Separating News from Entertainment: Attention and Political Accountability

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Abstract

How effective is public scrutiny when exposure to political information becomes a matter of choice? This paper develops a model in which heterogeneous voters allocate attention between news and entertainment, media supply responds to demand, and incumbents exert effort under endogenous public scrutiny. When news and entertainment become more easily separable—capturing the transition to digital media—some voters substitute away from news, potentially weakening aggregate monitoring and reducing incentives for effort. The effect depends on the distribution of voters' concern for being informed. Subsidizing news supply relaxes rationing, but yields limited welfare gains when demand for scrutiny is low.[1]

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1 Introduction

As news and entertainment become increasingly separable in unbundled media environments, exposure to political information becomes more a matter of individual choice. Political accountability is commonly thought to strengthen as voters become better informed. I show that when exposure is discretionary rather than incidental, greater separability between news and entertainment may reduce aggregate scrutiny and weaken incumbents' incentives to exert effort. Accountability thus depends not only on the availability of information but also on voters' demand for scrutiny.

A large empirical literature shows that media environments shape voter information and political accountability. Greater newspaper circulation increases government responsiveness (Besley and Burgess 2002), while reduced media coverage weakens electoral discipline (Snyder and Strömberg 2010). Digital technologies can similarly alter political participation and policy outcomes (Gavazza et al. 2019), and often substitute for traditional sources while improving consumer welfare when access remains free (Gentzkow 2007). While these findings establish that media technologies influence political behavior, less is understood about how the ability to separate news from entertainment shapes aggregate monitoring and political incentives.

I study this question in a two-period electoral accountability model with heterogeneous voters, a strategic incumbent, and competitive media producers. Voters allocate attention between news and entertainment, and political accountability emerges from the interaction between media consumption and electoral incentives. Greater attention to news strengthens monitoring and raises the incumbent's return to exerting effort. Media firms enter freely and supply both types of content, while entertainment is also available from outside the modeled sector, capturing its broader substitutability relative to locally specialized news. This environment allows media technology — modeled as the degree of separability between news and entertainment — to shape equilibrium attention and, in turn, political discipline.

The analysis yields three main insights. First, greater separability between news and entertainment can weaken political accountability when voters place relatively greater weight on entertainment. When exposure becomes discretionary rather than incidental, some voters substitute away from news, reducing aggregate monitoring and dampening incumbents' incentives to exert effort. In turn, an increase in voters' concern for public scrutiny has a larger impact on political accountability in a separable media environment when baseline demand for news is low.

Second, the political consequences of media technology depend on the distribution of voters' preferences for public scrutiny. Accountability depends on the composition of attention: it is strongest when scrutiny is broadly shared rather than concentrated within narrow groups, even if the mean is the same. This becomes particularly important when media are separable, as voters with intermediate preferences for public scrutiny play a pivotal role in sustaining aggregate monitoring.

Finally, expanding news supply has limited effects when the underlying demand for scrutiny is weak. Eliminating rationing increases consumption but generates modest welfare gains when few voters choose to become informed. Together, the analysis recasts political accountability as an equilibrium outcome shaped by the distribution of attention across citizens. Figure 1 summarizes the main mechanisms ruling the results.

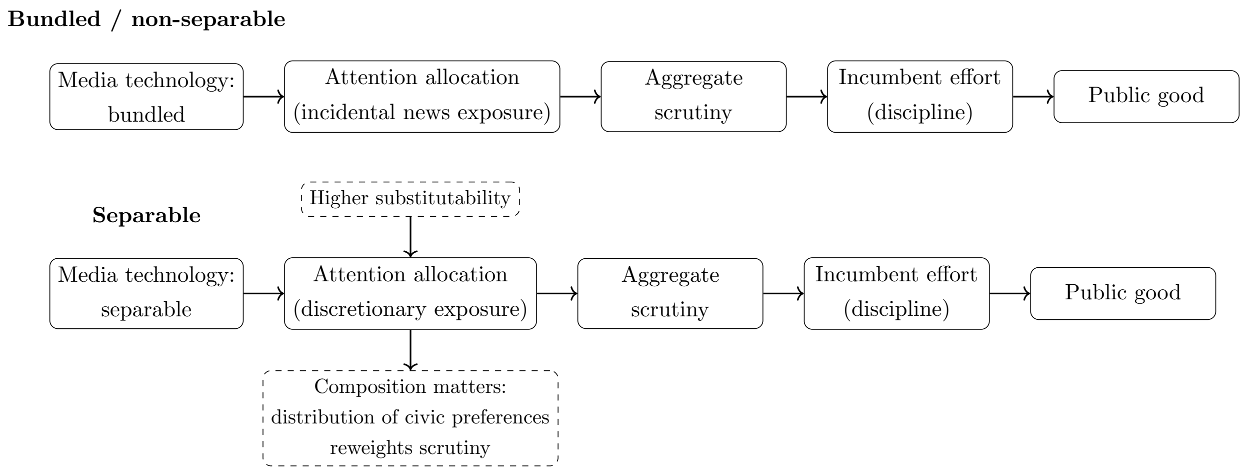

Figure 1: Separating news from entertainment reallocates attention away from marginal news consumers, weakening scrutiny and electoral discipline when demand for scrutiny is low or uneven.

This paper relates to the theoretical literature on media and political accountability. Classic political agency models emphasize how improved information disciplines politicians by strengthening electoral monitoring (e.g., Besley and Prat 2006; Prat and Strömberg 2013). A large literature studies how voter attention shapes political behavior, including policy choices, electoral outcomes, and pandering incentives (e.g., Prato and Wolton 2016; Hu and Li 2019; Trombetta 2020, among others).

While most of this work models information acquisition as costly, this paper highlights a distinct margin: whether exposure to political information is incidental or discretionary. By modeling the separability between news and entertainment, the analysis shifts attention from the cost of becoming informed to the equilibrium composition of citizens who remain attentive, thereby introducing a new mechanism through which media technology shapes political accountability through the demand for news.

The remainder of the paper is organized as follows. In the next section, I outline the related literature. In section three, I present the model setting in detail. Section four summarizes the solution and relevant comparative statics. In section five, I analyze political accountability under different distributions of the ethical parameter. Section six analyzes the response of a bad incumbent under different scenarios, and section seven describes voters' welfare. Section eight discusses the policy of subsidizing news production. All proofs and the definition of an equilibrium can be found in the Appendix.

2 Related Literature

This paper contributes to the theoretical literature on the political economy of media by examining how the substitutability between news and entertainment shapes political accountability. A large body of work studies how voter attention—often modeled through rational inattention—affects political behavior and policy outcomes. This literature shows that limits to attention influence the implementation of reforms (Prato and Wolton 2018; Hu and Li 2019; Devdariani and Hirsch 2023; Blumenthal 2023; Blumenthal 2025), pandering incentives (Trombetta 2020), political polarization (Hu et al. 2023; Matějka et al. 2015), and electoral outcomes (Martinelli 2006; Bruns and Himmler 2016). Comprehensive reviews are provided by Maćkowiak et al. (2023) and Balles et al. (2025).

Most rational inattention models conceptualize political information as costly to acquire. This paper focuses on a distinct margin: the opportunity cost of attention in environments where political news competes directly with entertainment. By emphasizing whether exposure to information is incidental or discretionary, the analysis shifts attention from the cost of becoming informed to the equilibrium composition of citizens who remain attentive. This distinction has implications for how media technology influences accountability, as environments that make political information easier to avoid may weaken aggregate monitoring even when information is readily available. Relatedly, Grillo and Prato (2023) study how voters' reference points shape beliefs about incumbent types.

The paper also relates to the broader literature on political agency and electoral discipline. In the canonical framework of Ferejohn (1986), elections mitigate moral hazard by allowing voters to sanction poorly performing incumbents. Subsequent work highlights the role of the media in improving political outcomes by facilitating information transmission and reducing capture (Besley and Prat 2006). In contrast to models where media content is shaped primarily by ideological incentives or competitive pressures (Gentzkow and Shapiro 2006; Mullainathan and Shleifer 2005), the media environment studied here links news provision directly to voters' demand for attention.

Finally, the analysis connects to research examining how media markets interact with political outcomes, particularly in settings where informational specialization is limited. Perego and Yuksel (2022) show that smaller communities may exhibit lower polarization, suggesting that ideological differentiation plays a reduced role in such environments. By abstracting from ideological bias, this paper isolates the attention channel through which media technology affects electoral incentives. More broadly, the results contribute to a growing literature emphasizing heterogeneity in political agency by demonstrating that the distribution of voters' preferences governs the effectiveness of electoral monitoring.

3 Model Setting

The game lasts two periods. There are N voters indexed by $J = 1, \ldots, N$. Voters are heterogenous with respect to "ethical voter" parameter λ_J drawn from a beta distribution: $\lambda_J \sim Beta(\alpha_1, \beta_1)\ \forall_{J \in N}$. Parameter λ captures voters' valuation of improved political outcomes rather than the effectiveness of the monitoring technology itself. Voters are the same in all other dimensions. Additionally, the model includes media producers and a ruler. The latter is determined exogenously and can be of two types: good or bad. If she is good, her cost of putting in effort is zero. Otherwise, her cost is drawn from a uniform distribution: $c \sim U[0, 1]$. The ruler decides on the amount of effort to put in both periods, and the more effort she puts in, the more likely she is to be re-elected. The political environment features both selection and incentive problems, but the central distortion studied here arises from moral hazard, as incumbent effort is unobserved.

3.1 Timing

In the first period, a ruler (she) is randomly selected. She can be either of a good type ($\theta = g$) with probability γ, or of a bad type ($\theta = b$). Only the ruler knows about her type. Each consumer J (he) draws his type λ_J and chooses the amount of entertainment $\hat{t}_{J,e}$ and news $\hat{t}_{J,n}$ to consume, with an "attention budget" constraint: $\hat{t}_{J,n} + \hat{t}_{J,e} = 1$. The aggregate demands for entertainment and news are given by $\hat{T}_e = \sum_{J=1}^{N} \hat{t}_{J,e}$ and $\hat{T}_n = \sum_{J=1}^{N} \hat{t}_{J,n}$ respectively. Subsequently, M media producers decide to enter the market. Their number depends on the demand for media content and exogenously determined revenues from advertising, as well as fixed costs for entertainment and news. Each media producer operates under the same profit function and concurrently determines the amount of entertainment and news to produce without the ability to target specific consumers (i.e., their offers are homogeneous).

Following entry and production decisions, consumption is determined by a rationing rule in the news market. Because payoffs depend only on realized consumption, I analyze equilibrium using a reduced game in realized choices (Appendix C). News is exclusively supplied by the media firms, so realized news consumption for a voter J is

$$\tilde{t}_J = \min\{\hat{t}_J, t_n^s\}.$$

Note that $1 - \tilde{t}_J$ denotes total entertainment consumption, including content obtained from outside the modeled media sector. The profit function counts only attention captured by symmetric media firms; hence the term $\min\{1-\hat{t}_J, 1-t_n^s\}$ represents in-model entertainment consumption, with any residual interpreted as an outside option.

If supply is insufficient, some voters are constrained and consume less news than desired. Entertainment, by contrast, is available from outside the model in arbitrary quantities. Any attention not allocated to realized news is therefore absorbed by entertainment, implying realized entertainment consumption $1 - \tilde{t}_J$. Average realized news consumption is

$$\tilde{t}_n = \frac{1}{N} \sum_J \tilde{t}_J,$$

which equals average desired news when $t_n^s \geq \max_J \hat{t}_J$ and is strictly lower otherwise. Realized consumption is therefore not an equilibrium condition but a mechanical implication of supply.

Subsequently, if a ruler is of a bad type, she chooses at once the optimal amount of effort she puts in the first e_1 and second e_2 period, with $e_t \in [0, 1]$.[2] The public good in period t is proportional to the incumbent's effort: $e_t \tau_t$. The maximum amount of the public good is always larger in the second period ($\tau_1 < \tau_2$). Public-good provision depends on political tenure rather than calendar time. Parameter τ_1 denotes the maximum public good produced by a first-term politician, while $\tau_2 > \tau_1$ applies only to an incumbent who is re-elected and therefore serves a second term. A newly elected replacement, even if entering in the second calendar period, is a first-term officeholder and thus generates public good τ_1. The political environment features tenure-based learning or capacity, so that experienced incumbents can generate a higher public good ($\tau_2 > \tau_1$).

[2] There is no difference if the ruler chooses the effort consecutively, as after the second period there are no re-election incentives. A good incumbent will choose maximum effort in the second period, and a bad incumbent will choose zero effort, regardless of the timing of the decision.

The timeline is as follows. An incumbent serves a first term, knowing how much consumers would pay attention to news and entertainment. Then, consumers consume media content. The more they pay attention to the news, the more the incumbent is motivated to exert an effort. The probability of re-election is given by $\rho(\tilde{t}_n, e_1) = \tilde{t}_n\sqrt{e_1}$ and $\tilde{t}_n = \frac{\tilde{T}_n}{N}$ is the average amount of consumed news in equilibrium. This reduced form captures the idea that higher aggregate news consumption improves voter monitoring and therefore increases the probability that poor-performing incumbents are replaced, while having a smaller effect on high-performing incumbents. This structure is consistent with standard retrospective voting models in which voters observe a noisy signal of incumbent performance whose precision increases with media coverage (e.g., see Besley and Prat 2006). In such environments, improved monitoring reduces the gap between the re-election probabilities of good and bad incumbents, in the sense that $\rho_{\theta=g}(\tilde{t}_n) - \rho_{\theta=b}(\tilde{t}_n)$ is decreasing in $\tilde{t}_n$.

Finally, elections are held during which consumers decide whether to re-elect the incumbent. If they do, the second period of the game begins, in which the politician puts effort e_2 into producing the public good. Note that consumers only obtain a noisy signal about the incumbent's performance; the revelation of the realized amount of public good, $\tau_1 e_1 + \tau_2 e_2$, happens after the game is concluded.

3.2 Consumers/Voters

There are no prices for either entertainment or news. Each consumer, $J = 1, \ldots, N$, decides how to allocate attention between news and entertainment. Both entertainment and news are continuous goods, and each consumer has the same attention budget normalized to one. Preferences over media consumption are represented by a CES aggregator with substitution parameter q and share parameter α. Producers supply both news and entertainment, but only entertainment can be accessed from outside the model in arbitrary quantities.

The substitution parameter q captures features of the media delivery technology rather than primitive differences in tastes. In bundled media environments, such as broadcast television or newspapers, news and entertainment are jointly delivered: consuming additional news typically requires also consuming entertainment-like filler, advertising, or waiting time. As a result, reallocating attention at the margin is costly, and news and entertainment behave as effective complements. In separable media environments, such as social media feeds or news applications, news is available in stand-alone units, allowing consumers to substitute away from entertainment with little friction. This reduces the marginal cost of reallocation and increases the effective elasticity of substitution between content types. Importantly, entertainment is available as an outside option in both environments. The technological change does not alter the feasible choice set, but rather the degree to which attention can be flexibly reallocated across content at the margin. Accordingly, changes in q should be interpreted as shifts in the effective substitutability induced by media technology, not as changes in underlying preferences.

Voters know the maximum level of public good in each period τ_t but learn about the politician's effort in both periods at the end of the game. Each consumer, J, gets an equal share of the transfers. Voters are heterogeneous with respect to λ_J, which characterizes electoral responsibility ("by paying attention to the news, I am more informed to vote"), social norms ("it is well regarded to be well informed"), or other concerns. There is also a positive externality from other consumers paying attention to the news: $\sum_{I=1,I\neq J}^{N}\lambda_I t_{n,I}$.

Each consumer/voter J is maximizing the following utility function:

$$
\begin{aligned}
\hat{t}_{J,n},\hat{t}_{J,e} = \arg\max_{t_{J,n},\,t_{J,e}} \; & \underbrace{\left((1-\alpha)\,t_{J,e}^{q}+\alpha\,t_{J,n}^{q}\right)^{\frac{1}{q}}}_{\text{Intrinsic utility}} \\
& + \frac{1}{N}\left(\sum_{I=1,I\neq J}^{N}\lambda_I t_{n,I}+\lambda_J t_{n,J}\right) \\
& \times \Bigg[\underbrace{\gamma}_{\theta=g}\Bigg(\underbrace{\hat{\rho}(\hat{t}_n,1)}_{\text{Good re-elected}}(\tau_1+\tau_2)+\underbrace{[1-\hat{\rho}(\hat{t}_n,1)]}_{\text{Good not re-elected}}(\tau_1+\gamma\tau_1)\Bigg) \\
& \quad + \underbrace{(1-\gamma)}_{\theta=b}\Bigg(\underbrace{\hat{\rho}(\hat{t}_n,e_1)}_{\text{Bad re-elected}}\,\tau_1 e_1+\underbrace{[1-\hat{\rho}(\hat{t}_n,e_1)]}_{\text{Bad not re-elected}}(\tau_1 e_1+\gamma\tau_1)\Bigg)\Bigg]
\end{aligned}
\tag{1}
$$

$$
\begin{aligned}
\text{s.t.}\quad & q\in(-\infty,0)\cup(0,1], \\
& 0\leq t_{J,n}+t_{J,e}\leq 1, \\
& \hat{t}_n=\frac{\hat{T}_n}{N}, \quad \tau_1<\tau_2, \\
& \alpha\in(0,1), \quad \gamma\in(0,1), \\
& \lambda_J\sim \text{Beta}(\alpha_1,\beta_1), \\
& \hat{\rho}(\hat{t}_n,e_1)=\hat{t}_n\sqrt{e_1}.
\end{aligned}
$$

The intrinsic utility of consuming news $t_{J,n}$ and entertainment $t_{J,e}$ for consumer J takes the form of the CES function with substitution parameter q and preference for news parameter α (top part of the equation 1). The remaining part of the utility function is the expected utility from the public good in both periods, which is distributed equally among all voters N. It is scaled by the own ethical parameter $\lambda_J t_{n,J}$ and others': $\left(\sum_{\substack{I=1\\ I\neq J}}^{N}\lambda_I t_{n,I}\right)$. Therefore, even if a voter does not care about the public good of being informed (when λ_J is relatively low), she can "free ride" on others' interest in news. Importantly, *consumers' attention also matters in case of* $\theta=g$, as even if a good incumbent exerts maximum effort, but if consumers are not interested in news, they might not re-elect her. If a bad incumbent is not re-elected, a new incumbent is determined exogenously with probability of being a good type γ. Note that consumers estimate the probability of the election given by $\hat{\rho}(\hat{t},e_1)$, as e_1 is not yet realized. I assume that, in equilibrium, voters correctly predict the probability, so that $\hat{\rho}(\hat{t}_n,e_1)=\rho(\tilde{t}_n,e_1)$.

