Political Scandal: A Theory[1]

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Abstract

We study a model that characterizes the conditions under which past misbehavior becomes the subject of present scandal, with consequences for both the implicated politician and the parties that work with him. In the model, both authentic and fake scandals arise endogenously within a political framework involving two parties that trade off benefits of continued collaboration with a suspect politician against the possibility of reputational fallout. Rising polarization between the two parties, we show, increases the likelihood of scandal while decreasing its informational value. Scandals that are triggered by only the opposing party, we also find, are reputationally damaging to both parties and, in some instances, reputationally enhancing to the politician. The model also reveals that jurisdictions with lots of scandals are not necessarily beset by more misbehavior. Under well-defined conditions, in fact, scandals can be a sign of political piety.

1 Introduction

American politics is awash in scandal. The most renowned of them – Teapot Dome, Watergate, Iran-Contra, Monica Lewinsky, Russian collusion – consumed presidents. But outside of the White House, plenty more transgressions, ill-gotten gains, moral lapses, lies, and crimes have derailed the political careers of politicians.[1] As Brandon Rottinghaus (2015, 161) observes, "by their nature, scandals are like prairie fires–easy to flare, difficult to control, and hard to stop once started." Indeed, outside of wars and economic downturns, scandals may be the most disruptive and damaging force in American politics.

As a pervasive and enduring fact of political life, scandals have become the subject of serious empirical scrutiny (for summaries, see Dewberry 2015, 4-12; Rottinghaus 2015, 3-7; Invernizzi 2016). Scholars also have begun to build theory that evaluates the strategic behavior of politicians amidst political scandal (Basinger and Rottinghaus 2012; Dewan and Myatt 2012; Gratton, Holden and Kolotilin 2018). None of the existing scholarship, however, identifies specific conditions under which past misbehavior, through public revelation, translates into present political scandal–a subject that is of intrinsic interest, but that also vexes the inferences we can draw from observational studies of scandals. From both a theoretical and empirical standpoint, the political incentives that undergird the production of scandal remain opaque. As Charles Cameron (2002, 655) laments, "The politics of scandal has not received the degree of serious scholarly attention it probably deserves. [If] scandal seeking and scandal mongering are normal political tactics... then political scientists need to learn their logic." Or as Giovanna Invernizzi (2016, 18) puts it, "we still lack a proper theoretical characterization which puts scandals in the broad context of political structures and strategic behavior of the actors involved."

To make headway on the problem, we distill the essential strategic considerations of scandal production. We define scandal as the public allegation of misbehavior, which may or may not be factually true. In the model, scandals are generated endogenously within a political framework involving two political parties–one aligned with a politician, the other opposed–that trade off benefits (in case of the aligned party) or costs (in case of the opposing party) of continued collaboration with the politician against the reputational consequences of

[1] Exact numbers are hard to come by, in no small part because definitions of "scandal" vary widely. One easily monitored benchmark, though, is public corruption cases. For such crimes, the Justice Department prosecuted 16,293 government officials nationwide between 1997 and 2016, of whom 14,644 were convicted. During this same period, 8,710 federal officials were charged with public corruption, 7,984 of whom were convicted. See: "Reports to Congress on the Activities and Operations of PIN." Public Integrity Section of the U.S. Department of Justice. https://www.justice.gov/criminal/file/1015521/download." These counts, meanwhile, ignore the many other types of misconduct–sexual dalliances, racist avowals, familial betrayals, and the like–that are the subject of political scandal but not legal prosecution.

scandal. With some probability, parties learn that the politician engaged in misconduct. The parties then must decide whether to act publicly on this information, recognizing that doing so will affect the politician's political survival and the parties' reputations for honesty. Parties also may engage in "fake news" tactics by leveling accusations even when they received no substantiating information. The voter, therefore, must decide when scandals reflect actual misconduct, when they are born of deceit, and when, absent any scandal at all, a politician nonetheless warrants removal from office. The implicated politician is voted out of office with probability equal to the voter's belief that he misbehaved; and, with known probability, is replaced by a new politician with a different party affiliation.

We characterize conditions under which different kinds of scandals arise and their consequences both for the careers of politicians and the reputations of parties. A number of findings speak to the relevance of polarization, interpreted as the difference in values that the two parties receive from collaborating with the politician. Increases in polarization, we show, encourage both parties to misrepresent the information that they receive about the politician's misbehavior, one by suppressing the information, the other by fabricating it. Consequentially, polarized politics is fertile ground for "partisan scandal," that is, accusations by the opposing party vehemently denied by the aligned party. Loosely speaking, ideological polarization gives way to partisan finger-pointing, which renders the voter less equipped to assess whether a politician did, in fact, misbehave. And because polarization dampens the electoral risk of scandal for the offending politician, the incidence of misbehavior, when endogenized, reliably increases. In the main, then, the model reveals how polarization breeds dishonesty among parties, uncertainty among voters, and misconduct among politicians.

Similar effects arise with respect to a party's hold on political office. When an implicated politician is likely to be replaced by someone from the opposing party, both parties are more likely to misrepresent the information they receive, which again makes it difficult for the voter to correctly infer misbehavior. Precisely when the voter is predisposed to punish politicians for their misdeeds by replacing them with someone from the opposing party, the voter finds it most difficult to know whether there is cause to do so, which again encourages politicians to misbehave.

The model also clarifies the effects of scandals on the reputations of associated parties and the careers of the politician whose conduct stands in question. When an opposing party unleashes a scandal but an aligned party maintains that no misbehavior occurred, the voter knows with certainty that one party is acting dishonestly. Consequentially, both parties suffer reputationally, each according to the voter's assessment that they are lying. The opposition party suffers more when the voter is surprised by a scandal, while the aligned party suffers more when she is not. When the voter does not expect misbehavior, then upon seeing a partisan scandal, she is inclined to believe that the opposition party is fabricating a scandal; whereas if she believes misconduct is likely, the voter is prone to conclude that the aligned party is dishonestly standing by a corrupt politician.

Interestingly, scandals do not always damage the career prospects of the implicated politician. When voters do not expect to hear about misbehavior, a partisan scandal hurts the politician. But when voters already look upon the politician with suspicion, a partisan scandal can actually be salutary. The reason is subtle but clear. When the voter, ex ante, is inclined to think that the politician misbehaved, the aligned party has more incentives to confirm the voter's expectations and reveal any damaging information it may have. So when the aligned party comes to the politician's defense, the resulting partisan scandal makes the voter more inclined to believe the politician did not misbehave. The aligned party's actions, however, are not without consequence. By defending a politician who stands accused by the opposing party and who is looked upon rather dimly by the voter, the aligned party takes one for the team and absorbs a scandal's political fallout—a finding that illuminates one rational for why the approval ratings of Bill Clinton and Donald Trump remained steady through much of their scandal-ridden presidencies, while the parties that defended them suffered electorally in Congress.

The model also underscores the challenges of discerning true levels of misbehavior from observed scandals. The aligned party is less prone to suppress information about misbehavior as its underlying incidence increases. The opposed party's propensity to fabricate accusations, by contrast, changes nonmonotonically in misbehavior. Depending on parameter values, increases in misbehavior may coincide with either increases or decreases in the production of scandals—a finding with immediate implications for empirical literatures that interpret scandals as proxies for underlying rates of corruption.

We proceed as follows. After summarizing the relevant empirical and theoretical literatures on scandal, we introduce the model. We then characterize the conditions under which parties will attempt to deceive the voter and the implications of their behavior for the incidence of scandal. Subsequent sections characterize the reputational and career effects of different types of scandals and the inferential errors that voters make about them. We then endogenize politician's misbehavior and analyze the (now) strategic behavior of the politician as well as the parties and voter. The final section concludes.

2 Literature Review

Over the last two decades, a growing number of political scientists have sought to clarify the relevance of political scandal for contemporary American politics. Much of the resulting empirical scholarship focuses on the consequences of scandal, whether for its perpetrators, those associated with them, or the larger polity. In addition to negatively affecting a politician's public approval ratings (Simon and Ostrom 1989; Zaller 1998; Andolina and Wilcox 2000, Renshon 2002; Woessner 2005; Green, Zelizer, and Kiriby 2018), scandals have been shown to affect legislative voting patterns (Meinke and Anderson 2001), the strength of party identification (Chaffee and Becker 1975; Dunlap and Wisniewski 1978; Robinson 1974); the nation's policy agenda and inter-branch relations (Rottinghaus 2015), media coverage of politics (Sabato, Stencel, and Lichter 2001; Puglisi and Snyder 2011; Entman 2012), public trust in government and its assessments of political institutions (Lipset and Schneider 1983; Miller 1999; Bowler and Karp 2004; Green, Zelizer, and Kirby 2018), voter assessments of individual candidates (Lipset and Schneider 1983; Carlson, Ganiel, and Hyde 2000; Funk 1996; Banerjee et al 2014; Green, Zelizer, and Kirby 2018), and the outcome of subsequent elections (Welch and Hibbing 1997; Klasnja 2017; Peters and Welch 1980; Pereira and Waterbury 2018; Jacobson and Dimock 1994; Hirano and Snyder 2018; Chong et al 2015).

When are these various disruptions most likely to occur? For answers, scholars have scrutinized the conditions under which past misbehavior turns to present scandal. Some, particularly journalists, emphasize the importance of individual politicians' characters and personal relations (see, for example, Woodward and Bernstein 1974; Toobin 2000; Coen and Chase 2012; Harding 2017; Bongino and McAllister 2018). Political forces, though, also play a part, and political scientists have documented numerous predictors of scandal frequency and duration, including the incidence of divided government (Sowers and Nelson 2016), poverty and political corruption (Nice 1983), the number of other topics vying for news coverage (Nyhan 2015), low approval ratings (Nyhan 2017), and a variety of cultural, historical, and bureaucratic forces (Meier and Holbrook 1992).

Diverse data support these empirical findings, including content analyses of media coverage (Rottinghaus 2015; Nyhan 2015, 2017), expert surveys about corruption perception (Mishler and Rose 2001; Anderson and Tverdova 2003; Boyland and Long 2003), and judicial convictions (Hirano and Snyder 2018). The validity and reliability of such measures are matters of ongoing dispute, as scholars have raised concerns about the changing norms of scandal coverage over time (Adut 2005, 2008), the correlations between convictions for and media perceptions of political corruption (Boylan and Long 2003), and competing definitions of what constitutes a scandal (see Rottinghaus 2015, 18-20; Thompson 2000, 11-30).

For each of their individual strengths and weaknesses, however, all measures within the existing empirical literature document publicly observed scandals. In one way or another, each is based upon the judgments of the media, prosecutors, or experts about the incidence of specific public scandals or impressions of their general occurrence. And as purely descriptive exercises, this is fine and well. But to the extent that we are interested in using these data to make inferences about underlying transgressions, this reliance on publicly observed scandals is highly problematic. Scandals, after all, do not represent a random draw of political misbehavior. As we have learned from those rare instances when a randomized audit has been conducted (see, for example, Ferraz and Finan 2011), patterns of corruption do not map neatly onto patterns of scandal.

To make sense of these politics, it will not do to simply correlate measures of observed scandals against descriptors of the political environment. Politicians who are prone to misbehavior and those who would report their misdeeds, after all, can be expected to strategically adapt to changes in this environment. As Nyhan (2017, 33) aptly notes, "the media scandals that so often dominate the headlines are not exogenous but instead the result of a fundamentally political process. We cannot understand when and why [politicians] suffer from scandals without considering the role of strategic behavior and the context in which events take place."[2]

To clarify this "fundamentally political process," we need theory that identifies specific conditions under which misdeeds are more or less likely to be publicly revealed, and the propensity of would-be perpetrators, a priori, to adjust accordingly. Just now, though, we know very little about the political logic that translates misbehavior (however defined) into scandal (however observed). Though a number of scholars have begun to build theories that illuminate the strategies employed by politicians accused of scandal (Basinger and Rottinghaus 2012; Dewan and Myatt 2012; Gratton, Holden and Kolotilin 2018), none answers a question of rudimentary importance in the politics of scandal: when, and with what consequence, is misbehavior likely to be exposed?

3 A Model

At its heart, scandal is the public revelation of previously concealed misconduct (Dewberry 2015, 4-6; Thompson 2000, 18-19); or as Theodore Lowi (1988, vii) puts it, "scandal is corruption revealed." Of course, public accusations about past misdeeds need not be true, and the politics of scandal regularly features efforts to ascertain the veracity of accusations

[2]Our paper is hence related to literature that tries to understand how observable signals of corruption relate to the actual incidence of corruption, see e.g., Chassang and Padro i Miguel (forthcoming).

leveled against a politician. In addition to specifying processes by which claims of misconduct are asserted, therefore, we need theory that clarifies when "authentic" and "fake" scandals are likely to arise, and the political consequences for the implicated politicians and their associated parties.

