



Government control of the media [☆]

Scott Gehlbach ^{a,*}, Konstantin Sonin ^b

^a University of Wisconsin–Madison, 110 North Hall, 1050 Bascom Mall, Madison, WI 53706, United States

^b Higher School of Economics, Myasnikitskaya 20, Moscow 101000, Russia



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ABSTRACT

We present a formal model of government control of the media to illuminate variation in media freedom across countries and over time. Media bias is greater and state ownership of the media more likely when the government has a particular interest in mobilizing citizens to take actions that further some political objective but are not necessarily in citizens' individual best interest; however, the distinction between state and private media is smaller. Large advertising markets reduce media bias in both state and private media but increase the incentive for the government to nationalize private media. Media bias in state and private media markets diverge as governments become more democratic, whereas media bias in democracies and autocracies converge as positive externalities from mobilization increase.

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1. Introduction

A substantial literature emphasizes the importance of media freedom for good governance.¹ Less is known about the determinants of media freedom itself. Although correlated with the presence of democratic institutions, political institutions alone do not determine media freedom. Many nondemocracies have higher levels of media freedom than many democracies, and media freedom often fluctuates within countries even as political institutions remain unchanged.

What accounts for variation in media freedom across countries and over time? In this paper, we emphasize variation along two dimensions of media freedom: *media ownership*, which might be either state or private, and *media bias*, which we define as the extent to which the media misreport the news in favor of government interests. As we show, media ownership typically influences media bias, but media ownership itself is endogenous to the anticipated bias under state and private ownership.

Our theoretical framework stresses a fundamental constraint facing any government seeking to influence media content: bias in reporting reduces the informational content of the news, thus lowering the likelihood that individuals who need that information to make decisions will

read, watch, or listen to it (e.g., Besley and Prat, 2006). At the margin, pro-government bias therefore reduces media consumption. This constraint operates in two ways. First, excessive media bias works against the government's propaganda interest, as citizens who ignore the news cannot be influenced by it. Second, media bias reduces advertising revenue, as media consumption is less when pro-government bias is large. In general, this reduction in advertising revenue is costly to the government, regardless of whether the media are private, as then the government must subsidize private owners to compensate for lost revenue, or state-owned.

We highlight two variables that influence the operation of this constraint. First, the government may have an interest in “mobilizing” citizens to take actions that further some political objective but are not necessarily in citizens' individual best interest. The degree to which this is the case – *the mobilizing character of the government* – determines the willingness of the government to pay the cost of media bias. Bias is generally greater in state-owned media, though as mobilization increases in importance, bias in state and private media converge. Despite this convergence, the government may be more inclined to seize ownership of private media when mobilization is valuable, as it can save the cost of subsidization by controlling the media directly.

Second, the *size of the advertising market*, which may be influenced by such factors as media technology and economic regulation, determines the opportunity cost of lost consumers due to pro-government bias in reporting. Consistent with the findings of an emerging empirical and theoretical literature (Besley and Prat, 2006; Ellman and Germano, 2009; Petrova, 2010, 2011), we show that private media are less biased when the advertising market is large, as purchasing influence is relatively expensive for the government. We advance on this result to show that growth in the advertising market can also reduce media bias under state ownership, though this effect is comparatively small.

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* Corresponding author.

E-mail addresses: gehlabach@polisci.wisc.edu (S. Gehlbach), ksonin@hse.ru (K. Sonin).

¹ For a review and related work, see Prat and Strömberg (2011).

Endogenizing ownership, we demonstrate that the government may seize ownership of the media when the advertising market is large, economizing on subsidies and acquiring advertising revenue for itself. A surprising implication is that the relationship between media freedom and the size of the advertising market may be nonmonotonic: holding ownership constant, growth in the advertising market reduces media bias, but the same growth may prompt the government to seize direct control of the media, thus increasing media bias.

Our theoretical framework also provides insight into a number of related issues. Building on a result by Besley and Prat (2006), we demonstrate that our key predictions hold when there is competition among media outlets. We also establish that media bias is greater in autocracies than democracies, and we demonstrate that as governments become more democratic, media bias in state and private media diverge. Finally, we show that citizens may have a preference for media bias if they benefit from mobilization even when it is not individually rational, implying a convergence in media bias between democracies and autocracies as such externalities increase.

Our theory builds on two modeling traditions in the political economy literature. First, we follow the approach pioneered by Shleifer and Vishny (1994) in modeling a bargaining relationship between a politician and a firm. In our case, the firm corresponds to a media outlet, whereas the allocation of control rights corresponds to the ability to decide what to report. Second, we build on a large and growing body of work that attempts to explain the origins of media bias. A useful distinction is sometimes made in this literature between “demand-side” and “supply-side” explanations of media bias.² Our paper falls into the latter category: media bias arises because the government wants citizens to take actions that are not necessarily in their individual best interest.

Relative to most work on media bias, the key distinction of our approach is that we model the government as a strategic actor. Closest to our framework is Besley and Prat (2006), who consider the impact of media control on political accountability. Relative to that paper, our work makes three distinct contributions. First, we treat media ownership as endogenous; as a result, we are able to show that media freedom may be nonmonotonic in advertising revenue. Second, we parameterize “regime type,” showing how media freedom depends on the weight that the government places on citizen preferences.³ Third, we depart from the retrospective-voting environment in Besley and Prat (2006) to consider more general consequences of citizens’ actions.

Our theoretical framework is also closely related to Gentzkow and Shapiro (2006). As in their work, we model Bayesian citizens who may use information reported by the media when making a costly decision whose outcome depends on the state of the world (see also Kamenica and Gentzkow, 2011). The questions we explore in this framework, however, are very different. Also related is Petrova (2010), who examines the tradeoff between advertising revenue and bias, but without modeling the government as a strategic actor.

