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INFORMATION GATEKEEPING AND MEDIA BIAS

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Information Gatekeeping and Media Bias

Hülya Eraslan and Saltuk Özertürk*

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ABSTRACT

We develop a model to study the political economy implications of information gatekeeping, i.e., a policy of granting access only to friendly media outlets and denying access to critical ones. While an incumbent prefers positive bias, granting access improves her re-election probability only if coverage is sufficiently credible in the eyes of the public. Information gatekeeping can induce a quid pro quo relationship: media provides coverage with positive bias in exchange of future access, thereby affecting electoral outcomes in favor of incompetent incumbents. The degree of access media enjoy increases with competence of incumbents over those issues under public focus.

Keywords: Information gatekeeping, media outlet, electoral competition, access, media bias.

JEL Codes: D72, D83, L82.

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Studies of media that see the process of news production beginning in the newsroom rather than in the halls of power are too media-centric.

Schlesinger (1990).

Thus far, we have managed to contain the media by implying ... that, in the event of Parliament stepping aside to make way for the legal process, the case will be heard in the decent seclusion of a secret court, and we alone will decide who gets the tickets.

John Le Carré, *A Legacy of Spies: A Novel*, (2017).

1 Introduction

News is not made in a vacuum. According to most media sociologists, central to news production is the interaction between reporter and official. As Shudson and Waisbord (2005) state, one consistent finding in the sociology of the media is that, in many media systems including those in liberal Western democracies, government officials play an important role in newsmaking. Most news comes to the media through ordinary, scheduled, and government-initiated events like press releases, press conferences, and background briefings for the press. For an outlet covering politics, access to what Schlesinger (1990) refers to as “the halls of power” is crucial to producing news.

Although media in Western democracies face considerably fewer obstacles to performing their duties, casual observation suggests that governments are far from passive in managing the flow of information to journalists. In his account of media relationship strategies employed by the Labour government under Tony Blair, British political historian Bill Jones (1992) argues that New Labour encouraged positive coverage by employing positive (i.e., privileged access to information) and negative (i.e., denial of access, bullying) sanctions. Presidential historian David Greenberg (2016) details how former U.S. President Richard Nixon’s staff obsessively compiled lists of journalists and classified them as friendly or unfriendly to restrict and, in most cases, completely deny access to those deemed unfriendly to press conferences, interviews, and historic trips.¹

The ongoing relationship between President Donald Trump and the mainstream media provides a more recent example. During the summer of 2016, Donald Trump’s presidential election campaign revoked the press credentials of Washington Post reporters, branding the paper as phony and dishonest. In February 2017, the relationship between the media and the White House hit an all time low when the Trump administration denied access to an off-camera briefing to several major U.S. media outlets, including CNN, Los Angeles Times, The New York Times, and Politico. This hostile treatment of media outlets deemed unfriendly to the Trump administration triggered widespread

¹See “Republic of spin: An inside history of the American Presidency” by Greenberg (2016).

criticism with some commentators pointing to a potential erosion of public trust because the press, known also as the fourth estate, would be unable to perform its duties due to lack of access to information sources. A March 2017 editorial published in *The Wall Street Journal*, known for its conservative tone, opened with the following sentence: "If President Trump announces that North Korea launched a missile that landed within 100 miles of Hawaii, would most Americans believe him? Would the rest of the world? We're not sure."²

The Trump example suggests that an incumbent who denies access to critical media outlets to induce positive coverage faces a trade-off. Information gatekeeping, that is, a policy of granting access only to those media outlets deemed friendly and denying access to critical ones, can increase positive coverage. However, such a policy also risks reducing the credibility of positive news in the eyes of the public. If only specific media outlets are granted access to information sources and their further access is implicitly conditional on continued positive coverage, citizens are less likely to rely on positive news when forming their opinions and deciding, for example, how to cast their votes. The media face a similar trade-off as well. Critical reporting about incumbents may result in loss of access, whereas too much positive coverage to maintain access may hurt a media outlet's public credibility.³

This paper provides a theoretical model to study how and when incumbent politicians can strategically use information gatekeeping policies to influence media news coverage and improve their chances of re-election. Our key innovation is explicitly relating an incumbent's optimal information gatekeeping policy to a media outlet's problem of managing its reputation in the eyes of the public and politicians. To secure and maintain access, a media outlet may need to convince current and potential future incumbents that it is sufficiently prone to side with them when news are bad. At the same time, an outlet's positive coverage improves an incumbent's electoral fortunes only when the public perceives it as sufficiently credible. Furthermore, an outlet's readership volume tends to increase with the perceived informativeness of its coverage by the public, implying that the outlet also needs to maintain credibility with the public.

Our model has two periods, each featuring an election with an incumbent and a challenger and revolving around a different key issue, such as immigration, national security, or the economy. The citizens are assumed to have no ideological preferences

²"A President's credibility" *The Wall Street Journal*, March 21st, 2017.

³Shapiro (2016) points out that news outlets can lose credibility when their one-sided reporting proves inaccurate. He offers the reporting of the New York Times on the presence of weapons of mass destruction in Iraq as an example and argues that "this episode was especially costly because of the appearance that the Times had tilted its reporting in order to maintain access to administration sources." Foer (2004) provides further details on how the New York Times reporter Judith Miller "kept printing the neocon party line and the neocons kept coming to her with huge stories and great quotes, constantly expanding her access." (See the article "The Source of the Trouble" by Franklin Foer in *New York Magazine*.)

and to vote for the candidate who they believe is more likely to have high ability over the key issue. In each period, before the key issue and the incumbent's ability over this key issue are determined, the incumbent chooses whether to grant access to a media outlet or not. We refer to this decision as the incumbent's access control strategy. The integrity of this media outlet is assumed to be unknown to all parties except the outlet itself. Therefore, when choosing the optimal access control strategy to maximize the probability of being re-elected, the incumbent does not know her ability over the key issue and the media outlet's integrity.⁴

After the access control decision in each period is made, the incumbent observes her ability over the key issue for the upcoming election. If access is granted, the media outlet also observes the incumbent's ability and then decides whether to report this information truthfully or to misreport it. The outlet can be one of three types: honest, corrupt, or strategic. All types of outlets are assumed to report high ability truthfully. If ability is low, however, the honest outlet always reports this fact truthfully, while the corrupt outlet always misreports it. The strategic outlet chooses its reporting strategy to maximize its payoff. In the first period, that payoff is given by the total expected readership volume across two periods. In the second period, the strategic outlet's only consideration is to maximize its second-period readership. As such, if granted further access it always reports truthfully in the second period. However, in choosing its first-period reporting strategy, the outlet takes into account the readership and voting decisions of the citizens, the future access decision of the second-period incumbent and the dependence of all these decisions on the citizens' and politicians' beliefs about its integrity.

Before each election, all citizens observe a noisy public signal concerning the incumbent's ability over the key election issue. If the media outlet is granted access, all citizens also observe the outlet's report immediately before the election when the outlet's report becomes public information. However, those citizens who pay the cost to follow the outlet observe its report at an earlier stage and use it when making a private action decision.⁵ Thus, all citizens value accurate information: the readership volume that the outlet attracts in each period increases with respect to its report's perceived informativeness by the public.

Analysis of the incumbent's optimal access control strategy yields a novel and key result. In each period, the incumbent grants access if and only if (i) the public assigns a sufficiently low probability to the media outlet misreporting and (ii) the incumbent assigns a sufficiently high probability to the media outlet misreporting. The intuition is as follows. Granting access improves an incumbent's re-election probability only if the outlet's positive report is able to convince the citizens to vote for her even when they

⁴We use female pronoun when referring to the politician and male pronoun when referring to citizens.

⁵As we explain shortly in our formal description of the model, this private action decision is merely an instrument to endogenize the media outlet's readership volume in each period.

observe a negative public signal. The citizens ignore a negative public signal and vote for the incumbent after a positive report only if they assign a sufficiently low probability to the media outlet misreporting. The first access condition thus captures the need for the media outlet to have sufficient public credibility. For the incumbent to assign a higher probability to winning the election by granting access, she must also believe that a positive report is sufficiently likely. Since a positive report is more likely when the outlet misreports, the second access condition describes the minimum misreporting probability demanded by the incumbent to grant access. This condition thus captures the need for the incumbent to perceive the outlet as being sufficiently accommodating.

We show that, in each period, an incumbent demands a strictly positive misreporting probability to grant access if and only if she is sufficiently likely to have low ability over the period's key issue. This observation allows us to describe precisely when the strategic outlet's first-period reporting strategy is driven by a concern to be perceived as sufficiently accommodating by a potential future incumbent. When politicians are sufficiently likely to have low ability over the future key issue, the outlet understands that any future incumbent will demand a strictly positive misreporting probability to grant second-period access. A truthful first-period report reveals to politicians that the outlet is not corrupt. Since politicians anticipate that only a corrupt outlet will misreport in the second period, a truthful first-period report results in loss of future access with certainty. To secure future access, the strategic outlet must misreport in the first period and thus hide the fact that it is not corrupt from the politicians.

We are particularly interested in understanding the emergence of a mutually beneficial relationship between an initial incumbent (i.e., the first-period incumbent) and a media outlet as a result of information gatekeeping. To this end, we focus on an equilibrium in which (i) the initial incumbent grants first-period access, (ii) the strategic outlet misreports low ability in the first period, and (iii) an initial incumbent with low ability in the first period's election retains power and grants access in the second period. We refer to this type of equilibrium as a *quid pro quo equilibrium*. The key feature of this equilibrium is that the strategic outlet behaves like the corrupt type in the first period: it misreports and helps the initial incumbent, who has low ability over the first election's key issue, to retain power. The initial incumbent then pays back the favor and grants the outlet further access in the second period. We show that a quid pro quo equilibrium exists when the following conditions are satisfied:

- (i) politicians are only moderately likely to have high ability over key election issues,
- (ii) there is sufficient initial public skepticism that the media outlet is corrupt,
- (iii) there is also sufficient initial public trust that the media outlet is honest, and

(iv) the public signal is not highly informative.

Characterization of the incumbent's optimal media access control strategy also allows us to describe other types of equilibria. Depending on the prior probability that politicians have high ability over key issues, there can exist equilibria with no access in any period or access in both periods. When politicians are sufficiently likely to have low ability over key issues, the minimum amount of misreporting that they demand to grant access exceeds the maximum that the public tolerates. With such politicians, the unique equilibrium has no access in any period. In contrast, politicians who are sufficiently likely to have high ability do not demand any misreporting in either period to grant access. In this case, access is granted in both periods, and the media's coverage is always truthful.

The focus on information gatekeeping provides some new insights compared to a model in which the government exerts influence on the media through financial favors, such as direct cash bribes or government-sponsored advertisement in the spirit of Besley and Prat (2006). When bad news (incumbent having low ability) is sufficiently likely, a model with financial favors would predict the incumbent to offer such favors to the media in exchange for their silence, whereas our model predicts that the incumbent denies the media access. Similarly, if good news is sufficiently likely, the incumbent would have little incentive to offer media any favors, whereas in our model she always grants access without requiring any misreporting in exchange. These differences arise from the fact that, unlike a financial favor to suppress negative coverage, granting access has uncertain consequences for the incumbent as it exposes her to media scrutiny. The incumbent accepts media scrutiny only if doing so improves her chances of being re-elected.⁶

The analysis has the following implications. First, the existence of a quid pro quo equilibrium implies that information gatekeeping policies by incumbent politicians can induce a pro-incumbent bias in media coverage and allow incumbents to influence electoral outcomes in their favor. Second, the availability of independent information sources and insufficient public trust in the media both limit the effectiveness of information gatekeeping in influencing public opinion. Third, information gatekeeping reduces expected voter welfare and political turnover unless politicians are sufficiently likely to be competent over key election issues. Finally, the degree of access that the media enjoy increases as the competence of politicians over issues under public focus also increases. We further discuss these implications in detail in Section 7.

Our model focuses on an incumbent's ability to affect electoral outcomes by controlling media access to information sources. However, electoral competition is obviously

⁶We discuss the theoretical and the empirical literature on media capture in detail in Section 2 and Section 7, respectively.

not the only setting in which negative news coverage can have negative consequences.⁷ The model's main insights can apply to other settings, including non-political ones, with the following essential features: (i) gatekeepers of information sources (politicians, firms, agencies, or even celebrities) use access control to minimize/avoid negative coverage, (ii) media outlets wishing to maximize readership/audience rely on access to produce news stories and are forward looking, and (iii) consumers of news value informative news coverage. For example, an article in the *Scientific American* describes how the U.S. Food and Drug Administration (FDA) offers an exclusive briefing to a select group of media outlets, including NPR, about an upcoming announcement a day before anyone else. In exchange, these outlet agree to abandon their independent reporting.⁸ We discuss how our results can apply to non-political settings, such as financial news, in Section 8.

The paper is organized as follows. The next section discusses the related literature. Section 3 describes the model. We analyze the incumbent's optimal media access control strategy and the media outlet's optimal reporting strategy in section 4. Section 5 analyzes the quid pro quo equilibrium. We present some other types of equilibria in Section 6. Section 7 discusses the implications. Section 8 concludes. The Appendix contains the technical details omitted from the main text including formal definitions of beliefs and conditions for their consistency, and the proofs that are not in the main text.

2 Related Literature

This paper provides the first formal analysis of the political economy implications of information gatekeeping by incumbent politicians. Thus, it contributes to a growing body of literature that describes how the news media can deviate from truthful reporting and affect electoral outcomes.⁹ In a recent survey of this literature, Prat (2016) distinguishes between media capture and media power. Media capture refers to situations in which the government plays an active role in shaping news coverage by using threats and promises to media organizations. In the case of media power, government assumes a passive role, with politically-driven media organizations reporting strategically to influence political outcomes. Prat (2016) argues that media capture and media power are two stylized extremes to study when news manipulation is more likely to succeed, point-

⁷A very recent example is the resignation of Tom Price, the Health and Human Services secretary in the Trump Administration. Price was forced to resign in September 2017, only six days after *Politico* revealed that he racked up at least \$400,000 in travel expenses for chartered flights, undermining President Trump's promise to drain the swamp of a corrupt and entitled capital.

⁸See the article "How the FDA Manipulates the Media" by Charles Seife in the *Scientific American* published on October 2016.

⁹Gentzkow, Shapiro and Stone (2016) offer a unifying framework on the origins of media bias and distinguish between supply-driven and demand-driven theories. Prat and Strömberg (2013) provide a survey on the political economy of the mass media that also discusses the empirical literature.

ing out that “[o]ften the interaction between government and news takes the form of a complex, mutually beneficial agreement between politicians and the media.”¹⁰ Our main contribution is to formalize the emergence of this mutually beneficial relationship when information gatekeeping by incumbents affects the media’s reporting incentives through reputational concerns.

In our model, the incentive for the media to misreport in favor of the incumbent stems only from information gatekeeping by the incumbent politician. This specific focus on information gatekeeping distinguishes our contribution from other papers where biased reporting emerges because of the media’s (i) own ideological bias (Baron (2006)), (ii) desire to implement a specific political agenda (Anderson and McLaren (2012)), (iii) preferences over candidates (Duggan and Martinelli (2010)), (iv) incentive to cater to its readers’ political preferences (Mullainathan and Shleifer (2005), Chan and Suen (2008), Bernhardt, Krassa and Polborn (2008), Piolatto and Schuett (2015)), (v) incentive to cater to its advertisers (Ellman and Germano (2009), Germano and Meier (2013)), (vi) ability to take advantage of the readers’ neglect of correlation between news outlets (Levy, de Barreda and Razin (2017)) and (vii) direct control by an authoritarian government to mobilize citizens (Gehlbach and Sonin (2014)).

