Ethical voters and the demand for political news*

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Abstract

Rational choice theory has difficulty explaining why people demand political news when the probability of their vote being pivotal is low. Group rule utilitarianism can provide a rationale for citizens to incur non-negligible costs with the unique aim of being informed at the voting stage. We build a framework in which citizens decide to consume news and vote according to a rule that maximises the payoff of their group if followed by all its members. Media outlets report on the ability of the candidates running for office, and they compete for audience by choosing their slant. We focus on the impact of competition on media slant, turnout, and the selection of competent politicians. Our results can explain empirical evidence showing that entry in the media market can either increase or decrease turnout. Consistent with evidence on the "Fox News effect," we show that competition tends to result in more slanted news reporting, as outlets try to please voters with more extreme views. Nonetheless, competition improves the high-ability candidate's chances of winning the election.

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1 Introduction

A string of recent empirical papers highlights the connection between media markets and political participation (DellaVigna and Kaplan 2007; Enikolopov, Petrova, and Zhuravskaya 2011; Gentzkow, Shapiro, and Sinkinson 2011; George and Waldfogel 2008; Oberholzer-Gee and Waldfogel 2009). These papers show that changes in the structure of the media market can have important effects on citizens' decisions to vote. The existing theoretical literature on media and politics has a hard time explaining this relationship. It tends to assume that the demand for political news does not originate from citizens' desire to make informed decisions at the ballot box, but rather from the need to become informed for other, private purposes (Gentzkow and Shapiro 2006; Stromberg 2004). Alternatively, the literature assumes that citizens' cost of voting is zero, so that everybody votes (Chan and Suen 2008).

As noted by Downs (1957), explaining why people demand information about politics is less than straightforward. A citizen's benefit from becoming informed equals the gain from swinging the election in favour of the better candidate. Because in large electorates a single vote is unlikely to be pivotal, rational citizens have little incentive to become informed.

In this paper, we employ a group rule-utilitarian approach, pioneered by Harsanyi (1977, 1980) and developed into a theory of ethical voting by Coate and Conlin (2004) and Feddersen and Sandroni (2006), to generate demand for political news. The electorate is divided into several distinct groups of citizens. Each citizen is assumed to behave according to a rule which maximises the group's welfare if followed by all its members. Because the group as a whole benefits from its members being informed, this allows us to endogenously derive the demand for news and link it to the decision to vote.

We then use the model to investigate how the characteristics of the media market affect political outcomes. In particular, we examine the effect of competition on turnout. We show that entry of an additional outlet can either increase or decrease turnout. This result is in line with the fact that the literature has produced conflicting evidence as to the effect of entry on turnout. For example, Gentzkow, Shapiro, and Sinkinson (2011), who study local newspaper markets in the United States, report a positive effect, while Enikolopov, Petrova, and Zhuravskaya (2011), who study the entry of a private TV channel in Russia, report a negative effect.

Our result that the effect can be of either sign is driven by information having heterogenous effects on the different groups of citizens in the model, namely partisans and independents. Independents do not know which candidate is preferable, and abstain if they remain uninformed. Partisans know which candidate they prefer, but do not know how much they gain from their preferred candidate being elected rather than the opposing one. Independents thus consume news to find out who to vote for, and news consumption increases their turnout. Partisans consume news to be able to fine-tune their voting behaviour to the importance of winning the election, and news consumption tends to reduce their turnout on average. The net effect of these opposing forces is generally ambiguous and depends on the share of partisans and independents in the population.

We also show that competition in the media market often leads to more supply and consumption of slanted news. Additional media outlets try to grab market share by catering to specific groups of citizens. This is consistent with the Fox News effect reported by DellaVigna and Kaplan (2007). Yet, competition usually increases the probability that the higher-ability candidate wins the election: it leads to greater overall news consumption, and both partisans and independents adjust their turnout in a way that favours the better candidate when they are informed.

The remainder of the paper is organised as follows. Section 2 lays out the model. Section 3 derives the equilibrium in the market for political news and sets forth our results on the effect of competition on turnout and media slant. Section 4 concludes.

2 The model

Two alternative candidates A and B compete for election. Their quality depends on the state of the world S, which can be either A or B. If $S = A$ then candidate A's quality is $w_A = \overline{w}$ and candidate B's quality is $w_B = \underline{w}$, while if $S = B$ then $w_A = \underline{w}$ and $w_B = \overline{w}$, with $\overline{w} > \underline{w} > 0$.[1] Both states are equally likely. Citizens do not observe the state of the world and have to consume political news to learn about it. Let $w^e \equiv (\overline{w} + \underline{w})/2$ denote the expected quality of a candidate.

The population, of unit mass, is composed of three types of citizens $i \in \{A, B, I\}$: partisans of candidate A, partisans of candidate B, and independents. Let ρ_i denote the fraction of the population that belongs to group i. Each group of partisans represents an equal fraction of the population: $\rho_A = \rho_B = (1 - \rho)/2$, with $\rho \in [0, 1]$. Independents represent the remainder of the population, $\rho_I = \rho$. We will refer to $1 - \rho$ as the degree of *polarisation* of society.

The election is decided by majority rule, and the winning candidate is denoted $\theta \in \{A, B\}$. The share of citizens of type i going to cast their ballot is denoted σ_i. A citizen of type i has a cost of voting $\tilde{c}(\rho_i\sigma_i)^\gamma$, where $\tilde{c}$ is a cost parameter drawn independently from a uniform distribution on the support $[0, \bar{c}]$, and $\gamma \geq 0$ is a parameter measuring congestion at the ballot box. If $\gamma > 0$, then the individual cost of voting increases with the total number of citizens of a type going to vote.

[1] This information structure simplifies the exposition. We could alternatively assume that w_A and w_B are iid; our qualitative results would be largely unaffected.

Suppose $S = A$, so that partisans of A and independents vote for candidate A while partisans of B vote for candidate B. Candidate A wins the election iff $\rho\sigma_I + (1-\rho)(\sigma_A - \sigma_B)/2 \geq \varepsilon$, where ε is a mean-zero error distributed according to cdf F. Assume that F is uniform on $\left[-\frac{1}{2\psi}, \frac{1}{2\psi}\right]$. The probability that candidate A wins is

$$\Pr(\theta = a) = F\left(\rho\sigma_I + \frac{1-\rho}{2}(\sigma_A - \sigma_B)\right) = \frac{1}{2} + \psi\left[\rho\sigma_I + \frac{1-\rho}{2}(\sigma_A - \sigma_B)\right]. \qquad (1)$$

The market for political news consists of $M \geq 0$ profit-maximising media outlets. Each outlet receives a perfectly informative signal about the state of the world, which it reports in its news section. The media's only source of revenue is advertising. We assume that advertising revenue is proportional to an outlet's audience. Therefore, each outlet tries to maximise its expected audience.

At the beginning of the game, each outlet commits to the political slant n with which it reports the news. An outlet can report the news with a partisan slant ($n \in \{n_A, n_B\}$), in which case the information is presented in a way that caters to the tastes of the targeted group of partisans. Alternatively, it can report the news without slant ($n = n_I$), in which case the information is presented in a neutral way. Commitment to a political slant is plausible because it can be achieved, e.g., by hiring an editor whose political views are publicly known.

Citizens derive utility from three sources: electoral outcomes, news consumption, and ethical behaviour. Utility (gross of the cost of voting) is separable in its three components and given by $U_i = u_i^V + u_i^N + u_i^D$, where u_i^V is the utility from the voting outcome, u_i^N is the utility from news consumption, and u_i^D is the utility from ethical behaviour. All three components depend on a citizen's type; moreover, the utility from the voting outcome depends on the state of the world S and on the winning candidate θ. Specifically, for partisans of i,

$$u_i^V = \begin{cases} w_i & \text{if candidate } i \text{ wins} \\ 0 & \text{if candidate } j \neq i \text{ wins,} \end{cases} \qquad i = A, B. \qquad (2)$$

That is, if their candidate wins, partisans obtain a payoff equal to the quality of their candidate, and zero otherwise. A partisan's utility from consuming a news outlet with slant $n \in \{n_A, n_B, n_I\}$ is

$$u_i^N = \begin{cases} \overline{n} & \text{if } n = n_i \\ 0 & \text{if } n = n_I \\ \underline{n} & \text{if } n = n_j \text{ for } j \neq i,\ j \in \{A, B\}, \end{cases} \qquad i = A, B, \qquad (3)$$

where $\overline{n} > 0 \geq \underline{n}$. Thus, each partisan group has a preferred slant that corresponds to its own ideology and derives more utility from a news outlet that is closer to its preferred slant.