Voting and Electoral Selection. Elections determine whether the incumbent remains in office for a second term. Rather than modeling the voting game explicitly, I adopt a reduced-form electoral selection technology that maps realized voter attention and incumbent effort into the probability of re-election. Let $\rho(\tilde{t}_n,e_1)\in[0,1]$ denote the probability that the incumbent is re-elected given realized aggregate news consumption $\tilde{t}_n$ and first-period effort e_1. I interpret ρ as summarizing the outcome of an underlying information-aggregation process: higher news consumption improves the precision with which voters evaluate incumbent performance, thereby increasing the likelihood that high-effort incumbents are retained.

Voters observe realized performance but not the incumbent's cost type. Consequently, electoral outcomes depend on effort rather than on the unobservable cost draw. I assume that ρ is increasing in both arguments: in particular, a good incumbent faces zero effort cost and exerts full effort ($e_1 = 1$), implying

$$\rho_g(\tilde{t}_n) = \rho(\tilde{t}_n, 1) = \tilde{t}_n,$$

so that improved monitoring directly raises the probability of re-election. A bad incumbent chooses effort strategically, trading off the electoral benefit of exertion against its cost.

Importantly, realized re-election probabilities are equilibrium objects rather than additional conditions: elections implement the probabilistic selection rule captured by ρ. This reduced-form approach allows us to focus on how media technology affects information and incentives without taking a stand on the specific institutional details of voting. The specific functional form of ρ is chosen for analytical convenience. My results do not rely on the square-root specification but instead require only that the re-election probability is increasing in both monitoring and effort and exhibits diminishing marginal returns to effort. These properties ensure an interior effort choice and generate the incentive–selection trade-off that is central to the analysis. Appendix G shows that the qualitative results extend to any $\rho(\tilde{t}_n, e_1)$ satisfying these monotonicity and curvature conditions.

Relation to existing models. In many models of rational inattention or media capture, changes in media technology operate through information costs or attention constraints. In contrast, the present framework holds total attention fixed and instead allows technology to affect the *elasticity of substitution* between news and entertainment, summarized by the parameter q. This distinction is important: varying q changes how voters reallocate attention in response to political incentives, even when information is freely available and aggregate attention is unchanged. As a result, media unbundling affects not only the level of news consumption but also its sensitivity to voters' ethical concerns and to political incentives, generating comparative statics that do not arise in standard cost-based models of information acquisition.

3.3 Media Firms

Media firms are symmetric and supply a homogeneous bundle consisting of news and entertainment. A firm's content choice is summarized by the share of attention devoted to news, denoted $t_n^s \in [0, 1]$, with the remaining share $1-t_n^s$ allocated to entertainment. Entertainment is assumed to be unconstrained, so any attention not allocated to realized news is absorbed by entertainment content. Attention allocated to news and entertainment need not be supplied entirely within the modeled sector. While total attention sums to one, media firms monetize only the share captured on their platforms. The choice of t_n^s can be interpreted as a programming format decision (e.g., news-oriented vs entertainment-oriented channels), which in practice is often lumpy. Modeling it as continuous is a tractable approximation.

Firms earn advertising revenue proportional to the amount of time consumers spend watching each type of content.

Let $t_J \in [0, 1]$ denote voter J's desired share of attention devoted to news. Given supplied news t_n^s, realized news consumption by voter J is

$$\tilde{t}_J = \min\{t_J, t_n^s\},$$

with realized entertainment consumption equal to $1 - \tilde{t}_J$. Because entertainment is available from outside the model, any attention not spent on realized news is allocated to entertainment; hence, per-capita entertainment attention equals $1 - \tilde{t}_J$ and does not involve an additional rationing constraint.

Thus, when supply is limited, voters may be rationed and unable to consume their desired amount of news. Also, any attention not spent on realized news is allocated to entertainment content.

It is useful to distinguish between desired and realized news consumption. Let

$$\hat{t}_n := \frac{1}{N} \sum_{J=1}^{N} \hat{t}_J$$

denote average desired news, while realized consumption is

$$\tilde{t}_J = \min\{\hat{t}_J, t_n^s\}, \qquad \tilde{t}_n = \frac{1}{N} \sum_{J=1}^{N} \tilde{t}_J.$$

Media supply t_n^s is determined by firms' profit maximization and free entry. Realized consumption follows mechanically from the rationing rule and does not constitute a separate equilibrium condition. When $t_n^s \geq \max_J \hat{t}_J$, average desired and realized news coincide ($\tilde{t}_n = \hat{t}_n$). Otherwise, $\tilde{t}_n < \hat{t}_n$.

Advertising revenue is directly proportional to the time spent consuming each type of media on the modeled outlets. Let $A_n > 0$ and $A_e > 0$ denote advertising rates per unit of attention for news and entertainment, respectively. If $M \in \mathbb{N}$ firms enter symmetrically, per-firm advertising revenue is

$$\frac{N}{M} \left[A_n \frac{1}{N} \sum_{J=1}^{N} \min\{\hat{t}_J, t_n^s\} + A_e \frac{1}{N} \sum_{J=1}^{N} 1 - \min\left\{\hat{t}_J, t_n^s\right\} \right].$$

Each firm incurs fixed costs FC_n and FC_e associated with producing news and entertainment, respectively.

Given the profile of voters' desired news shares $\hat{t}_n = (\hat{t}_J)_{J=1}^N$ and the number of active firms M, per-firm profits are given by

$$\Pi(t_n^s, \hat{t}, M) = \frac{N}{M} \left[A_n \frac{1}{N} \sum_{J=1}^{N} \min\{\hat{t}_J, t_n^s\} + A_e \frac{1}{N} \sum_{J=1}^{N} 1 - \min\left\{\hat{t}_J, t_n^s\right\} \right] - FC_n - FC_e \tag{2}$$

Which can be simplified to:

$$\Pi\left(t_n^s, \hat{t}, M\right) = \frac{N}{M} \left[A_e + (A_n - A_e) \cdot \frac{1}{N} \sum_{J=1}^{N} \min\left\{\hat{t}_J, t_n^s\right\} \right] - FC_n - FC_e \tag{3}$$

Firms choose $t_n^s \in [0, 1]$ to maximize profits. Because advertising revenue depends on realized attention and entry is discrete, the profit function is piecewise linear and therefore need not be differentiable at a finite set of kink points. Because realized attention is weakly increasing in t_n^s, profits are generically monotone in supply: if $A_n > A_e$, firms prefer higher news provision, whereas if $A_n < A_e$ they prefer lower provision. Set-valued best responses arise only in knife-edge cases. The representation of the profit function (3) makes clear that entertainment revenue constitutes a baseline, while the profitability of expanding news provision depends entirely on the relative advertising premium $(A_n - A_e)$. Accordingly, firm behavior is characterized via best-response conditions rather than first-order conditions.

Entry is free. If $\max_{t_n^s \in [0,1]} \Pi(t_n^s; \hat{t}, 1) \geq 0$, firms enter until profits are driven to zero. That is, in equilibrium, there exists an integer $M \geq 1$ and a supply choice t_n^s satisfying

$$t_n^s \in \arg\max_{t \in [0,1]} \Pi(t_n^s \hat{t}, M) \quad \text{and} \quad \Pi(t_n^s; \hat{t}, M) = 0.$$

If $\max_{t_n^s \in [0,1]} \Pi(t_n^s; \hat{t}, 1) < 0$, no firm enters and $M = 0$. Because firms are symmetric, equilibrium supply is identical across entrants, and entry adjusts the number of firms rather than the chosen content mix.

The media market equilibrium is therefore characterized by profit maximization and free entry, allowing for corner solutions, non-differentiabilities, and rationing. Rationing refers to the situation in which supplied news content t_n^s is insufficient to meet some consumers' desired news consumption, so that realized consumption satisfies $\tilde{t}_J = \min\{\hat{t}_J, t_n^s\}$. Whether rationing occurs depends on the relative advertising profitability of news and entertainment.

3.4 Incumbent

I assume that a ruler has risk-neutral preferences and knows how much news voters consume. In each period in office, she receives a remuneration of r. If an elected politician is good, she faces no costs of exerting effort, $c = 0$. If she is of a bad type, her cost is drawn from a uniform distribution $c \sim U(0,1)$ (before solving the optimization problem). Each type chooses an amount of effort to put in both periods:

$$\begin{aligned} \hat{e}_1, \hat{e}_2 = arg \max_{e_1, e_2} \{(1 - c(\theta)e_1)r + (1 - c(\theta)e_2)r\rho(\hat{t}_n, e_1)\} \\ \text{s.t.} \\ e_1, e_2 \in [0,1]; \quad r > 0 \\ \rho(\hat{t}_n, e_1) = \hat{t}_n\sqrt{e_1} \\ c(\theta = g) = 0; \quad c(\theta = b) \sim U(0,1) \end{aligned} \tag{4}$$

The game can equivalently be formulated as sequential. For the bad incumbent, since second-period effort does not affect re-election prospects, it yields no strategic benefit, implying $e_2^* = 0$. The bad incumbent, therefore, effectively chooses only first-period effort.

3.5 Equilibrium Concept

I focus on pure strategies, and the equilibrium is a Perfect Bayesian Equilibrium. On an equilibrium path, the ruler chooses the level of effort, taking the attention of consumers to news as given, and consumers divide their attention between news and entertainment, correctly foreseeing the effort of an incumbent, given $Pr(\theta)$ and the distribution of c. The appendix includes the definition of equilibrium (Appendix A), along with proofs of its existence (B) and uniqueness (C).

4 Solution

In equilibrium, three mechanisms determine political accountability, understood as the probability of re-electing a good incumbent and ousting a bad one:

(i) **Incumbent effort.** A good type exerts full effort in both periods, while a bad type exerts positive effort only in the first period, with intensity increasing in the average attention to news $\tilde{t}_n$ and decreasing in her cost of effort.

(ii) **Probability of re-election.** The probability that an incumbent is re–elected is increasing in both news attention and first–period effort, $\rho(\tilde{t}_n, e_1) = \tilde{t}_n\sqrt{e_1}$. Thus, higher news consumption strengthens accountability.

(iii) **Consumer demand and media supply.** Consumers divide their attention between news and entertainment depending on intrinsic preferences (α, q) and ethical concerns (λ_J). In equilibrium, media firms simply supply the aggregate amount of news that consumers demand, subject to profitability.

Because political accountability depends on voters' exposure to news, all aggregate political terms are functions of realized rather than desired consumption. While consumers' choices of attention directly discipline a bad incumbent, it is not optimal to confuse her with a good type. Political accountability is stronger when news is more attractive (high α), and when ethical concerns (λ_J) are more pronounced, but only in the case of a good incumbent or a bad incumbent exerting little effort. Therefore, "too much" interest in news might not be optimal if a bad incumbent chooses to exert large enough effort to be re-elected.

Equilibrium characterization. *In the two–period game described in Section 3, there exists a unique perfect Bayesian equilibrium with the following properties:*

(i) *A good incumbent exerts full effort in the first period ($e_1 = 1$) and again in the second period, while a bad incumbent exerts*

$$e_1^*(c; \tilde{t}_n) = \min\left\{1, \left(\frac{\tilde{t}_n}{2c}\right)^2\right\}, \qquad e_2^* = 0,$$

where $c \sim U[0,1]$ and $\tilde{t}_n$ is the average share of attention devoted for news.

(ii) *The re-election probability of an incumbent is:*

$$\rho(\tilde{t}_n, e_1) = \tilde{t}_n\sqrt{e_1},$$

(iii) *Consumers allocate attention between news and entertainment according to their CES preferences and their ethical parameter λ_J, with the optimal news share $t^*_{J,n}$ characterized by the first–order condition (6).*

(iv) *Media producers choose supply to maximize profits; in the abundant-supply regime, average realized consumption equals average desired consumption.*

Moreover, the equilibrium demand for news is strictly positive and uniquely determined for $q < 1$ and $\alpha \in (0, 1)$.

A more formal definition of equilibrium, along with proofs, can be found in the Appendix A, B, and C. Here, I provide a step-by-step solution to the model. I solve the problem using backward induction, starting with an incumbent who takes realized average news which will be supplied and consumed as given, $\tilde{t}_n$.

Incumbent's turn. As a good incumbent has zero cost of exerting an effort, and she wants to be re-elected, she maximizes her effort in period one. In period two, she is indifferent between any value of effort (I assume she exerts again the largest possible effort, $e_2 = 1$). An optimal effort of a bad type in period two is zero (there is no incentive to exert any effort, as it is not possible to be re-elected after the second period). In period one, the optimal effort is given by:

$$\frac{\partial \rho(\tilde{t}_n, e_1)}{\partial e_1} = \frac{c}{1 - ce_2}$$

$$\text{If } e_2 = 0 \text{ and } \rho(\tilde{t}_n, e_1) = \tilde{t}_n\sqrt{e_1}, \text{ we have:} \tag{5}$$

$$e_1^* = \left(\frac{\tilde{t}_n}{2c}\right)^2$$

A bad incumbent's effort thus increases with the average amount of news, but decreases faster with the cost of effort. Her welfare, if re-elected, is $(1 - ce_1^*)r + r$ if she is of a bad type, and $2r$ if she is good. If not re-elected, the bad type gets $(1 - ce_1^*)r$, and the good type gets r. In particular, the absence of a corner at zero effort follows from the bounded support of the cost distribution.

Firms' turn. Because realized consumption involves $\min\{\cdot\}$ terms and entry is discrete, the analysis proceeds by exploiting the structure of profits rather than by solving first-order conditions. Fix the profile of voters' desired news shares $\hat{t} = (\hat{t}_J)_{J=1}^N$ and the number of active firms M. Under the realized-attention rule $\tilde{t}_J = \min\{t_J, t_n^s\}$, per-firm profits are continuous and piecewise linear in t_n^s, with kinks at values of t_n^s equal to $\{\hat{t}_J\}_{J=1}^N$. These kinks reflect changes in the set of voters who are constrained by available news supply. Writing

$$D(\hat{t}, t_n^s) := \frac{1}{N}\sum_{J=1}^{N} \min\{\hat{t}_J, t_n^s\},$$

the profit function can be expressed as

$$\Pi(t_n^s; \hat{t}, M) = \frac{N}{M}\Big[A_e + (A_n - A_e)D(t_n^s)\Big] - (FC_n + FC_e).$$

This representation makes clear that entertainment advertising revenue constitutes a baseline, while the marginal profitability of expanding news supply is governed by the advertising premium $(A_n - A_e)$ and the mass of constrained voters.

In particular, on any interval between consecutive kink points, the slope of $D(\hat{t}, t_n^s)$ equals the fraction of voters with $\hat{t}_J > t_n^s$. Hence, if $A_n > A_e$, increasing t_n^s reallocates attention toward news in a way that is (weakly) profitable whenever some voters remain constrained; if $A_n < A_e$, firms prefer to keep news supply low. Because profits are piecewise linear, optimal supply is generically attained at a boundary point (or along a flat segment in knife-edge cases), rather than at an interior solution. Moreover, conditional on entry, increases in A_n (resp. A_e) shift the set of profit-maximizing supplies weakly upward (resp. downward).

Entry is free. If $\max_{t_n^s \in [0,1]} \Pi(t_n^s; \hat{t}, 1) \geq 0$, firms enter until profits are driven to zero; otherwise, the no-entry outcome obtains. The interaction between firms' supply choices and voters' consumption decisions is resolved through a fixed-point condition analyzed in Appendix B.

The model admits two qualitatively distinct supply regimes.

Rationing regime. If the profit-maximizing supply satisfies $t_n^s < \max_J \hat{t}_J$, some voters are constrained and realized consumption is $\tilde{t}_J = \min\{\hat{t}_J, t_n^s\}$.

Abundant-supply regime. If the profit-maximizing supply satisfies $t_n^s \geq \max_J \hat{t}_J$, average realized consumption coincides with average desired consumption for all J. Sufficient conditions for the abundant-supply regime include low fixed costs relative to advertising revenues or sufficiently high advertising rates for news.

