
GLondon	0.0559** (2.30)	0.0551** (2.35)	0.0523** (2.26)	0.0563** (2.34)	0.0572** (2.36)
Scotland	-0.0223 (1.05)	-0.0219 (1.06)	-0.024 (1.17)	-0.0212 (1.01)	-0.0109 (0.36)
Wales	-0.0000 (0)	-0.0054 (0.18)	-0.0045 (0.15)	-0.011 (0.36)	-0.0195 (0.93)
Big shot	-0.0206 (0.93)	-0.0235 (1.10)	-0.0238 (1.12)	-0.0166 (0.73)	-0.0163 (0.71)
Education	0.0318*** (8.73)	yes	yes	yes	yes
Income	0.0137*** (7.28)	yes	yes	yes	yes
Churchgoer	0.0094*** (3.78)	yes	yes	yes	yes
Economic Activity	yes	yes	yes	yes	yes
Obs.	2807	2807	2807	2807	2807
Log-Likelihood	-906.97	-864.74	-863.01	-870.57	-870.56
Pseudo-R2	0.2291	0.2650	0.2664	0.2600	0.2600

Note: the table reports marginal effects at the mean for continous variables and the probability variation determined by a switch from 0 to 1 for dummy variables. z-statistics from robust standard errors are in round brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: Newspaper readership (local papers) (Probit marginal effects)

Dependent Variable = Local Paper Reader

	1	2	3	4	5
Marginality97	0.0249** (2.34)	0.0228*** (2.83)			
Abs. Marginality97			0.0006** (2.30)		
Marginality92				0.0165* (1.88)	
Marginal Conservative Const.					0.0019 (0.45)
Electorate/1000	-0.0001 (0.48)	-0.0001 (0.52)	-0.0027 (0.01)	-0.0001 (0.35)	-0.0000 (0.12)
Age	0.0012** (2.02)	0.0011** (2.52)	0.0011** (2.50)	0.0012** (2.52)	0.0012** (2.52)
Age2	-0.0009 (1.50)	-0.0008* (1.92)	-0.0008* (1.90)	-0.0009* (1.93)	-0.0009* (1.94)
Sex	0.0069* (1.85)	0.0052* (1.86)	0.0053* (1.86)	0.0056* (1.92)	0.0058* (1.95)
Married	0.0042 (1.11)	0.0034 (1.08)	0.0035 (1.12)	0.0035 (1.09)	0.0035 (1.05)
Black	0.2032*** (3.82)	0.0939*** (3.71)	0.0861*** (3.57)	0.0592*** (2.97)	0.0614*** (2.97)
Length of Resid.	0.0001 (1.12)	0.0001 (1.11)	0.0001 (1.06)	0.0001 (1.02)	0.0001 (0.82)
Voted92	0.0008 (0.19)	0.0001 (0.04)	0.0001 (0.03)	0.0004 (0.13)	0.0005 (0.15)
Ideology	0.0008 (0.82)	0.0007 (0.99)	0.0007 (0.96)	0.0006 (0.81)	0.0006 (0.75)
GLondon	-0.0118*** (3.20)	-0.0093*** (3.27)	-0.0095*** (3.28)	-0.0096*** (3.09)	-0.0101*** (3.22)
Scotland	0.0622*** (3.50)	0.0576*** (3.83)	0.0569*** (3.76)	0.0505*** (3.73)	0.0490*** (3.57)
Wales	0.1787*** (7.87)	0.1759*** (8.99)	0.1741*** (8.91)	0.1692*** (9.14)	0.1827*** (9.22)
Big shot	-0.0018 (0.21)	-0.0018 (0.28)	-0.0017 (0.27)	-0.0005 (0.07)	-0.0009 (0.13)
Education	0.0021** (2.19)	yes	yes	yes	yes
Income	0.0002 (0.48)	yes	yes	yes	yes
Churchgoer	0.0006 (1.04)	yes	yes	yes	yes
Economic Activity	yes	yes	yes	yes	yes
Obs.	2713	2713	2713	2713	2713
Log-Likelihood	-279.81	-266.37	-267.26	-268.57	-270.09
Pseudo-R2	0.2688	0.3039	0.3016	0.2982	0.2942

Note: the table reports marginal effects at the mean for continous variables and the probability variation determined by a switch from 0 to 1 for dummy variables. z-statistics from robust standard errors are in round brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.