Mood swings, media coverage, and elections*

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Abstract

Can public mood swings that make *all* voters undergo an ideological shift towards a policy, hurt the electoral performance of that policy? The answer depends interestingly on the operations of an apolitical, viewership-maximizing dominant media. The media chooses news quality about fundamental uncertainties. Ex-ante preferences and news quality affect the voters' ex-ante value for information and viewership, and ex-post policy preferences and votes. Public mood swings in a policy's favor can reduce the expected vote share and the probability of winning by affecting the news quality, crowding out the mass ideological gain that initiates the change.

Keywords: Mood swings, Media coverage, Media viewership, Elections.
JEL Codes: D02, D72, D82.

1 Introduction

Political parties welcome favorable shifts in public mood. Such shifts bolster their ideological stand, irrespective of whether they are strategically orchestrated or caused by exogenous factors. Terror attacks nudge voters to become ideologically more aligned with parties who are expected to support enhanced vigilance.

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Financial scams push citizens closer to political ideologies that advocate stringent regulatory policies. Economic slowdowns generate mass support for politicians known for taking bold decisions in the past.[1]

In this paper, we show that favorable mood swings can lead to a reduction in electoral support when a non-partisan media supplies information about underlying uncertainties that affect the policy preferences of voters in order to maximize its viewership. This observation adds a novel dimension in the vast political economy literature. It has generally been accepted that parties welcome events and actions that make them more likable in the eyes of as many voters as possible, and swing the public mood in their favor. But we point out that mood swings bring about changes in the demand for information about fundamental uncertainties that can in turn impact the quality of media coverage. We then show that the altered nature of disbursed information can affect the voting behavior adversely and reduce the expected votes for the policy that gains such an ideological advantage. It can even defeat the favored policy!

A 'perverse' possibility such as this is indeed not expected to be universal. Our theoretical objective is to provide conditions under which it can occur. Our study employs a canonical model of elections with a continuum of voters. Each voter has to choose between two fixed policies and the social decision is reached via majority voting. These policies are agendas of ideologically stringent political parties who do not have the option to credibly change their well-established platforms, at least in the short run. The optimal policy for each voter depends on her single-peaked ideological preference and the common prior over an uncertain binary state. A public mood swing induces a shift of the bliss points of *all* voters in the same direction.

Prior to voting, each voter has an option to incur a personal cost and obtain additional information about the uncertain state from the media. We look at the operations of a dominant media outlet who has no ideological interest in politics. The media estimates the demand for news that constitutes the mass of voters who are willing to incur the cost to access the media. This demand depends on the size of the existing uncertainty, the distribution of the voters' bliss points, and the quality of coverage. Coverage is costly to the media and the media chooses the coverage quality in order to maximize its viewership net of coverage costs.

As a viewership driven organization, the media cares only about those vot-

[1] There is a large literature (De Neve (2013), Durr (1993), Kim and Fording (2001), Markussen (2008), Rockey and Pickering (2011), and Kayser (2009)) asserting that changing economic conditions deeply influence ideological positions of voters.

ers for whom there is value for the information that the media can provide. We call them the 'potential swing voters.' These voters are ideologically centrist in general, and their votes depend critically on the information that the media can generate. To obtain clear results, we impose a regularity condition on the distribution of voters' bliss points so that on the ideology-domain of the potential swing voters, the cumulative distributions are either concave or convex or linear.[2] Given this restriction, we show that a public mood swing hurts the expected vote share of the party that is favored by the shift only if either (i) the distribution of voters' bliss points is concave, both before and after the mood swing, and the quality of media coverage goes down once the shift is experienced, *or* (ii) the distribution of voters' bliss points is convex, both before and after the mood swing, and the quality of media coverage goes up. In the former case, mood swings dampen public information. This missing information polarizes the voters and hurts the party that otherwise gains ideological support. In the latter case, it improves public information. This reduces polarization but exposes the shortcomings of the same party. We provide robust numerical examples to establish that both these situations are non-empty. We then study the impact of mood swings on the probability of electoral victory to show that the observation extends easily when it comes to winning an election.

The remainder of the paper is structured as follows. The model is formally described in Section 2. Sections 3, 4 and 5 deal with the analysis and the main result. We conclude in Section 6 with a literature review and a broad discussion about the implications of the theory. All proofs are provided in an appendix.

2 Model

A continuum of voters with unit mass are identified by their ideological positions $v \in \mathbb{R}$ that are distributed according to a distribution $F(.)$ with density function $f(.)$. The voters choose one of two policies $t \in \{x, y\}$, $x < y$, through an election. They face an uncertain state $\omega \in \{\omega_1, \omega_2\}$ such that $\omega_1 < \omega_2$, with p being the prior probability that the state is ω_1. The payoff of voter v in state ω from policy t is

$$u(t|v, \omega) = -(v + \omega - t)^2.$$

[2]This restriction still allows for a large class of distributions, including the Normal distribution, since the relevant subdomain can be appropriately chosen. In addition, our main result is not hostage to this restriction. However analytical characterizations for arbitrary distributions do not add anything to the insights of the paper.

Information about the unknown state ω can be obtained from a media outlet. In particular, any voter can access the media at an individual cost of $S > 0$ and, conditional on access, the media reveals the true state with probability Q (while with probability $1 - Q$, media is uninformative) to all its viewers. We interpret Q as the size of media coverage and hence a proxy for quality of media news. Media incurs a cost $C(Q)$ to supply Q, where C is twice continuously differentiable with $C'(.) \geqslant 0$, $C''(.) \geqslant 0$ and $C(0) = 0$. The media's sole objective is to choose Q in order to maximize viewership net of the cost of coverage.

