# Collective mass media bias, social media, and non-partisans

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## HIGHLIGHTS

- Mass media's collective coverage significantly influences political outcomes through manipulating the information non-partisans receive.
- Taking social media into account, mass media reporting shows a possible collective bias.
- The collective bias may lead society to a collective failure, in which an inferior policy is voted for and implemented.

## ABSTRACT

This paper builds a simple political agency model to demonstrate that there is a possible collective bias in the reporting of political issues, and suggests that this bias may lead society to a collective failure, in which overall social welfare is harmed. In our model, media outlets aim to build a reputation of high adeptness at policy forecasting, and audiences rely on policy information to make better decisions and update their beliefs regarding the quality of each outlet after the election outcome is revealed. The role of social media is incorporated into our model's framework; thus, the chance of a non-partisan individual being informed about each political candidate's proposed agenda depends on the collective mass media coverage of that candidate as well as the number of partisan individuals in favor of that candidate, since it is assumed that partisan voters post politically relevant information on social networks.

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## 1. Introduction

The impact of mass media on political outcomes like government accountability (Besley and Prat, 2006), voting behavior (Dellavigna and Kaplan, 2007), and public policy (Strömberg, 2004; Eisensee and Strömberg, 2007) has been well documented. However, as widely appreciated as the forceful role of media in politics is, its troubling tendency toward bias is also widely acknowledged. Existing research demonstrates the origins of media bias from both demand (Strömberg, 2004; Gentzkow and Shapiro, 2010) and supply (Baron, 2006; Druckman and Parkin, 2005) sides. However, most previous studies have focused on the bias of individual outlets. In contrast, this paper argues that not only is each individual outlet biased in its reporting of political issues, but also that multiple outlets tend to similarly report on the same issue. In other words, there exists a possible *collective* bias in the coverage of political issues. Moreover, this collective bias may result in a collective failure, in which information regarding the superior policy is excluded from the news, the inferior policy ultimately gets implemented, and, in this way, overall social welfare is harmed.

The notion of collective bias is based on the following observations.

(I) The mass media's coverage of political issues is likely to be affected by partisan individuals' preferences, but could also affect the decisions of non-partisan individuals, those who have no ex-ante bias toward any issue.

Gentzkow and Shapiro (2006) argue that newspapers cater to audiences' preferences, because audiences are more likely to regard an outlet that reports "like-minded news" as high quality. In a later study, Gentzkow and Shapiro (2010) analyze US daily newspapers to prove that the mass media significantly responds to consumers' views in their reporting. The assumption of selective exposure to like-minded news is in line with studies in social psychology, specifically those of cognitive dissonance. In contrast,

non-partisan individuals lack ex-ante bias and, in turn, selective exposure. In other words, the mass media could directly affect the private actions and/or political decisions of non-partisans by manipulating the information to which they have access.

In this paper, we focus on the role of non-partisan instead of partisan individuals, unlike most studies in political economics. We did this for three reasons. First, it is the non-partisans who finally decide the outcome of elections. Second, all partisans, prior to choosing partisanship, were, at one point, non-partisan. Third, most young people who have a decisive impact on their country's future political direction are or have been non-partisan. Studies on the influence of mass media on non-partisans help us to understand the dynamics of political change in a society.

(II) The expanded use of social media, such as Facebook and Twitter, has intensified the exchange of information among individuals. Nowadays, audiences obtain information from mass as well as social media because informed audiences post content on social media. Meanwhile, audiences, especially younger ones, have gradually shifted from purchasing traditional print media products to reading news online, typically by downloading apps and then reading content electronically on mobile terminals.

The above shift has led to changes in the profit profiles of media outlets. The American media industry's main source of revenue is no longer from circulation, but instead from a collection of financial receipts related to reputation, such as advertising.[1] The powerful role of reputation is well appreciated in the context of organizational behavior (Fombrun, 1996) and industrial organization (Kreps and Wilson, 1982). A media outlet's reputation is a belief or evaluation of the outlet generally held by the public or community with regard to some socially desirable behaviors. Classically, reputation is related to factual and accurate reporting (see Gentzkow and Shapiro, 2006). It can also be gained by accurate political forecasting, for audiences do care about policy forecasting.[2] Accurate policy forecasting helps individuals to make more informed decisions and take appropriate action.