Independents' utility from the voting outcome is equal to the ability of the winning candidate, $u_I^V = w_\theta$. They have no utility *per se* from consuming a news outlet: regardless of its slant, $u_I^N(n) = 0$ for all n. Nevertheless, as a tie-breaking rule, we assume that if among the available outlets there is (at least) one without slant ($n = n_I$), independents prefer it to outlets with partisan slant. All citizens have an opportunity cost R of consuming the news, which can be seen as a measure of the utility from alternatives to news consumption, particularly entertainment. We assume $R \geq \overline{n}$.

Citizens' utility from ethical behaviour is

$$u_i^D = \begin{cases} d & \text{if the citizen behaves ethically} \\ 0 & \text{otherwise,} \end{cases}$$

where $d > 0$ is a civic-duty payoff or a payoff from doing one's part, as in Feddersen and Sandroni (2006). Each citizen obtains a payoff of d if he behaves according to the rule that, if followed by all other citizens in his group, maximises the group's utility. A rule of ethical behaviour comprises both a media outlet to consume and a threshold for the voting cost, c_i^*, below which a citizen is supposed to cast his ballot. Note that receiving d is not tied to voting *per se*: a citizen whose cost is above the threshold c_i^* and who follows the rule by abstaining also obtains d. All citizens in a group understand what the rule is. They do not receive d unless they follow the ethical rule at both the news consumption and the voting stage.

Because $R \geq \overline{n}$ and a single vote is never pivotal in this model, the only reason for a citizen to consume political news and vote is to secure the payoff d from behaving ethically. Citizens will only forego the outside option R (entertainment) and incur the cost of voting if (a) consuming news and participating in the election increases their group's collective payoff (making it ethical to behave in this way), and (b) the payoff d is sufficiently large to compensate them for the cost of voting and the foregone utility from consumption of entertainment. In what follows, we assume that d is always large enough for part (b) to be satisfied and focus on part (a).

The timing of the game is as follows. Nature draws the state of the world S. Media outlets announce their political slant. They learn the state of the world and report it with the announced slant. Citizens decide whether and from which of the M available outlets to consume news, and outlets receive advertising revenue proportional to the size of their audience. Citizens then learn their cost of voting and decide whether and for which candidate to vote. The candidate receiving the majority of votes wins the election, and citizens' payoffs from the electoral outcome are realised.

3 Equilibrium in the market for political news

We solve the game backward starting from the voting stage.

3.1 The voting stage

At the voting stage, the rule of ethical behaviour consists in a cost threshold c_i^* below which the citizen is supposed to vote. The expected cost of voting of group i when it uses a cutoff rule c_i^* is C_i, given by

$$C_i = \int_0^{c_i^*} \frac{\tilde{c}}{\bar{c}} (\rho_i \sigma_i)^\gamma \, \mathrm{d}\tilde{c}. \tag{4}$$

The cost $\tilde{c}$ being uniform over the support $[0, \bar{c}]$, choosing a threshold c_i^* means that a fraction $\sigma_i = c_i^*/\bar{c}$ of citizens in group i votes. Hence, choosing a threshold c_i^* is equivalent to choosing the fraction σ_i directly. Letting $c \equiv (2+\gamma)\bar{c}/2$, we have

$$C_i = (\rho_i \sigma_i)^\gamma \left[\frac{\tilde{c}^2}{2\bar{c}}\right]_0^{\bar{c}\sigma_i} = \frac{c}{2+\gamma} \rho_i^\gamma \sigma_i^{2+\gamma}. \tag{5}$$

Define $K_i \in \{0,1\}$ as an indicator variable that takes value 1 when group i is informed about the state of the world S and value 0 when group i is uninformed. Together with S, K_i determines group i's optimal σ_i.

Partisans. Partisan group i chooses σ_i to solve

$$\max_{\sigma_i} V_i(K_i, S) - C_i, \tag{6}$$

where $V_i(K_i, S) \equiv E[w_i \Pr(\theta = i)]$ for $i = A, B$. We have

$$V_i(K_i,S) = \begin{cases} \overline{w}\left[\frac{1}{2} + \psi\left(\frac{1-\rho}{2}(\sigma_i - \sigma_j) + \rho\sigma_I\right)\right] & \text{if } K_i = 1 \text{ and } S = i \\ \underline{w}\left[\frac{1}{2} + \psi\left(\frac{1-\rho}{2}(\sigma_i - \sigma_j) - \rho\sigma_I\right)\right] & \text{if } K_i = 1 \text{ and } S \neq i \\ w^e\left[\frac{1}{2} + \psi\left(\frac{1-\rho}{2}(\sigma_i - \sigma_j) + \rho\sigma_I \frac{\overline{w} - \underline{w}}{2w^e}\right)\right] & \text{if } K_i = 0. \end{cases}$$

The first-order condition for an interior solution is

$$w_i \psi \left(\frac{1-\rho}{2}\right)^{1-\gamma} = c\sigma_i^{1+\gamma}, \tag{7}$$

where $w_i \in \{\underline{w}, \overline{w}, w^e\}$, with a slight abuse of notation. To ensure an interior solution for all ρ when $\gamma \leq 1$, we impose the following assumption:

Assumption 1. $\overline{w}\psi < 2^{1-\gamma} c$.

Under Assumption 1, the solution to (6) is

$$\sigma_i(w_i) = \begin{cases} \left(\frac{1-\rho}{2}\right)^{\frac{1-\gamma}{1+\gamma}} \left(\frac{w_i\psi}{c}\right)^{\frac{1}{1+\gamma}} & \text{if } \rho \leq \overline{\rho}(w_i) \\ 1 & \text{if } \rho > \overline{\rho}(w_i), \end{cases} \tag{8}$$

where $\overline{\rho}(w_i) = 1$ for $\gamma \leq 1$ and $\overline{\rho}(w_i) = 1 - 2(w_i\psi/c)^{1/(\gamma-1)}$ for $\gamma > 1$. In what follows, we focus on interior solutions.

If a group of partisans is uninformed about S, the group's share that votes is $\sigma_0^* \equiv \sigma_i(w^e)$. If a group of partisans is informed, the group's share that votes is $\overline{\sigma}^* \equiv \sigma_i(\overline{w})$ if $w_i = \overline{w}$ and $\underline{\sigma}^* \equiv \sigma_i(\underline{w})$ if $w_i = \underline{w}$. Clearly, $\underline{\sigma}^* < \sigma_0^* < \overline{\sigma}^*$.

Independents. Independents choose σ_I to solve

$$\max_{\sigma_I} V_I(K_I, S) - C_I, \tag{9}$$

where $V_I(K_I, S) \equiv E(w_\theta)$. If independents are uninformed about S, they do not vote. Formally, $V_I(0, S)$ does not depend on σ_I because both states of the world are equally likely. If independents are informed, they vote for the better candidate (the one with ability $\overline{w}$). Suppose without loss of generality that $S = A$ (candidate A is better). Then,

$$V_I(1, A) = \overline{w}\left[\frac{1}{2} + \psi\left(\rho\sigma_I + \frac{1-\rho}{2}(\sigma_A - \sigma_B)\right)\right] + \underline{w}\left[\frac{1}{2} - \psi\left(\rho\sigma_I + \frac{1-\rho}{2}(\sigma_A - \sigma_B)\right)\right].$$

The first-order condition for an interior solution when $K_I = 1$ is

$$(\overline{w} - \underline{w})\psi\rho^{1-\gamma} = c\sigma_I^{1+\gamma}.$$

The following assumption ensures an interior solution for all ρ when $\gamma \leq 1$:

Assumption 2. *$(\overline{w} - \underline{w})\psi \leq c$.*

Under Assumption 2, the solution to (9) is

$$\sigma_I^* = \begin{cases} \rho^{\frac{1-\gamma}{1+\gamma}}\left(\dfrac{(\overline{w} - \underline{w})\psi}{c}\right)^{\frac{1}{1+\gamma}} & \text{if } \rho \geq \underline{\rho} \\ \\ 1 & \text{if } \rho < \underline{\rho}, \end{cases}$$

where $\underline{\rho} = 0$ for $\gamma \leq 1$ and $\underline{\rho} = ((\overline{w} - \underline{w})\psi/c)^{1/(\gamma-1)}$ for $\gamma > 1$.

