Bureaucratic Resistance and Policy Inefficiency *

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Abstract

Poor public service provision creates an electoral vulnerability for incumbent politicians. Under what conditions can bureaucrats exploit this to avoid reforms they dislike? We develop a model of electoral politics in which a politician must decide whether to enact a reform of uncertain value, and a voter evaluates the incumbent's reform based on post-reform government service quality, which anti-reform bureaucrats can undermine. Bureaucratic resistance for political leverage is most likely to occur when voters are torn between the reform and the status quo. Resistance lowers the informational value of government service for voters and can lead to policy distortions and accountability loss. When reform is moderately popular, resistance prevents beneficial reforms due to electoral risks and induces ineffective reforms by offering bureaucrats as scapegoats. Our model identifies a distinct mechanism of bureaucratic power and its implications for policy and accountability.

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1 Introduction

Bureaucrats play a central role in government as key providers of public services, from healthcare and education to transportation and law enforcement. This position gives them both substantial influence on who gets what from government (Slough, 2022; Xu, 2023) and grants them significant political power. By affecting service provision, bureaucrats can shape citizens' perception of government performance and how they hold politicians accountable. Because citizens find it difficult to accurately attribute responsibility for poor service delivery—whether it stems from bureaucratic actions or politicians' policies—bureaucrats can influence public perceptions and electoral outcomes. This paper examines the conditions under which bureaucrats can leverage their control over service delivery as a political tool to resist reforms they oppose, undermine the reelection prospects of unaligned politicians, and influence policymaking to align with their preferences.

While often overlooked in social science research, anecdotal evidence increasingly points to politically motivated service provision by local bureaucrats. In 2021, protests erupted among municipal employees in several cities over vaccine mandates for their employees. Consequently, garbage accumulated noticeably in various neighborhoods across the country. In New York City, for example, sanitation workers in Staten Island and South Brooklyn left trash uncollected for more than a week around the implementation of the city's COVID-19 vaccine mandate (ABCNews, 2021). City Sanitation Commissioner Edward Grayson attributed this lapse in service to the vaccine mandate, acknowledging that municipal garbage trucks were completing their routes with half-empty loads (Gross, 2021).

Similarly, recent research suggests that local police adjust their services to oppose reforms and influence city politics (Kyriazis, Schechter and Yogev, 2023; Wirsching, 2025). For example, officers of the San Francisco police department strongly opposed the progressive policies of District Attorney (DA) Chesa Boudin. During his recall campaign, San Francisco residents repeatedly raised concerns to city officials and the media that police were not responding to crime and justified their lack of engagement as due to the DA's reluctance to press charges (Knight, 2021; Swan, 2021). In an interview, Chesa Boudin complained that "we've seen, on body-worn camera footage, police officers telling victims there's nothing they can do and, 'Don't forget to vote in the upcoming recall election.'" (Pearson, 2023) This blame-shifting by police might have resonated with voters in a high-crime environment, who recalled the progressive DA by a significant margin. Immediately after the "unfriendly" attorney was successfully removed, police notably intensified their effort in making stops and arrests again (Kyriazis, Schechter and Yogev, 2023).

Yet, the logic, conditions, and consequences of such politically motivated *bureaucratic resistance* remain puzzling and largely unexplored. Why would bureaucrats engage in actions that disrupt public services for political reasons, knowing that voters will consider this possibility? And if this resistance affects how voters view reform policies, why would politicians ever push for reforms that bureaucrats oppose? In this paper, we study how and when politicians' electoral vulnerability motivates bureaucrats to undermine service provision, and how the potential for bureaucratic resistance influences voter behavior and an incumbent's willingness to pursue reforms.

We integrate bureaucratic resistance into a model of electoral politics and policymaking, where politicians and bureaucrats co-produce public services. An incumbent chooses between a reform and the status quo after observing the true value of the reform. It is commonly known that the incumbent has a pro-reform bias, and the opponent is biased against it.[1] The voter observes the incumbent's policy choice together with government service quality as a noisy signal of the true value of the incumbent's policy choice. The voter uses the observed service quality to glean the reform's merit and decides whether to retain the incumbent for a second period or to elect the opponent. Importantly, the reform's inherent value and the bureaucrats' performance are complementarities in the coproduction of government service quality. Bureaucrats who have an unknown degree of distaste for the reform[2] can

[1]Examples are policies that affect bureaucrats and display sufficient cleavages between liberals and conservatives, such as budgets for law enforcement, vaccine mandates for public employees, or the extent of environmental protection.

[2]Namely, bureaucrats are assumed to have a status quo bias (i.e., a "vested interest" in avoiding reforms

privately choose to disrupt public service provision at a personal cost (e.g., by refusing to work diligently).[3] This complexity obscures the voter's evaluation of the policy since he is unable to assign clear responsibility for poor service provision. For example, when a community experiences a decline in safety after police reform (e.g., a budget cut), it is challenging for residents to determine whether the drop in security is due to the reform itself or because police officers are resisting the changes. Even if the reform could potentially improve services, voters could still see a decline in quality due to bureaucratic pushback. We show that, in equilibrium, incumbents implement reform if they are sufficiently biased in its favor, bureaucrats resist if they are sufficiently anti-reform, and voters reelect their representative if government performance is sufficiently high.

The assumption of co-production in our model primarily applies to street-level bureaucracies, where bureaucrats can directly influence service provision and, consequently, voters' perceptions. For example, voters may reassess the merit of a budget cut or the restructuring of an agency based on their waiting times for emergency responders, delays in mail services, or their ability to obtain building permits in a timely fashion.

Our model produces several key insights. First, we demonstrate why and when bureaucrats undermine public service provision for political leverage. Since voters cannot perfectly identify who is responsible for poor service quality and can only probabilistically determine whether bureaucratic resistance has occurred, it becomes optimal for bureaucrats—provided the costs of resistance are low enough—to engage in resistance despite voters' awareness of this possibility. After incumbents introduce the reform, bureaucrats can exploit their intermediary role in government to affect voters' inference about the reform and undermine the incumbent's reelection chances in favor of the anti-reform opponent.

We also find that bureaucrats' incentive to resist is non-monotonic with respect to the

that affect bureaucrats' money, programs, and policy direction) (Moe, 2015).

[3] We abstract away from the standard issue of political delegation, where politicians seek to control bureaucrats who shirk their duties to avoid effort costs or to influence policy (e.g., Huber and Shipan (2002); Yazaki (2018); Slough (2024)). Instead, we focus on bureaucrats with considerable discretion (e.g., street-level bureaucracies) who trade off their motivation to serve the public with their incentives to affect public service provision for political leverage.

voter's prior belief about the reform's value. The incentive to resist depends on whether the voter is susceptible to information that bureaucrats mediate. When voters strongly favor the reform, bureaucrats have little incentive to resist, as they cannot significantly influence voter support for the reforming incumbent. Conversely, when voters are already pessimistic about the reform, bureaucrats have little incentive to resist, as the voter is already likely to perceive the reform as a failure. As a result, bureaucrats are most incentivized to resist when voters are torn between the reform and the status quo and, therefore, more receptive to interpreting poor service as a signal about the reform's effectiveness.

The implications of bureaucratic resistance for voter learning and policymaking are not immediately clear. A naive conclusion could be that bureaucratic resistance makes incumbents more cautious about reform by directly jeopardizing service quality. Simultaneously, resistance should make a rational voter more forgiving of poor service provision, which would incentivize politicians to introduce reforms. We show that while these opposing mechanisms are at play, they are more complex than this simple logic suggests and depend on the reform's true merit and popularity.

One reason for this complexity lies in how resistance shapes voter learning. By reducing the informational value of service provision, resistance forces Bayesian voters to rely more heavily on their prior beliefs about the reform's value when making their election decision. This has asymmetric effects on voter behavior: It makes an initially lenient, pro-reform voter even more lenient, as it makes policy failure more excusable by introducing a plausible alternative explanation. Counterintuitively, however, resistance also makes an a priori strict, anti-reform voter more strict, even though bureaucratic resistance can only worsen service provision. This is because, by introducing noise, resistance prevents the voter from confidently attributing policy success to the reform itself.

Consequently, we find that the possibility of resistance can *either* incentivize *or* deter incumbents from implementing reform, depending on the voter's prior beliefs. When reform is initially unpopular with the voter, resistance discourages reform efforts as incumbents fear the costs of resistance for service provision and voter backlash. Conversely, when reform is popular, bureaucratic resistance provides a convenient scapegoat for politicians and increases the incumbent's electoral incentive to introduce reform. For intermediary levels of reform popularity, these tendencies lead to accountability loss, where incumbents avoid implementing beneficial reforms (*under-reform*) and pursue ineffective ones too frequently (*over-reform*). Notably, the ability to resist can sometimes *harm* bureaucrats themselves. Particularly, in cases where bureaucrats are used as scapegoats for incumbents, bureaucrats would benefit from being able to commit to non-interference ex ante. However, once reform is implemented, resistance remains beneficial to undermine the reelection chances of reforming incumbents.

2 Related Literature and Contributions

We make several contributions to existing scholarship on bureaucratic politics, interest group influence, and political economy.

2.1 Bureaucratic Politics and Interest Groups

First, our theory addresses a fundamental debate in bureaucratic politics between the public choice school of thought (Tullock, 1965; Downs, 1967; Niskanen, 1971) and theories of bureaucratic control and delegation (Miller and Moe, 1983; McCubbins, 1985; McCubbins, Noll and Weingast, 1987; Banks and Weingast, 1992; Brehm and Gates, 1997). Niskanen positioned bureaucrats as primary strategic actors; he famously argued that self-interested bureaucrats use their private information to extract rents by making take-it-or-leave-it offers to incumbents. In contrast, theorists of legislative control criticized Niskanen's framework for ascribing out-sized power to bureaucrats. They framed the politician-bureaucrat relationship as a top-down principal-agent model and focused on incumbents' strategies to minimize agency loss and leverage bureaucratic expertise. We reconcile these two long-standing ideas on bureaucratic politics by synthesizing a principal-agent perspective on strategic politicians with the notion of politically powerful bureaucrats who can sway the incumbent's policy decisions by leveraging their private information, exploiting the incumbent's electoral vulnerability, and adjusting their work effort.

Additionally, we contribute to the growing literature on bureaucrats as interest groups within government. We build on Moe (2006)'s argument that bureaucrats leverage politicians' electoral vulnerability to influence who their principals are and what policies they choose in office. An extensive literature highlights bureaucrats' various means of direct political influence through their public sector unions, including collective bargaining (Moe, 2009, 2011; Anzia and Moe, 2015; Paglayan, 2019; Zoorob, 2019), union endorsements (Moe, 2006; Hartney and Flavin, 2011; Hartney, 2022), electoral mobilization of their members (Leighley and Nagler, 2007; Anzia, 2014; Flavin and Hartney, 2015), political contributions (Moe, 2011; DiSalvo, 2015), or direct lobbying (Anzia, 2022). In contrast, we focus on a more fundamental source of bureaucratic power and explain how and when bureaucrats can exert policy influence through their roles in government, i.e., *merely by virtue of being bureaucrats.*

Third, we describe and micro-found a novel explanation for why bureaucratic agencies might undermine the very programs and services they provide. Several scholars have characterized recent surges of bureaucratic resistance at the federal level, especially during the first Trump administration. Some have argued that agencies undermine their own work because, in an environment where securing legislation from Congress is difficult, US presidents pursue retrenchment by asking the administrative state to sabotage itself (Noll, 2022). Others have considered the expressive benefits of "guerrilla" forms of government (O'Leary, 2020) and found that bureaucratic resistance is a result of bureaucrats navigating the moral dilemma between norms of professionalism and personal beliefs about policy (Kucinskas and Zylan, 2023). Notably, voters are absent from these accounts. In contrast, we focus on how voters' dependence on bureaucrats to learn about policy outcomes can result in bureaucratic resistance as a strategic choice.