We used the above observations to develop the framework for a game in which media outlets' main motivation is to build a reputation for policy predicting, instead of aiming to maximize revenue from sales of media products such as newspapers (the classical scenario). Through playing, the audience/voter learns over time how good a media outlet is at policy forecasting. Moreover, the game incorporates social media. It assumes that voters are informed about future policies by social as well as print media, since some voters may post political information on their personal accounts, but that only partisan voters are motivated to post information about a political policy on social media, either advocating a position or sharing propaganda. Further, we assume that partisan voters are selectively exposed to like-minded news, i.e., news of their preferred policy/politician, while non-partisan voters take in whatever information they encounter. The electorate makes use of all the information they receive to take private action and then to vote. We assume that non-partisans do not actively seek political information, as they know that the payoff of one's private actions is deeply affected by election results, while one's individual impact on the election outcome is negligible.

There are three implications to this position. First, the collective coverage of mass media significantly influences political outcomes,

because its focus can affect the information non-partisan voters gather as well as the private actions they take, thus influencing their voting choice. Second, taking social media into account, mass media reporting shows a possible collective bias. Third, this collective bias may lead the society to a collective failure in which an inferior policy is voted for and implemented.

## 2. Model

### 2.1. Basic setting

We consider a two-period model. During the first period, two politicians, $L$ and $R$, separately form and announce their policy platforms. We assume that $L$ advocates high-tax policies, referred to as policy $L$, while $R$ advocates low-tax policies, referred to as policy $R$. At the end of the first period, an election is called. The winning politician implements his or her policy in the second period.

Two media outlets, referred to as newspapers $A$ and $B$, report on each candidate's political platform.[3] We assume that there are two types of newspapers. At a probability of $\alpha$, a newspaper is highly adept at policy prediction and reports the winning policy with probability $\overline{\gamma}$; otherwise, the newspaper is of low adeptness and only has a $\underline{\gamma}$, $\alpha < \frac{1}{2}$, $\overline{\gamma} > \underline{\gamma}$ probability of reporting the winning policy. The electorate is, ex-ante, unaware of the newspaper type.

The economy is populated by a continuum of individual voters, who are divided into three subgroups: pro-$L$, pro-$R$, and non-partisan. The proportions of each are $\omega\eta$, $\omega(1 - \eta)$, and $1 - \omega$, respectively. Within each subgroup, voters are ex-ante identical. Voters here are audiences. We assume $\max\{\omega\eta, \omega(1 - \eta)\} < \frac{1}{2}$, and $\min\{\omega\eta + 1 - \omega, \omega(1 - \eta) + 1 - \omega\} > \frac{1}{2}$. This assumption ensures that it is the non-partisan voters who decide the outcome of the election.

Partisans seek out and are selectively exposed to the policies they favor. In contrast, non-partisan voters are randomly informed. A non-partisan is more likely to be informed of a policy if it is widely covered in newspapers and/or posted on social media. We denote the amount of space that a newspaper $i$ uses for reporting stories on policy $j$ as $S_j^i$, while $i \in \{A, B\}$ and $j \in \{L, R\}$. For simplicity, the total space that each newspaper devotes to political issues is identical to 1, $0 \leq S_j^i \leq 1$. Thus, the collective media coverage of policy $j$ can be denoted as $\sum_i S_j^i$. The probabilities of a non-partisan voter getting information about a policy, $P_L$ and $P_R$ are simplified as $\frac{S_L^A + S_L^B + \omega\eta}{2+\omega}$ and $\frac{S_R^A + S_R^B + \omega(1-\eta)}{2+\omega}$. These probabilities indicate that the chance of a non-partisan being informed about a policy depends on its collective media coverage ($\sum_i S_j^i$), and on the number of partisan voters who post information about it on social media ($\omega\eta$ or $\omega(1 - \eta)$). Without loss of generality, it is assumed that mass and social media's impacts on informing audiences are of the same magnitude. We only analyze the decisions of those non-partisan voters who are informed on at least one policy issue. Uninformed voters resort to a default action and either randomly vote for a candidate or withdraw their vote, and thus have no effect on the outcome of the election.

Becoming informed about future policies helps individual voters to take private action,[4] for example, in choosing a high- or

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[1] In 2012, out of the American newspaper industry's $38.6 billion total revenue, 49% came from print advertising, 10% from digital advertising, 8% from direct marketing/niche advertising and non-daily publications, while only 26% was from circulation. (*The American Newspaper Media Industry Revenue Profile 2012*).

[2] Many methods have been utilized to evaluate and increase the accuracy of election forecasting, including expert judgment, polls, and statistical models (see LewisBeck, 2005).