To situate the model, we begin with a brief discussion of media freedom in postcommunist Russia, an important case that is well understood by scholars. We then proceed to discuss the model itself and various extensions. Proofs for Propositions 3–4, as well as various extensions, are provided in an online appendix.

2. Motivation: media freedom in postcommunist Russia

From the failed putsch that triggered the collapse of the Soviet Union in 1991, through the pivotal 1996 presidential campaign, and into the Putin era, what is reported on national television news has been a primary concern of political actors in Russia. The centrality of television news does

² See DellaVigna and Gentzkow (2010) for a survey of the empirical and related theoretical literature.

³ Models of media control in dictatorships include Edmond (2013), Lorentzen (2012), and Egorov et al. (2009).

not, however, imply a blind acceptance of what is reported on the air. Rather, Russian viewers recognize the bias in news broadcasts and seem to filter reports through that understanding. Summarizing the results of focus-group studies, Ellen Mickiewicz writes, “Viewers expect commercial and governmental involvement in shaping the news. They believe it is the viewer’s responsibility to extract significance and correct for bias” (Mickiewicz, 2006, p. 191, emphasis in original). Similarly, polling by the widely respected Levada Center shows that while few respondents agree that television news provides a “full and objective picture,” approximately half of those surveyed assert that it is possible to “extract” useful and objective information (Levada Center, 2007).

This is a first essential ingredient of our model: *individuals detect and consequently discount media bias*.⁴ Notwithstanding this ability, bias can be effective in shaping the beliefs of viewers, so long as there is some informational content to the news. Media outlets under Kremlin control tend to mix fact and fiction, providing enough real information to keep people guessing. The evidence suggests that Russians, like citizens elsewhere, are responsive to such bias: voting in the 1999 parliamentary and 2000 presidential elections seems to have been determined in part by the availability of independent television news (White et al., 2005; Enikolopov et al., 2011).⁵

Media bias comes at a cost, however, as viewers turn away from broadcasts that are insufficiently informative. This is the second key element of our model: *news consumption is voluntary*. Consider, for example, the exodus of viewers at NTV, a commercial station that was taken over in 2001 by state-controlled Gazprom. With the change in ownership came a change in management, and NTV’s new executives forced the replacement of many of the station’s top journalists with individuals presumably comfortable with a pro-Kremlin line. The immediate consequence of this change in editorial policy was a sharp decline in viewership, as NTV’s audience share fell from 17.9% in 2000 to 12.6% in 2001.⁶

State control of NTV gave the Kremlin additional power to dictate the station’s editorial line, but ownership is not necessary to induce bias. This is our third essential element: *government control of the media can be either direct or indirect*. Throughout the turbulent 1990s, the broadcast media remained heavily reliant on the state for financial support (Coyne and Leeson, 2009). The reliance on state subsidies provided considerable leverage to state officials, especially in regional media markets (Oates, 2007).⁷ As the economic transition advanced, however, media outlets found their financial footing. By the turn of the century the advertising market was growing quickly, a development that promised greater independence for the national broadcast media.

Of course, exactly the opposite occurred, as media freedom declined sharply under Putin, counter to what would be the case if there were a simple relationship between the size of the advertising market and government influence over media content. The proximate cause of this change was the consolidation of state ownership at the national television networks, as in addition to seizing control of NTV, Putin took over two networks controlled by Russian billionaire Boris Berezovsky. These events highlight the final ingredient of our approach: *media ownership is endogenous*. Although the number of television channels in Russia has exploded in recent years, news broadcasts are today largely the preserve of three national networks under direct government control. Eager to control the “commanding heights” of the media sector (Gehlbach, 2010), the Kremlin leaves little to chance at these outlets. Indirect control of the media has been replaced with very direct control.

⁴ For empirical evidence that voters filter out media bias, see Chiang and Knight (2011) and Gentzkow et al. (2011).

⁵ For such media effects elsewhere, see Gentzkow and Shapiro (2004) and DellaVigna and Kaplan (2007).

⁶ Data from advertising marketer Video International. Durante and Knight (2012) similarly demonstrate a change in viewership patterns in Italy when news content on public television shifted following the government turnover in 2001. See also Gentzkow and Shapiro (2010).

⁷ For evidence of indirect control in other contexts, see Lawson (2002), McMillan and Zoido (2004), and Di Tella and Franceschelli (2011).

3. Direct government control of the media

In the pages to follow, we develop a theoretical framework that incorporates the key features outlined in the previous section. We begin with an analysis of media control under “direct government control,” that is, state ownership.

3.1. Environment

Consider a model with two sets of players: a continuum of citizens of mass one, indexed by $i \in [0, 1]$, and a government that directly controls a media outlet. For concreteness, we often refer to the media outlet as a “station,” and we say that citizens “watch” the news.

The function of media control in our model is to influence the flow of information to citizens and thus encourage the “mobilization” of citizens in pursuit of some political objective that may not be in their individual best interest. We assume that each citizen i chooses an action $a_i \in \{0, 1\}$, the private return from which depends on the state of the world $s \in \{0, 1\}$. The interpretations of this action can be quite varied, including voting for the government over the opposition, refraining from anti-government protests (i.e., “negative mobilization”), and purchasing government savings bonds in a time of war. We assume that citizen i receives a payoff of $q \in (0, 1)$ if $a_i = s = 0$, a payoff of $1 - q$ if $a_i = s = 1$, and a payoff of 0 if $a_i \neq s$. The parameter q thus measures citizens’ aversion to mobilization (i.e., the minimum probability weight that citizens must place on the event $s = 1$ to justify $a_i = 1$).⁸ Citizens and the government share a common prior belief that $s = 1$ with probability $\theta \in (0, 1)$. Except where otherwise indicated, we assume that $\theta < q$, which implies that in the absence of further information any citizen i prefers to choose $a_i = 0$.