2.2 Formal Political Economy Literature

Our model is closely connected to several strands of literature in formal political economy. First, it is related to the political accountability literature (Canes-Wrone, Herron and Shotts, 2001; Fox, 2007; Gersen and Stephenson, 2014), which explores how voters' imperfect observations of policy outcomes creates electoral incentives for incumbents to prioritize popular policies, irrespective of their intrinsic value. Joining Ashworth, Bueno De Mesquita and Friedenberg (2018), Prato and Wolton (2017), and Schnakenberg, Schumock and Turner (2024), we study how the information environment influences voter learning within the accountability framework. Our contribution lies in studying an accountability game where *both* policymaking and changes in the information environment are endogenously determined in equilibrium by strategic actors.[4]

Furthermore, this paper is related to models in which the incumbent and the bureaucrats jointly produce government outcomes, making it difficult for the voter to attribute responsibility between the two parties (Fox and Jordan, 2011; Ujhelyi, 2014; Yazaki, 2018; Forand and Ujhelyi, 2021; Martin and Raffler, 2021; Awad, Karekurve-Ramachandra and Rothenberg, 2023; Foarta, 2023; Slough, 2024; Li, Sasso and Turner, 2024). Yet, most of these models do not provide an explanation for why and when bureaucrats are willing to engage in costly resistance.[5] One exception is Ujhelyi (2014), who also examines bureaucrats' strategic resistance and its implications for policymaking. However, while Ujhelyi (2014) assumes that politicians' and bureaucrats' choices are substitutes in government production

[4] In Ashworth, Bueno De Mesquita and Friedenberg (2018), the incumbent's policymaking and changes in the signal generation are exogenous. In Schnakenberg, Schumock and Turner (2024), changes in signal generation are endogenously chosen by a strategic donor, but policymaking is not. In Prato and Wolton (2017), both policy choice and signal generation are endogenous, but interest groups send a separate and visible signal instead of affecting the policy signal through a private action.

[5] This is because bureaucrats are assumed to be non-strategic (e.g., their types perfectly determine their behavior) (Fox and Jordan, 2011; Martin and Raffler, 2021; Foarta, 2023), or because incumbents adjust their policy and delegation to bureaucrats based on factors influencing bureaucrats' motivation such that bureaucratic resistance does not happen on the equilibrium path (Yazaki, 2018), or because bureaucrats and politicians are assumed to share policy preferences (Awad, Karekurve-Ramachandra and Rothenberg, 2023). Conversely, Slough (2024) and Li, Sasso and Turner (2024) consider a situation where the agency relationship between the incumbent and bureaucrats is defined by a moral hazard problem. Crucially, bureaucrats do not try to affect the incumbent's reelection, but rather aim to minimize costly effort in these models.

and focuses on the learning between politicians and bureaucrats about each other's type, we assume *complementarity* in government coproduction and extensively discuss how resistance affects voters' inference.[6]

Last, this paper is closely related to models of policy obstruction and sabotage (Patty, 2016; Fong and Krehbiel, 2018; Gieczewski and Li, 2022; Hirsch and Kastellec, 2022). The key difference between our argument and existing work is the observability of sabotage (i.e., resistance in our model). Unlike sabotage by the political opposition, which is overt and observable by the voter, the bureaucrats in our model resist covertly. In turn, the voter in our model must guess whether the observed government outcome is or is not affected by bureaucratic resistance.

3 Model

Consider a two-period ($t = 1, 2$) electoral competition model with an incumbent (she), an opponent, a median voter (he), and the bureaucrats (they).[7] There is an election after $t = 1$ where the voter chooses between the incumbent and the opponent as a new officeholder for $t = 2$.

3.1 Policymaking

An incumbent facing reelection decides whether to introduce a reform policy. Its value to voter welfare $\omega \in \{0, 1\}$ is unknown to the public. The common prior for the reform's value is $\Pr[\omega = 1] = 1/2$. Alternatively, the incumbent can keep the status quo with known value $q \in (0, 1)$.[8]

$t = 1$ is the window for reform. That is, a reform policy rejected in $t = 1$ cannot be

[6] Another difference is that the incumbent in Ujhelyi (2014) experiences an intrinsic cost from bureaucrats' non-compliance (resistance) while the incumbent in our model only cares about how resistance can affect her reelection probability.

[7] We assume that players do not discount their future payoffs, which does not affect the qualitative results.

[8] The result is qualitatively similar if the status quo's value is $1/2$ and $\Pr[\omega = 0] = q$. Thus, $1 - q$ can be interpreted as the probability that the reform outperforms the status quo.

reintroduced in $t = 2$ after the election. In $t = 2$, the reform can only be repealed or maintained.[9] For simplicity, we assume that players do not discount their payoffs.

At $t = 1$, the incumbent *privately* observes ω and chooses whether to introduce reform ($a = 1$) or not ($a = 0$), i.e., $a \in \{0, 1\}$.

3.2 Partisan Policy Preference

Politicians are both office- and policy-motivated. They obtain 1 from winning the election and 0 otherwise. In addition, they obtain intrinsic policy payoff by choosing the policy their party prefers while they are in office, independently drawn from a uniform distribution. Each politician knows this partisan policy payoff, but the voter only knows that each politician's payoff is drawn from a uniform distribution.

The incumbent is in the pro-reform party and obtains $\rho \sim U[0, 1]$ only if she chooses the reform. The opponent is in the anti-reform party and obtains $\rho_O \sim [0, 1]$ only if she chooses the status quo.[10]

3.3 Bureaucratic Resistance

Bureaucrats intrinsically dislike the reform and obtain disutility of *unknown* value $-\kappa$ with common prior $\kappa \sim U[0, 1]$. After observing a and ω if $a = 1$, the bureaucrats *privately* choose whether to undermine the policy, $b \in \{0, 1\}$, where $b = 1$ is to undermine the policy and $b = 0$ not to undermine. Such resistance to policy can comprise a variety of measures, including slowing the delivery of services, overlooking service infractions, misusing their authority, or mismanaging funds. Resistance is costly for bureaucrats (i.e., they incur a known cost of $c \in [0, 1]$ if they resist). c captures material/reputational punishments for noncompliance (Ujhelyi, 2014), bureaucrats' public service motivations and utility from high-quality service provision (Yazaki, 2018; Forand, Ujhelyi and Ting, 2022), or coordination

[9] See Section 3.9 for more discussion.

[10] Without differences in policy preferences, the game becomes trivial, see Section 3.9.

efforts of bureaucrats necessary to engage in resistance.

3.4 Government Outcome

The government outcome $g \in \mathbb{R}$ is produced by

$$g = \begin{cases} (1-b)\omega + \eta & \text{if } a = 1 \\ \\ (1-b)q + \eta & \text{if } a = 0 \end{cases}$$

where η is an i.i.d. shock drawn from a log-concave density $h(\cdot)$ that has full support on $\mathbb{R}$ and is symmetrical around 0. Let $H(\cdot)$ denote the associated CDF of $h(\cdot)$.

The density of g is $h(g-1)$ if the reform works ($\omega = 1$) *and* bureaucrats do not resist ($b = 0$), and $h(g)$ if the reform does not work ($\omega = 0$) *or* bureaucrats resist ($b = 1$).

3.5 Election

After observing the chosen policy a and the realized government outcome g, the voter chooses between the incumbent and the opponent. If the voter is indifferent between the two candidates, he flips a fair coin and reelects the incumbent with probability 1/2.

3.6 Second Period

The incumbent's policy decision in $t = 1$ affects the set of policies from which the election winner can choose in $t = 2$.

$\tilde{a} = 0$ indicates the election winner's choice of the status quo and $\tilde{a} = 1$ her choice of the reform. If the incumbent chooses the status quo in period one, the second-period policy is fixed as the status quo: $a = 0 \Rightarrow \tilde{a} = 0$. If the incumbent chooses the reform, the election winner can choose between maintaining or repealing it: $a = 1 \Rightarrow \tilde{a} \in \{0, 1\}$.

The government outcome in $t = 2$, $\tilde{g}$, is given by

$$\tilde{g} = \begin{cases} (1-\tilde{b})\omega + \tilde{\eta} & \text{if } a = \tilde{a} = 1 \\ \\ (1-\tilde{b})q + \tilde{\eta} & \text{if otherwise} \end{cases}$$

where $\tilde{b} \in \{0, 1\}$ is the bureaucrats' decision to undermine the policy, and $\tilde{\eta}$ is a shock drawn from $h(\cdot)$.

3.7 Payoffs

The voter obtains the government outcome in each period:

$$g + \tilde{g}.$$

The incumbent obtains policy payoff ρ in each period if she chooses the reform. Also, she obtains 1 if she wins the election:

$$a\rho + \mathbf{1}\{\text{reelection}\}(1 + a\tilde{a}\rho).$$

The opponent obtains ρ if she chooses the status quo and 1 if she wins the election:

$$\mathbf{1}\{\text{election}\}[1 + (1 - \tilde{a})\rho_O].$$

The bureaucrats obtain $-\kappa$ in each period if the reform is in place. Also, they obtain $-c$ if they engage in resistance:

$$- \underbrace{a(\kappa + \tilde{a}\kappa)}_{\text{disutility from the reform}} - \underbrace{c(b + \tilde{b})}_{\text{cost of resistance}} .$$

3.8 Timing

To recap,

0. Nature draws the reform's value ω, partisan policy payoff for ρ and ρ_O, the bureaucrats' disutility from the reform, κ.

1. The incumbent privately observes the personal value ρ and ω, and publicly chooses whether to introduce the reform ($a = 1$) or not ($a = 0$).

2. The opponent and the bureaucrats observe the reform's value ω.

3. The bureaucrats privately observe their disutility from the reform κ and choose whether to undermine the chosen policy ($b = 1$) or not ($b = 0$).

4. The government outcome g is produced, and the voter observes it.

5. The voter chooses between the incumbent and the opponent as the new officeholder in the election.

6. The election winner chooses the policy $\tilde{a}$ and the bureaucrats chose $\tilde{b}$.

7. Payoffs are realized, and the game ends.

3.9 Modeling Choices

Before solving the model, we discuss some crucial modeling choices and their relevance to our results.

3.9.1 Window for Reform

$t = 1$ in our model is a critical "watershed" point where the reform is implemented or abandoned (Keeler, 1993). We assume that if the incumbent decides *not* to introduce the reform at $t = 1$, she is committed to not revisit it in $t = 2$. This assumption is important because (i) it ensures the game remains non-trivial, and (ii) it reflects what would naturally occur in an equilibrium where the incumbent can choose to have or not have commitment power.

To see why, assume that the incumbent *cannot* commit to the status quo in $t = 2$. The voter then knows that the incumbent will choose the reform in $t = 2$ regardless of her policy in $t = 1$. Therefore, he only reelects the incumbent if he believes, based on his observation of g, that the reform is better than the status quo (i.e., $\text{E}[\omega|g] \geq q$). Since the voter is more likely to observe a high g when $\omega = 1$ and the reform is implemented, the incumbent's electoral incentives to choose the reform is weakly larger when it is effective than when it is not.[11] As a result, the incumbent's decision signals ω: $\omega = 1$ is more likely when she chooses the reform than the status quo, and the incumbent cannot choose the status quo in $t = 1$ without damaging the voter's expectation about the reform's worth, as well has her reelection prospects.[12] Consequently, without commitment, we have an *unraveling* result (Milgrom, 1981) where incumbents *always* choose the reform, making the analysis trivial.

