

Handcuffs for the Grabbing Hand? Media Capture and Government Accountability*

Timothy Besley and Andrea Prat
Department of Economics and STICERD
London School of Economics and Political Science
Houghton Street
London WC2A 2AE

November 16, 2001

Abstract

It is widely recognized that active media can play a role in enhancing political competition by informing voters. However, collusion between government and media can undermine this role. We extend the political accountability model to include the presence of media outlets and the possibility that the incumbent exerts influence over them. In equilibrium, the media structure is linked to political outcomes in two ways: directly through its monitoring capacity and indirectly through political capture. We examine evidence both across countries and within India.

*We are grateful to Silvia Pezzini for research assistance and to Carolee McLeish and Simeon Djankov for graciously providing us with data. We have received helpful comments from Stephen Coate, Torsten Persson, David Stromberg, and a number of seminar participants.

1 Introduction

It is increasingly understood that the formal institutions of democratic decision making are no cast iron guarantee of a well-functioning political system. For elections to serve as an effective disciplinary mechanism, it is necessary for voters to have sufficient information to monitor government actions. The role of the free press is vital in achieving this end. However, one of the stunning features of the media industry is its high degree of heterogeneity across countries. Even with the set of countries that hold regular free elections, there is a great variance in terms of concentration and ownership patterns. It is then interesting to ask what is the relation between the characteristics of the media system and the outcomes of the political system.

In this paper, we develop a canonical model of the role of the media in dealing with information problems in elections. A key feature of the model is the possibility that the government can influence the media through promises and threats. In the equilibrium that we describe, this is determined endogenously along with re-election rates for politicians and the extent of inefficiency/malfeasance in the political process. The model makes precise which forces are in theory likely to shape media capture versus those that affect outcomes conditional on media freedom.

Our baseline model is of pure adverse selection where voters do not know the incumbent's type. This may be learned by the media who then choose whether or not to print it given the technologies that the government has for silencing them. We make precise the conditions under which media is captured and how effective is the political process at weeding out bad types. We then enrich the model to allow for moral hazard, endogenous entry of media, ideological media and vertically differentiated media outlets. In all cases, the model makes precise how the structure of the media market leads to different equilibrium outcomes.

The empirical part of the paper builds on Djankov et al. (2001) who establish an important correlation between media ownership and political outcomes. However, their work leaves open the question of the exact nature of this link. The theoretical contribution provides a framework for distinguishing between two views of the mechanism at work linking media ownership and political outcomes. The *efficiency theory* posits a direct link between ownership and efficiency – some ownership structures foster media that are better able to monitor government. This view can apply to any industry (see Shleifer 1998). The *capture theory* argues that ownership matters because some ownership structures are more susceptible to political capture. This theory is more specific to the media industry and its role as an information provider. We formulate a framework which permits us to distinguish

the aspects of ownership that work through each channel. The empirical results suggest that ownership and concentration are predominantly driving the probability that the media is captured whereas foreign ownership seems to be an indicator of greater efficiency of news production.

The remainder of the paper is organized as follows. In the next section, we relate the paper to the literature. Section three develops the benchmark model to understand the main mechanics of media capture. In section four, we develop a series of extensions and complications. Section five develops the empirical implications of the model and compares its predictions with the evidence currently available: a cross-country data set and panel information on Indian states. Section six concludes.

2 Related Literature

This paper contributes to emerging literatures on the role of the media in affecting government behavior. Theoretical approaches to modeling the media essentially follow two approaches. The first considers how distributive politics may be affected by the media. Strömberg (2001a, 2001b) consider how the press could affect the allocation of targeted resources in a model of electoral politics. The role of the media is to increase voter awareness and hence to increase the sensitivity of turnout to favors granted. The second approach focuses on how the media can affect political accountability in a world of incomplete information. This is typified by Besley and Burgess (2001) which considers how media involvement can change issue salience and hence increase accountability of incumbents. This paper fits into this latter line of research. The theoretical contribution of this paper is to add the possibility that the government influences media behavior, which is absent in the two existing theoretical approaches.

The model in this paper builds on the large literature on political agency models dating back to Barro (1970) and Ferejohn (1986). These have linked incumbent performance with subsequent re-election chances, recognizing the importance of information flows in using elections to hold policy makers to account. However, they have taken the information structure facing politicians as given.¹

The empirical literature includes some contributions that look at reduced form relationships between media activity and policy outcomes. These include the work on press freedom and corruption of Brunetti and Weder (1999) and Ahrend (2000) that relates press freedom and corruption in cross-country

¹For general discussion of political agency models see Persson and Tabellini (2000) chapter 4 and Przeworski, Stokes and Manin (1999).

data. Both of these papers find that press freedom is associated with lower levels of corruption.

Djankov et al. (2001) focuses more directly on the effect of media ownership patterns on a variety of outcomes. They develop a remarkable data set on media ownership patterns in 98 countries to do so. They find strong patterns in the data relating media ownership to a whole range of policy outcomes – social and political. They tend to find a greater (negative) association between state ownership of newspapers (rather than television) and “good” outcomes. They interpret this as further nail in the coffin of the Pigouvian model of government.

Strömberg (2001c) relates New Deal spending in county level data for the United States to radio ownership, finding a positive association between the two, which is consistent with his model of distributive politics. Besley and Burgess (2001) find evidence that Indian states with higher levels of newspaper circulation also have governments who are more responsive to droughts and floods. They argue that this is consistent with their agency theoretic approach.

There is now a large empirical literature on the causes and determinants of corruption which is related to this paper. The empirical literature is expertly surveyed (and extended) in Triesman (2000). This paper takes a more detailed look at the political process underlying corruption. The paper is particularly related to studies of governance and corruption. Ades and DiTella (1999) argue that more open countries are less susceptible to corruption. This type of analysis is expanded and developed in Bonaglia et al (2001). Somewhat consonant with their approach, we find a robust link between foreign media ownership and corruption, even though openness to trade does not appear to be consistently related to it. However, we believe that foreign media ownership may be a good proxy for greater efficiency in the production of news and/or greater transparency in the political process. Persson, Tabellini and Trebbi (2001) consider the link between corruption and political/constitutional variables. They test the idea that majoritarian systems and larger voting districts are less prone to corruption, finding strong evidence in favor of this. Both Triesman (2000) and Persson, Tabellini and Trebbi (2001) treat political turnover as an exogenous variable in explaining corruption. Our theoretical model emphasizes the joint determination of these two variables.

3 The Basic Model

We use a two-period retrospective voting model. In the first period an incumbent is exogenously in power. There are two possible types $\theta \in \{b, g\}$ with $\Pr(\theta = g) = \gamma$, where g stands for “good” and b for “bad”. A good incumbent delivers a benefit of 1 to voters while a bad incumbent provides zero. At the beginning of time an incumbent is selected who is good with probability γ .

This is a pure adverse-selection model. The politician makes no choice and the political outcome is determined automatically by its type. The next section will introduce moral hazard.

After observing the outcome, voters choose whether to re-elect the incumbent or a randomly selected challenger, i.e. one that is good with probability γ . To make the problem interesting, we suppose that voters do not observe these payoffs directly at the time of the election. This is reasonable if some of the incumbent’s decisions are long-lasting – such as the quality of infrastructure investments that will become apparent some way into the future.

There are n active media.² If the incumbent is good, they observe no verifiable information. If the incumbent is bad, with probability $q \in [0, 1]$, they receive a verifiable signal that the incumbent is bad. In practice, the parameter q depends on technological and cultural characteristics and also on institutional variables such as the existence of censorship, the effectiveness of libel laws, and the extent of privacy protection regulation. Only verifiable information can be printed.

Implicit in this informational setup are three assumptions. First, news cannot be fabricated. If we allowed the media to print uncorroborated news, and we wanted to maintain the assumption that voters are rational, we would get into a complex signalling game. Second, signals can only be bad. We could easily extend the model to have both good and bad signals, as long as the probability of good signals is lower than that of bad signals. Obviously, the incumbent would never want to suppress a good signal.³ Third, all media have the same information. This restriction is imposed for analytical convenience and will be relaxed in the next section.

The n media outlets are identical and their payoff depends on two components: audience-related revenues and policy-related revenues. Audience-

²The next section extends the model to allow for endogenous entry.

³The crucial assumption is that not having a signal increases the probability that the incumbent is good. If this were not the case, a politician who manages to suppress bad information would still not be re-elected, and media capture would not occur in equilibrium.

related revenues are clearly central to for-profit media (sales, subscriptions, advertising receipts, cable fees, etc..) but they may also be relevant for non-profit or state-owned media, as long as their mission includes reaching as many viewers as possible. Viewers prefer informative news. We assume that they divide themselves equally among media that are reporting news. The audience-related revenue of an outlet is normalized to zero if the outlet has no news and it is $\frac{a}{m}$ if he has news, where a is a parameter that represents the maximum potential audience-related benefit and m is the number of outlets that are reporting news.⁴ Note that if at least one outlet has informative news, then all voters are informed.⁵

We allow incumbents to manipulate news. This is modeled as a bargaining game between the media and the politician. Our assumption that news cannot be fabricated means that the only strategy available to politicians is buying silence. The details of the bargaining game are as follows. The incumbent can make each outlet i a nonnegative offer of money t_i . A media outlet that accepts this offer will suppress his signal. Offers are simultaneous and secret. A transfer t_i costs t_i to the incumbent but yields $\frac{t_i}{\tau}$ to media outlet i . The parameter $\tau \in [0, \infty)$ is the transaction cost. The incumbent gets $r - \sum_{i \in I} t_i$ if she is re-elected and $-\sum_{i \in I} t_i$ if she is not, where I is the set of media outlets who accept her offer.

Transfers are to be understood in a wide sense. They range from direct instruments such as monetary subsidies to more subtle forms of influence such as enacting regulation that benefits firms owned by the same company that owns the media outlet. The cost of a transfer for the incumbent may be interpreted as the loss in terms of money, energy, or reputation that she has to incur to generate that transfer. The variable τ captures the existence of institutional transaction costs between the incumbent and the media. Legislative constraints and the risk of judicial prosecution may limit the channels through which the politicians can transfer funds to media. In the case where $\tau = \infty$, it is impossible for the policy maker to affect the revenues of the media.

For empirical purposes, it is important to observe that transactions costs depend on the form of ownership of the media. We would expect state-owned media (without some form of regulation) to have the lowest transaction costs. Privately owned media are mostly likely to receive benefits if their owners (families, trade unions, industrial groups etc.) have homogeneous interests.

⁴The functional form $\frac{a}{m}$ is assumed to get a simple closed-form solution, but the gist of the results depend only of the fact that audience-related revenues are decreasing in m .

⁵Again, the assumption that all voters watch informative news is not crucial. If only a fraction of voters were informed, jury theorems such as Feddersen and Pesendorfer (1997) would guarantee that that fraction is pivotal in the election.

Cross-ownership of the media with other activities may be important too. For example, a broadcaster with diverse business interests may receive transfers through policy choices that are favorable to their non-media interests. We would expect independently-owned media to be more expensive to influence than media that are part of larger groups. Other things being equal, widely held private media are the hardest to influence. We might also expect media to be more independent when owned by foreign nationals who are less beholden to the government.

The timing of the game is as follows:

1. The incumbent's type $\theta \in \{b, g\}$ is realized ($\Pr(\theta = g) = \gamma$). If $\theta = g$, media observe no signal ($s = \emptyset$). If $\theta = b$, media observe $s = b$ with probability q and $s = \emptyset$ otherwise. The incumbent observes the media signal and selects a transfer $t_i \geq 0$, for each outlet i .
2. Media outlet i observes all the transfers $\{t_j\}_{j=1, \dots, n}$ and decides to accept or reject t_i . If he accepts, he reports $s = \emptyset$ and receives $\frac{t_i}{\tau}$. If he rejects, he reports the true signal. Signals cannot be fabricated.
3. Voters observe the signals reported by the media and vote for the incumbent or a challenger of unknown type.