Unless stated otherwise, the main comparative statics are derived under the abundant-supply regime. This isolates the effect of media technology on voter behavior from mechanical supply constraints.

Consumers' turn. As it is backward induction, consumers solve their problem first. Their solution follows the FOC:

$$\begin{aligned}
&\underbrace{\left[(1-\alpha)(1-\hat{t}_{J,n})^q + \alpha\hat{t}_{J,n}^q\right]^{\frac{1}{q}-1}\left[\alpha\,\hat{t}_{J,n}^{\,q-1} - (1-\alpha)(1-\hat{t}_{J,n})^{\,q-1}\right]}_{\text{Marginal intrinsic utility}} = \\
&\qquad -\underbrace{\frac{\lambda_J}{N}\Big\{\gamma\big(\tau_1+\hat{t}_n\tau_2\big) + (1-\gamma)\,\tau_1\big(e_1+\gamma-\hat{t}_n\,\gamma\sqrt{e_1}\big)\Big\}}_{\text{direct own-}\lambda_J\hat{t}_{J,n}\text{ effect}} \\
&-\underbrace{\frac{1}{N^2}\Big(\sum_{I=1}^{N}\lambda_I\hat{t}_{I,n}\Big)\,\gamma\Big(\tau_2-(1-\gamma)\tau_1\sqrt{e_1}\Big)}_{\text{aggregate feedback via }\hat{t}_n}, \qquad \hat{t}_n = \frac{1}{N}\sum_{I=1}^{N}\hat{t}_{I,n}.
\end{aligned} \tag{6}$$

The solution exists, and it is unique for $q < 1$ and $\alpha \in (0,1)$ (please see Appendix B and C). If $\alpha < 0.5$, the LHS of (6) could be negative, and thus the marginal utility from consuming more news (instead of preferred entertainment) should be equal to the marginal political payoff from more news (note that $\tau_2 > \tau_1$).

If an incumbent is of a good type and is re-elected, the welfare per consumer is equal to

$$V^g = ((1-\alpha)\tilde{t}_e^q + \alpha\tilde{t}_n^q)^{\frac{1}{q}} + \sum_{J=1}^{N}\lambda_J\tilde{t}_{n,J}\frac{\tau_1+\tau_2}{N}$$

When an incumbent is of a bad type and is re-elected, realized welfare for each consumer is

$$V_J^{b,rel} = ((1-\alpha)\tilde{t}_{J,e}^q + \alpha\tilde{t}_{J,n}^q)^{\frac{1}{q}} + \sum_{J=1}^{N}\lambda_J\tilde{t}_{n,J}\frac{e_1^*\tau_1}{N},\ \forall_{J\in N}$$

When she is not re-elected, it is

$$V_J^{b,nrel} = ((1-\alpha)\tilde{t}_{J,e}^q + \alpha\tilde{t}_{J,n}^q)^{\frac{1}{q}} + \sum_{J=1}^{N}\lambda_J\tilde{t}_{n,J}\frac{\tau_1 e_1^* + \gamma\tau_1}{N},\ \forall_{J\in N}$$

Note that the "public scrutiny" part of the welfare ($\sum_{J=1}^{N}\lambda_J\tilde{t}_{n,J}$) is increasing with the number of voters, but transfers per capita $\frac{\tau_t}{N}$ are decreasing. Therefore, if the decrease in per capita transfers is larger than the increase in public scrutiny when the number of voters increases, on average, the expected welfare from transfers might decrease for a consumer.

How do consumers form expectations about incumbent performance in the first period? They do not observe the incumbent's effort choice or its realization costs. Instead, they understand that effort is chosen optimally by the incumbent as a function of the media environment and that costs are privately realized. Given knowledge of the equilibrium strategy and the cost distribution $c \sim U(0,1)$, voters form rational expectations over effort outcomes. Accordingly, $E(e_1^*)$ should be interpreted as the *ex ante* expected effort induced by the level of media scrutiny, rather than as an inference from observed effort. Under the maintained assumptions, this expected effort satisfies $E(e_1^*) = \tilde{t}_n - \frac{\tilde{t}_n^2}{4}$. Since effort responds to realized monitoring, expectations are taken with respect to $\tilde{t}_n$ (which equals $\hat{t}_n$ in the abundant-supply regime).[3]

While the solution exists for all $q < 1$, its closed form exists for some $q < 1$. I consider two cases: news and entertainment are complementary goods ($q = -1$), or substitutive goods ($q = \frac{1}{2}$).

- Complementary goods, $q = -1$:

$$\begin{aligned}
K(\hat{t}_n) &= \gamma\big(\tau_1 + \hat{t}_n\,\tau_2\big) + (1-\gamma)\,\tau_1\big(e_1 + \gamma - \hat{t}_n\,\gamma\sqrt{e_1}\big),\\
K'(\hat{t}_n) &= \gamma\big(\tau_2 - (1-\gamma)\,\tau_1\sqrt{e_1}\big)\\
\hat{t}_n \;=\; \frac{1}{N}\sum_{J=1}^{N}\hat{t}_{J,n}, &\qquad \bar{\Lambda} \;=\; \frac{1}{N}\sum_{J=1}^{N}\lambda_I\,\hat{t}_{J,n}\\
C_J \;&=\; \frac{\lambda_J}{N}\,K(\hat{t}_n) \;+\; \frac{\bar{\Lambda}}{N}\,K'(\hat{t}_n)\\
y^* \;&=\; \frac{-\,C_J\,\alpha(1-\alpha) \;+\; \sqrt{\alpha(1-\alpha)\,\big[\,1 + C_J(2\alpha-1)\,\big]}}{\alpha\,(1 + C_J\alpha)},\\
&\boxed{t^*_{J,n} \;=\; \frac{1}{1+y^*}}.
\end{aligned} \tag{7}$$

  Note that $\frac{\lambda_J}{N}K(\hat{t}_n)$ is equal to the direct own-$\lambda_J\hat{t}_{J,n}$ effect from (6) and $\frac{\bar{\Lambda}}{N}K'(\hat{t}_n)$ to the aggregate feedback via $\hat{t}_n$ from (6). $K(\hat{t}_n)$ summarizes the equilibrium political transfer associated with aggregate news consumption.

- Substitution goods, $q = \frac{1}{2}$:

$$\begin{aligned}
X \;=\; 2\alpha - 1 + C_J, \qquad m \;=\; 2\alpha(1-\alpha), &\qquad D \;=\; X^2 + m^2\\
&\boxed{t^*_{J,n} \;=\; \frac{(X+\sqrt{D})^2}{(X+\sqrt{D})^2 + m^2}}
\end{aligned} \tag{8}$$

In these special cases, the closed-form best responses permit a direct comparison of the equilibrium news share $t^*_{J,n}$ under the same policy term C_J. The latter is proportional to the sum of the utility and the marginal utility from expected transfers (see 7). Also, note that the aggregate ethical term is defined in terms of realized news consumption,

$$\bar{\Lambda} = \frac{1}{N}\sum_{J=1}^{N}\lambda_J\hat{t}_J.$$

I assume that there is an abundant supply regime in the environments described in Propositions 1–3.

[3]Note that: $e_1^*\left(c;\tilde{t}_n\right) = \min\left\{1, \left(\frac{\tilde{t}_n}{2c}\right)^2\right\}, \quad c \sim U[0,1]$. Therefore, the cutoff where the unconstrained solution hits one is $\frac{\tilde{t}_n^2}{2c}^2 = 1 \implies c = \frac{\tilde{t}_n}{2}$. If $c \leq \frac{\tilde{t}_n}{2}$, $e = 1$; else $e = \left(\tilde{t}_n/2c\right)^2$. Since $c \sim U(0,1)$, we can compute: $E\left(e_1^*\right) = \int_0^{\tilde{t}_n/2} 1dc + \int_{\tilde{t}_n/2}^{1}\left(\frac{\tilde{t}_n}{2c}\right)^2 dc \implies E(e_1^*) = \tilde{t}_n - \frac{\tilde{t}_n^2}{4}$.

Proposition 1. *Let $X := 2\alpha - 1 + C_J$. It follows from the respective closed forms that:*

$$\operatorname{sign}\Big(t_{J,n}^{(1/2)} - t_{J,n}^{(-1)}\Big) = \operatorname{sign}(X).$$

Proof in the Appendix D.

Remark. *The case of substitution goods ($q = \frac{1}{2}$) yields a larger news share than the complementary case ($q = -1$) if and only if $\alpha > (1 - C_J)/2$, and the reverse holds when $\alpha < (1 - C_J)/2$.*

This comparison captures the intuitive idea that, holding the policy term fixed, preferences biased toward entertainment ($\alpha < 1/2$) will result in relatively more news consumption when goods are stronger complements, while preferences biased toward news ($\alpha > 1/2$) will yield a larger news share when goods are easier substitutes.

From now on, I distinguish "non-separable media" (when $q < 0$), and "separable media" (when $q > 0$).

4.1 Change in Ethical Parameter λ_J

I analyse the demand for news when a consumer increases their concerns over being informed as a voter (i.e., an λ_J increases). More specifically, is there a difference in demand for news between separable and non-separable environments after a change in λ_J?

Proposition 2. *A marginal increase in the ethical parameter λ_J leads to:*

- *larger positive response in demand for news when media are separable ($q > 0$), and voters prefer entertainment at least as much as news ($\alpha \leq 0.5$):*

$$\left|\frac{\partial t^*_{J,n}}{\partial \lambda_J}\right|_{q>0} > \left|\frac{\partial t^*_{J,n}}{\partial \lambda_J}\right|_{q<0},$$

- *larger positive response in demand for news when media are non-separable ($q < 0$), and voters prefer news over entertainment ($\alpha > 0.5$):*

$$\left|\frac{\partial t^*_{J,n}}{\partial \lambda_J}\right|_{q>0} < \left|\frac{\partial t^*_{J,n}}{\partial \lambda_J}\right|_{q<0},$$

Proof in the Appendix E.

The result is driven by differences in the curvature of marginal intrinsic utility across media technologies. When intrinsic preferences do not strongly favor news ($\alpha \leq 1/2$), an increase in concern for being informed (λ_J) raises the optimal news share more strongly when news and entertainment are easily substitutable. In this case, reallocating attention away from entertainment is relatively easy, so policy incentives translate smoothly into higher news consumption. When intrinsic preferences favor entertainment ($\alpha < 1/2$) and news and entertainment are complementary, an increase in concern for being informed raises optimal news consumption only gradually. In this case, shifting attention toward news necessarily reduces entertainment consumption, which in turn lowers the marginal utility of news. As a result, complementarity dampens the response of news demand to changes in λ_J, and the optimal allocation remains interior.

The comparative statics follow from how media technology shapes the curvature of marginal intrinsic utility. When intrinsic preferences are news-loving ($\alpha > 1/2$), the mechanism operates through the curvature of marginal intrinsic utility. Under non-separable media ($q < 0$), complementarity attenuates the decline in marginal utility on the news-favored side of the allocation. As voters already devote substantial attention to news, the marginal utility schedule becomes locally flatter than under separability.

Because the behavioral response to a change in λ_J is inversely related to the slope of marginal utility, this flatter profile amplifies the adjustment of optimal news consumption. Consequently, holding $\alpha > 1/2$ fixed, the non-separable environment can generate a larger comparative-static response than the separable one. If we remain in the interior regime of $t^*_{n,J}$ and focus on the case of preferred entertainment $\alpha < 0.5$, the reaction to the marginal increase in λ_J is stronger for the separable media case. It follows that a decrease in voters' interest in being informed ($\Delta\lambda_J < 0$) reduces optimal news consumption. Locally, this reduction is stronger in the separable media environment than in the non-separable one, reflecting the same substitution forces discussed above. In the next section, I switch attention from changes of λ_J given one distribution to changes in distribution given λ_J. In other words, I study average news demand under different distributions of λ_J, using the uniform distribution $\lambda_J \sim U(0, 1)$ as a baseline.

5 The Role of λ_J Distribution

While notions such as "Goldilocks voters" and pandering incentives appear in related work (e.g., in Prato and Wolton 2016), the distributional effects studied in this section rely on a feature specific to the CES aggregation of news and entertainment. Changes in q alter the curvature of individual best responses, and therefore the shape of the technology gap $h(C) = t^*_{q^-}(C) - t^*_{q^+}(C)$. It should be interpreted as the individual change in news consumption induced by the technology shift. Note that $h(C)$ need not be positive; in our calibration, it is negative, so $\Delta(F)$ should be interpreted as a decline in news consumption.

In standard models where news enters additively or where technology affects only information costs, the gap between media regimes is typically monotone in voter types. Here, by contrast, the gap can be largest for intermediate voters and attenuated at the extremes, making dispersion, location, and skewness of λ central determinants of aggregate outcomes. To motivate the analysis of the distribution of λ_J, I outline an example when this distribution matters for the consumption of news.

Assume there are 60 voters, they prefer entertainment over news ($\alpha = 0.4 < 0.5$), the probability of electing a good incumbent is 0.6, and the difference between the maximum public good in the second and first period is 5 ($\tau_2 - \tau_1 = 5$). I estimate the best responses of consumers and plot the histogram of individual optimal news shares $t^*_{J,n}$ in the non-separable ($q = -1$) and separable ($q = \frac{1}{2}$) media environment and four λ_J distributions: $U(0, 1)$, $Beta(0.5, 0.5)$, $Beta(2, 5)$, and $Beta(5, 2)$.

Non-separable media. Histograms (2) show the demand for news according to the four distributions listed above. The demand is computed using the best response of the incumbent, and assuming no rationing from the media sector. It illustrates how the distribution of preferences shapes equilibrium news consumption.

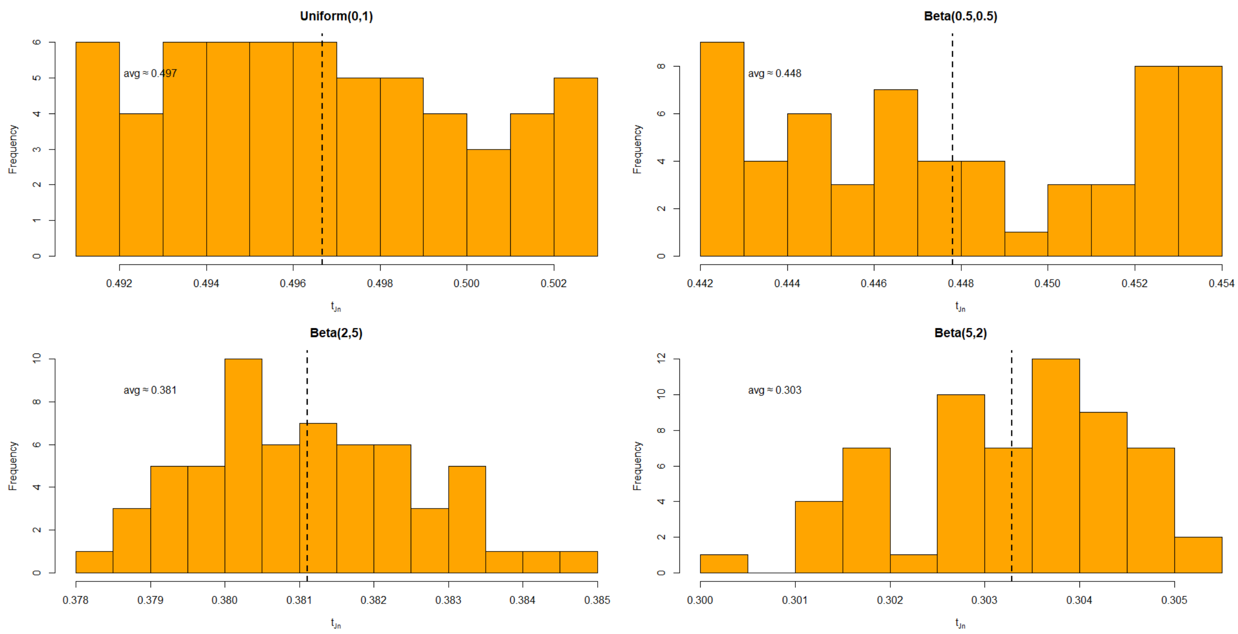

Figure 2: Distribution of the demand for news in the environment of non-separable media content (for $q = -1$).

The results show meaningful dispersion and shifts in the equilibrium cross-section. Interestingly, the average demand for news is the largest for the uniform distribution, even in comparison with $Beta(5, 2)$, which is left-skewed. At first glance, this numerical ordering may appear counterintuitive. Although individual news demand is increasing in λ_J, aggregate demand is determined in equilibrium and therefore depends on the entire distribution of preferences.

The key force is that voters with intermediate values of λ are most responsive to changes in the information environment, while voters at the extremes are close to corner solutions. Increasing the mass of high-λ voters therefore does not proportionally raise aggregate news consumption, as these voters already demand high levels of news. Instead, shifting probability weight away from moderate types reduces the share of voters whose behavior adjusts strongly in equilibrium. As a result, distributions that place greater weight on the extremes can generate lower aggregate news demand despite having a higher mean preference for news.

Separable media content. Histograms (3) show the analogous distribution as in (2) but for $q = \frac{1}{2}$, which I interpret as separable media content. Again, the uniform distribution of λ_J results in the largest average demand for news, but it is smaller than in (2): $\hat{t}_{n,sep} = 0.486 < 0.497 = \hat{t}_{n,nsep}$. Also, the values are smaller for the remaining three cases, with the in-between differences steeper than in the non-separable media environment.