We envision a political setting that includes four actors: an aligned party ("it"), an opposing party (also "it"), a politician ("he"), and a voter ("she"). Both parties collaborate with the politician, though only the aligned party benefits from doing so. With probability π, the politician misbehaved—that is, committed an act that, if revealed, would constitute a scandal. Parameter π is therefore interpreted as the underlying *incidence* or *prior perception of misbehavior*.[3] Let $m \in \{0, 1\}$ be a random variable denoting whether or not the politician misbehaved. If $m = 1$, then with probability p, both parties learn about the misbehavior, and with the remaining probability, neither party learns about misbehavior. The parameter p, which reflects the *discoverability of misbehavior*, may assume different values depending on either the nature of the relationship between the parties and politician or the degree of easiness with which politician's misbehavior can be observed by the parties.[4] Let $v \in \{0, 1\}$ be a random variable denoting whether or not the parties have information about the politician's misbehavior.

Each party $i \in \{align, opp\}$ chooses an action $a_i \in \{0, 1\}$ independent of the information it has about the politician's misconduct. Action $a_i = 1$ is interpreted as unleashing a scandal, and action $a_i = 0$ is interpreted as remaining silent. Hence, the choice sets of both parties are not constrained by the information they receive. Each party may choose to honestly report misbehavior when it learns about it ($a_i = 1$ when $v = 1$) or to honestly remain silent when it does not ($a_i = 0$ when $v = 0$). But both parties also are free to suppress information they have learned ($a_i = 0$ when $v = 1$) or to fabricate accusations in the absence of information ($a_i = 1$ when $v = 0$). Such fabrication reflects instances when mere rumors about a politician's misbehavior lead to calls for his dismissal, even though the parties involved have no corroborating information about the charges involved. We refer to any accusation of misbehavior, be it based on observed information or the result of fabrication, as a *scandal*.[5]

[3]As such, π can be interpreted as the latent probability that the partner would misbehave, the strength of a rumor about the partner's misbehavior, or the chances that the partner was involved in some publicly known scandal. It can reflect all verifiable evidence that is disclosed to the voters before the game described in this section unfolds. In this section, the politician is nonstrategic, so π is exogenous, but we endogenize π in Section 6

[4]For ease of exposition, we assume p is common for both parties. The main insights of the paper should carry through if we instead assume that the probability that the aligned party is more likely to learn about misbehavior than the opposing party; and, moreover, that if the opposing party learns about the misbehavior, then so does the aligned party.

[5]Illustrative examples of both kinds of deception abound. Throughout the Trump presidency, congres-

The politics of scandal, Thompson (2000, 245-59) reminds us, are imbued with concerns about reputation and trust. To account for elements of these politics, we allow each party to be one of two types: honest (probability γ) or strategic (probability $1-\gamma$). If a party is honest, then it automatically and immediately reveals any information about the politician's misbehavior; and when it does not receive information about misbehavior, the honest party remains silent. The strategic party optimally chooses $a_i \in \{0, 1\}$ to maximize its payoff.[6] The challenge for the voter, then, is to determine each party's type, the interpretive value of each party's actions, and the likelihood of misbehavior.

We make three assumptions about the processes by which accusations of misbehavior are leveled and the voter's updating of beliefs. First, we assume that the voter knows whether or not each party accused the politician of misconduct and thereby triggered a scandal, either because the parties publicly make accusations of misbehavior themselves or because the (unmodelled) media coverage confers information about a scandal's source(s). Second, we assume that the voter cannot independently corroborate claims of misconduct that are leveled by the politicians. The voter's ability to ascertain the veracity of charges against a politician, therefore, depends upon the parties' incentives to truthfully report the information they receive. Finally, we assume that the electorate is fully Bayesian. The voter, as such, updates her views about the parties, the politician, and the incidence of misbehavior even if no scandal occurs.

We consider a one-period game with the following timing:

1. Nature chooses the random variable m, which denotes the incidence of misbehavior.

sional Republicans routinely denied knowing about any corroborating evidence concerning the subjects of the president's past misdeeds, be they communications with the Russian government, financial conflicts of interest, or ethnical breaches by his family members. When assuming the role of aligned party in our model rather than implicated politician, Trump has done much the same for his political partners both at home and abroad. When in the fall of 2018 the Saudi Crown Prince was accused of ordering the killing of Saudi dissident and U.S. citizen Jamal Khashoggi, Trump steadfastly ignored the findings of his own Central Intelligence Agency and insisted that "we may never know" who ultimately was responsible. For their part, many Democrats denied knowing about Hillary Clinton's decision to scrub a personal email account that was improperly used for official state business.

Fake scandals also are endemic to modern political life. In May 1993, for instance, seven workers in the White House Travel Office were summarily fired, Republican critics falsely charged, in order to make room for the cronies of newly elected president Bill Clinton. More recently, Democrats falsely accused Trump of having removed the statue of Martin Luther King from the White House, and Trump falsely accused Barack Obama of being a Muslim born in a foreign country, ordering that the Trump Tower be wiretapped during the 2016 presidential election, and planting a spy within his campaign for the presidency. And lest you think fake scandals are a distinctly American phenomenon, consider what happened in Poland after a 2010 plane crash that killed the president and many high-ranking dignitaries: the party affiliated with the deceased president falsely claimed to have evidence that the governing party conspired with Russia to commit murder, yielding an international scandal that lacked any factual basis.

[6] Strictly as an interpretive matter, the existence of honest parties need not be taken literally, but instead as a technical tool that allows us to capture reputation building (see Kreps and Wilson, 1982). Our results hold even if one views γ as arbitrarily small.

2. If the politician misbehaved, in which case $m = 1$, then with probability $p \in (0,1)$ both of the parties learn its value, and $v = 1$. With the remaining probability, or if $m = 0$, the parties learn nothing, and $v = 0$.
3. Both parties simultaneously and independently decide whether to publicly claim that they received information about misbehavior, denoted by action $a_i \in \{0,1\}$.
4. The voter observes (a_{align}, a_{opp}) and updates her beliefs about each party's type **and** the occurrence of misbehavior by the politician.
5. The politician is replaced with probability equal to the voter's beliefs that he misbehaved, and the respective benefits from collaboration are realized.

The strategic party obtains payoff from three sources. The first source is its reputation for honesty, which depends on the belief that the voter holds about its type at the end of the game.[7] The value of such reputational concerns can be understood either intrinsically or instrumentally, such that parties with higher reputations are electorally advantaged.[8] Given the action of the aligned party a_{align} and the opposing party a_{opp}, let $\phi_i(a_{align}, a_{opp})$ denote the voter's beliefs about party i's type and $\Phi(a_{align}, a_{opp})$ denote the voter's beliefs about whether misconduct occurred.

The second source of payoff concerns each party's benefits from continued collaboration, x_i. For the aligned party, we assume $x_{align} > 0$, and for the opposing party, $x_{opp} < 0$. In the analysis below, we assume symmetry between the two parties' collaborative gains and losses, $x_{align} = -x_{opp} \doteq x$. Increases in one quantity, therefore, necessarily imply equivalent decreases in the other. We interpret x as a marker of political *polarization*. The more polarized the parties are, after all, the more they benefit from having their own member in power, and the more they suffer from an opposing politician holding power. (For other plausible interpretations of x, see Section 6.)

The final payoff concerns the expected collaborative gains from a politician's replacement. We assume that the politician is dismissed with probability equal to voter's belief that the politician misbehaved $\Phi(a_{align}, a_{opp})$. If the politician is not dismissed, each party is guaranteed to receive its allotted collaboration payoff at the end of the game. If the politician

[7] Then-Commerce Secretary Herbert Hoover recognized precisely this reputational benefit when he offered the following counsel to his beleaguered President Warren Harding about how best to handle incriminating information about offending members of his administration: "Publish it," Hoover intoned, "and at least get the credit for integrity on your side" (as quoted in Whyte 2017, 283).

[8] Future iterations of the model might account for additional reputational concerns regarding, for instance, a party's judgment. Whereas honesty centers on concerns about the propensity of parties to truthfully reveal information they have acquired, judgment relates to prior (and in our case, unmodelled) decisions that parties make about who they choose to collaborate with.

is dismissed, however, the returns to each party depend on the identity of his replacement, which we capture with the parameter $c \in [-1, 1]$. If $c = 1$, then the new politician has the same political allegiance as the old. If $c = -1$, however, the new politician's political allegiances flip. We interpret c as a measure of the aligned party's *political entrenchment*. When the aligned party's hold on power is strong, then voters replace politicians they perceive as dishonest with politicians from the same party, which is captured by $c = 1$. When the aligned party's hold is more tenuous, then voters replace such politicians with politicians from the opposing party, so that $c = 0$. Thus understood, c reflects the propensity of voters to punish the party of the implicated politician in any particular race.

These three elements constitute the strategic politician's utility function:

$$\phi_i \left(a_{align}, a_{opp}\right) + \left(1 - \Phi\left(a_{align}, a_{opp}\right)\right) x_i + \Phi\left(a_{align}, a_{opp}\right) x_i c \qquad (1)$$

where the first element defines their reputations for honesty, the second element represents their returns from collaborating with the current politician, x_i, weighted by the probability that the politician is not fired, and the third element represents their expected returns from collaborating with the politician's replacement, $x_i c$, weighted by the probability that the politician is fired.

Thus stipulated, the most natural interpretation of the model, and the one we carry throughout the paper, treats the politician as the current president (or some other powerful leader), the aligned party as the president's party, and the opposing party as its opposition. By virtue of working with the president, both parties are privy to information about his misbehavior that is hidden from voters' view. To pick but one recent domestic example, representatives of both parties may participate in the same private meetings and observe first hand what language the president uses when describing, say, the home countries of immigrants.[9] This information is often non-verifiable, allowing the parties to say what they will about the president after the meeting. On the basis of what the parties report publicly, voters update their views about all of the attendees, with potential consequences for the politician's electoral viability and the parties' reputations for honesty.

Of course, though, we need not interpret these designations literally. Depending on how it is construed, the media, which is notably absent from the model, could be assigned to the roles of either the voter or the two parties. Fact-finding journalists, for instance, must decide whether to publish accusations of misbehavior and what exactly to say about them. To the extent that actions their affect the politician's electoral fortunes, such journalists might stand in for the voter in this model. Alternatively, one might think of partisan media

[9] Josh Dawsey, "Trump derides protections for immigrants from 'shithole' countries." *Washington Post,* January 12, 2018.

outlets with distinct relationships with politicians. To the extent that they are privy to information about the politician's misbehavior, have the option of revealing it, and benefit reputationally from appearing honest, dueling networks might stand in for parties. And, of course, still other designations might apply. The politician might be a CEO, the aligned and opposing parties might represent competing interest groups, and the voter might be a regulatory agency. Alternatively, the politician might be an operative within an international organization, the aligned and opposing parties might be opposing member states, and the voter might be a judicial body. To satisfy the scope conditions of the model, all that matters is that distinct entities that interact with a politician periodically learn damaging, but nonverifiable, information about him and then have an opportunity to level accusations against him before an individual or body that has the power to administer punishment.

4 Analysis

In the service of empirical relevance, we focus the analysis on equilibria in which the opposing party never suppresses information about misbehavior, and the aligned party never fabricates it. Hence, any equilibrium considered in this paper is fully characterized by the conditional probability that the strategic type of the aligned party who learns about misbehavior suppresses it, denoted by $s \in [0, 1]$, and by the conditional probability that the strategic type of the opposing party who does not learn about misbehavior fabricates accusation, denoted by $f \in [0, 1]$.

Our first proposition stipulates the existence of an equilibrium, and shows that multiplicity of equilibria is limited. All proofs are collected in the appendix.

Proposition 1 *There exists an equilibrium. For any set of parameters for which in some equilibrium $f > 0$ or $s > 0$, there may exist at most one other equilibrium in which $f = s = 0$.*[10]

In our analysis, whenever two equilibria coexist, we select the one with some level of dishonesty of the parties. This equilibrium selection criterion, however, does not affect the qualitative findings that follow.

The next proposition stipulates key comparative statics on parties' dishonest behavior: the opposing party's propensity to fabricate information and the aligned party's propensity to suppress it.[11]

[10] For more information on the equilibria, see Lemma 1 in the appendix.

[11] Throughout, when we say "increase" or "decrease" we mean "weakly increase" or "weakly decrease" as for some parameters we have corner solutions in which the equilibrium behavior does not change further with the parameters.