Turnout. A partisan group's turnout when they do not consume news is given by

$$ET_P^0 \equiv \frac{1-\rho}{2}\sigma_0^* = \left(\frac{\psi}{c}\left(\frac{1-\rho}{2}\right)^2 \frac{\overline{w} + \underline{w}}{2}\right)^{\frac{1}{1+\gamma}}, \tag{10}$$

where the superscript 0 indicates that the group of partisans is uninformed. When a group of partisans consumes news (and thus learns the state of the world), their expected turnout is given by

$$ET_P^1 = \frac{1-\rho}{2}\left(\frac{\underline{\sigma}^* + \overline{\sigma}^*}{2}\right) = \left(\frac{\psi}{c}\left(\frac{1-\rho}{2}\right)^2\right)^{\frac{1}{1+\gamma}}\left[\frac{\underline{w}^{\frac{1}{1+\gamma}}}{2} + \frac{\overline{w}^{\frac{1}{1+\gamma}}}{2}\right], \tag{11}$$

where the superscript 1 indicates that the group of partisans is informed.

Lemma 1. *In the presence of congestion at the ballot box ($\gamma > 0$), a partisan group's expected turnout is lower when they consume news than when they do not: $ET_P^0 > ET_P^1$.*

The intuition for this result is that when there is congestion at the ballot box ($\gamma > 0$), the marginal cost of increasing the share of people who vote is convex: an additional percentage point is more costly when σ is high. This means that as w_i becomes larger, partisans increase turnout at a decreasing rate: the increase in turnout when moving from $\underline{w}$ to w^e is larger than the increase when moving from w^e to $\overline{w}$. On average, therefore, turnout is lower when partisans are informed about w_i.

When independents consume news, their turnout is

$$ET_I^1 = \rho\sigma_I^* = \left(\frac{\psi\rho^2(\overline{w} - \underline{w})}{c}\right)^{\frac{1}{1+\gamma}}. \tag{12}$$

Becoming informed has opposite effects on partisans and independents: for partisans, it decreases expected turnout, while for independents, it increases turnout. These effects will play an important role for our analysis of how competition in the media market impacts political participation.

Expected payoffs at the voting stage. To write the expected payoffs in a form that is as compact as possible, let us define the following functions, giving for each group the equilibrium share that votes as a function of their information:

$$\overline{\sigma}(K_i) = \begin{cases} \overline{\sigma}_0^* & \text{if } K_i = 0 \\ \overline{\sigma}^* & \text{if } K_i = 1 \end{cases} \qquad i = A, B, \tag{13}$$

$$\underline{\sigma}(K_i) = \begin{cases} \underline{\sigma}_0^* & \text{if } K_i = 0 \\ \underline{\sigma}^* & \text{if } K_i = 1 \end{cases} \qquad i = A, B, \tag{14}$$

$$\sigma_I(K_I) = \begin{cases} 0 & \text{if } K_I = 0 \\ \sigma_I^* & \text{if } K_I = 1. \end{cases} \tag{15}$$

The expected payoff of partisan group i as a function of the information held by all the groups can then be written as

$$\begin{aligned} EU_i^P(K_i, K_j, K_I) = {} & \frac{\overline{w}}{2}\left[\frac{1}{2} + \psi\left(\rho\sigma_I(K_I) + \frac{1-\rho}{2}(\overline{\sigma}(K_i) - \underline{\sigma}(K_j))\right)\right] \\ & + \frac{\underline{w}}{2}\left[\frac{1}{2} - \psi\left(\rho\sigma_I(K_I) + \frac{1-\rho}{2}(\overline{\sigma}(K_j) - \underline{\sigma}(K_i))\right)\right] \\ & - \frac{c}{2+\gamma}\left(\frac{1-\rho}{2}\right)^{\gamma}\left[\frac{\overline{\sigma}(K_i)^{2+\gamma}}{2} + \frac{\underline{\sigma}(K_i)^{2+\gamma}}{2}\right], \quad i, j = A, B,\ j \neq i. \end{aligned}$$

Let $\Delta_P \equiv EU_i^P(1, K_j, K_I) - EU_i^P(0, K_j, K_I)$ denote a partisan group's gain from being informed. The following lemma characterises the gain and shows that it does not depend on the information of the opposing partisan group and the independents.

Lemma 2. *Being informed increases a partisan group's payoff at the voting stage by*

$$\Delta_P(\rho) = \mu \left(\frac{1-\rho}{2} \right)^{\frac{2}{1+\gamma}} \left[\frac{\overline{w}^{\frac{2+\gamma}{1+\gamma}} + \underline{w}^{\frac{2+\gamma}{1+\gamma}}}{2} - (w^e)^{\frac{2+\gamma}{1+\gamma}} \right] \geq 0, \tag{16}$$

where

$$\mu \equiv \frac{1+\gamma}{2+\gamma} \left(\frac{\psi^{2+\gamma}}{c} \right)^{\frac{1}{1+\gamma}},$$

with strict inequality for $\rho < 1$. The gain does not depend on the behaviour of the opposing partisan group and the independents.

The intuition is that it is always beneficial to be more informed at the voting stage. Being informed makes it possible to fine-tune turnout according to the ability of one's candidate. When the candidate is of high ability, so that the stakes are high, partisans can increase σ. This increases the probability of winning when it matters most. When the candidate is of low ability, partisans can decrease σ, which saves on voting costs when winning does not matter as much.

The independents' expected payoff as a function of the information held by all the groups can be written as

$$\begin{aligned} EU^I(K_A, K_B, K_I) = &\frac{1}{2} \left[w^e + (\overline{w} - \underline{w})\psi \left(\rho\sigma_I(K_I) + \frac{1-\rho}{2} \left(\overline{\sigma}(K_A) - \underline{\sigma}(K_B) \right) \right) \right] \\ &+ \frac{1}{2} \left[w^e + (\overline{w} - \underline{w})\psi \left(\rho\sigma_I(K_I) + \frac{1-\rho}{2} \left(\overline{\sigma}(K_B) - \underline{\sigma}(K_A) \right) \right) \right] - \frac{c}{2+\gamma} \rho^\gamma \sigma_I(K_I)^{2+\gamma}. \end{aligned}$$

Let $\Delta_I \equiv EU^I(K_A, K_B, 1) - EU^I(K_A, K_B, 0)$ denote the independents' gain from being informed. The following lemma characterises the gain and shows that it does not depend on the information of the partisan groups.

Lemma 3. *Being informed increases the independents' payoff at the voting stage by*

$$\Delta_I(\rho) = \mu\rho^{\frac{2}{1+\gamma}} \left(\overline{w} - \underline{w} \right)^{\frac{2+\gamma}{1+\gamma}} \geq 0, \tag{17}$$

with strict inequality for $\rho > 0$. The gain does not depend on the partisan groups' behaviour.

The intuition for this result is that the independents benefit from being informed because their vote improves the chances of the high-ability candidate. The marginal effect of σ_I is independent of σ_A and σ_B. Thus, σ_I and the gain from being informed do not depend on the state of the world or on whether partisans are informed.

3.2 The news consumption stage

Lemma 2 implies that a partisan group's optimal ethical rule at the news consumption stage does not depend on the behaviour of the other groups (i.e., there is a dominant strategy). Letting $\mathcal{N}$ denote the set of slants among available media outlets, partisans of group i are collectively better off consuming the news if and only if

$$\Delta_P(\rho) + \max_{n \in \mathcal{N}} u_i^N \geq R. \tag{18}$$

This allows us to derive news consumption as a function of the available slants and the value of the outside opportunity R:

- If $R > \Delta_P + \overline{n}$, partisans never consume political news.
- If $\Delta_P < R \leq \Delta_P + \overline{n}$, partisans only consume news of their most preferred slant (i.e., they consume their own partisan outlet but not the opposing partisan outlet or an independent outlet).
- If $\Delta_P + \underline{n} < R \leq \Delta_P$, partisans are willing to consume news without slant (i.e., if their own partisan outlet is unavailable, they consume an independent outlet).
- If $R \leq \Delta_P + \underline{n}$, partisans always consume news, even if it has their least preferred slant (i.e., the opposing partisan outlet).