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[3] Two newspapers are assumed to be symmetric and ex-ante neutral toward either policy, as most studies that justify demand-driven media bias such as Strömberg (2004) assume. This assumption is made in order to focus our attention on analyzing the role of media competition and audiences, especially partisan ones, on mass media's coverage choices. Our model loses nothing to generality in the situation where neutral media outlets pander to biased ones for reputation concerns, because we assume there are partisan audiences. The effects of biased media on neutral media's coverage are actually similar with the influence of partisan audiences.

[4] Strömberg (2004), Baron (2006), and Gentzkow and Shapiro (2006) apply similar assumptions.

low-paying job. The utility of an *L*-informed voter is defined as,

$$\begin{cases} 0.5 & \text{if choosing low-paying job, and } L \text{ wins;} \\ 0 & \text{otherwise.} \end{cases}$$

The utility of an *R*-informed voter is

$$\begin{cases} 1 & \text{if choosing high-paying job, and } R \text{ wins;} \\ 0 & \text{otherwise.} \end{cases}$$

The utility of a fully informed voter is

$$\begin{cases} 1 & \text{if choosing high-paying job, and } R \text{ wins;} \\ 0.5 & \text{if choosing low-paying job, and } L \text{ wins;} \\ 0 & \text{otherwise.} \end{cases}$$

The utility functions show that the payoff for a non-partisan voter depends on whether he or she is informed about the winning policy and takes relevant action. For a fully informed voter, *R* policy is superior to *L* given exogenous variables such as the cost of education and training. We assume that the default option of an uninformed voter is a medium-paying job with a baseline utility of 0, and that only informed voters can deviate from the default option and choose a high- or low-paying job.

A newspaper aims to build a reputation of high adeptness at policy forecasting when determining its coverage strategy.[5] Thus, the newspaper *i* decides $S_j^i$ so as to maximize

$$\frac{S_j^i}{2+\omega} P(i = H \mid j) + \frac{1 - S_j^i}{2+\omega} P(i = H \mid -j),$$

where fractions $\frac{S_j^i}{2+\omega}$ and $\frac{1-S_j^i}{2+\omega}$ denote the proportion of non-partisan voters who access policy information *j* through newspaper *i*. These fractions are weighted by a posterior belief $P(i = H \mid j \in \{L, R\})$, that is, the probability that newspaper *i* is considered high quality given that it reported on policy *j*.

### 2.2. Timing

This game can be solved by backward induction. We first derive the private actions and voting choices of the electorate. Owing to

1. Two newspapers simultaneously decide their coverage strategy, $(S_R^A, S_R^B)$.
2. The audiences fully observe $(S_R^A, S_R^B)$.
3. Partisan audiences are selectively exposed to like-minded information from newspapers and share such content on social media. Non-partisan voters passively receive information from newspapers and/or social media and may thusly become informed about policies.
4. Audiences take private action and vote for a candidate.
5. The outcome of the election is revealed. The winning candidate implements his or her policy. Audiences see how well each newspaper forecasted the winning policy.

It is necessary to note that the newspapers' coverage strategies can be observed from their previous reporting style or by audiences' skimming of the newspapers. However, being fully informed about a policy requires more sustained and consistent attention. Then, audiences take private action according to the policy information they receive.

### 2.3. Multiple equilibria

This game can be solved by backward induction. We first derive the private actions and voting choices of the electorate. Owing to

selective exposure, partisan voters are only informed about the policies they favor. Then, they take relevant actions[6] and vote for their preferred politicians in order to receive a positive utility.

Non-partisans' voting choices depend on what information they receive. Since a non-partisan has $P_L$ and $P_R$ probabilities of getting informed of policies *L* and *R*, he or she gets informed of only *L*, only *R*, or both policies at probabilities of $1 - P_R$, $1 - P_L$, and $P_L + P_R - 1$, respectively. For those who are only informed of one policy, they must take relevant action and vote for the relevant politician.[7] Furthermore, besides those who are fully informed, $(1 - \omega)(1 - P_R) + \omega\eta$ of the electorate vote for *L*, and $(1-\omega)(1-P_L) + (1-\eta)\omega$ for *R*. It then follows that fully informed voters

$$\begin{cases} \text{choose high-paying job and vote for } R & \text{if } (1 - \omega)(1 - P_R) \\ \quad + \omega\eta \leq \frac{1}{2}, \\ \text{choose low-paying job and vote for } L & \text{if } (1 - \omega)(1 - P_R) \\ \quad + \omega\eta > \frac{1}{2}. \end{cases}$$

The fully informed voters choose high-paying jobs and vote for *R* unless the supporters for *L* have already exceeded $\frac{1}{2}$. In other words, politician *R* will win the election if $(1-\omega)(1-P_R)+\omega\eta \leq \frac{1}{2}$; otherwise, *L* will win.