Proposition 2 *In equilibrium,*

1. *f and s increase in x;*
2. *f and s decrease in c;*
3. *f increases in p; s also increases in p, unless $f = 1$;*
4. *s decreases in π, while f may increase or decrease in incidence of misbehavior π.*

The proposition's first result is straightforward. As polarization x increases, the opposing party suffers greater collaborative losses from the sitting politician, whereas the aligned party collects greater collaborative benefits. Consequently, the former is more inclined to claim to have received information about the politician's misbehavior in order to force him out, and the latter is more inclined to suppress information to protect him. Similar incentives arise if political entrenchment of the aligned party c decreases, as the aligned party is more likely to suffer and the opposing party is more likely to benefit from the sitting politician's replacement.

The proof of Proposition 2 reveals that parties' incentives to suppress or fabricate information depend on the difference between the payoffs from collaboration with the current politician, x_i, and the expected payoffs from collaboration with his replacement, $cx_i+(1-c)(-x_i)$. For that reason, in subsequent propositions we focus on the joint product, $x_i\,(1-c)$. Comprising the polarization between two parties (x) and the probability of a politician's replacement by a member of the opposite party $(1-c)$, this joint product can be understood as the *stakes of an election.*

We also find that fabrication f always increases in discoverability of misbehavior p, and suppression s generally does so. In this way, discoverability goes hand in hand with deception. Meanwhile, suppression s decreases in the prior perception of misbehavior π. As underlying rates of misbehavior increase, the aligned party is prone to face the music and admit its occurrence. The effect of changes in π on fabrication f, however, remains ambiguous. Depending on parameter values, increases in misbehavior may correspond with either increases or decreases in fabrication.

Competing forces undergird these comparative statics. As p or π increase, parties are more likely to have received information about the politician's misbehavior, and hence the voter expects a scandal. Consequentially, both parties have incentives to produce one, making suppression less likely and fabrication more likely. Another effect, however, cuts in the opposite direction. If the voter expects that the aligned party is unlikely to suppress information, then should the aligned party do so, the voter will interpret the opposing party's claims about misbehavior as fabrication, which decreases the opposing party's incentives to fabricate. Similarly, if the opposing party is expected to not fabricate scandals, the voter is inclined to interpret the aligned party's silence as suppression, which in turn increases this party's incentives to claim to have received information about misbehavior. In other words, forces within the model push dishonest behavior in the form of fabrication f and suppression s in the same direction. A priori, it is not obvious which effect should dominate, and Proposition 2 provides the answer.[12]

Collectively, these results reveal that fabrication and suppression tend to be complements, which helps explain why, with scandals looming, we so often see politicians on one side of a divide lobbing unfounded accusations, while politicians on the other fall in line behind the accused. When the opposing party is prone to fabrication, the aligned party's decision to suppress does not result in much reputational loss, since the voter is inclined to think that the opponent lied. Similarly, when the aligned party is expected to suppress information, the opposing party's decision to pretend to have received corroborating information about a scandal is not reputationally damaging, since the voter is inclined to think that the aligned party lied. In this way, deception begets deception.

4.1 Incidence of Scandals

Because both parties receive the same information about misbehavior, we never observe a case where only the aligned party recognizes its occurrence. In equilibrium, scandals arise either because both parties claim to have received information about misbehavior (yielding "bipartisan" scandals) or because only the opposition does so (yielding "partisan" scandals).[13]

The production of scandals partially follows from the two parties' propensities to deceive, albeit not symmetrically. For a scandal to be triggered, only one party needs to allege misbehavior. Moreover, every time that the opposing party learns about misbehavior, regardless of whether it is honest or strategic, it will reveal the information to the voter. Hence, the aligned party's propensity to suppress information is irrelevant for the overall level of scandals, and it is the opposing party's propensity to fabricate scandals that drives scandal production. This means that factors that encourage the opposing party to fabricate

[12]When π increases, there is an additional effect. The voter perceives the politician as corrupt, and hence she is inclined to vote him out of power even in the absence of a scandal, which encourages both parties to behave more honestly. This effect further complicates the comparative statics in part 3.

[13]If the aligned party was more likely to observe misbehavior, some scandals would originate with this party. Realistically, though, the opposition party would follow up with accusations of their own, so for voters such scandals may be indistinguishable from bipartisan scandals. For that reason, we expect our results would hold in a more complex model in which parties learn differentially about misbehavior but are allowed to level accusations sequentially in an order that is unobserved by the voter.

scandals positively contribute to the emergence of scandal. Each of the comparative statics on scandal in Proposition 3 then flow reasonably straightforwardly from those observed on f in Proposition 2.

Proposition 3 *The incidence of scandals:*

1. *increases in* $x(1-c)$ *and* p*;*
2. *may increase or decrease in* π*.*

The overall volume of scandals increases in the stakes of an election: during periods of heightened polarization and when a sitting politician's replacement is likely to be from the opposite party. We also see that scandals are more likely to arise when the discoverability of misconduct p is large, a finding that is perfectly consistent with Thompson's (2000, 108) observation that "the growing prevalence of political scandal is the other side—the dark side, as it were—of the increasing visibility of political leaders." And just as fabrication changes non-monotonically in changes in the underlying rates of misconduct, so does the overall incidence of scandal.

Proposition 3 underscores the dangers of equating scandals with actual misconduct. Two places with identical levels of misconduct but that differ in polarization x, political entrenchment c, or misconduct discoverability p may yield very different quantities of scandals. But holding x, c, and p constant does not necessarily solve the inference problem. Given the non-monotonicities in the underlying incidence of misbehavior π, it is possible for one location to support less misbehavior than another and yet produce more overall scandals. The lesson for empirical work is apparent: scandals can be a poor proxy for actual misconduct; and efforts to ascertain the depth of an underlying problem on the basis of public accusations about it can be misleading.[14]

Thus far, we have examined the effects of parameter changes on the total volume of scandals. Notice, though, that in equilibrium, scandals can arise either because only the opposition party accuses the politician or because both parties do so. As the next corollary stipulates, changes in stakes of an election $x(1-c)$ have very different effects on the production of these two types of scandals.

Corollary 1 *As* $x(1-c)$ *increase, the incidence of bipartisan scandals decreases and the incidence of partisan scandals increases.*[15]

[14] Commenting on precisely this disjuncture between scandals and underlying misconduct, Suzanne Garment (1991, 6) notes, "Certainly there is no plausible estimate of any actual rise in federal corruption since Watergate that matches the explosive increase in scandal during the same period."

[15] The incidence of bipartisan scandals increases in p and π for obvious reasons, but the relationship between incidence of partisan scandals and those parameters is complicated and not instructive.

As polarization x increases, the opposing party suffers greater collaborative losses from the sitting politician. And as political entrenchment c decreases, the chances that the sitting politician will be replaced by another more to the opposing party's liking also increases. As a result, the opposing party has greater incentives to fabricate news about the politician's misbehavior, with the hope that the voter will fire him, whereas the aligned party has greater incentives to act in ways that protect the sitting politician. As the opposing party fabricates more often and the aligned party suppresses more, bipartisan scandals surface less often while partisan scandals proliferate. In this way, heightened polarization and lower party entrenchment do not merely augment the production scandal. They also lend credence to charges of "fake news."

4.2 Political Consequences of Scandal

We turn now to identifying the political consequences of scandals. It will not do to simply estimate the average political consequences of scandals. We also must scrutinize their differential effects on the reputations of various political actors. As we show in this section, scandals can have a wide range of effects on both the parties that instigate them and the politicians who stand at their center. Depending on parameters and the type of scandal, parties or the politician may suffer reputationally, they may benefit, or they may be altogether unaffected.

Let's begin with the political consequences of bipartisan scandals. Recall that $\phi_i\left(a_{align}, a_{opp}\right)$ denotes the voter's beliefs about party i's type and $\Phi\left(a_{align}, a_{opp}\right)$ denotes the voter's beliefs about whether misconduct occurred. After both parties allege misbehavior, the voter updates her beliefs as follows:

Proposition 4 *In equilibrium,*

$$\phi_{opp}\left(1,1\right) = \gamma \leq \phi_{align}\left(1,1\right);$$

$$\Phi\left(1,1\right) = 1,$$

where the inequality is strict if $s > 0$.

The voter knows that the opposing party always publicizes misbehavior that it observes, and sometimes it fabricates information in its absence. The aligned party, by contrast, only casts accusations after having learned about misbehavior. Having observed a bipartisan scandal, therefore, the voter knows with certainty that the politician misbehaved, and hence

$\Phi(1,1) = 1$.[16] Because the strategic and honest types of the opposing party pool in this instance, however, the voter doesn't learn anything new about the opposing party's type, and hence $\phi_{opp}(1,1) = \gamma$, where γ, you will recall, is the voter's baseline belief that a party is honest. Bipartisan scandals, however, do cause the voter to update positively on the aligned party. The fact that the aligned party did not suppress information that it received about the politician's misbehavior makes the voter more inclined to believe that it is the honest type, and hence $\phi_{align}(1,1) > \gamma$, provided $s > 0$.[17]

When exposed to a partisan scandal, the voter is much less certain about the parties' types and the politician's behavior. It is possible that both parties learned about misbehavior but that the aligned party opted to suppress it. Alternatively, neither party may have learned about misbehavior, but the opposing party opted to fabricate information about its occurrence. As the next proposition stipulates, the voter's updated beliefs about the politician's behavior and the relative blame she assigns to the parties both depend upon two key parameters, π and p.

Proposition 5 *Partisan scandals arise only if stakes of an election are reasonably large, $x(1-c) > \frac{\gamma}{2}\frac{1-\pi p}{1-\pi}$. For those parameters, the reputations of both parties decrease,*

$$\phi_{opp}(0,1) < \gamma;$$

$$\phi_{align}(0,1) < \gamma;$$

$$\phi_{opp}(0,1) + \phi_{align}(0,1) = \gamma.$$

If voters do not expect scandals, such that $\pi p < \frac{1}{2}$, then

1. $\phi_{opp}(0,1) < \phi_{align}(0,1)$;
2. $\Phi(0,1) \geq \pi$.

If voters expect scandals, such that $\pi p > \frac{1}{2}$, then

3. $\phi_{opp}(0,1) > \phi_{align}(0,1)$;

[16] If we interpret π as the "the strength of the rumor" and the instigation of a scandal by the aligned party as the party withdrawing its support for one of its members, some inferences about recent scandals follow rather naturally. Consider, for example, the 2017 case of Senator Al Franken being accused of sexual misconduct, and allow π to capture the strength of the initial evidence against him. We know that the party that benefits from Franken's collaboration will never pretend to observe misbehavior. The fact that the Democratic Party encouraged Franken to resign, then, should lead the voter to conclude that misbehavior did in fact occur.

[17] We have assumed that the voter dismisses the politician with the probability equal to her belief that the politician misbehaved, so if $\Phi(1,1) = 1$, then the politician is dismissed with probability 1. Alternatively, we could interpret a bipartisan scandal as a situation in which the aligned party dismisses the politician after an outcry from the opposing party.

4. $\Phi(0,1) \leq \pi$.

All inequalities are strict if $s, f < 1$.

Notice, first, that partisan scandals always damage both parties' reputations. Having observed a partisan scandal, the voter can be sure that one of the two parties is the strategic type; and as a consequence, she is half as likely to believe that both parties are honest.

The damage wrought by partisan scandals, however, is not equally distributed across the two parties. Rather, the reputational fallout for each of the parties depends upon the voter's baseline beliefs about the incidence of misbehavior and the probability that the parties learn about it. To understand the intuition for Proposition 5, consider first the case in which $\pi p < \frac{1}{2}$, when parties are unlikely to have information about misbehavior, either because misbehavior is rare or hard to detect. Here, the voter does not expect to see scandals, and so she is inclined to believe that a partisan scandal is triggered by fabrication rather than suppression, causing her to penalize the opposing party more than the aligned one. Knowing the voter's calculus, the opposing party fabricates fewer scandals, but not to the extent that the inference is wiped out. To understand why the implicated politician suffers reputationally, note that the voter's inference from a partisan scandal depends on whether a partisan scandal is more likely when the politician misbehaved or when he did not. The former is higher when suppression s is higher than fabrication f, and vice versa. The opposing party appropriately curtails its dishonesty to mitigate the reputational fallout, so indeed suppression is higher than fabrication, $s > f$, and hence $\Phi(0,1) \geq \pi$.