We focus on the ability of the government to influence citizens by controlling what is shown on the news and thus potentially influencing citizens’ beliefs about the state of the world. A news broadcast contains one of two messages, $\hat{s} \in \{0, 1\}$. Rather than choosing the message directly, we assume that the government structures the news operation to attain the desired level of bias, with the message determined probabilistically by the structure after the state of the world has been realized. This implicitly captures the need to delegate responsibility for the news to the reporters, anchors, and editors who make daily decisions about what to cover and how to cover it.⁹ In particular, at the beginning of the game, prior to realization of the state of the world, the government publicly chooses an editorial policy $\beta(s) \in [0, 1] \times [0, 1]$, where the vector $\beta(s)$ is the probability that the station reports the message $\hat{s} = 1$ when the state is $s \in \{0, 1\}$. Consistent with the principle discussed in Section 2 that individuals can detect bias, we assume that the editorial policy is chosen in such a way that $\beta(s)$ is observable by all citizens.

Watching the news may be profitable to citizens if the government’s editorial policy $\beta(s)$ is such that the news is sufficiently informative. As we stress in the previous section, however, news consumption is voluntary. We capture this idea by assuming that each citizen i has an exogenous idiosyncratic opportunity cost of watching the news μ_i , where μ_i is a random variable distributed uniformly on the unit interval. We use the indicator variable ω_i , which is a function $\omega_i : [0, 1] \rightarrow \{0, 1\}$, to denote the decision to watch the news.¹⁰

Summarizing, the timing of events is:

1. The government chooses an editorial policy $\beta(s) \in [0, 1] \times [0, 1]$, which is observed by all citizens.
2. Each citizen i decides whether to watch the news, $\omega_i \in \{0, 1\}$.

3. The state of the world $s \in \{0, 1\}$ is realized, with the message $\hat{s} \in \{0, 1\}$ determined according to $\beta(s)$. Only citizens who watch the news receive the message.
4. Each citizen i chooses an action, $a_i \in \{0, 1\}$.

To close the model, we assume that the government values the “mobilization” of citizens—that is, the taking of actions that further some political objective but may not be in citizens’ individual best interest. Thus, for example, the government may prefer that citizens vote for the government, refrain from demonstrating against it, or volunteer for military service in a time of war, regardless of the state of the world (i.e., regardless of what maximizes citizens’ utility). Below we relax this assumption by considering the possibility that the government places some weight on citizen welfare. We also assume that the government independently values viewership, as it increases advertising revenue, assumed proportional to viewership.

Formally, we assume that the government’s preferences over lotteries over terminal histories can be represented by the following (Bernoulli) utility function:

$$u_G = \psi \int_0^1 a_i di + \gamma \int_0^1 \omega_i di. \tag{1}$$

The first term is the government’s private return from the “mobilization” of citizens, that is, choosing $a_i = 1$, which depending on the state of the world may not be in citizens’ individual best interest. The second term is advertising revenue, where γ measures the size of the market. The parameter ψ measures the weight that the government places on mobilization relative to advertising revenue.¹¹

3.2. Equilibrium

To begin, note that the government wants citizens to believe that $s = 1$, as only in that case is it profitable for citizens to choose $a_i = 1$. Therefore, in equilibrium, it must be the case that $\beta(1) = 1$: with probability one, the station reports $\hat{s} = 1$ when in fact the state $s = 1$.¹² However, it cannot also be true in equilibrium that $\beta(0) = 1$ (i.e., that the station always reports $\hat{s} = 1$), as then the news would be uninformative, implying that no citizen would watch the news. Thus, in equilibrium, the media must truthfully report the state with some positive probability when the state $s = 0$, that is, the government must choose $\beta(0) < 1$. In what follows, we refer to $\beta(0)$ as the level of media bias.

To solve for the equilibrium bias $\beta^*(0)$, we begin by considering the beliefs and actions of those who watch the news. In equilibrium, the posterior probability that the state $s = 1$, conditional on having received the message $\hat{s} = 1$, is

$$\frac{\theta \beta^*(1)}{\theta \beta^*(1) + (1-\theta)\beta(0)} = \frac{\theta}{\theta + (1-\theta)\beta(0)}, \tag{2}$$

where the equality follows from $\beta^*(1) = 1$. The higher the media bias $\beta(0)$, the less likely citizens are to believe that the state $s = 1$ when they receive the message $\hat{s} = 1$. Similarly, the posterior probability that the state $s = 1$, conditional on having received the message $\hat{s} = 0$, is zero.

Thus, citizens would never choose $a_i = 1$ after receiving the report $\hat{s} = 0$, but they might choose $a_i = 1$ after receiving the message $\hat{s} = 1$ if $\beta(0)$ is sufficiently small so that $\frac{\theta}{\theta + (1-\theta)\beta(0)} > q$ —that is, that the posterior probability that the state $s = 1$, conditional on having received the message $\hat{s} = 1$, is greater than the minimum probability weight that justifies $a_i = 1$. Intuitively, citizens prefer to choose $a_i = 1$ after receiving the message $\hat{s} = 1$

⁸ This parameterization follows Feddersen and Pesendorfer (1998).

⁹ Duggan and Martinelli (2011) adopt a similar assumption in their model of media slant and electoral competition.

¹⁰ Our assumption that this opportunity cost is exogenous applies most clearly to broadcast media, where there is no purchasing decision to be made so long as a citizen already possesses a television or radio.

¹¹ The tension between increasing mobilization and increasing advertising revenue suggests an analogy to models of two-sided markets; see, e.g., Parker and Van Alstyne (2000) and Rochet and Tirole (2003). For an application of such models to media bias, see Gentzkow et al. (forthcoming).