We then move to analyzing the coverage strategy of each newspaper. When $(1 - \omega)(1 - P_R) + \omega\eta \leq \frac{1}{2}$,

$$P(High \mid R) = \frac{\alpha\overline{\gamma}}{\alpha\overline{\gamma} + (1-\alpha)\underline{\gamma}},$$

$$P(High \mid L) = \frac{\alpha(1 - \overline{\gamma})}{\alpha(1 - \overline{\gamma}) + (1-\alpha)(1 - \underline{\gamma})}.$$

When $(1 - \omega)(1 - P_R) + \omega\eta > \frac{1}{2}$, *L* politician wins,

$$P(High \mid L) = \frac{\alpha\overline{\gamma}}{\alpha\overline{\gamma} + (1-\alpha)\underline{\gamma}},$$

$$P(High \mid R) = \frac{\alpha(1 - \overline{\gamma})}{\alpha(1 - \overline{\gamma}) + (1-\alpha)(1 - \underline{\gamma})}.$$

**Proposition 1.** $(1, 1)$ *and* $(0, 0)$ *are the two Nash Equilibria.*

**Proof.** When $(1 - \omega)(1 - P_R) + \omega\eta \leq \frac{1}{2}$, namely $S_R^i \geq -S_R^{-i} + \frac{2-5\omega+6\omega\eta}{2(1-\omega)}$, newspaper *i* maximizes $\frac{S_R^i}{2+\omega}\frac{\alpha\overline{\gamma}}{\alpha\overline{\gamma}+(1-\alpha)\underline{\gamma}} + \frac{1-S_R^i}{2+\omega}\frac{\alpha(1-\overline{\gamma})}{\alpha(1-\overline{\gamma})+(1-\alpha)(1-\underline{\gamma})}$. As $\frac{\overline{\gamma}}{\alpha\overline{\gamma}+(1-\alpha)\underline{\gamma}} > 1 > \frac{(1-\overline{\gamma})}{\alpha(1-\overline{\gamma})+(1-\alpha)(1-\underline{\gamma})} > 0$, newspaper *i* chooses $S_R^i = 1$. Similarly, both newspapers choose $S_L = 1$ if $(1 - \omega)(1 - P_R) + \omega\eta > \frac{1}{2}$.

If $\frac{2-5\omega+6\omega\eta}{2(1-\omega)} \geq 0$, namely, the proportion of Pro-*L* voters among partisans $\eta \geq \frac{5}{6} - \frac{1}{3\omega}$, multiple equilibria $(1, 1)$ and $(0, 0)$ coexist, as shown in Fig. 1. If $\eta < \frac{5}{6} - \frac{1}{3\omega}$, $(1, 1)$ is the only equilibrium. ∎

There are three implications to Proposition 1. First, multiple equilibria take place. When the fraction of Pro-*L* partisan voters is above some level, the collective coverage of newspapers determines the outcome of the election. If a policy is widely reported by newspapers and thus non-partisan voters are well
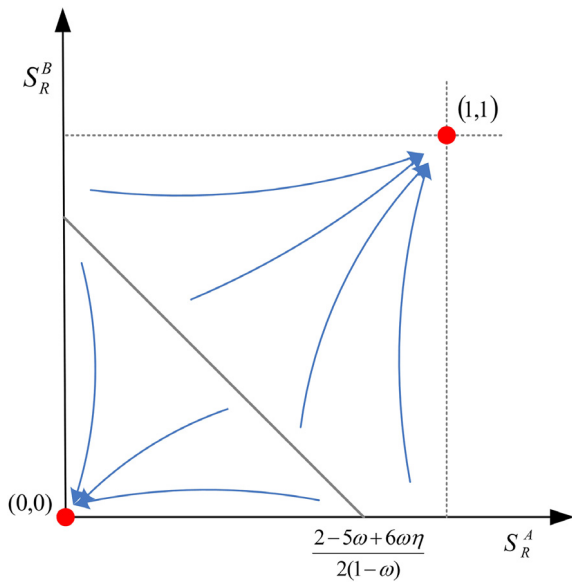
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**Fig. 1.** Multiple equilibria of mass media coverage.

informed about it, then they can make use of and in turn support its implementation. In contrast, no coverage of a policy means that non-partisan voters cannot learn about or profit from it by taking private action and thus will not vote for it. In other words, newspaper coverage can affect non-partisan voters' private actions and, in turn, their voting choices. This result underlines the influence of mass media on political outcomes. Furthermore, it contributes to the available research, showing that this influence works through non-partisan voters.