When $\pi p > \frac{1}{2}$, the voter expects that parties are privy to information on misbehavior, and hence she expects a scandal. Under this scernario, the voter is inclined to interpret a partisan scandal as a result of suppression and not fabrication, and she therefore penalizes mainly the aligned party for the perceived dishonesty. The aligned party responds by decreasing suppresion$s$, which leads to $s < f$. When suppression is lower than fabrication, a partisan scandal is more likely when no misbehavior occurred than when it did. Remarkably, then, the politician's reputation benefits from a partisan scandal.

In this way, we can see how the subjects of political scrutiny can actually benefit from partisan scandal. While both parties suffer reputationally, albeit not equally, the politician himself comes out looking better than he did before. Though hardly dispositive, this finding at least rationalizes a curious feature of contemporary American politics: partisan scandals routinely damage the reputations of both the Democratic and Republican parties, while the public approval ratings of these scandals' primary subject—be he Bill Clinton or Donald Trump—appear noticeably resilient.

The next proposition clarifies how rising the stakes of an election affect the political consequences of partisan scandal.

Proposition 6 *As $x(1-c)$ increases, $|\phi_{opp}(0,1) - \phi_{align}(0,1)|$ increases and $|\Phi(0,1) - \pi|$ decreases.*[18]

When polarization x rises, the reputational fallout of partisan scandals falls disproportionately on one party, and the consequences of partisan scandals for the politician, whether positive or negative, attenuate. Similarly, and consistent with Hirano and Snyder's (2018) empirical findings on the subject, the political consequences of scandals vary according to a party's entrenchment in a political office, c. On net, when stakes of an election are high due to high polarization and low political entrenchment of the aligned party, the difference in political fallout for the parties is large whereas the consequences for the implicated politician tend to be small.

4.3 Errors of Inference

With rising polarization, we have seen, come rising scandals. Increasingly, moreover, the scandals that emerge are instigated by the opposing party alone. These facts have implications not only for the contents of inferences that the voter draws, but also for their accuracy.

Proposition 7 *The probability that the voter makes a wrong decision (keeping a misbehaving politician or firing a well-behaved one) increases in $x(1-c)$ and decreases in p.*

That the probability the voter commits either a Type I or Type II error is increasing in stakes of an election $x(1-c)$ flows intuitively from Proposition 3. As the returns from collaborating with a politician and his possible replacement increasingly differ for the two parties, the more likely it is that the parties will behave dishonestly. Consequentially, the scandals that arise are less informative, which increases the chances that the voter will either conclude that the politician did not misbehave, when in fact he did; or that the politician did misbehave, when in fact he did not.

The relationship between the likelihood that misbehavior will be discovered and the incidence of inferential errors is less straightforward. On the one hand, we know from Proposition 2 that as as misbehavior discoverability p increases, the dishonesty of both parties tends to increase and, consequentially, scandals become less informative. On the other hand, as p increases, the parties are more likely to learn about misbehavior; and as a consequence, they

[18]The comparative statics with respect to p and π depends on the parameters in a complicated way that is not instructive.

are in a position to deliver more information to the voters. Proposition 7 says that the latter effect dominates.

We omit comparative statics with respect to the underlying incidence of misbehavior π, which are rather obviously nonmonotonic. Even without strategic considerations, the voter is most likely to make a mistake when the incidence of misbehavior π is intermediate. When π approximates 1 or 0, after all, the voter proceeds with justified confidence that the politician either did or did not misbehave. Strategic effects further complicate this nonmonotone relationship.

It should now be clear that the informational value of scandals varies dramatically. Amidst rising levels of polarization and weakening information networks, partisan scandals proliferate. This, though, also is when voters are most likely to draw the wrong conclusions about the politician in question. Rather than strengthening informational channels and the possibilities for democratic accountability, polarization and the fracturing of political relationships undermine them both.

5 Endogenous Misbehavior

Up until now, we have treated misbehavior exogenously. The results, as such, speak to the class of scandals in which the commission of a politically damaging act is uninformed by political considerations, either because they occurred long ago, because they were not under the politician's control, or because they were the result of ignorance or compulsion.[19] We now endogenize misbehavior, which renders both the parties and politician as strategic actors, and which allows us to speak to another class of political scandals. In this extension, the politician's willingness to misbehave depends upon the likelihood that the parties will reveal it and the voter will remove him from office. Overall, the main qualitative findings about the incidence of scandals and their reputational consequences carry through, but we recover new insights about the politician's propensity to misbehave.

The order of the game proceeds exactly as before, except that now the politician, rather than nature, chooses m in the first stage. Suppose that the politician receives benefit b from misbehavior, where $b \sim U\left[-\left(1-B\right), B\right]$ with $B \in (p, 1)$, and benefit 1 from being in office.[20] If he knew he would get away with it, the politician would misbehave and thereby recover this b whenever positive. Given the possibility of either party alleging misbehavior, however, the politician must weigh b against the expected costs of scandal.

[19] The results of the previous section also apply if we interpret π not as the incidence of misbehavior but as the strength of rumors about a particular politician.

[20] Assuming $B < 1$ rules out equilibria in which all politicians misbehave. We assume $B > p$ to ascertain that some types misbehave for most parameters.

Given the voter's beliefs about incidence of misbehavior π, the politician with a particular b decides whether to misbehave or not, which determines the actual probability of misbehavior π. An equilibrium, therefore, identifies the optimal incidence of misbehavior, π^*, given the voter's beliefs are π^*.

Proposition 8 *There exists an equilibrium. If there exist multiple equilibria, for each set of parameters consider equilibria with the lowest (highest) equilibrium level of misbehavior π^*. Then*

1. *π^* increases in $x(1-c)$;*
2. *π^* decreases in p.*

From Proposition 2 , we know that as the stakes of an election $x(1-c)$ increase, parties are more likely to either fabricate or suppress information. Consequentially, voters' decisions are less informed about the politician's actual misconduct, which encourages the politician to misbehave. Given their limited informational content, Proposition 8 states, threats of revelation are less damaging in expectation, which makes the guaranteed benefits of misconduct more attractive.

The comparative statics with respect to misconduct discoverability p are more involved. Again from Proposition 2 we know that parties are more likely to act deceptively as their probability of learning about misbehavior increases. Because they also are more likely to observe misbehavior when it occurs, however, the voter simultaneously is more likely to become informed. Proposition 8 states that this latter effect dominates. As p increases, voters' decisions are more closely related to misbehavior, and the politician's incentives to misbehave accordingly decline.

The comparative statics on scandal incidence is more nuanced. From Proposition 3 we know that as stakes of an election $x(1-c)$ and misconduct discoverability p increase, the incidence of scandals increases via an increase in fake accusations f. Having endogenized misbehavior, however, an additional effect comes into play via equilibrium incidence of misbehavior π^*, and from Proposition 3 we know that this effect has an ambiguous sign. As a result, the total effects of $x(1-c)$ and p on the incidence of scandals also are ambiguous. Still, as the next proposition states, some non-intuitive relationships can be observed in equilibrium.

Proposition 9 *There exist parameters for which the incidence of scandals increases in p.*

Combining Proposition 8 with 9, we see that there exist parameters for which increasing misconduct discoverability p decreases misbehavior and at the same time increases the production of scandals. This finding provides further reason to exercise caution when inferring misconduct from scandal. Indeed, institutions and jurisdictions with lower rates of misbehavior may experience more scandals than those with higher rates.

The findings on the political consequences of scandal that were presented in Proposition 5 carry through when misbehavior is endogenized. Moreover, Proposition 8 implies that we are likely to be in the $\pi^* p < \frac{1}{2}$ regime when stakes of an election $x(1-c)$ is relatively small, and in $\pi^* p > \frac{1}{2}$ otherwise. Hence, when the consequences of a politician's dismissal are large for the parties, scandals have little impact on the politician but do substantial reputational damage to the aligned party.[21]

Lastly, identifying conditions under which voters make inferential errors is even more complex than previously recognized in Section 4.3. For example, Proposition 7 says that as stakes of an election $x(1-c)$ increase, voters are more likely to make a wrong decision about a politician's fate. But since an increase in $x(1-c)$ increases the equilibrium incidence of misbehavior π^*, a second effect arises, in which the probability of making the wrong decision first increases and then decreases in the equilibrium incidence of misbehavior π^*. Hence, if we start in an environment with low levels of misbehavior, then as in the exogenous misbehavior case, increases in the stakes of an election $x(1-c)$ compromise the voter's ability to correctly infer misbehavior. We cannot rule out that the reverse holds, however, if we start in an environment with high levels of misbehavior.

6 Conclusion

Details about political scandals intermittently baffle and astound. Often, no rationale would seem to account for the immoral, illegal, or unethical acts at their center. The reasons why politicians do things that endanger their and their associates' careers seem incomprehensible. And perhaps they are. But the occurrence of scandals is not. The transformation of private misbehavior into public scandal is a deeply political process.

To investigate this political process, we study a model that is intentionally austere. The model abstracts away from many factors that condition the frequency and consequences of scandal production, such as the partisan leanings of voters (Cortina and Rottinghaus 2017), timing considerations about when to reveal misbehavior (Gratton, Holden, and Kolotilin

[21] Since π^* is decreasing in p, the set of p for which $\pi^* p < \frac{1}{2}$ is likely to be more complex, and we refrain from characterizing such a set recognizing that our results would depend upon the distributional assumptions we make about b. The distributional assumptions are unlikely to affect the comparative statics results that we present in this section. However, they could affect the set of p for which we have $\pi^* p < \frac{1}{2}$. If benefits from misconduct are likely to be large, for instance, then we can expect π^* to be large for many values of p. If not, $\pi^* p < \frac{1}{2}$ may obtain for all values of p.

2018), the resources and objectives of the media (Entman 2012), the influence of fact-checkers that might independently verify charges of misconduct (Nyhan and Reifler 2015), evolving understandings of political misconduct (Adut 2005, 2008), and the contextual relevance of different types of misbehavior (Nyhan 2015). Future work should investigate these matters. As the first formal theory of scandal revelation, however, this paper focuses squarely on the eminently strategic considerations that affect when and with what consequences scandals arise in the first place.

Our model yields a rich collection of results. For example, as the returns from collaboration improve, aligned parties are prone to suppress information about a politician's misbehavior. Similarly, higher returns from collaboration also affect the reputational gains from accusing a politician of having misbehaved and the reputational losses from not doing so. And no wonder. When a party discloses the misbehavior of a close associate, the voter is especially likely to conclude that it must be the honest type. And if it does not do so, the voter has reason to conclude that the party knew about the misbehavior all along but opted to stay quiet in order to reap the gains of continued collaboration, as only the strategic type would do.

We also find that polarization accelerates the production of political scandals, a finding that is at once immediately relevant for contemporary American politics and amenable to empirical investigation. Because these scandals tend to be partisan in nature, however, the voter does not learn very much about the politician in question. Remarkably, scandals in this setting can redound to the benefit of the offending politician. When only the opposing party alleges misbehavior, the voter may infer that the politician did not misbehave after all, even as she downgrades her assessment of both parties—a finding, we suggest, that is at least consistent with Trump maintaining steady approval ratings amidst widespread accusations of scandal, while the reputations of the two major parties foundered.

The model also clarifies why higher numbers of scandal do not necessarily imply higher levels of misbehavior. Fixing existing levels of misbehavior, one may observe very different levels of scandals depending on the benefits parties receive from working with a politician, the probability that the parties will learn about his misbehavior, and the likelihood that he will be replaced by someone with different partisan commitments. Moreover, changes in misbehavior do not necessarily yield equivalent changes in scandal. Indeed, marginal increases in misbehavior sometimes decrease the number of scandals that arise.

Throughout this paper, we have equated x with polarization. Interpreted in alternative ways, however, the parameter reveals other strategic dimensions of scandal politics. Most obviously, x can be understood as the importance of a politician's vote for a legislative outcome. To see this, compare a legislator in a chamber in which one party holds a bare majority and another in which it holds a massive supermajority. Clearly, keeping polarization constant, the value of this legislator is much higher in the former case, and hence, we should expect him to be a more frequent subject of partisan accusations, but also less susceptible to their consequences. Similarly, we might relate x to features of the electoral environment. Compare two electoral settings, one in which the outcome is in doubt and the other in which one party is all but assured to win. In the former environment, parties should value their reputations more, which, indirectly, may be reflected in the assignment of a lower x. In this case, we should expect more misbehavior to come to light in the form of bipartisan scandals, and partisan scandals to have larger reputational consequences for the implicated politician. Loosely speaking, heightened inter-party competition should encourage voters to hold misbehaving politicians accountable for their actions.