¹² We focus on equilibria in which messages have the “natural” meaning. As in cheap-talk games, there also exist “mirror-image” equilibria in which states and signals are reversed.

only if the media outlet is sufficiently likely to tell the truth when in fact the state $s = 0$.

Suppose that $\frac{\theta}{\theta + (1-\theta)\beta(0)}$, which is the posterior probability that the state $s = 1$ conditional on having received the message $\hat{s} = 1$, is greater than q , which implies that citizens mobilize if (and only if) they receive the message $\hat{s} = 1$; we shall show that this condition holds in equilibrium. Then the expected benefit from watching the news is

$$(1-\theta)[1-\beta(0)]q + [\theta + (1-\theta)\beta(0)] \left[\frac{\theta}{\theta + (1-\theta)\beta(0)} \right] (1-q).$$

The first term is the probability that the station reports $\hat{s} = 0$, multiplied by the payoff from (correctly) choosing $a_i = 0$ upon seeing that report. The first expression in brackets in the second term is the probability that the station reports $\hat{s} = 1$, whereas $\frac{\theta}{\theta + (1-\theta)\beta(0)}(1-q)$ is the expected payoff from choosing $a = 1$, having received that message. Simplifying gives

$$(1-\theta)[1-\beta(0)]q + \theta(1-q).$$

In contrast, the expected benefit from not watching the news is simply $(1-\theta)q$, as in the absence of further information, citizens choose $a = 0$, which is the correct choice with probability $1-\theta$. The marginal benefit of watching the news is therefore

$$\theta(1-q) - \beta(0)(1-\theta)q. \tag{3}$$

Intuitively, the demand for watching the news is greatest when bias is least. Defining $\bar{\mu}$ as Expression (3), any citizen i with opportunity cost of watching the news $\mu_i < \bar{\mu}$ chooses to watch the news. Given the assumption that μ_i is distributed uniformly on $[0, 1]$, the expected mass of individuals who watch the news is given by the greater of Expression (3) and zero.

Because citizens are mobilized if and only if they receive the message $\hat{s} = 1$, the probability that any citizen chooses $a = 1$, conditional on having watched the news, is equal to the probability that the media outlet reports $\hat{s} = 1$, $\theta + (1-\theta)\beta(0)$, which is increasing in media bias $\beta(0)$. Expected mobilization is then equal to the product of this probability and the expected mass of citizens who watch the news (Expression (3), conditional on $\beta(0)$ being small enough that viewership is positive):

$$[\theta + (1-\theta)\beta(0)] \cdot [\theta(1-q) - \beta(0)(1-\theta)q]. \tag{4}$$

The government chooses media bias $\beta(0)$ to maximize the expected value of Eq. (1). Using Expressions (3) and (4), we may write this problem as

$$\max_{\beta(0)} \psi[\theta + (1-\theta)\beta(0)] \cdot [\theta(1-q) - \beta(0)(1-\theta)q] + \gamma[\theta(1-q) - \beta(0)(1-\theta)q]. \tag{5}$$

This is a concave problem, the solution to which we provide in the following proposition, where for future reference we use the subscript G to denote direct government control.

Proposition 1. *Under direct government control of the media (i.e., state ownership), the equilibrium level of bias is*

$$\beta_G^*(0) = \max \left[0, \frac{\psi\theta(1-2q) - \gamma q}{2\psi(1-\theta)q} \right]. \tag{6}$$

In our analysis, we assumed preliminarily that $\frac{\theta}{\theta + (1-\theta)\beta(0)} > q$. We may now verify this by substituting the equilibrium value $\beta_G^*(0)$ into this condition. If $\beta_G^*(0) = 0$, then $\frac{\theta}{\theta + (1-\theta)\beta(0)} = 1$, so that the condition holds trivially. In contrast, if $\beta_G^*(0) > 0$, then the condition is

$$\frac{\theta}{\theta + (1-\theta) \left[\frac{\theta(1-2q) - \gamma q}{2(1-\theta)q} \right]} > q,$$

which holds for any q and any $\theta > 0$.

Proposition 1 says that when $\beta_G^*(0) > 0$, media bias is greater when the government has a particular interest in mobilizing citizens to take actions that further some political objective (i.e., when ψ is large). Thus, for example, media bias may be greater under autocratic regimes whose leaders aim to transform society, or under populist governments that retain power through mass public participation, than in “kleptocracies” or “sultanistic” regimes. Moreover, holding regime type constant, media bias may be greater in periods when mobilization is especially important, as during an election campaign or time of war.

In addition, Eq. (6) shows that the larger the advertising market, as measured by γ , the smaller is media bias. (Intuitively, this effect is smaller when the mobilizing character of the government, as measured by ψ , is large.) As we discuss above, this argument is typically made in the context of private ownership of the media. Our model shows that the same relationship may hold when the media are state-owned, to the extent that the government values advertising revenue from media that it owns.

Turning to other parameters of the model, the smaller citizens’ aversion to mobilization, as measured by the parameter q , the greater is media bias. Thus, for example, if $a_i = 1$ means a vote for the incumbent government and $a_i = 0$ a vote for an opposition challenger, then media bias is greater when citizens are more inclined to vote for the incumbent—that is, when the challenger is relatively weak. Intuitively, when citizens need less persuasion to vote for the incumbent (i.e., when q is small), then the incumbent government has greater latitude to skew reporting in its favor without discouraging citizens from watching the news. Similarly, if $a_i = 0$ means protest to bring about regime change and $a_i = 1$ refraining from such protest, then media bias might be greater if citizens have previously observed poor outcomes in response to popular protest, leading them to infer that any regime is likely to produce a poor outcome (Meirowitz and Tucker, 2013).

Finally, media bias is (weakly) increasing in θ , which measures the prior belief that the state $s = 1$. Thus, as in demand-side models of media bias, the media outlet tends to report what citizens already believe to be the case, though in our model this tendency is driven by a supply-side desire to persuade citizens to behave in a particular way.