From this perspective, the commitment to the status quo benefits the incumbent and the voter. The incumbent can cut her electoral loss when $\omega = 0$. In turn, the expected value of the *introduced* reform increases because when $\omega = 0$, the incumbent can choose the status quo with the commitment. This benefits both the voter and the reforming incumbent. Therefore, we can expect the incumbent to develop a commitment device to tie her hands once she has chosen the status quo, and the voter supports it.

3.9.2 Nature of Bureaucratic Resistance

There are important distinctions between our concept of bureaucratic resistance and the canonical account of shirking. Seminal principal-agent models focus on bureaucrats who *implement* policy and have incentives to shirk to affect policy outcomes directly (Brehm and Gates, 1997; Epstein and O'Halloran, 1999; Huber and Shipan, 2002). In contrast, we focus on bureaucrats as *service providers* who cannot affect policies directly (ω) but rather target voter inference about policy choices through service quality (g). Our theory, therefore, primarily applies to street-level bureaucracies, like police officers or waste collectors, who regularly interact with voters and can adjust the quality of services to affect voters' perceptions of a policy.

[11] Namely, there is no such equilibrium where the incumbent is *less* likely to choose the reform when it is effective than when it is not.

[12] Formally, $\text{E}[\omega|a = 1] \geq \text{E}[\omega|a = 0]$ if $\Pr[a = 1|\omega = 1] \geq \Pr[a = 1|\omega = 0]$ for any interior $\Pr[\omega = 1]$.

Readers familiar with canonical principal-agent models may also question the idea that shirking (rather than working) is costly for bureaucrats. However, we are not the first to assume this mirror image where policy-motivated bureaucrats face a trade-off between the benefits of sabotaging an unwanted policy and the material, reputational, or psychological costs of doing so (Brehm and Gates, 1997; Ujhelyi, 2014; Yazaki, 2018). Instead of minimizing the costs of positive effort for government output while accounting for its benefits (e.g., higher wages, avoiding political oversight), bureaucrats in this setting maximize the benefit from negative government output while taking the costs into account.

Another important aspect of bureaucratic resistance in our model is that it can only damage the quality of government services when the reform is effective. This assumption can be relaxed (see Appendix B). The qualitative results still hold if bureaucrats can resist the government service under an ineffective reform, but the damage to an ineffective reform is smaller than the damage to an effective reform.[13] Substantively, we assume that there exists a "floor effect" of resistance for a failed policy, and bureaucrats' influence on the government service is limited when the policy is failing in the first place.

Finally, we assume that bureaucrats know the reform's value when they choose to resist, which reflects the idea that bureaucrats tend to be better informed about policies that affect their operations (Lipski, 1980). Relaxing this assumption does not change our results qualitatively (see footnote 15).

3.9.3 Politicians' Policy Preferences

We assume that the incumbent is strictly pro-reform and the opponent is strictly anti-reform. This assumption can be relaxed. The key is that the incumbent must be more pro-reform than the opponent at the point when the reform is deployed. If not, the bureaucrats do not have any incentives to resist the reform and the game becomes trivial. This is because

[13] This assumption ensures that the bureaucrats' incentives to resist under an effective reform are no smaller than the same incentives under an ineffective reform. If this condition does not hold, $\mathrm{E}[\omega|g, a = 1]$ is non-monotonic, and there exist multiple equilibria.

the bureaucrats in our model take the cost of resistance only to lower the probability that the reform is retained in the next period by undermining a reforming incumbent's reelection prospects. Thus, if the opponent is as or more likely to maintain the reform compared to the incumbent, bureaucratic resistance does not occur.

We also assume that the incumbent's policy payoff remains independent of bureaucratic resistance, unlike in Ujhelyi (2014). Instead, any cost to the incumbent from resistance is channeled through its negative impact on her reelection prospects when she introduces a reform. Specifically, we model the incumbent's policy payoff as a "partisan" or "ideological" payoff ρ, which does not depend on the reform's implications for voter welfare, g. Nevertheless, because the reelection probability strictly increases with g and bureaucratic resistance can only harm g, adding an extra term that captures the incumbent's intrinsic valuation of the policy success as an increasing function of g would not qualitatively alter our results.

3.9.4 Voter's Uncertainty about Resistance

A crucial assumption of our model is that voters cannot observe whether bureaucrats resisted the policy or not. If it is observable, the voter rationally adjusts his inference about whether the incumbent's choice was "correct" when interpreting g. Hence, bureaucrats do not have any incentives to resist.

One may question this assumption and argue that there are cases where bureaucratic resistance is well-documented and often covered by local media outlets. However, it is important to note that while voters (as well as journalists and scholars) can form a rational conjecture about whether resistance occurred for a specific incident or how frequently it occurs, *observing* resistance would imply that they are fully aware of the intentions of bureaucrats. For example, increasing response times (low g in our model) can be indicative of a work slowdown by police, as in the case of police response to Chesa Boudin's policies. However, conclusively attributing these longer response times to intentional resistance requires evidence that delays are indeed the result of a slowdown ($b = 1$) rather than merely the consequence of an ineffective policy ($\omega = 0$).

Also, one may be concerned about a communication game in which the incumbent and the bureaucrats aim to persuade the voter about the reform's value. However, our model assumes that neither party can provide credible information about the reform's effectiveness. As we demonstrate in the analysis, once the reform is introduced, the incumbent has an incentive to claim the reform is effective regardless of its actual value, while the bureaucrats are always incentivized to argue that it is ineffective. Consequently, this dynamic results in a babbling equilibrium, where messages from both parties are uninformative.

Finally, our assumption that resistance is unobserved—and thus affects the information voters receive about government services—distinguishes our argument from an alternative non-information story of resistance. In the latter case, resistance would be a visible tool for bureaucrats to pressure politicians and demonstrate their political strength and indispensability. In this case, voters would punish politicians for provoking resistance and poor services. However, since voters condition their election on *bureaucrats' behavior*, bureaucrats' dominant strategy would be to fully reveal their actions and *claim responsibility* for resistance to ensure that voters punish the incumbent. This is inconsistent with multiple examples, such as the Chesa Boudin case, where bureaucrats refuse to take responsibility for poor services rather than claim it.

4 Equilibrium

The solution concept is a weak Perfect Bayesian Equilibrium with pure strategies (henceforth, equilibrium). Every player plays their best response in pure strategy given their beliefs about other players' strategies and every player's belief is formed following Bayes' Rule. All proofs are relegated to the Appendix A.

4.1 Second-Period Behavior

Regardless of what happened in the first period, the incumbent who wins the election with the reform keeps it, $\mathbf{1}\{a = 1\} \times \mathbf{1}\{\text{reelection}\} \Rightarrow \tilde{a} = 1$, since she gets policy payoff $\rho \geq 0$ by doing so and 0 otherwise. If she does not introduce the reform or the opponent wins the election, the status quo is chosen, $\tilde{a} = 0$. Regardless of the election winner or the policy she chooses, bureaucrats have no incentive to resist with cost $-c < 0$, that is, $\tilde{r} = 0$.

From here forward, we focus on the first period.

4.2 First-Period Strategies

If the incumbent introduces the reform, the voter's strategy is a function of his Bayesian conditional expectation of the reform's value given g, $\mathbb{E}[\omega|g]$, $\mathbf{1}\{\text{election}\}(g) : \mathbb{R} \to \{0, 1\}$. He reelects the reforming incumbent if and only if the expected value of the reform given g is larger than that of the status quo:

$$\mathbb{E}[\omega|g] \geq q. \tag{1}$$

If the incumbent does not introduce the reform, he flips a fair coin and reelects the incumbent with probability 1/2.

The incumbent's strategy in the first period is a function of the reform's merit and partisan payoffs from it, (ω, ρ), $a(\omega, \rho) : \{0, 1\} \times [0, 1] \to \{0, 1\}$. She introduces the reform if and only if the combination of the reelection gain and partisan benefits from the reform is larger than the reelection gain from the status quo:

$$\rho + (1 + \rho)\Pr[\mathit{reelection}|a(\omega) = 1] \geq \Pr[\mathit{reelection}|\mathit{status\,quo}] = 1/2. \tag{2}$$

If the incumbent introduces the reform, the bureaucrats' strategy is a function of their disutility from reform and the value of the reform (κ, ω), $b(\kappa, \omega) : [0, 1] \times \{0, 1\} \to \{0, 1\}$. Bureaucrats engage in resistance only if the product of their gain from reducing the reforming incumbent's reelection probability and their disutility from the reform outweighs the cost of resistance

$$\kappa \cdot \Big(\Pr[reelection(a=1)|\omega, b=1] - \Pr[reelection(a=1)|\omega, b=0] \Big) \geq c. \tag{3}$$

If the incumbent does not introduce the reform, the bureaucrats do not resist because the reform will not be in place in the second period with or without their resistance.

4.3 Equilibrium without Bureaucratic Resistance

As a benchmark, we solve the game without any resistance. One can think of this equilibrium as if the costs of resistance are very high.

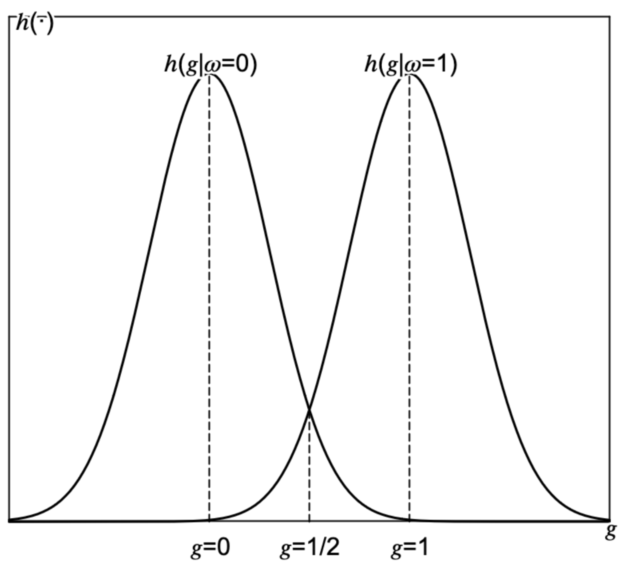
Proposition 1 (Equilibrium without Bureaucratic Resistance) *In the game without bureaucratic resistance, there exists a unique pure strategy equilibrium with a set of threshold values,* $\{g_B^*, \rho_{B0}^*, \rho_{B1}^*\} \in \mathbb{R} \times [0,1]^2$ *such that*

- *the voter reelects the reforming incumbent if and only if the observed government service quality is above the threshold,* $g \geq g_B^*$.
- *the incumbent introduces the reform with value* ω *if and only if the partisan payoff is above the threshold given* ω, $\rho \geq \rho_{B\omega}^*$ *such that* $\frac{1}{2} > \rho_{B0}^* \geq \rho_{B1}^*$.
- *The voter and the incumbent apply stringent thresholds when the reform is ex ante unpopular;* $g_B^*(q)$ *is increasing in* q *and* $\rho_{B\omega}^*(q)$ *is weakly increasing in* q.