Our model identifies information gatekeeping as a novel channel through which an incumbent can influence media coverage and electoral outcomes. This feature relates our paper to the seminal media capture theory of Besley and Prat (2006).¹¹ We differ from Besley and Prat (2006) in three important ways. First, we focus on a media outlet’s reputational concerns that arise due to information gatekeeping by incumbent politicians. In their conclusion, Besley and Prat (2006) point out that a more complete picture could be provided by a dynamic model of reputation formation by media firms in which readers, when facing unverifiable information, decide whether to believe the media or not. This paper complements theirs by illustrating how information gatekeeping can induce a media outlet a reputational incentive to pander to the incumbent when readers value informative coverage. Second, in Besley and Prat (2006), the government suppresses negative coverage by using cash bribes/financial favors to media outlets who have the negative information at the outset. Unlike our model, their model’s government cannot control a media outlet’s ability to obtain information. Third, as discussed earlier,

¹⁰Prat (2017) defines the power of a media organization as the ability to induce voters to make electoral decisions they would not make if reporting were unbiased and develops a new measure of media power based on media consumption patterns and media ownership structure.

¹¹In other related work, Petrova (2008) investigates the link between economic inequality and media capture. Latham (2015) presents empirical evidence that the media turn against unpopular governments by increasing negative coverage. He motivates the empirical analysis with two reduced form models, one based on that of Besley and Prat (2006). Since an unpopular government is less likely to remain in power to continue to compensate the media in exchange for suppressing bad news, negative coverage increases when government is less popular.

compared to a model in which the government uses financial favors to influence media coverage, our focus on information gatekeeping delivers different implications on when incumbents grant or deny the media access.

This paper also contributes to the broader literature on strategic communication with reputational concerns.¹² In the context of news media, Gentzkow and Shapiro (2006) show how a rational consumer who is uncertain about the accuracy of a media firm may tend to judge it to have higher accuracy when its reports match the consumer's priors. Shapiro (2016) demonstrates that special interest groups may exploit a media firm's (sender's) reputational concern to appear objective in order to manipulate the actions of a voter (receiver). Unlike these papers, the sender (the media) in our model faces two different receivers, namely the public and the incumbent, whose preferences may not be aligned (see Bar-Isaac and Deb (2014)). Our framework with two receivers is thus similar to applications of two-sided reputation in the context of financial certification (Frenkel (2015), Bouvard and Levy (2017)) and regulation (Shapiro and Skeie (2015)). We contribute to this literature by studying the implications of access control. Crucially, in our model, one of the receivers (incumbent) controls the sender's (media's) access to information and uses this ability to influence the action of the other receiver (the public).

3 Model

We use a two period electoral competition model with the following basic features. In the first period an incumbent is exogenously in power. This incumbent and a challenger compete in an election at the end of the first period. The winner of the first-period election becomes the new incumbent and the two politicians compete again in the second period. Each election is dominated by a different key issue that is randomly determined. The citizens only care about the elected politician's ex ante unknown ability over this key issue. In each period, before the key issue and the incumbent's ability over the key issue are realized, the incumbent chooses whether to grant access to a media outlet.¹³ The integrity of the media outlet is known only by the outlet. With access, the outlet can observe the incumbent's ability over the key issue and produce a news report. The details of the model are introduced below.

3.1 Politicians

There are two periods and two politicians, A and B . At the beginning of the first period, politician A is the incumbent and politician B is the challenger. An election is

¹²See, among others, Morris (2001), Ely and Valimaki (2003) and Ottaviani and Sorensen (2006).

¹³Our model considers a single media outlet. In the concluding remarks, we argue that our results are robust when there are multiple outlets that compete for access.

held at the end of each period. The winner of the election in period $t = 1$ becomes the incumbent at the beginning of period $t = 2$. Thus, letting κ_t denote the incumbent in period t , we have $\kappa_1 = A$ and κ_2 is the winner of the first-period election. Both politicians A and B are purely office motivated: the payoff of each politician in period t is given by her probability of winning the election in that period.

The election in each period revolves around a different key issue such as national security, immigration or health reform. Before each election, a particular issue exogenously becomes the key issue for that election. To keep the model simple, we abstract away from policy competition between the politicians and assume that there is full agreement about the policy to be implemented over the key issue. The probability of successful implementation of that policy depends on the issue-specific ability of the elected politician. The ability of a politician measures the likelihood that she can implement that policy successfully. We let $\theta_t^j \in \{\ell, h\}$ denote ability of politician $j \in \{A, B\}$ specific to the key issue in period $t = 1, 2$.

At the start of each period, the key issue and each politician's ability specific to this issue are unknown to all parties including the politicians themselves.¹⁴ For both politicians and for each period, the common prior probability that $\theta_t^j = h$ is given by $p_h \in (0, 1)$. Therefore, the issue-specific abilities of politicians are not correlated across periods and are independently drawn in each period. This assumption simplifies our exposition. In practice, a politician may have some innate ability relative to the challenger that is correlated across different issues. We assume that different issues require sufficient issue-specific specialization so that any potential correlation of ability across issues is negligible.

3.2 Media outlet

At the beginning of each period, before the key issue and the incumbent's ability over this issue are realized, the incumbent chooses whether to grant access to a media outlet or not. We refer to this choice as the incumbent's media access control decision. The media access control decision determines whether an outlet is able to observe and report the incumbent's ability over the specific key issue that dominates the upcoming election. In each period, the incumbent's optimal access control strategy maximizes the probability that she assigns to winning the election in that period. Below we describe the interaction between the incumbent and the outlet in more detail.

After the media access control decision at the beginning of period $t = 1, 2$, the key

¹⁴In reality, a politician could be better informed than the public about her ability over the key issue. As we explain shortly, we do assume that the incumbent observes her ability over the key issue soon after the access decision. However, at the start of each period not all aspects of the key issue are observable by the incumbent, and thus she initially holds the same common prior belief about her ability as the public.

issue for the upcoming election is realized and the incumbent κ_t observes her ability $\theta_t^{\kappa_t}$ specific to this key issue. If the media outlet has been denied access, it remains uninformed about $\theta_t^{\kappa_t}$ and cannot produce a news report. If the incumbent has granted access, however, issue-specific ability $\theta_t^{\kappa_t}$ is perfectly observed by the outlet as well. The outlet then chooses a news report $r_t \in \{\ell, h\}$. We assume that the outlet always truthfully reveals high ability in both periods, that is, $r_t = h$ whenever $\theta_t^{\kappa_t} = h$.¹⁵ Depending on its type, denoted by θ^J , the outlet can choose to reveal truthfully or misreport low ability.¹⁶

Specifically, the outlet can be one of three types: $\theta^J \in \{C, H, S\}$. The corrupt type (C) always misreports low ability as high. The honest type (H) always reveals low ability truthfully and reports $r_t = \ell$ whenever $\theta_t^{\kappa_t} = \ell$. The strategic type (S) chooses its reporting strategy to maximize its total dynamic payoff which is the sum of its endogenous readership volume across the two periods as we formalize in more detail in section 4.2. If the outlet is denied access in a given period, its readership volume for that period is normalized to zero.

To isolate the implications of information gatekeeping for an outlet's reporting incentives, we assume that the outlet has no ideological views and also has no preferences for either of the two candidates.¹⁷ The strategic outlet can be thought of as a commercially oriented one whose only objective is to maximize readership volume. The corrupt type captures an outlet that always sides with incumbents and provides positive coverage regardless of its information and the identity of the incumbent. The honest type refers to an outlet whose reporting is driven completely by journalistic integrity. We let p_C (respectively p_S) denote the common prior probability that the citizens and the two politicians assign to the outlet being corrupt (respectively strategic) at the beginning of the first period. Ex ante, all three types have a positive probability, that is, $p_C > 0$, $p_S > 0$ and $p_C + p_S < 1$.

3.3 Citizens

There are a continuum of citizens who vote in the election in each period. If access is granted, each citizen chooses whether to pay a cost to follow the outlet, become a reader and observe its report. In our model, acquiring costly information on the incumbent's ability is valuable for citizens for two reasons: (i) this information allows citizens to make a more informed voting decision, and (ii) it also helps citizens to choose a "correct"

¹⁵This assumption is only for expositional simplicity. As we discuss in Section 4.2, this assumption would be satisfied in any equilibrium.

¹⁶We thus assume that the information reported by the media outlet is unverifiable. As a result, the outlet can engage in outright distortion and misreport low ability as high. In Section 8, we discuss how our model can be reinterpreted when information is verifiable and favorable reporting takes the form of selective reporting rather than misreporting.

¹⁷We discuss ideologically oriented media in concluding remarks.

private action prior to the election. Like many papers in the literature, our motivation to introduce a private action for citizens is purely instrumental to generate demand for costly political news.¹⁸ With finite but large number of voters, the probability that any voter is pivotal in the election is arbitrarily small (see Prat and Strömberg (2013)). Hence, the voting motive alone is not sufficient for citizens to acquire costly political information.

Private action. Prior to the election in each period $t = 1, 2$, citizen i chooses a private action $a_t^i \in \{L, H\}$ which yields a payoff of $v(a_t^i | \omega_t)$ where $\omega_t \in \{\ell, h\}$ denotes the state of the world. A citizen's "correct" private action depends on ω_t . We assume that $a_t^i = L$ is the "correct" action in state $\omega_t = \ell$ and $a_t^i = H$ is the "correct" action in state $\omega_t = h$. Formally,

$$v(L|\ell) = v(H|h) = 1/2, \quad \text{and} \quad v(L|h) = v(H|\ell) = 0. \quad (1)$$

We also assume that citizens choose action L whenever they are indifferent.

The state ω_t is correlated with the issue-specific ability of the incumbent in period t . Specifically,

$$\Pr(\omega_t = \ell | \theta_t^{K_t} = \ell) = \Pr(\omega_t = h | \theta_t^{K_t} = h) = \mu \in (\frac{1}{2}, 1). \quad (2)$$

Given the correlation structure in (2), any information that the outlet provides on the incumbent ability $\theta_t^{K_t}$ is also informative about ω_t . Therefore, observing the outlet's report r_t can potentially improve a citizen's expected private action payoff to the extent that this report is informative about ω_t .

Whether a citizen is willing to follow the outlet and receive its report before the private action decision depends on the cost of doing so. In any period, citizen i must pay a cost c_i to follow the outlet where c_i is independently and identically distributed on the unit interval with a uniform distribution. The citizens who follow the outlet observe its report r_t before choosing their private actions. The citizens who do not follow the outlet choose their private actions based on their prior beliefs on ω_t . This formulation introduces the citizens into the model as pure information seekers and implies that readership volume in a given period is increasing in the perceived informativeness of the outlet's report by the public. As such, it allows us to isolate information gatekeeping by the incumbent as the only potential reason for the outlet to misreport low ability.

We assume that the citizens observe ω_t and hence receive their private action payoffs before the election (see Strömberg (2016)). Note that the parameter μ in (2) captures the informativeness of ω_t as an information signal for inferring $\theta_t^{K_t}$. As μ approaches to $\frac{1}{2}$, observing ω_t is completely uninformative about $\theta_t^{K_t}$, whereas as μ approaches to

¹⁸See, among others, Strömberg (2004), Gentzkow and Shapiro (2006), Baron (2006), Anderson and McLaren (2012)). A common assumption in this literature is that political news may be of interest to citizens not only due to voting but also because such news influence their private actions, such as personal financing and investment decisions, labor supply or even what claims to make during a cocktail party or on Facebook.

1 observing ω_t reveals $\theta_t^{K_t}$ perfectly. In what follows, we also refer to ω_t as the public signal that the citizens always observe on the incumbent's issue-specific ability in period $t = 1, 2$ regardless of whether the incumbent grants the outlet access or not.¹⁹

Voting. After each citizen chooses his private action in period t , all citizens observe ω_t . We also assume that all reporting by the outlet becomes public information before the election takes place at the end of that period. That is, whether or not a citizen follows the outlet, before the election he observes the outlet's report r_t if access has been granted in that period. This assumption captures the idea that news become public information eventually and those with private incentives to observe the news at an earlier stage do so by paying a cost.

At the voting stage, each citizen only cares about whether the elected politician can successfully execute policy over the key issue.²⁰ If politician $j \in \{A, B\}$ with issue-specific ability θ_t^j wins the election in period t , then citizen i receives a payoff

$$u_{i,t}(\theta_t^j) = \theta_t^j. \quad (3)$$

Recall that in each period $\theta_t^j \in \{\ell, h\}$ for $j \in \{A, B\}$. Citizens prefer to elect a politician with ability h , that is, $\ell < h$, and they vote sincerely to maximize their expected payoffs conditional on their information on the incumbent's ability at the time of the election.²¹ We assume that the citizens vote for the incumbent if they are indifferent between the incumbent and the challenger. The winner of each election is the candidate who receives the majority of the votes in that election.

Finally, we assume that the citizens do not observe the issue-specific ability of the politician who won the election and hence their payoffs $u_{i,t}(\theta_t^j)$ immediately after each election. This assumption seems reasonable as long as the policy implemented over the key election issue has long term consequences and hence its outcome is not immediately observable to citizens after the election.²²

¹⁹Therefore, the state ω_t serves a dual role in our model. First, it determines the private action payoff $v(a_t^i|\omega_t)$ for each citizen. Second, in each election ω_t also serves as a public information signal about the incumbent's issue-specific ability $\theta_t^{K_t}$.

²⁰We assume that all citizens vote in the election. For two recent papers that address media bias in the context of voluntary voter participation, see Piolatto and Schuett (2015) and Oliveros and Vardy (2015).

²¹The citizens in our model represent the portion of the electorate whose voting behavior is based purely on the candidates' competence over key issues. We thus implicitly assume that getting the support of this portion is crucial to win an election. The assumption that all citizens have the same prior beliefs about the abilities of the two candidates allows us to simplify our exposition. We could add more realism to the model by introducing partisan citizens who assign a higher probability that their favorite candidate has better ability. This additional complexity does not add much new insight as we discuss in our concluding remarks.

²²This is a standard assumption in the literature. See, for example, Besley and Prat (2006) and Strömberg (2016).

3.4 Timing of events

At the start of the first period, the media outlet type $\theta^J \in \{C, H, S\}$ is realized and observed only by the outlet. In each period $t = 1, 2$, the timing of events are as follows.

- The incumbent κ_t decides whether to grant access to the outlet or not.
- The key election issue and the incumbent's ability $\theta_t^{\kappa_t} \in \{h, \ell\}$ over the key issue is realized. The incumbent observes $\theta_t^{\kappa_t}$.
- If access is denied ($g_t = 0$), then each citizen i chooses his private action $a_t^i \in \{H, L\}$, observes $\omega_t \in \{h, \ell\}$ and makes his voting decision. The winner of the election becomes the incumbent κ_{t+1} for the following period.
- If access is granted ($g_t = 1$), the outlet observes $\theta_t^{\kappa_t}$. The outlet chooses a report $r_t \in \{h, \ell\}$.²³ Simultaneously, each citizen i chooses whether to follow the outlet ($f_t^i = 1$) or not ($f_t^i = 0$). Each citizen i who follows the outlet observes r_t before choosing his private action a_t^i .
- After the private action choice, ω_t is observed and r_t becomes public information.
- The citizens vote in the election and determine the incumbent κ_{t+1} for the following period.

3.5 Equilibrium

An equilibrium consists of a profile of strategies and a system of beliefs such that the strategies are optimal for each player given their equilibrium beliefs and given the equilibrium strategies of the other players, and beliefs are consistent with equilibrium strategies. We formally define and derive the optimality conditions of the strategies of the politicians and the outlet in sections 4.1 and 4.2 respectively restricting attention to pure strategy equilibria. Since our main focus is on the strategic interactions between the incumbent and the media outlet, the optimality conditions for citizens' strategies are presented in section A2 of Appendix A. We characterize the conditions for the consistency of the system of beliefs in section A1 of Appendix A. The beliefs depend on the history observed by the player holding the beliefs up to the relevant point in time. When we refer to the beliefs in the rest of the main text, we suppress their arguments for ease of exposition unless they are not clear from the context or explicitly need to be highlighted. For ease of reference, we list the system of beliefs below:

²³Recall that all types of the outlet report $r_t = h$ when $\theta_t^{\kappa_t} = h$, the honest type always reports truthfully and corrupt type always reports $r_t = h$. Therefore, the only strategic reporting choice made itse is the one by the strategic type when $\theta_t^{\kappa_t} = \ell$.