Lemma 3 implies that independents' optimal ethical news-consumption rule also does not depend on the other groups' behaviour. Independents' gain collectively from being informed if and only if $\Delta_I(\rho) \geq R$. They are indifferent between available outlets because they do not care about slant.[2] Thus, if $\Delta_I \geq R$, they consume any available outlet, while if $\Delta_I < R$ they do not consume any news.

3.3 The effect of market entry on participation

Figure 1 shows how $\Delta_P(\rho)$ and $\Delta_I(\rho)$ divide the (ρ, R) space into different regions of ethical news consumption. In addition, it depicts two critical values of ρ which play a role in determining the effect of market entry on turnout, ρ^* and ρ^{**}. They are defined as the values of ρ that solve the following equations:

$$\rho^* : \; ET_I^1 = ET_P^0 - ET_P^1 \tag{19}$$

$$\rho^{**} : \; ET_I^1 = 2(ET_P^0 - ET_P^1), \tag{20}$$

[2] The only exception is the tie-breaking rule specified in Section 2, according to which independents choose an outlet with independent slant over one with partisan slant whenever both are available.

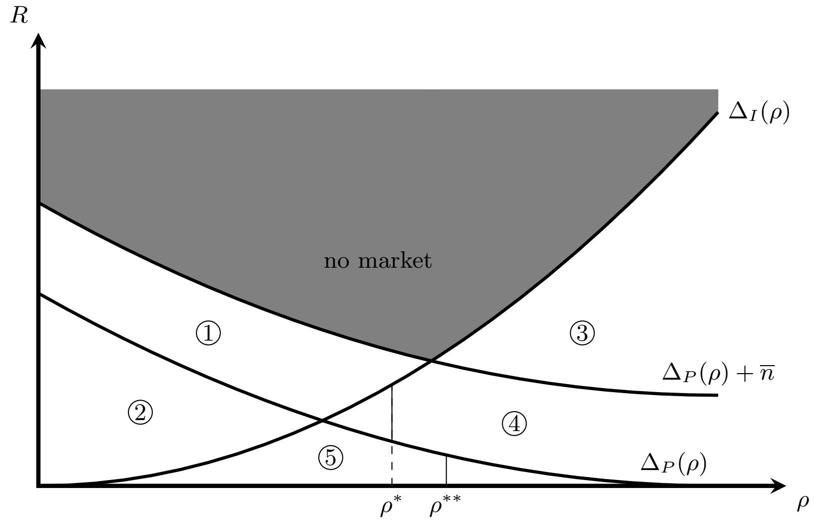

Figure 1: News consumption as a function of ρ and R

and their significance is the following. Consider a change in the media market such that both the independents and one group of partisans become informed (while previously they were not), and the other partisan group's decision whether to consume news is unaffected. In general, the total effect on turnout of such a change is ambiguous because being informed decreases partisan turnout (see Lemma 1) but increases independent turnout. The threshold ρ^* is such that the change increases total turnout for $\rho > \rho^*$, decreases it for $\rho < \rho^*$, and leaves turnout constant for $\rho = \rho^*$. The other threshold, ρ^{**}, is defined analogously for a change in the media market that leads all three groups to become informed. Clearly, $\rho^{**} > \rho^*$ because when both groups of partisans decrease their turnout, the proportion of independents needs to be relatively larger for the overall effect on turnout to be positive.[3]

Propositions 1 to 3 characterise the impact of entry in the media market on turnout. The first two propositions provide necessary and sufficient conditions for entry to decrease turnout (Proposition 1) and for entry to increase turnout (Proposition 2) regardless of the number of existing media outlets. Proposition 3 gives conditions under which the sign of the effect depends on the number of existing media outlets.

Proposition 1. *Market entry always weakly decreases turnout if* $R \leq \Delta_P(\rho) + \overline{n}$ *and one of the following conditions is met:*

(i) $R > \Delta_I(\rho)$ *(i.e., independents do not consume any news),*

[3]The proof of Proposition 1 shows that ρ^* and ρ^{**} are uniquely defined by (19) and (20), respectively, and contained in the interval $(0, 1)$.

(ii) $R > \Delta_P(\rho)$ *(i.e., partisans only consume news with their favourite slant) and* $\rho < \min\{1/2, \rho^*\}$*,*

(iii) $R \leq \Delta_P(\rho)$ *and* $\rho < \rho^{**}$*.*

The decrease is strict as long as entry modifies some citizens' decision of whether or not to consume news and $\gamma > 0$*.*

Proposition 1 states that a necessary condition for entry to decrease turnout is that a group of partisans benefits collectively from consuming news which is presented with their own partisan slant. Otherwise, entry can never induce partisans to consume news, which is required for turnout to go down following entry.[4] The proposition then provides three sufficient conditions. Condition (i) corresponds to regions 1 and 2 in Figure 1, where independents do not consume news. Entry never causes any partisan group to stop consuming news in these regions, so the result always holds in a weak sense; by Lemma 1, it holds in a strong sense if $\gamma > 0$ and entry induces at least one previously uninformed partisan group to become informed.

Conditions (ii) and (iii) additionally cover parts of regions 4 and 5, respectively, where independents consume news, so that entry has the potential to increase turnout. The conditions on ρ ensure that in equilibrium it does not. In region 4, partisans do not consume independent news. Thus, the first entrant will choose a partisan slant to attract both the independents and one of the partisan groups. Provided $\rho < \rho^*$, the total effect on turnout is negative. Moreover, $\rho < 1/2$ means that when a second outlet enters, the equilibrium has both outlets reporting with opposing partisan slants, thus further reducing turnout.[5] Subsequent entrants do not modify the set of available slants and therefore do not affect turnout.

In region 5, partisans are potentially interested in consuming both independent and their own partisan news (with a preference for the latter, when available). The first entrant can thus capture the entire market. All groups consume news and change their turnout. When $\rho < \rho^{**}$, the effect on partisans dominates the effect on independents. Further entry does not affect turnout.

Proposition 2. *Market entry always weakly increases turnout if* $R \leq \Delta_I(\rho)$ *and one of the following conditions is met:*

(i) $R > \Delta_P(\rho) + \overline{n}$ *(i.e., partisans do not consume any news),*

(ii) $R \leq \Delta_P(\rho)$ *and* $\rho > \rho^{**}$*.*

[4] The other possibility would be that entry causes independents to stop consuming news, but this never happens in equilibrium; see the proof of Proposition 1.

[5] In region 4, the equilibrium with two media outlets is (n_A, n_B) if $\rho < 1/2$ and (n_I, n_I) if $\rho > 1/2$; see the discussion after Proposition 3 below and the proofs of Propositions 1 and 3 in the Appendix.

The increase is strict for the first outlet to enter the market; subsequent entry has no effect on turnout.

According to Proposition 2, a necessary condition for entry to increase turnout is that the independents benefit collectively from being informed. Otherwise, independents never consume news and thus do not vote, and their participation is required for entry to raise turnout.[6] The proposition provides two sufficient conditions. Condition (i) corresponds to region 3, where partisans never consume news. Media outlets compete for independents only, so the first entrant causes an increase in turnout, and subsequent entrants have no effect. Condition (ii) covers region 5 and complements Condition (iii) of Proposition 1. The argument is similar; here, though, $\rho > \rho^{**}$ ensures that the first entrant's effect on independent turnout outweighs its effect on partisan turnout.

For the next result, let $M \geq 0$ denote the number of outlets present in the market prior to entry.