Three key assumptions are implicit in this set-up. First, the incumbent knows what signal the media have received. This is a useful simplification since it avoids an asymmetry between the outlets and the incumbent. It is arguably quite natural given that only verifiable signals can be printed – before making an offer the incumbent can always ask the media to reveal their evidence. Second, the incumbent makes her offers after the signals are realized. If she made her offers before, she would need to give each outlet qa for certain instead of a with probability q . As everybody is risk neutral and the probability q is given, there would be no difference. Third, each media outlet observes the offers made to other media outlets.⁶

Equilibrium of the game has two key components. The first is the bargaining game between the politician and the media. The second is the equilibrium in the election game.

The bargaining game determines whether the media is an effective disciplinary mechanism *in equilibrium*. In situations where no transfer is made by the incumbent to the media, then the media reports any informative signal that it receives. In such circumstances, we will say that the media is

⁶Appendix C shows that the results go through even if the the outlet observes only his own offer.

free. When they receive transfers in exchange for silence, we will say that the media is *captured*.

To model equilibrium in the media market, we focus attention on perfect Bayesian equilibrium restricted to pure-strategy equilibria in which voters use undominated strategies, i.e., always vote for the candidate they prefer. The equilibrium conditions for a free press are given in:⁷

Proposition 1 *Equilibrium in the media market may be one of two kinds:*

1. *If $n > \frac{r}{\tau a}$, the media industry is free – media outlets report their information to voters.*
2. *If $n < \frac{r}{\tau a}$, the media industry is captured – each media outlet suppresses its information in exchange for a bribe $t_i = \tau a$.*

A key ratio is $r/\tau a$ – the level of rent enjoyed by an incumbent relative to the cost of silencing a media outlet. The Proposition says that media will be free if there is a large enough group of outlets relative to this ratio. Hence, it does predict that, *ceteris paribus*, media plurality is a good thing. Capture is most likely when rents from office holding are high. This is because the incumbent is willing to offer larger bribes to the media (other things being equal) when there is a larger rent associated with political survival. A more commercialized media (as measured by higher a) is a safeguard against media freedom, making it more costly for government to silence the media.

To understand the equilibrium structure of bribes when the media is captured, observe that, although the incumbent has all the bargaining power, it is not enough for her to reimburse each broadcaster for his lost revenues, $\frac{a}{n}$. In order to buy his silence, the incumbent has to pay him the amount he would get *if he were the only broadcaster to bring news*. A lower amount is not acceptable since the incumbent makes positive offers only if he knows that everybody is going to accept. Thus at least a has to be offered to all active broadcasters, making the total cost of suppressing information $n\tau a$. The incumbent compares this with the foregone re-election benefit r to determine whether suppressing the media is a good idea. The media sector is corrupt if $n < \frac{r}{\tau a}$. The model makes precise why plurality can be a guarantee of independence. Multiple broadcasters are not good because they lead to more

⁷All proofs are in the Appendix. It is shown that there is a unique pure-strategy perfect Bayesian equilibrium in which voters do not use dominated strategies. The restriction to pure strategies excludes coordination problems among broadcasters at stage 2. There may be mixed-strategy equilibria in which broadcasters and the incumbent randomize at the bribing stage. The restriction to undominated strategies avoids the well-known coordination problems among voters.

information being generated but because multiplicity makes it harder for the incumbent to manipulate the whole media industry.

There are two political consequences of media activism in this simple set-up: effects on turnover and effects on equilibrium levels of inefficiency and/or rents extracted from voters. With captured media, bad politicians are never identified as voters have no ability to screen. Their expected utility is therefore γ in both periods. Turnover – defined as the probability that an incumbent is replaced by a challenger – is equal to zero (voters are indifferent between the incumbent and the challenger but they vote for the incumbent.)⁸

If the media are not captured, a bad incumbent is found out with probability q , in which case she is replaced with a challenger of unknown quality. Voters' expected utility is γ in the first term and $\gamma + q(1 - \gamma)\gamma$ in the second term and turnover is now $q(1 - \gamma)$. It is easily seen, therefore, that if the equilibrium is one with free media then turnover is higher than under captured media. It is also clear that voter welfare is higher.

Also, if we let A be the sum of expected audience-related revenues for all outlets, we have that $A = qa$ when media are free and $A = 0$ when media are captured. A by-product of capture is that the media industry alienates viewers by producing uninformative political news.

The next result maps this finding into the underlying parameters that determine whether media is free.

Proposition 2 *Turnover of politicians, voter welfare, and total audience-related revenues are non-decreasing in q , n , a , and τ .*

These effects come through two distinct channels. Greater media independence (high τ), media commercialization (high a) and plurality (high n) influence whether or not the media is captured. Political transparency and efficient news production (high q) is valuable in societies with non-captured media, but does not directly influence media capture. We exploit this observation in interpreting the empirical results below.

⁸If they voted for the challenger, a bad incumbent would have no incentive to buy off the media and the media will be informative, in which case the lack of signal would be a good signal. Thus, there cannot exist a pure-strategy equilibrium in which when there is no signal voters elect for the challenger for sure.

Still, there could exist a mixed-strategy equilibrium in which when $s = 0$ voters kick out the incumbent with positive probability. However, this equilibrium can only exist if information is completely suppressed (otherwise voters strictly prefer the incumbent). Hence, this equilibrium is analogous to the capture equilibrium.

4 Extensions

The baseline model that we have discussed so far makes use of several simplifying assumptions: the number of media firms was exogenously given, the agency problem was about adverse selection only, voters and media had no ideological preferences, and all the outlets had the same exogenously given precision. This section eliminates, one at a time, these restrictions with the goal of probing the robustness of the determinants and the effects of media capture.

We believe that these extensions are important in confronting the data. In particular, we show why with moral hazard and adverse selection more efficient media can sometimes reduce turnover. Our results on endogenous monitoring allow media capture to be a more continuous idea which fits better with the way in which press freedom is measured in practice.

4.1 Endogenous Entry

The model is as before except that now the number of media is endogenous. There is a very large number of potential media outlets. Each of them can become active by sustaining a fixed cost c , which may include hiring journalists, getting the appropriate technology, and securing all the necessary authorizations.⁹

The timing of the game is modified by adding a Stage 0 in which each of the potential media outlets choose whether to enter or not. The decision is made simultaneously and non-cooperatively. The rest of the game is as before. In particular, the outlets that have paid c receive an informative signal with probability q . We assume that $qa > c$, so at least one outlet will find it profitable to enter.

As before, we focus on pure-strategy equilibria (in this case, this also excludes coordination failures at the entry stage):

Proposition 3 *Equilibrium in the media market may be one of two kinds:*

1. If $\text{mod}\left(\frac{qa}{c}\right) > \frac{r}{\tau a}$, the media industry is free. The number of active media outlets is $m = \text{mod}\left(\frac{qa}{c}\right)$.

⁹The assumption that there is no entry is not utterly unrealistic for television. The most common form of broadcasting is aerial television. At present, only in a handful of countries (like the US) other forms of broadcasting such as cable or satellite are more widespread. Aerial television presents great barriers to entry, both technological because a network of transmitters is needed and administrative because a broadcasting license is needed. As a consequence, many countries, including several well-established market-oriented democracies, have been characterized by a small, and extremely stable, set of broadcasting organizations.

2. If $\text{mod} \left(\frac{qa}{c} \right) < \frac{r}{\tau a}$, the media industry is captured. The number of active media outlets is $m = \text{mod} \left(\frac{r}{\tau a} \right)$.

Whether or not the media is free is now determined by comparing two ratios: $\frac{r}{\tau a}$ and $\frac{qa}{c}$. The former is the maximum number of media the incumbent is willing to pay off, as in Proposition 1. The latter is the equilibrium number of entrants (disregarding integer constraints) under the assumption that the media industry is free: it is derived from condition that equates the marginal revenue of the m th outlet that enters ($\frac{qa}{m}$) with its marginal cost (c). The last outlet that enters is then $m = \text{mod} \left(\frac{qa}{c} \right)$. If this number is greater than the number of maximum number of outlets that the incumbent is willing to pay off, then the media industry is free. If the media industry is free, the number of outlets is then $\text{mod} \left(\frac{qa}{c} \right)$. If, however, the industry is captured, the number is $\text{mod} \left(\frac{r}{\tau a} \right) \geq \text{mod} \left(\frac{qa}{c} \right)$. This is because, in a captured industry the marginal revenue of the m th entrant is a as long as $m \leq \text{mod} \left(\frac{r}{\tau a} \right)$.

In the baseline model we found that media plurality was an effective defense against capture. This result still holds with free entry, except that now plurality is a consequence of entry cost. The higher the barriers to entry, the more likely that the incumbent captures the media. From Proposition 2, it is easy to see that an increase in the cost of entry reduces political turnover and voter welfare.

4.2 Moral Hazard

The model so far allows no means for politicians to disguise their type. We now add moral hazard. The incumbent can choose to engage in rent extraction. The more rent she extracts, the easier it is for the media to find out. This has the effect of deterring the incumbent from appropriating too much rent, which is good for voters. However, the ability of the politician to hide her type by behaving well in the first term may make screening more difficult. This section studies how these two contrasting effects interact and shows in what ways they can be relevant empirically.

The amount of rent that the incumbent appropriates is $y \in [0, 1]$. The remainder, $1 - y$, goes to voters. As before, there are two types of incumbents. Type g has zero benefit from rent and thus always chooses $y = 0$. Type b has a linear benefit from rent (and for simplicity we assume she has no re-election motive except the desire to get rent in the second term). The probability of detection now depends upon both q and y . The more the incumbent appropriates, the easier it is for the media to catch her. Let $\Psi(y)q$ be the probability of detection given y . We assume that $\Psi' \geq 0$, $\Psi'' > 0$, $\Psi(0) = 0$,

$\Psi'(0) = 0$, $\Psi(1) = 1$, and $\lim_{y \rightarrow 1} \Psi'(y) = \infty$. As before, $q \in [0, 1]$.¹⁰

To illustrate the issues, we suppose that at least one media outlet is active and that there is no media capture. Appendix B outlines a full-fledged model with moral hazard and the possibility of corrupt media.

It is obvious that a good incumbent chooses $y = 0$ in both terms. A bad incumbent appropriates $y = 1$ in the second term. Thus, the utility for a bad type from being re-elected is 1 while the voters receive zero. In the first term, for a given q , a bad incumbent's rent extraction decision solves $\max_y \{y + 1 - \Psi(y)q\}$. This yields an optimal \hat{y} satisfying

$$\Psi'(\hat{y})q = 1,$$

where the left-hand side is the marginal cost of rent extraction due to a higher probability of detection and the right-hand side is the marginal benefit. It is now easy to check that

$$\frac{d\hat{y}}{dq} = -\frac{\Psi'(\hat{y})}{\Psi''(\hat{y})q} < 0.$$

Naturally enough, greater media activism reduces rent appropriation by politicians.

The presence of moral hazard makes the effect of active media on turnover ambiguous. To see this, first observe that turnover is now $\rho(q) = \Psi(\hat{y}(q))q(1 - \gamma)$. As q increases, there are two effects. Holding rent extraction fixed, active media are more likely to detect rent appropriation as in the pure adverse selection model. This is the *screening effect* of active media. However, there is also an effect due to reductions in y – more active media leads politicians to extract less from voters and makes it *less* likely that a bad incumbent is detected and removed from office. This is the *discipline effect* of media activity. This ambiguity can be seen analytically by observing that the sign of

$$\rho'(q) = \left(\Psi(\hat{y}) + \Psi'(\hat{y})q \frac{d\hat{y}}{dq} \right) (1 - \gamma)$$

cannot be determined in a general way.