Since g is an informative signal of the reform's merit, a voter who observes higher service quality is more likely to believe that the reform is effective. Consequently, the conditional expectation of the reform's value exceeds the value of the status quo if and only if the observed service quality exceeds a certain threshold, g_B^*. Naturally, this threshold increases as the value of the status quo increases.

The incumbent introduces the reform only when the partisan payoff for the reform is large enough. This follows directly from inequality (2): as ρ increases, the incumbent's expected payoff from introducing the reform increases. Additionally, the incumbent is more likely to introduce an effective reform than an ineffective one because voters are more likely to observe a higher g when the reform is effective. Figure 1 illustrates this: the density of g when the reform is effective ($h(g|\omega = 1) = h(g - 1)$) is shifted to the right relative to the density when the reform is ineffective ($h(g|\omega = 0) = h(g)$). Consequently, higher values of g are more likely to be drawn from the former distribution than from the latter.

Figure 1: Comparison of Conditional Densities of g



Note: The figure shows the densities for g, conditional on ω.

Apart from g, the voter also gains additional information by observing the incumbent's action. In equilibrium, the incumbent is more likely to introduce the reform when it is effective than when it is not, so the very act of introducing the reform serves as a positive signal of its value.

Last, the incumbent is less inclined to introduce the reform when the voter values the status quo more regardless of whether the reform is effective or not. This is because she is less likely to be reelected after introducing the reform when the voter highly values the status quo q.

4.3.1 Popularity of the Reform and Policy Distortion

Ideally for voter welfare, the incumbent should choose the reform only if it is effective ($\rho^*_{B0} = 1$ and $\rho^*_{B1} = 0$). However, in reality, the incumbent can distort her choice, introducing the reform when it is not effective ($\rho^*_{B0} < 1$, *Over-Reform*) or not introducing an effective reform ($\rho^*_{B1} > 0$, *Under-Reform*) in equilibrium.

As in the canonical accountability literature (Canes-Wrone, Herron and Shotts, 2001; Fox, 2007; Gersen and Stephenson, 2014), visibility of the incumbent's policy choice combined with uncertainty about its implications can lead to policy distortions by encouraging the incumbent to adopt popular policies for electoral gains.

Remark 1 *In the absence of bureaucratic resistance, higher popularity of the reform exacerbates over-reform while mitigating under-reform. Conversely, lower popularity of the reform reduces over-reform but worsens under-reform.*

The incumbent's incentive to over-reform arises from two components. The first is the partisan policy payoff ρ. Even if the incumbent could never secure reelection with the reform, she would introduce it if $\rho \geq \Pr[reelection|status\_quo] = 1/2$. The second component arises from electoral incentives due to the voter's inability to directly observe ω. Because g is a noisy signal, the voter can still observe g high enough to secure the incumbent's reelection after introducing an ineffective reform. This incentivizes the incumbent to introduce an ineffective reform even when $\rho < 1/2$. Specifically, for $\rho \in \left[\rho^*_{B0}, \frac{1}{2}\right]$, policy distortion occurs only because of electoral incentives.

In contrast, because policy payoff ρ always pushes the incumbent toward introducing the reform, under-reform is driven purely by electoral concerns. The incumbent avoids introducing an effective reform only when the probability of winning reelection is higher with the status quo than with the reform.

4.4 Equilibrium with Bureaucratic Resistance

We now present our main findings. We characterize the equilibrium when bureaucrats are able to resist, explore their incentives to do so, and compare how resistance affects the voter's and the incumbent's strategies compared to the equilibrium without resistance.

Proposition 2 (Equilibrium with Bureaucratic Resistance) *In the game without bureaucratic resistance, there exists a unique pure strategy equilibrium with a set of threshold values,* $\{g^*, \rho_0^*, \rho_1^*, \kappa^*\} \in \mathbb{R} \times [0,1]^3$ *such that*

- *the voter reelects the reforming incumbent if and only if* $g \geq g^*$*.*
- *the incumbent introduces the reform with value* ω *if and only if* $\rho \geq \rho_\omega^*$ *such that* $\frac{1}{2} > \rho_0^* \geq \rho_1^*$*.*
- $g^*(q,c)$ *is monotonically increasing in* q *and* $\rho_\omega^*(q)$ *is weakly increasing in* q*.*
- *bureaucrats resist if and only if the incumbent introduces an effective reform* ***and*** *disutility from the reform is above the threshold,* $\kappa \geq \kappa^*$*.*
- *bureaucrats are more likely to resist for an intermediately popular reform than extremely popular or unpopular reforms;* $1 - \kappa^*(q,c)$ *is weakly single-peaked in* q*.*[14]

4.4.1 Bureaucrats' Incentives to Resist

The bureaucrats' incentives to resist in t = 1 come from (i) their desire to avoid the reform in t = 2 and (ii) their ability to influence the election outcome by affecting government outcome, g. Therefore, they do not resist unless they can influence the election outcome by affecting the government outcome (i.e., they do not undermine the status quo, since the voter's election decision is independent of g).

To build intuition for when bureaucrats resist an implemented reform, consider an arbitrary threshold g' such that the voter reelects the reforming incumbent if and only if $g \geq g'$.

[14] In q such that $\kappa^*(q) < 1$, $1 - \kappa^*(q)$ is strictly single-peaked and flat if $\kappa^*(q) = 1$.

If the reform is effective and the bureaucrats do not resist, the distribution of g follows $h(g-1)$. In contrast, if the reform is ineffective *or* bureaucrats resist, the distribution of g is $h(g)$. Therefore,

$$\Pr[reelection(a=1)|b=1] = \Pr[g \geq g'|a=1, b=1] = 1 - H(g')$$

with resistance $b = 1$ and

$$\Pr[reelection(a=1)|b=0] = \Pr[g \geq g'|a=1, b=0] = \begin{cases} 1 - H(g') & \text{if } \omega = 0 \\ \\ 1 - H(g'-1) & \text{if } \omega = 1 \end{cases}$$

without resistance, $b = 0$.

Then equation (3) can be rewritten as

$$\kappa \underbrace{\Big(1 - H(g') - 1 + H(g')\Big)}_{=0} \geq c \tag{4}$$

if the reform is ineffective ($\omega = 0$) and

$$\kappa\Big(H(g') - H(g'-1)\Big) \geq c \tag{5}$$

if the reform is effective ($\omega = 1$). Notice that equation (4) never holds for $c > 0$ as the reelection probability is constant with respect to resistance, so the bureaucrats do not obstruct the reform that does not work: $b^*(\omega = 0) = 0$. In contrast, the bureaucrats can benefit from sabotaging the reform that actually works, as the reelection probability changes by $H(g') - H(g'-1) > 0$.[15]

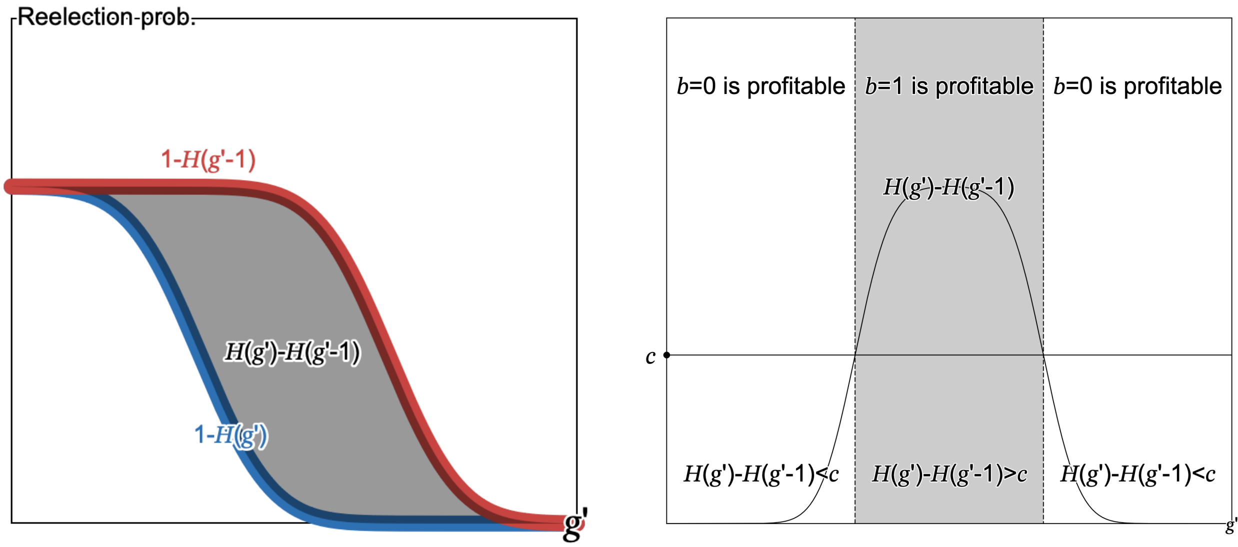
Therefore, the bureaucrats undermine the reform if and only if it is effective ($\omega = 1$) and, for

$$\kappa > \hat{\kappa}(g', c) := \frac{c}{H(g') - H(g'-1)} \tag{6}$$

if $\hat{\kappa}(g', c) < 1$. If $\hat{\kappa}(g', c) \geq 1$, there is no $\kappa < 1$ such that resistance is profitable for

[15] Notice that if bureaucrats do not know ω, they resist if and only if $(1/2)\kappa[(H(g') - H(g'-1)] \geq c$ and $\hat{\kappa} = \frac{2c}{H(g')-H(g'-1)}$.

Figure 2: Resistance's Marginal Effect on Re-election



(a) The X-axis is the voter's cutoff g' and the Y-axis is the reelection probability. The red line is the probability of reelection as a function of g' when $x = 1$ and $b = 0$ and the blue line is the same probability when $x = 0$ or $b = 1$. The gray area between the two lines captures the marginal effect of resistance as a function of the voter's cutoff g'.

(b) The X-axis is the voter's cutoff g' and the Y-axis is resistance's marginal effect on reelection probability. The line $H(g') - H(g' - 1)$ is the resistance's marginal effect as a function of the voter's cutoff g' (The size of the gray area on panel (a)). Notice that it is maximized at $g' = 1/2$. The shaded area indicates the range of g' where resistance is incentive compatible.

bureaucrats, so they do not resist.

Hence, bureaucrats can lower the probability of reelection for a reforming incumbent from $1-H(g'-1)$ to $1-H(g')$ (i.e., from the red to the blue line in Figure 2a), and bureaucrats are more encouraged to resist an effective reform if this negative impact is greater. The marginal negative impact is greatest when the voter's prior preference for the reform $(1 - q)$ is in the intermediate range, and diminishes when prior preferences are at the extremes (see Figure 2b). Intuitively, if the voter strongly favors the reform a priori (a very lenient threshold g'), the probability of observing a sufficiently low g to overturn that preference is small even with resistance. Conversely, if the voter strongly favors the status quo (a very strict threshold), the voter is unlikely to be satisfied with a given level of service quality and unlikely to reelect a reforming incumbent, even without bureaucrats' interference. The necessity for bureaucrats to resist and oust a reformer is therefore lower. In contrast, when the voter is ex ante torn between the reform and the status quo, a small change in the distribution of g can meaningfully sway the voter's decision, making resistance more rewarding for bureaucrats.