4. Indirect government control of the media

In the previous section, we assume that the government has direct control over the media outlet. Even if the station owner is private, however, the government may be able to “indirectly” control news content, providing subsidies, government advertising, or outright bribes to encourage the private owner to bias coverage away from the commercially optimal editorial policy. To examine this possibility, consider a model with three sets of players: citizens and government, as before, plus a private media owner. We assume that the government has preferences over mobilization and subsidies represented by

$$u_G = \psi \int_0^1 a_i di - C, \tag{7}$$

where the first term is proportional to mobilization and C is a contribution (subsidy), defined below, from the government to the private owner. In this context, the parameter ψ measures the degree to which the government values mobilization relative to subsidies. Implicitly, we assume that subsidies and advertising revenue are denominated in the same units, so that ψ has the same meaning in Eqs. (1) and (7).

The private owner, in contrast, has preferences over advertising revenue and contributions represented by the utility function

$$u_P = \gamma \int_0^1 \omega_i di + C, \tag{8}$$

where the first term is advertising revenue and C is the subsidy from the government to the private owner. Analogous to the government’s preferences, the private owner does not directly value mobilization.

At the beginning of the game, the government names a pair $(\hat{C}, \hat{\beta}(s))$ that promises a contribution (subsidy) \hat{C} if the private owner chooses $\hat{\beta}(s)$, and no contribution otherwise. We assume that this promise is binding, which can easily be motivated on reputational grounds. The private owner then chooses $\beta(s)$ to maximize Expression (8). Thus, the timing of events begins:

1. The government names a pair $(\hat{C}, \hat{\beta}(s))$.
2. The private owner chooses an editorial policy $\beta(s) \in [0, 1] \times [0, 1]$, which is observed by the government and all citizens.
3. The government pays $C = \hat{C}$ if $\beta(s) = \hat{\beta}(s)$, and $C = 0$ otherwise.

The rest of the game proceeds as in the previous section, beginning with the decision of each citizen whether to watch the news.

Given that subsidies enter linearly into both the government's and private owner's utility functions (i.e., because utility is freely transferable between the two actors), the equilibrium outcome is jointly efficient between the government and private owner (e.g., Gehlbach, 2013, ch. 3), that is, maximizes the expected value of

$$\psi \int_0^1 a_i di + \gamma \int_0^1 \omega_i di.$$

This is precisely the government's maximization problem under direct control of the media, implying that the equilibrium level of bias is the same as in Proposition 1. Intuitively, in making its offer to the private owner, the government fully internalizes the impact of bias on advertising revenue, as it must compensate the private owner for any advertising revenue lost due to bias in reporting.

The sharp prediction that media bias is the same under government and private ownership – a consequence of the Coase theorem – follows from the assumption that the government can costlessly transfer utility to the private owner. That assumption may fail for various reasons. For example, because of political considerations the government may subsidize the private owner through non-monetary transfers, as when the government provides transmission frequencies to favored enterprises. The opportunity cost to the treasury of providing those transfers may be greater than the benefit to the private owner.

We follow Besley and Prat (2006) in modeling these considerations in a reduced-form way, assuming that the private owner receives proportion $\frac{1}{\alpha}$ of any subsidy paid by the government, where the parameter $\alpha \geq 1$.¹³ Thus, the private owner's preferences (Eq. (8) above) are now represented by the function

$$\alpha \gamma \int_0^1 \omega_i di + C.$$

In inducing $\beta(0)$, the government therefore puts greater weight on advertising revenue than in the case of direct government control. The following proposition provides the optimum $\beta(0)$ under indirect government control of the media, where the subscript *P* denotes private ownership.

Proposition 2. *Under indirect government control of the media (i.e., private ownership and state subsidies), the equilibrium level of bias is*

$$\beta_p^*(0) = \max \left[0, \frac{\psi\theta(1-2q) - \alpha\gamma q}{2\psi(1-\theta)q} \right]. \tag{9}$$

The equilibrium level of bias in Proposition 2 differs from that in Proposition 1 in the multiplier α on γq . Thus, to the extent that transaction costs prevent efficient bargaining between the government and the private owner, bias will be less under private than state ownership of

the media. Because bias determines (probabilistically) the information available to citizens, this in turn implies that citizens will be more poorly informed when the media are state-owned, a result consistent with the cross-country evidence presented in Leeson (2008).

Propositions 1 and 2 show that a marginal change in ψ (the value the government attaches to mobilization) affects media bias more for private media than for state-owned media, so long as $\alpha > 1$. Intuitively, the tradeoff between mobilization and advertising revenue is starker for private media. More generally, the model predicts that private and state-owned media will be similarly biased in favor of the government in states that attach great value to citizen mobilization. As we shall show, however, this does not imply a tolerance of private media in mobilizing regimes. Rather, the high cost of subsidization encourages governments to seize control of private media for themselves.

With respect to the second parameter on which we focus, the larger the advertising market, as measured by γ , the greater the difference between direct and indirect government control of the media. (In Section 6.1, we show that when there is competition among media outlets, media bias may be less when the advertising market is large even when there are no transaction costs to subsidization.) To see this clearly, focus on the case where $\psi\theta(1-2q) > \alpha\gamma q$, so that media bias is strictly positive even under private ownership. Then the additional bias under state ownership is

$$\frac{\psi\theta(1-2q) - \gamma q}{2\psi(1-\theta)q} - \frac{\psi\theta(1-2q) - \alpha\gamma q}{2\psi(1-\theta)q} = \frac{\gamma(\alpha-1)}{2\psi(1-\theta)},$$

which is increasing in γ for $\alpha > 1$. This has an important consequence for media freedom: the opportunity cost to the government of allowing private ownership of the media, in terms of foregone citizen mobilization, is greater when the advertising market is large. In such environments, as we show in the following section, the government may therefore be motivated to acquire direct control of the media.