Proposition 3. *When neither the conditions for Proposition 1 nor those for Proposition 2 are met (i.e., when $\Delta_P(\rho) < R \leq \min\{\Delta_P(\rho) + \overline{n}, \Delta_I(\rho)\}$, and $\rho > \min\{1/2, \rho^*\}$), and $\gamma > 0$, entry affects turnout in a non-monotonic way:*

(i) when $\rho > \rho^*$, there exists a threshold $M^* \leq 2$ such that for $M < M^*$ entry strictly increases turnout while for $M \geq M^*$ entry weakly decreases turnout;

(ii) when $\frac{1}{2} < \rho < \rho^*$, the first entrant decreases turnout, the second entrant increases it, and there exists a threshold $M^{**} > 2$ such that for $M \in \{M^{**}, M^{**} + 1\}$ entry strictly decreases turnout. For all other M, entry does not affect turnout.

Proposition 3 corresponds to the part of region 4 not covered by Proposition 1. There are two cases, (i) and (ii). When $\rho > \rho^*$, entry initially increases turnout, while when $\frac{1}{2} < \rho < \rho^*$, it initially decreases turnout. In both cases, the first entrant chooses a partisan slant, capturing independents and one of the partisan groups. The effect on independent turnout dominates the effect on partisan turnout if and only if $\rho > \rho^*$. If $\rho < 1/2$, the entry of a second outlet leads to an equilibrium in which both outlets report with partisan slant, (n_A, n_B), and turnout decreases. If $\rho > 1/2$, serving half the independents is more profitable than serving one partisan group. The entry of a second outlet leads to an equilibrium in which both report without partisan slant, (n_I, n_I). The group of partisans that was targeted by the first entrant (before the arrival of the second) stops consuming news, so turnout increases

[6] The other possibility for entry to increase turnout is that it leads a partisan group to stop consuming news. This does not happen in the regions of the parameter space identified by Proposition 2.

if $\gamma > 0$ and stays constant otherwise.[7] Subsequent entry either has no effect or decreases turnout if it attracts partisans back into the market.

The following corollary to Proposition 3 highlights the decrease in the number of people consuming news when an entrant comes into a market with a monopolist incumbent and $\rho > 1/2$. As the group that stops consuming news is partisan, the second entrant increases turnout. The Corollary gives a condition under which the increase in turnout caused by the second entrant is smaller than the one caused by the first entrant.

Corollary. *When $\Delta_P(\rho) < R \leq \min\{\Delta_P(\rho) + \overline{n}, \Delta_I(\rho)\}$ and $\rho > \frac{1}{2}$, moving from $M = 1$ to $M = 2$ decreases the total number of citizens who become informed. The first entrant increases turnout by more than the second if and only if $\rho > \rho^{**}$.*

The case where $\rho > \max\{1/2, \rho^{**}\}$ is consistent with the finding in Gentzkow, Shapiro, and Sinkinson (2011) according to which the first entrant has a stronger effect on turnout than subsequent ones. When $\rho > \max\{1/2, \rho^{*}\}$, both the first and the second outlet that enter lead to increases in turnout. The quantitative effect of the first is $ET_I^1 + ET_P^1 - ET_P^0$, while that of the second is $ET_P^0 - ET_P^1$. The first entrant raises turnout by more than the second if and only if

$$ET_I^1 + ET_P^1 - ET_P^0 > ET_P^0 - ET_P^1 \quad \Leftrightarrow \quad \rho > \rho^{**}.$$

The extent of media slant can be defined as the number of outlets reporting news with a partisan slant.[8] As the following proposition shows, the only case in which entry reduces media slant is the one identified in the Corollary. Entrants typically try to occupy niches in the market by catering to the tastes of a specific group of citizens.

Proposition 4. *Unless $\Delta_P < R \leq \min\{\Delta_P + \overline{n}, \Delta_I\}$ and $\rho > \frac{1}{2}$, entry weakly increases slant (the number of partisan outlets). Nonetheless, under the same conditions, entry weakly increases the type-$\overline{w}$ (high-ability) candidate's chances of winning the election.*

Although entry typically raises the supply and consumption of news with partisan slant, this does not have to be detrimental to the selection of politicians. A by-product of the increase in slant caused by competition is that more citizens can find an outlet that reports news in a way that is palatable to them. Therefore, the number of citizens who become informed increases with the level of competition in the media market (except in the particular region of the parameter space identified in the proposition). This has a positive impact on the probability that the higher-ability politician is elected. There are two reasons. The first

[7] Thus, the threshold referred to in (i) is $M^* = 2$ if $\rho > 1/2$ and $\gamma > 0$, and $M^* = 1$ otherwise.

[8] This captures the supply side of media slant. Because slant is demand-driven in this model, more supply of slanted news generally implies more consumption of slanted news as well.

is that independents who become informed vote for the high-ability candidate. The second is that partisans who become informed increase their turnout when their candidate is of high ability and decrease it when their candidate is of low ability.

An interesting implication of this result is that news consumption by any given group of citizens creates positive externalities for the other groups. Independents benefit from partisans being informed because it improves the election chances of the better politician. More interestingly, partisans also benefit from independents being informed. They obtain additional support at the ballot box when their candidate is of high ability. Although they face stronger opposition when their candidate is of low ability, the first effect dominates because that is the case where the outcome of the election matters most.

4 Conclusion

We develop a theoretical framework in which we study the relationship between media markets and large democratic elections. The demand for political news is endogenous, and voters bear the cost of becoming informed because they want to make a better-informed voting decision. We assume that voters are group rule-utilitarian, in the sense of Harsanyi (1977, 1980), which allows us to address the argument by Downs (1957) that in large elections the probability of being pivotal is so small that rational voters would not gather costly information about candidates.

We build a model with two types of voters: independents, who care about the higher-ability candidate winning the election, and partisans, who have a strong preference for one candidate, but are interested in the ability of their candidate as it determines the gain from defeating the opposing candidate (so that it influences their optimal turnout). Media outlets maximise the size of their audience by choosing the slant that attracts the most consumers. Partisans have a preference for news that is slanted in favour of their candidate, whereas independents only care about the information provided and not about the slant of an outlet.

We use our framework to analyse the impact of competition in the media market on a number of political variables. In particular, we study how it affects turnout and derive predictions compatible with the contrasting empirical evidence in Gentzkow, Shapiro, and Sinkinson (2011), indicating a positive effect, and Enikolopov, Petrova, and Zhuravskaya (2011), indicating a negative effect. According to our model, the main factor that matters for the sign of the effect is the composition of the population. If the share of independents is small, turnout tends to decrease when more media outlets are available. If the share of independents is large, turnout increases. The forces driving these results are that independents have, by construction, no preference *a priori* for one candidate, hence they vote only when they are informed about who is the high-ability candidate. On the other hand, partisans tend to vote less, on average, when they are informed, as they reduce their turnout heavily when they are aware that their preferred candidate is of low ability, and they do not increase it as much when they discover that the candidate is of high ability. Furthermore, the relative size of each group affects the optimal strategy of media outlets, and this implies that when there are few partisans, their chance of being informed decreases. Finally, independents' interest in becoming informed, and hence in voting, increases with their relative size. When they are few, the expected utility of being informed is lower (as they have little chance of being able to affect the result of the election). Therefore, it is more likely that they decide not to become informed and abstain. Conversely, when they are many, they have a greater interest in becoming informed and voting.

Our model also makes predictions on the impact of competition on media slant. Consistent with the observations in DellaVigna and Kaplan (2007), we observe that when the number of media outlets increases, there is a tendency for more slanted reporting and a larger share of the population consuming slanted news. Surprisingly, this effect generally increases the probability that the candidate with the highest ability wins. The intuition behind these two results is that (i) competition in the media market pushes editors to serve different consumers and to tailor their product to attract as many consumers as possible, and (ii) having access to slanted news increases the appeal of consuming news to partisans; hence they are more likely to become informed. Being informed allows independents to vote for the high-ability candidate. It also allows partisans to increase turnout when the state of the world is more favourable to them, and to decrease it otherwise. Both effects improve the high-ability candidate's chances of winning the election.

Appendix

Throughout the entire appendix, we assume without loss of generality that if only one partisan outlet is available, its slant is n_A. Moreover, we sometimes refer specifically to partisans of A and B although by symmetry both groups of partisans are interchangeable.

The first appendix summarises the equilibrium in the media market as a function of R and ρ. The second appendix includes the proofs of all theorems stated in the main text.

Remark: Let us define $N \in \{0, 1, 2, 3\}$ as the number of different slants in the market, and $ET(M, N)$ as the total expected turnout when there are M active outlets and N different slants in the market.