To summarize, turnover is lower (higher) with increased monitoring if the discipline effect is more (less) important than the screening effect. While it

¹⁰As usual, a political accountability model with moral hazard and adverse selection has several interpretations. In the one we choose to use for concreteness, θ is honesty and y is rent. However, θ could be disutility of effort and y could be effort (the good type has no disutility for effort), or θ could be the degree to which the incumbent's policy preferences are similar to the voters' and y the policy enacted (a bad politician is one with different taste, who tries to introduce policies that voters do not like).

is not possible make sharp predictions unless specific functional forms are assumed, we would expect turnover to be decreasing in monitoring only for high levels of q . This is because, if q starts at a low level, an increase in it causes a large screening effect. Indeed, one can show that for a q that tends to zero turnover must be increasing.¹¹

Even though effects on turnover are ambiguous, voter welfare is still higher from media activism. To see this, observe that expected voter welfare is

$$W(q) = 2\gamma + (1 - \gamma) [1 - \hat{y} + \Psi(\hat{y})q\gamma].$$

The first term refers to the case where a good incumbent is elected in period one and is returned to power for sure since no rent seeking is every detected. The second term refers to electing a bad incumbent who will extract \hat{y} and be caught with probability $\Psi(\hat{y})q$, being replaced by a good incumbent with probability γ .

It is important to observe that a positive level of rent seeking by bad incumbents may be desirable to voters. This is because (in this model) rent-seeking is the only device for screening politicians. However, equilibrium rent seeking always exceeds the level desired by voters. This makes greater media activism valuable on the margin.¹²

The same argument for why voter welfare is increasing in q implies that expected rents are decreasing in media activity. To see this, observe that rents can be written as:

$$R(q) = (1 - \gamma) [1 + \hat{y} - \Psi(\hat{y})q\gamma].$$

¹¹To show that $\lim_{q \rightarrow 0^+} \rho(0) = 0$ and $\lim_{q \rightarrow 0^+} \rho'(0) > 0$, observe that $\lim_{q \rightarrow 0^+} \rho(q) = \lim_{q \rightarrow 0^+} \Psi(\hat{y}(q))q(1 - \gamma) = 0$ and $\lim_{q \rightarrow 0^+} \hat{y}(q) = 1$. Obviously, it cannot be the case that $\lim_{q \rightarrow 0^+} \rho'(0) < 0$. however we can also exclude that $\lim_{q \rightarrow 0^+} \rho'(0) = 0$ as follows:

$$\lim_{q \rightarrow 0^+} \rho'(q) = \left(1 - \lim_{q \rightarrow 0^+} \frac{(\Psi'(\hat{y}(q)))^2}{\Psi''(\hat{y}(q))} \right) (1 - \gamma) = (1 - 0) (1 - \gamma) > 0.$$

A simple functional form is: $\Psi(y) = 1 - \sqrt{1 - y^2}$. In this instance, a bad incumbent chooses $\hat{y}(q) = \frac{1}{\sqrt{1+q^2}}$, and turnover is

$$\rho(q) = (1 - \gamma) \left(1 - \sqrt{\frac{q^2}{1+q^2}} \right) q$$

It is now easy to check that for high enough q this has a negative slope in q .

¹²To see this, note that the marginal benefit of rent to a voter is $\Psi'(\hat{y})q\gamma$ while the marginal cost is 1. The incumbent sets $\Psi'(\hat{y})q = 1$ implying that the marginal cost must exceed the marginal benefit. Hence, the voter will always prefer a lower y at the margin.

The incumbent always chooses a rent level below the expected rent maximizing level as he cares only about being re-elected himself rather than the total rents extracted from voters (by him and other bad incumbents). In general this makes him more cautious in rent seeking than rent maximization would imply. An increase in q accentuates this effect (through the discipline effect) as well as reducing rents via the screening effect.

Putting this discussion together, we have:

Proposition 4 *Suppose that there is both moral hazard and adverse selection. Then, the effect of media activity, as measured by q , has an ambiguous effect on turnover of incumbents. Voter welfare is increasing in q and expected rents are decreasing in q .*

The idea that media can discipline incumbent behavior is retained in the model with moral hazard. Voters prefer a more active media and rent appropriation is lower. This extension does, however, suggest that the relationship between turnover and media activity need not be monotonic.¹³

4.3 Ideological Media

We now consider the possibility that the media and citizens are ideologically motivated. This is important in practice, since we observe political alternatives and the media organized along these lines. We are primarily interested in how this affects the likelihood that media can hold politicians to account.

We model ideology in a very simple way. There are two positions: left and right with the right wingers being a fraction $\pi > \frac{1}{2}$ of the population. The right wingers, therefore determine the election outcome if they vote on purely ideological grounds. We assume, however, that voters' ideological benefits are not sufficient to persuade them to vote for an incumbent of their own ideology who has been shown to be corrupt. Thus, incumbent quality (i.e., whether they are good or bad) is assumed to be a salient issue for right wingers. We revert to the pure adverse selection model and suppose that a right wing incumbent is in office and she will face a left wing challenger at the next election.

We suppose that there is one media outlet of each ideology that attaches a benefit of $\Lambda > 0$ from having a politician of their preferred type in office. A

¹³One could even go one step further by endogenizing the entry choice of politicians. A good politician receives a fixed ego rent, while a bad politician benefits from the rent he appropriates. Then, an increase in q decreases the expected benefit of a bad type but does not change the incentive of a good one. We should then expect the pool of potential candidates to improve, that is, the ratio γ should increase. This self-selection effect amplifies the positive consequences of an increase in monitoring activity.

key issue is whether voters' media habits are polarized on ideological grounds. Suppose that a proportion $\rho \in [0, 1]$ of voters value ideology over information, i.e. they prefer to read an uninformative newspaper with their ideology rather than an informative paper on opposite positions. The other $1 - \rho$ voters are "flexible" – if both papers are informative or both are uninformative, they buy the one with their ideology. If only one is informative, they buy that one. Such voters will play a key role in making the media an effective force for monitoring.¹⁴

Given this set-up, there are four types of voters, depending on their ideological positions and their degree of flexibility. If inflexible right wingers make up 50% of the electorate, then a bad incumbent only needs to bribe the right wing media. If this group is not a majority – which happens when $\rho < \frac{1}{2\pi}$ – then the incumbent must also silence the left wing media.

For simplicity, fix both the potential audience-related revenue a and the transaction cost τ at 1. If both media outlets are informative, their respective revenues are equal to the proportions of left wingers and right wingers. If only one is informative, then it gains the share of flexible voters with the opposite ideology. In equilibrium, an incumbent wants to buy off the media only if her type is bad and she would buy off exactly those outlets that are needed to guarantee re-election. Then, in equilibrium an outlet realizes that suppressing information determines the victory of the incumbent. The cost of silencing the right wing media alone is $\max((1 - \rho)\pi - \Lambda, 0)$. For both media, the cost is $\max((1 - \rho)(1 - \pi) - \Lambda, 0) + (1 - \rho)\pi + \Lambda$. It is then easy to determine the cost of re-election as a function of ρ and Λ :

Lemma 5 *The transfer to media that a bad right-wing incumbent must make to ensure re-election is:*

$$\left\{ \begin{array}{lll} 1 - \rho & \text{if } \Lambda < (1 - \rho)(1 - \pi) & \text{and } \rho < \frac{1}{2\pi} \\ (1 - \rho)\pi + \Lambda & \text{if } \Lambda \geq (1 - \rho)(1 - \pi) & \text{and } \rho < \frac{1}{2\pi} \\ (1 - \rho)\pi - \Lambda & \text{if } \Lambda < (1 - \rho)\pi & \text{and } \rho \geq \frac{1}{2\pi} \\ 0 & \text{if } \Lambda \geq (1 - \rho)\pi & \text{and } \rho \geq \frac{1}{2\pi} \end{array} \right. .$$

The more inflexible are voters (higher ρ), the cheaper it is for the incumbent to get re-elected. This is due to two effects that go in the same direction. The first effect operates at the level of media competition. Flexible voters are potential "cross-over" readers. If there are few of them, newspapers have less incentive to compete on information provision. The second effect affect the electoral stage. If there are few flexible voters, the incumbent can afford

¹⁴Results would be analogous, but slightly more complicated, if we assumed that voters do not buy newspapers if they are both uninformative.

to let the left wing media be informative. She will still enjoy a majority of uninformed right-wingers.

The other ideological variable, Λ , has a mixed effect. If the readership is flexible enough that the incumbent must bribe both papers ($\rho < \frac{1}{2\pi}$), then a high Λ can only make bribing more expensive. An increase in Λ makes it cheaper to buy off the right wing paper and more expensive to buy the left wing paper. If Λ is low, these effects cancel out. If Λ is high enough that the right wing media needs no bribe to keep quiet, then increasing Λ makes the total bribing cost higher. If instead the readership is inflexible, the incumbent buys only the right wing paper, and the bribe she needs to pay is decreasing in Λ . We summarize this discussion in:

Proposition 6 *Suppose that the voters and the media are ideologically polarized. Then media are less likely to be captured if voters are more flexible in their media habits, i.e. are willing to read newspapers of the opposite ideology. More media polarization makes it more difficult to capture the media when voters are flexible in their media habits, i.e. if $\rho < \frac{1}{2\pi}$, but reduces the cost of capturing the media when voters are inflexible in their media habits.*

Of course, in reality, Λ and ρ should not be considered in isolation. One would expect that countries with an electorate polarized along ideological lines will have ideological newspapers and inflexible readers. The main point of this section is that, unless one is able to disentangle media polarization and readership flexibility, introducing ideology in the model has an inherently ambiguous effect.

4.4 Endogenous Monitoring

We now assume that the difficulty of detecting a bad type is a random variable. Sometimes a minimum of information gathering is enough, other times it is necessary to have in place the resources to launch a journalistic investigation. Each media outlet chooses its own monitoring technology. As we shall see, in equilibrium outlets are now vertically differentiated. From an ex ante point of view, the media are captured only some of the time. While before the probability of capture was either 0 or 1, now this discontinuity disappears.

Each media outlet can, at a cost, improve its monitoring ability by hiring talented journalists and/or providing them with better resources. Hence, outlet i selects $q \in [0, 1]$ at cost of $c(q)$, where c is increasing, convex, and twice differentiable. (Corner solutions are avoided if we also assume that $c(0) = c'(0) = 0$ and $\lim_{q \rightarrow 1} c'(q) = \infty$.) There is a large group n of media

entrants who, at stage 0, select their monitoring technologies simultaneously and non-cooperatively. The difficulty of detecting the incumbent's type is given by the random variable ν , which is uniformly distributed on the unit interval. The variable ν is realized after the media have chosen their q 's. An outlet with q_i receives verifiable information that an incumbent is bad if $\nu \leq q_i$. The rest of the game is as in the baseline model. We now characterize the equilibrium vector of quality investments and the probability of media capture.

The number of informed media outlets depends on the realization of ν . The incumbent will still want to buy off either all informed media outlets or none of them, and in equilibrium the cost of buying off one broadcaster is still τa . If m is the number of informed media, the incumbent chooses to bribe them if and only if $r \geq m\tau a$. This defines a maximum number of broadcasters $M = \text{mod}\left(\frac{r}{\tau a}\right)$ that the politician is willing to pay off. If more than M broadcasters turn out to be informed, the incumbent gives up.

Without loss of generality, broadcasters can be indexed in order of decreasing technology, so that $q_1 \geq q_2 \geq \dots \geq q_n$. The incumbent bribes the media if and only if $\nu > q_{M+1}$. There are thus three cases according to the realization of ν . If $\nu > q_1$, no broadcaster is informed and the incumbent gets re-elected. If $q_{M+1} < \nu \leq q_1$, informed media are bribed and the incumbent is re-elected. If $\nu \leq q_{M+1}$, no corruption occurs and the incumbent goes.