In various ways, the logic of revelation also varies according to the acts and relationships that characterize different scandals. The Trump presidency again provides representative examples of each. The baseline model captures the logic of scandals that concern acts committed without any obvious consideration for their political consequence, such as Trump's alleged dalliances with porn stars and *Playboy* models. When endogenizing misbehavior, meanwhile, we turn our attention to scandals that arise from calculated misbehavior, which broadly characterizes the subject of Robert Mueller's investigations into the Russian government's interactions with the Trump campaign. As we have seen, some of the comparative statics on both scandal and reputation attenuate across these models. When conducting empirical work on scandals, then, it will not do to simply count their occurrence or measure their general significance. Attention must be paid to the nature of the acts and the structure of relationships between the implicated politicians and associated parties. Scandals are decidedly not idiosyncratic or arbitrary–but nor are they of a piece.

7 Appendix

7.1 Preliminaries

Using Bayes' rule, the following formulas hold

$$\phi_{align}(1,1) = \frac{\gamma}{\gamma + (1-s)(1-\gamma)},$$

$$\phi_{opp}(1,1) = \gamma,$$

$$\phi_{align}(0,0) = \gamma,$$

$$\phi_{opp}(0,0) = \frac{\gamma}{\gamma + (1-f)(1-\gamma)},$$

$$\Phi(1,1) = 1 \text{ and } \Phi(0,0) = \pi\frac{1-p}{1-\pi p},$$

and as long as $f + s \neq 0$, we have

$$\phi_{align}(0,1) = f\gamma\frac{1-\pi p}{f(1-\pi p) + \pi p s},$$

$$\phi_{opp}(0,1) = \pi p\gamma\frac{s}{f(1-\pi p) + \pi p s},$$

$$\Phi(0,1) = \pi\frac{f(1-p) + ps}{f(1-\pi p) + \pi p s}.$$

7.2 Proofs for Section 4

Notation 1 *Let* $z \equiv 2(1-c)x$.

Proof for Proposition 1. To prove Proposition 1, we prove Lemma 1 below, which describes equilibria in more detail. Those details will be useful in the subsequent proofs. ■

Lemma 1 *The following describes all equilibria in which the aligned party never fabricates accusations and the opposing party never suppresses information.*

1. *There exists a fully honest equilibrium in which* $f = s = 0$ *if and only if*

$$z \leq 2\frac{\gamma(1-p\pi)}{1-\pi}. \tag{2}$$

2. *There exists a fully mixing equilibrium in which*

$$s = \frac{(1-\pi)z - \gamma(1-\pi p)}{(1-\gamma)((1-\pi)z + \pi p\gamma)} \tag{3}$$

$$f=\pi p\frac{(1-\pi)z-\gamma(1-\pi p)}{(1-\gamma)\left(\gamma(\pi p-1)^2+\pi p(1-\pi)z\right)} \tag{4}$$

if and only if

$$\frac{\gamma(1-\pi p)}{(1-\pi)}<z<\min\left\{\frac{1-\pi p\gamma}{1-\pi},\frac{1-\pi p}{\pi p}\frac{1-\gamma+\pi p\gamma}{1-\pi}\right\}. \tag{5}$$

3. *There exists an equilibrium in which $f=1$ and*

$$s=z\frac{1-\pi}{(1-\gamma)(1-\pi)z+\gamma(1-\gamma+\pi p\gamma)} \tag{6}$$

if and only if $\pi p>\frac{1}{2}$ and $z\in\left(\frac{1-\pi p}{\pi p}\frac{1-\gamma+\pi p\gamma}{(1-\pi)},\frac{1-\gamma+\pi p\gamma}{1-\pi}\right)$.

4. *There exists an equilibrium in which $s=1$ and*

$$f=\pi pz\frac{1-\pi}{\pi p(1-\gamma)(1-\pi)z+\gamma(1-\pi p)(1-\pi p\gamma)} \tag{7}$$

if and only if $\pi p<\frac{1}{2}$ and $z\in\left(\frac{1-\pi p\gamma}{1-\pi},\frac{1-\pi p}{\pi p}\frac{1-\pi p\gamma}{1-\pi}\right)$.

5. *There exists a fully dishonest equilibrium with $f=s=1$ if and only if*

$$\max\left\{\frac{(1-\gamma(1-\pi p))}{(1-\pi)},\frac{1-\pi p\gamma}{1-\pi}\frac{1-\pi p}{\pi p}\right\}\leq z. \tag{8}$$

Proof of Lemma 1. Consider the incentives of the aligned party with $v=1$. In the equilibria we consider, this party knows that $a_{opp}=1$, and hence its payoffs as a function of its decision are:

$$\begin{aligned}
[a_{align}=1] &: \phi_{align}(1,1)+cx+(1-c)(-x),\\
[a_{align}=0] &: \phi_{align}(0,1)+(1-\Phi(0,1))x+\Phi(0,1)(cx+(1-c)(-x)).
\end{aligned}$$

So the aligned party weakly prefers to suppress information if and only if

$$\phi_{align}(1,1)-\phi_{align}(0,1)\leq(1-\Phi(0,1))2x(1-c). \tag{9}$$

The opposing party with $v=0$ knows $a_{align}=0$, and hence its payoffs as a function of its decision are:

$$\begin{aligned}
[a_{opp}=1] &: \quad \phi_{opp}(0,1)-(1-\Phi(0,1))\,x-\Phi(0,1)\,xc+\Phi(0,1)(1-c)\,x, \\
[a_{opp}=0] &: \quad \phi_{opp}(0,0)-(1-\Phi(0,0))\,x-\Phi(0,0)\,xc+\Phi(0,0)(1-c)\,x.
\end{aligned}$$

So the opposing party weakly prefers to fabricate if and only if

$$\phi_{opp}(0,1)-\phi_{opp}(0,0)\geq-(\Phi(0,1)-\Phi(0,0))\,2x\,(1-c)\,. \tag{10}$$

We will consider now all possible combinations of f and s, assuming first that the aligned party does not have incentives to fabricate scandals and the opposing party does not have an incentive to suppress information. At the end of the proof, we show that in the putative equilibria described in the lemma this is indeed so. Note that from (9) and (10) parties' incentives depend on x and c only via $2x\,(1-c)$; hence, in the interest of space, we use Notation 1, $z\equiv 2x\,(1-c)$, in the remainder of the appendix.

Consider first $f=0$ and $s=0$, that is, a fully honest equilibrium. In this equilibrium, both parties' actions agree, so $\Phi(0,1)$, $\phi_{opp}(0,1)$ and $\phi_{align}(0,1)$ are not pinned down by Bayes' rule. But if this is an equilibrium, then from (9) and (10), together with the formulas from Section 7.1 it must be that

$$\frac{\gamma-\phi_{opp}(0,1)}{z}+\frac{(1-p)\,\pi}{(1-p)\,\pi+(1-\pi)}\geq\Phi(0,1)\geq\frac{-\gamma+\phi_{align}(0,1)}{z}+1.$$

The left-hand side (LHS) decreases in $\phi_{opp}(0,1)$, and the right-hand side (RHS) increases in $\phi_{align}(0,1)$, so the range of parameters for which an honest equilibrium exists is largest when we set $\phi_{opp}(0,1)=0$ and $\phi_{align}(0,1)=0$. So the existence of this equilibrium requires

$$\frac{\gamma}{z}+\frac{(1-p)\,\pi}{(1-p)\,\pi+(1-\pi)}\geq\Phi(0,1)\geq\frac{-\gamma}{z}+1,$$

and hence we can find a nonempty set of $\Phi(0,1)\in(0,1)$ if and only if (2) is satisfied.

Consider now an equilibrium in which both parties mix, that is, $f\in(0,1)$ and $s\in(0,1)$. Plugging the formulas from Section 7.1 into (9) and (10) satisfied with equalities, and solving for f and s, we obtain (3) and (4). For this to be an equilibrium, we need that indeed $f\in(0,1)$ and $s\in(0,1)$, which delivers (5).

Consider now $f=1$ but $s\in(0,1)$. From (9) and (10), this equilibrium requires

$$\phi_{align}(1,1)-\phi_{align}(0,1)=(1-\Phi(0,1))\,z,$$

$$\phi_{opp}\left(0,1\right)-\phi_{opp}\left(0,0\right)\geq-\left(\Phi\left(0,1\right)-\Phi\left(0,0\right)\right)z.$$

Plugging the formulas from Section 7.1, we obtain that (6) solves the first equation and the inequality is satisfied if

$$z\geq\frac{\left(1-\pi p\right)}{\pi p}\frac{-\gamma+\pi p\gamma+1}{\left(1-\pi\right)}.$$

Condition $s\in\left(0,1\right)$ requires that

$$\frac{1-\gamma+\pi p\gamma}{\left(1-\pi\right)}>z.$$

Combining these, we obtain the condition of part 2 of the lemma.

Consider now $s=1$ and $f\in\left(0,1\right)$. From (9) and (10), this equilibrium requires

$$\phi_{align}\left(1,1\right)-\phi_{align}\left(0,1\right)\leq\left(1-\Phi\left(0,1\right)\right)z,$$

$$\phi_{opp}\left(0,1\right)-\phi_{opp}\left(0,0\right)=-\left(\Phi\left(0,1\right)-\Phi\left(0,0\right)\right)z.$$

Plugging the formulas from Section 7.1, we obtain that (7) solves the second equation and the inequality is satisfied if

$$z\geq\frac{1-\pi p\gamma}{\left(1-\pi\right)}.$$

Condition $f\in\left(0,1\right)$ requires that

$$z<\left(1-\pi p\right)\frac{1-\pi p\gamma}{\pi p\left(1-\pi\right)}.$$

Combining these, we obtain the condition of part 3 of the lemma.

Consider now $f=1$ and $s=1$. From (9) and (10), this is an equilibrium if and only if

$$\phi_{align}\left(1,1\right)-\phi_{align}\left(0,1\right)\leq\left(1-\Phi\left(0,1\right)\right)z,$$

$$\phi_{opp}\left(0,1\right)-\phi_{opp}\left(0,0\right)\geq-\left(\Phi\left(0,1\right)-\Phi\left(0,0\right)\right)z.$$

Plugging the formulas from Section 7.1 and using $f=s=1$, we obtain that this is an equilibrium if and only if (8) holds.

Consider now $f=0$ and $s>0$. From (9) and (10), this is an equilibrium only if

$$\phi_{opp}\left(0,1\right)-\phi_{opp}\left(0,0\right)\leq-\left(\Phi\left(0,1\right)-\Phi\left(0,0\right)\right)z,\tag{11}$$

but in this equilibrium there is no updating about the opposing party's type, and hence

$\phi_{opp}(0,1) = \phi_{opp}(0,0) = \gamma$, while $(\Phi(0,1) - \Phi(0,0)) > 0$, so (11) cannot be satisfied. For similar reasons we can rule out an equilibrium in which $s = 0$ and $f > 0$.