Media Market

In order to facilitate the reading of the proofs, we provide here a summary of the equilibrium in the media market.

		$R-\Delta_P(\rho)>\bar{n}$	$R-\Delta_P(\rho)\in[\bar{n},0)$		$R-\Delta_P(\rho)\leq 0$
$R-\Delta_I(\rho)>0$	$M=1$	$\varnothing$	n_A		n_I
	$M=2$	$\varnothing$	n_A, n_B		n_A, n_B
	$M>2$	$\varnothing$	n_A^+, n_B^+		n_A^+, n_B^+
			$\rho\leq\frac{1}{2}$	$\rho>\frac{1}{2}$	
$R-\Delta_I(\rho)\leq 0$	$M=1$	n_I	n_A	n_A	n_I
	$M=2$	n_I, n_I	n_A, n_B	n_I, n_I	n_I, n_I
	$M>2$	n_I^+	n_A^+, n_B^+, n_I	n_I^+, n_A, n_B	n_I^+, n_A, n_B

For $M>2$, the notation n_i^+ indicates that several outlets with slant i may operate before competition eventually induces an outlet to differentiate and choose a different slant. For example, n_A^+, n_B^+, n_I means that there may be many partisan outlets of both types operating before the first independent outlet starts to operate.

Proofs

Proof of Lemma 1. We have

$$ET_P^0 > ET_P^1 \Leftrightarrow \left(\frac{\underline{w}+\overline{w}}{2}\right)^{\frac{1}{1+\gamma}} > \frac{\underline{w}^{\frac{1}{1+\gamma}}}{2}+\frac{\overline{w}^{\frac{1}{1+\gamma}}}{2}. \tag{21}$$

By Jensen's inequality, this condition is satisfied if and only if $\gamma>0$. If $\gamma=0$, $ET_P^0 = ET_P^1$. □

Proof of Lemma 2. From (13) and (14), we have

$$\begin{aligned} EU_i^P(0,K_j,K_I) = {} & \frac{\overline{w}}{2}\left[\frac{1}{2}+\psi\left(\rho\sigma_I(K_I)+\frac{1-\rho}{2}\left(\sigma_0^*-\underline{\sigma}(K_j)\right)\right)\right] \\ & +\frac{\underline{w}}{2}\left[\frac{1}{2}-\psi\left(\rho\sigma_I(K_I)+\frac{1-\rho}{2}\left(\overline{\sigma}(K_j)-\sigma_0^*\right)\right)\right]-\frac{c}{2+\gamma}\left(\frac{1-\rho}{2}\right)^{\gamma}(\sigma_0^*)^{2+\gamma}, \end{aligned}$$

which can be simplified to

$$\begin{aligned} EU_i^P(0,K_j,K_I) = {} & w^e\left(\frac{1}{2}+\psi\frac{1-\rho}{2}\sigma_0^*\right)-\frac{c}{2+\gamma}\left(\frac{1-\rho}{2}\right)^{\gamma}(\sigma_0^*)^{2+\gamma} \\ & +\frac{\psi}{2}\left[\rho\sigma_I(K_I)(\overline{w}-\underline{w})-\frac{1-\rho}{2}\left(\overline{w}\underline{\sigma}(K_j)+\underline{w}\overline{\sigma}(K_j)\right)\right]. \end{aligned}$$

Using the first-order condition of the partisans' voting problem (6), implying that

$$w^e\psi\frac{1-\rho}{2}-\frac{c}{2+\gamma}\left(\frac{1-\rho}{2}\right)^{\gamma}(\sigma_0^*)^{1+\gamma}=\frac{w^e\psi(1-\rho)(1+\gamma)}{2(2+\gamma)},$$

as well as the definition of σ_0^*, we obtain finally

$$EU_i^P(0, K_j, K_I) = \frac{w^e}{2} + \mu \left(\frac{1-\rho}{2}\right)^{\frac{2}{1+\gamma}} (w^e)^{\frac{2+\gamma}{1+\gamma}} \\ + \frac{\psi}{2}\left[\rho\sigma_I(K_I)(\overline{w} - \underline{w}) - \frac{1-\rho}{2}\big(\overline{w}\underline{\sigma}(K_j) + \underline{w}\overline{\sigma}(K_j)\big)\right]. \quad (22)$$

Similarly, we have

$$EU_i^P(1, K_j, K_I) = \frac{\overline{w}}{2}\left[\frac{1}{2} + \psi\left(\rho\sigma_I(K_I) + \frac{1-\rho}{2}\big(\overline{\sigma}^* - \underline{\sigma}(K_j)\big)\right)\right] \\ + \frac{\underline{w}}{2}\left[\frac{1}{2} - \psi\left(\rho\sigma_I(K_I) + \frac{1-\rho}{2}\big(\overline{\sigma}(K_j) - \underline{\sigma}^*\big)\right)\right] - \frac{c}{2+\gamma}\left(\frac{1-\rho}{2}\right)^{\gamma}\left[\frac{(\overline{\sigma}^*)^{2+\gamma}}{2} + \frac{(\underline{\sigma}^*)^{2+\gamma}}{2}\right],$$

which can be simplified in an analogous way to obtain

$$EU_i^P(1, K_j, K_I) = \frac{w^e}{2} + \mu\left(\frac{1-\rho}{2}\right)^{\frac{2}{1+\gamma}}\left[\frac{\overline{w}^{\frac{2+\gamma}{1+\gamma}} + \underline{w}^{\frac{2+\gamma}{1+\gamma}}}{2}\right] \\ + \frac{\psi}{2}\left[\rho\sigma_I(K_I)(\overline{w} - \underline{w}) - \frac{1-\rho}{2}\big(\overline{w}\underline{\sigma}(K_j) + \underline{w}\overline{\sigma}(K_j)\big)\right]. \quad (23)$$

Subtracting (22) from (23) yields (16). Because $(2+\gamma)/(1+\gamma) > 1$ for any $\gamma \geq 0$, the term in square brackets is positive by Jensen's inequality. It follows that $\Delta_P(\rho) \geq 0$, with strict inequality for $\rho < 1$. □

Proof of Lemma 3. From (15), we obtain after simplifying

$$EU^I(K_A, K_B, 0) = w^e + (\overline{w} - \underline{w})\frac{\psi(1-\rho)}{2}\left(\frac{\overline{\sigma}(K_A) - \underline{\sigma}(K_B)}{2} + \frac{\overline{\sigma}(K_B) - \underline{\sigma}(K_A)}{2}\right) \quad (24)$$

and

$$EU^I(K_A, K_B, 1) = w^e + (\overline{w} - \underline{w})\psi\left[\rho\sigma_I^* + \frac{(1-\rho)}{2}\left(\frac{\overline{\sigma}(K_A) - \underline{\sigma}(K_B)}{2} + \frac{\overline{\sigma}(K_B) - \underline{\sigma}(K_A)}{2}\right)\right] \\ - \frac{c}{2+\gamma}\rho^{\gamma}(\sigma_I^*)^{2+\gamma}.$$

Using the first-order condition of the independents' voting problem (9), we can further simplify this expression as

$$EU^I(K_A, K_B, 1) = w^e + \mu\rho^{\frac{2}{1+\gamma}}(\overline{w} - \underline{w})^{\frac{2+\gamma}{1+\gamma}} \\ + (\overline{w} - \underline{w})\frac{\psi(1-\rho)}{2}\left(\frac{\overline{\sigma}(K_A) - \underline{\sigma}(K_B)}{2} + \frac{\overline{\sigma}(K_B) - \underline{\sigma}(K_A)}{2}\right). \quad (25)$$

Subtracting (24) from (25) yields $\mu\rho^{\frac{2}{1+\gamma}}(\overline{w} - \underline{w})^{\frac{2+\gamma}{1+\gamma}}$, which is positive because $\overline{w} > \underline{w}$. □

Proof of Proposition 1. The proposition states that (for $\gamma > 0$) entry reduces turnout when $R \leq \Delta_P + \overline{n}$ and one of the following conditions holds:

(i) $\Delta_I(\rho) < R$

(ii) $R > \Delta_P$ and $\rho < \min\{\frac{1}{2}, \rho^*\}$

(iii) $R \leq \Delta_P$ and $\rho < \rho^{**}$.