The timing of events and activities are as follows. First, nature determines the true state ω that remains unknown to all, with common prior p. Then media announces a coverage quality Q. Upon observing Q, each voter decides whether to incur the cost S and access the media or not. If a voter does not access the media, then he votes based only on the prior p; otherwise, if a voter accesses the media, then he observes the outcome of media coverage and then votes according to his post-coverage belief. We study the perfect Bayesian equilibrium of this game. We are interested in how the expected vote shares of the two policies change when the distribution $F(\cdot)$ undergoes a first-order-stochastic-dominance (FOSD) shift. Such shifts capture an aggregate mood swing towards policy y.

3 Voting behavior

Voters are expected utility maximizers and vote sincerely.[3] That is, depending upon the information they have, each voter votes for the policy that, if implemented, yields higher expected utility. Let $\bar{t} = \frac{x+y}{2}$. For each prior p, define the cutoff voter

$$v_p = \bar{t} - (p\omega_1 + (1-p)\omega_2).$$

It is easy to show that the voting behavior without media coverage (viz. $Q = 0$) is as follows: all voters $v < v_p$ vote for x and all voters $v > v_p$ vote for y. Clearly, the cutoff v_p is independent of the distribution of voter ideologies.

Additional information from the media is valuable for a voter only if he expects such information will alter his behavior from what is specified above. As a consequence, those who are far on the left of the ideology line will be expected to vote for policy x irrespective of the state, while those far to the right would be expected to vote for policy y. As acquiring media access comes with a positive

[3] Sincere voting is a natural assumption given the large election framework.

cost S, this would imply that relatively centrist voters are those who are likely to pay the access fee S.

For a fixed Q, define two cutoff voters

$$\underline{v}(Q) = \min\left\{\bar{t} - \omega_2 + \frac{S}{2Q(1-p)(y-x)}, v_p\right\}$$

and

$$\bar{v}(Q) = \max\left\{v_p, \bar{t} - \omega_1 - \frac{S}{2Qp(y-x)}\right\},$$

and note that for any $0 \leqslant p \leqslant 1$ and $0 \leqslant Q \leqslant 1$, we have

$$v_p = p\bar{v}(Q) + (1-p)\underline{v}(Q).$$

The following lemma identifies voters who access media coverage and then describes the voting behavior of all voters in the presence of media activity.

Lemma 1. *Suppose the media supplies coverage of quality Q. Voters $v < \underline{v}(Q)$ and $v > \bar{v}(Q)$ do not access media coverage and vote for x and y respectively. The rest of the voters with valuation $\underline{v}(Q) < v < \bar{v}(Q)$ access the media; moreover, (i) if coverage reveals the true state, then they all vote for x if the revealed state is ω_1, and otherwise all vote for y, and (ii) if coverage reveals no information, then all $v < v_p$ vote for x and all $v > v_p$ vote for y.*

We call voters in the interval $[\underline{v}(Q), \bar{v}(Q)]$ the *swing voters*. Absent media information, those amongst them who fall to the left of v_p vote for x while those to the right vote for y. However, with the arrival of media news, they vote according to what the media reveals. Figure 1 depicts the dependence of the identity and size of these swing voters on the quality of coverage Q. As Q rises, the range of the swing voters' domain becomes larger.

In Figure 1 we also depict the potential swing voter's domain $[v_{min}, v_{max}]$ defined as $\underline{v}(1)$ and $\bar{v}(1)$ respectively, and given by

$$v_{min} = \bar{t} - \omega_2 + \frac{S}{2(1-p)(y-x)} \text{ and } v_{max} = \bar{t} - \omega_1 - \frac{S}{2p(y-x)}.$$

Voters outside this interval will never access the media. The media's attention will therefore be restricted to the voters in the set $[v_{min}, v_{max}]$.

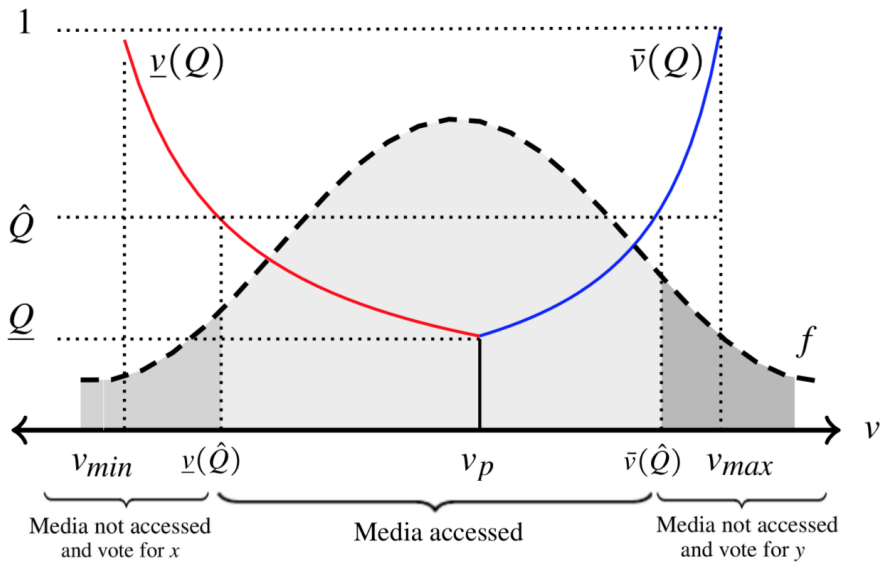

Figure 1: Voting behavior and the potential swing voters for an arbitrary coverage quality $\hat{Q}$