In equilibrium, broadcasters fall into two categories. The ones with $q > q_{M+1}$ are "potentially corrupt" and have a positive probability of being bought off. The ones with a lower q are always free and compete only for audiences. The equilibrium choices of q are thus as follows:

Lemma 7 *Let $M = \text{mod}\left(\frac{r}{\tau a}\right)$ and let $\hat{q}(k)$ be the unique q such that $c'(q) = \frac{a}{k}$. In equilibrium, $q_1 = \dots = q_M = \hat{q}(1)$ and, for every $i \geq M + 1$, $q_i = \hat{q}(i)$. A bad incumbent is thrown out of office with probability $\hat{q}(M + 1)$.*

The proposition describes a pure-strategy equilibrium that is unique up to a renumbering of media. The choice of monitoring technology is determined by equating the marginal cost to the marginal revenue. If an outlet belongs to the potentially corrupt group, its marginal revenue is given by the monopoly profit of being bought off by the incumbent which is just a . If outlet i belongs to the down-market clean group of media, its marginal revenue is audience-related and it depends on how many outlets are more precise: $\frac{a}{i}$.¹⁵

This more complicated model yields similar basic predictions to the baseline model. Improved media efficiency is now best modeled as a fall in the

¹⁵The proof of the lemma checks that (in this highly discontinuous problem) these first-order conditions are indeed necessary and sufficient for a pure-strategy equilibrium.

cost of investment. Thus, let $c(q) = \kappa C(q)$, where κ is a positive number and the function C has the regularity properties discussed above. Voter welfare and turnover are determined by the probability that a bad incumbent is kicked out: $\hat{q}(M+1)$, which by Lemma 7 is implicitly defined by

$$\kappa C'(q) = \frac{a}{\text{mod}\left(\frac{r}{\tau a}\right) + 1}.$$

This shows that $C'(\hat{q}(M+1))$ is nondecreasing in a and τ , and nonincreasing in κ . Note that an increase in a has two effects, both positive: it increases the incentives for media to buy better monitoring technology and it increases the cost for the incumbent of buying off the media. As $C'(q)$ is increasing in q , we have:

Proposition 8 *Suppose the media choose their monitoring level endogenously. Turnover and voter welfare are nondecreasing in a and τ , and nonincreasing in κ .*

To sum up, the model with endogenous quality choice yields the following additional insights. If there maximum number of media outlets that the media can buy off (here denoted by M), then the probability of captured media now depends on the investment level of the M th most efficient media outlet. Transactions costs τ , the size of audience a , and the cost of investment κ , all play a critical role in the motivation of this marginal media outlet to invest. More specifically, the insight that greater audience and lower transactions costs induce a greater probability of capture remains a central feature of the analysis.

5 A Look at the Evidence

The theory suggests a rich array of phenomena which may eventually be amenable to empirical analysis as data become available. Existing data do, however, permit only a crude cut at the issues. We will use the insights of the theory to guide this exploration in two main ways. First, it will motivate our focus on how media activity reduces corruption via a link with election outcomes. Second, we will use it to motivate a more structured look at the data in which press freedom is treated as an intermediate input.

5.1 Data

Our main focus will be on cross-country data. Very little reliable information on the structure of the media is available for this context. However, we exploit

a new series of information on media ownership assembled in Djankov et al (2001). These data are available for 98 countries for both television and newspapers.¹⁶ They give data on the ownership structure and market share of the top five media outlets in each country.

Djankov et al (2001) use the data to look at the reduced form relationship between state ownership of the media and policy outcomes. Looking over a wide array of outcomes, they conclude that state ownership matters. Moreover, their results suggest consistently that newspaper ownership is more strongly correlated with outcomes than is ownership of television. A brief look at the data reveals why this is plausible. First, state ownership of newspapers is much rarer than that of television. By itself, this does not imply much. However, there are well-established traditions of public service broadcasting in almost all OECD countries and state ownership in this sphere might legitimately be regarded as benign. On average 61% (standard deviation 35%) of the top five for which data is available is state owned. There is less variation for television than for state ownership of newspapers which has a mean of 29% (standard deviation 40%). It is also possible that governments find it much harder to control newspaper circulation by privately owned newspapers as opposed to privately owned tv stations – government often controls transmission facilities even if it does not own the stations themselves.

We focus here mainly on the newspaper ownership data (although we will add some measures for television as a robustness check). These data can be used to create a four way classification of ownership – state owned, family-owned, widely held and “other” private media.¹⁷ We also construct a measure of the extent of foreign ownership of newspapers. This is the fraction of the top five media (again weighted by market share) which is foreign owned. Finally, we use the market share data, we construct a measure of concentration – it is equal to one if the five outlets in the data have a market share exceeding 75%. We use similar information for television – measuring concentration and the extent of foreign ownership.¹⁸ Together,

¹⁶The fact that marketshare data are missing for a small subset reduces the sample to 91 for TV and 93 for newspapers.

¹⁷This is the smallest group and includes ownership by trade unions, cooperatives etc.

¹⁸We use different measures of concentration for newspapers and television. For the press, it is simply an indicator variable equal to one if the market share of the media outlets covered in the data exceed 75%. (We checked for sensitivity of the results for different values of this threshold.) For television, this does not make much sense. The data set only gives data for television stations that report news. Thus, in Kuwait, there is a single entry for a state owned TV station which has only a 13% market share so it would appear to be unconcentrated by our newspaper method even though it has a monopoly on television news. Instead therefore, we look at the market share of the largest TV station

these variables may be used to proxy for the parameters τ , a , n and q in the model laid out above.

In the spirit of the theory, we will focus on corruption measures as the main outcome. We use data from three different sources. The first is the corruption perceptions index (CPI) developed by *Transparency International*. This is based on an amalgam of other corruption data and is available for a cross section of 90 countries for 1999 (73 in the sample for which we have media ownership data). Our other measure comes from a World Bank study by Kaufman et al (2000) which develops an index of efforts by governments to combat corruption using an unobserved components model. It is available for 156 countries (94 in the sample for which we have media ownership data). Finally, we use data from the International Country Risk Guide (ICRG) which measures corruption for 91 of our countries.

The theoretical model makes endogenous whether or not the media operates free from political control. It is possible to look at this (somewhat crudely) using the press freedom index published by *Freedom House*. We use the data from 1999, which are available for 180 countries (92 out of the 96 countries for which we have media ownership data). They rate the *actual* press freedom in six different categories.

The theoretical model suggests that the electoral mechanism is key to understanding the link between press freedom and policy outcomes. To look at this, we obtained data on political turnover from Beck et al (1999). They record the length of time in office for the incumbent who held power in 1997 for 172 countries (for all countries in the sample with media ownership data). They also record the length of tenure of the party in office for 148 countries (83 of the countries for which we have media ownership data are included).

In exploring the link between corruption and media ownership, we use two main sets of controls. The most basic controls are land area in square kilometers, whether a country is landlocked, the legal origin of a country,¹⁹ and whether a country is located in the tropics. We then supplement these controls with the log of population size, income per capita, trade as a percentage of GDP and whether a country has held an election in the previous five years. Clearly, it could be debated which of these variables is plausibly exogenous. However, our main purpose is to check which results are highly sensitive to inclusion and exclusion of such controls which are frequently used

relative to the total market share for the five largest news providing TV stations in the data set. On this basis, Kuwait would get a one to denote its complete monopoly power. The results reported are not sensitive to extending it to have the two largest providers and using the same method.

¹⁹These are shown to be important indicators of outcomes in financial markets and governance more generally in La Porta et al (1998), (1999).

as exogenous variables in exercises of the form being conducted here.

5.2 Approach

The theory described two distinct routes for the importance of the organization of the media on outcomes. One route is via susceptibility to capture by government. Here, the theory isolated the parameters a, τ and n (or c) as the driving force. The second channel is via the effect of media structure on government when the media is not captured media – the transparency/news efficiency parameter q is key here.

The media ownership variables from Djankov et al (2001) could, in principle, capture either stage of this process. Private forms of ownership may increase transactions costs (τ) making media capture less likely (as in Proposition 1), will tend to be more commercialized (high a) and, perhaps, be more efficient at producing news – thereby increasing q . Concentration of ownership can be thought of as a proxy for low n which leads to higher prospects of capture. It could also lead to higher audience-related revenue per outlet through market power effects (which goes in the opposite direction). Foreign ownership of media may also proxy for increased transactions costs (high τ) if it is more difficult for foreign media to be bribed. However, it could also be a proxy for q if foreign owned newspapers produce news more efficiently. It may also be true that foreign owned media operate in countries that are more open and transparent.

We pursue two approaches to the data. First, we estimate reduced form regressions treating press freedom, corruption and political longevity as endogenous. Second, we pursue a more structured approach where press freedom is treated as an intermediate input.

5.3 The Reduced Form Approach

The reduced form regressions look at the correlations between media ownership variables and the following outcome variables: three measures of corruption, the measure of press freedom and two measures of political longevity. We run cross-section regressions of the form:

$$y_s = region_s + o_s + \beta_1 x_{1s} + \beta_2 x_{2s} + \varepsilon_s \quad (1)$$

where $region_s$ represents a regional dummy variable; o_s are media ownership variables and x_{1s} and x_{2s} are various vectors of control variables. The vector o_s comprises the fraction of ownership in different categories: widely held,

family and other sources of private ownership, fraction of foreign owned media and measures of concentration. The vector x_{1s} is denoted as “basic controls” in the Tables and comprises dummy variables for legal origin, whether a country is landlocked or located in the tropics, and the land area of the country. The vector x_{2s} is denoted by “extra controls” in the Tables and comprises income per capita, trade as a percentage of national income, log of population, and whether a country has held a legislative election in the previous five years.²⁰ We successively present results that add more of these controls to the equation so that the robustness of the relationship of interest can be seen. In every case, we estimate robust standard errors clustered to allow for within region correlation.

We present our results for all six outcomes in a common format. The first three columns add successively new sets of controls as described above and in the notes to the Tables. The media ownership variables in these columns are held fixed. They are disaggregated private ownership, foreign ownership and concentration, all for newspapers. (The omitted ownership category here is state ownership.) In column (4), we maintain the full set of controls but look at state ownership as a distinct category. In column (5), we add state ownership, foreign ownership and concentration for television.

The results for corruption are in Tables 2 through 4. For both corruption measures correlations between private/state categories of ownership are fragile to including other regressors as controls. The main robust result is the negative relationship between the share of foreign ownership of the media and corruption.²¹ Importantly it holds even when openness to trade is used as a control.²² For the ICRG data we observe the predicted positive association between ownership concentration and corruption. Column (6)

²⁰The results are robust to excluding the six countries on our sample that have not held elections in the past five years. In fact, they are a little stronger when we do so.

²¹For this result to hold, the scale (and not just the presence) of foreign ownership is important. The result does not hold if we use instead a dummy variable equal to one in countries that have some amount of foreign ownership. To get a better sense of where identification is coming from here, it is useful to note that foreign ownership is concentrated in the Eastern Europe and Central Asia region and the Western Europe/North American region. However, there is significant variation within these regions. There is some foreign ownership in 40% of the sample in Eastern Europe and Central Asia and 38% of the sample in Western Europe/North America. Around 12% of the countries in the other regions have some foreign ownership. Foreign ownership is largely uncorrelated with the other control variables that we use in the regressions.

²²See Ades and DiTella (1999), Triesman (2000), and Bonaglio et al (2001) for discussion of the openness-corruption relationship. Openness to trade is negative and significant in most specifications that exclude a control for population size. However, it is sensitive to including this variable in the specifications of this paper. (Not suprisingly, there is a strong negative correlation between population size and openness.)

adds information on state and foreign ownership of television. However, this is not robustly correlated with corruption.²³

Table 5 looks at the reduced form relationship between ownership and press freedom. Here, we find that state ownership is correlated with press freedom – greater state ownership implying less press freedom. This is robust to including all of our controls. In this instance, foreign ownership is not significantly related to the outcome. Table (5) reveals that it is newspaper ownership by the state, rather than television that is correlated with press freedom. Press freedom is best thought of as capturing whether media is captured by government. Thus, in terms of the theory the result on state ownership is best thought of as affecting either τ or a . Also consistent with the theory, which suggested that capture should be related to plurality in the media, we find some evidence in Table 4 that concentration of newspaper ownership (row 8 of the Table) is negatively related to press freedom.²⁴

Finally, we look at political longevity. This is our indicator of political turnover with high longevity being equivalent to low turnover. This is related to the structure of the media in Tables 6 and 7. Using either the length of the term of the chief executive or the party, there is some evidence that greater state ownership of newspapers is related to lower turnover. This is most clear cut in column (4) of each table.²⁵ There is a hint of a positive correlation between foreign ownership and longevity – we return to the interpretation of this in the next section. While the timing of this is slightly suspect (media ownership is for 1999 whereas the turnover is measured based on history up to 1997), the result is consonant with the model’s predictions with state ownership affecting capture via its influence on a and τ . Consonant with Djankov et al (2001) these results again confirm the importance of newspaper ownership in mediating this relationship.²⁶

²³Among the unreported coefficients on our control variables, the following are worth remarking. First, richer countries are less prone to corruption. This is consistent with Triesman (2000) and Bonaglio et al (2001). However, this should be treated with caution as others (notably Mauro (1996)) have argued for the causality to run in the opposite direction. The relationship between openness to trade and corruption is sensitive to including population size. Relative to countries of German legal origin, those of Scandinavian legal origin have lower measured corruption levels. Countries located in the tropics are more prone to corruption as are larger countries. Using the World Bank and the ICRG measures, countries that have had an election in the past five years are less corrupt.