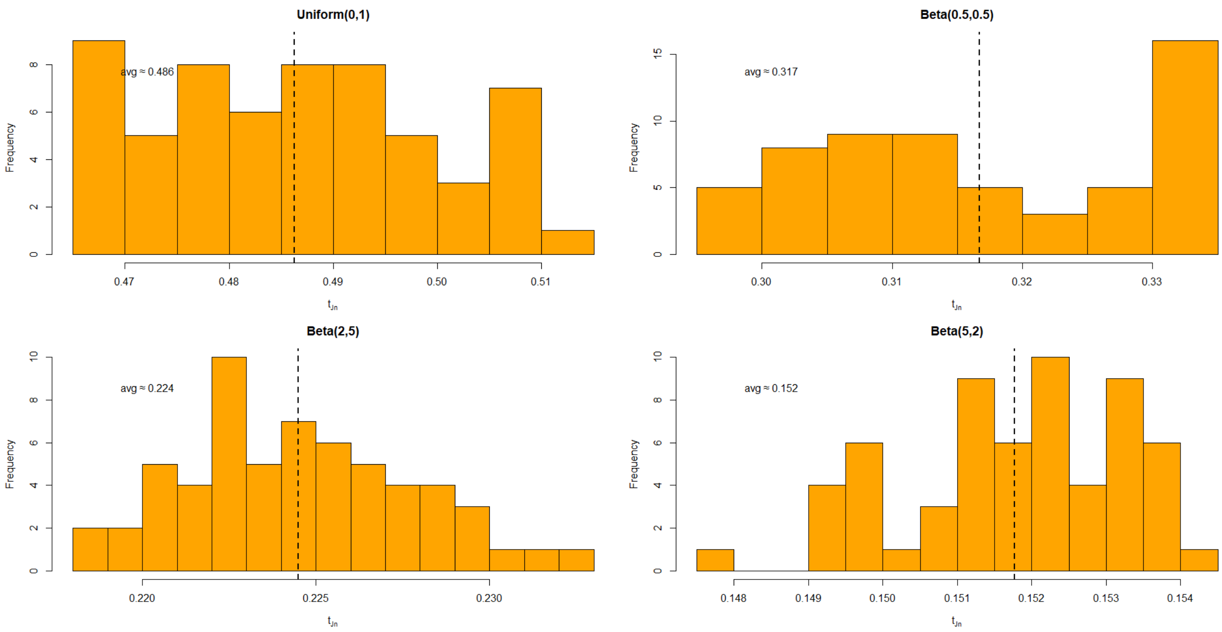

Figure 3: Distribution of the demand for news in the environment of separable media content ($q = \frac{1}{2}$)

As in Figure 2, the distribution with the second-highest desired average news is $Beta(0.5, 0.5)$, which places substantial mass in both tails. By contrast, the lowest aggregate demand arises under the left-skewed distribution $Beta(5, 2)$.

This pattern reflects the role of marginal consumers in determining the equilibrium level of attention. Voters with extreme preferences are close to corner solutions and therefore adjust their behavior a little when the information environment changes. Distributions that concentrate mass away from intermediate types consequently generate weaker aggregate responses, even when the mean preference for news is relatively high. The numerical ordering is not driven by simulation noise but reflects the equilibrium mapping from preference distributions into aggregate attention. In particular, the result arises whenever a larger share of voters lies near corner solutions, reducing the mass of marginal consumers whose behavior responds strongly to the information environment.

In this configuration of parameter values, the shift from non-separable to separable media content brought a decrease in the average demand for news. It follows that in an environment where entertainment is preferred over news ($\alpha = 0.4$), easier substitutability between these content types decreases the average demand for news. In Proposition 3, I formulate the general case, showing how the distribution of λ_J shapes the aggregate technology gap *conditional on the shape of the individual technology gap* $h(C)$, where $h(C) := t^*_{q^-}(C) - t^*_{q^+}(C)$, $C = a\lambda + b$. Rather than deriving global properties of $h(C)$ for all parameter values, I state the relevant shape conditions explicitly. The incentive index C_J is an equilibrium object that depends on aggregate political outcomes through terms such as $K(\tilde{t}_n)$ and $\bar{\Lambda}$. To isolate the role of heterogeneity in voter preferences, Proposition 3 studies a partial-equilibrium comparative static in which these aggregate components are held fixed. Under this maintained environment, the mapping from λ to incentives can be represented in reduced form by the affine mapping $C = a\lambda + b$. This approach allows the distributional mechanism to be examined without the additional general-equilibrium feedback that would primarily rescale incentives.

Proposition 3 (Distributional effects of changing media technology)**.** *Fix two media technologies $q^- < 0 < q^+ < 1$. For any scalar incentive index C, let $t^*_q(C)$ denote a voter's* *optimal share of news consumption under technology q, and define the technology gap (difference in news consumption for a voter between non-separable and separable media):*

$$h(C) \;:=\; t^*_{q^-}(C) - t^*_{q^+}(C).$$

Let λ denote voters' concern for being informed, and consider a reduced-form affine mapping $C = a\lambda + b$, where $a \neq 0$ and b are treated as fixed. For any distribution F of λ on $[0,1]$, define the average technology gap

$$\Delta(F) \;:=\; \mathbb{E}_{\lambda\sim F}[h(a\lambda+b)]\,.$$

The object $\Delta(F)$ measures the average difference in news consumption between the two media technologies; when $h(C) \geq 0$ on the relevant range, $\Delta(F)$ can be interpreted as the average drop in news demand induced by the change in technology.

Assume that for all λ in the support of F and for both technologies $q \in \{q^-, q^+\}$, the optimal news choice is interior, i.e. $t^*_q(a\lambda + b) \in (0,1)$, and that h is three times continuously differentiable on $\mathcal{C}$, where $\mathcal{C}$ contains $\{a\lambda + b : \lambda \in \operatorname{supp}(F)\}$.

(i) ***Dispersion.*** *Let F_1 and F_2 be two distributions on $[0,1]$ with the same mean and suppose that F_2 is a mean-preserving spread of F_1. The two distributions have the same mean, and $\mathbb{E}[\phi(\lambda)]$ is weakly larger under F_2 than under F_1 for every convex function ϕ. This notion captures increased dispersion without changing the mean.*

If h is convex on $\mathcal{C}$ (i.e. $h''(C) \geq 0$ for all $C \in \mathcal{C}$), then

$$\Delta(F_2) \;\geq\; \Delta(F_1).$$

If instead h is concave on $\mathcal{C}$ (i.e. $h''(C) \leq 0$), the inequality reverses.

Dispersion matters because media technology changes affect moderate voters the most, and dispersion determines the number of such voters.

(ii) ***Location (first-order stochastic dominance).*** *Let F_1 and F_2 be two distributions on $[0,1]$ such that F_2 first-order stochastically dominates F_1. If h is nondecreasing on $\mathcal{C}$ (i.e. $h'(C) \geq 0$ for all $C \in \mathcal{C}$), then*

$$\Delta(F_2) \;\geq\; \Delta(F_1).$$

If instead h is nonincreasing on $\mathcal{C}$ (i.e. $h'(C) \leq 0$), the inequality reverses.

Location matters because shifting the distribution of λ changes the weight placed on voters whose news consumption is most sensitive to media technology.

(iii) ***Skewness (local third-moment effect).*** *Fix a baseline distribution F_0 on $[0,1]$ with mean μ and consider a perturbation F_ε that preserves the mean and variance of λ and changes only its centered third moment by $\Delta m_3(\varepsilon)$, with $\Delta m_3(\varepsilon) \to 0$ as $\varepsilon \to 0$. Then, for ε sufficiently small,*

$$\Delta(F_\varepsilon) - \Delta(F_0) = \frac{a^3}{6}\, h^{(3)}(C_0)\, \Delta m_3(\varepsilon) \;+\; o(\Delta m_3(\varepsilon))\,,$$

where $C_0 := a\mu + b$ and $\frac{o(\Delta m_3(\varepsilon))}{\Delta m_3(\varepsilon)} \to 0$ as $\varepsilon \to 0$. In particular, the sign of the change in Δ induced by a small increase in skewness is given by $\operatorname{sign}\big(a^3 h^{(3)}(C_0)\big)$.

Skewness matters because a small group of extreme voters can have a disproportionate impact when individual responses are asymmetrically distributed around the mean. Individual responses are asymmetric around the mean when voters who care more about being informed react differently to technology changes than equally distant voters who care less.

Proof in the Appendix F.

Economic intuition. Proposition 3 shows that the aggregate difference in news consumption between the two media technologies is shaped not only by the mean of voters' "interest in being informed" λ, but also by how that interest is distributed across the population. The key object is the individual *technology gap* $h(C) = t^*_{q^-}(C) - t^*_{q^+}(C)$, which measures how much a voter with incentive index $C = a\lambda + b$ changes her news consumption when the effective elasticity of substitution increases when moving from the non-separable to the separable environment. Abstracting from general-equilibrium feedback into the coefficients, distributional shifts operate through a composition effect: the average technology gap reflects how probability mass is allocated across types with different values of $h(\cdot)$. The result highlights a composition effect rather than an equilibrium feedback effect.

A useful way to interpret the results is to distinguish voters who are *insensitive* to media technology from those who are *sensitive*. Insensitive voters are those who consume very little news under either technology (very low λ) or consume a lot of news under either technology (very high λ). Sensitive voters are those with intermediate λ, for whom the technology choice meaningfully changes the relative attractiveness of news and entertainment and therefore induces a larger gap $h(C)$. As the Proposition 3 relies on the notion of convexity/concavity of $h(C)$, I outline below the intuition behind these concepts.

When is the technology gap convex? The purpose of this subsection is not to establish global convexity of $h(C)$ for all parameter values, but to clarify the economic forces that generate convexity on the range of C relevant for the distributions considered below.

The curvature of the technology gap

$$h(C) = t^*_{q_-}(C) - t^*_{q_+}(C)$$

is a local property that depends on the relative curvature of the best-response functions under the two media technologies. In particular, h is convex on a given range of C if the best response under the non-separable technology bends upward more strongly (or is less concave) than under the separable technology on that range.

A set of sufficient conditions under which convexity of h is likely to obtain on the relevant range are the following. First, optimal news consumption must be interior for both technologies, so that corner solutions do not flatten the response. Second, intrinsic preferences should not be strongly news-loving (e.g. $\alpha < 1/2$), so that voters are not already close to maximal news consumption. Third, complementarity in the non-separable case ($q_- < 0$) should be sufficiently strong relative to substitutability in the separable case ($q_+ > 0$), so that increases in the incentive index C lead to an accelerating adjustment of news demand under the non-separable technology.

Even when h is convex at low or moderate values of C, convexity need not hold globally. As C increases and voters approach high levels of news consumption under both technologies, best responses tend to flatten due to diminishing marginal utility and proximity to corner solutions. In this region, the separable technology may exhibit greater curvature than the non-separable one, causing the technology gap to become concave. Accordingly, the sign of $h''(C)$ should be understood as range-dependent, and distributional results based on convexity apply only on the subset of C induced by the relevant support of λ.

Now we have all the building blocks to understand conditions of minimizing the aggregate technology gap (difference in news consumption between non-separable and separable media environments):

1. **Dispersion at a fixed mean.** When the individual technology gap $h(C)$ is convex on the relevant range, a mean-preserving spread in λ increases the expectation $\Delta(F) = E[h(a\lambda + b)]$ by Jensen's inequality. In our calibration, $h(C)$ is negative, so $\Delta(F)$ represents a decline in news consumption when media becomes more substitutable. Consequently, a higher value of $\Delta(F)$ corresponds to a smaller aggregate drop. Intuitively, the individual gap is largest for voters with intermediate levels of λ and attenuated at the extremes. Increasing dispersion shifts probability mass toward voters who are either almost indifferent to news or highly committed to it, both of whom adjust their behavior less when media technology changes. As a result, the aggregate decline in news consumption becomes smaller even though the expectation of the convex function h rises. Figure 4 illustrates this mechanism by comparing a tight distribution ($\lambda \sim \text{Beta}(10, 10)$) with a more dispersed one ($\lambda \sim \text{Beta}(0.6, 0.6)$), both sharing the same mean. Dashed lines represent the densities, while solid lines depict the technology gap $h(\lambda)$. The shaded areas correspond to contributions to $\Delta(F)$. Consistent with the convexity of h, the dispersed distribution yields a higher $\Delta(F)$ (0.024 vs. 0.035), implying a smaller decline in news consumption.

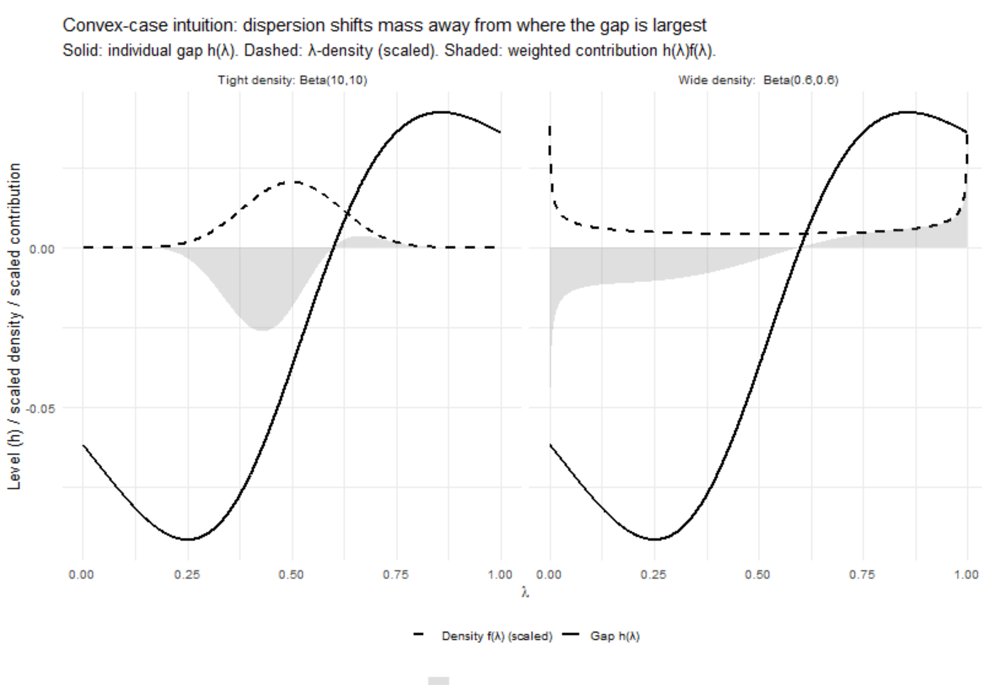

Figure 4

2. **Location (mean shifts).** An upward shift in the distribution of λ reduces the average technology gap whenever voters at higher λ are less sensitive to media technology than voters at lower or intermediate λ. The latter occurs when voters are entertainment-loving ($\alpha < 0.5$) and $h(c)$ is convex. In this case, increasing the mean of λ shifts the weight toward voters whose news consumption is relatively insensitive to the media environment, thereby dampening the aggregate effect of a technological change.

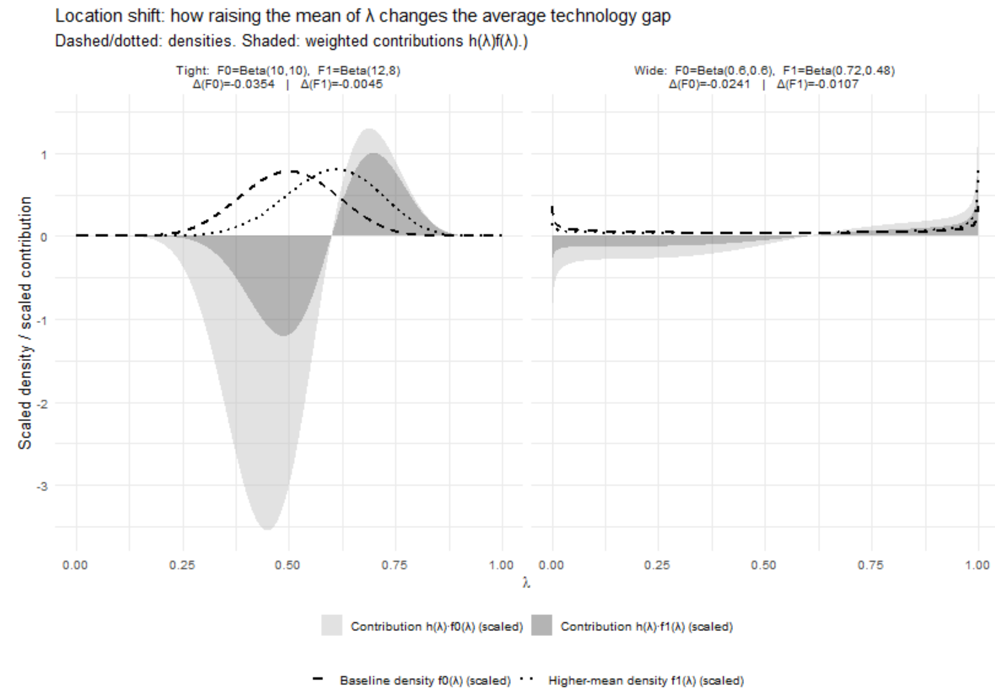

Figure 5

Figure 5 shows the same densities as Figure 4, but in both cases, there is an additional curve with the mean shifted upward (dotted line, contribution to average technology gap in darker gray). We can see that, especially for the case of tight distribution, the technology gap ΔF shrinks for distributions with larger mean ($\Delta(F0_{tight}) = -0.0354$ vs. $\Delta(F1_{tight} = -0.0045)$; and ($\Delta(F0_{wide}) = -0.0241$ vs. ($\Delta(F1_{tight} = -0.0107)$.