4.5 Resistance Effects on Voter Learning

Proposition 3 *Bureaucratic resistance makes the voter more lenient for a popular reform and more stringent for an unpopular reform; there exists $q^\dagger$ such that $g^*(q,c) \geq g^*_B(q)$ if and only if $q \geq q^\dagger$.*[16]

For ex ante popular reforms (low q), bureaucratic resistance makes a voter who already favors the policy even more forgiving toward the incumbent. Conversely, for initially unpopular reforms (high q), bureaucratic resistance has the opposite effect: it discourages the voter from reelecting the reforming incumbent, even when service quality remains relatively high. A voter who initially opposes the policy becomes even less forgiving toward the incumbent. Since resistance only reduces g in expectation, this latter result may seem puzzling.

The explanation lies in that bureaucratic interference introduces noise and diminishes the informational value of government performance as a signal of the policy's quality. This leads a Bayesian voter to rely more heavily on prior beliefs when evaluating the incumbent's policy choice. For example, when confronted with poor service provision and a high likelihood of police resistance, an already pro-reform voter might reason: "Crime rates haven't dropped as quickly as I hoped, but I know the police are not fully committed to the policy change. That's probably why it didn't work as well. It's unfair to blame the policy when it hasn't been properly implemented." In contrast, after observing good service quality despite the high possibility of police resistance, an already skeptical voter is concerned that this high g could result from noise rather than a genuinely effective reform. This voter might say: "Crime rates improved, but that's likely because of other factors, like broader trends in

[16]There exists such $q^\dagger$ for any $c_h > c_l > 0$ such that $g^*(q,c_l) \geq g^*(q,c_h)$ if and only if $q \geq q^\dagger$ (see Appendix A.3).

policing or community initiatives, not this policy. The police would have sabotaged an otherwise successful reform, so the apparent success is likely to be a fluke."[17]

This mechanism offers a rational basis for what might appear as "motivated reasoning" (Ditto and Lopez, 1992): People do not simply dismiss signals that contradict their priors out of bias; rather, they do so rationally, because they recognize that interference from a third actor undermines the reliability of those signals.

For a formal intuition, consider the voter's posterior beliefs $\mathrm{E}[\omega|g]$.[18] Without resistance, the posterior belief is:

$$\mathrm{E}[\omega|g] = \frac{\Pr[g|\omega=1]}{\Pr[g|\omega=1]+\Pr[g|\omega=0]} = \frac{h(g-1)}{h(g-1)+h(g)}.$$

Now suppose that bureaucrats resist with probability $1-\kappa' \in [0,1]$. Then,

$$\mathrm{E}[\omega|g,\kappa'] = \frac{\kappa' h(g-1)+(1-\kappa')h(g)}{\kappa' h(g-1)+(1-\kappa')h(g)+h(g)}.$$

It becomes clear that $\mathrm{E}[\omega|g,\kappa']$ is a perturbation of $\mathrm{E}[\omega|g]$ with extra noise from resistance, so the value of g decreases in general, inducing the voter to rely more on his prior. Formally,

$$\begin{aligned}\mathrm{E}[\omega|g] \geq \mathrm{E}[\omega|g,\kappa'] &\iff h(g-1) \geq \kappa' h(g-1)+(1-\kappa')h(g)\\ &\iff h(g-1)\geq h(g) \iff g \geq 1/2,\end{aligned}$$

so $\mathrm{E}[\omega|g] \geq \mathrm{E}[\omega|g,\kappa']$ if and only if $g \geq 1/2$. As Figure 3 illustrates, this implies that the voter's posterior belief with bureaucratic resistance has a more dispersed distribution and, in turn, is less sensitive to g than his posterior without resistance.[19]

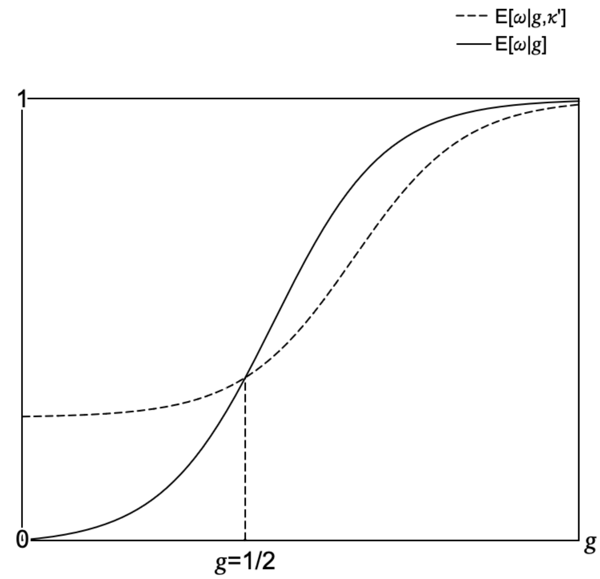
Another way in which bureaucratic resistance influences the voter's inference is through its effect on the incumbent's decision. Because the incumbent knows the reform's true

[17]For more intuition, see Appendix C.1.

[18]Here, we keep the incumbent's choice fixed.

[19]Since $\mathrm{E}[\mathrm{E}[\omega|g]] = \mathrm{E}[\mathrm{E}[\omega|g,\kappa']] = \mathrm{E}[\omega] = 1/2$, $\mathrm{E}[\omega|g,\kappa']$ is a mean-preserving spread of $\mathrm{E}[\omega|g]$ due to the extra noise from resistance. Having a mean-preserving spread in the posterior distribution corresponds to being dominated in Blackwell informativeness order (Blackwell, 1953), so g without resistance dominates g with resistance in Blackwell informativeness order. This means that g without resistance carries more information about ω than g with resistance (see Appendix C.1).

Figure 3: Resistance's Countervailing Effects on Voter Learning



Note: The figure shows the voter's conditional expectation of the reform's value, with and without resistance.

value, her choice conveys information to the voter. By altering how the incumbent decides, resistance indirectly affects the voter's inference. We elaborate on the incumbents' reaction to resistance next.

4.6 Resistance Effects on Policymaking

Interestingly, bureaucratic resistance can either increase or decrease the incumbent's willingness to reform, depending on the reform's ex ante popularity and its inherent value. The logic is that incumbents consider not only the direct threat of resistance to service quality but also its implications for how voters interpret the reform's merit.

Proposition 4 *1. Bureaucratic resistance induces over-reform if the reform is popular: for* $q < q^\dagger$, $\rho_0^*(q,c) < \rho_{B0}^*(q)$;

2. Bureaucratic resistance causes under-reform, but alleviates over-reform when the reform is unpopular enough: there exists $q^{\dagger\dagger}$ *such that* $\rho_1^*(q,c) > \rho_{B1}^*(q)$ *and* $\rho_0^*(q,c) >$

$\rho^*_{B0}(q)$ *if* $q > q^{\dagger\dagger}$*;*

3. *If the cost of resistance is low enough, bureaucratic resistance causes both under-reform and over-reform for an intermediately popular reform: There exists* $c^\dagger$ *such that* $q^{\dagger\dagger} < q^\dagger$*,* $\rho^*_1(q,c) > \rho^*_{B1}(q)$ *and* $\rho^*_0(q,c) < \rho^*_{B0}(q)$ *if and only if* $c < c^\dagger$ *.*

If the reform is initially popular ($q < \min\{q^\dagger, q^{\dagger\dagger}\}$), the possibility of resistance can incentivize the incumbent to introduce it, resulting in over-reform. Two factors explain this result. First, when the reform is popular, resistance poses little threat—or none at all when $\omega = 0$—to the incumbent's reelection chances, since even poor service provision can be sufficient to secure voter support.[20] Second, as per Proposition 3, the incumbent even *benefits* from resistance by making the voter more lenient toward her. Consequently, if a reform is popular yet ineffective, the incumbent can essentially use bureaucrats as scapegoats for any shortfall in service quality—a likely outcome given the reform's ineffectiveness.[21] Hence, resistance creates policy distortions by increasing the number of reforms that are doomed to fail (see panel (a) in Figure 4).

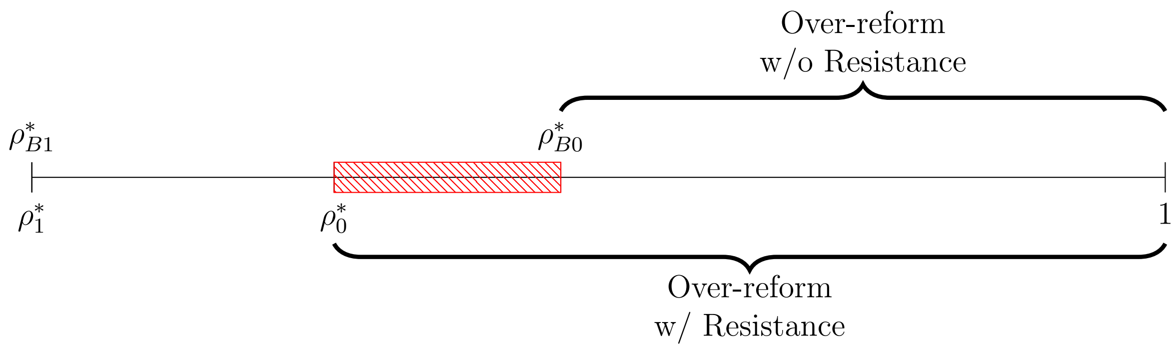
Conversely, when the reform is unpopular ($q > \max\{q^\dagger, q^{\dagger\dagger}\}$), bureaucratic resistance leads the politician to be cautious with reforms, because both the direct and inference effects work to the incumbent's disadvantage. For ineffective and unpopular reforms, bureaucratic resistance reinforces the skepticism of an already doubtful voter by lowering the informational value of g. When the reform is effective, the incumbent must further account for the direct effect of resistance, which lowers the distribution of service quality. By dampening enthusiasm for reform, resistance amplifies under-reform but can help curb over-reform in this case (see panel (c) in Figure 4).

What happens when the reform's popularity falls within an intermediate range? If the cost of resistance is low and thus, resistance is likely, it prompts a reform when it is *ineffec-*

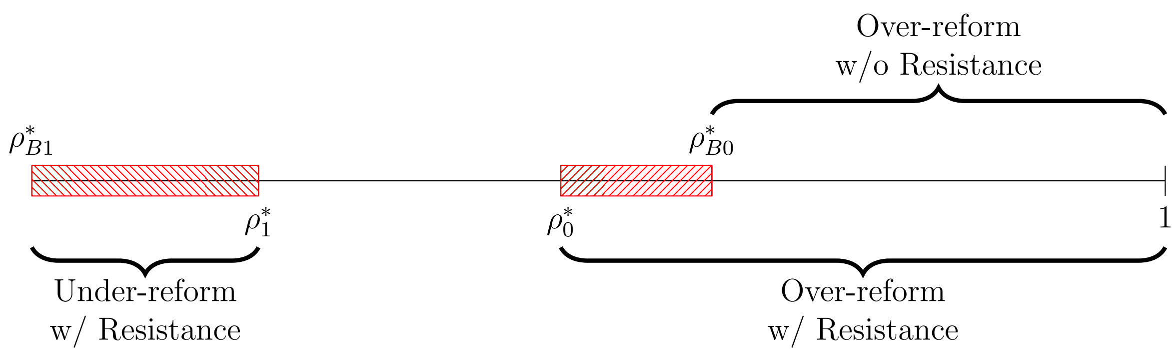
[20]Note that the result holds even if resistance can reduce the service quality of an ineffective reform (see Appendix B).

[21]For effective reforms ($\omega = 1$), this mechanism does not alter the incumbent's behavior, since incumbents always implement effective reforms even in the absence of resistance.