- (i) the beliefs of the citizens about the media outlet at the time of media consumption decision in each period t conditional on the outlet being granted access in that period denoted by $(\pi_{Ct}(\cdot), \pi_{St}(\cdot))$,
- (ii) the beliefs of the citizens about the incumbent at the time of private action decision in each period t denoted by $\beta_t(\cdot)$,
- (iii) the beliefs of the citizens about the incumbent at the time of voting decision in each period t denoted by $\tilde{\beta}_t(\cdot)$,
- (iv) the beliefs of the citizens about the media outlet at the time of voting decision in each period t denoted by $(\tilde{\pi}_{Ct}(\cdot), \tilde{\pi}_{St}(\cdot))$,
- (v) beliefs of the politician A at the time of the access control decision in the second period denoted by $(q_{C2}^A(\cdot), q_{S2}^A(\cdot))$.

4 Optimal Strategies

4.1 Politicians' optimal access control strategies

An access control strategy for politician A in period 1 is given by $\gamma_1^A \in \{0, 1\}$ where $\gamma_1^A = 1$ iff politician A grants access to the media outlet in the first period. An access control strategy in the second period depends on the history. For politician A , the information about the history includes her first-period ability θ_1^A . To unify the functional form of the strategies in the second period across politicians, it is useful to treat different types of politician A as different players. In what follows, Ah refers to politician A who has observed $\theta_1^A = h$ and $A\ell$ refers to politician A who has observed $\theta_1^A = \ell$. Conditional on first-period access, an access control strategy for politician $i \in \{Ah, A\ell, B\}$ in the second period is given by $\gamma_2^i : \{h, \ell\} \times \{h, \ell\} \rightarrow \{0, 1\}$ where $\gamma_2^i(r_1, \omega_1) = 1$ iff access is granted in the second period given r_1 and ω_1 .²⁴

Optimal access control strategy of the incumbent in each period maximizes the probability that she assigns to winning the election in that period. In Appendix A2.3, we show that citizens vote for the incumbent if and only if $\tilde{\beta}_t \geq p_h$ where $\tilde{\beta}_t$ is the probability they assign to incumbent having high ability at the time of the election. Thus, the reelection probability of the incumbent is given by $\Pr(\tilde{\beta}_t \geq p_h)$. In computing this probability, the incumbent takes into account (i) her own beliefs about the media outlet's type, (ii) the public beliefs about the outlet's type, (iii) any prior information she has

²⁴Access strategy for the second period also specifies an access decision for politicians A and B if access was denied in the first period. We do not introduce a notation for this since we do not need it in our analysis.

observed about her previous period ability, and (iv) the optimal reporting strategy ρ_t^* of the media outlet.

Re-election without access: Consider first the voting outcome when the incumbent denies access to the media outlet. In this case, it can be easily verified from (A8) that $\tilde{\beta}_t \geq p_h$ if and only if $\omega_t = h$. This establishes the following result.

LEMMA 1 *If the incumbent does not grant access to the media outlet in period t , then she wins the election in that period with probability $\Pr(\omega_t = h)$.*

Re-election with access: Now consider the election outcome when the incumbent grants access to the media outlet. Clearly, if the outlet reports $r_t = \ell$, then the challenger is elected (see (A8)). Likewise, when the outlet reports $r_t = h$ and the citizens observe $\omega_t = h$, then they vote for the incumbent. Less clear is the case when the outlet reports $r_t = h$, but the citizens observe $\omega_t = \ell$. Do the citizens ignore their negative signal and vote for the incumbent relying on the outlet's report or do they vote for the challenger relying on their signal? To answer this question, note that given the consistency of the belief $\tilde{\beta}_t$ formalized in (A8), a necessary condition for the citizens to vote for the incumbent when $r_t = h$ and $\omega_t = \ell$ is

$$\tilde{\beta}_t = \frac{(1 - \mu)p_h}{(1 - \mu)p_h + \mu(1 - p_h)(\tilde{\pi}_{Ct} + \tilde{\pi}_{St}\rho_t^*)} \geq p_h. \quad (4)$$

In the above expression, the terms $\tilde{\pi}_{Ct}$ and $\tilde{\pi}_{St}$ denote the probabilities that the citizens assign to the media outlet being corrupt and strategic respectively after having observed $r_t = h$ and $\omega_t = \ell$. The condition (4) can be rewritten as

$$\tilde{\pi}_{Ct} + \tilde{\pi}_{St}\rho_t^* \leq \frac{1 - \mu}{\mu}. \quad (5)$$

At the time of the election, the citizens believe that the outlet has misreported with probability $\tilde{\pi}_{Ct} + \tilde{\pi}_{St}\rho_t^*$. This follows because the corrupt type always misreports while the strategic type misreports when $\rho_t^* = 1$. When this probability of misreporting is sufficiently low, the citizens perceive the outlet's report as sufficiently informative about the incumbent's ability. In this case, they vote for the incumbent after outlet's positive report despite having observed a negative signal.

Using (A5) and (A6), condition (5) can be expressed in terms of the public beliefs about the outlet at the time of the media consumption decision. At this point, the citizens believe that the media outlet misreports with probability $\pi_{Ct} + \pi_{St}\rho_t^*$. Hence, condition (5) can be rewritten as

$$\pi_{Ct} + \pi_{St}\rho_t^* \leq x(p_h, \mu) \quad (6)$$

where

$$x(p_h, \mu) = \frac{(1 - \mu)^2 p_h}{\mu(1 - \mu)p_h + \mu(1 - p_h)(2\mu - 1)}. \quad (7)$$

Intuitively, when the citizens assign a sufficiently small probability to misreporting, they vote for the incumbent after a positive report even if they observe a negative public

signal. The term $x(p_h, \mu)$ on the right hand side of (6) captures the maximum amount of misreporting the public tolerates.

The table below summarizes the possible election outcomes when the media outlet is granted access.

| Media's report | Public signal | Election outcome |
|----------------|-------------------------------------|--|
| $r_t = h$ | $\omega_t = h$ | incumbent wins |
| $r_t = \ell$ | $\omega_t = h$ or $\omega_t = \ell$ | incumbent loses |
| $r_t = h$ | $\omega_t = \ell$ | incumbent wins iff $\pi_{Ct} + \pi_{St}\rho_t^* \leq x(p_h, \mu)$ |

We now show that (6) is a necessary condition to grant access in a given period. By Lemma 1, if the incumbent denies access to the media outlet, she wins the election with probability $\Pr(\omega_t = h)$. Suppose now the incumbent grants access in period t , but (6) is not satisfied. In this case, the citizens ignore a positive report and vote for the challenger upon observing a negative signal $\omega_t = \ell$. Hence, if (6) is not satisfied, then the probability that the incumbent wins the election by granting access is given by $\Pr(\omega_t = h, r_t = h)$. Since this probability is lower than $\Pr(\omega_t = h)$, condition (6) must be satisfied for the incumbent to grant access in any period.

We can now complete the characterization of the incumbent's optimal access control strategy. When (6) is satisfied, the probability that the incumbent assigns to winning the election after granting access is given by $\Pr(r_t = h | I_t^{K_t})$ where $I_t^{K_t}$ denotes the incumbent's information at the beginning of period t . Given the outlet's reporting strategy ρ_t^* , we thus have

$$\Pr(r_t = h | I_t^{K_t}) = p_h + (1 - p_h)(q_{Ct} + q_{St}\rho_t^*) \quad (8)$$

where q_{Ct} and q_{St} are the probabilities that the incumbent assigns at the beginning of period t to the outlet being corrupt and strategic, respectively. To grant access, this probability must be at least as high as the probability of being reelected when she denies access. By Lemma 1, the latter probability is given by $\Pr(\omega_t = h) = \mu p_h + (1 - \mu)(1 - p_h)$. It follows that for the incumbent to grant access, we must have

$$q_{Ct} + q_{St}\rho_t^* \geq y(p_h, \mu) \quad (9)$$

where

$$y(p_h, \mu) = \frac{(1 - \mu)(1 - 2p_h)}{1 - p_h}. \quad (10)$$

The term $y(p_h, \mu)$ on the right hand side of (9) captures the minimum probability of misreporting that the incumbent demands to grant access.

Conversely, if (6) holds, then the citizens vote for the incumbent when $r_t = h$ regardless of the state they observe. If in addition (9) holds, then the incumbent assigns a higher probability to winning the election when she grants access. This analysis yields the following key result.

PROPOSITION 1 *In any period, the incumbent grants access to the media outlet if and only if (i) the public assigns a sufficiently low probability to the outlet misreporting low ability and (ii) the incumbent privately assigns a sufficiently high probability to the outlet misreporting low ability. Formally, the incumbent grants access to the outlet if and only if (6) and (9) hold.*

Since the above result proves crucial for our equilibrium characterization, a few remarks on the mechanism that yields it are in order. The incumbent grants access to a media outlet in a given period only if the outlet's positive report is pivotal in convincing the citizens to vote for the incumbent even when they observe a negative signal. The outlet's positive report achieves this purpose only if the public assigns a sufficiently low probability to misreporting. In what follows, we refer to (6) as the *public credibility condition*. On the other hand, the incumbent attaches a higher probability to being reelected by granting access only if she privately believes that there is a sufficiently high probability that the media outlet misreports low ability. In what follows, we refer to (9) as the *pandering to the incumbent condition*.

By examining (9), we can describe exactly when an incumbent demands a strictly positive misreporting probability to grant access in a given period. The term $y(p_h, \mu)$ on the right hand side of (9) is strictly decreasing in the prior probability p_h that the incumbent has high ability over the key election issue. Hence, an incumbent requires a higher minimum misreporting probability to grant access when it is more likely that she has low ability. For $p_h \geq 1/2$, we have $y(p_h, \mu) \leq 0$ which implies that an incumbent who is sufficiently likely to have high ability over key issue does not demand any misreporting to grant access. For $p_h < 1/2$, however, we have $y(p_h, \mu) > 0$ and thus the incumbent grants access in a given period only if she assigns a strictly positive (and sufficiently high) probability to the media outlet misreporting in that period. We summarize this observation below.

PROPOSITION 2 *In any period, the incumbent demands a strictly positive probability of misreporting to grant access if and only if $p_h < 1/2$.*

4.2 Media outlet's optimal reporting strategy

A reporting strategy of the media outlet in period t is given by $\rho_t \in \{0, 1\}$, where $\rho_t = 1$ iff the outlet misreports low ability conditional on being granted access. In other words, $\rho_t = 1$ iff $r_t = h$ when $g_t = 1$ and $\theta_t^{\kappa_t} = \ell$. We assume that the outlet reports truthfully whenever it is indifferent between misreporting and reporting truthfully.

To describe the outlet's optimal reporting strategy, we need to derive the readership volume that the outlet attracts in a given period when it is granted access and follows a reporting strategy ρ_t . This requires an analysis of the citizens' optimal private action and media consumption decisions. Since this analysis is standard in the literature and merely

instrumental to obtain an endogenous readership volume, we present it in Appendix A2.1 and A2.2, and only explain the key insights below.

Readership volume: A citizen's incentive to follow the media outlet stems from the desire to make the "correct" private action decision. The correct private action depends on the realization of ω_t which is correlated with the incumbent's ability. Therefore, the additional information on ω_t that the outlet's report provides can potentially increase a citizen's ex ante expected private action payoff. A citizen follows the outlet only when the resulting gain in this expected payoff exceeds his private cost c_i of following the outlet. This is the case when the citizens perceive the outlet's report as sufficiently informative, that is, when they assign a sufficiently low probability $\pi_{Ct} + \pi_{St}\rho_t^*$ to the outlet misreporting low ability. In Appendix A2.2, we show that citizen i follows the outlet at time t if and only if the outlet is granted access and

$$c_i \leq k_0 - k_1(\pi_{Ct} + \pi_{St}\rho_t^*) \quad (11)$$

where

$$k_0 = \min\{p_h, 1 - p_h\}(\mu - \frac{1}{2}) \quad (12)$$

and

$$k_1 = (1 - p_h)(\mu - \frac{1}{2}). \quad (13)$$

Both k_0 and k_1 are positive constants. Since $c_i \sim U[0, 1]$, the above optimal media consumption strategy provides us with the following endogenous readership volume.

LEMMA 2 The readership volume of a media outlet that is granted access in period t when it follows reporting strategy ρ_t is given by

$$V_t(\rho_t; \pi_{Ct}, \pi_{St}) = \max\{0, k_0 - k_1(\pi_{Ct} + \pi_{St}\rho_t)\}. \quad (14)$$

Lemma 2 allows us to express the outlet's readership volume in a given period as a function of its reporting strategy and the public beliefs about its type. The readership volume in (14) is increasing in the perceived informativeness of the outlet's report. As the citizens assign a lower probability $\pi_{Ct} + \pi_{St}\rho_t$ that the outlet misreports, the readership volume increases.²⁵ Accordingly, the outlet's readership volume in any period is decreasing in the public belief that it is corrupt. When the strategic outlet misreports with a positive probability in a given period, the readership volume in that period is decreasing in the public belief that it is strategic.

Optimal second-period reporting: Using Lemma 2, it is straightforward to see that if the strategic outlet is granted second-period access, it always reports low ability truthfully in the second period. In any period, the readership volume is decreasing in the

²⁵For the same reason, our assumption that the strategic outlet does not misreport high ability would be satisfied in any equilibrium. Misreporting high ability would make the outlet's coverage less informative and thus reduce its readership volume. Such a strategy would also reduce the ex ante probability of positive coverage in the eyes of the incumbent, decreasing the outlet's chances of securing access.

probability ρ_t of misreporting. Since the strategic outlet has no further concern for future access in the second period, its only objective is to maximize the second-period readership volume. The following lemma is a direct consequence of this observation.

LEMMA 3 *If granted access in the second period, the strategic media outlet truthfully reveals low ability, that is, $\rho_2^* = 0$.*

Optimal first-period reporting: When choosing its first-period reporting strategy, the strategic outlet potentially faces a trade-off between maximizing the first-period readership volume and retaining access to the incumbent of the second period. We now describe the outlet's optimal first-period reporting problem to illustrate this trade-off.

To formally express the first-period objective function of the outlet, we introduce an indicator variable. Let $z_A(\rho_1, \omega_1) = 1$ if and only if politician A wins the election given the reporting strategy ρ_1 and the public signal ω_1 . Furthermore, let $r(\rho_1) = h$ if $\rho_1 = 1$, and $r(\rho_1) = \ell$ if $\rho_1 = 0$. The optimal first-period reporting strategy ρ_1^* is a solution to

$$\begin{aligned} \rho_1^* \in \arg \max_{\rho_1 \in \{0,1\}} & V_1(\rho_1; \pi_{C1}, \pi_{S1}) + E_{\omega_1} [z_A(\rho_1, \omega_1) \gamma_2^{A\ell}(r(\rho_1), \omega_1) V_2(0; \pi_{C2}, \pi_{S2})] \\ & + E_{\omega_1} [(1 - z_A(\rho_1, \omega_1)) \gamma_2^B(r(\rho_1), \omega_1) V_2(0; \pi_{C2}, \pi_{S2})]. \end{aligned} \quad (15)$$

The first term $V_1(\rho_1; \pi_{C1}, \pi_{S1})$ in (15) is the outlet's first-period readership volume. At the time of the first-period reporting decision, the public signal ω_1 is not yet realized. Therefore, both expectations in (15) are taken over ω_1 . Consider the terms inside the first expectation. If politician $A\ell$ wins the election, she grants further access if and only if $\gamma_2^{A\ell}(r(\rho_1), \omega_1) = 1$. In this case, the outlet obtains the readership volume $V_2(0; \pi_{C2}, \pi_{S2})$ since it reports truthfully in the second period. The terms inside the second expectation apply if politician B wins the first-period election. In either case, the readership volume depends on the second-period public beliefs π_{C2} and π_{S2} about the outlet's type. These beliefs, in turn, depend on the first-period reporting strategy ρ_1 , the public signal ω_1 to be realized and the identity of the incumbent who grants second-period access. Furthermore, as established by Proposition 1, the second-period access decision of politician $A\ell$ depends on these same public beliefs and also on her own private beliefs about the outlet's type.