²⁴Among the unreported controls, countries that have held an election in the past five years tend to have higher press freedom and countries in the tropics have less.

²⁵Note also that among private ownership, there is a suggestion that the main effect is coming from family ownership.

²⁶The main findings from the controls are that countries that are more open to trade tend to have longer lived incumbents and, not surprisingly, those that have elections tend to have shorter lived incumbents.

Overall, these reduced form results (while only suggestive) admit of natural interpretations corresponding to the key variables of the theory. We now push this a bit harder by taking a more structured look at the data.

5.4 Press Freedom as an Intermediate Input

We now take a more structured look at the data which tries to discern which aspects of media ownership are better measures of τ , a and n , and which are better measures of q . Our proxy for media capture is the press freedom index constructed by Freedom House.²⁷ We will estimate the following “structural model”:

$$\begin{aligned} y_s &= \alpha p_s + \beta x_s + \lambda q_s + region_s + \varepsilon_s \\ p_s &= \theta z_s + \xi x_s + region_s + \eta_s \end{aligned} \tag{2}$$

where p_s is the press freedom index described above, q_s are media ownership variables proxying for q and z_s are media ownership variables proxying for τ , a and n in the theory. The outcome variables, y_s , will now be the three corruption measures and the two political longevity measures. We let the data guide us in deciding which media ownership variables matter at which stage of the relationship. We can do this because the model is overidentified. We continue to use robust standard errors allowing for regional clustering in all regressions.

Tables 8 and 9 present results motivated by the empirical model in equation (2). We use ownership variables as instruments for press freedom and test whether they can be excluded from the second stage regression. For both corruption and longevity we could not reject the hypothesis that foreign ownership belongs in the second stage of the regression using a Sargan test of our over-identifying restrictions. Thus, we present three sets of results. First, an OLS specification where press freedom is on the right (column (1)). Second, a equation where press freedom is instrumented with the three types of private ownership and concentration measure for newspapers (column (2)). (We present the Sargan test of overidentification for these variables.) We then introduce foreign ownership of newspapers as an exogenous variable at both stages of the regression (column (3)) reporting its coefficient at the second stage in row (2) of the Tables 8 and 9. This is motivated by thinking of

²⁷The freedom index is an integer variable taking on values between 1 and 6. This is at odds with the baseline model which treats press freedom as a zero-one variable. However, the extension in section 4.4 is relevant here. Using this, the freedom index can be interpreted as the probability of capture, which is in that case is a continuous variable.

this variable representing the transparency/news efficiency variable, q , from the theory.

Table 6 gives the results for corruption. The cross-sectional correlation between the CPI measure of corruption and the press freedom index is weak. It remains so when we treat press freedom as an endogenous variable in Columns (2) and (3). In contrast, the OLS results for the World Bank anti-corruption index and the ICRG data are consistent with Brunetti and Wedder, (1999) and Ahrend (2001), supporting the idea that there is a negative correlation between press freedom indicators and corruption. Moreover, the result is robust (of a similar size and sign) after instrumenting.²⁸ The results that include foreign ownership of newspapers parallel the reduced form regressions from Tables 2, 3 and 4 with a strong and significant negative correlation between corruption and foreign ownership. This is indicative of an effect working via q – foreign owned media having more efficient news production technologies.²⁹

Table 8 explores the same approach for the political longevity measures. Here a consistent pattern emerges across the two measures with press freedom being negatively correlated with longevity. However, this effect is significant only for party longevity. The results are similar whether or not we instrument press freedom with private ownership and concentration of newspaper ownership. Including foreign ownership as a regressor continues to hint at a positive relationship between longevity and foreign ownership. This has a natural interpretation in line with the theory supporting the idea that this is best thought of as capturing q . To see this, recall the result from section 3.2 that an increase in q may *reduce* turnover if the disciplinary effect of higher q on rent seeking dominates the selection effect in the presence of moral hazard.³⁰ The results in Table 7 are consistent also with a discipline effect and the result in Proposition 4.³¹

Overall the more structured approach pays some dividends yielding a more precise interpretation of patterns in the data and providing a closer link to theory. Loosely speaking, we can conclude that state ownership and concentration affects the likelihood of media capture, but does not appear to

²⁸Re-running the results on the 69 observations that are common to all three corruption indices indicated that differences in the country samples in each regression in Table 6 are partially due to sample selection with the results being weaker for all three measures on the sub-sample for which Transparency International data are available..

²⁹Countries with significant foreign ownership may also have higher transparency in their political processes.

³⁰See the discussion preceding Proposition 4.

³¹For these to be true together, note that we must be looking at the *average* effect of these variables in our sample. The results suggests that foreign ownership is concentrated among the less corrupt countries and capture among the high corruption countries.

have a direct effect on the efficiency of news production. In contrast, foreign ownership appears to affect ability to produce news, having an independent effect on corruption and (possibly) turnover.

5.5 Results on Political Turnover in India

As a final test of the model, we present some results on political turnover in India using data from Besley and Burgess (2001).³² The data that we use are for the sixteen main Indian states for the period 1957 to 1992. We focus here, out of necessity, on newspaper ownership and circulation. However, this is appropriate for India, especially during the period in question (see Besley and Burgess (2001) for further discussion).

The data contain measures of newspaper ownership. Ownership by government in India is unimportant with less than 3% of titles being state owned on average during our data period. However, this has fallen from around 6% to a little above 1% over period covered. The media are grouped in the following categories: ownership by individuals (as close as we can get to the family ownership category), ownership by government, ownership by political parties and other forms of private ownership.³³ The main difference with the cross-country results is the inclusion media ownership by political parties as a separate category. This is interesting as it may indicate the presence of ideologically motivated media along the lines of the model in section 4.3. Averaging over the data period, roughly 65% of media are individually owned, 3% are state owned, 1% are owned by political parties, with the remainder in the “other” private ownership category.

As we saw in Proposition 2, there is a direct relation between total audience and media capture. In the Indian dataset audience is proxied by newspaper circulation. Table 10 column (1) reports the result of regressing newspaper circulation on ownership controlling for state fixed effects, year effects and other economic controls reported in the notes to the table. Here, we find that ownership by political parties is significant related to reduced newspaper circulation.

³²For the Indian data, we are unable to do tests based on corruption measures. However, related to the model in this paper, Besley and Burgess (2001) show that governments appear to be more responsive to citizens when newspaper readership is greater. Information on the sources and exact definitions of the variables are in the data Appendix of that paper.

³³This is ownership by societies, trust funds, firms, and educational institutions. Two other important features of the data is the absence of circulation data for each ownership category and the fact these data are for all forms newspapers and periodicals some of which may have limited news content.

We now turn to the key prediction of the model that we can test in these data: that political turnover will be affected by media ownership if the latter is proxying for τ and q . We measure the political longevity as the period of time spent in office by particular political groupings. We focus on those groupings that attain a majority of seats in the legislative over this period.³⁴ The average time that a majority coalition stays in office is 6.5 years. In column (2) of Table 10, we look at the reduced form effect of ownership on longevity. Here, we find that this depends positively on ownership by political parties, and negatively on private ownership. This is a consistent with a story in which media capture is more likely with ideological media (proxied by political party ownership) and less likely with more independent forms of ownership.

In parallel with the reasoning above it is interesting to ask whether this effect is operating through an effect on newspaper circulation or whether ownership has a direct effect on policy. Thus, instead of ownership, we use newspaper circulation per capita as a right hand side variable. While the coefficient on newspapers is negative, it is not significant in the OLS specification.³⁵ However, once instrumented with the ownership variables, it becomes strongly negative and significant. Moreover, the Sargan test of the overidentification restriction that ownership has not direct effect on turnover in this specification passes comfortably. This finding could be taken as consistent with the idea that there are different degrees of media capture across Indian states that results in greater political longevity. However, clearly this suggestive finding requires more detailed investigation. However, it is somewhat encouraging that our two different sources of data tell broadly consistent stories.³⁶

6 Concluding Comments

Media institutions play a vital role in informing citizens. However, they can do so effectively only if they operate independently from the state and face governments who are open and transparent in their dealings with their

³⁴ Over our data period five groupings attain majorities: hindu parties, Janata parties, the Congress party, hardleft parties and regional parties. Besley and Burgess (2001) give exact accounts of how these groupings are formed.

³⁵If newspapers are disaggregated by language as in Besley and Burgess (2001), the effect of hindi newspaper circulation is negative and significant in the OLS specification.

³⁶However, it should be noted that, as instrumental variables, press freedom and newspaper circulation display a difference. The former reflects media capture, while the latter relates to informativeness, which in turn depends on media capture *and* efficiency. Thus, we expect q to affect circulation more than freedom.

citizens and the media. This paper has developed a political agency model in which freedom of the press emerges endogenously. We have shown how such a model makes specific predictions about different features of the polity and the organization of the media improve policy outcomes.

The theory has informed the empirical work undertaken here in three main ways. First, it provides a focused interpretation of the relationship between the structure of the media and policy outcomes. Second, it suggests looking at the mechanism via which media affects outcomes (operating here through the political process). Here, we explored concomitant effects of media structure on the functioning of the political process. Third, the model suggests trying to partition aspects of media structure into those that reduce the chances of capture by government and those that enhance its effectiveness (controlling for the degree of capture).

While crude, the empirical analysis has paid dividends in all three directions. There is evidence that state ownership and concentration enhance the prospect of capture while foreign ownership is correlated with greater media efficiency. Clearly, much remains to be done to develop a full understanding of the role of the media in political economy models – this paper tackles only one dimension. However, by beginning from firm theoretical foundations, it suggests how future data collection exercises might proceed to provide more focused insight into what is important in the functioning of the fourth estate.

We conclude with a tentative remark on regulation. Most countries used to have rules that were specific to the media industry, such as explicit concentration limits or cross-ownership restrictions. However, in the last decade there has been a philosophical shift (at least in the US and the EU) toward treating media like any other industry. The old ad-hoc rules have often been replaced by the general competition policy principles that govern the other industries. A contribution of this paper is the distinction between two hypotheses on why media ownership patterns matter: the efficiency theory and the capture theory. While the former applies to any industry, the latter is specific to media. If, as our empirical analysis suggests, the capture theory has some truth, one may want to re-consider the case for discarding media-specific regulation.