For what follows, it is helpful to derive the subsidy the government pays the private owner to represent its point of view. To do so, first note that if the private owner were to reject the government's offer, it would choose the level of media bias that maximizes viewership, which is clearly $\beta(0) = 0$. This implies expected advertising revenue of $\gamma\theta(1-q)$. In contrast, expected advertising revenue in equilibrium is

$$\gamma\theta(1-q) - \gamma\beta_p^*(0)(1-\theta)q. \tag{10}$$

Thus, the government must reimburse the private owner for lost advertising revenue, which is proportional to the equilibrium level of bias $\beta_p^*(0)$. Using Proposition 2 and the assumption that the private owner receives proportion $\frac{1}{\alpha}$ of any subsidy paid by the government, we can derive this subsidy as

$$\alpha\gamma\beta_p^*(0)(1-\theta)q = \max \left[0, \alpha\gamma \left(\frac{\psi\theta(1-2q) - \alpha\gamma q}{2\psi} \right) \right]. \tag{11}$$

5. Endogenous control of the media

The discussion above treats control of the media as exogenous. What does the model say about the determinants of media control?

To answer this question, first recall that equilibrium media bias is the same under state and private ownership when the government can costlessly subsidize the private owner. Thus, the government is indifferent between direct and indirect control when it must purchase a media outlet to acquire control; the cost of the purchase is the value to the private owner of subsidies and advertising revenue, which then flow to the government. In practice, there are transaction costs of subsidization, implying that the government is not indifferent between state and private ownership, and unlike market actors, the government can acquire direct control of the media through force.

¹³ Shleifer and Vishny (1994) also assume that subsidization is inefficient in their canonical model of bargaining between a politician and a firm.

To see when the government would nationalize the media, assume that the station is initially privately owned, but that at the beginning of the game the government may transfer the station to state ownership at some fixed cost $\kappa > 0$.¹⁴ The game then proceeds as before: direct control if the government has exercised this option, indirect control if it has not.

The government acquires direct control if κ is small relative to the benefit of taking over the station. Consider first the payoff to the government from direct control:

$$\psi[\theta + (1-\theta)\beta_C^*(0)] \cdot [\theta(1-q) - \beta_C^*(0)(1-\theta)q] + \gamma[\theta(1-q) - \beta_C^*(0)(1-\theta)q]. \quad (12)$$

The first term is proportional to total expected mobilization, given that the government chooses bias directly, whereas the second is expected advertising revenue in equilibrium (Eq. (10) above, where we substitute $\beta_C^*(0)$ for $\beta_p^*(0)$). In contrast, the payoff to the government from indirect control is

$$\psi[\theta + (1-\theta)\beta_p^*(0)] \cdot [\theta(1-q) - \beta_p^*(0)(1-\theta)q] - \alpha\gamma\beta_p^*(0)(1-\theta)q. \quad (13)$$

The first term is proportional to total expected mobilization, given that the government must subsidize the private owner to induce bias, whereas the second is the cost of the subsidy to the government (Eq. (11) above).

The additional benefit to the government from acquiring direct control is the difference between Eqs. (12) and (13). To fix ideas, focus on the case where $\psi\theta(1-2q) > \alpha\gamma q$, which implies that both $\beta_C^*(0)$ and $\beta_p^*(0)$ are strictly greater than zero. Then the additional benefit to the government of direct control is

$$\left(\alpha^2 - 1\right) \frac{\gamma^2 q}{4\psi} + \gamma\theta(1-q) + \left[\alpha\gamma \frac{\psi\theta(1-2q) - \alpha\gamma q}{2\psi} - \gamma \frac{\psi\theta(1-2q) - \gamma q}{2\psi} \right]. \quad (14)$$

The first term in this expression is the payoff from additional mobilization under state ownership, which results from the higher level of bias when the government chooses bias directly. The second term is total expected advertising revenue when the news is reported without bias. In equilibrium under private ownership, some portion of this advertising revenue is replaced with a government subsidy. The third term reflects the elimination under state ownership of transaction costs associated with compensating the private owner for lost advertising revenue.

The government chooses to take direct control of the station when Expression (14) is large relative to κ . For comparative statics, consider first the impact of a marginal increase in ψ , which measures the mobilizing character of the government. As we discuss in the previous section, the additional bias under state ownership diminishes as the government values mobilization more. Thus, the advantage to the government of direct control for the sake of mobilization (the first term in Expression (14)) is smaller when ψ is large. However, the government also values direct control for the subsidy it saves in implementing its desired level of bias, and this benefit is larger when ψ is large. Transaction costs imply that the second effect outweighs the first, as shown by the following proposition, which more generally establishes that the incentive for the government to seize direct control of the media is increasing in ψ , so long as the government optimally chooses bias greater than zero when the media are state-owned.

Proposition 3. *If $\beta_C^*(0) > 0$, a marginal increase in ψ (generically) increases the incentive for the government to acquire direct control of the media. If $\beta_C^*(0) = 0$, a marginal increase in ψ (generically) has no impact on the incentive for the government to acquire direct control of the media.*

¹⁴ More generally, any cost of nationalization that is not a function of ψ or γ leads to the same comparative statics.

Now consider the effect of an increase in γ on the government's incentive to acquire control. If $\alpha = 1$, so that there are no transaction costs associated with subsidization, then the incentive for the government to acquire control is clearly greater when γ is large. The government nationalizes the media to acquire advertising revenue and save the cost of subsidization, both of which are larger when the advertising market is large. If $\alpha > 1$, state ownership also promises increased mobilization through higher media bias, in proportion to the size of the advertising market. More generally, the incentive for the government to acquire direct control of the media is increasing in the size of the advertising market regardless of whether there is media bias under state or private ownership, given that direct control gives the government access to advertising revenue.