Truthful reporting in the first period has the following important implication. It perfectly reveals to all parties that the outlet is not the corrupt type. By Lemma 3 only the corrupt type misreports in the second period. Therefore, after observing $r_1 = \ell$, both the public and the politicians assign zero probability to misreporting in the second period if the outlet is granted further access.

When $p_h \geq 1/2$, the strategic outlet does not face a trade-off between maximizing first-period readership and securing future access. As a result, it reveals low ability

truthfully in the first period. In this case, by Proposition 2, the second-period incumbent does not require any misreporting to grant access. Truthful reporting in the first period maximizes first-period readership volume. Truthful first-period reporting also maximizes second-period readership through its effect on the public beliefs: the public assigns zero probability to misreporting in the second period. Therefore, when $p_h \geq 1/2$, the strategic outlet reveals low ability truthfully in the first period.

When $p_h < 1/2$, however, the strategic outlet faces a trade-off between maximizing first-period readership and securing future access. Since the politicians assign zero probability to misreporting in the second period after a truthful first-period report, by Proposition 2, the second-period incumbent denies access.

The following proposition summarizes these observations.

PROPOSITION 3 (i) *When $p_h \geq 1/2$, the strategic outlet does not face a trade-off between maximizing first-period readership and securing future access: it reports truthfully in the first period.* (ii) *When $p_h < 1/2$, the strategic outlet faces a trade-off: truthful first-period reporting maximizes first-period readership but results in certain loss of future access.*

Proposition 3 illustrates exactly when the strategic outlet's first-period reporting strategy is driven by a pandering motivation. When $p_h < 1/2$, the strategic outlet can secure second-period access only if it misreports in the first period and ensures the reelection of the initial incumbent with low first-period ability. To secure future access in this case, the strategic outlet must convince the initial incumbent that it is the corrupt type with sufficiently high probability. While doing that it also must maintain sufficient credibility in the eyes of the public.

The analysis so far provides us with the necessary tools to describe different types of equilibria that can exist depending on the values of the exogenous parameters μ , p_h , p_C and p_S . We revisit different types of equilibria in Section 6. Our main focus, however, is to understand when an incumbent politician can effectively use information gatekeeping to build a mutually beneficial relationship with the media and influence electoral outcomes. We now focus on what we refer to as a *quid pro quo equilibrium*.

5 Quid Pro Quo Equilibrium

We start the section by defining a quid pro quo equilibrium. Recall that politician Al refers to the initial incumbent who has low ability over the key issue for the first election. The main feature of the quid pro quo equilibrium is that politician Al wins the first-period election thanks to the media outlet misreporting low ability. She then pays back the favor and grants the media outlet second-period access.

DEFINITION 1 *A quid pro quo equilibrium is an equilibrium with the following properties:*

R1 *first-period incumbent grants access to the media outlet.*

R2 *The strategic outlet misreports low ability in the first period.*

R3 *Conditional on winning the first election, politician Al continues to grant access in the second period regardless of ω_1 .²⁶*

It might seem surprising that politician Al grants further access even though she is aware that the strategic outlet will not bail her out for a second time if she were to have low ability in the second period as well (Lemma 3). By Proposition 1, returning the favor by granting further access is possible if politician Al believes that the outlet is corrupt with a sufficiently high probability so that misreporting in the second period still remains sufficiently likely. At the same time, the media outlet is able to maintain sufficient credibility in the eyes of the public so that the incumbent can count on increasing her re-election probability when the outlet misreports.

We first describe the necessary conditions for a quid pro quo equilibrium that pertain to the first-period strategies. The following lemma provides the necessary conditions for R1 (first-period access) and R2 (first-period misreporting).

LEMMA 4 *A quid pro quo equilibrium exists only if*

$$(i) \ y(p_h, \mu) \leq p_C + p_S \leq x(p_h, \mu),$$

$$(ii) \ p_h \in (p_h^*, 1/2) \text{ where } p_h^* \text{ is the unique solution to } x(p_h, \mu) = y(p_h, \mu).$$

Condition (i) states that a quid pro quo equilibrium exists only if the prior probability that the outlet is honest is sufficiently high but not too high. Given that the strategic outlet misreports in the first period by R2, first-period access is granted only if this condition is satisfied. The condition follows from Proposition 1 since both the incumbent and the public believe that the outlet is corrupt with probability p_C and strategic with probability p_S at the time of the first-period access decision.

Condition (ii) states that a quid pro quo equilibrium exists only if p_h is strictly less than $1/2$ but also not too low. Recall from Proposition 3 that the strategic outlet misreports in the first period only if $p_h < 1/2$. To explain the reason for the additional restriction $p_h > p_h^*$, it is useful to recall the properties of $x(p_h, \mu)$ and $y(p_h, \mu)$. The maximum probability of misreporting $x(p_h, \mu)$ that the public tolerates defined in (7)

²⁶The definition requires politician Al to grant access to the outlet in the second period regardless of ω_1 . The results remain qualitatively the same under an alternative definition which requires politician Al to grant second period access only when $\omega_1 = h$. As we show in our analysis, if second period access is granted when $\omega_1 = \ell$, it is also granted when $\omega_1 = h$.

is always positive and is strictly increasing in p_h . The term $y(p_h, \mu)$ that captures the minimum probability of misreporting that the incumbent demands is strictly decreasing in p_h , and it is positive only if $p_h < 1/2$. Hence, there exists a critical value $p_h^* < 1/2$ such that $x(p_h, \mu) > y(p_h, \mu)$ if and only if $p_h > p_h^*$ (see Figure 1). Intuitively, when it is sufficiently likely that the incumbent has low ability, the minimum misreporting probability that she demands exceeds the maximum probability that the public can tolerate, and therefore it is not possible to satisfy condition (i) when $p_h < p_h^*$.

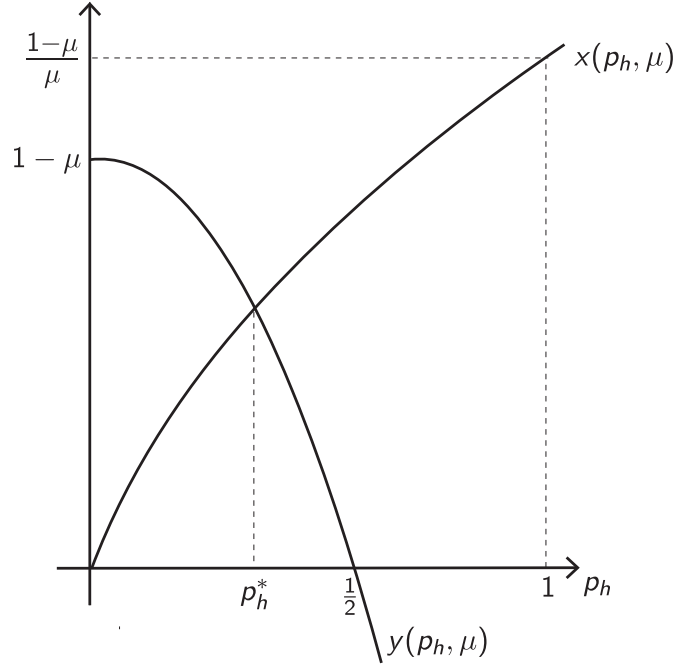


Figure 1: The maximum misreporting probability $x(p_h, \mu)$ that the public tolerates versus the minimum misreporting probability $y(p_h, \mu)$ that the incumbent demands

Before we focus on the second-period access decision, an important distinction needs to be made. R3 requires that, conditional on winning the first-period election, politician $A\ell$ grants further access. However, R3 does not specify the equilibrium second-period access decision of politician Ah , that is, the initial incumbent who observes high ability in the first period. Whether politician Ah grants or denies second-period access has an important implication for information revelation as we explain below.

In a quid pro quo equilibrium, politician $A\ell$ knows more about the outlet's type than the public after the first-period election. Given a positive report on her first-period low ability, politician $A\ell$ now privately assigns zero probability to the outlet being the honest type. Since the citizens only observe a noisy public signal ω_1 on incumbent's first-period ability, however, they continue to assign a positive probability that the outlet is honest

after the first-period election. On the other hand, all types of media outlets report $r_1 = h$ when they observe $\theta_1^A = h$ in the first period. Therefore, the outlet's first-period report does not provide politician Ah any information on the outlet's type.

If both politicians $A\ell$ and Ah grant second-period access in a quid pro quo equilibrium, the second-period access decision does not reveal the initial incumbent's first-period ability to the public. We refer to this equilibrium as a *pooling quid pro quo equilibrium* and analyze it in the next section. A quid pro quo equilibrium is *separating* if only politician $A\ell$ grants second-period access, but politician Ah denies it. The crucial feature of a *separating quid pro quo equilibrium* is that the second-period access decision perfectly reveals to the public that the strategic outlet has misreported in the first period. We analyze the separating quid pro quo equilibrium in Section 5.2.

5.1 Pooling quid pro quo equilibrium

DEFINITION 2 *A pooling quid pro quo equilibrium is a quid pro quo equilibrium with the following additional property:*

R4 *Conditional on winning the first election, politician Ah continues to grant access in the second period regardless of ω_1 .*

We now describe the necessary conditions for both politicians $A\ell$ and Ah to grant second-period access as required by R3 and R4.

Consider first the pandering condition (9) for second-period access. Recall that when $p_h < 1/2$, the second-period incumbent requires a minimum misreporting probability $y(p_h, \mu) > 0$ to grant access. She also understands that only the corrupt media outlet misreports in the second period. To satisfy (9) for second-period access in a pooling quid pro quo equilibrium, both $A\ell$ and Ah must assign a sufficiently high probability that the outlet is corrupt. After a positive first-period report, politician $A\ell$ updates her prior belief and assigns a posterior probability

$$q_{C2}^{A\ell} = \frac{p_C}{p_C + p_S}$$

that the outlet is corrupt. Politician Ah , however, maintains her prior belief that the outlet is corrupt with probability p_C . It is thus harder to satisfy (9) for politician Ah . Therefore, the binding pandering condition for second-period access is given by $p_C \geq y(p_h, \mu)$. This condition precisely pins down for the strategic outlet the necessity of being perceived as sufficiently corrupt by the second-period incumbent to secure further access.

Consider now the public credibility condition (6) for second-period access in a pooling quid pro quo equilibrium. Since the strategic outlet reports truthfully if granted further access, condition (6) for second-period access becomes

$$\pi_{C2}(\omega_1) \leq x(p_h, \mu) \text{ for } \omega_1 \in \{h, \ell\}.$$

In the above expression, $\pi_{C2}(\omega_1)$ denotes the probability that the public assigns to the outlet being corrupt at the time of the second-period media consumption decision after observing $r_1 = h$, the public signal ω_1 and the second-period access decision of the incumbent in power (see (A3)).²⁷ Given $r_1 = h$, the public assigns a higher probability that the outlet is corrupt if they observe $\omega_1 = \ell$ rather than $\omega_1 = h$. Therefore, we have $\pi_{C2}(\ell) > \pi_{C2}(h)$. Intuitively, it is harder to convince the public about the outlet's credibility after a positive first-period report if the public observes the negative public signal $\omega_1 = \ell$. The binding public credibility condition for second-period access is thus given by $\pi_{C2}(\ell) \leq x(p_h, \mu)$.

Recall that p_h^* is the unique solution to $x(p_h, \mu) = y(p_h, \mu)$. The following result combines all the necessary conditions for a pooling quid pro quo equilibrium. Furthermore, as we show below, these necessary conditions are jointly sufficient for the existence of a pooling quid pro quo equilibrium.

PROPOSITION 4 *A pooling quid pro quo equilibrium exists if only if $p_h \in (p_h^*, 1/2)$ and the following conditions hold.*

(i) *The prior probability that the media outlet is honest is sufficiently high:*

$$p_C + p_S \leq x(p_h, \mu). \quad (16)$$

(ii) *The prior probability that the media outlet is corrupt is sufficiently high:*

$$p_C \geq y(p_h, \mu). \quad (17)$$

(iii) *The citizens assign a sufficiently low probability to the media outlet being corrupt after observing positive report in the first period:*

$$\pi_{C2}(\ell) \leq x(p_h, \mu), \quad (18)$$

and

$$\mu\pi_{C2}(\ell) + (1 - \mu)\pi_{C2}(h) \leq \frac{p_h}{1 - p_h} - p_S. \quad (19)$$

The condition $p_h \in (p_h^*, 1/2)$ is identical to condition (ii) in Lemma 4. Condition (16) comes from condition (i) of the same lemma. The part $p_C + p_S \geq y(p_h, \mu)$ in that condition is always satisfied given (17). Conditions (17) and (18) are, respectively, the pandering and the binding public credibility conditions for second-period access. Condition (19) is a necessary condition for the strategic outlet to misreport in the first period given R3 and R4. In choosing its first-period reporting strategy, the strategic outlet faces a dynamic trade-off between the first-period readership it loses due to misreporting and the future readership volume she expects to attract by securing second-period access. By misreporting in the first period, it loses a current readership volume

²⁷This probability can be computed using (A3) after substituting for $\rho_1^* = 1$ and $\gamma^i(h, \omega_1) = 1$ for all $i \in \{Ah, A\ell\}$ and $\omega_1 \in \{h, \ell\}$.

$k_1 p_S$. However, it gains an expected second-period readership volume $k_0 - k_1 \bar{\pi}_{C2}$ where $\bar{\pi}_{C2} = \mu \pi_{C2}(\ell) + (1 - \mu) \pi_{C2}(h)$. Since $k_0/k_1 = p_h/(1 - p_h)$, condition (19) is satisfied whenever the gain from misreporting exceeds its cost.

Intuitively, the left hand side of (19) captures the future public reputation the strategic outlet anticipates to have for being corrupt by the time it secures second-period access.²⁸ As the left hand side of (19) becomes smaller, the strategic outlet expects its future public credibility to suffer less after it misreports in the first period. As a result, it expects to attract a larger second-period readership which in turn increases its incentive to misreport in the first period.

The preceding analysis has shown that each of the conditions in Proposition 4 are necessary for the existence of a pooling quid pro quo equilibrium. We now argue that these conditions are jointly sufficient for the existence of a pooling quid pro quo equilibrium. Suppose $p_h \in (p_h^*, 1/2)$ and conditions (16)-(18) hold. Recall that the strategic outlet reports truthfully in the second period by Lemma 3. Thus, by Proposition 1, conditions (17) and (18) imply that both politicians $A\ell$ and Ah grant second-period access. Hence, R3 and R4 are satisfied. Given that $p_h \in (p_h^*, 1/2)$ and (19) holds, R3 and R4 imply that the strategic outlet misreports in the first period. Thus, R2 is satisfied. By (16) and (17) we have $y(p_h, \mu) \leq p_C + p_S \leq x(p_h, \mu)$. Since R2 is satisfied, by Proposition 1 first-period access is granted, that is, R1 is satisfied as well.

To summarize, if all the conditions in Proposition 4 are satisfied, then there exists a pooling quid pro quo equilibrium. We next describe how the parameters μ , p_h , p_C and p_S can be chosen to satisfy all these conditions and establish when a pooling quid pro quo equilibrium exists.