3. **Skewness matters only insofar as the gap differs between the high- and low-λ tails.** Holding mean and dispersion fixed, skewness shifts probability mass toward one tail. If the technology gap is larger among low-λ voters than among high-λ voters, then shifting mass toward the right tail (positive skewness) lowers $\Delta(F)$; if the opposite is true, it raises $\Delta(F)$. Location determines how responsive the average voter is, while skewness determines whether extreme voters matter more on one side of the distribution than the other. In the numerical illustrations depicted on Figures 4 and 5, the distributions of λ are symmetric around their mean, so skewness plays no role. This allows us to isolate the effects of dispersion and location without confounding them with asymmetry in the distribution.

In sum, the aggregate technology gap is smallest when the distribution of λ places relatively little mass on the voters for whom media technology matters most. In the empirically relevant case in which the individual gap is largest for intermediate λ and attenuated at the extremes, this occurs when (i) λ is highly dispersed (many voters near 0 or 1 rather than in the middle) and/or (ii) the population is shifted toward high λ so that many voters consume news under either technology.

In our calibration, numerical inspection of $t_q^*(C_0)$ (via the closed forms for $q \in \{-1, 1/2\}$) shows that on the relevant C–range we have the sign pattern:

$$h'(C_0) < 0, \qquad h''(C_0) > 0, \qquad h'''(C_0) > 0. \tag{9}$$

Since $h'(C_0) < 0$, a higher mean μ *reduces* Δ. Hence, holding dispersion fixed,

$$\mu(\text{Beta}(2,5)) < \mu(\text{Uniform}) < \mu(\text{Beta}(5,2)) \tag{10}$$

This explains why $\Delta(\text{Beta}(2,5)) > \Delta(\text{Beta}(5,2))$ despite identical variances.
Since $h''(C_0) > 0$, larger variance *increases* Δ. Thus, at the same mean 0.5,

$$Var\big(\text{Beta}(0.5, 0.5)\big) > Var\big(\text{Uniform}\big) \quad \Rightarrow \quad \Delta\big(\text{Beta}(0.5, 0.5)\big) > \Delta\big(\text{Uniform}\big), \tag{11}$$

matching the finding that the uniform distribution yields the smallest drop.
Since $h'''(C_0) > 0$, right-skew ($\kappa_3 > 0$) *raises* Δ while left-skew lowers it. Therefore, relative to the mean–0.5 cases,

$$\kappa_3\big(\text{Beta}(5,2)\big) > 0 \;\; \text{boosts} \;\; \Delta, \qquad \kappa_3\big(\text{Beta}(2,5)\big) < 0 \;\; \text{drags} \;\; \Delta \text{ down.} \tag{12}$$

In our calibration, the (negative) mean effect dominates the skew drag for Beta$(2,5)$, keeping it on top; for Beta$(5,2)$, the positive skew offsets its higher mean (which would otherwise reduce Δ) and pushes it above Beta$(0.5,0.5)$.

The ranking below is therefore a calibration-specific implication of Proposition 3, given that in our benchmark parameterization the technology gap satisfies $h'(C) < 0$, $h''(C) > 0$, and $h'''(C) > 0$ on the relevant range of C:

$$\boxed{\Delta(\text{Beta}(2,5)) \;>\; \Delta(\text{Beta}(5,2)) \;>\; \Delta(\text{Beta}(0.5,0.5)) \;>\; \Delta(\text{Uniform})}. \tag{13}$$

The ordering of drops across λ–distributions can be understood from the shape of the gap $h(C)$, which measures the additional demand for news under non-separable relative to separable media. In our calibration ($\alpha = 0.4$, $N = 60$, $\gamma = 0.6$, $\tau_2 - \tau_1 = 5$), numerical inspection shows that $h'(C) < 0$, $h''(C) > 0$. Among our four priors for λ_J, only Beta$(0.5,0.5)$ is U–shaped and therefore concentrates mass at the extremes; the skewed distributions Beta$(2,5)$ and Beta$(5,2)$ are unimodal and place most mass away from the boundaries (near 0.29 and 0.71). The empirical ordering in (13) is thus explained by two forces evaluated at our calibration: (i) a *mean effect* with $h'(C) < 0$, which makes a lower mean $E[\lambda]$ increase the drop (hence Beta$(2,5) >$ Beta$(5,2)$), and (ii) a *variance effect* with $h''(C) > 0$, which makes higher dispersion at a fixed mean increase the drop (hence Beta$(0.5,0.5) >$ Uniform). The skewness terms are second order here and do not overturn that ranking.

This mechanism is illustrated in the difference in distributions between Figures (2) and (3). Distributions that concentrate mass away from the boundaries of λ_J exhibit a visibly larger downward shift in desired average news consumption when the media becomes more substitutable, while the uniform distribution displays the smallest change.

Now I turn to the analysis of the best response of a bad incumbent, showing that incentivizing effort might not always be optimal from the voters' perspective.

6 Bad incumbent's response

Given the linear cost of effort ce_1 and the re-election probability $\rho(\tilde{t}_n, e_1) = \tilde{t}_n\sqrt{e_1}$, the bad incumbent's optimal effort is increasing in aggregate news consumption $\hat{t}_n$. Moreover, because the best-response function is $e_1^*(c;\hat{t}_n) = \min\{1, (\hat{t}_n/2c)^2\}$ and costs are bounded with $c \sim U(0,1)$, equilibrium effort is strictly positive for all c whenever $\hat{t}_n > 0$. Figure 6 illustrates the best response of a bad incumbent as a function of desired average news.

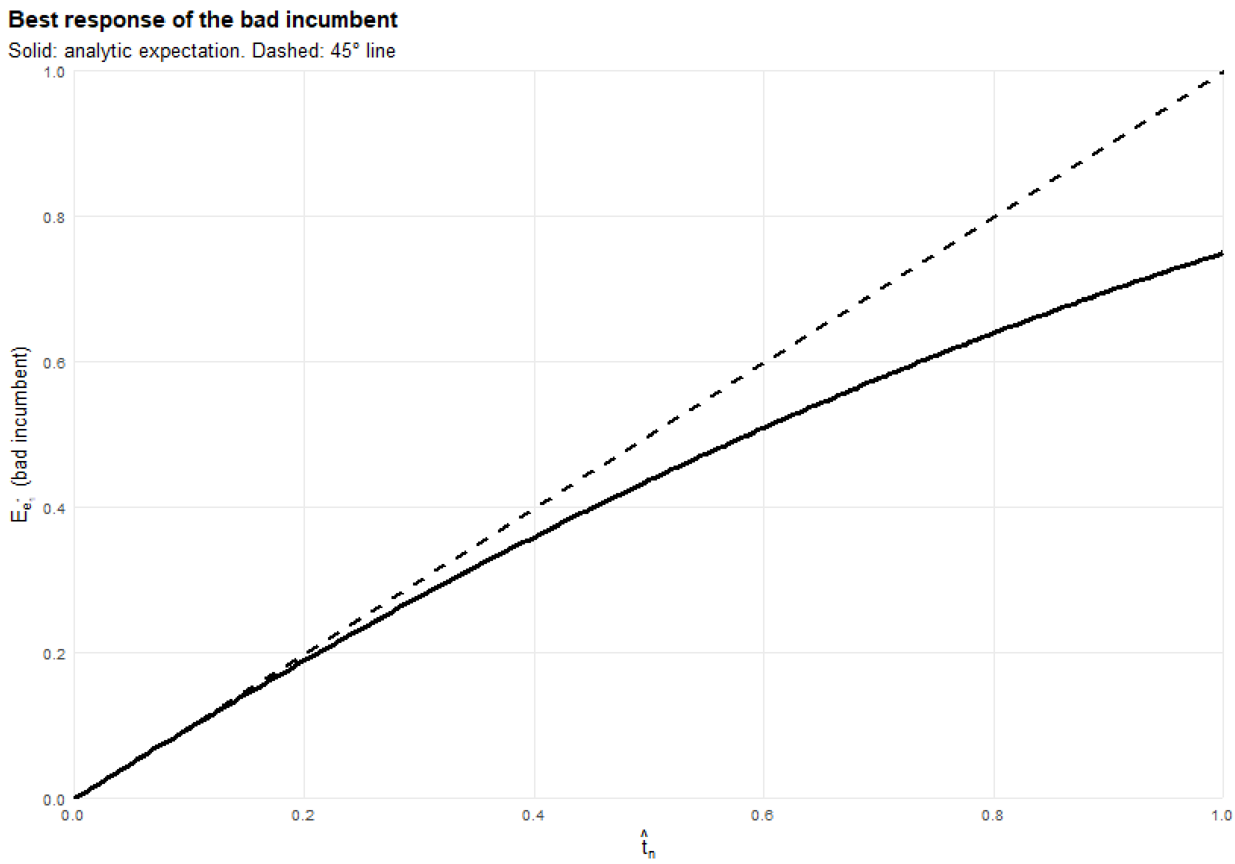

Figure 6

While stronger monitoring disciplines incumbents, it does not necessarily improve voter welfare. If the incumbent is ineffective, lower news demand may reduce her incentive to exert effort, thereby decreasing the probability of re-election. Conversely, when the incumbent is good, insufficient monitoring lowers the likelihood that voters retain a high-performing politician.

Figure 7 plots re-election probabilities as a function of aggregate news consumption for both incumbent types. The fixed-cost curve illustrates the behavior of a representative bad type given that $c = 0.5$, whereas the expected curve reflects voters' ex-ante re-election probability before the cost realization is observed.

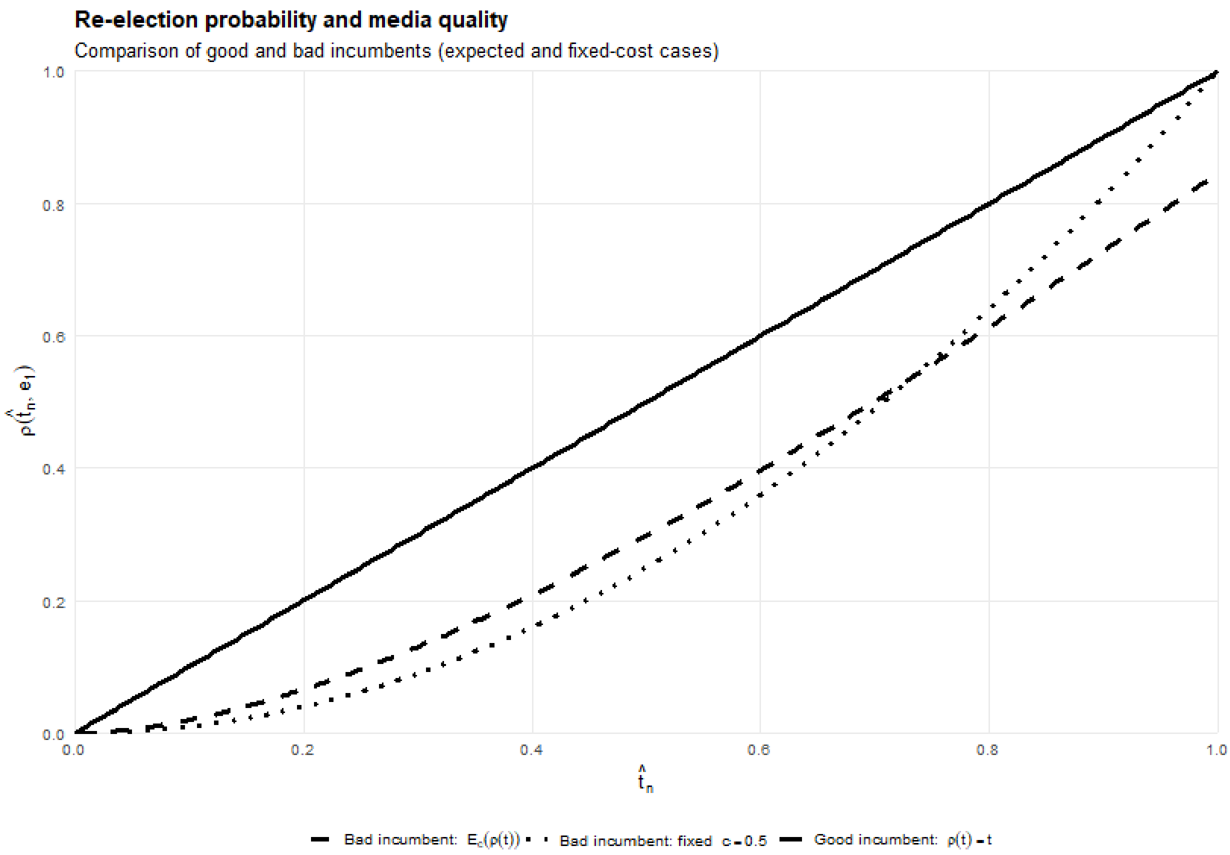

Figure 7

An incumbent takes $\hat{t}_n \in [0, 1]$ as given. A *good incumbent* ($\theta = g$) faces zero effort cost and therefore exerts full effort in the first period ($e_1 = 1$), yielding a re-election probability

$$\rho_g(\hat{t}_n) = \hat{t}_n.$$

A *bad incumbent* ($\theta = b$) draws her cost $c \sim U(0, 1)$ and chooses

$$e_1^*(c; \hat{t}_n) = \min\left\{1, \left(\frac{\hat{t}_n}{2c}\right)^2\right\},$$

which follows from backward induction since no re-election incentive exists in the second period. The associated re-election probability is

$$\rho_b(\hat{t}_n; c) = \hat{t}_n\sqrt{e_1^*(c; \hat{t}_n)},$$

and the expected probability under the cost distribution equals

$$E_c[\rho_b(\hat{t}_n)] = \frac{\hat{t}_n^2}{2}\left(1 - \ln\frac{\hat{t}_n}{2}\right).$$

The fixed-cost curve highlights the strategic behavior of individual bad types. Whenever $c < \hat{t}_n/2$, the incumbent exerts full effort and becomes observationally indistinguishable from a good type. For instance, when $\hat{t}_n$ is high, a type with $c = 0.5$ falls below this threshold and therefore chooses maximal effort. Such incumbents can be interpreted as *low-cost relative to the monitoring environment*: although their absolute cost is moderate, heightened scrutiny makes imitation optimal.

Figure 7 reveals that the gap in re-election probabilities is largest at intermediate levels of monitoring and narrows toward the boundaries. As voter attention intensifies, low-cost bad incumbents optimally increase effort and begin to resemble good types, compressing electoral differences. This convergence reflects endogenous behavioral responses rather than improved screening: greater monitoring strengthens incentives but simultaneously induces pooling through strategic effort ("pandering").

Consequently, political accountability is non-monotone in news demand. When monitoring is weak, voters remain insufficiently informed; when it is very strong, the informational advantage declines because bad incumbents mimic good ones. Monitoring improves incentives but weakens selection, implying that electoral discipline is strongest at intermediate levels of attention — a "Goldilocks" region of voter monitoring. This mechanism is consistent with Prato and Wolton (2016), who show that excessive voter interest may encourage low-quality politicians to pander.

7 Voters' welfare

With voters becoming more interested in entertainment, and with heterogeneous ethical parameters λ_J, the shift from non-separable to separable media may worsen public scrutiny, defined as the average demand for news (Proposition 2). Also, according to Proposition 3, the "technology gap" - drop in consumption of news after this transition - depends on the shape of λ_J distribution.

Assume the calibration from an example in Section 4, with $\lambda_J \sim Beta(2, 5)$ (producing the largest drop in the average demand for news, $h(C)$). Conditional on the interest in news ($\alpha \in (0, 1)$), how does the realized welfare of a consumer change if the media environment changes from non-separable to separable?