We prove each condition separately. Before, we derive the equations that define ρ^* and ρ^{**} and establish their uniqueness.

ρ^* **and** ρ^{**} : Using equations (10), (11), and (12), equation (19) can be rewritten as

$$\left(\frac{\psi\rho^2(\overline{w}-\underline{w})}{c}\right)^{\frac{1}{1+\gamma}} = \left(\frac{\psi}{c}\left(\frac{1-\rho}{2}\right)^2 w^e\right)^{\frac{1}{1+\gamma}} - \left(\frac{\psi}{c}\left(\frac{1-\rho}{2}\right)^2\right)^{\frac{1}{1+\gamma}}\left[\frac{\underline{w}^{\frac{1}{1+\gamma}}}{2}+\frac{\overline{w}^{\frac{1}{1+\gamma}}}{2}\right]. \tag{26}$$

After some algebra, we obtain the following implicit function defining ρ^*:

$$\frac{\rho}{1-\rho} = \sqrt{\frac{2^{\gamma-1}}{\overline{w}-\underline{w}}\left((w^e)^{\frac{1}{1+\gamma}} - \frac{1}{2}\left(\underline{w}^{\frac{1}{1+\gamma}} + \overline{w}^{\frac{1}{1+\gamma}}\right)\right)^{1+\gamma}}. \tag{27}$$

Similarly, from equation (20), we can implicitly define ρ^{**} as:

$$\frac{\rho}{1-\rho} = \frac{1}{2}\sqrt{\frac{1}{\overline{w}-\underline{w}}\left((w^e)^{\frac{1}{1+\gamma}} - \frac{1}{2}\left(\underline{w}^{\frac{1}{1+\gamma}} + \overline{w}^{\frac{1}{1+\gamma}}\right)\right)^{1+\gamma}}. \tag{28}$$

The left hand side of both (27) and (28) is increasing in ρ, and the right hand side is a non-negative constant. Therefore, the solution of the equations always determines a unique value for ρ^* and ρ^{**}. Notice that $\lim_{\rho\to 1}\dfrac{\rho}{1-\rho} = +\infty$; hence, for any value of the right hand side, ρ^* and ρ^{**} always exist and belong to the interval $[0, 1)$.

Proof of condition (i): We know that $ET_P^1 < ET_P^0$ for $\gamma > 0$ (Lemma 1). When $\Delta_I(\rho) < R$, independents do not consume news and thus they never vote. The optimal strategy for an outlet entering the market depends on R and Δ_P. There are two possible cases:

$0 < R - \Delta_P \leq \overline{n}$**.** When $0 < R - \Delta_P \leq \overline{n}$, there is no market for independent news. The first outlet to enter ($M = 1$) chooses n_A and is consumed by a mass $\frac{1-\rho}{2}$ of citizens. Partisans of A becoming informed, $ET(1, 1) = ET_P^1 + ET_P^0 < 2ET_P^0 = ET(0, 0)$. When a second outlet enters ($M = 2$), the alternatives for the entrant are either n_A and share the readers, or n_B, becoming a monopolist for partisans of B, obtaining $\frac{1-\rho}{2} > \frac{1-\rho}{4}$

readers. As profits only depend on the number of readers, the latter is more profitable. Partisans of B becoming informed, turnout decreases further: $ET(2,2) = 2ET_P^1 < ET_P^1 + ET_P^0 = ET(1,1)$. Any further entry does not affect the voters' information, as independents never consume news and the remaining voters are already informed: for any $M' \geq 2$, $ET(M', N) = ET(2,2)$.

$R - \Delta_P \leq 0$. When $R < \Delta_P$, partisans may consume independent news. When the first outlet enters the market, choosing a slant may prevent some partisans from consuming (if $R > \Delta_P + \underline{n}$), so the optimal strategy of a monopolist is to choose no slant and serve the whole market. All partisans become informed at once: $ET(1,1) = 2ET_P^1 < 2ET_P^0 = ET(0,0)$. When a second outlet enters, the three possible equilibria are: (a) n_I, n_I, (b) n_A, n_B, (c) n_I, n_A. The Pareto dominant equilibrium is n_A, n_B: in all cases each outlet serves half of the market, but in case (b) the utility of consumers is largest. All partisans remain informed, $ET(2,2) = 2ET_P^1 = ET(1,1)$. For any $M' \geq 1$, $ET(M', N) = ET(1,1)$.

We prove conditions (ii) and (iii) for the case where $\Delta_I > R$, so that independents consume any available outlet, as the case where $\Delta_I < R$ was covered under condition (i).

Proof of condition (ii): When $0 < R - \Delta_P \leq \overline{n}$, partisans consume only outlets with their own partisan slant. Since $\rho < \rho^*$, $ET_I^1 < ET_P^0 - ET_P^1$. When $M = 1$, the optimal strategy is to serve partisans of A and independents with a slant n_A, rather than serving only the independents (with n_I). Turnout decreases with the first outlet: $ET(1,1) = ET_P^1 + ET_P^0 + ET_I^1 < 2ET_P^0 = ET(0,0)$ because $\rho < \rho^*$. If a second outlet enters the market, the only equilibrium is to share the market equally by choosing slants n_A and n_B, which guarantees $\frac{1}{2}$ consumers to each outlet. If any outlet deviated to n_I, this outlet would serve $\frac{1-\rho}{2}$, while the independent one would serve ρ, and since $\rho < \frac{1}{2}$, the deviation is not profitable. Only with $M > 2$ there is room for independent outlets. Concerning turnout, the market is covered (and remains covered in case of entry) as soon as $M = 2$: $ET(2,2) = 2ET_P^1 + ET_I^1 < ET(1,1)$. For any $M' \geq 2$, $ET(M', N) = ET(2,2)$.

Proof of condition (iii): By construction, when $\rho < \rho^{**}$, if all citizens simultaneously start consuming news, the overall effect is a reduction in turnout. We now show that if $R \leq \Delta_P$, all agents become informed when moving from $M = 0$ to $M = 1$, and they remain informed if any further outlet enters the market. There are two possible cases.

$\underline{n} < R - \Delta_P < 0$. Both partisans and independents may consume an independent or a partisan outlet, but partisans of A never consume n_B. When $M = 1$, the only possible strategy to cover the whole market is n_I. In this case, all agents consume news and

$ET(1,1) = 2ET_P^1 + ET_I^1 < 2ET_P^0 = ET(0,0)$. When $M = 2$, if $\rho > 0$, the only equilibrium is n_I for both. If an outlet deviated to n_A, its market share would be $\frac{1-\rho}{2} < \frac{1}{2}$. For large enough M (that is, $M = M'$ such that $\frac{1-\rho}{2} \geq \frac{1}{M'}$), it is profitable for an entrant to choose n_A. Notice that an equilibrium with one partisan outlet and $M' - 1$ independents is not possible: as soon as one outlet finds it optimal to choose n_A, it is profitable for at least one other outlet to deviate to n_B, obtaining $\frac{1-\rho}{2}$ consumers instead of $\frac{1+\rho}{2(M'-1)}$ (the former being larger when $\frac{1-\rho}{2} \geq \frac{1}{M}$). The equilibrium therefore passes from all outlets being independent to at least one outlet of each slant. Concerning turnout, for any $M'' \geq 1$, $ET(M'', N) = ET(1,1)$.

$R - \Delta_P \leq \underline{n}$. All agents may consume any available outlet. It does not matter, for turnout, how many outlets are available or what their slant is: for any $M > 0$ all voters are informed, and entry, after the first one, has no impact on who is informed. For any $M \geq 1$, $ET(M, N) = ET(1,1) < ET(0,0)$.

□

Proof of Proposition 2. Proposition 2 states that turnout increases when either of the two sets of conditions is met:

(i) $\Delta_P(\rho) + \overline{n} < R \leq \Delta_I$

(ii) $R \leq \min\{\Delta_I, \Delta_P(\rho)\}$ and $\rho > \rho^{**}$.