PROPOSITION 5 *A pooling quid pro quo equilibrium exists when the following hold.*

- (i) *The citizens can learn little from the public signal. That is, μ is sufficiently low.*
- (ii) *The prior probability that politicians have high ability over key issue is moderately high. That is, p_h is sufficiently high but strictly less than $1/2$.*
- (iii) *There is just enough public skepticism that the journalistic profession is corrupt. That is, p_C is sufficiently low but bounded below by $y(p_h, \mu)$.*
- (iv) *There is sufficient initial public trust that the journalistic profession is honest. That is, p_S satisfies*

$$p_S \leq \min\{x(p_h, \mu) - p_C, \frac{p_h}{1 - p_h}\}.$$

²⁸After misreporting in the first period, the strategic outlet anticipates that with probability μ , the negative signal $\omega_1 = \ell$ is to be realized and the public assigns a probability $\pi_{C2}(\ell)$ to its being corrupt. With probability $1 - \mu$, the positive signal $\omega_1 = h$ is to be realized and the public believes that it is corrupt with probability $\pi_{C2}(h)$.

In a pooling quid pro quo equilibrium, the citizens do not figure out from the second-period access decision that (i) the initial incumbent they kept in power had low ability over the key election issue and (ii) the media outlet has misreported in the first period. As such, after the second-period access decision, they maintain the same beliefs about the outlet's type that they had during the first-period election. We next analyze a quid pro quo equilibrium in which the public perfectly learns the initial incumbent's first-period ability from the second-period access decision. This is the separating quid pro quo equilibrium.

5.2 Separating quid pro quo equilibrium

DEFINITION 3 *A separating quid pro quo equilibrium is a quid pro quo equilibrium with the following additional property:*

R4' Conditional on winning the first election, politician Ah denies access in the second period regardless of ω_1 .

Along with R1-R3, the above definition requires that conditional on winning the first-period election only politician $A\ell$ grants second-period access. As a result, the second-period access decision perfectly reveals to the public that (i) the initial incumbent they kept in power had low ability over the key issue of the first election, (ii) the outlet misreported in the first period and thus it is certainly not the honest type. The separating quid pro quo equilibrium is of interest as it illustrates the possibility of a quid pro quo between the initial incumbent and the media outlet even when the public becomes perfectly aware of first-period low ability after second-period access is granted.

The key aspect of a separating quid pro quo equilibrium is that, after the second-period access decision, the public and politician $A\ell$ have the same posterior beliefs about the outlet's type regardless of ω_1 . That is,

$$\pi_{C2}(\omega_1) = q_{C2}^{A\ell} = \frac{p_C}{p_C + p_S} \text{ for } \omega_1 \in \{h, \ell\}. \quad (20)$$

The following result establishes the necessary and sufficient conditions for the existence of a separating quid pro quo equilibrium.

PROPOSITION 6 *A separating quid pro quo equilibrium exists if and only if $p_h \in (p_h^*, 1/2)$, and the following conditions hold.*

(i) *The prior probability that the media outlet is honest is sufficiently high but not too high:*

$$y(p_h, \mu) \leq p_C + p_S \leq x(p_h, \mu). \quad (21)$$

(ii) The public assign a sufficiently low probability to the media outlet being corrupt after the second-period access decision reveals that it has misreported in the first period. That is,

$$\frac{p_C}{p_C + p_S} \leq x(p_h, \mu) \quad (22)$$

and

$$\frac{p_C}{p_C + p_S} \leq \frac{p_h}{1 - p_h} - p_S. \quad (23)$$

(iii) The prior probabilities p_C and p_S are such that politician Ah denies second-period access but politician Al grants it. That is,

$$\frac{p_C}{p_C + p_S} \geq y(p_h, \mu) \quad (24)$$

and

$$p_C < y(p_h, \mu). \quad (25)$$

The condition $p_h \in (p_h^*, 1/2)$ and condition (21) are identical to the conditions in Lemma 4. Recall that by (20) the term on the left hand sides of (22)-(24) is the public belief $\pi_{C2}(\omega_1)$ that the outlet is corrupt. Thus, condition (22) follows from the public credibility condition that must be satisfied for politician Al to grant second-period access. Likewise, condition (23) captures the strategic outlet's dynamic trade-off and is necessary for the strategic outlet to misreport in the first period. Conditions (24) and (25) are necessary, respectively, for politician Al to grant second-period access and for politician Ah to deny it. These conditions again follow because, after observing a positive first-period report, politician Ah maintains her prior belief and assigns a probability p_C that the outlet is corrupt, whereas for politician Al this posterior probability is given by $p_C/(p_C + p_S)$.

We next show that the conditions in Proposition 6 are jointly sufficient for the existence of a separating quid pro quo equilibrium. Suppose $p_h \in (p_h^*, 1/2)$ and conditions (22)-(25) all hold. Recall that the strategic outlet reports truthfully in the second period by Lemma 3. Thus, by Proposition 1, conditions (22), (24) and (25) imply that politician Al grants second-period access and politician Ah denies it. Hence, R3 and R4' are satisfied. Given that $p_h \in (p_h^*, 1/2)$ and (23) holds, R3 and R4' imply that the strategic outlet misreports in the first period. Thus, R2 is satisfied. Together with (21), this implies by Proposition 1 first-period access is granted. That is, R1 is satisfied as well. Therefore, if all the conditions in Proposition 6 are satisfied, then there exists a separating quid pro quo equilibrium.

We can combine conditions (22) and (24) to obtain

$$\frac{1 - x(p_h, \mu)}{x(p_h, \mu)} \leq \frac{p_S}{p_C} \leq \frac{1 - y(p_h, \mu)}{y(p_h, \mu)}. \quad (26)$$

Condition (26) reveals a key observation. For a separating quid pro quo equilibrium to exist, the citizens must perceive the media outlet as sufficiently credible after learning that it has misreported in the first period. This is the case only if they associate first-period misreporting with strategic, rather than corrupt, behavior. That is, p_S/p_C must

be sufficiently high. At the same time, for politician A_ℓ to grant second-period access, it also cannot be too likely that first-period misreporting is associated with strategic, rather than a corrupt, behavior. That is, p_S/p_C cannot be too high.

The following result describes how we can choose μ , p_h , p_C and p_S to satisfy all the conditions in Proposition 6 so that a separating quid pro quo equilibrium exists.

PROPOSITION 7 *A separating quid pro quo equilibrium exists when the following hold.*

- (i) μ is sufficiently low.
- (ii) p_h is sufficiently high but strictly less than $1/2$.
- (iii) $p_C < y(p_h, \mu)$ but bounded below by $y(p_h, \mu)^2$.
- (iv) $\frac{p_S}{p_C} = \frac{1 - y(p_h, \mu)}{y(p_h, \mu)}$.

We should note that condition (iv) is a sufficient, but not a necessary, condition. Along with the other sufficient conditions, all that is needed for a separating quid pro quo equilibrium is a sufficiently high p_S/p_C that satisfies (26). Furthermore, conditions (iii) and (iv) together imply that $p_C + p_S \leq x(p_h, \mu)$. Thus, there must be sufficient initial public trust that the journalistic profession is honest as in the pooling quid pro quo case.

To summarize, a quid pro quo relationship between an incumbent politician and the strategic outlet can emerge under the following conditions. First, there must be sufficient initial public trust in journalistic integrity. Second, the citizens must be able learn little from alternative and publicly available news sources. These two conditions ensure that the public continues to rely on the media outlet's positive coverage in the election even when the strategic outlet misreports. Third, it must be only moderately likely that the politicians who run for office are perceived as competent over key election issues. With such politicians, the strategic outlet's first-period reporting is driven by a pandering motivation. This is the key reason for the media outlet to misreport in favor of the initial incumbent. Finally, there must also be just enough public skepticism that the journalistic profession is corrupt. When $p_C \geq y(p_h, \mu)$ but sufficiently low, we have a pooling quid pro quo equilibrium. When $p_C < y(p_h, \mu)$ but bounded from below and p_S/p_C is sufficiently high, the quid pro quo equilibrium is separating.

6 Other Types of Equilibria

In this section, we discuss some other types of equilibria that can exist depending on the values of the parameters μ , p_h , p_C and p_S . In particular, we describe (i) when the equilibrium involves no access in any period and (ii) when access is always granted and the strategic outlet is always truthful in both periods.

6.1 Equilibrium with No Access in Any Period

Too little journalistic integrity. When the prior probability p_C that the media outlet is corrupt is sufficiently high, it is not possible to satisfy the public credibility condition (6) for any period. Consider parameter values such that $p_C > x(p_h, \mu)$. In this case, (6) is not satisfied for first-period access even when the strategic outlet reports low ability truthfully. No first-period access implies that the public has the same posterior beliefs about the outlet's type at the time of the second-period access decision as well. Given that the strategic outlet always reports truthfully in the second period (Lemma 3), the public credibility condition (6) for second-period access is not satisfied either for $p_C > x(p_h, \mu)$. Therefore, when the media outlet is initially perceived as too corrupt, there is a unique equilibrium with no access in any period.

Too much journalistic integrity. An equilibrium with no access in any period also emerges when it is sufficiently likely that the media outlet is honest. Consider parameters such that $p_C + p_S < y(p_h, \mu)$. In this case, the pandering condition (9) is not satisfied for first-period access even when the strategic outlet misreports. With no first-period access, both politicians A and B have the same posterior beliefs about the media outlet's type at the time of the second-period access decision. Given Lemma 3, the pandering condition (9) for second-period access becomes $p_C \geq y(p_h, \mu)$. This condition is never satisfied when $p_C + p_S < y(p_h, \mu)$. Therefore, when the media outlet is initially perceived as too honest, there is a unique equilibrium with no access in any period.

Incompetent politicians. An equilibrium with no access in any period also emerges when it is too likely that the politicians have low ability over key election issues, that is, when p_h is sufficiently low. Recall that $p_h^* \in (0, 1/2)$ is the unique solution to $x(p_h, \mu) = y(p_h, \mu)$. When $p_h < p_h^*$, we have $x(p_h, \mu) < y(p_h, \mu)$. Thus, the incumbent demands a minimum misreporting probability which exceeds the maximum that the public can tolerate. As a result, it is no longer possible to satisfy both the public credibility and the pandering conditions (6) and (9) for access (see Figure 1).

The following result summarizes these observations.

PROPOSITION 8 *There is a unique equilibrium with no access in any period in each of the following three cases: (i) there is too little journalistic integrity, that is, $p_C > x(p_h, \mu)$, (ii) there is too much journalistic integrity, that is, $p_C + p_S < y(p_h, \mu)$, or (iii) the politicians are perceived to be incompetent over key issues, that is, $p_h < p_h^*$.*

6.2 Equilibrium with Access and Truthful Reporting in Both Periods

Recall from Proposition 2 that when $p_h \geq 1/2$ the incumbent does not demand any misreporting to grant access and the strategic outlet is always truthful in the first period.

In this case, the pandering condition in (9) is never binding and the media outlet has no incentive to misreport in the first period to convince the future incumbent that it is corrupt with a sufficiently high probability. If, in addition $p_C \leq x(p_h, \mu)$, then the public credibility condition (6) for first-period access is also satisfied when the outlet reveals low ability truthfully in the first period. Hence, first-period access is granted. Given that the strategic outlet reports truthfully in the second period (Lemma 3), the second-period public credibility condition requires $\pi_{C2} \leq x(p_h, \mu)$. But truthful reporting by the strategic outlet in the first-period implies that $\pi_{C2} = 0$ regardless of ω_1 (see (A5)). Hence, second-period access is granted as well regardless of ω_1 . We thus have the following result.

PROPOSITION 9 When the politicians are likely to have high ability over key issues, that is, $p_h \geq 1/2$, and the media outlet is perceived to have sufficient integrity, that is, $p_C \leq x(p_h, \mu)$, there is a unique equilibrium in which access granted in both periods and the strategic outlet always truthfully reveals low ability.

7 Implications

7.1 Pro-incumbent media bias

As mentioned earlier, according to Prat (2016), media capture refers to situations in which a government plays an active role in achieving favorable news coverage through promises and threats to the media. An empirical literature examines government capture of the media by using (i) outright bribes (see McMillan and Zoido (2004) for the case of Fujimori's Peru), (ii) other forms of financial rewards such as government advertising in newspapers (see Di Tella and Franceschelli (2011) for the case of Argentina during 1998-2007 and Szeidl and Szucs (2017) for Hungary during 1994-2016),²⁹ or (iii) threats of prosecution (see Stanig (2015) for the impact of defamation laws on local newspaper coverage of scandals in Mexico in 2001). This paper illustrates a novel form of media capture through an incumbent acting as a gatekeeper of information sources. The existence quid pro quo equilibrium implies that an incumbent politician's control of access to information sources can induce a media outlet to misreport negative information to secure future access and help a low-ability incumbent remain in power. This key implication is stated below.

²⁹Di Tella and Franceschelli (2011) document strong negative correlation between the coverage of government corruption in the four main newspapers in Argentina and the government sponsored advertisement in these newspapers. In the case of Hungary, Szeidl and Szucs (2017) find strong evidence of media capture through misallocation of advertisement by state-owned firms. In particular, they document distortive two-way favors between right wing governments and the connected media in the form of advertisement in exchange for lower media coverage of government corruption scandals.

Implication 1 *Information gatekeeping by incumbent politicians can induce a pro-incumbent bias in media coverage and affect electoral outcomes in favor of incumbents.*

To our knowledge, there has been no theoretical or empirical analysis of the political economy implications of information gatekeeping by incumbents. Nevertheless, the idea that incumbents deliberately deny access to critical media outlets is not entirely new to economists. Gentzkow and Shapiro (2008) mention that a government's ability to control future access to information can provide an additional lever to punish critical outlets. They refer to a memo issued by President Nixon who, after two years of critical reporting by The Washington Post, asked his entire White House staff "not to see anybody from The Washington Post or return any calls to them."³⁰

Some anecdotal evidence suggests that information gatekeeping can lead to a quid pro quo relationship between an incumbent politician and the media. A recent article published in the British newspaper The Guardian entitled "The Wall Street Journal's Trump Problem" details how The Wall Street Journal (WSJ), owned by media mogul Rupert Murdoch, softened its coverage of the Trump administration after his inauguration.³¹ The article identifies Murdoch's desire to maintain access to Trump as a key reason for the journal's soft coverage and quotes Sarah Ellison, a long-time observer and former WSJ reporter: "This is the most access Murdoch has had to a sitting president ever – that is something he's tried to do and has done in other countries particularly with British prime ministers." While only suggestive, the soft coverage of WSJ to maintain access to an administration that was known to deny access to critical outlets seems to fit well with our model. Incidentally, the same article also refers to a YouGov/Economist survey conducted in the summer of 2017 that found WSJ to be the most trusted outlet among American news organizations surveyed: "The Journal is the rare publication of record that managed largely (but not entirely) to escape the fake news slur while – unlike, say, Trump-friendly outlets like Fox News, Breitbart, and the Sinclair Media Group – maintaining a reputation for strong commitment to journalistic standards." This last point illustrates that WSJ commands sufficient public trust for integrity, which is also consistent with a quid pro quo equilibrium.

³⁰As we discuss further in Section 8, empirical work by Dyck and Zingales (2003) offers strong support for quid pro quo theory in the context of financial news media. They show that financial reporters provide positive spin on company news in exchange of access to private information from corporate insiders.

³¹The article reports poor morale among WSJ reporters and many departures, including one of its number-two editors to archrival The New York Times, amid mounting concerns about WSJ's coverage of the new president, which many staffers felt was too soft and too quick to downplay controversies (see the article "The Wall Street Journal's Trump Problem" in The Guardian on September 10, 2017).

7.2 Limits to influencing public opinion

In contrast to the existing literature, our analysis emphasizes that captured media can affect voting behaviour only if their positive coverage can pass a public credibility test. This emphasis on public credibility allows the model to deliver the following implication.