4 Media coverage

The media anticipates the voting behavior depicted in Figure 1 and, for each choice of Q, can compute the size of viewership (the light grey area in Figure 1 under the density function f)

$$\mathcal{V}(Q) = \int_{\underline{v}(Q)}^{\bar{v}(Q)} f(v)\mathrm{d}v.$$

Thus, the media's problem reduces to:

$$Max_{Q\in[0,1]}\Pi(Q) = \mathcal{V}(Q) - C(Q). \tag{1}$$

It is easy to verify (as shown in Figure 1) that if $Q \leqslant \underline{Q} = \frac{S}{2p(1-p)(y-x)(\omega_2-\omega_1)}$, we have $\underline{v}(Q) = \bar{v}(Q) = v_p$, which means no one is buying information for coverage quality below this threshold. We assume that distributions of voters' ideal points and the media's cost of coverage are such that there is a unique interior solution in the interval $[\underline{Q}, 1]$, characterized by the first order conditions $\frac{\mathrm{d}\Pi}{\mathrm{d}Q} = 0$. We denote that solution by Q_f^*. We also note that restrictions on the distribution functions

required to fulfil this assumption need only be over the interval $[v_{min}, v_{max}]$ of the potential swing voters. In what follows we will consider distributions that satisfy the following *regularity condition* with respect to this important subdomain: for any $F(\cdot)$ defined over $\mathbb{R}$, F is either concave, or convex, or linear over $[v_{min}, v_{max}]$.

5 Mood swing, media reaction, and vote share

We begin by computing the expected vote share $\mu(x|Q^*;F)$ of policy x when the media optimally selects the coverage quality Q^*.[4] This is given by

$$\mu(x|Q_f^*;F) = (1-Q_f^*)F(v_p) + Q_f^*[pF(\bar{v}(Q^*)) + (1-p)F(\underline{v}(Q^*))]). \quad (2)$$

The vote share can be decomposed into two effects as expressed in the following way: $\mu(x|Q_f^*;F) = F(v_p) - Q_f^*[F(v_p) - [pF(\bar{v}(Q^*)) + (1-p)F(\underline{v}(Q^*))]]$. The first term $F(v_p)$ is the pure preference effect and the rest is the media effect. Since $v_p = p\bar{v}(Q) + (1-p)\underline{v}(Q)$ for any Q, if F is concave on $[v_{min}, v_{max}]$, then the media effect is negative for policy x, while if F is convex on $[v_{min}, v_{max}]$, then the media effect is positive. A linear F has no media effect on expected votes of either party.

We now move to the analysis of mood swings. We assume that the original distribution F becomes G such that, for each $v \in \mathbb{R}$, we have $F(v) \geqslant G(v)$. In other words, the mood swing favors policy y. Denote by Q_g^* as the (possibly new) optimal response of the media under $G(\cdot)$ and let $\Delta(x|F \to G) = \mu(x|Q_g^*;G) - \mu(x|Q_f^*;F)$ denote the change in the expected vote share of policy x due to this mood swing. Then,

$$\begin{aligned}\Delta(x|F \to G) = &\left(Q_g^*[pG(\bar{v}(Q_g^*)) + (1-p)G(\underline{v}(Q_g^*))] + (1-Q_g^*)G(v_p)\right) \\ &- \left(Q_f^*[pF(\bar{v}(Q_f^*)) + (1-p)F(\underline{v}(Q_f^*))] + (1-Q_f^*)F(v_p)\right). \quad (3)\end{aligned}$$

First note that $\Delta(x|F \to G) > 0$ only if $Q_f^* \neq Q_g^*$. This implies that while the media may not be sufficient for an unfavorable mood swing to become useful for policy x, it is indeed necessary in our set up. In what follows we look for conditions for this surprising phenomenon to occur.

[4] We are interested in a stronger result than what one can obtain by looking at probability of electoral victory.

For the media to increase (decrease) coverage after the mood shift, it must be that $\mathcal{V}'(Q_f^*|g) > (<) \mathcal{V}'(Q_f^*|f)$. This implies that $Q_g^* > Q_f^*$ if and only if

$$[f(\underline{v}(Q_f^*)) - g(\underline{v}(Q_f^*))]\frac{\mathrm{d}\underline{v}(Q_f^*)}{\mathrm{d}Q} > (<)[f(\bar{v}(Q_f^*)) - g(\bar{v}(Q_f^*))]\frac{\mathrm{d}\bar{v}(Q_f^*)}{\mathrm{d}Q}. \quad (4)$$

We now state our result. It provides a set of necessary conditions for $\Delta(x|F \to G) > 0$.

Proposition 1. *Suppose G is a FOSD of F and $\Delta(x|F \to G) > 0$. Then either (i) F and G are both concave on the subdomain $[v_{min}, v_{max}]$ and $Q_f^* > Q_g^*$, or (ii) F and G are both convex on the subdomain $[v_{min}, v_{max}]$ and $Q_f^* < Q_g^*$.*