In both cases, the condition $R \leq \Delta_I$ guarantees that independents consume news if an outlet is available. This means that independents always become informed, and hence they vote, as long as $M > 0$. The first set of conditions requires also that $R > \Delta_P(\rho) + \overline{n}$, hence partisans never consume news, regardless of the slant of the outlet. Consequently, if an outlet enters the market, only independents get informed and turnout increases: $ET(1,1) = 2ET_P^0 + ET_I^1 > 2ET_P^0 = ET(0,0)$. Any further entry cannot affect turnout, as independents are already informed and partisans do not get informed anyway: for any $M \geq 1$, $ET(M, N) = ET(1,1) > ET(0,0)$.

The second set of conditions, instead, guarantees that, in case of entry of the first outlet, both independents and partisans start to consume news ($R \leq \min\{\Delta_I, \Delta_P(\rho)\}$) no matter the slant. This has two countervailing effects on turnout, independents start to vote, and partisans reduce their turnout. By definition of ρ^{**}, if $\rho > \rho^{**}$ the total effect on turnout is positive: $ET(1,1) = 2ET_P^1 + ET_I^1 > 2ET_P^0 = ET(0,0)$. Any further entry cannot affect turnout, as both independents and partisans are already informed: for any $M \geq 1$, $ET(M, N) = ET(1,1) > ET(0,0)$.

□

Proof of Proposition 3. Proposition 3 states that, for $\Delta_P < R \leq \min\{\Delta_P + \overline{n}, \Delta_I\}$ and $\rho > \min\{\frac{1}{2}, \rho^*\}$,

(i) when $\rho > \rho^*$, it always exist a threshold $M^* \leq 2$ such that for $M < M^*$ entry strictly increases turnout, and for $M \geq M^*$ entry weakly decreases turnout

(ii) when $\frac{1}{2} < \rho < \rho^*$, entry of the first outlet always decreases turnout, the second always increases it, and it always exist a threshold $M^{**} > 2$ such that for $M \in \{M^{**}, M^{**}+1\}$ entry strictly decreases turnout. Otherwise, entry does not affect turnout.

The first part of the proposition ($\Delta_P < R \leq \min\{\Delta_P + \overline{n}, \Delta_I\}$) guarantees that independents consume any type of outlet, while partisans only consume slanted outlets of their own kind.

Under monopoly, the best strategy is always n_A. For $M > 1$, the equilibrium depends on ρ. If $\rho < \frac{1}{2}$, the equilibrium is n_A, n_B when $M = 2$. For $M > 2$, the optimal strategy for the entrant may be either n_I or n_A, depending on ρ. There always exists a $\tilde{M} > 2$, such that the equilibrium for $M = \tilde{M}$ is n_A, n_I, n_B. When $\rho > \frac{1}{2}$, if $M = 2$, then the equilibrium is that both choose n_I. When the number of outlets increases, there exists a $\tilde{M} > 2$, such that the equilibrium for $M = \tilde{M}$ is n_A, n_I and for $M = M' + 1$ is n_A, n_I, n_B.

The second part of the proposition includes two sets of conditions that are treated separately.

Proof of condition (i): when $\rho > \rho^*$, the first outlet that enters the market makes turnout increase: having a slant n_A, it is consumed by both partisans of A and independents, and by definition of ρ^*, $ET(1,1) = ET_P^1 + ET_P^0 + ET_I^1 > 2ET_P^0 = ET(0,0)$. When $M = 2$, we may have n_A, n_B (if $\rho < \frac{1}{2}$), in which case partisans of B start being informed and turnout decreases, hence $M^* = 2$. Or, ($\rho > \frac{1}{2}$) we may have two independent outlets, in which case partisans of A stop being informed and turnout increases even more. In that case, $M^* > 2$ corresponds to the number of outlets necessary for some of them to find it profitable to provide slanted news. When $\rho < \frac{1}{2}$, $ET(2,2) = 2ET_P^1 + ET_I^1 < ET_P^1 + ET_P^0 + ET_I^1 = ET(1,1)$, and for any $M \geq 2$, $ET(M,N) = ET(2,2) < ET(1,1) > ET(0,0)$. When $\rho > \frac{1}{2}$, $ET(2,1) = 2ET_P^0 + ET_I^1 > ET_P^1 + ET_P^0 + ET_I^1 = ET(1,1)$. Turnout remains constant up to when the first partisan outlet enters the market ($M = M^*$), then it decreases: $ET(M^*,2) = ET_P^1 + ET_P^0 + ET_I^1 < ET(2,1)$ and $ET(M^*+1,3) = 2ET_P^1 + ET_I^1 < ET(M^*,2)$, and for any $M \geq M^*+1$, $ET(M,N) = ET(M^*+1,3) < ET(M^*,2) < ET(2,1) > ET(1,1) > ET(0,0)$.

Proof of condition (ii): when $\frac{1}{2} < \rho < \rho^*$, the entrance of the first outlet implies that both partisans of A and independents become informed. Since $\rho < \rho^*$, the net impact on turnout is negative: $ET(1,1) = ET_P^1 + ET_P^0 + ET_I^1 < 2ET_P^0 = ET(0,0)$. When a second outlet enters the market, the equilibrium being n_I for both, partisans of A stop consuming news and turnout is $ET(2,1) = 2ET_P^0 + ET_I^1 > ET_P^1 + ET_P^0 + ET_I^1 = ET(1,1)$. Turnout remains constant up to when the first partisan outlet enters the market ($M = M^{**}$), then it decreases: $ET(M^{**}, 2) = ET_P^1 + ET_P^0 + ET_I^1 < ET(2,1)$ and $ET(M^{**}+1, 3) = 2ET_P^1 + ET_I^1 < ET(M^*, 2)$, and for any $M \geq M^* + 1$, $ET(M, N) = ET(M^* + 1, 3) < ET(M^*, 2) < ET(2,1) > ET(1,1) < ET(0,0)$. □

Proof of Proposition 4. Proposition 4 states that

(ii) entry weakly increases slant (the number of partisan outlets), unless $\Delta_P < R \leq \min\{\Delta_P + \overline{n}, \Delta_I\}$ and $\rho > \frac{1}{2}$,

(iiii) under the same conditions, entry weakly increases the type-$\overline{w}$ candidate's chances of winning the election.

Concerning the first statement, we distinguish the following cases:

- if $R > \Delta_I$, independents never consume outlets. When $R > \Delta_P$, the optimal choice for an outlet is always to choose a partisan slant. When $R < \Delta_P$, a monopolist would choose n_I, but for $M > 1$, outlets choose a partisan slant. Therefore, more competition can only weakly increase the number of partisan outlets available.

- if $R < \min\{\Delta_I, \Delta_P\}$, outlets find it optimal to be independent, if M is sufficiently low, and for M large they start providing slanted news too.

- $\Delta_P < R \leq \min\{\Delta_P + \overline{n}, \Delta_I\}$ and $\rho < \frac{1}{2}$, then the equilibrium for $M = 1$ is n_A, for $M = 2$ it is n_A, n_B and if any further outlet enters the market, there will be either more partisan outlets or some independent outlets, but the number of partisan outlets never decreases.

- if $\Delta_P + \overline{n} < R < \Delta_I$, partisans never consume news, and all outlets report independent news.

We can conclude that when the number of outlets increases, there is always a weak increase in the number of partisan outlets available, unless $\Delta_P < R \leq \min\{\Delta_P + \overline{n}, \Delta_I\}$ and $\rho > \frac{1}{2}$, in which case, when $M = 1$ we have a partisan outlet, but with $M = 2$ we have two independent ones. This case is also the only one in which some readers (partisans of A) stop consuming news after a new outlet enters the market (from $M = 1$ to $M = 2$). In all the other cases, new outlets implies more agents that are informed. Given that, the second part of the proposition is easy to prove. An increase in the number of outlets increases the number of informed voters. When independents are informed, they vote for the type-$\overline{w}$ candidate, otherwise they abstain. Therefore, if they are informed, the chances of this candidate to win the contest increase. In the case of partisans, with respect to when they are not informed, if they know their candidate is of type $\overline{w}$, they increase their turnout, while they decrease it otherwise. Therefore, they also increase the chances of the type-$\overline{w}$ candidate to win and they decrease those of the type-$\underline{w}$ one. All the forces going in the same direction, if more agents are informed (which happens when competition increases in the outlets market), the chances of the type-$\overline{w}$ candidate to win are larger. $\square$

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