Implication 2 *The availability of independent information sources and insufficient public trust in the news media both limit the effectiveness of information gatekeeping in influencing public opinion.*

The above prediction on the impact of independent information sources is akin to the one in Besley and Prat (2006) although their model's underlying mechanism is quite different. Besley and Prat (2006) show that independent media ownership reduces capture since it increases the transaction costs when the government bribes the media to suppress bad news. In our model, the availability of alternative and independent information sources allows citizens to observe a public signal. When this signal is precise, the public is harder to persuade through biased positive coverage.³² Depending on the context, this alternative information source can also be a policy research institute, a professional organization with specific expertise on the key election issue or an internet blog.³³

Without focusing specifically on information gatekeeping, some recent empirical papers show the difference independent news media can make in captured environments. Enikolopov, Petrova and Zhuravskaya (2011) show that the public availability of NTV, an independent news channel in Russia, decreased aggregate vote share of the pro-Putin party by 8.9 percentage points and increased the combined vote for the major opposition parties by 6.3 percentage points. Barone, d'Acunto and Narciso (2015) examines the implications of a switch to digital TV in Italy between 2008 and 2012 that dramatically increased the number of available channels with no ties to the Berlusconi government.³⁴ They show that digital TV caused a drop in the vote share of Berlusconi's coalition between 5.5 and 7.5 percentage points.³⁵

³²Filtering out the bias in captured media by relying on independent news sources can be difficult. For example, Bai, Golosov, Qian and Kai (2014) studied how people update their beliefs about air pollution in China after receiving news from government-controlled and independent sources. They found that people have problems in interpreting conflicting information coming from different sources and do not fully discount repeated information from government sources.

³³For example, during a municipality election in which the key issue is urban planning, a report by the local chamber of architects can provide useful public information. When a foreign policy issue dominates a national election, input from an independent foreign policy think tank can inform public opinion.

³⁴Out of 78 new channels that became available after the switch, 58 were aired by new media companies with no ties to Berlusconi or to the government.

³⁵In the context of financial news, Enikolopov, Petrova and Sonin (2015) presents evidence that publications in an independent Russian blog about corruption in state controlled companies had a significant impact on the stock prices of these companies.

Our theory identifies insufficient initial public trust in the media as a potential obstacle for an incumbent to influence public opinion through information gatekeeping. The literature offers empirical evidence that some voters ignore or completely avoid pro-government coverage when they perceive a media outlet as lacking credibility. Durante and Knight (2012) found that viewers changed their choice of news programs when the news content of public channels switched to a right-wing bias following the 2001 Italian national elections. In the case of Russia, Gehlbach and Sonin (2014) argue for a sharp decline in NTV's viewership after its takeover by the state-controlled Gazprom and the forced replacement of its top reporters with others known to be friendly to the Kremlin.³⁶ These observations seem to be consistent with our prediction that an incumbent needs sufficient public trust in the media to be able to influence public opinion by controlling media access to information.

7.3 Voter welfare

A common theme in the literature on the political economy of the media is that the information transmitted through the media enables voters to identify and punish bad politicians/policies and identify and reward good ones.³⁷ This theme has found broad empirical support. Ferraz and Finan (2008) found evidence that Brazilian voters punished corrupt mayors more often in election districts with a local radio station. Using data on U.S. House of Representatives elections, Snyder and Strömberg (2010) show that political coverage increases voter information, voter turnout, and the selection and incentives of politicians. Banerjee, Kumar, Pande and Su (2011) document that, relative to control slums, the vote share of better performing incumbents was higher in a random sample of slums of a major Indian city where the citizens received newspapers containing report cards on the performance of the incumbent legislator. In the case of Mexico, Larreguy, Marshall and Snyder (2015) find that voters punished the party of malfeasant mayors only in those electoral districts covered by local media stations.

Our paper contributes to this literature by showing how an incumbent's control of the media's access to information sources can reduce the amount and quality of political information that flows to the public and thus can reduce voter welfare. Consider a modified version of our model where, by assumption, an incumbent cannot deny access

³⁶At the same time, there is also evidence that biased coverage does have persuasive power among some voters. For example, by exploiting cable channel positions as exogenous shifters of cable news viewership, Martin and Yurukoglu (2017) estimate that Fox News increases Republican vote share by 0.3 points among viewers induced into watching 2.5 additional minutes per week.

³⁷See Strömberg (2016) for a baseline model of media coverage and its effect on political accountability and for a comprehensive discussion of the empirical literature. The papers that discuss improved electoral outcomes due to political information provided by the media include Besley and Burgess (2002), Besley and Prat (2006), Prat and Strömberg (2013), Strömberg (2001, 2004).

to the media outlet. In this benchmark case, the media outlet is always able to observe the incumbent's ability over the key election issue. Furthermore, unless the outlet is the corrupt type, it provides truthful coverage, ensuring that incumbents with low ability over the key election issue are voted out of office. With information gatekeeping, however, the amount and quality of information that the public receives from the media can vary drastically. In particular, under certain conditions, information gatekeeping can yield (i) equilibria with no access and hence no coverage by the media or (ii) a quid pro quo equilibrium in which the media misreports and so helps a low-ability incumbent remain in power in exchange for future access. Since the incumbent's optimal media access control strategy maximizes her chances of being re-elected, information gatekeeping also reduces political turnover. Unless the politicians are sufficiently likely to have high ability over key election issues, in which case access is always granted, information gatekeeping reduces expected voter welfare compared to the benchmark case. The model thus delivers the following welfare implication of information gatekeeping.

Implication 3 *Information gatekeeping reduces expected voter welfare and political turnover unless the politicians are sufficiently likely to be competent over key election issues.*

7.4 Politician's competence

An incumbent's optimal access control strategy in our model depends on the prior probability that she has high ability over the key issue. An incumbent who is likely to be competent over the key issue always grants access, whereas one who is likely to be incompetent always denies access. Thus, our theory describes a positive relationship between the degree of access that the media enjoy and the expertise/competence level of the incumbent over the key issue.

Implication 4 *The degree of access that the media enjoy increases with respect to the competence of politicians over the issue under public focus.*

The implication above suggests that, depending on the particular issue under public focus, politicians may make themselves less or more available to the media. Strictly speaking, the incumbent in our model chooses her optimal access strategy in each period before the realization of the key issue. Our results would hold in an alternative timing of events in which the incumbent learns the key issue before the access decision but observes her issue-specific ability only after the access decision, possibly because not all aspects of the key issue are revealed at the initial stage. A politician typically becomes less media-friendly when the public focuses on issues that the politician feels less secure about. When the key issue fits the politician's expertise, he/she increases visibility through more exposure to media.

Casual observation seems consistent with this prediction. For example, during the

2016 presidential election campaign, Hillary Clinton avoided holding a press conference for over 260 days.³⁸ During that period, the primary public concern over Clinton was about her trustworthiness in the handling of the classified e-mail scandal. As the public became more focused on Donald Trump’s public blunders, unusual style, and lack of experience in public office, however, Clinton became more media-friendly and increased her media appearances to emphasize her credentials and experience in public service.

8 Concluding remarks

Understanding how an incumbent politician’s control of the media’s access to information sources, a policy that we refer to as information gatekeeping, can affect media coverage and electoral outcomes is an important research question. To isolate the effect of information gatekeeping, our model considers a media outlet whose only motivation is to maximize readership and citizens who value informative media coverage. In this environment, we show that a media outlet can misreport in favor of a low-ability incumbent simply to maintain access. The model illustrates how information gatekeeping introduces an incentive to pander to the incumbent and how the media outlet needs to balance this incentive with the readers’ demand for informative reporting. This section concludes by discussing some extensions and other possible applications of our model.

Competition for access: The main insights of the model, and in particular of the quid pro quo equilibrium, remain valid when multiple media outlets compete for access. Suppose there are $n \geq 2$ outlets, each having different prior probabilities of being the corrupt and the strategic type. In each period, the incumbent grants access to only one of these outlets or denies access to all.³⁹ The incumbent’s optimal access control strategy is again driven by the same considerations as in Proposition 1. Among outlets that satisfy the public credibility condition, the incumbent grants first-period access to the one with the highest probability of being corrupt. This observation follows because, in the eyes of the incumbent, the likelihood of positive coverage and hence the chances of re-election increase with the probability that the outlet is corrupt.

Consider now the second-period access decision. When $p_h < 1/2$, any second-period incumbent demands a strictly positive misreporting probability to grant access. Furthermore, as only the corrupt outlet misreports in the second period, among the available outlets that satisfy both second-period access conditions, the second-period incumbent grants access to the one to which she assigns the highest probability of being corrupt. The strategic outlet with initial access understands that a truthful first-period report, by

³⁸See The Washington Post article “It’s been 263 days since Hillary Clinton last held a press conference.” on August 24, 2016.

³⁹In our model, there is no reason for the incumbent to grant access to more than one outlet. Such a policy lowers the value of access for each outlet without creating any benefits to the incumbent.

revealing that it is not the corrupt type, results in loss of future access with certainty. If this outlet misreports in the first period, the initial incumbent assigns an even higher probability that the outlet is corrupt. To beat competition from other outlets and maintain access, the strategic outlet with initial access must therefore misreport in the first period. Hence, the quid pro quo equilibrium can continue to exist when multiple media outlets compete for access in each period.

Information gatekeeping by authoritarian regimes: We describe an environment with democratic politics to study the electoral implications of information gatekeeping by incumbents.⁴⁰ At the same time, the model's main insights can also apply to authoritarian regimes without free elections. Authoritarian regimes use a variety of suppressive methods, including imprisonment of journalists, outright bans, or even murder to eliminate negative news coverage by local media. When dealing with the international media, however, such regimes may need to employ less brutal forms of control, such as information gatekeeping, to maintain more acceptable images. Our model can be modified to describe a setting in which an authoritarian regime seeks to improve its international image by controlling the international media's access to information sources. Our results suggest that an international media outlet may pander to a repressive regime by adopting a less critical tone in its coverage in exchange of access.

An academic paper published in *Studies in Contemporary History* by historian Harriet Scharnberg provides evidence of such a quid pro quo relationship in the case of Nazi Germany. The paper, covered in an article in *The Guardian*, details how Associated Press (AP) remained the only international news outlet that was able to retain access to Hitler's Germany by entering into "a mutually beneficial two-way cooperation" with the Nazi regime.⁴¹ This cooperation put AP in the presumably profitable situation of being the prime channel for news reports and photos originating in that totalitarian state. The article reports that AP ceded control of its output by signing on to the so-called *Schriftleitergesetz* (editor's law), thus promising not to publish any material "calculated to weaken the strength of the Reich abroad or at home."

Financial news media: Our model focuses on media coverage of political news. However, our theory would also apply to non-political news such as financial news. In particular, the model can be modified to address pandering by financial reporters to

⁴⁰Our focus on electoral politics is consistent with the recent and rising anti-media trend in many democratic countries. As Jennifer Dunham, director of research for Freedom of the Press, stated, "Political leaders and other partisan forces in many democracies—including the United States, Poland, the Philippines, and South Africa—attacked the credibility of independent media and fact-based journalism, rejecting the traditional watchdog role of the press in free societies." (See the report by the research institute Freedom House, which advocates press freedom around the world, entitled "Freedom of the Press 2017: Press Freedom's Dark Horizon.")

⁴¹See the article in *The Guardian* published on March 30, 2016, by Philip Oltermann, entitled "Revealed: How Associated Press cooperated with the Nazis."

companies by putting a positive spin on company-related news in exchange for continued access to information sources and the effect of such spin on stock prices. Dyck and Zingales (2003), who provide strong empirical support for a quid pro quo relationship between reporters and companies in the context of the financial news media, show that a positive spin on a company's news is best explained by reporters' concern for maintaining access to company insiders. Their results indicate that impact of positive news coverage on asset prices is larger (i) when investors have fewer alternative sources of information to turn to, which the authors capture by the number of analysts following the company and (ii) when the newspaper providing coverage is more reputable. These findings provide support for our theory in the context of the financial news media.

Partisan citizens: For simplicity, in our model all citizens hold the same prior belief about the incumbent's ability over the key election issue. We interpret these citizens as the moderate segment of the electorate and assume that their support is crucial to win an election. We can also introduce partisan citizens, who hold heterogeneous prior beliefs on the incumbent's ability. Suppose that, other than the moderate citizens who hold a prior belief p_h , there is also a fraction of citizens who initially hold less favorable views towards the incumbent. These citizens assign a prior probability $p_h^u < p_h$ that the incumbent has high ability. Again, all citizens want to elect the candidate which they believe has the higher ability over the key issue. The only difference this addition makes in the analysis is that now the incumbent faces two different public credibility conditions with $x(p_h, \mu) > x(p_h^u, \mu)$. That is, the citizens who are initially less favorable are harder to convince to vote for the incumbent. When the fraction of unfavorable citizens is sufficiently large and, hence, their support is pivotal, the incumbent may deny access, since satisfying both public credibility and pandering conditions for access simultaneously is impossible. Therefore, an extension with heterogeneous prior beliefs on incumbent ability can generate the prediction that sufficiently unpopular incumbents are likely to deny access to the media.

Partisan media: In our model, the strategic outlet cares only about commercial revenues and has no preferences over which candidate wins the election. The assumption of no ideological bias allows us to illustrate starkly that information gatekeeping by an incumbent alone can induce a media outlet to pander to the incumbent. A different model can introduce partisan media outlets who, in addition to caring for commercial revenues, also have ideological preferences over the candidates. In this environment, positive coverage, say, by a liberal newspaper on a conservative incumbent may be less likely, but it can also have a more pronounced positive effect on public opinion. For example, in the case of print media, Chiang and Knight (2011) find evidence that newspaper endorsements for Democratic candidates from left-leaning newspapers are less influential than are endorsements from neutral or right-leaning newspapers and like-

wise for endorsements for Republican candidates. This alternative model could address how an incumbent's information gatekeeping policy depends on the ideological loyalties of media outlets.

Selective reporting of verifiable information: As Besley and Prat (2006) point out in their concluding remarks, in many instances journalists report personal impressions or rely on sources that cannot be easily verified by readers. Consistent with this observation, our model assumes that the information the media outlet observes on the incumbent's issue-specific ability is unverifiable. As a result, the outlet can engage in outright distortion of facts and misreport low ability as high. However, rather than outright distortion, many real life examples of favorable coverage involve selective reporting of only positive (and verifiable) information and excluding any negative information (see, for example, the discussion in Gentzkow et al (2016)). With a slight modification, we can reinterpret our model and capture favorable coverage as selective reporting of positive and verifiable information as follows.

Suppose that, when granted access, the media outlet observes a set of verifiable facts on the incumbent's ability over the key issue. Specifically, the outlet always observes some positive information regardless of the incumbent's ability. The outlet also observes some negative information only if the incumbent has low ability. The readers, on the other hand, do not observe whether the outlet has uncovered any negative information. In this setting, favorable coverage takes the form of the outlet selectively reporting only positive information and hiding any negative information from the public. With this reinterpretation, our model also applies to the case when the outlet selectively reports verifiable information.

Appendix

A1 Consistency of Beliefs

In this section, we derive the conditions for the consistency of the beliefs.

A1.1 Consistency of citizens' beliefs about the outlet at the time of media consumption decision

Conditional on the media outlet being granted access in any period $t = \{1, 2\}$, the citizens' beliefs about the media outlet's type at the time of their media consumption decisions in period t are consistent with the equilibrium strategies.

At $t = 1$, no information is revealed by the time of the media consumption decision.

Hence, the citizens' beliefs are given by the priors, i.e.

$$\pi_{C1} = p_C, \quad \pi_{S1} = p_S. \quad (\text{A1})$$

At $t = 2$, the beliefs depend on the history. Let $\pi_{C2}(g_1, \omega_1, r_1, \kappa_2)$ and $\pi_{S2}(g_1, \omega_1, r_1, \kappa_2)$ denote, respectively, the probabilities that citizens attach to the media outlet being type C and type S right before the second-period media consumption decision, given the history up to that point (with r_1 observed only if $g_1 = 1$) and conditional on the second-period incumbent κ_2 granting second-period access to the media outlet.

When $g_1 = 0$, no information about the media outlet is revealed up to this point, and so these probabilities are given by the priors regardless of the rest of the history.