Proposition 1 shows that the only two situations where a favorable mood swing can be detrimental for policy y are when both the distributions are concave or both are convex on the domain of potential swing voters. The main driving force for this result is certainly not hostage to the regularity assumption (that we have imposed on the distributions to obtain clear results). It lies in the fact that irrespective of the nature of the distributions, it is necessary that a mood swing changes the quality of media coverage. Under any mood swing favoring policy y, the vote share of policy x, when media reveals no information, can only (weakly) fall (since $F(v_p) \geqslant G(v_p)$). So the crucial element that swamps this loss is the gain, if any, in the vote share of policy x when the media is informative. When media provides the information, it is ω_1 with probability p and ω_2 with probability $1-p$. Hence, the vote share of policy x is $pF(\bar{v}(Q_f^*)) + (1-p)F(\underline{v}(Q_f^*))$ under F and $pG(\bar{v}(Q_g^*)) + (1-p)G(\underline{v}(Q_g^*))$ under G. If F and G are regular but not both concave or not both convex, as G FOSD F, it follows that for any p, $pF(\bar{v}(Q_f^*)) + (1-p)F(\underline{v}(Q_f^*))$ is (weakly) larger than $pG(\bar{v}(Q_g^*)) + (1-p)G(\underline{v}(Q_g^*))$. Hence, it is necessary for $\Delta(x|F \to G) > 0$ that either both the distributions are concave or both are convex. In addition, when both are concave, a decrease in coverage (the condition for which is given in (4)) as a result of the mood swing from F to G becomes necessary as well as this is the only way the line joining $F(\bar{v}(Q_f^*))$ and $F(\underline{v}(Q_f^*))$ can go above that joining $G(\bar{v}(Q_g^*))$ and $G(\underline{v}(Q_g^*))$. Finally, when both the distributions are convex, the exact opposite reaction from the media is necessary. These features are clearly shown in Figures 2 and 3 below.

Each part of Proposition 1 also allows for *robust existence* of the phenomenon we are after. An example under case (i) is as follows (see Figure 2, not drawn to scale). We use this example to uncover the requirements for obtaining the result

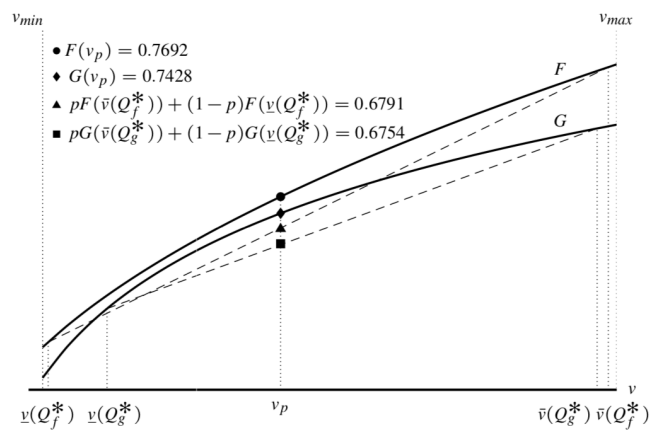

Figure 2: Mood swing, media activity, and vote share with concave F and G.

when both distributions are concave. The two contesting policies are $x = -1$ and $y = 0.85$. The two uncertain states are $\omega_1 = -1$ and $\omega_2 = 1$ with prior $p = 0.6674$. Suppose the personal cost borne by the voters to acquire media coverage is $S = 0.5$. Given these values, the domain of potential swing voters is $[v_{min}, v_{max}] = [-0.6687, 0.7225]$ and $v_p = 0.2598$. Let $F(\cdot)$ be the initial distribution such that for each $v \in [-0.6687, 0.7225]$, it takes the form $F(v) = \sqrt{v + \frac{779}{1000}} - \frac{1}{4}$. Let the cost of coverage borne by the media be $C(Q) = \frac{35Q^2}{100}$. The media's optimal response turns out to be $Q_f^* = 0.9942$ that yields itself a viewership range of $[\underline{v}_f(Q_f^*), \bar{v}_f(Q_f^*)] = [-0.6663, 0.7213]$. The expected vote share of policy x is 0.6796. Suppose now that there is a mood swing and F undergoes a FOSD shift to a new distribution G such that on $[v_{min}, v_{max}] = [-0.6687, 0.7225]$, we have $G(v) = \frac{22}{10}\log(v + \frac{16}{10}) + \frac{6}{40}$. As a consequence, optimal coverage drops to $Q_g^* = 0.8805$ and the new viewership range changes to $[\underline{v}_g(Q_g^*), \bar{v}_g(Q_g^*)] = [-0.6135, 0.6950]$. The expected vote share of policy x rises to 0.6834.

Our next example is on part (ii) of the Proposition 1 when both distributions are convex in the domain of swing voters. Figure 3 depicts the details (not drawn to scale). In this example the two policies are $x = -1.1$ and $y = 0.8$ and the two states are $\omega_1 = -1$ and $\omega_2 = 1$ with prior $p = 0.54$. The critical voter $v_p = -0.07$. The coverage cost is linear and given by $C(Q) = \frac{43Q}{100}$ and the voter's access cost is equal to $S = 0.6$. We start with the original distribution F that, over the domain $[v_{min}, v_{max}] = [-0.8067, 0.5576]$, is given by $F(v) = \frac{1}{2}(\frac{56v}{100} + \frac{11}{10})^2$. The media

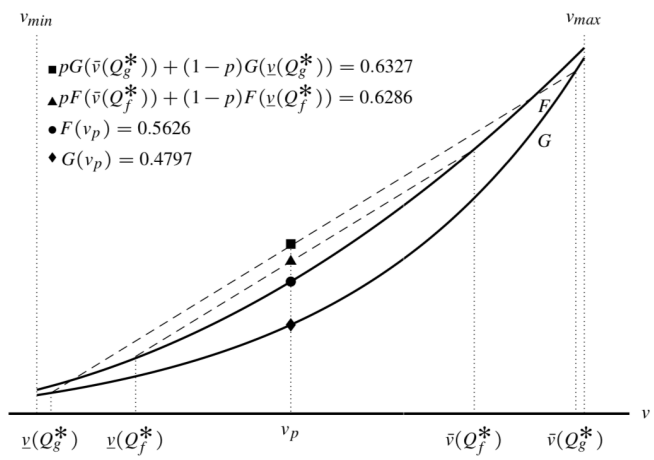

Figure 3: Mood swing, media activity, and vote share with convex F and G.