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Appendix A: Proofs of Results

Proof of Proposition 1

We first show that there exists an equilibrium with those properties by backward induction:

3. If voters receive signal $s = b$, the posterior probability that $\theta = g$ is zero and voters kick out the incumbent. If they observe $s = \emptyset$, the posterior probability belongs to $[\gamma, 1]$, and it is a (weakly) dominant strategy to re-elect the incumbent.³⁷

2. Suppose the transfer vector $\{t_i\}_{i=1,\dots,n}$ is observed and assume without loss of generality that $t_1 \leq \dots \leq t_n$. We posit the following strategy on the part of outlets. Let $I_i = 1$ if i accepts and 0 if he rejects. The strategy is defined recursively. Given I_1, \dots, I_{i-1} , $I_i = 1$ if and only if

$$t_i \geq \frac{\tau a}{i - \sum_{j < i} I_j}.$$

To see that this is a best response, notice that i should accept t_i if and only if he thinks that $t_i \geq \frac{\tau a}{n - \sum_{j \neq i} I_j}$. As t_i is nondecreasing and $\frac{\tau a}{i - \sum_{j < i} I_j}$ is nonincreasing in i , there exists a number k between 0 and n such that $I_i = 1$ if and only if $i \geq k + 1$. By definition, $t_k < \frac{\tau a}{k - \sum_{j < k} I_j} = \frac{\tau a}{k}$ and $t_{k+1} \geq \frac{\tau a}{k+1 - \sum_{j < k} I_j} = \frac{\tau a}{k+1}$. An outlet $i \leq k$ does not gain from deviating to $I_i = 1$ because

$$t_i \leq t_k < \frac{\tau a}{k} \leq \frac{\tau a}{i - \sum_{j < i} I_j}.$$

An outlet $i \geq k + 1$ does not gain from deviating to $I_i = 0$ because

$$t_i \geq t_{k+1} \geq \frac{\tau a}{k+1} = \frac{\tau a}{i - \sum_{j < i} I_j}.$$

1. Given the broadcasters' strategies in 2., $t_i \geq \tau a$ for all i is a necessary and sufficient condition for a transfer vector to be accepted by all outlets. It is necessary because the lowest transfer, say t_1 , must satisfy

$$t_1 \geq \frac{\tau a}{1 - \sum_{j < 1} I_j} = \tau a.$$

Sufficiency is immediate to check. Then, the incumbent knows that she is able to buy the broadcasters' silence by paying τa to each of them. Obviously,

³⁷In equilibrium, the posterior is exactly γ .

she either buys out everybody or nobody. In the former case she gets $r - m\tau a$. In the latter case, she gets zero. Then, the incumbent offers $t_i = \tau a$ to each broadcaster if and only $m \leq \frac{r}{\tau a}$ and zero otherwise.

We now show that there exists no other pure-strategy PBE in which voters play undominated strategies that does not satisfy the properties in the statement.

3. The only information voters receive is the signal s . Thus, voters strategy can only be conditioned on s . Kicking out the incumbent if $s = b$ is a strictly dominant strategies. The only question is whether there can be a pure-strategy equilibrium in which the incumbent is kicked out if $s = \emptyset$. But this is impossible because if that were the case, the incumbent would not suppress information and hence the posterior when the voters observe $s = \emptyset$ would be strictly greater than γ , and voters should actually re-elect the incumbent whenever they observe $s = \emptyset$.

2. and 1. We show that in equilibrium an informed broadcaster accepts an offer t_i if and only the offer is at least a . First, for any belief, the revenue of i cannot be higher than a . Thus, for any belief he has, i must accept offers above a . Second, given any reply function on the part of broadcasters, in equilibrium the incumbent buys off either all the informed broadcasters or none of them. Suppose that there exists an equilibrium in which i accepts an offer strictly below a . It must be the case that all other broadcasters accept offers too. Thus, if i rejects the offer, he is the only one to break news and he gets a : a contradiction. Third, if some broadcaster rejects offers of exactly a (but accepts offers above), we have an openness problem and an equilibrium does not exist.

Proof of Proposition 3

Stages 1, 2, 1nd 3, are as in proof of Proposition 1. For stage 0, hold the entry choices of the other broadcasters fixed. Suppose that exactly $m - 1$ broadcasters are entering. If $m \leq \frac{r}{\tau a}$, an additional broadcaster who enters receives expected revenue qa . Thus he enters if and only if $c \leq qa$ (and we assumed $qa > c$). If instead $m > \frac{r}{\tau a}$, the expected revenue is $\frac{qa}{m}$, and the broadcaster enters if $c \leq \frac{qa}{m}$. In this case, the equilibrium number of entrants is $m = \text{mod} \left(\frac{qa}{c} \right)$. If $\text{mod} \left(\frac{qa}{c} \right) < \frac{r}{\tau a}$, then, when $m - 1 = \text{mod} \left(\frac{r}{\tau a} \right)$, an additional broadcaster would get a negative revenue by entering, and the equilibrium m is $\text{mod} \left(\frac{r}{\tau a} \right)$. If $\text{mod} \left(\frac{qa}{c} \right) > \frac{r}{\tau a}$, then the equilibrium m is $\text{mod} \left(\frac{qa}{c} \right)$.

It is also easy to see that this is the only pure-strategy equilibrium of the entry game.

Proof of Proposition 4: The ambiguity in the turnover effect is explained in the text. For voter welfare observe that

$$\begin{aligned}
W'(q) &= (1 - \gamma) \left((-1 + \Psi'(\hat{y}(q))q\gamma) \frac{d\hat{y}}{dq} + \Psi(\hat{y}(q))\gamma \right) \\
&= (1 - \gamma) \left(\frac{\Psi'(\hat{y})(1 - \Psi'(\hat{y})q\gamma)}{\Psi''(\hat{y})q} + \Psi(\hat{y}(q))\gamma \right) \\
&= (1 - \gamma) \left(\frac{(\Psi'(\hat{y}))^2 q(1 - \gamma)}{\Psi''(\hat{y})q} + \Psi(\hat{y}(q))\gamma \right) > 0,
\end{aligned}$$

where the third equality is due to the first order condition for the incumbent. The effect on expected rent is confirmed by observing that $R'(q) = -W'(q)$.

Proof of Proposition 7

Formally, the timing of the game is as follows:

1. Broadcasters choose their q 's and incur cost q . Without loss of generality, index them in order of decreasing q .
2. The incumbent's type $\theta \in \{b, g\}$ is realized ($\Pr(\theta = g) = \gamma$). The difficulty ν is realized. Broadcaster i observes signal

$$s_i = \begin{cases} b & \text{if } \theta = b \text{ and } \nu \leq q_i \\ \emptyset & \text{otherwise} \end{cases}.$$

The incumbent observes ν and selects a transfer $t_i \geq 0$, for each broadcaster i .

3. Broadcaster i observes t_i and decides to accept or reject it. If he accepts, he reports $s = \emptyset$ and receives t_i . If he rejects, he reports the true signal. Signals cannot be fabricated.
4. Voters observe the signals reported by broadcasters and vote for the incumbent or a challenger of unknown type.

The following is a pure-strategy perfect Bayesian equilibrium. $M = \text{mod} \left(\frac{x}{\tau a} \right)$ and let $\hat{q}(k)$ be the unique q such that $c'(q) = \frac{a}{k}$.

1. Broadcaster i selects $q_i = \hat{q}(1)$ if $i \leq M$ and $q_i = \hat{q}(i)$ otherwise.
2. If the signal is good or $\nu \leq q_{M+1}$ or $\nu > q_1$, the incumbent offers no transfers. If the signal is bad and $\nu \in (q_{M+1}, q_1]$, the incumbent offers a transfer $t_i = \frac{a}{\tau}$ to all informed broadcasters.

3. An informed broadcaster accepts a transfer t_i if and only if $t_i \geq a$.
4. Voters re-elect the incumbent if and only if $s = \emptyset$.

It is immediate to check that 2, 3, and 4 are best responses. Given 2, 3, and 4, we now check point 1. Let $(\hat{q}_1, \dots, \hat{q}_n)$ be the strategies of the n outlets according to point 4. Holding the other q 's fixed, we consider a deviation $q_i \neq \hat{q}_i$ by player i . For $j = 1, \dots, n$, let

$$k(j) = \begin{cases} j & \text{if } j \geq M + 1 \\ 1 & \text{if } j \leq M \end{cases} .$$

The payoff to an informed outlet, if m outlets are informed is then written as $\frac{a}{k(j)}$.

Given ν , let $w(\nu)$ be the highest $j \neq i$ such that $\nu \leq \hat{q}_j$. Then, given a realization ν , if $q_i \geq \nu$, the payoff of i given q_i is

$$r(q_i, \nu) = \begin{cases} \frac{a}{k(w(\nu)+1)} & \text{if } q_i > \hat{q}_i \\ \frac{a}{k(w(\nu))} & \text{if } q_i < \hat{q}_i \end{cases} .$$

This is because, if $q_i > \hat{q}_i$, the informed outlets are $1, \dots, w(\nu)$ plus outlet i . If instead $q_i < \hat{q}_i$, the informed outlets are $1, \dots, \hat{q}_{i-1}, \hat{q}_{i-1}, \dots, \hat{q}_n$ plus outlet i .

The expected profit of i if he chooses q_i is $\int_0^{q_i} r(q_i, \nu) d\nu$. To prove that a deviation is not profitable it is sufficient to show that $r(q_i, q_i) \leq 0$ whenever $q_i > \hat{q}_i$ and $r(q_i, q_i) \geq 0$ whenever $q_i < \hat{q}_i$. The former is true because, if $q_i > \hat{q}_i$ (note that by definition $q_i \in (\hat{q}_{w(q_i)+1}, \hat{q}_{w(q_i)}]$),

$$r(q_i, q_i) = \frac{a}{k(w(q_i) + 1)} = c'(\hat{q}_{w(q_i)+1}) \leq c'(q_i) .$$

The latter is true because, if $q_i < \hat{q}_i$,

$$r(q_i, q_i) = \frac{a}{k(w(q_i))} = c'(\hat{q}_{w(q_i)}) \geq c'(q_i) .$$

7 Appendix B: Media Competition in the Presence of Moral Hazard

The timing of the game is as follows:

1. Broadcasters choose whether they want to become active at cost c .
2. The incumbent's type $\theta \in \{b, g\}$ is realized ($\Pr(\theta = g) = \gamma$). If $\theta = g$, the incumbent chooses $y = 0$ and broadcasters observe no signal ($s = \emptyset$). If $\theta = b$, the incumbent selects $y \in [0, 1]$ and broadcasters observe $s = b$ with probability $\Psi(y)q$ and $s = \emptyset$ otherwise.
3. The incumbent observes s and selects a transfer $t_i \geq 0$, for each broadcaster i .
4. Broadcaster i observes t_i and decides to accept or reject it. If he accepts, he reports $s = \emptyset$ and receives $\frac{t_i}{\tau}$. If he rejects, he reports the true signal. Signals cannot be fabricated.
5. Voters observe the signals reported by broadcasters and vote for the incumbent or a challenger of unknown type.

Proposition 9 *Let $\hat{y}(n)$ be the unique solution of*

$$\Psi'(y)q \left(r - \max \left(0, 1 - \frac{na}{\tau} \right) \right) = 1$$

for any n . Let $\pi_{clean}(n) \equiv (1 - \gamma) \Psi(\hat{y}(n))q \frac{a}{n}$ and let \hat{n}_{clean} be the unique integer n such that $\pi_{clean}(n+1) \leq c < \pi_{clean}(n)$. Similarly, Let $\pi_{corrupt}(n) \equiv (1 - \gamma) \Psi(\hat{y}(n))qa$ and let $\hat{n}_{corrupt}$ be the unique integer n such that $\pi_{corrupt}(n+1) \leq c < \pi_{corrupt}(n)$. Then, in a pure-strategy equilibrium, the number of active broadcasters is

$$\hat{n} = \max \left(\min \left(\hat{n}_{corrupt}, \text{mod} \left(\frac{1}{\tau a} \right) \right), \hat{n}_{clean} \right)$$

and a bad incumbent selects $y = \hat{y}(n)$.

Proof. Start from the last stage. The proof of the last three stages is identical to Proposition 1

5. Voters re-elect the incumbent if and only if $s = \emptyset$.
4. An active broadcaster accepts t_i if and only if $t_i \geq \frac{a}{\tau}$.

3. A bad incumbent who gets caught find it profitable to silence broadcasters if and only if $n \leq \frac{1}{\tau a}$.
2. When choosing y , the expected payoff of a bad incumbent is

$$(1 - \Psi(y)q)(y + r) + \Psi(y)q \left(y + \max \left(0, 1 - \frac{na}{\tau} \right) \right)$$

yielding the first-order condition

$$\Psi'(y)q \left(r - \max \left(0, 1 - \frac{na}{\tau} \right) \right) = 1$$

which determines the unique $\hat{y}(n)$.