When $g_1 = 1$ and $\kappa_2 = B$, since politician B has access to same information as the citizens up to this point, we have

$$\pi_{C2}(g_1, \omega_1, r_1, \kappa_2) = \tilde{\pi}_{C1}(g_1, \omega_1, r_1) \text{ and } \pi_{S2}(g_1, \omega_1, r_1, \kappa_2) = \tilde{\pi}_{S1}(g_1, \omega_1, r_1).$$

When $g_1 = 1$ and $r_1 = \ell$, we have $\pi_{C2}(g_1, \omega_1, r_1, \kappa_2) = 0$ and

$$\pi_{S2}(g_1, \omega_1, r_1, \kappa_2) = \tilde{\pi}_{S1}(g_1, \omega_1, r_1) = \frac{(1 - \rho_1^*)p_S}{(1 - \rho_1^*)p_S + (1 - p_S - p_C)}$$

for all ω_1 and κ_2 .

When $g_1 = 1$, $r_1 = h$ and $\kappa_2 = A$, the citizens' beliefs about the media outlet's type at this point depends on the state ω_1 , the beliefs they hold about θ_1^A at the end of period 1, as well as the equilibrium second-period access control strategy of politician A. Note that

$$\begin{aligned} \pi_{C2}(g_1, \omega_1, r_1, \kappa_2) &= \frac{\Pr(r_1 = h, \omega_1, \theta^J = C, g_2 = 1 | \kappa_2 = A)}{\Pr(r_1 = h, \omega_1, g_2 = 1 | \kappa_2 = A)} \\ &= \frac{\sum_{\theta_1^A \in \{h, \ell\}} \Pr(r_1 = h, \omega_1, \theta^J = C, g_2 = 1, \theta_1^A | \kappa_2 = A)}{\sum_{\theta_1^A \in \{h, \ell\}} \Pr(r_1 = h, \omega_1, g_2 = 1, \theta_1^A | \kappa_2 = A)}. \end{aligned} \quad (\text{A2})$$

The expression for $\pi_{S2}(\cdot)$ is analogous.

For notational convenience, let $x_{\omega_1, \theta}$ denote the probability that politician A with first-period ability $\theta \in \{h, \ell\}$ grants second-period access to the media outlet after being reelected following $r_1 = h$. That is,

$$x_{\omega_1, \theta} = \gamma_2^{A\theta*}(h, \omega_1).$$

In what follows, we need to refer to some notation that are formally introduced later on in the Appendix. Let $\tilde{\beta}_1(1, h, \omega_1)$ denote the posterior probability that citizens attach to $\theta_1^A = h$ at the end of the first period after they observe $r_1 = h$, as defined in section A1.4. Let $\tilde{\pi}_{C1}(1, h, \omega_1)$ and $\tilde{\pi}_{S1}(1, h, \omega_1)$ denote the posterior probabilities that citizens attach to the media outlet being corrupt and strategic, respectively, at the end of the first period after they observe $r_1 = h$, as defined in section A1.2. In the rest of this subsection, we suppress the arguments of these probabilities for ease of exposition.

Recall that when $\theta_1^A = h$, all types of the media outlet report h . When $\theta_1^A = \ell$, a corrupt type always reports h and a strategic type reports h if $\rho_1^* = 1$. Thus, it is

immediate from (A2) that when $g_1 = 1$, $r_1 = h$ and $\kappa_2 = A$, we have

$$\pi_{C2}(g_1, \omega_1, r_1, \kappa_2) = \frac{(\tilde{\beta}_1 x_{\omega_1, h} + (1 - \tilde{\beta}_1) x_{\omega_1, \ell}) \tilde{\pi}_{C1}}{\tilde{\beta}_1 x_{\omega_1, h} + (1 - \tilde{\beta}_1) x_{\omega_1, \ell} (\tilde{\pi}_{C1} + \tilde{\pi}_{S1} \rho_1^*)},$$

and

$$\pi_{S2}(g_1, \omega_1, r_1, \kappa_2) = \frac{(\tilde{\beta}_1 x_{\omega_1, h} + (1 - \tilde{\beta}_1) \rho_1^* x_{\omega_1, \ell}) \tilde{\pi}_{S1}}{\tilde{\beta}_1 x_{\omega_1, h} + (1 - \tilde{\beta}_1) x_{\omega_1, \ell} (\tilde{\pi}_{C1} + \tilde{\pi}_{S1} \rho_1^*)}.$$

To summarize, the consistency of citizens' beliefs about the media outlet's type at the time of their media consumption decisions in period t , conditional on the media outlet being granted access in period t , requires that

$$\pi_{C2}(g_1, \omega_1, r_1, \kappa_2) = \begin{cases} p_C & \text{if } g_1 = 0, \\ \tilde{\pi}_{C1} & \text{if } g_1 = 1, \kappa_2 = B, \\ 0 & \text{if } g_1 = 1, r_1 = \ell, \\ \frac{(\tilde{\beta}_1 x_{\omega_1, h} + (1 - \tilde{\beta}_1) x_{\omega_1, \ell}) \tilde{\pi}_{C1}}{\tilde{\beta}_1 x_{\omega_1, h} + (1 - \tilde{\beta}_1) x_{\omega_1, \ell} (\tilde{\pi}_{C1} + \tilde{\pi}_{S1} \rho_1^*)} & \text{otherwise,} \end{cases} \quad (\text{A3})$$

and

$$\pi_{S2}(g_1, \omega_1, r_1, \kappa_2) = \begin{cases} p_S & \text{if } g_1 = 0, \\ \tilde{\pi}_{S1} & \text{if } g_1 = 1, \kappa_2 = B, \\ \frac{p_S(1 - \rho_1^*)}{p_S(1 - \rho_1^*) + (1 - p_S - p_C)} & \text{if } g_1 = 1, r_1 = \ell, \\ \frac{(\tilde{\beta}_1 x_{\omega_1, h} + (1 - \tilde{\beta}_1) \rho_1^* x_{\omega_1, \ell}) \tilde{\pi}_{S1}}{\tilde{\beta}_1 x_{\omega_1, h} + (1 - \tilde{\beta}_1) x_{\omega_1, \ell} (\tilde{\pi}_{C1} + \tilde{\pi}_{S1} \rho_1^*)} & \text{otherwise,} \end{cases} \quad (\text{A4})$$

where $x_{\omega_1, \theta} = \gamma_2^{A\theta^*}(h, \omega_1)$, $\tilde{\beta}_1 = \tilde{\beta}_1(1, h, \omega_1)$, $\tilde{\pi}_{C1} = \tilde{\pi}_{C1}(1, h, \omega_1)$ and $\tilde{\pi}_{S1} = \tilde{\pi}_{S1}(1, h, \omega_1)$.

A1.2 Consistency of citizens' beliefs about the outlet at the time of voting decision

For all $t = \{1, 2\}$, the citizens' beliefs about the media outlet's type at the time of the voting decision in period t are consistent with the equilibrium strategies. Let I_0 denote the null history and let $I_1 = (g_1, r_1, \omega_1, \kappa_2)$ denote the history at the end of period 1. Suppressing their arguments, let $\pi_{C2} = \pi_{C2}(g_1, \omega_1, r_1, \kappa_2, g_2)$ and $\pi_{S2} = \pi_{S2}(g_1, \omega_1, r_1, \kappa_2, g_2)$ denote the citizens' beliefs about the media outlet's type at the beginning of period 2 as defined in section A1.1. Using the fact that

$$\tilde{\pi}_{Ct}(g_t, r_t, \omega_t, I_{t-1}) = \frac{\Pr(g_t, \omega_t, r_t, \theta^I = C)}{\Pr(g_t, \omega_t, r_t)} \quad \text{and} \quad \tilde{\pi}_{St}(g_t, r_t, \omega_t, I_{t-1}) = \frac{\Pr(g_t, \omega_t, r_t, \theta^I = S)}{\Pr(g_t, \omega_t, r_t)},$$

we obtain

$$\tilde{\pi}_{Ct}(g_t, r_t, \omega_t, I_{t-1}) = \begin{cases} \pi_{Ct} & \text{if } g_t = 0, \\ 0 & \text{if } g_t = 1, r_t = \ell \\ \frac{(\mu p_h + (1 - \mu)(1 - p_h)) \pi_{Ct}}{\mu p_h + (1 - \mu)(1 - p_h)(\pi_{Ct} + \pi_{St} \rho_t^*)} & \text{if } g_t = 1, r_t = h \text{ and } \omega_t = h, \\ \frac{((1 - \mu)p_h + \mu(1 - p_h)) \pi_{Ct}}{(1 - \mu)p_h + \mu(1 - p_h)(\pi_{Ct} + \pi_{St} \rho_t^*)} & \text{otherwise,} \end{cases} \quad (\text{A5})$$

and

$$\tilde{\pi}_{St}(g_t, r_t, \omega_t, I_{t-1}) = \begin{cases} \pi_{St} & \text{if } g_t = 0, \\ \frac{\pi_{St}(1 - \rho_t^*)}{\pi_{St}(1 - \rho_t^*) + (1 - \pi_{Ct} - \pi_{St})} & \text{if } g_t = 1, r_t = \ell, \\ \frac{(\mu p_h + (1 - \mu)(1 - p_h)\rho_t^*) \pi_{St}}{\mu p_h + (1 - \mu)(1 - p_h)(\pi_{Ct} + \pi_{St}\rho_t^*)} & \text{if } g_t = 1, r_t = h \text{ and } \omega_t = h, \\ \frac{((1 - \mu)p_h + \mu(1 - p_h)\rho_t^*) \pi_{St}}{(1 - \mu)p_h + \mu(1 - p_h)(\pi_{Ct} + \pi_{St}\rho_t^*)} & \text{otherwise.} \end{cases} \quad (\text{A6})$$

A1.3 Consistency of citizens' beliefs about the incumbent at the time of private action decision

For all $t = \{1, 2\}$, the citizens' beliefs about the incumbent's type at the time the private action decision are consistent with the equilibrium strategies:

$$\beta_t^i(g_t, f_t^i, r_t, I_{t-1}) = \begin{cases} p_h & \text{if } g_t = 0 \text{ or } f_t^i = 0, \\ 0 & \text{if } g_t = f_t^i = 1 \text{ and } r_t = \ell, \\ \frac{p_h}{p_h + (1 - p_h)(\pi_{Ct} + \pi_{St}\rho_t^*)} & \text{otherwise,} \end{cases} \quad (\text{A7})$$

where I_0 is null, $I_1 = (g_1, r_1, \omega_1, \kappa_2)$, $\pi_{C2} = \pi_{C2}(g_1, \omega_1, r_1, \kappa_2)$ and $\pi_{S2} = \pi_{S2}(g_1, \omega_1, r_1, \kappa_2)$ as defined in section A1.1.

A1.4 Consistency of citizens' beliefs about the incumbent at the time of voting

For all $t = \{1, 2\}$, the citizens' beliefs about the incumbent's type at the time the voting decision are consistent with the equilibrium strategies:

$$\tilde{\beta}_t(g_t, r_t, \omega_t, I_{t-1}) = \begin{cases} \frac{\mu p_h}{\mu p_h + (1 - \mu)(1 - p_h)} & \text{if } g_t = 0 \text{ and } \omega_t = h, \\ \frac{(1 - \mu)p_h}{(1 - \mu)p_h + \mu(1 - p_h)} & \text{if } g_t = 0 \text{ and } \omega_t = \ell, \\ 0 & \text{if } g_t = 1 \text{ and } r_t = \ell, \\ \frac{\mu p_h}{\mu p_h + (1 - \mu)(1 - p_h)(\tilde{\pi}_{Ct} + \tilde{\pi}_{St}\rho_t^*)} & \text{if } g_t = 1 \text{ and } r_1 = \omega_t = h, \\ \frac{(1 - \mu)p_h}{(1 - \mu)p_h + \mu(1 - p_h)(\tilde{\pi}_{Ct} + \tilde{\pi}_{St}\rho_t^*)} & \text{otherwise,} \end{cases} \quad (\text{A8})$$

where I_0 is null, $I_1 = (g_1, r_1, \omega_1, \kappa_2)$ and $\tilde{\pi}_{C2} = \tilde{\pi}_{C2}(g_2, r_2, \omega_2, I_1)$ and $\tilde{\pi}_{S2} = \tilde{\pi}_{S2}(g_2, r_2, \omega_2, I_1)$ as defined in section A1.2.

A1.5 Consistency of politician A 's beliefs about the outlet at the time of second-period access decision

Politician A 's beliefs about the media outlet's type at the time of the second-period access decision must be consistent with the equilibrium strategies. Recall that when $\theta_1^A = h$, all types of the media outlet report h . Hence, when $g_1 = 0$ or when $g_1 = 1$ and $\theta_1^A = h$, no information is revealed about the media outlet's type. However, when $g_1 = 1$ and $\theta_1^A = \ell$, the media outlet's report reveals information about its type. Since $r_1 = \ell$ is possible only when $\theta_1^A = \ell$, the consistency conditions can be written as

$$q_{C2}^A(g_1, \theta_1^A, r_1) = \begin{cases} p_C & g_1 = 0; \text{ or } g_1 = 1, \theta_1^A = h, \\ 0 & \text{if } g_1 = 1 \text{ and } r_1 = \ell, \\ \frac{p_C}{p_C + p_S \rho_1^*} & \text{if } g_1 = 1, r_1 = h \text{ and } \theta_1^A = \ell, \end{cases} \quad (\text{A9})$$

and

$$q_{S2}^A(g_1, \theta_1^A, r_1) = \begin{cases} p_S & g_1 = 0; \text{ or } g_1 = 1, \theta_1^A = h, \\ \frac{p_S(1 - \rho_1^*)}{p_S(1 - \rho_1^*) + (1 - p_C - p_S)} & \text{if } g_1 = 1 \text{ and } r_1 = \ell, \\ \frac{p_S \rho_1^*}{p_C + p_S \rho_1^*} & \text{if } g_1 = 1, r_1 = h \text{ and } \theta_1^A = \ell. \end{cases} \quad (\text{A10})$$

A2 Citizens' Optimal Strategies

A2.1 Optimal private action strategy

A private action strategy for any citizen in period t is a function $\alpha_t : \{A, B\} \times \{0, 1\}^2 \times \{h, \ell\} \rightarrow \{H, L\}$ where $\alpha_t(\kappa_t, g_t, f_t^i, r_t)$ is the action each citizen takes after (i) observing whether incumbent κ_t grants access ($g_t = 1$) or not ($g_t = 0$), (ii) making his own media consumption decision f_t^i and (iii) observing the report r_t whenever he follows the media outlet ($f_t^i = 1$). The optimal private action strategy of the citizens is stated below.

LEMMA 5 *When $p_h \leq \frac{1}{2}$, a citizen chooses action H in period t if and only if the media outlet is granted access, the citizen follows the outlet, the outlet reports that the incumbent has high ability and*

$$\pi_{Ct} + \pi_{St} \rho_t^* < \frac{p_h}{1 - p_h}. \quad (\text{A11})$$

When $p_h > \frac{1}{2}$, a citizen chooses action L if and only if the media outlet is granted access, he follows the outlet and the outlet reports that the politician has low ability.