optimally sets coverage $Q_f^* = 0.9108$ for which it obtains a viewership range of $[\underline{v}_f(Q_f^*), \bar{v}_f(Q_f^*)] = [-0.7731, 0.5289]$. The expected vote share of policy x is 0.6227. From here, the electorate experiences an FOSD shift and we obtain a new distribution G that, over the domain $[v_{min}, v_{max}]$, is $G(v) = \frac{1}{2}e^{\frac{12v}{10}} + \frac{2}{100}$. The media now increases its coverage to $Q_g^* = 0.9879$, thereby increasing its coverage base to $[\underline{v}_g(Q_g^*), \bar{v}_g(Q_g^*)] = [-0.8025, 0.5540]$. The expected vote share of policy x rises to 0.6308.

5.1 On electoral victory

We have so far looked at the impact of mood swings on the expected vote shares. If political parties want to maximize their vote shares in an election, this is what they should be mindful of while confronting public mood swings. But it is often the case that party leaders are only interested in winning elections. If it comes to the probability of electoral victory, the relevant answers will depend on the relative locations of the median voters of the two distributions vis á vis the critical voters $\underline{v}_f(Q_f^*), \underline{v}_g(Q_g^*), \bar{v}_f(Q_f^*), \bar{v}_g(Q_g^*)$ and v_p.

In this section we demonstrate two features of mood swings and votes. First, that favorable mood swings can hurt a party in both expected vote share as well as its winning probability. Second, that one does not imply the other. Let v_f^m and v_g^m be the two median voters under the distributions F and G respectively, and, given

G FOSD F, it follows that $v_g^m > v_f^m$.

Consider the first example (as in Figure 2) where both F and G are concave in the domain of media interest and where a favourable mood swing for policy y increases the expected vote share of party x. The locations of the critical voters are given by: $\underline{v}_f(Q_f^*) = -0.663$, $\underline{v}_g(Q_g^*) = -0.613$, $v_f^m = -0.2165$, $v_g^m = -0.1576$, $v_p = 0.2598$, $\bar{v}_g(Q_g^*) = 0.695$ and $\bar{v}_f(Q_f^*) = 0.7213$. Then, $\Pr(x \text{ wins under } F) = (1-Q_f^*) + Q_f^* p = 0.6693$ and $\Pr(x \text{ wins under } G) = (1-Q_g^*) + Q_g^* p = 0.7071$. So this is an example where both the vote share and the probability of electoral victory for policy x rise as the public mood shifts towards policy y.

Consider next the second example (Figure 3) where both F and G are convex in the domain of media interest and where a favourable mood swing for policy y again increases the expected vote share of party x. The critical values in this example are given by: $\underline{v}_g(Q_g^*) = -0.8025$, $\underline{v}_f(Q_f^*) = -0.7731$, $v_f^m = -0.1786$, $v_p = -0.07$, $v_g^m = -0.034$, $\bar{v}_f(Q_f^*) = 0.5289$ and $\bar{v}_g(Q_g^*) = 0.5540$. Then, $\Pr(x \text{ wins under } F) = (1-Q_f^*) + Q_f^* p = 0.5810$ and $\Pr(x \text{ wins under } G) = (1-Q_g^*) + Q_g^* p = 0.5330$. So this is an example where the vote share of policy x rises but the probability of its electoral victory falls as the public mood shifts towards policy y.

We now construct a third example to show that the vote share of policy x can fall when the probability of its electoral victory rises as the public mood shifts towards policy y. Let the two policies be $x = -1.09$ and $y = 0.8$ and the two states are $\omega_1 = -1$ and $\omega_2 = 1$ with prior $p = 0.65$. The critical voter $v_p = 0.155$. The coverage cost is linear and given by $C(Q) = \frac{44Q}{100}$ and the voter's access cost is equal to $S = 0.6$. We start with the original distribution F that, over the domain $[v_{min}, v_{max}] = [-0.6914, 0.6107]$, is given by $F(v) = \frac{448e^v}{1000}$. The media optimally sets coverage $Q_f^* = 0.8303$ for which it obtains a viewership range of $[\underline{v}_f(Q_f^*), \bar{v}_f(Q_f^*)] = [-0.5987, 0.5608]$. The expected vote share of policy x is 0.5839. From here, the electorate experiences an FOSD shift and we obtain a new distribution G that, over the domain $[v_{min}, v_{max}]$, is $G(v) = \frac{4}{10}(v + \frac{111}{100})$. The media now decreases its coverage to $Q_g^* = 0.7964$, thereby decreasing its coverage base to $[\underline{v}_g(Q_g^*), \bar{v}_g(Q_g^*)] = [-0.5755, 0.5483]$. The expected vote share of policy x decreases to 0.506, confirming Proposition 1. The median voters of the two distributions are given by $v_f^m = 0.1098$, $v_g^m = 0.14$. Hence, the critical values have the following order: $\underline{v}_f(Q_f^*) = -0.5987$, $\underline{v}_g(Q_g^*) = -0.5755$, $v_f^m = 0.1098$, $v_g^m = 0.14$, $v_p = 0.155$, $\bar{v}_g(Q_g^*) = 0.5483$ and $\bar{v}_f(Q_f^*) = 0.5608$. Then, $\Pr(x \text{ wins under } F) = (1-Q_f^*) + Q_f^* p = 0.7093$ and $\Pr(x \text{ wins under } G) = (1-Q_g^*) + Q_g^* p = 0.7212$.