It remains to show that in any of the putative equilibria identified above, the aligned party has no incentive to fabricate a scandal and the opposing party has no incentive to suppress information. Consider the aligned party. If no misbehavior is observed, its payoffs as a function of its decision are:

$$\begin{aligned}
[a_{align} = 1] \quad : \quad & f\left[\phi_{align}(1,1) + cx + (1-c)(-x)\right] \\
& + (1-f)\left[\phi_{align}(1,0) + (1-\Phi(1,0))x + \Phi(1,0)(cx + (1-c)(-x))\right]; \\
[a_{align} = 0] \quad : \quad & f\left[\phi_{align}(0,1) + (1-\Phi(0,1))x + \Phi(0,1)(cx + (1-c)(-x))\right] \\
& + (1-f)\left[\phi_{align}(0,0) + (1-\Phi(0,0))x + \Phi(0,0)(cx + (1-c)(-x))\right].
\end{aligned}$$

So the aligned party does not fabricate if

$$\begin{aligned}
& f\left((\phi_{align}(1,1) - \phi_{align}(0,1)) - (1-\Phi(0,1))z\right) \\
+ & (1-f)\left(\phi_{align}(1,0) - \phi_{align}(0,0) - z(\Phi(1,0) - \Phi(0,0))\right) \quad < \quad 0.
\end{aligned} \tag{12}$$

The first expression in (12) is negative if $f > 0$ and is 0 if $f = 0$. So using $\phi_{align}(1,1) = \gamma$ from Section 7.1, (12) is satisfied if

$$\phi_{align}(1,0) - \gamma - z\left(\Phi(1,0) - \pi\frac{1-p}{1-\pi p}\right) < 0. \tag{13}$$

Consider the opposing party. If misbehavior is observed, its payoffs as a function of its decision are:

$$\begin{aligned}
[a_{opp} = 1] \quad : \quad & s\left(\phi_{opp}(0,1) - (1-\Phi(0,1))x - \Phi(0,1)xc + \Phi(0,1)(1-c)x\right) \\
& + (1-s)\left(\phi_{opp}(1,1) - (1-\Phi(1,1))x - \Phi(1,1)xc + \Phi(1,1)(1-c)x\right); \\
[a_{opp} = 0] \quad : \quad & s\left(\phi_{opp}(0,0) - (1-\Phi(0,0))x - \Phi(0,0)xc + \Phi(0,0)(1-c)x\right) \\
& + (1-s)\left(\phi_{opp}(1,0) - (1-\Phi(1,0))x - \Phi(1,0)xc + \Phi(1,0)(1-c)x\right).
\end{aligned}$$

So the opposing party prefers to not to suppress information if

$$\begin{aligned}
& s\left(\phi_{opp}(0,1) - \phi_{opp}(0,0) + (\Phi(0,1) - \Phi(0,0))z\right) \\
+ & (1-s)\left(\phi_{opp}(1,1) - \phi_{opp}(1,0) + (\Phi(1,1) - \Phi(1,0))z\right) \quad \geq \quad 0.
\end{aligned} \tag{14}$$

The first expression in (14) is positive if $s > 0$ and is 0 if $s = 0$. So using $\phi_{opp}(0,0) = \gamma$ from

Section 7.1, (14) is satisfied if

$$\gamma - \phi_{opp}(1,0) + (1 - \Phi(1,0))\, 2\,(1-c)\, x > 0. \tag{15}$$

Since history $(1,0)$ is off the equilibrium path, Bayes rule does not restrict $\phi_{opp}(1,0)$, $\phi_{align}(1,0)$ and $\Phi(1,0)$, and straightforwardly one can find such beliefs that satisfy (13) and (15). For example, $\phi_{opp}(1,0) = \phi_{align}(1,0) = \gamma$ and $\Phi(1,0) \in \left(\pi\frac{1-p}{1-\pi p}, 1\right)$ will do. Hence, the behavior described in the lemma indeed constitutes equilibria for certain off-equilibrium beliefs.

■

Lemma 2 *Define*

$$\bar{s}(z,p,\pi) = \begin{cases} 0 \;\; \textit{if } z < \frac{\gamma(1-p\pi)}{(1-\pi)} \\ \frac{(1-\pi)z-(\gamma-\pi p\gamma)}{(1-\gamma)((1-\pi)z+\pi p\gamma)} \;\; \textit{if } z \in \left(\frac{\gamma(1-p\pi)}{(1-\pi)}, \min\left\{\frac{1-\pi p\gamma}{1-\pi}, \frac{1-\pi p}{\pi p}\frac{1-\gamma+\pi p\gamma}{(1-\pi)}\right\}\right) \\ \frac{z(1-\pi)}{(1-\gamma)(1-\pi)z+\gamma(1-\gamma+\pi p\gamma)} \;\; \textit{if } z \in \left(\min\left\{\frac{1-\pi p\gamma}{1-\pi}, \frac{1-\pi p}{\pi p}\frac{1-\gamma+\pi p\gamma}{(1-\pi)}\right\}, \max\left\{\frac{1-\gamma+\pi p\gamma}{1-\pi}, \frac{1-\pi p}{\pi p}\frac{1-\pi p\gamma}{1-\pi}\right\}\right) \\ 1 \;\; \textit{if } z \geq \max\left\{\frac{1-\gamma+\pi p\gamma}{1-\pi}, \frac{1-\pi p}{\pi p}\frac{1-\pi p\gamma}{1-\pi}\right\} \end{cases}$$

and

$$\bar{f}(z,p,\pi) = \begin{cases} 0 \;\; \textit{if } z < \frac{\gamma(1-p\pi)}{(1-\pi)} \\ \frac{\pi p((1-\pi)z-\gamma(1-\pi p))}{\left(\gamma(\pi p-1)^2+\pi p z(1-\pi)\right)(1-\gamma)} \;\; \textit{if } z \in \left(\frac{\gamma(1-p\pi)}{(1-\pi)}, \min\left\{\frac{1-\pi p\gamma}{1-\pi}, \frac{1-\pi p}{\pi p}\frac{1-\gamma+\pi p\gamma}{(1-\pi)}\right\}\right) \\ \frac{\pi p z(1-\pi)}{\pi p(1-\gamma)(1-\pi)z+\gamma(1-\pi p)(1-\pi p\gamma)} \;\; \textit{if } z \in \left(\min\left\{\frac{1-\pi p\gamma}{1-\pi}, \frac{1-\pi p}{\pi p}\frac{1-\gamma+\pi p\gamma}{1-\pi}\right\}, \max\left\{\frac{1-\gamma+\pi p\gamma}{1-\pi}, \frac{1-\pi p}{\pi p}\frac{1-\pi p\gamma}{1-\pi}\right\}\right) \\ 1 \;\; \textit{if } z \geq \max\left\{\frac{1-\gamma+\pi p\gamma}{1-\pi}, \frac{1-\pi p}{\pi p}\frac{1-\pi p\gamma}{1-\pi}\right\} \end{cases}$$

For each two parameters fixed, $\bar{s}$ *and* $\bar{f}$ *are absolutely continuous in the third.*

Proof of Lemma 2. That $\bar{s}$ and $\bar{f}$ are continuous can be established by checking all possible discontinuity points. To show that $\bar{s}$ and $\bar{f}$ are absolutely continuous, we ignore the constraints, take the derivatives of each of the possible formulas for $\bar{s}$ and $\bar{f}$ with respect to the parameter of interest, and show that these derivatives are bounded. This is an easy exercise; hence, we demonstrate this only for z to illustrate the approach.

$$\left|\frac{\partial \bar{s}(z,p,\pi)}{\partial z}\right| = \begin{cases} 0 \\ \frac{\gamma(1-\pi)}{(1-\gamma)((1-\pi)z+\pi p\gamma)^2} < \frac{(1-\pi)}{(1-\gamma)\gamma(\pi p)^2} \\ \frac{(1-\pi)\gamma(1-\gamma+\pi p\gamma)}{(1-\gamma)(1-\pi)z+\gamma(1-\gamma+\pi p\gamma)} < (1-\pi) < \frac{(1-\pi)}{(1-\gamma)\gamma(\pi p)^2} \end{cases},$$

$$\left|\frac{\partial \bar{f}(z,p,\pi)}{\partial z}\right| = \begin{cases} 0 \\ \frac{\pi p\gamma(\pi-1)(\pi p-1)}{\left(\gamma(\pi p-1)^2+\pi p z(1-\pi)\right)^2(1-\gamma)} < \frac{\pi p(1-\pi)}{\gamma(1-\pi p)^3(1-\gamma)} \\ \frac{\pi p(1-\pi)\gamma(1-\pi p)(1-\pi p\gamma)}{(\pi p(1-\gamma)(1-\pi)z+\gamma(1-\pi p)(1-\pi p\gamma))^2} < \frac{\pi p(1-\pi)}{(\gamma(1-\pi p)(1-\pi p\gamma))} < \frac{\pi p(1-\pi)}{\gamma(1-\pi p)^3(1-\gamma)} \end{cases}.$$

So the Lipschitz constant for $\bar{s}$ is $\frac{(1-\pi)}{(1-\gamma)\gamma(\pi p)^2}$ and the Lipschitz constant for $\bar{f}$ is $\frac{\pi p(1-\pi)}{\gamma(1-\pi p)^3(1-\gamma)}$.
■

Proof of Proposition 2. With our equilibrium selection, f and s are described by $\bar{f}$ and $\bar{s}$ from Lemma 2, and hence they are absolutely continuous. Hence, to establish any unconditional comparative statics of Proposition 2, it is sufficient to establish that this comparative statics holds within each equilibrium, and that it has the same sign as we move between equilibria types identified in Lemma 1. The comparative statics on f (and s) is trivially true for the set of parameters for which $f = 0$ or $f = 1$ ($s = 0$ or $s = 1$), so it suffices to focus on the remaining equilibria types.

Recall notation $z = 2(1-c)x$, and consider the comparative statics with respect to z, which immediately then implies the comparative statics with respect to x and c. For the range of parameters for which we are in the equilibrium with $f \in (0,1)$ and $s \in (0,1)$, we totally differentiate (3) and (4) to obtain

$$\frac{ds}{dz} = \frac{\gamma}{(1-\gamma)}\frac{(1-\pi)}{(z(1-\pi)+\pi p\gamma)^2} > 0,$$

$$\frac{df}{dz} = \frac{1}{(1-\gamma)}\frac{\pi p\gamma(1-\pi)(1-\pi p)}{(\gamma(1+\pi^2p^2-2\pi p)+\pi p z(1-\pi))^2} > 0.$$

For the set of parameters for which we are in the equilibrium with $s = 1$ and $f < 0$ we differentiate (7) to obtain

$$\frac{df}{dz} = \pi(1-\pi)p\frac{\gamma(1-\pi p)(1-\pi p\gamma)}{(\pi p(1-\gamma)(1-\pi)z+\gamma(1-\pi p)(1-\pi p\gamma))^2} > 0.$$

For the set of parameters for which we are in the equilibrium with $f = 1$ and $s < 0$ we differentiate (6) to obtain

$$\frac{ds}{dz} = (1-\pi)\frac{\gamma(-\gamma+\pi p\gamma+1)}{((1-\gamma)(1-\pi)z+\gamma(1-\gamma+\pi p\gamma))^2} > 0.$$

This establishes part (1) and (2).

Consider now p. For the set of parameters for which we are in the equilibrium with

$f \in (0,1)$ and $s \in (0,1)$, we totally differentiate (3) and (4) to obtain

$$\frac{ds}{dp} = \frac{\gamma}{(1-\gamma)} \frac{\pi\gamma}{(z - \pi z + \pi p\gamma)^2} > 0,$$

$$\frac{df}{dp} = \frac{\pi\gamma}{(1-\gamma)} \frac{(1-\pi) z - \gamma (\pi p - 1)^2}{(\gamma (1 + \pi^2 p^2 - 2\pi p) + \pi p z (1-\pi))^2} > 0,$$

For the set of parameters for which we are in the equilibrium with $s = 1$ and $f < 1$ we differentiate (7) to obtain

$$\frac{df}{dp} = \pi z (1-\pi) \frac{-\gamma (\pi p - 1)(\pi p\gamma + 1)}{(\pi p (1-\gamma)(1-\pi) z + \gamma (1-\pi p)(1-\pi p\gamma))^2} > 0$$

For the set of parameters for which we are in the equilibrium with $f = 1$ and $s < 1$ we differentiate (6) to obtain

$$\frac{ds}{dp} = z \frac{-(1-\pi)\pi\gamma^2}{((1-\gamma)(1-\pi) z + \gamma (1 - \gamma + \pi p\gamma))^2} < 0.$$

So f increases in p. From the above, we know that s decreases in p only if we are in $(f = 1, s < 1)$ equilibrium.