Proof: Using (2), the probability that citizen i attaches to the state $\omega_t = h$ can be written as

$$\Pr(w_t = h | \beta_t) = \mu \beta_t + (1 - \mu)(1 - \beta_t). \quad (\text{A12})$$

Let $v^e(a; \beta_t)$ denote the expected payoff of citizen i from choosing action $a \in \{H, L\}$ given his belief β_t , i.e.

$$v^e(a; \beta_t) = v(a|h) \Pr(\omega_t = h|\beta_t) + v(a|\ell)(1 - \Pr(\omega_t = h|\beta_t)). \quad (\text{A13})$$

Citizen i 's private action strategy maximizes (A13). Using (1), (A12) and (A13), it is straightforward to see that the optimal action for citizen i is H if and only if $\Pr(\omega_t = h|\beta_t) > \frac{1}{2}$, which holds if and only if

$$\beta_t > \frac{1}{2}. \quad (\text{A14})$$

Suppose $p_h \leq 1/2$. If the media outlet is not granted access in period t or if a citizen does not follow the media outlet in that period, then $\beta_t = p_h$ by (A7) and the citizen chooses action L . If a citizen follows the media outlet and receives $r_t = \ell$, then that citizen chooses action L . This observation follows because by (A7), we have $\beta_t = 0$ when $r_t = \ell$. Since both of these citizens choose action L , any improvement in the private action payoff can only come from a report $r_t = h$ and the resulting switch to action H by the citizen. For such a switch to occur, a citizen must perceive the media outlet's report to be sufficiently informative when the media outlet reports $r_t = h$. From the point of view of this citizen, the informativeness of the media outlet's report is inversely related to the probability that the media outlet misreports low ability. Given the equilibrium reporting strategy ρ_t^* of the strategic type the media outlet, citizen i expects the media outlet to misreport low ability with probability $\pi_{Ct} + \pi_{St}\rho_t^*$. The result then follows from equations (A14) and (A7).

Suppose now $p_h > 1/2$. If the media outlet is not granted access in period t or if a citizen does not follow the media outlet in that period, then $\beta_t = p_h$ by (A7) and the citizen chooses action H . If the media outlet reports $r_t = h$, then we have $\beta_t > 1/2$ regardless of π_{Ct} , π_{St} and ρ_t^* . Therefore, in this case the citizen chooses action L if and only if the media outlet is granted access, the citizen follows the media outlet and receives $r_t = \ell$. ■

A2.2 Optimal media consumption strategy

We restrict attention to symmetric media consumption strategies. A media consumption strategy for any citizen in period t is given by $\phi_t : [0, 1] \rightarrow \{0, 1\}$ where $\phi_t(c) = 1$ iff a citizen with private cost c follows the outlet conditional on the outlet being granted access. Before formalizing a citizen's optimal media consumption strategy, let

$$k_0 = \min\{p_h, 1 - p_h\}(\mu - \frac{1}{2}) \quad (\text{A15})$$

and

$$k_1 = (1 - p_h)(\mu - \frac{1}{2}). \quad (\text{A16})$$

The following lemma characterizes a citizen's optimal media consumption strategy and shows that a citizen follows the media outlet if and only if he perceives its report to be

sufficiently informative, that is, when $\pi_{Ct} + \pi_{St}\rho_t^*$ is sufficiently low.

LEMMA 6 *Citizen i follows the media outlet at time t if and only if the outlet is granted access and*

$$c_i \leq k_0 - k_1(\pi_{Ct} + \pi_{St}\rho_t^*). \quad (\text{A17})$$

Proof: Clearly if the outlet is not granted access, then there is no gain from following the outlet. Thus, A citizen follows the outlet only if the outlet is granted access.

First suppose $p_h \leq \frac{1}{2}$. If citizen i does not follow the outlet in any period t , then by Lemma 5, he chooses action L . By (1), (A12) and (A13), his expected payoff is then given by

$$v^e(L; p_h) = (\mu(1 - p_h) + (1 - \mu)p_h) \frac{1}{2}. \quad (\text{A18})$$

Suppose now (A17) is satisfied. Given $c_i \geq 0$ and since $k_0(p_h, \mu) = p_h(\mu - 1/2)$ when $p_h \leq 1/2$, this in turn implies that (A11) is satisfied. Hence, by Lemma 5, citizen i chooses action H after receiving $r_t = h$ and chooses action L after receiving $r_t = \ell$. Given beliefs (π_{Ct}, π_{St}) about the outlet's type and the outlet's equilibrium reporting strategy ρ_t^* , we have

$$\Pr(r_t = h) = p_h + (1 - p_h)(\pi_{Ct} + \pi_{St}\rho_t^*), \quad (\text{A19})$$

and

$$\Pr(r_t = \ell) = (1 - p_h)(1 - \pi_{Ct} - \pi_{St}\rho_t^*). \quad (\text{A20})$$

The ex ante expected payoff from following the outlet is given by

$$\Pr(r_t = h)v^e(H; \beta_t^h) + \Pr(r_t = \ell)v^e(L; \beta_t^\ell) - c_i \quad (\text{A21})$$

where β_t^r is the probability that citizen i assigns to the incumbent having high ability at time t after he follows the media outlet and receives the report $r \in \{h, \ell\}$. That is, $\beta_t^r = \beta_t(1, 1, r_t, I_t^0)$ (see (A7)).

Therefore, citizen i follows the media outlet if and only if the outlet is granted access and

$$\Pr(r_t = h)v^e(H; \beta_t^h) + \Pr(r_t = \ell)v^e(L; \beta_t^\ell) - c_i \geq v^e(L; p_h). \quad (\text{A22})$$

Note that

$$\begin{aligned} v^e(H; \beta_t^h) &= \Pr(\omega_t = h | \beta_t^h)(1 - q) \\ &= \left(\frac{p_h\mu + (1 - p_h)(\pi_{Ct} + \pi_{St}\rho_t^*)(1 - \mu)}{p_h + (1 - p_h)(\pi_{Ct} + \pi_{St}\rho_t^*)} \right) \frac{1}{2} \end{aligned} \quad (\text{A23})$$

where the first line follows from (1) and (A13); and the second line follows from (A7) and (A12). Similarly, we have

$$v^e(L; \beta_t^\ell) = \frac{\mu}{2}. \quad (\text{A24})$$

If (A17) is satisfied, using (A19), (A20), (A23) and (A24), it is straightforward to see that (A22) is satisfied. Conversely, suppose (A17) is violated. If (A11) is satisfied, from the arguments above, (A22) cannot be satisfied, and thus citizen i does not follow the outlet. If (A11) is violated, then citizen i always chooses action L and his ex ante expected payoff

from following the outlet is equal to $v^e(L; p_h) - c_i$. This last observation follows, since

$$\Pr(\omega = \ell | \beta_t^h) \Pr(r_t = h) + \Pr(\omega = \ell | \beta_t^\ell) \Pr(r_t = \ell) = \Pr(w_t = \ell | p_h).$$

Consequently, (A22) cannot be satisfied.

Suppose now $p_h > \frac{1}{2}$. If citizen i does not follow the outlet in any period t , then by Lemma 5, he chooses action H . By (1), (A12) and (A13), his expected payoff in this case is given by

$$v^e(H; p_h) = (\mu p_h + (1 - \mu)(1 - p_h)) \frac{1}{2} = 1/2 - v^e(L; p_h). \quad (\text{A25})$$

Lemma 5 also implies that citizen i chooses action H after receiving $r_t = h$ and action L after receiving $r_t = \ell$. By arguments similar to those above, citizen i follows the outlet if and only if the outlet is given access and

$$\Pr(r_t = h) v^e(H; \beta_t^h) + \Pr(r_t = \ell) v^e(L; \beta_t^\ell) - c_i \geq v^e(H; p_h). \quad (\text{A26})$$

It is straightforward to verify that (A26) is satisfied if and only if (A17) is satisfied. ■

A2.3 Optimal voting strategy

Recall that the media outlet's report is observed by all citizens before the voting decision. Therefore, a citizen's voting strategy in any period does not depend on whether he followed the outlet or not in that period. Consequently, a voting strategy for any citizen in period t is a function $v_t : \{0, 1\} \times \{0, 1\} \times \{h, \ell\}^2 \rightarrow \{0, 1\}$ where $v_t(\kappa_t, g_t, r_t, \omega_t) = 1$ if and only if citizens vote for the incumbent in period t when the incumbent is κ_t , the incumbent's access decision is g_t , the media outlet reports r_t if granted access, and the citizens observe ω_t .

At the time of the election, the citizens assign a probability $\tilde{\beta}_t$ to the incumbent having high ability, whereas they hold the same prior belief p_h about the challenger's ability. Thus, optimality of the voting strategy requires that for all $t = 1, 2$,

$$v_t^*(\kappa_t, g_t, r_t, \omega_t) = \begin{cases} 1 & \text{if } \tilde{\beta}_t \geq p_h, \\ 0 & \text{otherwise.} \end{cases} \quad (\text{A27})$$

A3 Proofs

The proofs of the results that are not in the main text are presented in this Appendix.

Proof of Proposition 4: The proof that these conditions are jointly sufficient for the existence of a pooling quid pro quo equilibrium has been presented in the main text. The analysis in the main text has also shown that the conditions $p_h \in (p_h^*, 1/2)$, (16), (17) and (18) are necessary for the existence of a pooling quid pro quo equilibrium. Below we establish that condition (19) is necessary for a pooling quid pro quo equilibrium.

Suppose R1, R3 and R4 are satisfied. Consider the reporting decision by the strategic outlet after observing $\theta_1^A = \ell$. For $p_h < 1/2$, if it reports truthfully, it loses second-period

access with probability one by Proposition 3. Its total payoff across the two periods is then given by $V_1(0; p_C, p_S) = \max\{0, k_0 - k_1 p_C\}$.

If the strategic outlet misreports, its first-period payoff is given by

$$V_1(1; p_C, p_S) = \max\{0, k_0 - k_1(p_C + p_S)\}.$$

To compute its expected second-period payoff, note that politician $A\ell$ wins the election in the first period when the outlet misreports. This observation follows because by Proposition 1, access is granted only if citizens vote for politician A after a positive report regardless of their public signal. Given R1, first-period access is granted, and thus citizens vote for A when the outlet misreports. Since R3 is satisfied, the outlet is granted access in the second period regardless of the realization of ω_1 . Consequently, its expected second-period payoff is

$$\max\{0, k_0 - k_1(\mu\pi_{C2}(\ell) + (1 - \mu)\pi_{C2}(h))\}.$$

Accordingly, $\rho_1^* = 1$ is optimal iff

$$\max\{0, k_0 - k_1(p_C + p_S)\} + \max\{0, k_0 - k_1\bar{\pi}_{C2}\} > \max\{0, k_0 - k_1 p_C\} \quad (\text{A28})$$

where $\bar{\pi}_{C2} = \mu\pi_{C2}(\ell) + (1 - \mu)\pi_{C2}(h)$. Note that if the right hand side is zero, so is the left hand side. Furthermore $p_C < \bar{\pi}_{C2}$ and $p_C < p_C + p_S$. Thus, (A28) is satisfied if and only if all three terms in (A28) are strictly positive. Rearranging, we conclude that, given that R1 and R3 are satisfied, if (19) holds, then R2 is also satisfied. ■

Proof of Proposition 5: The maximum probability of misreporting $x(p_h, \mu)$ that the public tolerates is strictly decreasing in the informativeness μ of the public signal. In particular, we have

$$\lim_{\mu \rightarrow \frac{1}{2}} x(p_h, \mu) = 1 \text{ and } \lim_{\mu \rightarrow 1} x(p_h, \mu) = 0.$$

Thus, decreasing μ relaxes conditions (16) and (18). By choosing μ sufficiently low, we can always satisfy these two conditions. Furthermore, increasing p_h relaxes all four conditions in Proposition 4. As p_h increases, (i) $x(p_h, \mu)$ increases and thus the right hand sides of both (16) and (18) are relaxed, (ii) both $\pi_{C2}(\ell)$ and $\pi_{C2}(h)$ decrease and thus the left hand sides of both (18) and (19) are relaxed,⁴² (iii) $y(p_h, \mu)$ decreases and thus the right hand side of (17) is relaxed, (iv) the right hand side of (19) increases. Therefore, choosing μ sufficiently small and $p_h \in (p_h^*, 1/2)$ sufficiently high help to satisfy all four conditions. These observations are stated in (i) and (ii).

Consider the effect of p_C . Since both $\pi_{C2}(\ell)$ and $\pi_{C2}(h)$ are increasing in p_C , we can relax conditions (16), (18) and (19) by decreasing p_C . Therefore, choosing p_C sufficiently small while obeying $p_C \geq y(p_h, \mu)$ helps to satisfy all four conditions. This observation is stated in (iii).

There now remains two considerations for choosing p_S . First, p_S must be chosen

⁴²Intuitively, when the citizens start with a more optimistic prior probability p_h that the incumbent has high ability, upon observing a positive report $r_1 = h$ they are less suspicious that this report is coming from a corrupt type outlet.

sufficiently small so that the right hand side of (19) is relaxed. This is easy to do when $p_h \in (p_h^*, 1/2)$ is sufficiently high. Second, p_s must also be chosen to satisfy $p_C + p_s \leq x(p_h, \mu)$ so that the prior probability that the outlet is honest is sufficiently high. This observation is stated in (iv). ■

Proof of Proposition 6: We establish below that each of the conditions in the proposition are necessary for the existence of a separating quid pro quo equilibrium. The proof that these conditions are jointly sufficient for the existence of a separating quid pro quo equilibrium is presented in the main text.

The conditions $p_h \in (p_h^*, 1/2)$ and (21) follow from Lemma 4. In a separating quid pro quo equilibrium, the public belief $\pi_{C2}(\omega_1)$ and politician Al 's private belief q_{C2}^{Al} that the outlet is corrupt at the time of the second-period media consumption are the same as indicated by (20). Given (20), conditions (22) and (24) are, respectively, the public credibility and pandering conditions that must be satisfied for Al to grant second-period access. Condition (25) is the second-period pandering condition for Ah , and it must be satisfied for Ah to deny second-period access. Finally, condition (23) is necessary for the strategic outlet to misreport in the first period. It follows from plugging (20) in (19). ■

Proof of Proposition 7: Since $x(p_h, \mu)$ increases as μ decreases, lowering μ relaxes both (22) and $p_C + p_s \leq x(p_h, \mu)$. Furthermore, $x(p_h, \mu)$ is increasing in p_h . Thus, increasing p_h also relaxes both (22) and $p_C + p_s \leq x(p_h, \mu)$. Increasing p_h also makes $y(p_h, \mu)$ smaller and relaxes (24). Finally, increasing p_h relaxes (23) through its effect on the right hand side. Therefore, conditions (i) and (ii) in Proposition 7 follow.

Let us choose $p_C < y(p_h, \mu)$ so that (25) is satisfied. Let us also assume (24) is satisfied as an equality:

$$\frac{p_C}{p_C + p_s} = y(p_h, \mu). \quad (\text{A29})$$

Note that $p_C < y(p_h, \mu)$ and condition (A29) corresponds to condition (iv) in the proposition. We now show that all the remaining four conditions in Proposition 6 are satisfied with the additional sufficient condition $p_C \geq y(p_h, \mu)^2$ stated as (iii) in the proposition.

Step 1: Given (A29), we can rewrite $p_C + p_s \leq x(p_h, \mu)$ as

$$p_C + \frac{1 - y(p_h, \mu)}{y(p_h, \mu)} p_C \leq x(p_h, \mu) \quad (\text{A30})$$

Solving for p_C , condition (A30) becomes $p_C \leq x(p_h, \mu)y(p_h, \mu)$. Since $x(\cdot) \leq 1$ and $p_C < y(p_h, \mu)$ by our assumption, condition (A30) is always satisfied.

Step 2: Given (A29), we can rewrite $p_C + p_s \geq y(p_h, \mu)$ as

$$p_C + \frac{1 - y(p_h, \mu)}{y(p_h, \mu)} p_C \geq y(p_h, \mu). \quad (\text{A31})$$

Solving for p_C , condition (A31) becomes $p_C \geq (y(p_h, \mu))^2$. Hence, p_C must be bounded from below by $y(p_h, \mu)^2$ which is stated as condition (iii) in the proposition.

Step 3: Given (A29), condition (22) can be rewritten as $y(p_h, \mu) \leq x(p_h, \mu)$, which is always satisfied for $p_h \in (p_h^*, 1/2)$.

Step 4: Finally, consider (23). Given (A29) and the definition of $y(p_h, \mu)$ in (10), this condition can be rewritten as

$$p_s \leq \frac{3p_h - 1 + (1 - 2p_h)\mu}{1 - p_h}. \quad (\text{A32})$$

But note that, for $p_h < 1/2$, the right hand side of (A32) is strictly greater than one, and hence (A32) is satisfied. ■

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