6 Concluding discussion

In this paper, we identify the role of an apolitical viewership-seeking media in hurting a party's electoral performance, both in terms of reduced expected vote share and the probability of victory, when the party experiences a favorable mood swing. In electoral politics, parties generally run positive campaigns that extol the virtues of the party, or negative campaigns that belittle the achievements of its rival. In fact, most elections generate combinations of these two types of campaigns used by parties in order to generate mood swings in their favor. Our work provides careful qualifications to the effects of such mass campaigns. In particular, we show that when the dominant media chases viewership, the parties need to be cognizant of the repercussion that mood swings will have on the information disbursement mechanism, and the resultant composite effect that defines ultimate voter behavior. This adds an interesting dimension to electoral tactics, where candidates can wilfully orchestrate moves to eulogize their opponents or malign themselves in controlled amounts, and increase the chances of winning the elections in the process.

With respect to voter preferences and behavior, our framework is substantiated by Ellis (2012) where voter ideology is seen as an amalgamation of operational and symbolic parts. Operational ideology is the general public view that reacts systematically to changes in the policy context, while the public's symbolic ideology is given by their private preferences and are unconnected to changes in the environment. A number of other works (e.g., Cantril and Cantril (1999), Ellis and Stimson (2009, 2011), Jacoby (2000), Popp and Rudolph (2011), Schiffer (2000) and Stimson (2004)) support this interpretation. According to Ellis (2012), "[u]nderstanding how mass ideology, considered in this dualistic way, intersects with the political context is important in developing a fuller understanding of how changes in the public's political leanings manifest themselves in [...] electoral change." Our work contributes to this long standing discourse.

Central to our theoretical narrative is the media whose defining role in a vibrant democracy cannot be overstated. The literature on media's influence on politics is naturally large though mostly around media bias (see for e.g. Andina-Diaz (2006), Della Vigna and Kaplan (2007), Chiang and Knight (2008), Duggan and Martinelli (2011), Anderson and McLaren (2012), Chakraborty et al. (2016), and Wolton (2018)). For excellent surveys on this issue, see Prat and Stromberg (2013), Stromberg (2015), Stone (2015) and Gentzkow et al. (2014). Mullainathan and Shleifer (2005) derive ex-post media bias as an outcome of viewership-maximizing news slants in order to attract readership from a popula-

tion with heterogenous tastes. They show that a monopolist media facing rational voters with heterogenous preferences never engage in biased news.[5] This behavior on part of the media is ingrained into our framework. The media may vary its quality of coverage, but there is no scope for strategic slants.

The media we model is therefore politically disinterested, and cares only about maximizing its viewership subject to the cost of coverage. Our results are robust to whether this objective is based on profit motives met through subscription fees, or popularity net of operational costs where revenues come from commercial advertisements. Prat (2014) shows that viewership is in fact instrumental in empirically determining the existing media power to influence electoral outcomes. The assumption of viewership-maximizing behavior of the media is also consistent with the findings in Genztkow and Shapiro (2010) that the slant that a newspaper chooses is on average close to what it would have chosen if it had "independently maximized its own profits." Moreover, according to George and Waldfogel (2006), the media not only slants the news but chooses the stories to cover or ignore. We show that the transformed customer base owing to the mood swing may galvanize the media into disseminating more precise news that goes against the interests of the party. It may also lull the media into not covering news items that would have bolstered the voter base of the party. And these changes are driven solely by viewership motives of the media. In either of these cases, the loss from the altered information disbursal mechanism may override the gain from the public mood swing, thereby making the party lose out.

If it comes to electoral competition in an environment where voters face uncertainties, our framework is more in the spirit of the citizen candidate model a la Osborne and Slivinski (1996). The two contesting policies represent two political parties who are unable to credibly alter policy positions even when they observe a public mood swing. In addition, voters are not sure about how to evaluate these policies in face of uncovered fundamental uncertainties about which they need to acquire costly information from an outside source. Carrillo and Castanheira (2008) allow parties to choose platforms and invest in enhancing the quality of leadership strategically. Voters observe platform choices but are uncertain about the quality of each party and obtain free information about it that is imperfect. Costly information acquisition on the part of the voters is studied in Matejka and Tabellini (2018). Voters are more attentive when their stakes are higher, when their cost of information is lower and prior uncertainty is higher. These features

[5] See also Oliveros and Vardi (2014) and Galvis et al. (2016) for more on media market and strategic media bias.

are present in our framework as well though in their model voters vary in their private information. In our framework, voters have a common prior but their ex-post information vary in equilibrium depending upon their bliss points that determine their decision about media access. Another effect of an apolitical media can be found in Bandyopadhyay et al. (2019) where an unknown challenger with high quality deliberately takes unpopular platforms in order to generate value for information about his quality. Information is not free but can only be supplied by a profit-seeking media outlet. They show that totally apolitical profit-seeking motives of the media can generate platform polarization. While the impact of profit motives on electoral outcomes has been studied, these papers do not look at mood swings. Our paper shows why the question of how public mood swings affect platform choices in the presence of a viewership driven media is important and nuanced.