Proposition 4. *The incentive for the government to acquire direct control of the media is increasing in the size of the advertising market, measured by γ .*

The surprising implication of this analysis is that the relationship between the size of the advertising market and media freedom may be nonmonotonic. Holding ownership constant, growth in the advertising market reduces media bias, regardless of whether the station is owned by the state (so long as the government places some value on advertising revenue) or a private entity. However, the same growth may prompt the state to seize direct control of the media, which leads to a discontinuous jump in media bias.¹⁵

The theoretical framework in this section can also explain when the government chooses to privatize rather than nationalize media. To fix ideas, assume that the cost of owning the media is proportional to total potential viewers, that is, that the cost of nationalization is $\kappa\theta(1-q)$, where $\kappa > 0$. This assumption captures the idea that owning a media outlet is more costly, the larger that outlet's broadcast or distribution network; the well-known advantage of private providers in cost reduction (Hart et al., 1997) implies that κ may be greater under state than private ownership. Then all of the comparative statics above go through as before: the government's preference for direct government control of the media is greater, to the extent that ψ and γ are large.

6. Extensions

In this section, we extend our analysis in various directions. We begin by showing that our key results extend to the case of multiple competing media outlets. We then proceed to analyze the relationship between media bias and regime type. Finally, we consider the possibility of externalities from mobilization.

6.1. Competition among media outlets

The model above can be easily extended to accommodate multiple media outlets. We provide a complete formalization and equilibrium characterization in the online appendix. Here we present the key insights.

Assume multiple competing stations, with J_p as the number of private stations. As in the baseline model, the government promises a contribution to each private media owner in return for implementing a specific editorial policy. Following this, each media outlet, state and private, simultaneously and independently chooses an editorial policy, following which each citizen chooses whether to watch the news and, if so, which station to watch. As in Duggan and Martinelli (2011), we assume that information-processing costs prevent citizens from watching more than one station. Finally, assume for simplicity that there are no transaction costs associated with subsidization of private stations.

In equilibrium, it must be the case that there is a common equilibrium bias $\beta^*(0)$ for all stations, as media outlets can earn advertising

¹⁵ In an online appendix, we show that media bias is also increasing in the size of the advertising market when the government's decision to nationalize takes place *after* the private media owner chooses its editorial policy, that is, when the government can use the threat of nationalization to encourage the private owner to skew news reports in the government's direction.

revenue and subsidies only if they are among the lowest-bias stations. Further, if $\beta^*(0) > 0$, then the government must guarantee any private owner total potential advertising revenue $\gamma\theta(1 - q)$, as any private owner could choose $\beta(0) = 0$ and capture the entire potential advertising market for itself. If the government chooses to induce a common bias $\beta(0) > 0$, it therefore solves

$$\max_{\beta(0)} \psi[\theta + (1-\theta)\beta(0)] \cdot [\theta(1-q) - \beta(0)(1-\theta)q] + \gamma[\theta(1-q) - \beta(0)(1-\theta)q],$$

which follows from maximizing the mobilization payoff and advertising revenue from state-owned stations, net of subsidies paid to private stations, given the constraint that private owners be left with total potential advertising revenue. This is precisely the government's problem in the case of a single state-owned media outlet or a single private station with no transaction costs, implying the same comparative statics as in the baseline model.

If private stations are numerous, however, the government may be better off providing no subsidies, knowing that media outlets would consequently choose $\beta(0) = 0$ (the equilibrium of the bias-setting game when the government does not intervene). To see this, observe that equilibrium advertising revenue at state stations net of subsidies paid to private stations is

$$\gamma[\theta(1-q) - \beta(0)(1-\theta)q] - J_p\gamma\theta(1-q).$$

Similarly to Besley and Prat (2006), the cost to the government of inducing a positive bias level is linearly increasing in the number of private stations. Thus, when the number J_p of private stations is large, both state and private media report the news without bias in equilibrium. An immediate implication is that the government may be better off nationalizing private media to save the fixed cost of inducing bias. Given that the fixed cost is proportional to γ , the incentive to do so is greater when the advertising market is large.¹⁶

6.2. Regime type

The baseline model assumes that the government always prefers that a particular action be taken, regardless of whether that is in citizens' individual best interest. In practice, the extent of this conflict of interest may vary according to regime type, with governments more willing to internalize citizen welfare in democracies than in autocracies.

We can explore this idea by modifying the government's utility function when the media outlet is state-owned, as follows:

$$u_G = \psi \int_0^1 a_i di + \gamma \int_0^1 \omega_i di + \lambda \int_0^1 [(1-s)(1-a_i)q + sa_i(1-q)]_i di.$$

This function differs from Eq. (1) as here the government places weight $\lambda \geq 0$ on citizens' state-dependent payoff from mobilization.¹⁷ Eliminating terms that do not depend on citizen behavior and simplifying gives the following function:

$$\tilde{u}_G = [\psi + \lambda(s-q)] \int_0^1 a_i di + \gamma \int_0^1 \omega_i di. \tag{15}$$

¹⁶ An interesting extension suggested by a referee is the case where private media owners have direct and possibly heterogeneous preferences over mobilization, in addition to valuing advertising revenue. Although a complete analysis is beyond the scope of this paper, the discussion here illustrates that all media outlets must choose the same editorial policy in equilibrium. Any differences in the degree to which private media owners (dis) value mobilization affect the cost of inducing a common positive bias, with pro-mobilization stations requiring smaller subsidies and anti-mobilization stations larger subsidies. In particular, the best possible deviation from a common positive bias for a pro-mobilization station will not necessarily be $\beta(0) = 0$.

¹⁷ At the cost of additional algebra, we obtain similar qualitative results if we also assume that the government places some weight on citizens' idiosyncratic cost of watching the news.