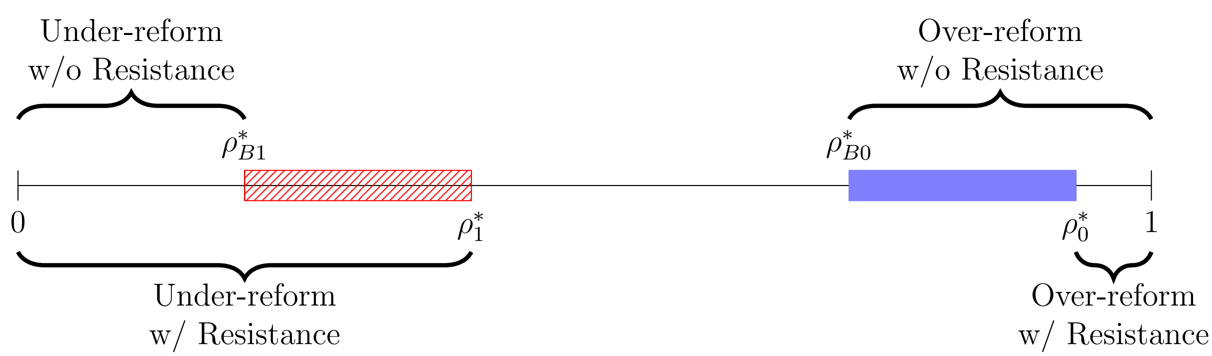
Figure 4: Effect of Bureaucratic Resistance on Policy Distortion under Different q



(a) If $q < \min\{q^\dagger, q^{\dagger\dagger}\}$, bureaucratic resistance increases over-reform.



(b) If $c < c^\dagger$ and $q \in [q^{\dagger\dagger}, q^\dagger]$, bureaucratic resistance increase over- and under-reform.



(c) If $q > \max\{q^\dagger, q^{\dagger\dagger}\}$, bureaucratic resistance reduces over-reform but increases under-reform.

Note: Red boxes with lines indicate increases in policy distortions with resistance, solid blue boxes indicate reductions in policy distortions with resistance.

tive but deters it when it is *effective*, leading to both more over-reform and under-reform. Specifically, cheap and frequent resistance makes the voter sufficiently lenient to accept an ineffective reform while simultaneously providing a substantial direct threat to service quality that deters the incumbent from implementing an effective reform. As a result, there exists an intermediate range of reform popularity where resistance induces both types of policy distortion ($q \in [q^{\dagger\dagger}, q^{\dagger}]$, panel (b) in Figure 4).

5 Empirical Examples

In this section, we provide examples of when resistance discourages and encourages reform to illustrate how our model helps explain various dynamics in bureaucratic politics.

5.1 Examples of Dampened Reform Efforts

The deaths of unarmed Black Americans at the hands of police in recent years, including George Floyd, Daunte Wright, Breonna Taylor, and Tyre Nichols, have sparked a movement calling for sweeping police reform. In 2020, millions marched for police reform, and lawmakers across the aisle supported reform efforts. However, lawmakers' support for police reform faltered in recent years and reform policies stalled (McCaskill, 2020; Pearson, 2022). Why?

Our model illustrates how resistance by powerful police organizations and their threats to sabotage reform policies might have contributed to politicians' unwillingness to follow through with reforms aimed at police accountability and transparency. In particular, if voters are sufficiently weary about the effectiveness of reforms (q is high), our results predict that incumbents will shy away from reforms because of bureaucrats' ability to resist reforms by undermining service quality, and, consequently, affect voters' perceptions of the policy and incumbents' re-election prospects.[22]

A clear example of this are the difficulties of eliminating "qualified immunity" for police officers. In the aftermath of George Floyd's killing, federal and state lawmakers nationwide attempted to reverse a legal principle that effectively shields police officers from being sued for violating individuals' civil rights. Yet, the federal bill soon stalled in Congress, as bipartisan

[22]Note that the threat of resistance is sufficient, and *actual* resistance does not happen since the reform is not implemented and thus cannot be undermined by resistance.

Senate negotiations failed, and by October 2021, at least 35 qualified immunity bills had been withdrawn or died in state legislatures (Kindy, 2021).

The opposition to these reforms by police organizations played an important role in this development. Police unions bought ads in local newspapers warning that officers might hesitate to pursue criminals due to concerns about potential lawsuits, urging readers to call state legislators to oppose the reforms (Kindy, 2021). Similarly, in opinion pieces, unions asserted that crime would surge uncontrollably if the reforms passed (Kindy, 2021). Against the backdrop of rising crime rates after 2020, this strategy effectively discouraged lawmakers from pursuing reforms that could make them appear soft on crime. In cases where police groups were unable to completely prevent immunity reforms (e.g., New Mexico), they often managed to shift the narrative and ensured that victims could only seek retribution from cities and counties, rather than individual officers (Kindy, 2021). Hence, by underscoring their capacity to resist the policies (low c), leveraging citizens' fear of crime (low g) and insinuating to voters that the reforms would be worse than the status quo ($\omega = 0$)—thereby suggesting that incumbents would be responsible for any decline in service quality—police made reforms of "qualified immunity" electorally risky and unattractive for incumbents.

5.2 Examples of Increased Reform Efforts

Conversely, our model also explains how and when incumbents can *leverage* the possibility of resistance for their electoral gains. If reforms are fairly popular with voters (low q), incumbents are motivated to implement them and blame bureaucratic resistance if the reforms fail. Importantly, politicians can exploit the fact that voters expect bureaucrats to resist a policy they dislike, and bureaucrats cannot credibly deny their incentives to resist.

A prominent example of this is the strategy of populist incumbents to blame the "deep state" for policy failures (i.e., claiming that bureaucrats are actively undercutting their political authority and thwarting the will of the people by sabotaging policies). Ron DeSantis' efforts to blame teachers, librarians, and school administrators for failures of his education policies nicely illustrate this tactic. Since 2022, the Florida governor has implemented a series of laws that impose severe restrictions on classroom materials addressing topics such as gender identity, sexual orientation, racism, and slavery. These laws soon resulted in logistic chaos, as school districts were overwhelmed with requests from parents and conservative groups to remove a wide array of books from their curricula (Atterbury, 2024). Moreover, the policies led to many empty bookshelves, as school districts started pulling even dictionaries and encyclopedias due to references to "sexual conduct" and a Miami school required parental consent for students to access a book by a Black author (Luscombe, 2024). Consequently, Florida voters became increasingly unhappy with the impact these policies had on educational services (Luscombe, 2024). To navigate the backlash, DeSantis asserted that school officials were strategically obstructing the policy. For instance, after a book about Puerto Rican baseball legend Roberto Clemente was removed for its discussion of racism, DeSantis claimed that teacher unions were removing benign books to portray him as a racist, authoritarian zealot (Algar, 2023). Crucially, DeSantis' narrative capitalizes on voter uncertainty about whether policy failures (low g) stem from strategic resistance by educators ($b = 1$) or flaws in his policies ($\omega = 0$). Given the vocal opposition from teachers and their unions, who protested and filed lawsuits against these policies, it is difficult for these bureaucrats to deny their incentives to resist DeSantis' policies. Hence, by claiming that the state bureaucracy was working to undermine his administration, DeSantis weaponized expectations of bureaucratic resistance among his supporters to legitimize drastic policies that ultimately led to a decline in the quality of education services.

6 Conclusion & Discussion

Politicians inherently depend on bureaucrats to deliver policies to their voter base, and poor public service provision creates an electoral vulnerability for politicians. When and how can bureaucrats exploit this to affect policies they dislike? In this paper, we argue that bureaucrats' central position in government production, together with voters' difficulty in attributing responsibility for service provision, vests bureaucrats with a unique source of political power. Our model illustrates how this leads to bureaucrats' strategic resistance of public service provision, affects voters' learning from policy outcomes, and can impact politicians' policies and chances of reelection.

Using a three-player model with a politician, a bureaucrat, and a voter, we find that bureaucratic resistance leads to complex disruptions in electoral accountability relationships among voters and politicians. Depending on the voter's beliefs about the reform's merit, bureaucratic resistance (1) reduces the informativeness of public services for voters, making them either more or less favorable to the incumbent, (2) occurs more often if voters are more susceptible to the government outcome, and (3) can both promote and hinder reform efforts, sometimes resulting in too few beneficial reforms (*under-reform*) and too many ineffective reforms (*over-reform*) compared to the normative optimum.

Our model and analysis enrich our understanding of the degree of political motivation among bureaucrats and their consequences for voters' learning and politicians' behavior. In doing so, we highlight an underappreciated mechanism of political influence for bureaucrats as interest groups and micro-found a reason why bureaucrats act against the very programs and services they oversee. Additionally, we respond to recent calls to integrate interactions among politicians, bureaucrats, and voters within a single framework for studying political accountability (Grossman and Slough, 2022). Compared to conventional models of electoral politics that examine the relationships between voters and politicians or between politicians and bureaucrats separately, this integration allows discovery of new mechanisms influencing voter learning, service quality, and government responsiveness.

This article opens several paths for future work. In our model, we focus on a simple two-period game and abstract away from potential dynamics. Particularly, we treat both the voter's perceptions about the reform's value relative to the status quo (q) and bureaucrats' perceived costs of resistance (c) as exogenous. It appears fruitful for future theoretical research to explore how our results are affected by voters' dynamic adjustment of their beliefs about the cost of resistance or the reform's value over time.

Our model can also inform future empirical work on the drivers, conditions, and consequences of bureaucratic resistance in several ways. In particular, one could test the comparative statics described here (i.e., the effect of changes in voters' beliefs about the reform's value (q) and bureaucrats' cost-benefit trade-off when resisting (c relative to κ) on the probability of resistance ($1-\kappa^*$), the probability of reform ($1-\rho^*$), and the probability of reelection ($1-g^*$)). Similarly, scholars could use surveys to empirically evaluate the impact of bureaucratic resistance (i.e., variation in c) on voters' perceptions of reform merit ($\mathrm{E}[\omega|g,c]$), conditional on the realized government quality (g).

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Appendix: Supporting Information for *Bureaucratic Resistance and Policy Inefficiency*

A Proofs

A.1 Proof for Proposition 1

Suppose bureaucrats never resist, so $b = 0$.

For an arbitrary threshold g' such that the voter reelects the reforming incumbent if and only if $g \geq g'$, the incumbent gets reelected with probability $1 - H(g')$ in $\omega = 0$ and $1 - H(g' - 1)$ in $\omega = 1$. Therefore, in $\omega = 0$, introducing reform ($a = 1$) is undominated if and only if

$$\rho + (1 + \rho) \underbrace{[1 - H(g')]}_{\Pr[reelection|a=1,\omega=0]} \geq \frac{1}{2} \iff \rho \geq \rho_0(g') := \frac{H(g') - \frac{1}{2}}{2 - H(g')}. \tag{7}$$

Notice that $\frac{1}{2} > \rho_0(g') \iff \frac{1}{2} > \frac{H(g')-\frac{1}{2}}{2-H(g')} \iff 2 - H(g') > 2H(g') - 1 \iff 1 > H(g')$.