7 Appendix

Proof of Lemma 1: If the voter buys no information then he votes according to his prior and his expected utility is given by $u(v)$.

$$u(v) = \begin{cases} -p(v+\omega_1-x)^2-(1-p)(v+\omega_2-x)^2, & \text{if } v < v_p \\ -p(v+\omega_1-y)^2-(1-p)(v+\omega_2-y)^2, & \text{if } v > v_p \end{cases}$$

If the voter pays S to get information then his expected utility is

$$-S+(1-Q)u(v)+Q(pu(v|\omega_1)+(1-p)u(v|\omega_2)),$$

where $u(v|\omega)$ is the utility when voter knows the true state ω, given by

$$u(v|\omega_1) = \begin{cases} -(v+\omega_1-x)^2, & \text{if } v < \frac{y+x-2\omega_1}{2} \\ -(v+\omega_1-y)^2, & \text{if } v > \frac{y+x-2\omega_1}{2} \end{cases}$$

$$u(v|\omega_2) = \begin{cases} -(v+\omega_2-x)^2, & \text{if } v < \frac{y+x-2\omega_2}{2} \\ -(v+\omega_2-y)^2, & \text{if } v > \frac{y+x-2\omega_2}{2} \end{cases}$$

We first show that for $p \in (0,1)$, we have $\frac{y+x-2\omega_2}{2} < v_p < \frac{y+x-2\omega_1}{2}$. Pick any $p \in (0,1)$. Since $\omega_2 > \omega_1$ and therefore, $\frac{y+x-2\omega_2}{2} < \frac{y+x-2\omega_1}{2}$. Since $v_p =$

$\frac{y+x-2p\omega_1-2(1-p)\omega_2}{2} = \frac{y+x-2\omega_2}{2} + p(\omega_2-\omega_1) > \frac{y+x-2\omega_2}{2}$. As $p<1$, we get $\frac{y+x}{2} + p(\omega_2-\omega_1) < \frac{y+x}{2} + (\omega_2-\omega_1)$. Rearranging the terms, we get $v_p < \frac{y+x-2\omega_1}{2}$.

We now show that no one buys information for $v \in \left(-\infty, \frac{y+x-2\omega_2}{2}\right) \cup \left(\frac{y+x-2\omega_1}{2}, \infty\right)$. Pick a $v \in \left(-\infty, \frac{y+x-2\omega_2}{2}\right)$. If voter does not buy information then his expected utility is

$$-p(v+\omega_1-x)^2-(1-p)(v+\omega_2-x)^2 \tag{5}$$

If voter buys information then his expected utility is

$$\begin{aligned}
&-S-(1-Q)(p(v+\omega_1-x)^2+(1-p)(v+\omega_2-x)^2)\\
&\quad -Q(p(v+\omega_1-x)^2+(1-p)(v+\omega_2-x)^2)\\
&= -S-p(v+\omega_1-x)^2-(1-p)(v+\omega_2-x)^2\\
&< -p(v+\omega_1-x)^2-(1-p)(v+\omega_2-x)^2.
\end{aligned}$$

Next pick a $v \in \left(\frac{y+x-2\omega_1}{2}, \infty\right)$. If the voter does not buy information then his expected utility is

$$-p(v+\omega_1-y)^2-(1-p)(v+\omega_2-y)^2 \tag{6}$$

If voter buys information then his expected utility is

$$\begin{aligned}
&-S-(1-Q)(p(v+\omega_1-y)^2+(1-p)(v+\omega_2-y)^2)\\
&\quad -Q(p(v+\omega_1-y)^2+(1-p)(v+\omega_2-y)^2)\\
&= -S-p(v+\omega_1-y)^2-(1-p)(v+\omega_2-y)^2\\
&< -p(v+\omega_1-y)^2-(1-p)(v+\omega_2-y)^2.
\end{aligned}$$

Lastly we show the existence of $\underline{v}(Q)$ and $\bar{v}(Q)$. Pick a $v \in \left(\frac{y+x-2\omega_2}{2}, v_p\right)$.If voter does not buy information then his expected utility is given by 5. If he buys information then his expected utility is

$$\begin{aligned}
&-S-(1-Q)(p(v+\omega_1-x)^2+(1-p)(v+\omega_2-x)^2)\\
&\quad -Q(p(v+\omega_1-x)^2+(1-p)(v+\omega_2-y)^2)\\
&= -S-p(v+\omega_1-x)^2-(1-p)(v+\omega_2-x)^2\\
&\quad +Q(1-p)((v+\omega_2-x)^2-(v+\omega_2-y)^2)
\end{aligned} \tag{7}$$

Note that 7 = 5 gives

$$-S+Q(1-p)((v+\omega_1-x)^2-(v+\omega_2-y)^2)=0$$

Solving this we get, $\underline{v}=\dfrac{S}{2Q(1-p)(y-x)}+\dfrac{y+x-2\omega_2}{2}$. Note that $\underline{v}>\dfrac{y+x-2\omega_2}{2}$ because $\dfrac{S}{2Q(1-p)(y-x)}>0$. Therefore, we just need to ensure that $\underline{v}<v_p$ i.e,

$$\frac{S}{2p(1-p)(y-x)(\omega_2-\omega_1)}<Q \tag{8}$$

Note that when $Q\leqslant\dfrac{S}{2p(1-p)(y-x)(\omega_2-\omega_1)}$ then $\underline{v}\geqslant v_p$, which is outside the given interval.Therefore, we can write

$$\underline{v}(Q)=\min\left\{\frac{S}{2Q(1-p)(y-x)}+\frac{y+x-2\omega_2}{2},v_p\right\}.$$

Also, notice that for any $v\in\left(\frac{y+x-2\omega_2}{2},\underline{v}\right)$, then voter does not buy information and vote for policy x. And for $v\in(\underline{v},v_p)$ then voter buys information and vote accordingly.