The second implication is that both media outlets lean toward the same coverage strategy. The equilibria of $(1, 1)$ and $(0, 0)$ demonstrate that each outlet focuses on reporting one of the issues, and both outlets share the same focus. Under equilibrium $(0, 0)$, a collective media bias takes place. The underlying reasoning is as follows: Newspapers aim to build their reputations as policy predictors, specifically, they are more likely to be considered high quality if they report more on winning policies. Thus, each newspaper tends to report more on the same policies. These policies, according to the first implication, then interestingly turn out to be the winning ones. By coordinating coverage strategies on reporting the same issue, each newspaper maximizes its reputation.

The third implication is that collective issue bias may result in a collective failure in which overall social welfare is lower than it could be. Under equilibrium $(0, 0)$, both newspapers only report on policy $L$, while information on the superior policy, $R$, is excluded from the news. As a result, $L$ wins the election and policy $L$ is implemented. Indeed, overall social welfare is improved in equilibrium $(1, 1)$, under which newspapers report on $R$, non-partisan voters choose high-paying jobs, and policy $R$ gets implemented. Why, then, do newspapers coordinate their reporting strategies on an inferior policy? A possible reason is that social media amplifies the influence of partisan voters who post politically relevant information online. Once the proportion of voters who initially prefer the inferior policy climbs above a certain level, a newspaper that intends to report on a better policy has to consider the possibility that the other newspapers will only report on the inferior policy, and it then turns out to be the winning policy. In this situation, reporting on the better policy ends up harming the newspaper's reputation at policy prediction. With the incorporation of social media, newspapers tend to coordinate

their coverage, even on an inferior policy, in order to reduce the risk of harming their reputations. In this sense, this model also provides insights into how the rise of social media affects mass media coverage.

## 3. Conclusion

This study develops a simple game to demonstrate that, regarding political issues, newspapers tend toward the same coverage strategies, which may lead society to a collective failure, in which information regarding the superior policy is excluded from the news, the inferior policy ultimately gets implemented, and, in this way, overall social welfare is harmed. In the game, media outlets are concerned about building a reputation for predicting and reporting winning policies. These policies are decided by non-partisan voters, whose policy choices are jointly determined by mass media's collective coverage and the proportion of partisan voters who post policy information on social networks. Our results imply that mass media places a very influential role in determining public policies through manipulating the information non-partisans receive. In the scenario where social media is incorporated, newspapers tend to coordinate their coverage strategies, even on an inferior policy, in order to increase their influence among non-partisan audiences.

This work adds insight to studies that aim to answer questions regarding the effects of mass media on public policies, where media bias comes from, and the effects of social media on mass media coverage strategies for political issues. Specifically, this model studies the effects of mass media on non-partisan audiences and public policies, as well as, through incorporating the role of social media, the effects of partisan audiences on mass media coverage. Future research is still required on these three questions, especially the effects of social media on mass media coverage and political outcomes, given the current media and political environment.

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## References

Baron, D., 2006. Persistent media bias. J. Public Econ. 90 (1–2), 1–36.
Besley, T., Prat, A., 2006. Handcuffs for the grabbing hand? Media capture and government accountability. Amer. Econ. Rev. 96 (3), 720–736.
Dellavigna, S., Kaplan, E., 2007. The fox news effect: Media bias and voting. Quart. J. Econ. 122 (3), 1187–1234.
Druckman, J.N., Parkin, M., 2005. The impact of media bias: How editorial slant affects voters. J. Polit. 67 (4), 1030–1049.
Eisensee, T., Strömberg, D., 2007. News droughts, news floods, and US disaster relief. Quart. J. Econ. 122 (2), 693–728.
Fombrun, C., 1996. Reputation. John Wiley & Sons, Ltd..
Gentzkow, M.A., Shapiro, J.M., 2006. Media bias and reputation. J. Polit. Econ. 114 (2), 280–316.
Gentzkow, M.A., Shapiro, J.M., 2010. What drives media slant? Evidence from US daily newspapers. Econometrica 78 (1), 35–71.
Kreps, D.M., Wilson, R., 1982. Reputation and imperfect information. J. Econom. Theory 27 (2), 253–279.
LewisBeck, M.S., 2005. Election forecasting: Principles and practice. Br. J. Polit. Int. Relat. 7 (2), 145–164.
Strömberg, D., 2004. Mass media competition, political competition, and public policy. Rev. Econom. Stud. 71 (1), 265–284.