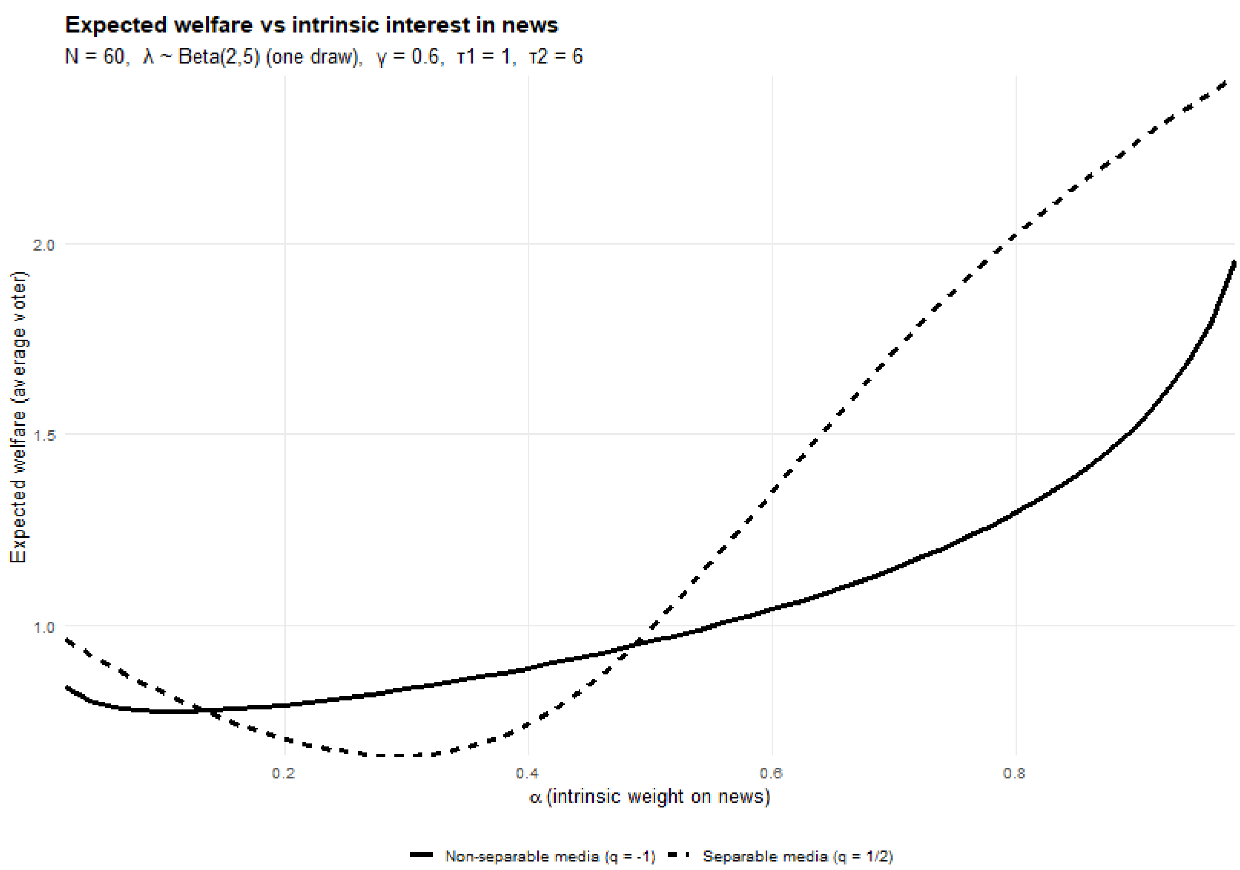

Figure 8

In the calibration from Figure 8, all parameters are as in Section 4, with varying α. The expected welfare is calculated according to (1), taking into account a voter's optimal $t^*_{n,J}$ from (6). It follows that if voters are moderately interested in news $\alpha \approx 0.3$, and the distribution of the ethical parameter is right-skewed ($Beta(2,5)$), a change from a non-separable to a separable media environment produces a drop in welfare. This is intuitive: when news and entertainment are complements, non-interested voters have to consume more or less the same amount of both content, which leads to higher public scrutiny than in an environment of easy substitution.

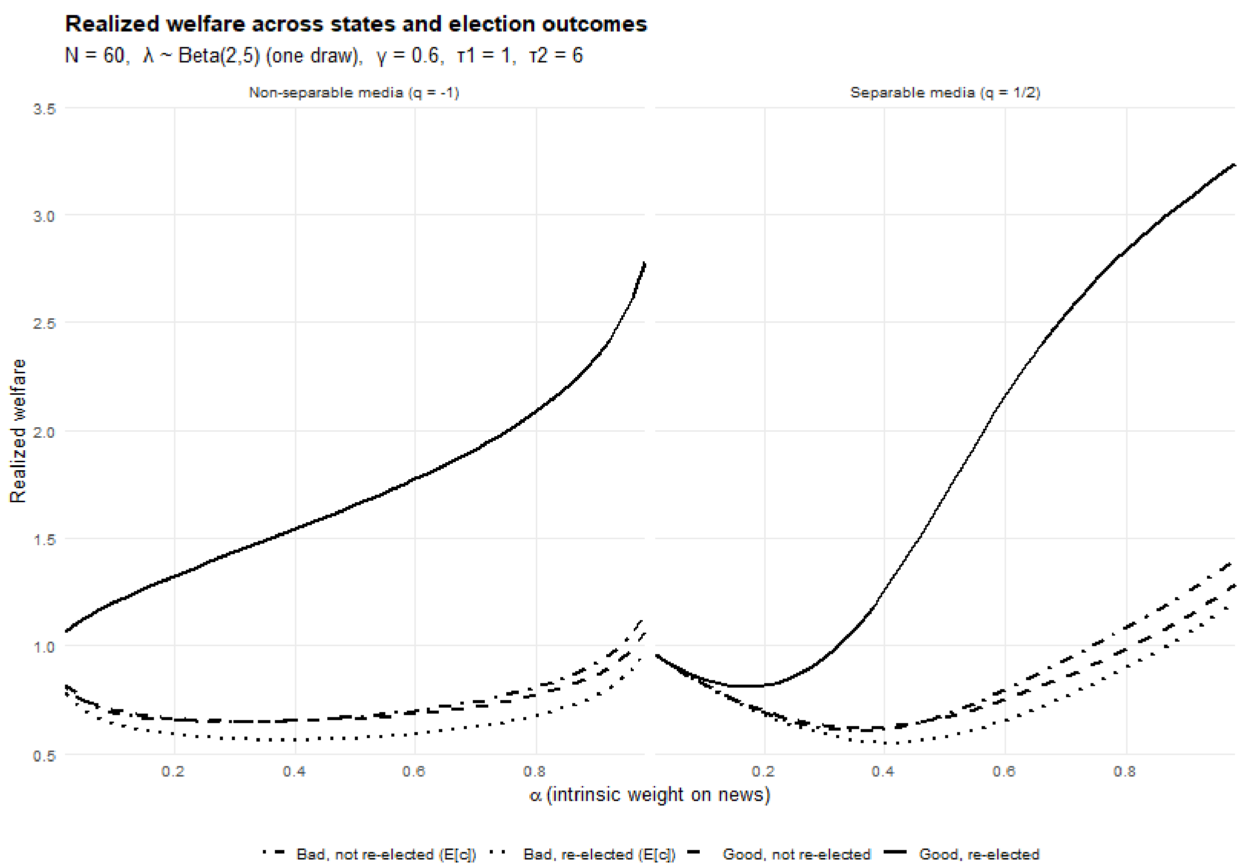

Figure 9

In Figure (9), when the parameter α is very small, consumers place almost no intrinsic value on news, and therefore choose $t_{J,n} \approx 0$.In this region, the political-accountability component of welfare— that is, the transfer implied by equilibrium political outcomes— becomes negligible. Consequently, differences in realized transfers across incumbent types have little effect on aggregate welfare.

As a consequence, realized welfare in the case of a re-elected good type,

$$V^{g,\mathrm{rel}} = \left((1-\alpha)(1-t_{J,n})^q + \alpha t_{J,n}^q\right)^{1/q} + \frac{1}{N}\sum_{J=1}^{N} \lambda_J t_{J,n} \cdot (\tau_1 + \tau_2), \tag{14}$$

and in the case of a re-elected bad type,

$$V^{b,\mathrm{rel}} = \left((1-\alpha)(1-t_{J,n})^q + \alpha t_{J,n}^q\right)^{1/q} + \frac{1}{N}\sum_{J=1}^{N} \lambda_J t_{J,n} \cdot (\tau_1 e_1^*), \tag{15}$$

both converge to the intrinsic utility of entertainment alone,

$$\left((1-\alpha)(1-t_{J,n})^q + \alpha t_{J,n}^q\right)^{1/q} \approx (1-\alpha)^{1/q} \approx 1. \tag{16}$$

This explains why, in the separable case ($q = 1/2$), where goods are close substitutes and $t_{J,n}$ declines sharply as $\alpha \to 0$, the welfare lines for good and bad incumbents overlap at low α. By contrast, in the non-separable case ($q = -1$), complementarities sustain a small positive level of news consumption even for low α, so the difference between good and bad types, while diminished, remains visible.

8 Subsidizing the production of news

In this model, media producers are not strategic players: they take voters' demand as given and supply news subject to advertising revenues and fixed costs. In equilibrium, firms supply a homogeneous level of news determined by the fixed-point mapping between supply and realized consumption. It is useful to distinguish three related objects. Let $\hat{t}_n$vdenote the average *desired* news consumption, and let $\tilde{t}_n$ denote the average *realized* consumption, which may be lower when supply constraints bind. Equilibrium supply is given by t_n^s and satisfies the fixed-point condition described in Appendix C. When $t_n^s < \max_j t_j^*$, high-demand voters are rationed and $\tilde{t}_n < \hat{t}_n$; Otherwise, realized and desired consumption coincide.

Two supply regimes can arise. In the *abundant-supply* regime, realized consumption equals desired consumption for all voters because supply is sufficient to meet even the highest individual demand. Formally, $t_n^s \geq \max_j t_j$, so no voter is rationed. By contrast, when supply is limited—for example, when it matches average demand ($t_n^s = \hat{t}_n$)—voters whose desired consumption exceeds the available supply are rationed and consume less news than they would otherwise choose. Therefore, rationing occurs whenever $t_n^s < \max_j t_j^*$.

Because voters' utility from news includes a public scrutiny component that depends on aggregate consumption, this raises the question of whether public policy can improve accountability by subsidizing news production.

Policy experiment. Consider a subsidy that increases the effective advertising revenue from news, raising A_n to $A_n + \Delta A_n$. The policy objective is to induce media producers to supply a higher level of news, potentially up to the maximum demanded amount

$$t_{n,\max} := \max_J t_{n,J}^*.$$

If $t_n^s \geq t_{n,\max}$, rationing disappears and every voter consumes her desired amount of news.

Firms' response under discrete profits. Under the media market described in Section 2.3, firms' profit functions are continuous but generally non-differentiable in t_n^s, with kinks at voters' desired news shares. Optimal supply is therefore characterized by a set of profit-maximizing news levels rather than by first-order conditions. An increase in A_n weakly raises the marginal profitability of reallocating attention from entertainment to news for any voter who is currently constrained. As a result, subsidizing news expands the set of optimal supply choices t_n^s. However, because profits are piecewise linear, small subsidies may have no effect on equilibrium supply, while larger subsidies can induce discrete increases in t_n^s. Once t_n^s reaches $t_{n,\max}$, further subsidization does not increase news consumption.

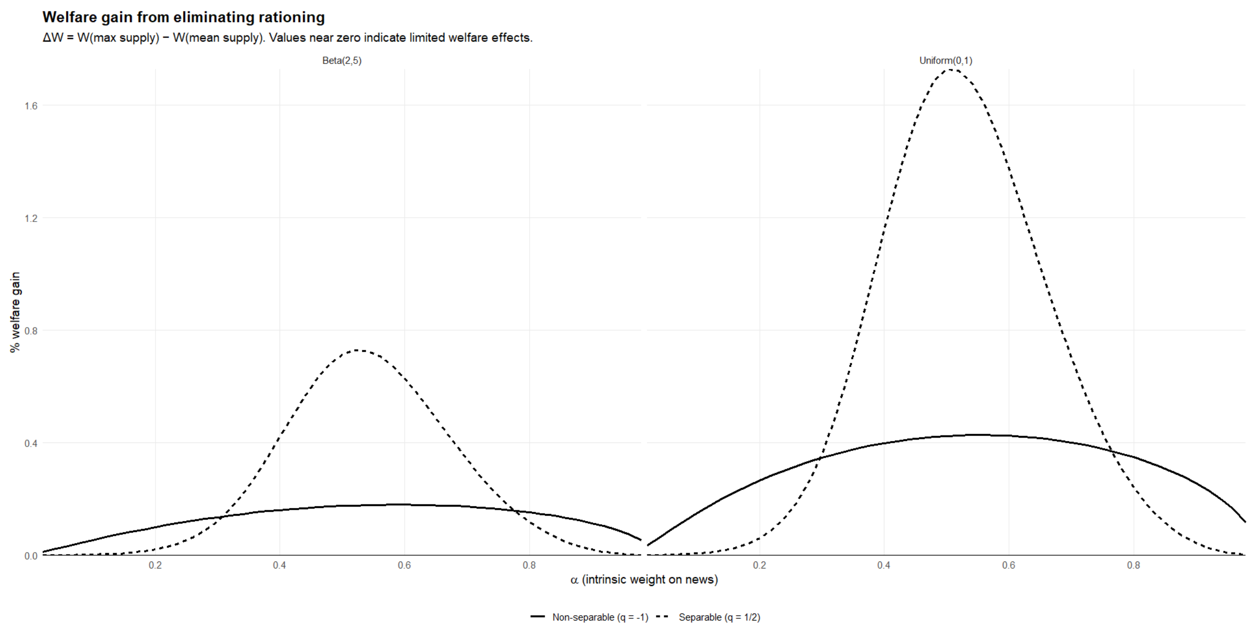

Figure 10: Welfare gain from eliminating rationing, expressed as a percentage of baseline welfare.

Implications for public scrutiny and welfare. If the subsidy succeeds in eliminating rationing, aggregate news consumption increases from $\hat{t}_n$ to

$$\tilde{t}_n = \frac{1}{N}\sum_{J=1}^{N} t^*_{n,J},$$

which weakly raises public scrutiny and strengthens the incentives of an incumbent to exert effort. Holding voters' preferences fixed, expanding supply cannot reduce welfare, since voters are no longer constrained in their media consumption choices.

Figure 10 plots the welfare gain from eliminating rationing directly, measured as the percentage difference between welfare under maximal supply and welfare under baseline supply. The gains are positive but economically modest, never exceeding roughly 2% of baseline welfare. Moreover, the improvements are concentrated in regions where demand for news is high and supply constraints bind more tightly. This suggests that preference heterogeneity—rather than rationing alone—is the primary determinant of aggregate welfare in this environment.

Limits of subsidies. The subsidy can therefore be interpreted as a policy that relaxes the supply constraint and moves the economy from a rationing equilibrium toward the abundant-supply regime.

Subsidies are most relevant when fixed costs are high enough that, absent intervention, no firm enters or supplied news is severely constrained. In such cases, subsidies may be necessary to sustain any news production at all. By contrast, when firms already operate in the abundant-supply regime, subsidizing production primarily redistributes surplus without substantially improving political accountability. Moreover, if subsidies are financed through reduced transfers, an optimal policy trades off higher public scrutiny against lower disposable income. Characterizing the welfare-maximizing subsidy under endogenous taxation is beyond the scope of this paper and left for future work.

Overall, the analysis highlights a central message of the model: the main constraint on political accountability is not media supply per se, but voters' demand for scrutiny. When interest in news is low, subsidizing production has limited effectiveness, regardless of the media technology.

9 Conclusion

The results show that political oversight can be significantly undermined if voters prefer entertainment over news and when the former becomes easier to substitute. Consequently, incumbents might not invest sufficient effort in producing public goods. As voters' demand for news diminishes, the probability of re-election of a good type decreases. However, for a very high demand for news, bad incumbents might invest "too much" effort and reach the same probability of re-election as good incumbents. While Proposition 2 establishes the individual response to voter concern, Proposition 3 shows that the distribution of these concerns plays a central role in determining aggregate demand for news. Together, these results highlight that both individual incentives and the distribution of voter preferences shape equilibrium scrutiny.

In our example, the smallest drop in demand for news was observed for the uniform distribution, suggesting that a large variation in the interest in politics helps the public scrutiny once news and entertainment become more substitutable.

According to the Reuters Institute Digital News Report from 2023, the share of people interested in news in the last eight years declined in every surveyed country except Finland.[4] Hence, not only it has become easier to substitute news for entertainment, but the preferences in favor of news decreased. This might have severe consequences for local journalism. As investigative journalism is more costly than other types of content (reprinted stories, job offers, crosswords, weather, etc.) and, with the Internet being a main source of most of the sought content, many places do or at risk of losing the critical mass of demand enabling local journalism to thrive.[5]

Therefore, my findings are relevant to today's media landscape, especially locally. While policies that reduce media production costs might not lead to larger news consumption, targeted interventions to enhance voter demand for news could improve political accountability.

Future work could extend this model by introducing subsidies for media companies financed from public transfers, or by endogenizing voters' decision to vote. Additionally, empirical validation of the theoretical predictions would provide further insights into the practical implications of media consumption patterns on political accountability.

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[4] Reuters Institute Digital News Report 2023, access: 30 May 2024

[5] On a related angle, using the data for the U.K, Gavazza et al. (2019) show that the Internet penetration contributed to the decrease of voter turnout in local elections, especially among less-educated and young adults. Many voters lost interest in politics because the Internet does not offer access to political information like newspapers and radio.

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A Definition of Equilibrium

Additional notation. Let $N \in \mathbb{N}$ denote the number of voters. For each voter $J = 1, \dots, N$, let $\hat{t}_J \in [0,1]$ denote the *desired* share of attention devoted to news. Given a media supply $t_n^s \in [0,1]$, voter J's *realized* news consumption is

$$\tilde{t}_J := \min\{\hat{t}_J, t_n^s\}, \qquad \tilde{t}_{J,e} := 1 - \tilde{t}_J.$$

Average realized news consumption is:

$$\tilde{t}_n := \frac{1}{N}\sum_{J=1}^{N} \tilde{t}_J$$

Average ethical considerations:

$$\bar{\Lambda} := \frac{1}{N}\sum_{J=1}^{N} \lambda_J \tilde{t}_J$$

.