Next, pick a $v\in\left(v_p,\frac{y+x-2\omega_1}{2}\right)$. If voter does not buy information then his expected utility is given by 6. If he buys information then his expected utility is

$$\begin{aligned}&-S-(1-Q)(p(v+\omega_1-y)^2+(1-p)(v+\omega_2-y)^2)\\&-Q(p(v+\omega_1-x)^2+(1-p)(v+\omega_2-y)^2)\\=&-S-p(v+\omega_1-y)^2-(1-p)(v+\omega_2-y)^2+Qp((v+\omega_2-y)^2-(v+\omega_2-x)^2)\end{aligned} \tag{9}$$

Note that 9 = 6 gives

$$-S+Qp((v+\omega_1-y)^2-(v+\omega_2-x)^2) \quad = \quad 0$$

Solving this we get $\bar{v}=\frac{y+x-2\omega_1}{2}-\frac{S}{2Qp(y-x)}$. Note that $\bar{v}<\frac{y+x-2\omega_1}{2}$ because $-\frac{S}{2Qp(y-x)}<0$. Therefore, we just need to ensure that $\bar{v}>v_p$. i.e

$$\frac{S}{2p(1-p)(y-x)(\omega_2-\omega_1)}<Q \tag{10}$$

Note that when $Q \leqslant \frac{S}{2p(1-p)(y-x)(\omega_2-\omega_1)}$ then $\bar{v} \leqslant v_p$, which is outside the given interval. Therefore, we can write

$$\bar{v}(Q) = \max\left\{v_p, \frac{y+x-2\omega_1}{2} - \frac{S}{2Qp(y-x)}\right\}$$

Also, notice that for any $v \in (v_p, \bar{v})$, voter buys information and vote accordingly. And for $v \in \left(\bar{v}, \frac{y+x-2\omega_1}{2}\right)$ then voter does not buy information and vote for policy y.

Proof of Proposition 1: Suppose G is a FOSD of F. On the subdomain $[v_{min}, v_{max}]$, suppose first that F is weakly convex and G is weakly concave. It follows that $F(v_p) - (pF(\bar{v}(Q_f^*)) + (1-p)F(\underline{v}(Q_f^*))) \leqslant 0$ and $G(v_p) - (pG(\bar{v}(Q_g^*)) + (1-p)G(\underline{v}(Q_g^*))) \geqslant 0$. If $\Delta(x|F \to G) > 0$, then it must be that

$$Q_f^*[F(v_p) - (pF(\bar{v}(Q_f^*)) + (1-p)F(\underline{v}(Q_f^*)))]$$
$$-Q_g^*[G(v_p) - (pG(\bar{v}(Q_g^*)) + (1-p)G(\underline{v}(Q_g^*)))] > F(v_p) - G(v_p) \geqslant 0,$$

a contradiction.

Next, suppose F is weakly concave and G is weakly convex. Then

$$pF(\bar{v}(Q_f^*)) + (1-p)F(\underline{v}(Q_f^*)) \geqslant pG(\bar{v}(Q_g^*)) + (1-p)G(\underline{v}(Q_g^*)).$$

With $F(v_p) \geqslant G(v_p)$, we again have a contradiction.

Next suppose either F or G is linear. Note that if f is uniform on $[a,b] \supseteq [v_{min}, v_{max}]$ and G is an FOSD of F, then $\Delta(x|F \to G) \leqslant 0$. To see this, note that under F, the vote share of x is $F(v_p)$, while under G it is a convex combination of two values each not greater than $F(v_p)$, that is $(1-Q_g^*)G(v_p) + Q^*(pG(\bar{v}(Q_g^*)) + (1-p)G(\underline{v}(Q_g^*))) < F(v_p)$. Also, if G is linear, for similar reasons, we will always have $\Delta(x|F \to G) \leqslant 0$ no matter what is F.

So given our regularity assumption on the distribution of voters' ideal point on $[v_{min}, v_{max}]$, what remains are cases (i) and (ii) in the statement of the proposition. So first suppose that F and G are both concave. If $Q_g^* > Q_f^*$, then $\underline{v}(Q_g^*) < \underline{v}(Q_f^*) < \bar{v}(Q_f^*) < \bar{v}(Q_g^*)$. Since G is FOSD F, it follows that $pG(\bar{v}(Q_g^*)) + (1-p)G(\underline{v}(Q_g^*)) \leqslant pF(\bar{v}(Q_f^*)) + (1-p)F(\underline{v}(Q_f^*))$, and $G(v_p) \leqslant F(v_p)$. Thus, $\Delta(x|F \to G) \leqslant 0$. Hence, if F and G are both concave then it must be that $Q_g^* > Q_f^*$. Finally, suppose F and G are both convex. If $Q_g^* < Q_f^*$, then $\underline{v}(Q_f^*) < \underline{v}(Q_g^*) < \bar{v}(Q_g^*) < \bar{v}(Q_f^*)$. As G is FOSD F and F and G are both convex, it follows that $pG(\bar{v}(Q_g^*)) + (1-p)G(\underline{v}(Q_g^*)) \leqslant pF(\bar{v}(Q_f^*)) + (1-p)F(\underline{v}(Q_f^*))$, and $G(v_p) \leqslant F(v_p)$. Thus, $\Delta(x|F \to G) \leqslant 0$.

□

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