1. Given the strategies used in the following stages, the expected revenue of broadcasters is a function of n :

$$\pi(n) = \begin{cases} \pi_{\text{corrupt}}(n) \equiv (1 - \gamma) \Psi(\hat{y}(n))qa & \text{if } n \leq \frac{1}{\tau a} \\ \pi_{\text{clean}}(n) \equiv (1 - \gamma) \Psi(\hat{y}(n))q\frac{a}{n} & \text{if } n > \frac{1}{\tau a} \end{cases} .$$

As $\hat{y}(n)$ and $\frac{a}{n}$ are non-increasing in n , the functions $\pi_{\text{corrupt}}(n)$ and $\pi_{\text{clean}}(n)$ are both non-increasing in n . Let \hat{n}_{corrupt} be the unique integer n such that $\pi_{\text{corrupt}}(n+1) \leq c < \pi_{\text{corrupt}}(n)$. Similarly, \hat{n}_{clean} is the unique n such that $\pi_{\text{clean}}(n+1) \leq c < \pi_{\text{clean}}(n)$. It is easy to check that $\hat{n}_{\text{corrupt}} \geq \hat{n}_{\text{clean}}$. Let \hat{n} be the equilibrium number of entrants. There are three cases: (i) If $\hat{n}_{\text{clean}} > \text{mod} \left(\frac{1}{\tau a} \right)$, then $\hat{n} > \frac{r}{\tau a}$ and $\hat{n} = \hat{n}_{\text{clean}}$; (ii) If $\hat{n}_{\text{clean}} \leq \text{mod} \left(\frac{1}{\tau a} \right)$ and $\hat{n}_{\text{corrupt}} \geq \text{mod} \left(\frac{1}{\tau a} \right)$, then $\hat{n} = \text{mod} \left(\frac{1}{\tau a} \right)$; (iii) If $\hat{n}_{\text{corrupt}} < \text{mod} \left(\frac{1}{\tau a} \right)$, then $\hat{n} = \hat{n}_{\text{corrupt}}$. These conditions are summarized by

$$\hat{n} = \max \left(\min \left(\hat{n}_{\text{corrupt}}, \text{mod} \left(\frac{1}{\tau a} \right) \right), \hat{n}_{\text{clean}} \right) .$$

■

8 Appendix C: Privately observed transfers

The game is exactly as in Section 3 except that each outlet observes only the offer made to him. That is, outlet i observes t_i , but not the other t 's. We show that the outcome presented in Proposition 1 is a PBE and it is the unique pure-strategy PBE of this game in which voters do not play dominated strategies.

To show that it is an equilibrium, use backwards induction:

3. As in the proof of Proposition 1.

2. Broadcasters hold “passive” beliefs of the form: if $t_i > 0$, then broadcaster i thinks that all other broadcasters have been offered τa . As we shall see in (1.), this belief is correct in equilibrium. Given these beliefs, broadcaster i accepts t_i if and only if $\frac{t_i}{\tau} \geq a$. This is a best response because, if i observes $t_i > 0$, he thinks that all other broadcasters are going to accept and hence accepts his offer if and only if t_i is at least equal to the payoff he would get if he rejected (a , because he would be the only one to break news).³⁸

1. The incumbent knows that she is able to buy the broadcasters’ silence by paying τa to each of them. Obviously, she either buys out everybody or nobody. In the former case she gets $r - m\tau a$. In the latter case, she gets zero. Then, the incumbent offers $t_i = \tau a$ to each broadcaster if and only if $m \leq \frac{r}{\tau a}$ and zero otherwise.

We now show that there exists no other pure-strategy PBE in which voters play undominated strategies that does not satisfy the properties in the statement.

3. As in the proof of Proposition 1.

2. and 1. We show that in equilibrium an informed broadcaster accepts an offer t_i if and only if the offer is at least a . *For any belief*, the revenue of i cannot be higher than a . Thus, for any belief he has, i must accept offers above a . Given any reply function on the part of broadcasters, in equilibrium the incumbent buys off either all the informed broadcasters or none of them. Consider a pure-strategy equilibrium in which he buys all of them and the equilibrium offer to i is \hat{t}_i . *On the equilibrium path*, outlet i must believe that the others are selling out. This means that it is a best response for him to accept \hat{t}_i if and only if $\hat{t}_i \geq a$. This shows that in any equilibrium in which media sell out, $t_i = a$.

³⁸See Segal (1999) for a discussion of passive beliefs in principal-agent problems with many agents. In the present model the principal is the incumbent and the agents are the active broadcasters.

9 Appendix D: Data Appendix

- Newspaper and television ownership: from Djankov et al (2001). The raw data give details on ownership of the largest five television, newspaper and radio outlets at December 1999 for 98 countries. The sample includes the five largest daily newspapers, as measured by share in the total circulation of dailies, and the five largest television stations, as measured by share of viewing. Entertainment, sport media and foreign owned media are excluded if they do not provide local news content. Details on the sources are given in Djankov et al (2001). We construct the following variables from the raw data:
 - Fraction of the media (weighted by market share) that are state owned, widely held, family owned, other private ownership.
 - Ownership concentration for newspapers is a dummy variable equal to one if the five largest outlets control for than 75% of the market. Ownership concentration for television is the market share (among the top five outlets) of the largest television station after consolidating ownership across owners of multiple outlets.
 - Foreign ownership denotes the fraction of foreign owned media (weighted by market share). Countries with some foreign ownership of newspapers are: Austria, Benin, Bulgaria, Columbia, Croatia, Czech Republic, Spain, Estonia, Finland, Hungary, Ireland, Israel, Kenya, Moldova, New Zealand, Poland, Romania, Slovakia, Sweden, South Africa, U.K., Zimbabwe.
- GNP per capita comes from the World Development Indicators database, very few data come from the National Statistical Offices and a few others have been computed by the author based on previous years' figures.
- Corruption: We measure all three indicators so that a higher score denotes more corruption. Data come from three sources
 - The corruption perceptions index (CPI) from *Transparency International* available at <http://www.transparency.de/documents/cpi/2000/cpi2000.html>.
 - The World Bank Corruption Index in the text is the Graft index taken from Kaufman et al [1999]. They use 31 indicators of governance grouped into three clusters. (The set of indicators does not include the CPI index nor the ICRG data). The exact methodology is described in detail in Kaufman et al [1999]. The variable

takes values in the interval $[-2.5; 2.5]$, where a high ranking means high control of corruption.

- The ICRG corruption index comes from the International Country Risk Guide and measures corruption on 1-6 scale.
- The correlation matrix of these three measures is:

	CPI	ICRG	World Bank
CPI	1	-	-
ICRG	0.83	1	-
World Bank	0.97	0.83	1

- Press freedom: press freedom index from *Freedom House* Press Freedom Survey available at <http://www.freedomhouse.org/pfs2000>. Details are provided there. There are three main dimensions of press freedom considered: legal, political, and economic. Violations such as repression of journalists are also measured.
- Years in office: this is the number of years that the party in power/chief executive has been in office in 1997. It is taken from Beck et al. [2000].
- Election: This is an index of whether legislative elections have taken place in a country. It has been computed by assigning value 1 if elections ever took place in the country between 1988 and 1997, 0 otherwise. The data come from Beck et al (1999).
- Legal origin: there are five classifications – British, French, German, Scandinavian, and Socialist. Landlocked: is a dummy variable equalled to one if there is no opening. Tropical: is a dummy variable equal to one if some part of the country lies between the tropic of cancer and the tropic of capricorn. These come from the “World Data” set from the World Bank.
- Population is taken from the World Development Indicators 2000, published by the World Bank.
- Openness to trade is defined as “trade (% of goods GDP)”. Source: World Development Indicators 2000. The data used are for 1997 (due to completeness of the series). Cyprus, Korean Democratic Republic and Turkmenistan figures are computed from CIA estimates (Source: CIA World Factbook). The data for Taiwan are taken from Taiwan’s Directorate General of Budget, Accounting and Statistics website (http://www.dgbas.gov.tw/english/dgbas_e0.htm). Theses data are for 1999.

Table 1
Means of Main Variables

	Range	Mean	s.d.	Numbers of obs
State owned (newspapers)	(0-1)	0.29	0.40	96
Widely held (newspapers)	(0-1)	0.04	0.12	96
Family owned (newspapers)	(0-1)	0.59	0.41	96
Other Private (newspapers)	(0-1)	0.08	0.17	96
Foreign Ownership (newspapers)	(0-1)	0.11	0.24	96
Ownership Concentration (newspapers)	{0,1}	0.42	0.50	96
State owned (TV)	(0-1)	0.61	0.35	90
Foreign Ownership (TV)	(0-1)	0.12	0.20	90
Ownership Concentration (TV)	(0,1)	0.68	0.26	90
Election	(0-1)	0.82	0.39	193
Press freedom	(1-6)	3.49	1.62	180
Corruption (Transparency International)	(1-10)	6.24	2.40	90
Corruption (World Bank)	(-2.5 – +2.5)	-0.008	0.91	156
Corruption (International Country Risk Guide)	(0-6)	2.77	1.30	91
Years in Office (CEO)	(1-44)	7.40	8.31	172
Years in Office (Party)	(1-69)	10.13	12.79	148

Notes: A detailed description of the variables and their sources are in the Appendix.

Table 2: Corruption (Transparency International Data)

	(1)	(2)	(3)	(4)	(5)
Widely Held (newspapers)	-2.92 (3.26)	-1.75 (1.66)	0.32 (0.38)	-	-
Family Owned (newspapers)	-0.76 (1.10)	-0.09 (0.14)	0.51 (0.93)	-	-
Other Private (newspapers)	0.19 (0.20)	0.47 (0.49)	0.69 (0.97)	-	-
State Owned (newspapers)	-	-	-	-0.53 (1.05)	-0.53 (0.84)
State Owned (TV)	-	-	-	-	-0.62 (0.82)
Foreign Owned (newspapers)	-1.59 (2.09)	-1.35 (1.85)	-1.39 (2.60)	-1.42 (3.06)	-1.42 (2.68)
Foreign Owned (TV)	-	-	-	-	-0.22 (0.26)
Ownership Concentration (newspapers)	-0.22 (0.44)	-0.55 (1.13)	-0.10 (0.36)	-0.12 (0.43)	0.01 (0.02)
Ownership Concentration (TV)	-	-	-	-	0.61 (0.45)
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Basic Controls	No	Yes	Yes	Yes	Yes
Extra Controls	No	No	Yes	Yes	Yes
Number of Observations	73	73	72	72	69
R ²	0.62	0.69	0.82	0.82	0.82

Notes: A detailed description of the variables and their sources are in the Appendix. Absolute values of t-statistics (adjusted for clustering by region) in parentheses. The seven regions are: Western Europe/North America, Latin American and Caribbean, East and Central Asia, Sub-Sahara Africa, East Asia and Pacific, Middle-East and North Africa, South Asia. Basic controls are: dummy variables for legal origin, whether a country is landlocked or located in the tropics, and the land area of the country. Extra controls are: income per capita, trade as a percentage of national income, log of population, and whether a country has held a legislative election in the previous five years.

Table 3: Corruption (World Bank Data)

	(1)	(2)	(3)	(4)	(5)
Widely Held (newspapers)	-1.95 (6.21)	-1.57 (3.67)	-0.90 (2.19)	-	-
Family Owned (newspapers)	-0.59 (2.71)	-0.32 (1.32)	-0.25 (1.44)	-	-
Other Private (newspapers)	-0.47 (1.58)	-0.28 (0.83)	-0.27 (0.93)	-	-
State Owned (newspapers)	-	-	-	0.26 (1.55)	0.09 (0.43)
State Owned (TV)	-	-	-	-	-0.26 (0.64)
Foreign Owned (newspapers)	-0.67 (2.31)	-0.68 (2.42)	-0.54 (2.39)	-0.52 (2.31)	-0.55 (2.14)
Foreign Owned (TV)	-	-	-	-	-0.08 (0.25)
Ownership Concentration (newspapers)	0.15 (0.97)	0.01 (0.03)	0.17 (1.32)	0.15 (1.11)	0.19 (1.26)
Ownership Concentration (TV)	-	-	-	-	0.47 (0.89)
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Basic Controls	No	Yes	Yes	Yes	Yes
Extra Controls	No	No	Yes	Yes	Yes
Number of Observations	93	92	90	90	83
R ²	0.68	0.69	0.80	0.79	0.80

Notes: A detailed description of the variables and their sources are in the Appendix. Absolute values of t-statistics (adjusted for clustering by region) in parentheses. The seven regions are: Western Europe/North America, Latin American and Caribbean, East and Central Asia, Sub-Sahara Africa, East Asia and Pacific, Middle-East and North Africa, South Asia. Basic controls are: dummy variables for legal origin, whether a country is landlocked or located in the tropics, and the land area of the country. Extra controls are: income per capita, trade as a percentage of national income, log of population, and whether a country has held a legislative election in the previous five years.