If $\omega = 1$, $a = 1$ is undominated if and only if

$$\begin{aligned} \rho + (1 + \rho) \underbrace{\Big([1 - H(g' - 1)]\Big)}_{\Pr[reelection|a=1,\omega=1,b=0]} &\geq \frac{1}{2} \\ \iff \rho \geq \rho_{B1}(g') &:= \frac{H(g' - 1) - \frac{1}{2}}{2 - H(g' - 1)}. \end{aligned} \tag{8}$$

Observe

$$\begin{aligned} E[\omega|g, g'] &= \frac{\Pr[\omega = 1]h(g|\omega = 1)\Pr[a = 1|\omega = 1, g']}{\Pr[\omega = 1]h(g|\omega = 1)\Pr[a = 1|\omega = 1, g'] + \Pr[\omega = 0]h(g|\omega = 0)\Pr[a = 1|\omega = 0, g']} \\ &= 1\Big/\left(1 + \frac{\Pr[\omega = 0]}{\Pr[\omega = 1]}\frac{h(g|\omega = 0)}{h(g|\omega = 1)}\frac{\Pr[a = 1|\omega = 0, g']}{\Pr[a = 1|\omega = 1, g']}\right). \end{aligned}$$

Define

$$I_B(g) = \frac{h(g)}{h(g - 1)} \qquad R_B(g) = \frac{1 - \rho_0(g)}{1 - \rho_{B1}(g)}.$$

Then, for an arbitrary observation g and an arbitrary threshold g',

$$I_B(g)R_B(g') = \frac{\Pr[\omega = 0]}{\Pr[\omega = 1]}\frac{h(g|\omega = 0)}{h(g|\omega = 1)}\frac{\Pr[a = 1|\omega = 0]}{\Pr[a = 1|\omega = 1]}.$$

In equilibrium, this arbitrary threshold must be where the conditional expectation of ω given the observed g is the same as the status quo's value:

$$E[\omega|g,g] = \frac{1}{1+I_B(g)R_B(g)} = q$$
$$\iff I_B(g)R_B(g) = \frac{1-q}{q}.$$

Let g_B^* denote such threshold. If $I_B(g)R_B(g)$ is monotonic with respect to g, then g_B^* is unique.

Lemma A1

$$I_B(g)R_B(g) = \frac{h(g)\left(2[1-H(g)]+\frac{1}{2}\right)[2-H(g-1)]}{h(g-1)\left(2[1-H(g-1)]+\frac{1}{2}\right)[2-H(g)]} = \frac{\frac{h(g)\left(2[1-H(g)]+\frac{1}{2}\right)}{[2-H(g)]}}{\frac{h(g-1)\left(2[1-H(g-1)]+\frac{1}{2}\right)}{[2-H(g-1)]}}$$

is decreasing in g.

Proof. When $h(g)$ is log-concave, $H(g)$ is also log-concave or its horizontal shifts. Also, log-concave functions are closed for multiplication. Thus, $\frac{h(g)\left(2[1-H(g)]+\frac{1}{2}\right)}{[2-H(g)]} > 0$ is log-concave. Notice that $\frac{h(g-1)\left(2[1-H(g-1)]+\frac{1}{2}\right)}{[2-H(g-1)]}$ is a horizontal shift of $\frac{h(g)\left(2[1-H(g)]+\frac{1}{2}\right)}{[2-H(g)]} > 0$. Since a log-concave function satisfies the MLRP with respect to a horizontal shift (Saumard and Wellner, 2014), $\frac{h(g)\left(2[1-H(g)]+\frac{1}{2}\right)}{[2-H(g)]} \Big/ \frac{h(g-1)\left(2[1-H(g-1)]+\frac{1}{2}\right)}{[2-H(g-1)]}$ is monotonic in g.

To see this in detail, observe that

$$\frac{\partial}{\partial g}\frac{\frac{h(g)\left(2[1-H(g)]+\frac{1}{2}\right)}{[2-H(g)]}}{\frac{h(g-1)\left(2[1-H(g-1)]+\frac{1}{2}\right)}{[2-H(g-1)]}} \propto \frac{\partial}{\partial g}\log\frac{\frac{h(g)\left(2[1-H(g)]+\frac{1}{2}\right)}{[2-H(g)]}}{\frac{h(g-1)\left(2[1-H(g-1)]+\frac{1}{2}\right)}{[2-H(g-1)]}}.$$

Notice

$$\log\frac{\frac{h(g)\left(2[1-H(g)]+\frac{1}{2}\right)}{[2-H(g)]}}{\frac{h(g-1)\left(2[1-H(g-1)]+\frac{1}{2}\right)}{[2-H(g-1)]}} = \log\frac{h(g)}{h(g-1)} + \log\frac{2[1-H(g)]+\frac{1}{2}}{2-H(g)} - \log\frac{2[1-H(g-1)]+\frac{1}{2}}{2-H(g-1)}$$
$$= \log\frac{h(g)}{h(g-1)} + \log\frac{2[1-H(g)]+\frac{1}{2}}{2[1-H(g-1)]+\frac{1}{2}} + \log\frac{2-H(g)}{2-H(g-1)}.$$

First, we know that $\log \frac{h(g)}{h(g-1)}$ is decreasing in g by the MLRP. Second, observe that

$$\frac{\partial}{\partial g} \log \frac{2[1-H(g)]+\frac{1}{2}}{2[1-H(g-1)]+\frac{1}{2}} = \frac{-2h(g)}{2[1-H(g)]+\frac{1}{2}} - \frac{-2h(g-1)}{2[1-H(g-1)]+\frac{1}{2}} \leq 0$$
$$\iff h(g)\Big(\frac{5}{4} - H(g-1)\Big) \geq h(g-1)\Big(\frac{5}{4} - H(g)\Big)$$
$$\iff \frac{5}{4}\left(h(g) - h(g-1)\right) \geq h(g)H(g-1) - h(g-1)H(g).$$

Since $h(g)$ has the monotone likelihood ratio dominance over $h(g-1)$, $h(g-1)$ has the hazard rate dominance over $h(g)$ (An, 1997), which implies

$$\frac{h(g)}{1-H(g)} \geq \frac{h(g-1)}{1-H(g-1)} \iff h(g) - h(g)H(g-1) \geq h(g-1) - h(g-1)H(g)$$
$$\iff h(g) - h(g-1) \geq h(g)H(g-1) - h(g-1)H(g),$$

which implies $\frac{5}{4}\left(h(g) - h(g-1)\right) \geq h(g)H(g-1) - h(g-1)H(g)$, so $\frac{\partial}{\partial g} \log \frac{2[1-H(g)]+\frac{1}{2}}{2[1-H(g-1)]+\frac{1}{2}} = \frac{-2h(g)}{2[1-H(g)]+\frac{1}{2}} - \frac{-2h(g-1)}{2[1-H(g-1)]+\frac{1}{2}} \leq 0$.

Similarly, the monotone likelihood ratio dominance of $h(g-1)$ over $h(g)$ implies

$$\frac{\partial}{\partial g} \log \frac{2-H(g)}{2-H(g-1)} = \frac{-h(g)}{2-H(g)} - \frac{-h(g-1)}{2-H(g-1)} \leq 0$$
$$\iff 2[h(g) - h(g-1)] \geq h(g)H(g-1) - h(g-1)H(g).$$

Therefore, $\log I_B(g) + \log R_B(g)$ is decreasing in g, and therefore, $I_B(g)R_B(g)$ is decreasing in g. ■

Consequently, there exists a unique $g_B^*(q)$ such that $I_B(g_B^*(q))R_B(g_B^*(q)) = \frac{1-q}{q}$, by the Intermediate Value Theorem.

Let $\rho_{B0}^*(q) := \rho_0(g_B^*(q))$ and $\rho_{B1}^*(q) := \rho_{B1}(g_B^*(q))$.

Since $g_B^*(q)$ is increasing in q, $\rho_0(g)$ and $\rho_{B1}(g)$ are increasing in g, so both are increasing in q. For instance, $\frac{\mathrm{d}\rho_0(g_B^*(q))}{\mathrm{q}} = \frac{\partial\rho_0(g_B^*(q))}{\partial g_B^*(q)} \frac{\partial g_B^*(q)}{q} > 0$ since $\frac{\partial\rho_0(g_B^*(q))}{\partial g_B^*(q)} > 0$ and $\frac{\partial g_B^*(q)}{\partial q} > 0$.

A.2 Proof for Proposition 2

As in (6), for an arbitrary threshold g', bureaucrats resist if and only if $\omega = 1, a = 1$, and

$$\kappa \geq \max\{\hat{\kappa}(g'; c), 1\} \text{ such that } \hat{\kappa}(g'; c) := \frac{c}{H(g') - H(g'-1)}.$$

It is useful that $H(g) - H(g-1)$ is single-peaked in g and attains a unique peak at $g = 1/2$: $h(g) - h(g-1) \geq 0 \iff g \leq 1/2$.

Since resistance occurs only when $\omega = 1$, the incumbent's decision given an arbitrary threshold g' is unaffected: $a = 1$ in $\omega = 0$ if and only if $\rho \geq \hat{\rho}_0(g')$.

Given the probability of resistance, $\hat{\kappa}(g'; c)$, $a = 1$ in $\omega = 1$ is undominated for the incumbent if and only if

$$\rho + (1+\rho)\underbrace{\Big(\hat{\kappa}(g';c)[1-H(g'-1)] + [1-\hat{\kappa}(g';c)][1-H(g')]\Big)}_{\Pr[reelection|a=1,\omega=1,b=0]} \geq \frac{1}{2}$$

$$\iff \rho + (1+\rho)\Big(\hat{\kappa}(g';c)[H(g')-H(g'-1)] + [1-H(g')]\Big).$$

Since $\hat{\kappa}(g';c)[H(g')-H(g'-1)] = \frac{c}{H(g')-H(g'-1)}[H(g')-H(g'-1)] = c$ if $\hat{\kappa}(g';c) < 1$ and $\hat{\kappa}(g';c)[H(g')-H(g'-1)] = [H(g')-H(g'-1)]$ if $\hat{\kappa} = 1$, define

$$\hat{c}(g';c) = \begin{cases} c & \text{if } \hat{\kappa}(g';c) < 1 \\ H(g')-H(g'-1) & \text{if } \hat{\kappa}(g';c) = 1, \end{cases}$$

$a=1$ in $\omega=1$ is undominated if and only if

$$\iff \rho + (1+\rho)\Big(\hat{c}(g') + [1-H(g')]\Big) \geq \frac{1}{2} \iff \rho \geq \rho_1(g') := \frac{H(g') - \frac{1}{2} - \hat{c}(g')}{2 - H(g') + \hat{c}(g')}. \tag{9}$$

Define

$$I(g,g') = \frac{h(g)}{h(g) + \hat{\kappa}(g';c)[h(g-1)-h(g)]} \qquad\qquad R(g') = \frac{1-\rho_0(g')}{1-\rho_1(g')}.$$

Then,

$$E[\omega|g,g'] = \frac{1}{1+I(g,g')R(g')},$$

so the equilibrium threshold g^* must satisfies

$$E[\omega|g^*,g^*] = q \iff I(g^*,g^*)R(g^*) = \frac{1-q}{q}.$$

Lemma A2 *$I(g,g)R(g)$ is decreasing in g.*

Proof. Suppose $\hat{\kappa}(g) \geq 1$. Then, the proof for Proposition 1 implies that $I(g,g)R(g)$ is decreasing in g.