Thus, the government's payoff from mobilization depends on the state of the world s , with the degree of that dependence a function of the weight λ that the government places on citizen payoffs from mobilization.

Eq. (15) shows that when $\psi < \lambda q$, then the government benefits from additional mobilization if and only if the state $s = 1$, as do citizens. A necessary condition for positive media bias (i.e., for $\beta(0) > 0$) is thus $\psi > \lambda q$, which says that the government benefits from additional mobilization regardless of the state, as in the baseline model. Analysis similar to that for the baseline model shows that the government's maximization problem is

$$\max_{\beta(0)} [\psi + \lambda(1-q)]\theta + (\psi - \lambda q)(1-\theta)\beta(0) \cdot [\theta(1-q) - \beta(0)(1-\theta)q] + \gamma[\theta(1-q) - \beta(0)(1-\theta)q].$$

This is a concave problem, the solution to which is

$$\beta^*(0) = \max \left[0, \frac{\psi\theta(1-2q) - \gamma q - 2\lambda q(1-q)\theta}{2(\psi - \lambda q)(1-\theta)q} \right].$$

In the analysis for indirect control, the only change is in that the private owner receives proportion $\frac{1}{\alpha}$ of any subsidy paid by the government, which affects the equilibrium level of bias in precisely the same manner as in Proposition 2.

Proposition 5. *In the generalization of the model to account for regime type, the equilibrium level of bias $\beta^*(0) = 0$ if $\psi < \lambda q$. In contrast, if $\psi > \lambda q$, the equilibrium level of bias is*

$$\max \left[0, \frac{\psi\theta(1-2q) - \gamma q - 2\lambda q(1-q)\theta}{2(\psi - \lambda q)(1-\theta)q} \right]$$

under direct control of the media and

$$\max \left[0, \frac{\psi\theta(1-2q) - \alpha\gamma q - 2\lambda q(1-q)\theta}{2(\psi - \lambda q)(1-\theta)q} \right]$$

under indirect control of the media.

An immediate implication of Proposition 5 is that media bias is smaller when λ , which measures the weight that the government places on citizen payoffs from mobilization, is large. To the extent that democracies are characterized by larger values of λ , Proposition 5 therefore suggests that media bias should be greater under autocracy than democracy.¹⁸ Moreover, if $\alpha > 1$, this effect is greater under indirect control than under direct control of the media. The impact of media ownership on media bias is therefore larger under democratic than under autocratic rule.

6.3. Externalities from mobilization

Finally, we depart from the assumption that any citizen i has preferences only over his own actions. In some settings, citizens may value mobilization even when it is not individually rational to participate—that is, there may be externalities from mobilization. For example, all citizens may be better off to the extent that others purchase

¹⁸ Gentzkow et al. (2013) speculate that democratic institutions explain their finding of no effect of party in power on newspaper content in the United States from 1869 to 1928. At the same time, Gentzkow et al. show that partisan control did have an effect on newspaper content in the Reconstruction South, where—in terms of our model—the government may have had a particular interest in mobilizing citizens to take actions that furthered political objectives.

government savings bonds or volunteer for military service in a time of war. Formally, we can capture this possibility by assuming that any citizen i 's payoff from mobilization is

$$(1-s)(1-a_i)q + sa_i(1-q) + \chi \int_0^1 a_j dj,$$

where $\chi \geq 0$.

To analyze this environment, we exploit the generalized setting of the previous section, in which the government places weight λ on citizens' payoffs from mobilization:

$$u_G = [\psi + \lambda\chi + \lambda(s-q)] \int_0^1 a_i di + \gamma \int_0^1 \omega_i di. \quad (16)$$

This differs from Eq. (15) only by the inclusion of the term $\lambda\chi$, which represents the degree to which the government internalizes externalities from mobilization. The equilibrium level of bias is then a straightforward extension of Proposition 5.

The optimal level of media bias from the perspective of any citizen i is in general not zero, given externalities from mobilization. Citizens may have a preference for media bias during a time of war, for example, even if it means that they may make the wrong personal decision about whether to purchase savings bonds or volunteer for the military. From a welfare perspective, it is preferable that the government weighs these externalities against the individual cost of choosing $a_i = 1$ when the state $s = 0$. To the extent that democracies are characterized by higher values of λ , this will occur under democratic government. An autocracy that places a relatively high value on mobilization (ψ) may, however, be second-best.

In addition to these normative considerations, there are also positive implications of the discussion here. The presence of the term $\lambda\chi$ in Eq. (16) suggests that an increase in externalities from mobilization leads to a larger increase in media bias in democracies, characterized by larger values of λ , than in autocracies. Returning again to the previous example, we might therefore expect to see some convergence in media bias between democracies and autocracies during a time of war.

7. Conclusion

In this paper, we provide a theoretical framework to analyze government control of the media. Our model emphasizes a fundamental constraint facing any government that hopes to control media content: bias in reporting reduces the informational content of the news, thus decreasing viewership among those who value that information. The extent of media bias and incentive for the government to seize direct control of the media depend on the degree to which the government internalizes this effect.

Our model generates a large number of testable empirical predictions of the relationship between media freedom and various features of the political-economic environment. A few of these find support in existing analyses. Many, however, await rigorous testing: there is much to be done.

Notwithstanding the various extensions we consider, our theoretical framework also provides numerous opportunities for further development. One question that immediately suggests itself is whether we would obtain similar results if the government employed "sticks" rather than "carrots" to induce media bias (e.g., by threatening jail time rather than promising subsidies). In fact, this makes little difference in our setting: both sticks and carrots are costly to the government, with the size of the threat or promise necessary to induce a given bias increasing in the size of the advertising market. The two strategies do differ in whether utility is

transferred from the government to the private owner, but that is inconsequential for our analysis.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.jpubeco.2014.06.004>.

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