Table 4: Corruption (ICRG)

	(1)	(2)	(3)	(4)	(5)
Widely Held (newspapers)	-1.58 (2.36)	-1.17 (1.63)	-0.82 (1.21)	-	-
Family Owned (newspapers)	-0.61 (1.70)	-0.34 (0.81)	-0.44 (1.13)	-	-
Other Private (newspapers)	-0.33 (0.48)	-0.09 (0.13)	-0.03 (0.04)	-	-
State Owned (newspapers)	-	-	-	0.39 (1.03)	0.04 (0.07)
State Owned (TV)	-	-	-	-	0.82 (1.30)
Foreign Owned (newspapers)	-1.33 (3.27)	-1.29 (3.12)	-1.03 (2.48)	-1.11 (2.97)	-1.29 (2.99)
Foreign Owned (TV)	-	-	-	-	0.45 (0.61)
Ownership Concentration (newspapers)	0.40 (1.71)	0.24 (0.98)	0.36 (1.50)	0.34 (1.36)	0.15 (0.51)
Ownership Concentration (TV)	-	-	-	-	0.21 (0.22)
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Basic Controls	No	Yes	Yes	Yes	Yes
Extra Controls	No	No	Yes	Yes	Yes
Number of Observations	87	86	84	84	77
R ²	0.49	0.48	0.52	0.53	0.51

Notes: A detailed description of the variables and their sources are in the Appendix. Absolute values of t-statistics (adjusted for clustering by region) in parentheses. The seven regions are: Western Europe/North America, Latin American and Caribbean, East and Central Asia, Sub-Sahara Africa, East Asia and Pacific, Middle-East and North Africa, South Asia. Basic controls are: dummy variables for legal origin, whether a country is landlocked or located in the tropics, and the land area of the country. Extra controls are: income per capita, trade as a percentage of national income, log of population, and whether a country has held a legislative election in the previous five years.

Table 5: Press Freedom

	(1)	(2)	(3)	(4)	(5)
Widely Held (newspapers)	3.60 (5.19)	3.90 (4.39)	3.06 (3.63)	-	-
Family Owned (newspapers)	1.73 (4.06)	1.94 (2.98)	2.06 (4.46)	-	-
Other Private (newspapers)	1.33 (1.96)	1.38 (1.74)	1.45 (2.22)	-	-
State Owned (newspapers)	-	-	-	-2.02 (4.58)	-1.39 (2.65)
State Owned (TV)	-	-	-	-	-0.30 (0.31)
Foreign Owned (newspapers)	1.19 (2.29)	1.02 (2.00)	0.71 (1.50)	0.75 (1.65)	0.75 (1.36)
Foreign Owned (TV)	-	-	-	-	0.52 (0.84)
Ownership Concentration (newspapers)	-0.58 (1.95)	-0.56 (1.78)	-0.77 (2.39)	-0.73 (2.25)	-0.60 (1.63)
Ownership Concentration (TV)	-	-	-	-	-0.60 (0.54)
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Basic Controls	No	Yes	Yes	Yes	Yes
Extra Controls	No	No	Yes	Yes	Yes
Number of Observations	91	91	90	90	82
R ²	0.57	0.56	0.67	0.67	0.64

Notes: A detailed description of the variables and their sources are in the Appendix. Absolute values of t-statistics (adjusted for clustering by region) in parentheses. The seven regions are: Western Europe/North America, Latin American and Caribbean, East and Central Asia, Sub-Sahara Africa, East Asia and Pacific, Middle-East and North Africa, South Asia. Basic controls are: dummy variables for legal origin, whether a country is landlocked or located in the tropics, and the land area of the country. Extra controls are: income per capita, trade as a percentage of national income, log of population, and whether a country has held a legislative election in the previous five years.

Table 6: Party Years in Office

	(1)	(2)	(3)	(4)	(5)
Widely Held (newspapers)	-3.72 (0.88)	-4.75 (0.76)	-1.73 (0.27)	-	-
Family Owned (newspapers)	-5.26 (1.04)	-4.85 (0.97)	-9.17 (2.14)	-	-
Other Private (newspapers)	2.68 (0.21)	1.49 (0.16)	0.46 (0.05)	-	-
State Owned (newspapers)	-	-	-	8.11 (1.97)	2.94 (0.42)
State Owned (TV)	-	-	-	-	-19.71 (1.16)
Foreign Owned (newspapers)	5.17 (0.97)	5.47 (1.10)	7.42 (1.60)	5.41 (1.28)	4.13 (0.76)
Foreign Owned (TV)	-	-	-	-	-3.80 (1.16)
Ownership Concentration (newspapers)	6.40 (1.38)	4.48 (0.94)	-0.88 (0.28)	-0.98 (0.30)	-0.74 (0.16)
Ownership Concentration (TV)	-	-	-	-	27.86 (0.16)
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Basic Controls	No	Yes	Yes	Yes	Yes
Extra Controls	No	No	Yes	Yes	Yes
Number of Observations	82	82	81	81	76
R ²	0.12	0.08	0.21	0.22	0.15

Notes: A detailed description of the variables and their sources are in the Appendix. Absolute values of t-statistics (adjusted for clustering by region) in parentheses. The seven regions are: Western Europe/North America, Latin American and Caribbean, East and Central Asia, Sub-Sahara Africa, East Asia and Pacific, Middle-East and North Africa, South Asia. Basic controls are: dummy variables for legal origin, whether a country is landlocked or located in the tropics, and the land area of the country. Extra controls are: income per capita, trade as a percentage of national income, log of population, and whether a country has held a legislative election in the previous five years.

Table 7: Chief Executive Years in Office

	(1)	(2)	(3)	(4)	(5)
Widely Held (newspapers)	-2.67 (1.11)	-5.69 (1.18)	-0.05 (0.01)	-	-
Family Owned (newspapers)	-2.77 (0.95)	-5.29 (1.17)	-5.69 (1.63)	-	-
Other Private (newspapers)	-1.37 (0.25)	-3.19 (0.46)	-1.22 (0.19)	-	-
State Owned (newspapers)	-	-	-	5.10 (1.47)	7.39 (1.72)
State Owned (TV)	-	-	-	-	-1.92 (0.56)
Foreign Owned (newspapers)	1.91 (0.82)	3.19 (1.25)	4.63 (1.85)	3.58 (1.57)	4.00 (1.46)
Foreign Owned (TV)	-	-	-	-	1.35 (0.56)
Ownership Concentration (newspapers)	2.99 (1.58)	4.08 (1.86)	2.86 (1.17)	3.00 (1.26)	5.36 (2.08)
Ownership Concentration (TV)	-	-	-	-	-2.89 (0.60)
Regional Dummies	Yes	Yes	Yes	Yes	Yes
Basic Controls	No	Yes	Yes	Yes	Yes
Extra Controls	No	No	Yes	Yes	Yes
Number of Observations	95	94	92	92	84
R ²	0.23	0.20	0.27	0.30	0.19

Notes: A detailed description of the variables and their sources are in the Appendix. Absolute values of t-statistics (adjusted for clustering by region) in parentheses. The seven regions are: Western Europe/North America, Latin American and Caribbean, East and Central Asia, Sub-Sahara Africa, East Asia and Pacific, Middle-East and North Africa, South Asia. Basic controls are: dummy variables for legal origin, whether a country is landlocked or located in the tropics, and the land area of the country. Extra controls are: income per capita, trade as a percentage of national income, log of population, and whether a country has held a legislative election in the previous five years.

Table 8: Press Freedom as an Intermediate Input (Corruption)

	(1) CPI (OLS)	(2) CPI (2SLS)	(3) CPI (2SLS)	(4) WBI (OLS)	(5) WBI (2SLS)	(6) WBI (2SLS)	(7) ICRG (OLS)	(8) ICRG (2SLS)	(9) ICRG (2SLS)
Press Freedom	-0.17 (1.58)	0.00 (0.02)	0.17 (0.78)	-0.19 (4.67)	-0.21 (3.49)	-0.17 (2.54)	-0.37 (3.86)	-0.42 (2.82)	-0.33 (2.13)
Foreign Owned (newspapers)	-	-	-1.42 (2.40)	-	-	-0.39 (1.75)	-	-	-0.92 (2.45)
Regional Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Basic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Extra Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	70	70	70	88	88	88	82	82	82
Sargan Test (p-value)	-	0.96	0.99	-	0.95	0.82	-	0.99	0.99

Notes: A detailed description of the variables and their sources are in the Appendix. Absolute values of t-statistics (adjusted for clustering by region) in parentheses. The seven regions are: Western Europe/North America, Latin American and Caribbean, East and Central Asia, Sub-Saharan Africa, East Asia and Pacific, Middle-East and North Africa, South Asia. Basic controls are: dummy variables for legal origin, whether a country is landlocked or located in the tropics, and the land area of the country. Extra controls are: income per capita, trade as a percentage of national income, log of population, and whether a country has held a legislative election in the previous five years. The overidentification test is due to Sargan. The number of observations times the R-squared from the regression of the stage two residuals on the instruments is distributed $\chi^2 (T + 1)$ where T is the number of instruments.

Table 9: Press Freedom as an Intermediate Input (Political Longevity)

	(1) CEO (OLS)	(2) CEO (2SLS)	(3) CEO (2SLS)	(4) Party (OLS)	(5) Party (2SLS)	(6) Party (2SLS)
Press Freedom	-0.76 (1.27)	-1.96 (1.52)	-2.18 (1.60)	-2.20 (2.50)	-2.96 (1.95)	-3.51 (2.04)
Foreign Owned (newspapers)	-	-	4.60 (1.60)	-	-	6.71 (1.58)
Regional Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Basic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Extra Controls	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	90	90	90	79	79	79
Sargan Test (p-value)	-	0.97	0.90	-	0.98	0.92

Notes: A detailed description of the variables and their sources are in the Appendix. Absolute values of t-statistics (adjusted for clustering by region) in parentheses. The seven regions are: Western Europe/North America, Latin American and Caribbean, East and Central Asia, Sub-Sahara Africa, East Asia and Pacific, Middle-East and North Africa, South Asia. Basic controls are: dummy variables for legal origin, whether a country is landlocked or located in the tropics, and the land area of the country. Extra controls are: income per capita, trade as a percentage of national income, log of population, and whether a country has held a legislative election in the previous five years. The overidentification test is due to Sargan. The number of observations times the R-squared from the regression of the stage two residuals on the instruments is distributed $\chi^2(T+1)$ where T is the number of instruments.

Table 10: Indian Evidence

Dependent Variable	Newspaper circulation per capita	Length of term in office	Length of term in office	Length of term in office
Method of Estimation	OLS	OLS	OLS	2SLS
	(1)	(2)	(3)	(4)
Share of individually owned newspapers	-0.04 (0.88)	-49.96 (2.33)	-	-
Share of newspapers Owned by political parties	-0.82 (4.31)	187.38 (3.14)	-	-
Share of other privately owned newspapers	0.03 (0.60)	-42.52 (1.74)	-	-
Newspaper circulation per capita	-	-	-24.27 (1.38)	-305.32 (3.96)
R2	0.92	0.46	0.44	-
Number of Observations	401	401	445	400
Sargan Test (p-value)	-	-	-	0.99

Notes: Regressions are for the sixteen main Indian states 1958-92. All regressions include state fixed effects, year effects and controls for: literacy, income per capita (logged), population density, proportion of the population in urban areas. For sources and definitions of variables see Besley and Burgess (2001). The length of term in office is the number of years for which a particular coalition has a majority of seats in the legislature (Vidhan Sabbha). Ownership shares are for titles not circulation. The overidentification test is due to Sargan. The number of observations times the R-squared from the regression of the stage two residuals on the instruments is distributed $\chi^2 (T + 1)$ where T is the number of instruments.