Media profits. Advertising revenue is proportional to time spent consuming each content type on the platform. Given supplied news $t_n^s \in [0,1]$ and desired news shares $\hat{t} = (t_J)_{J=1}^N$, realized news is $\tilde{t}_J = \min\{t_J, t_n^s\}$ and realized entertainment is $\tilde{e}_J := 1 - \tilde{t}_J$. Given $M \in \mathbb{N}$ symmetric outlets, per-firm profit is

$$\Pi(t_n^s; \hat{t}, M) = \frac{N}{M}\left[A_n \frac{1}{N}\sum_{J=1}^{N} \min\{\hat{t}_J, t_n^s\} + A_e \frac{1}{N}\sum_{J=1}^{N}\big(1 - \min\{\hat{t}_J, t_n^s\}\big)\right] - FC_n - FC_e. \quad (17)$$

Equivalently,

$$\Pi(t_n^s; t, M) = \frac{N}{M}\Big[A_e + (A_n - A_e)\cdot D(t_n^s; \hat{t})\Big] - (FC_n + FC_e), \qquad D(t_n^s; \hat{t}) := \frac{1}{N}\sum_{J=1}^{N} \min\{\hat{t}_J, t_n^s\}. \quad (18)$$

where $\frac{1}{N}\sum_{J=1}^{N}\big(1 - \min\{t_J, t_n^s\}\big)$ - the minimum reflects that only entertainment supplied by modeled firms generates advertising revenue.

Definition. An equilibrium is a profile

$$\Big((t_J)_{J=1}^N,\ (e_1^\theta, e_2^\theta)_{\theta\in\{g,b\}},\ t_n^s,\ M,\ \rho\Big)$$

such that:

(i) **Consumers.** Given $(\tilde{t}_n, \bar{\Lambda})$ and incumbent behavior, each voter J chooses $\hat{t}_J \in [0,1]$ to maximize expected utility, anticipating realized consumption $\tilde{t}_J = \min\{\hat{t}_J, t_n^s\}$.

(ii) **Incumbent.** Given the realized average news $\tilde{t}_n$, the incumbent chooses effort by backward induction.

(iii) **Media firms (supply and entry).** Given $\hat{t}$, firms choose (t_n^s, M) as follows.

  (a) *Supply optimality:* $t_n^s \in \arg\max_{u\in[0,1]} \Pi(u; \hat{t}, M)$.

  (b) *Free entry:* if $M \geq 1$, then $\Pi(t_n^s; \hat{t}, M) \geq 0$ and $\Pi(t_n^s; \hat{t}, M+1) \leq 0$ (no profitable additional entrant).

  If $\max_{u\in[0,1]} \Pi(u; \hat{t}, 1) < 0$, then $M = 0$ and $t_n^s = 0$.

(iv) **Consistency.** Beliefs are Bayesian on path, and $\rho(\tilde{t}_n, e_1)$ is consistent with equilibrium strategies.

B Existence of equilibrium.

Setup and notation. Let $t_n^s \in [0,1]$ denote the (homogeneous) news supply chosen by each entering media firm. Given a profile of desired news shares $\hat{t} = (\hat{t}_J)_{J=1}^N \in [0,1]^N$, realized news consumption is $\tilde{t}_J = \min\{t_J, t_n^s\}$ and realized average news is $\tilde{t}_n = \frac{1}{N}\sum_{J=1}^N \tilde{t}_J$.

Media supply is determined by firms' profit maximization and free entry; there is no additional market-clearing condition equating supply with average desired or realized demand.

Assumptions. The existence proof relies on the following regularity conditions.

(E1) **Compactness.** Each voter chooses a desired news share $\hat{t}_J \in [0,1]$; hence the joint choice set $X = [0,1]^N$ is compact and convex.

(E2) **Voter problem.** For any fixed aggregates and any fixed supply $t_n^s \in [0,1]$, each voter's utility is strictly concave in realized news consumption. Hence, each voter has a unique best reply, and the best-reply function is continuous in the parameters.

(E3) **Firms' payoffs in supply.** For any desired $\hat{t} \in X$ and $M \in \mathbb{N}$, per-firm profit $\Pi(t_n^s; \hat{t}, M)$ is continuous in $t_n^s \in [0,1]$. Moreover, for each $(\hat{t}, M)$ the argmax set $\arg\max_{t_n^s\in[0,1]} \Pi(t_n^s; \hat{t}, M)$ is nonempty and compact.

(E4) **Convex-valued firm best replies (sufficient condition).** For each $(\hat{t}, M)$, the profit-maximizing set in t_n^s is convex (an interval). A sufficient condition is that $\Pi(t_n^s; \hat{t}, M)$ is quasi-concave in t_n^s. Under the residual-attention revenue specification, $\frac{1}{N}\sum_J \min\{\hat{t}_J, t_n^s\}$ is concave in t_n^s, so $\Pi(t_n^s; \hat{t}, M)$ is concave whenever $A_n \geq A_e$.

Lemma 1 (Voters). Under (E2), for any fixed supply t_n^s and aggregate objects (e.g., average desired news), each voter's problem has a unique solution and the best reply is continuous in $(t_n^s, \text{aggregates})$.

Lemma 2 (Firms). Under (E3)–(E4), for each $(\hat{t}, M)$ the firm best-reply correspondence in supply is nonempty, compact-valued, convex-valued, and upper hemicontinuous.

Lemma 3 (Free entry) Fix $(t_n^s, \hat{t})$. Suppose $\Pi(t_n^s; \hat{t}, M)$ is strictly decreasing in M for $M \geq 1$. Define

$$\bar{M}(t_n^s, \hat{t}) := \max\{M \in \mathbb{N} : \Pi(t_n^s; \hat{t}, M) \geq 0\},$$

with the convention that $\bar{M}(t_n^s, \hat{t}) = 0$ if $\Pi(t_n^s; \hat{t}, 1) < 0$. Then $\bar{M}(t_n^s, \hat{t})$ is the unique integer consistent with free entry in the sense that: (i) if $\bar{M} \geq 1$, then $\Pi(t_n^s; \hat{t}, \bar{M}) \geq 0$ and $\Pi(t_n^s; \hat{t}, \bar{M} + 1) < 0$; and (ii) if $\bar{M} = 0$, no entry occurs.

Proof. For $M \geq 1$, $\Pi(t_n^s; \hat{t}, M) = \frac{N}{M} R(t_n^s; \hat{t}) - (FC_n + FC_e)$ is strictly decreasing in M because $\frac{N}{M}$ is strictly decreasing and $R(t_n^s; \hat{t}) \geq 0$. □

Equilibrium. An equilibrium consists of a supply level $t_n^s \in [0, 1]$, a voter profile $\hat{t} \in X$, and an integer $M \in \mathbb{N} \cup \{0\}$ such that: (i) given t_n^s (and the induced aggregates), voters choose $\hat{t}$ as their best replies; (ii) given $\hat{t}$, firms choose t_n^s as a profit-maximizing supply at M; (iii) M satisfies free entry (or no entry).

Proposition 4 (Existence)**.** *Under (E1)–(E4), an equilibrium exists.*

Proof. We construct the equilibrium in the one-dimensional supply space.

Step 1 (voter response to supply). Fix a conjectured supply level $s \in [0, 1]$. By Lemma 1 and (E2), given s and the induced aggregate objects, each voter has a unique desired best reply. Let

$$\hat{t}(s) := \big(\hat{t}_1(s), \ldots, (\hat{t}_N(s)\big) \in X$$

denote the induced desired-news profile. By continuity of best replies, $\hat{t}(s)$ is continuous in s.

Step 2 (firm best reply under free entry). For any induced demand profile $\hat{t} \in X$ and any $u \in [0, 1]$, let $\bar{M}(u, (\hat{t})$ be the unique free-entry level from Lemma 3. Define the *reduced* profit function under free entry as

$$\widehat{\Pi}(u; \hat{t}) := \begin{cases} \Pi(u; \hat{t}, \bar{M}(u, \hat{t})), & \text{if } \bar{M}(u, \hat{t}) \geq 1, \\ 0, & \text{if } \bar{M}(u, \hat{t} = 0, \end{cases}$$

and define the firm's best-reply correspondence in supply under free entry by

$$\widehat{S}(t) := \arg\max_{u \in [0,1]} \widehat{\Pi}(u; \hat{t}).$$

By (E3) and compactness of $[0, 1]$, $\widehat{S}(\hat{t})$ is nonempty and compact-valued. Under (E4), $\widehat{S}(\hat{t})$ is convex-valued (an interval).

Step 3 (define a supply correspondence). Fix $s \in [0, 1]$ and let $\hat{t}(s)$ be the induced voter demand profile from Step 1. Define

$$T(s) := \widehat{S}\big(\hat{t}(s)\big) \subset [0, 1].$$

By construction, $T(s)$ is nonempty and compact-valued; under (E4) it is convex-valued.

Step 4 (upper hemicontinuity). Since voters' best replies are continuous in s (Step 1), the mapping $s \mapsto \hat{t}(s)$ is continuous. By Berge's maximum theorem applied to $\widehat{\Pi}(\cdot;\hat{t})$ and the compact choice set $[0,1]$, the correspondence $\hat{t} \mapsto \widehat{S}(\hat{t})$ is upper hemicontinuous. Therefore the composition $T(s) = \widehat{S}(\hat{t}(s))$ is upper hemicontinuous, and hence has a closed graph.

Step 5 (fixed point in supply). The correspondence $T : [0,1] \rightrightarrows [0,1]$ maps the nonempty compact convex set $[0,1]$ into itself and has nonempty, compact, convex values and a closed graph. By Kakutani's fixed point theorem, there exists $s^\star \in [0,1]$ such that

$$s^\star \in T(s^\star).$$

Let $t^\star := t(s^\star)$ and set $M^\star := \bar{M}(s^\star, t^\star)$. Then $t^\star$ is optimal for voters given $s^\star$ (Step 1), $s^\star$ is profit-maximizing for firms given $t^\star$ under free entry (Steps 2–3), and $M^\star$ satisfies free entry by Lemma 3. Hence $(t^\star, s^\star, M^\star)$ constitutes an equilibrium. □

C Uniqueness of Equilibrium

This section provides sufficient conditions under which the equilibrium is unique. The argument proceeds in two steps. First, I establish the uniqueness of voters' realized news consumption for any fixed media supply. Second, I demonstrate that the media supply itself is uniquely determined by a contraction argument.

Uniqueness of realized voter behavior. Fix a media supply $t_n^s \in [0,1]$ and consider the game in realized news consumption $\tilde{t} = (\tilde{t}_1, \ldots, \tilde{t}_N) \in [0, t_n^s]^N$. Each voter J chooses $\tilde{t}_J$ to maximize

$$U_J(\tilde{t}_J, \tilde{t}_n) = u(\tilde{t}_J) + \lambda_J \, H\big(\tilde{t}_n\big)\,, \qquad \tilde{t}_n := \frac{1}{N}\sum_{K=1}^{N} \tilde{t}_K,$$

where $u(\cdot)$ is strictly concave and $H(\cdot)$ is concave. Thus, voters interact only through the aggregate $\tilde{t}_n$. Since utility depends only on realized consumption, the original game in desired news shares is strategically equivalent to a reduced game in realized choices. Establishing uniqueness in the reduced game therefore pins down the realized allocation of the original model, with desired shares selecting the corresponding feasible element.

Assumption (U1). The realized-choice game is diagonally strictly concave, as defined by Rosen (1965).

Lemma 4 Under Assumption (U1), for any fixed t_n^s, the realized-choice game admits at most one Nash equilibrium $\tilde{t}^\dagger(t_n^s)$.

Proof. Let $g_J(\tilde{t}) := \partial U_J(\tilde{t})/\partial \tilde{t}_J$ denote voter J's marginal payoff, and let $g(\tilde{t}) = (g_1(\tilde{t}), \ldots, g_N(\tilde{t}))$. Diagonal strict concavity requires that for any two distinct profiles $\tilde{t} \neq \tilde{s}$,

$$(\tilde{t} - \tilde{s})^\top \big(g(\tilde{t}) - g(\tilde{s})\big) < 0. \tag{DSC}$$

By Theorem 2 in Rosen (1965), condition (DSC) implies that the concave game admits at most one Nash equilibrium. □

Discussion. Assumption (U1) ensures that although voters' payoffs depend on aggregate news consumption, own diminishing returns dominate strategic interactions. Consequently, fixing the media supply t_n^s pins down a unique realized consumption profile $\tilde{t}^\dagger(t_n^s)$.

Uniqueness of media supply. We now turn to the determination of media supply. Let $t(t_n^s)$ denote the profile of voters' desired news shares induced by supply t_n^s. Define the firm best-response correspondence

$$\mathcal{T}(t_n^s) := \arg\max_{t\in[0,1]} \Pi(t; t(t_n^s), M(t_n^s)),$$

where $M(t_n^s)$ is the equilibrium number of firms under free entry. A media-market equilibrium is a fixed point

$$t_n^s \in \mathcal{T}(t_n^s).$$

Assumption (U2). In a neighborhood of the equilibrium, the firm's best reply is single-valued, and the mapping $\mathcal{T}(\cdot)$ is a contraction:

$$|\mathcal{T}'(t_n^s)| < 1.$$

Assumption (U2) requires that the feedback from media supply to realized average demand be locally dampened. This condition rules out self-reinforcing responses of demand to supply and guarantees local uniqueness of the fixed point.

Lemma 5 Under Assumption (U2), the fixed point $t_n^s = \mathcal{T}(t_n^s)$ is unique.

Proof. By Assumption (U2), $\mathcal{T}$ is locally Lipschitz with constant strictly smaller than one.[6] Hence $\mathcal{T}$ admits at most one fixed point. □

Proposition 4 Under Assumptions (U1) and (U2), the equilibrium is unique.

Proof. By Lemma 4, for any t_n^s there exists at most one realized voter profile $\tilde{t}^\dagger(t_n^s)$. By Lemma 5, there exists at most one media supply t_n^s satisfying $t_n^s = \mathcal{T}(t_n^s)$. The incumbent's effort choices are uniquely determined by backward induction, given realized average news consumption. Therefore, the equilibrium profile of voter behavior, media supply, entry, and incumbent effort is unique. □

D Proposition 1

Let $X := 2\alpha - 1 + C_J$. It follows from the respective closed forms that:

$$\operatorname{sign}\left(t_{J,n}^{(1/2)} - t_{J,n}^{(-1)}\right) = \operatorname{sign}(X).$$

[6] A function $\mathcal{T}$ is locally Lipschitz at $t_n^{s,*}$ if there exists a neighborhood U of $t_n^{s,*}$ and a constant L such that $|\mathcal{T}(x) - \mathcal{T}(y)| \le L|x-y|$ for all $x, y \in U$. If $L < 1$, $\mathcal{T}$ is a local contraction and admits at most one fixed point in U.

Proof. Fix $\alpha \in (0,1)$ and a policy term C_J (treated as fixed in this comparison), and define

$$X := 2\alpha - 1 + C_J, \qquad m := 2\alpha(1-\alpha) > 0, \qquad D := X^2 + m^2.$$

According to equation (8), the separable case $q = \frac{1}{2}$ yields

$$t_{J,n}^{(1/2)} = \frac{(X+\sqrt{D})^2}{(X+\sqrt{D})^2 + m^2}.$$

The complementary case $q = -1$ (7) can be simplified to:

$$t_{J,n}^{(-1)} = \frac{X+\sqrt{D}}{X+\sqrt{D}+m}.$$

Now introduce the auxiliary variable

$$z := \frac{X+\sqrt{X^2+m^2}}{m} = \frac{X+\sqrt{D}}{m} \quad (>0),$$

so that the two best responses become

$$t_{J,n}^{(1/2)} = \frac{z^2}{1+z^2}, \qquad t_{J,n}^{(-1)} = \frac{z}{1+z}.$$

Hence

$$t_{J,n}^{(1/2)} - t_{J,n}^{(-1)} = \frac{z^2}{1+z^2} - \frac{z}{1+z} = \frac{z(z-1)}{(1+z^2)(1+z)}.$$

Because $z > 0$ and $(1+z^2)(1+z) > 0$, we obtain

$$\operatorname{sign}\big(t_{J,n}^{(1/2)} - t_{J,n}^{(-1)}\big) = \operatorname{sign}(z-1).$$

It remains to connect $\operatorname{sign}(z-1)$ to $\operatorname{sign}(X)$ using an *implicit-differentiation (monotonicity) argument.* Observe that z is the positive solution to

$$z - \frac{1}{z} = \frac{2X}{m}.$$

Define $F(z,X) := z - \frac{1}{z} - \frac{2X}{m}$. Then $F(z,X) = 0$ and

$$\frac{\partial F}{\partial z} = 1 + \frac{1}{z^2} > 0, \qquad \frac{\partial F}{\partial X} = -\frac{2}{m} < 0.$$

By the implicit function theorem, $z = z(X)$ is differentiable and

$$\frac{dz}{dX} = -\frac{F_X}{F_z} = \frac{\frac{2}{m}}{1+\frac{1}{z^2}} > 0.$$

Thus $z(X)$ is *strictly increasing* in X. Moreover, at $X = 0$ we have

$$z(0) = \frac{0+\sqrt{0+m^2}}{m} = 1.$$

Since z is strictly increasing and crosses 1 at $X = 0$, it follows that

$$\operatorname{sign}(z-1) = \operatorname{sign}(X).$$

Combining with the earlier step yields

$$\operatorname{sign}\big(t_{J,n}^{(1/2)} - t_{J,n}^{(-1)}\big) = \operatorname{sign}(X)$$

$\square$

E Proposition 2

A marginal increase in the ethical parameter λ_J leads to:

- *larger positive response in demand for news when media are separable ($q > 0$), and voters prefer entertainment at least as much as news ($\alpha \leq 0.5$):*

$$\left| \frac{\partial t^*_{J,n}}{\partial \lambda_J} \right|_{q>0} > \left| \frac{\partial t^*_{J,n}}{\partial \lambda_J} \right|_{q<0},$$

- *larger positive response in demand for news when media are non-separable ($q < 0$), and voters prefer news over entertainment ($\alpha > 0.5$):*

$$\left| \frac{\partial t^*_{J,n}}{\partial \lambda_J} \right|_{q>0} < \left| \frac{\partial t^*_{J,n}}{\partial \lambda_J} \right|_{q<0},$$

Proof. Fix primitives $(N, \gamma, \tau_1, \tau_2)$ with $\tau_2 > \tau_1$, $\alpha \in (0,1)$, and $q < 1$. For voter J, the first-order condition determining the optimal news share can be written as

$$F_q(t, \lambda_J; \alpha) := M_q(t; \alpha) + \frac{\lambda_J}{N} K(\hat{t}) + \frac{1}{N^2} \Big(\sum_I \lambda_I t_I \Big) K'(\hat{t}) = 0, \tag{19}$$

where $\hat{t} = N^{-1} \sum_I t_I$ and $K(\cdot), K'(\cdot)$ are defined in the text.