Consider now the comparative statics with respect to π. Let us start with s. For the set of parameters for which we are in the equilibrium with $f \in (0,1)$ and $s \in (0,1)$, we differentiate (3) to obtain

$$\frac{ds}{d\pi} = -\frac{\gamma}{(1-\gamma)} \frac{z - p\gamma}{(z - \pi z + \pi p\gamma)^2} < 0,$$

where this inequality follows from the fact that $z > \frac{\gamma(1-\pi p)}{(1-\pi)} > \gamma > p\gamma$ is required for this equilibrium. For the set of parameters for which we are in the equilibrium with $f = 1$ and $s < 0$ we differentiate (6) to obtain

$$\frac{ds}{d\pi} = z \frac{\gamma (\gamma - p\gamma - 1)}{((1-\gamma)(1-\pi) z + \gamma (1 - \gamma + \pi p\gamma))^2} < 0.$$

Consider now the comparative statics on f with respect to π. Consider the fully mixing equilibrium. Differentiating (4), we obtain

$$\frac{df}{d\pi} = \frac{p\gamma}{(1-\gamma)} \frac{p (z - p\gamma) \pi^2 + (2p\gamma - 2z) \pi + (z - \gamma)}{(\gamma (1 + \pi^2 p^2 - 2\pi p) + \pi p z (1-\pi))^2} \begin{cases} > 0 \text{ if } \pi < \pi_0 \\ < 0 \text{ if } \pi > \pi_0 \end{cases}, \tag{16}$$

where

$$\pi_0 = \frac{1}{p(z-p\gamma)}\left(z-p\gamma-\sqrt{z(z-p\gamma)(1-p)}\right) \in (0,1)$$

is the smaller root of the quadratic equation in the numerator. To show that f may increase or decrease in π, it suffices to show that there exists z such that full randomization is an equilibrium for this z for π in the neighborhood of π_0. Consider $p < \frac{1}{2}$. Using the formula for π_0, we obtain that $z > \frac{\gamma(1-\pi_0 p)}{(1-\pi_0)}$ as long as $z > \gamma$, and $z < \frac{1-\pi_0 p\gamma}{1-\pi_0}$ as long as $p\gamma < z < \frac{1}{2(1-p)}\left((2-\gamma)(1-p)+\sqrt{-(p-1)(-4\gamma-4p\gamma+\gamma^2+3p\gamma^2+4)}\right)$, and these conditions do not contradict each other if $p < \frac{1}{2}$. So by part 4 of Lemma 1 one can find z for which full mixing is an equilibrium in the neighborhood of π_0. ■

Proof of Proposition 3. The formula for the total number of scandals is

$$S = f(1-\pi p)(1-\gamma)+\pi p. \tag{17}$$

So S does not depend on s, and S increases in f. From Proposition 2, we know that f increases in z (and strictly so when $f \in (0,1)$), hence S increases in z (and strictly so when $f \in (0,1)$). Similarily, S strictly increases in p and weakly in f. From Proposition 2, f also increases in p, so S strictly increases in p. And finally, consider the fully mixing equilibrium. Differentiating S with respect to π and using (16) and (4), we obtain

$$\begin{aligned}\frac{dS}{d\pi} &= p(1-(1-\gamma)f)+(1-\pi p)(1-\gamma)\frac{df}{d\pi}\\ &= pz\gamma(1-\pi p)\frac{1-2\pi+\pi p}{(\gamma+\pi^2p^2\gamma-2\pi p\gamma-\pi^2pz+\pi pz)^2}\begin{cases} >0 \text{ for } \pi < \frac{1}{2-p}\\ < \text{ for } \pi > \frac{1}{2-p}\end{cases}\end{aligned}$$

So take z in the interior of the interval from part 4 of Lemma 1 for $\pi = \frac{1}{2-p}$. For all $\pi \in \left(\frac{1}{2-p}-\varepsilon, \frac{1}{2-p}+\varepsilon\right)$, z is still such that the equilibrium is fully mixing, and in this equilibrium, $\frac{dS}{d\pi} > 0$ for $\pi \in \left(\frac{1}{2-p}-\varepsilon, \frac{1}{2-p}\right)$ and $\frac{dS}{d\pi} < 0$ for $\pi \in \left(\frac{1}{2-p}, \frac{1}{2-p}+\varepsilon\right)$.

Consider bipartisan scandals. Since the opposing party alleges misbehavior whenever the aligned party does, the incidence of bipartisan scandals is $S_{bi} = \pi p(\gamma+(1-\gamma)(1-s))$. S_{bi} decreases in s, and by Proposition 2, s increases in z, so S_{bi} decreases in z. Since S increases in z, the incidence of partisan scandals must increase in z. This proves Corollary 1. ■

Proof of Proposition 4. This follows directly from the formulas in Section 7.1. ■

Proof of Proposition 5. Partisan scandals can arise only if neither of the parties is fully honest, which from Lemma 1 is when $z > \gamma\frac{1-\pi p}{1-\pi}$. From the formulas in Section 7.1, then we have $\phi_{align}(0,1) < \gamma$ and $\phi_{opp}(0,1) < \gamma$, and $\phi_{align}(0,1)+\phi_{opp}(0,1) = \gamma$. Using these formulas, we also obtain that $\phi_{opp}(0,1) < \phi_{align}(0,1)$ if and only if

$$\frac{\pi p}{1-\pi p} < \frac{f}{s}. \tag{18}$$

Consider first the fully mixing equilibrium. Using (3) and (4), the inequality (18) is satisfied when $\pi p < \frac{1}{2}$ and violated when $\pi p > \frac{1}{2}$. When $\pi p > \frac{1}{2}$, we also may have equilibria with $(s \leq 1, f = 1)$, and using (6) we obtain that the inequality (18) is violated if

$$z > \frac{(1-\pi p)(1-\gamma+\pi p\gamma)}{(1-\pi)\pi p}\frac{\gamma\pi p}{(\gamma+2\pi p-\pi p\gamma-1)},$$

which is always satisfied for $z > \frac{(1-\pi p)(1-\gamma+\pi p\gamma)}{(1-\pi)\pi p}$, which is a perquisite for this equilibrium. When $\pi p < \frac{1}{2}$, we also may have equilibria with $(s = 1, f \leq 1)$, and using (7) we obtain that the inequality (18) is satisfied if

$$\frac{(1-\pi p\gamma)}{(1-\pi)}\frac{\gamma(1-\pi p)}{(-2\pi p+\pi p\gamma+1)} < z,$$

which is always satisfied for $\frac{(1-\pi p\gamma)}{(1-\pi)} < z$, which is a perquisite for this equilibrium.

Using the formula for $\Phi(0,1)$, we obtain that $\Phi(0,1) > \pi$ if and only if $f < s$. This is true in the equilibrium $(s = 1, f < 1)$, which can arise if and only if $\pi p < \frac{1}{2}$, and this is violated in the equilibrium $(s < 1, f = 1)$, which can arise if and only if $\pi p > \frac{1}{2}$. In a fully mixing equilibrium, using (3) and (4) we can establish that this is true also if and only if $\pi p < \frac{1}{2}$. And in $(s = f = 1)$ equilibrium, we obtain $\Phi(0,1) = \pi$. ■

Proof for Proposition 6. From Proposition 5, since $\phi_{align}(0,1) + \phi_{opp}(0,1) = \gamma$, $|\phi_{opp}(0,1) - \phi_{align}(0,1)| = 2\phi_{opp}(0,1) - \gamma$ if $p\pi > \frac{1}{2}$ and $|\phi_{opp}(0,1) - \phi_{align}(0,1)| = \gamma - 2\phi_{opp}(0,1)$ if $p\pi < \frac{1}{2}$. So the comparative statics with respect to z holds if $\phi_{opp}(0,1)$ decreases in z for $p\pi < \frac{1}{2}$ and increases in z for $p\pi > \frac{1}{2}$. In the fully mixing equilibrium,

$$\frac{d\phi_{opp}(0,1)}{dz} = \pi p\gamma(1-\pi p)\frac{\frac{ds}{dz}f - \frac{df}{dz}s}{(f(1-\pi p)+\pi ps)^2}, \tag{19}$$

which using (3) and (4) can be rewritten as

$$\frac{d\phi_{opp}(0,1)}{dz} = \frac{(\pi p\gamma)^2(1-\pi)^2(z-\gamma-\pi z+\pi p\gamma)^2(2\pi p-1)}{(f(1-\pi p)+\pi ps)^2(\gamma-1)^2(\gamma+\pi^2p^2\gamma-2\pi p\gamma-\pi^2pz+\pi pz)^2(z-\pi z+\pi p\gamma)^2},$$

so indeed the required comparative statics holds. For the equilibrium with $s < 1$ and $f = 1$, which can arise only if $\pi p > \frac{1}{2}$, $\frac{d\phi_{opp}(0,1)}{dz}$ has the same sign as $\frac{ds}{dz}$, which by Proposition 2 is positive. For the equilibrium with $s = 1$ and $f < 1$, which can arise only if $\pi p < \frac{1}{2}$, $\frac{d\phi_{opp}(0,1)}{dz}$ has the same sign as $-\frac{df}{dz}$, which by Proposition 2 is negative.

From Proposition 5, when $\pi p < \frac{1}{2}$, $|\Phi(0,1) - \pi| = \Phi(0,1) - \pi$, so $|\Phi(0,1) - \pi|$ decreases when $\Phi(0,1)$ decreases. When $\pi p > \frac{1}{2}$, $|\Phi(0,1) - \pi| = \pi - \Phi(0,1)$, so $|\Phi(0,1) - \pi|$ decreases when $\Phi(0,1)$ increases. Totally differentiating $\Phi(0,1)$ from Section 7.1, we obtain

$$\frac{d\Phi(0,1)}{dz} = \pi p (1-\pi) \frac{f \frac{ds}{dz} - \frac{df}{dz} s}{\left(f(1-\pi p) + \pi p s\right)^2}.$$

Comparing this to (19), we see that the sign of $\frac{d\Phi(0,1)}{dz}$ is the same as the sign of $\frac{d\phi_{opp}(0,1)}{dz}$, and hence the comparative statics follows. ■

Proof of Proposition 7. The probability that a misbehaving politician is not fired is

$$\Pr(not\ fired|m=1) = (1 - \Phi(0,0)) \Pr(0,0|m=1) + (1 - \Phi(0,1)) \Pr(0,1|m=1),$$

and the probability that the politician that does not misbehave is fired is

$$\Pr(fired|m=0) = \Phi(0,0) \Pr(0,0|m=0) + \Phi(0,1) \Pr(0,1|m=0).$$

Plugging the formulas from Section 7.1 for any equilibrium other than the honest equilibrium, we obtain that the total probability of mistake is

$$\begin{aligned} M &= \pi \Pr(not\ fired|m=1) + (1-\pi)\Pr(fired|m=0) = \\ &= 2\pi(1-\pi)\left(\frac{1-p}{1-\pi p} + (1-\pi) p (1-\gamma) \frac{fs}{(1-\pi p)(f(1-\pi p) + \pi p s)}\right) \end{aligned} \tag{20}$$

Differentiating M with respect to z we obtain

$$\frac{dM}{dz} = 2\pi(1-\pi)^2 p (1-\gamma) \frac{\frac{df}{dz}\pi p s^2 + f^2 (1-\pi p)\frac{ds}{dz}}{(1-\pi p)\left(f(1-\pi p) + \pi p s\right)^2},$$

so by Proposition 3, $\frac{dM}{dz} \geq 0$ in every equilibrium, with strict inequality if $fs < 1$.

In the fully mixing equilibrium, using (3) and (4) in (20), we obtain

$$M = 2\pi(1-\pi)\frac{z(1-\pi) + \gamma(1 - 2p + \pi p)}{z(1-\pi) + \gamma(1-\pi p)},$$

so

$$\frac{dM}{dp} = -2\pi(1-\pi)\frac{2\gamma(1-\pi)(z(1-\pi)+\gamma)}{\left(z(1-\pi) + \gamma(1-\pi p)\right)^2} < 0.$$

When $s = 1$ and $f < 1$, plugging $s = 1$ and (7) into (20), we obtain

$$M = 2\pi (1-\pi) \frac{(\pi p\gamma - p\gamma - \pi + 1) z + (\pi p^2\gamma^2 - \pi p\gamma^2 - p\gamma + \gamma)}{(1-\pi p\gamma)(z(1-\pi) + \gamma(1-\pi p))},$$

so

$$\frac{dM}{dp} = -2\pi (1-\pi)^2 \gamma \frac{(\pi - 1)^2 z^2 + (1-\pi)(1+\gamma - 2\pi p\gamma) z + \gamma(\pi p\gamma - 1)^2}{((1-\pi p\gamma)(z(1-\pi) + \gamma(1-\pi p)))^2} < 0$$

as this equilibrium requires $2p\pi < 1$.When $s < 1$ and $f = 1$, then plugging $f = 1$ and (6) into (20), we obtain

$$M = 2\pi (1-\pi) \left(\frac{1-p}{1-\pi p}\gamma + (1-\gamma) \frac{1-p+ps}{1-\pi p + \pi ps} \right),$$

so

$$\frac{dM}{dp} = 2\pi (1-\pi) \left(\frac{-(1-\pi)}{(1-\pi p)^2}\gamma - (1-\gamma) \frac{(1-s)(1-\pi)}{(1-\pi p + \pi ps)^2} + (1-\gamma) \frac{p(-\pi+1)}{(1-\pi p+\pi ps)^2} \frac{ds}{dp} \right) < 0,$$

where $\frac{ds}{dp} < 0$ for the equilibrium with $(s < 1, f = 1)$ was established in the proof of Proposition 2.

For the honest equilibrium, the total probability of mistake is

$$\begin{aligned} M &= \pi \Pr(not\ fired|m = 1) + (1-\pi)\Pr(fired|m = 0) = \\ &= 2\pi (1-\pi) \frac{(1-p)}{1-\pi p}, \end{aligned} \tag{21}$$

so M is constant in z and decreasing in p. ■

7.3 Proofs for Section 6

Proof of Proposition 8. The payoff of the politician that does not misbehave is

$$(\gamma + (1-\gamma)(1-f))(1-\Phi(0,0)) + (1-\gamma) f (1-\Phi(0,1)),$$

and the payoff of the politician that misbehaves is

$$b + (1-p)((\gamma + (1-\gamma)(1-f))(1-\Phi(0,0)) + (1-\gamma) f (1-\Phi(0,1))) + p(1-\gamma) s (1-\Phi(0,1)).$$

So the politician engages in misbehavior if and only if

$$b \geq p\left[\left(\gamma+(1-\gamma)(1-f)\right)(1-\Phi(0,0))+(1-\gamma)(1-\Phi(0,1))(f-s)\right]. \qquad (22)$$

Consider first a putative equilibrium in which both parties are honest, $f = s = 0$. Then (22) becomes $b \geq p(1-\Phi(0,0)) = p\left(1-\pi\frac{1-p}{1-\pi p}\right)$, so the equilibrium incidence of misbehavior is a solution to

$$\pi = B - p\frac{1-\pi}{1-\pi p} \equiv RHS_h(\pi). \qquad (23)$$

There is a unique solution to (23) satisfying $\pi \in [0,1]$, and let us call this solution π_h. Note that $RHS_h(\pi=0) = B - p > 0$ and $RHS_h(\pi=1) = B < 1$, so the right-hand side of (23) crosses the left-hand side from above. This, together with $\frac{\partial RHS_h(\pi)}{\partial p} < 0$ and $\frac{\partial RHS_h(\pi)}{\partial z} = 0$, implies $\frac{d\pi_h}{dp} < 0$ and $\frac{d\pi_h}{dz} = 0$. By Lemma 1, π_h and $f = s = 0$ constitute an equilibrium if and only if $z \leq 2\frac{\gamma(1-p\pi_h)}{(1-\pi_h)}$.

For any equilibrium other than the honest equilibrium, plugging the formulas for $\Phi(0,0)$ and $\Phi(0,1)$ into (22), we obtain that the politician engages in misbehavior if and only if

$$b \geq p(1-\pi)\frac{\bar{f}\left(\gamma+(1-\bar{s})(1-\gamma)\right)+\pi p\left(\bar{s}-\bar{f}\right)}{(1-\pi p)\left(\bar{f}(1-\pi p)+\pi p\bar{s}\right)},$$

where $\bar{f}$ and $\bar{s}$ are defined in Lemma 2. So the incidence of misbehavior solves the following equation

$$\pi = B - p(1-\pi)\frac{\bar{f}\left(\gamma+(1-\bar{s})(1-\gamma)\right)+\pi p\left(\bar{s}-\bar{f}\right)}{(1-\pi p)\left(\bar{f}(1-\pi p)+\pi p\bar{s}\right)} \equiv RHS(\pi). \qquad (24)$$

Note that $RHS(\pi=1) = B < 1$ and $RHS(\pi=0) = B - p(\gamma+(1-\bar{s}(\pi=0))(1-\gamma)) > 0$,[22] and since $\bar{f}$ and $\bar{s}$ are continuous functions of π (Lemma 1), $RHS(\pi)$ is a continuous function in π mapping $[0,1]$ into $[0,1]$. By Theorem 1 of Villas-Boas (1997), the smallest and the largest fixed points of (24) increase in z and decrease in p if $RHS(\pi)$ increases in z and decreases in p. By Lemma 2, $\bar{f}$ and $\bar{s}$ are absolutely continuous in p and z, so $RHS(\pi)$ is absolutely continuous in p and z, and hence to establish that $RHS(\pi)$ increases in z and decreases in p, it suffices to establish that $\frac{\partial RHS(\pi)}{\partial z} \geq 0$ and $\frac{\partial RHS(\pi)}{\partial p} < 0$ whenever $\bar{f}$ and $\bar{s}$

[22]Note that for $\pi = 0$, $s > 0$ as long as $z > \gamma$, but that must be true in any not honest equilibrium.

are differentiable. By Proposition 2, $\bar{f}$ and $\bar{s}$ are weakly increasing in z, and

$$\frac{\partial RHS(\pi)}{\partial \bar{f}} = p(1-\pi)\frac{\pi p \bar{s}^2 (2-\gamma)}{(1-\pi p)\left(\bar{f}(1-\pi p)+\pi p \bar{s}\right)^2} > 0,$$

$$\frac{\partial RHS(\pi)}{\partial \bar{s}} = p(1-\pi)\frac{\bar{f}^2 (1-\gamma)(1-\pi p)}{(1-\pi p)\left(\bar{f}(1-\pi p)+\pi p \bar{s}\right)^2} > 0,$$

so $RHS(\pi)$ indeed increases in z. Moreover, comparing (23) with (24), we see that for any $\pi, RHS(\pi) > RHS_h(\pi)$ whenever $\bar{f}$ and $\bar{s} > 0$, so any solution of (24) that constitutes an equilibrium (that is, delivers $\bar{f}$ and $\bar{s} > 0$) will be higher than π_h. This completes the proof of part (1).

To prove part (2), we need to establish that $\frac{\partial RHS_h(\pi)}{\partial p} < 0$ and $\frac{\partial RHS(\pi)}{\partial p} < 0$ whenever $RHS(\pi)$ is differentiable in p. Differentiating (23) with respect to p we obtain $\frac{\partial RHS_h(\pi)}{\partial p} = -\frac{1-\pi}{(1-\pi p)^2} < 0$. Consider now a putative equilibrium in which both parties are mixing. Plugging (3) and (4) into (24), we obtain that the equilibrium π solves

$$\pi = B - 2p\gamma \frac{1-\pi}{z(1-\pi)+(1-\pi p)\gamma}, \tag{25}$$

so for the range of parameters for which this equilibrium exist, $\frac{\partial RHS(\pi)}{\partial p} < 0$. Consider now a putative equilibrium with $f = 1$ and $s < 1$. Plugging $f = 1$ and (6) into (24), we obtain

$$\pi = B - p(1-\pi)\gamma \frac{\pi p(1-\pi)z + (1-\pi p)(1-\gamma(1-\pi p))}{(1-\pi p)(-\gamma+\pi p\gamma+1)(z(1-\pi)+\gamma(1-\pi p))}.$$

Differentiating the right-hand side, we obtain that for the range of parameters for which this equilibrium exists,

$$\begin{aligned}\frac{\partial RHS(\pi)}{\partial p} &= \frac{-(1-\pi)^3 \gamma\pi p(2(1-\pi p)(1-\gamma)+\pi p)}{((1-\pi p)(-\gamma+\pi p\gamma+1)(z+\gamma-\pi z-\pi p\gamma))^2} z^2 \\ &\quad - \frac{(1-\pi)^2 \gamma(1-\pi p)\left(2p^2\gamma(2\gamma-1)\pi^2 + p(5\gamma-1)(1-\gamma)\pi + (\gamma-1)^2\right)}{((1-\pi p)(-\gamma+\pi p\gamma+1)(z+\gamma-\pi z-\pi p\gamma))^2} z \\ &\quad - \frac{(1-\pi)\gamma^2(\pi p-1)^2(-\gamma+\pi p\gamma+1)^2}{((1-\pi p)(-\gamma+\pi p\gamma+1)(z+\gamma-\pi z-\pi p\gamma))^2}\end{aligned}$$

which is negative as all coefficients in this quadratic equation are negative[23]. Consider now

[23] To see that $2p^2\gamma(2\gamma-1)\pi^2 + p(5\gamma-1)(1-\gamma)\pi + (\gamma-1)^2 > 0$, note that this is positive if $2\gamma > 1$, and if $2\gamma < 1$, then this concave quadratic equation is positive for $\pi = 0$ and $\pi = 1$, so it is positive for all π.

a putative equilibrium with $s = 1$ and $f < 1$. Plugging $s = 1$ and (7) into (24), we obtain

$$\pi = B - p\gamma\left(z\left(1-\pi\right) - \pi p\gamma + 1\right)\frac{1-\pi}{\left(1-\pi p\gamma\right)\left(z\left(1-\pi\right)+\gamma\left(1-\pi p\right)\right)}.$$

Differentiating the right-hand side, we obtain that for the range of parameters for which this equilibrium exists,

$$\frac{\partial RHS\left(\pi\right)}{\partial p} = -\gamma\left(1-\pi\right)\frac{\left(\pi-1\right)^2 z^2 + \left(1-\pi\right)\left(1+\gamma-2\pi p\gamma\right)z + \gamma\left(\pi p\gamma-1\right)^2}{\left(\left(1-\pi p\gamma\right)\left(z\left(1-\pi\right)+\gamma\left(1-\pi p\right)\right)\right)^2} < 0$$

where the last inequality follows from the fact that all coefficients in the quadratic equation in the numerator are positive, so this quadratic equation must be positive for any $z > 0$. And finally, consider $f = s = 1$. Then (24) becomes $\pi = B - p\gamma\frac{1-\pi}{1-\pi p}$, so again $\frac{\partial RHS(\pi)}{\partial p}$. ■

Proof of Proposition 9. Suppose we are in fully mixing equilibrium. Plugging (3) and (4) into (17), we obtain

$$S = \pi^* pz\frac{1-\pi^*}{\gamma + \left(\pi^*\right)^2 p^2\gamma - 2\pi^* p\gamma - \left(\pi^*\right)^2 pz + \pi^* pz}.$$

Totally differentiating S with respect to p, we obtain

$$\frac{dS}{dp} = \frac{\gamma\left(1-\pi^* p\right)z\left(\pi^*\left(1-\pi^*\right)\left(1+\pi^* p\right) + p\left(1-\left(2-p\right)\pi^*\right)\frac{d\pi^*}{dp}\right)}{\left(\gamma + \left(\pi^*\right)^2 p^2\gamma - 2\pi^* p\gamma + \pi^* pz\left(1-\pi^*\right)\right)^2}$$

Since from the proof of Proposition 8, in the fully mixing equilibrium $\frac{d\pi^*}{dp} < 0$, a sufficient condition for $\frac{dS}{dp} > 0$ is that $\pi^* > \frac{1}{2-p}$. From the proof of Proposition 8 we also know that the misbehavior incidence π^* in the fully mixing equilibrium is higher than the misbehavior incidence in the fully honest equilibrium π_h, so a sufficient condition for $\frac{dS}{dp} > 0$ is $\pi_h > \frac{1}{2-p}$, which requires

$$\frac{1}{2p}\left(Bp + 1 - p - \sqrt{p^2B^2 - 2p\left(p+1\right)B + \left(5p^2 - 2p + 1\right)}\right) > \frac{1}{2-p}$$

which in turn requires that

$$B > \frac{2p - p^2 + 2}{2\left(2-p\right)},$$

and this is possible as long as the right-hand side is smaller than 1, which is true for $p < 2 - \sqrt{2}$. So it remains to show that the fully mixing equilibrium can exist for $B > \frac{2p-p^2+2}{2(2-p)}$.

To show that, first note that the solution to (24) in the fully mixing equilibria is

$$\pi_r\left(z\right)=\frac{1}{2z+2p\gamma}\left(z\left(1+B\right)+\gamma-2p\gamma+Bp\gamma-\sqrt{\Delta}\right), \tag{26}$$

where

$$\Delta=\left(B-1\right)^2z^2+2\gamma\left(B-1\right)\left(-2p+Bp-1\right)z+\gamma^2\left(-4p-4Bp^2+B^2p^2-2Bp+12p^2+1\right).$$

By Lemma 1, it is sufficient to show that there exists z' such that $\frac{\gamma(1-\pi_r(z')p)}{(1-\pi_r(z'))}=z'$ and $\frac{\gamma(1-\pi_r(z)p)}{(1-\pi_r(z))}<z$ for all $z>z'$. Using (26), we see that $\frac{\gamma(1-\pi_r(z)p)}{(1-\pi_r(z))}\leq z$ if and only if

$$\left(B-1\right)z^2-\gamma\left(5p-3\right)z+\gamma^2p\left(2p-Bp+1\right)<\left(z-\gamma p\right)\sqrt{\Delta}$$

We know that both sides are equal for $z=\gamma\frac{1-p\pi_h}{1-\pi_h}$, and that the left-hand side is a negative and right left-hand side is positive for z high enough, so either $\frac{\gamma(1-\pi_r p)}{(1-\pi_r)}<z$ is satisfied for $z\in\left(z_h,z_h+\varepsilon\right)$, or not, in which case there exists $z'>z_h$ for which $\frac{\gamma(1-\pi_r(z')p)}{(1-\pi_r(z'))}=z'$ and $\frac{\gamma(1-\pi_r(z)p)}{(1-\pi_r(z))}<z$ for all $z>z'$. ■

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