Let $t^* = t^*_{J,n} \in (0,1)$ denote an interior solution. By the implicit function theorem,

$$\frac{\partial t^*}{\partial \lambda_J} = -\frac{\partial F_q / \partial \lambda_J}{\partial F_q / \partial t}. \tag{20}$$

Step 1 (Sign). Since $K(\cdot) > 0$ and $K'(\cdot)$ is bounded under backward-induction expectations, the numerator is strictly positive. Moreover, for $q < 1$ the CES aggregator exhibits strictly decreasing marginal utility, implying

$$M'_q(t; \alpha) < 0 \quad \text{for all } t \in (0,1).$$

Hence the denominator is negative and

$$\frac{\partial t^*}{\partial \lambda_J} > 0.$$

Step 2 (Reduction). The remaining terms in the denominator are $O(1/N)$ relative to $M'_q(t^*; \alpha)$. Thus, for N not too small,

$$\frac{\partial t^*}{\partial \lambda_J} = \frac{K(\hat{t})}{N} \frac{1}{|M'_q(t^*; \alpha)|} (1 + o(1)). \tag{21}$$

Therefore, the ordering across technologies reduces to comparing $|M'_q(t^*; \alpha)|$.

Step 3 (Slope of marginal utility). Let

$$g(t) = (1-\alpha)(1-t)^q + \alpha t^q, \quad w(t) = \alpha t^{q-1} - (1-\alpha)(1-t)^{q-1}.$$

A direct calculation yields

$$M'_q(t; \alpha) = (q-1) g(t)^{1/q-2} \Big[-w(t)^2 + g(t) \big(\alpha t^{q-2} + (1-\alpha)(1-t)^{q-2} \big) \Big].$$

Since $(q-1) < 0$ and the bracketed term is positive, $M'_q(t; \alpha) < 0$ on $(0,1)$.

Step 4 (Ordering across q). Define the CES balanced share

$$t_{\text{bal}}(q,\alpha) = \frac{\alpha^{1/(1-q)}}{\alpha^{1/(1-q)} + (1-\alpha)^{1/(1-q)}}.$$

Standard CES properties imply that if $q' < q$ (stronger complementarity), $t_{\text{bal}}(q', \alpha)$ moves toward the majority good.

Consider any compact interior set $t \in [\varepsilon, 1-\varepsilon]$. On such sets the feedback terms remain bounded and the curvature of M_q is governed by the powers t^{q-2} and $(1-t)^{q-2}$.

Case 1: $\alpha \leq 1/2$ (entertainment-tilted).

The optimal share satisfies $t^* \leq 1/2$. Because $q-2$ is more negative when $q < 0$ than when $q > 0$, the marginal utility schedule is locally steeper under complementarity. Hence

$$|M'_{q<0}(t^*;\alpha)| > |M'_{q>0}(t^*;\alpha)|$$

and therefore

$$\left.\frac{\partial t^*}{\partial \lambda_J}\right|_{q>0} > \left.\frac{\partial t^*}{\partial \lambda_J}\right|_{q<0}.$$

Case 2: $\alpha > 1/2$ (news-tilted).

The argument is symmetric. The optimum lies closer to the news boundary, where complementarity causes marginal utility to decline more sharply once entertainment is crowded out. Consequently,

$$|M'_{q>0}(t^*;\alpha)| > |M'_{q<0}(t^*;\alpha)|$$

and

$$\left.\frac{\partial t^*}{\partial \lambda_J}\right|_{q>0} < \left.\frac{\partial t^*}{\partial \lambda_J}\right|_{q<0}.$$

Step 5 (Corners). If t^* approaches 0 or 1, the terms t^{q-2} or $(1-t)^{q-2}$ diverge when $q < 0$, which may overturn the interior ordering. The proposition therefore holds for interior equilibria.

□

F Proposition 3

Fix two media technologies $q^- < 0 < q^+ < 1$. For any scalar incentive index C, let $t_q^*(C)$ denote a voter's optimal share of news consumption under technology q, and define the technology gap (difference in news consumption for a voter between non-separable and separable media):

$$h(C) \;:=\; t^*_{q^-}(C) - t^*_{q^+}(C).$$

Let λ denote voters' concern for being informed, and suppose that $C = a\lambda + b$, where $a \neq 0$ and b are treated as fixed. For any distribution F of λ on $[0,1]$, define the average technology gap

$$\Delta(F) \;:=\; \mathbb{E}_{\lambda\sim F}[h(a\lambda + b)]\,.$$

The object $\Delta(F)$ measures the average difference in news consumption between the two media technologies; when $h(C) \geq 0$ on the relevant range, $\Delta(F)$ can be interpreted as the average drop in news demand induced by the change in technology.

Assume that for all λ in the support of F and for both technologies $q \in \{q^-, q^+\}$, the optimal news choice is interior, i.e. $t_q^*(a\lambda + b) \in (0, 1)$, and that h is three times continuously differentiable on $\mathcal{C}$, where $\mathcal{C}$ contains $\{a\lambda + b : \lambda \in \operatorname{supp}(F)\}$.

(i) **Dispersion.** Let F_1 and F_2 be two distributions on $[0, 1]$ with the same mean and suppose that F_2 is a mean-preserving spread of F_1. The two distributions have the same mean, and $\mathbb{E}[\phi(\lambda)]$ is weakly larger under F_2 than under F_1 for every convex function ϕ. This notion captures increased dispersion without changing the mean.

If h is convex on $\mathcal{C}$ (i.e. $h''(C) \geq 0$ for all $C \in \mathcal{C}$), then

$$\Delta(F_2) \;\geq\; \Delta(F_1).$$

If instead h is concave on $\mathcal{C}$ (i.e. $h''(C) \leq 0$), the inequality reverses.

Dispersion matters because media technology changes affect moderate voters the most, and dispersion determines the number of such voters.

(ii) **Location (first-order stochastic dominance).** Let F_1 and F_2 be two distributions on $[0, 1]$ such that F_2 first-order stochastically dominates F_1. If h is nondecreasing on $\mathcal{C}$ (i.e. $h'(C) \geq 0$ for all $C \in \mathcal{C}$), then

$$\Delta(F_2) \;\geq\; \Delta(F_1).$$

If instead h is nonincreasing on $\mathcal{C}$ (i.e. $h'(C) \leq 0$), the inequality reverses.

Location matters because shifting the distribution of λ changes the weight placed on voters whose news consumption is most sensitive to media technology.

(iii) **Skewness (local third-moment effect).** Fix a baseline distribution F_0 on $[0, 1]$ with mean μ and consider a perturbation F_ε that preserves the mean and variance of λ and changes only its centered third moment by $\Delta m_3(\varepsilon)$, with $\Delta m_3(\varepsilon) \to 0$ as $\varepsilon \to 0$. Then, for ε sufficiently small,

$$\Delta(F_\varepsilon) - \Delta(F_0) = \frac{a^3}{6}\, h^{(3)}(C_0)\, \Delta m_3(\varepsilon) \;+\; o(\Delta m_3(\varepsilon))\,,$$

where $C_0 := a\mu + b$ and $\frac{o(\Delta m_3(\varepsilon))}{\Delta m_3(\varepsilon)} \to 0$ as $\varepsilon \to 0$. In particular, the sign of the change in Δ induced by a small increase in skewness is given by $\operatorname{sign}\big(a^3 h^{(3)}(C_0)\big)$.

Skewness matters because a small group of extreme voters can have a disproportionate impact when individual responses are asymmetrically distributed around the mean. Individual responses are asymmetric around the mean when voters who care more about being informed react differently to technology changes than equally distant voters who care less.

Proof. Fix constants $a > 0$ and $b \in \mathbb{R}$, interpreted as the coefficients of the affine incentive mapping evaluated at a reference equilibrium. The following analysis studies how changes in the cross-sectional distribution of λ affect outcomes, holding this mapping fixed. Allowing these coefficients to adjust endogenously would introduce general-equilibrium feedback without altering the underlying composition effect highlighted by the proposition.

We begin with the case where $h'(C) \geq 0$, so that h is weakly increasing on the relevant range. The nonincreasing case follows immediately by applying the same argument to $-h$, and therefore requires no separate proof. Thus, the proposition imposes no global sign restriction on h'; the calibration with $h'(C_0) < 0$ is fully consistent with the general comparative-statics logic. The argument is presented for the nondecreasing case; the opposite monotonicity follows by symmetry.

Define

$$\Delta(F) \;=\; {}_{\lambda \sim F}\big[h(a\lambda + b)\big].$$

Note that for $g(\lambda) := h(a\lambda + b)$ we have

$$g'(\lambda) = a\,h'(C) \geq 0, \qquad g''(\lambda) = a^2 h''(C), \qquad g^{(3)}(\lambda) = a^3 h^{(3)}(C),$$

so g inherits the monotonicity/convexity/third-derivative signs of h (since $a > 0$).

We analyze (i)–(iii) in turn for $\lambda \sim \mathrm{Beta}(\kappa\mu, \kappa(1-\mu))$.

(i) Dispersion at fixed mean (convex order). Fix $\mu \in (0,1)$ and compare two concentrations $\kappa_1 < \kappa_2$. It is a standard fact that within the Beta family with fixed mean, the concentration parameter orders distributions by the *convex order*:

$$\mathrm{Beta}(\kappa_1\mu, \kappa_1(1-\mu)) \;\geq_{cx}\; \mathrm{Beta}(\kappa_2\mu, \kappa_2(1-\mu)),$$

i.e., they have the same mean and the one with smaller κ is a mean-preserving spread. Hence for any convex g one has $[g(\lambda_{\kappa_1})] \geq [g(\lambda_{\kappa_2})]$, with the inequality reversed if g is concave. Applying this with $g(\lambda) = h(a\lambda + b)$ and noting g'' has the sign of h'' gives:

$$h'' \geq 0 \implies \Delta(\kappa_1) \geq \Delta(\kappa_2), \qquad h'' \leq 0 \implies \Delta(\kappa_1) \leq \Delta(\kappa_2),$$

which proves part (i).

(ii) Mean shifts (first-order stochastic dominance). Fix $\kappa > 0$ and let $\mu_1 < \mu_2$. For $\lambda \sim \mathrm{Beta}(\kappa\mu, \kappa(1-\mu))$ with κ fixed, the family satisfies a *monotone likelihood ratio* (MLR) in μ:

$$\frac{f_{\mu_2}(\lambda)}{f_{\mu_1}(\lambda)} = \left(\frac{\lambda}{1-\lambda}\right)^{\kappa(\mu_2-\mu_1)}$$

is increasing in λ when $\mu_2 > \mu_1$. MLR $\Rightarrow$ first-order stochastic dominance (FOSD), hence for any nondecreasing g,

$$[g(\lambda_{\mu_2})] \;\geq\; [g(\lambda_{\mu_1})].$$

Applying this with the nondecreasing $g(\lambda) = h(a\lambda + b)$ (because $h' \geq 0$ and $a > 0$) yields

$$\mu_2 > \mu_1 \implies \Delta(\mu_2) \geq \Delta(\mu_1),$$

which establishes part (ii).

(iii) Skewness (third moment, local effect). Fix (μ, κ) and consider two nearby laws with the same mean and variance but different third central moments (skewness). A third-order Taylor expansion of $g(\lambda) = h(a\lambda + b)$ around μ gives, with $\sigma^2 = (\lambda)$ and $\mu_3 = [(\lambda - \mu)^3]$,

$$\Delta(F) = [g(\lambda)] = g(\mu) \;+\; \frac{g''(\mu)}{2}\,\sigma^2 \;+\; \frac{g^{(3)}(\mu)}{6}\,\mu_3 \;+\; R_4,$$

where the remainder R_4 is $o(\sigma^3)$ under the stated smoothness of h. Since $g^{(3)}(\mu) = a^3 h^{(3)}(a\mu + b)$, the *ceteris paribus* effect of changing skewness at fixed mean and variance is given by the sign of $h^{(3)}$ times the sign of μ_3:

$$h^{(3)}(C) > 0 \;\;\&\;\; \mu_3 > 0 \implies \Delta \text{ increases}, \qquad h^{(3)}(C) < 0 \;\;\&\;\; \mu_3 > 0 \implies \Delta \text{ decreases}.$$

For the Beta family, $\operatorname{sign}(\mu_3) = \operatorname{sign}(\beta - \alpha) = \operatorname{sign}(1 - 2\mu)$; thus "right-skew" (positive third central moment) holds when the mode lies left of the mean (e.g., $\mu < \frac{1}{2}$), and the above implication applies. This proves part (iii) in the local (third-order) sense.

Combining (i)–(iii) completes the proof. □

Remarks. (i) The affine rescaling $C = a\lambda + b$ with $a > 0$ preserves the signs of $h', h'', h^{(3)}$ in the composition $g(\lambda) = h(a\lambda + b)$; thus all comparisons transfer directly to $\Delta(F)$. (ii) Part (i) uses *convex order* (mean-preserving spread); part (ii) uses *FOSD* via MLR; part (iii) is a *local* statement based on the third central moment and $h^{(3)}$. (iii) Away from the local regime of (iii), higher-order terms may matter; the sign conclusions still hold when $h^{(4)}$ and higher terms are negligible on the empirically relevant range of C.

G Pandering under general monitoring

Proposition 5. *Fix an information environment summarized by aggregate news consumption t_n. Suppose the probability that an incumbent of type $\theta \in \{g, b\}$ is re-elected is $\rho_\theta(t_n, e)$, where e is effort, and assume:*

(P1) (More monitoring) For each θ, ρ_θ is weakly increasing in t_n.

(P2) (Effort improves re-election) For each θ, ρ_θ is increasing in e and continuously differentiable in e.

(P3) (Bad types are more exposed) For all (t_n, e),

$$\frac{\partial \rho_B(t_n, e)}{\partial t_n} \geq \frac{\partial \rho_G(t_n, e)}{\partial t_n}.$$

(P4) (Interior effort choice) The incumbent chooses effort e to maximize $\rho_\theta(t_n, e)R - c(e)$, where $c(\cdot)$ is strictly convex and $R > 0$.

Then the optimal effort $e^*_\theta(t_n)$ is weakly increasing in t_n for $\theta = B$, and the increase is weakly larger for the bad type than for the good type. In particular, for sufficiently low monitoring (low t_n), an increase in t_n raises the bad type's equilibrium effort ("pandering").

Proof. Under (P4), an interior optimum satisfies the first-order condition

$$R\,\partial_e \rho_\theta(t_n, e^*_\theta) = c'(e^*_\theta).$$

Differentiate implicitly with respect to t_n:

$$R\left(\partial_{te}\rho_\theta(t_n, e^*_\theta) + \partial_{ee}\rho_\theta(t_n, e^*_\theta)\,\frac{de^*_\theta}{dt_n}\right) = c''(e^*_\theta)\,\frac{de^*_\theta}{dt_n}.$$

Rearranging yields

$$\frac{de_\theta^*}{dt_n} = \frac{R\,\partial_{te}\rho_\theta(t_n, e_\theta^*)}{c''(e_\theta^*) - R\,\partial_{ee}\rho_\theta(t_n, e_\theta^*)}.$$

By strict convexity, $c'' > 0$. Under standard regularity ensuring the denominator is positive (e.g. $\partial_{ee}\rho_\theta$ not too large), the sign of de_θ^*/dt_n equals the sign of $\partial_{te}\rho_\theta$. Condition (P3) implies that the marginal electoral effect of monitoring is weakly larger for the bad type, which yields the comparative statics stated in the proposition. □