Suppose $\hat{\kappa}(g) < 1$. Take logarithm to get

$$\log I(g,g)R(g) = \log I(g,g) + \log R(g).$$

Since log is an increasing function, $I(g,g)R(g)$ is decreasing in g if $I(g,g)$ and $R(g)$ are decreasing in g independently.

$$I(g,g) = \frac{h(g)}{h(g) + c\frac{h(g-1)-h(g)}{H(g)-H(g-1)}} = \frac{1}{1 + c\frac{[h(g-1)/h(g)]-1}{H(g)-H(g-1)}}$$

is decreasing in g since

$$\varphi(g) := \frac{[h(g-1)/h(g)] - 1}{H(g) - H(g-1)}$$

is increasing in g:

$$\varphi'(g) = \frac{[H(g) - H(g-1)]\frac{\partial}{\partial g}\left(\frac{h(g-1)}{h(g)} - 1\right) + (\frac{h(g-1)}{h(g)} - 1\Big)\frac{\partial}{\partial g}[H(g) - H(g-1)]}{[H(g) - H(g-1)]^2} > 0$$
$$\iff [H(g) - H(g-1)]\frac{h'(g-1)h(g) - h'(g)h(g-1)}{\Big(h(g)\Big)^2} - [h(g) - h(g-1)]\Big(\frac{h(g-1)}{h(g)} - 1\Big) > 0.$$

First, the first term, $[H(g) - H(g-1)]\frac{h'(g-1)h(g) - h'(g)h(g-1)}{[h(g)]^2}$ is positive. To see this, first notice that $[H(g) - H(g-1)] > 0$ due to the first-order stochastic dominance. Second, the log-concavity of h ensures $\frac{\partial}{\partial g}\frac{h'(g)}{h(g)} < 0 \iff h''(g)h(g) < [h'(g)]^2$ (Bagnoli and Bergstrom, 2006). Therefore, $h'(g-1)h(g) - h'(g)h(g-1) > 0 \iff \frac{h'(g-1)}{h(g-1)} > \frac{h'(g)}{h(g)}$.

Straightforwardly, the second term, $-\Big(h(g) - h(g-1)\Big)\Big(\frac{h(g-1)}{h(g)} - 1\Big) = -\Big(-h(g) - \frac{[h(g-1)]^2}{h(g)}\Big)$, is positive since $h(g) > 0$.

$$R(g) = \frac{1 - \rho_0(g)}{1 - \rho_1(g)} = \frac{1 - \frac{H(g) - 1/2}{2 - H(g)}}{1 - \frac{H(g) - c - 1/2}{2 - H(g) + c}}$$

is monotonically decreasing in g:

$$\frac{\partial}{\partial g}R(g) \propto \frac{\partial H}{\partial g}\frac{\partial}{\partial H}\log R(g) = \frac{\partial H(g)}{\partial g}\left(\frac{\frac{\partial}{\partial H}(1-\rho_0)}{(1-\rho_0)} - \frac{\frac{\partial}{\partial H}(1-\rho_1)}{(1-\rho_1)}\right) < 0$$
$$\iff \frac{\frac{\partial}{\partial H}(1-\rho_0)}{(1-\rho_0)} - \frac{\frac{\partial}{\partial H}(1-\rho_1)}{(1-\rho_1)} < 0 \text{ because } \frac{\partial H(g)}{\partial g} = h(g) > 0.$$

Because $\frac{\partial H}{\partial g} = h > 0$, we only have to check the sign of the derivative with respect to $H(g)$, treating it as a variable. Observe

$$\frac{\partial}{\partial H}(1-\rho_0) = -\frac{\partial}{\partial H}\frac{H - \frac{1}{2}}{2 - H} - \frac{3}{2(2-H)^2}$$
$$\frac{\partial}{\partial H}(1-\rho_1) = -\frac{\partial}{\partial H}\frac{H - \frac{1}{2} - c}{2 - H + c} = -\frac{3}{2(2-H+c)^2},$$

so

$$\frac{\frac{\partial}{\partial H}(1-\rho_0)}{(1-\rho_0)} = -\frac{3}{2(2-H)^2}\frac{2-H}{2-H+1/2} = -\frac{3}{2}\frac{1}{(2-H)(2-H+1/2)}$$
$$\frac{\frac{\partial}{\partial H}(1-\rho_1)}{(1-\rho_1)} = -\frac{3}{2(2-H+c)^2}\frac{2-H+c}{2-H+1/2+2c} = -\frac{3}{2}\frac{1}{(2-H+c)(2-H+1/2+2c)}.$$

Notice that $2-H+c > 2-H$ and $2-H+1/2+2c > 2-H+1/2$, so

$$\frac{1}{(2-H)(2-H+1/2)} > \frac{1}{(2-H+c)(2-H+1/2+2c)}$$
$$\iff \frac{\frac{\partial}{\partial H}(1-\rho_0)}{(1-\rho_0)} < \frac{\frac{\partial}{\partial H}(1-\rho_1)}{(1-\rho_1)}.$$

Thus, $R(g)$ is decreasing in g. ■

Therefore, there exists a unique g^* such that $I(g,g)R(g) \leq \frac{1-q}{q}$ if and only if $g \geq g^*$. Notice that $I(g,g)R(g)$ is decreasing in g and $\frac{1-q}{q}$ is decreasing in q, so $g^*(q)$ is increasing in q.

Let $\rho^*_\omega(q,c) = \rho_\omega(g^*(q,c))$ and $\kappa^*(q,c) = \max\{\hat{\kappa}(g^*(q,c)), 1\}$.

By the same logic as in the previous proof, $\rho^*_\omega(q,c)$ is increasing in q.

To see that $\hat{\kappa}(g^*(q,c))$ is U-shaped in q, notice that

$$\frac{\partial}{\partial g}\hat{\kappa}(g,c) = \frac{\partial}{\partial g}\frac{c}{H(g)-H(g-1)} = -\frac{c[h(g)-h(g-1)]}{[H(g)-H(g-1)]^2} \geq 0 \iff h(g) \leq h(g-1) \iff g \geq 1/2,$$

so $\frac{\partial}{\partial g}\hat{\kappa}(q,c)$ is increasing in g if and only if $g \geq 1/2$. Notice that

$$\frac{\mathrm{d}\hat{\kappa}(g^*(q,c))}{\mathrm{d}q} = \frac{\partial}{\partial g}\hat{\kappa}(g^*(q,c),c)\frac{\partial g^*(q,c)}{\partial g} = \frac{c[h(g^*(q,c)) - h(g^*(q,c)-1)]}{[H(g^*(q,c)) - H(g^*(q,c)-1)]^2}\underbrace{\frac{\partial g^*(q,c)}{\partial g}}_{>0} \geq 0$$
$$h(g^*(q,c)) - h(g^*(q,c)-1) \geq 0 \iff g^*(q,c) \geq 1/2.$$

Then, $\hat{\kappa}(g^*(q,c))$ is increasing in q if and only if $q > q_{1/2}$ such that $g^*(q_{1/2},c) = 1/2$.

A.3 Proof for Proposition 3

It is sufficient to show that there exists a unique $g^\dagger$ such that $I(g,g)R(g)$ is decreasing in c if and only if $g < g^\dagger$.

Recall

$$\hat{c}(g,c) = \begin{cases} c & \text{if } \hat{\kappa}(g) < 1 \\ H(g) - H(g-1) & \text{if } \hat{\kappa}(g) = 1. \end{cases}$$

With abuse of notation, define

$$\hat{\rho}_1(g,\hat{c}(g,c)) = \begin{cases} \frac{H(g-1)-\hat{c}(g,c)-1/2}{2-H(g-1)+\hat{c}(g,c)} & \text{if } \frac{H(g-1)-\hat{c}(g,c)-1/2}{2-H(g-1)+\hat{c}(g,c)} \geq 0 \\ 0 & \text{if } \frac{H(g-1)-\hat{c}(g,c)-1/2}{2-H(g-1)+\hat{c}(g,c)} < 0. \end{cases}$$

$$\hat{R}(g,\hat{c}(g,c)) = \frac{1-\rho_0(g)}{1-\hat{\rho}_1(g,\hat{c}(g,c))}.$$

For $\hat{\kappa}(g;c) = \frac{c}{H(g)-H(g-1)} < 1 \iff \hat{c}(g,c) = c$,

$$\hat{\rho}_1(g,\hat{c}(g,c)) = \hat{\rho}_1(g,c) = \frac{H(g)-c-1/2}{2-H(g)+c}$$

$$\hat{R}(g,\hat{c}(g,c)) = \hat{R}(g,c) = \frac{1-\hat{\rho}_0(g)}{1-\hat{\rho}_1(g,c)}.$$

If $\hat{\kappa}(g;c) = \frac{c}{H(g)-H(g-1)} \geq 1 \iff \hat{c}(g,c) = H(g)-H(g-1)$, then

$$\hat{\rho}_1(g,\hat{c}(g,c)) = \rho_{1B}(g) = \frac{H(g-1)-1/2}{2-H(g-1)}$$

$$\hat{R}(g,\hat{c}(g,c)) = \frac{1-\hat{\rho}_0(g)}{1-\rho_{B1}(g)}.$$

Also define

$$\hat{I}(g,\hat{c}(g,c)) = \frac{h(g)}{h(g)+\hat{c}(g,c)\frac{h(g-1)-h(g)}{H(g)-H(g-1)}} = \frac{1}{1+\hat{c}(g,c)\frac{[h(g-1)/h(g)]-1}{H(g)-H(g-1)}} = \frac{1}{1+c\varphi(g)}.$$

Again, for $\hat{\kappa}(g;c) = \frac{c}{H(g)-H(g-1)} < 1 \iff \hat{c}(g,c) = c$,

$$\hat{I}(g,\hat{c}(g,c)) = \hat{I}(g,c) = \frac{1}{1+c\frac{[h(g-1)/h(g)]-1}{H(g)-H(g-1)}},$$

and for $\hat{\kappa}(g;c) = \frac{c}{H(g)-H(g-1)} \geq 1 \iff \hat{c}(g,c) = H(g)-H(g-1)$,

$$\hat{I}(g,\hat{c}(g,c)) = I_B(g) = \frac{h(g)}{h(g-1)}.$$

We want to show that there exists a unique $g^\dagger$ such that

$$\hat{I}(g,c_h)\hat{R}(g,c_h) - \hat{I}(g,c_l)\hat{R}(g,c_l) \geq 0 \iff \frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} \geq 0$$

if and only if $g \leq g^\dagger$.

First consider g, c_h, and c_l such that $c_h > c_l > 0$ and $\hat{c}(g,c_h) = c_h$ and $\hat{c}(g,c_l) = c_l$.

Claim 1 *For $c_h < H(g)-H(g-1) \iff \hat{c}(g,c_h) = c_h$, there exists a unique solution*

$g^\dagger < 1/2$ that solves

$$\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} = 0$$

by the Intermediate Value Theorem because

1. $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)}$ *is monotonically decreasing in g*
2. *there exists a small enough g such that* $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} > 0$
3. $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} < 0$ *for $g \geq 1/2$.*

Proof for Claim 1.

1. Observe

$$\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} = \frac{1+c_l\varphi(g)}{1+c_h\varphi(g)}.$$

is monotonically decreasing in g and takes 1 at $g = 1/2$. To see this, observe

$$\frac{\partial}{\partial g}\frac{1+c_l\varphi(g)}{1+c_h\varphi(g)} = \frac{(c_l-c_h)\varphi'(g)}{(1+c_h\varphi(g))^2}.$$

Recall $\varphi'(g) > 0$ (See the proof for Lemma A2). Because $c_l - c_h < 0$, $\frac{\partial}{\partial g}\frac{1+c_l\varphi(g)}{1+c_h\varphi(g)} < 0$, so $\frac{1+c_l\varphi(g)}{1+c_h\varphi(g)} = \frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)}$ is decreasing in g.

$$\frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} = \frac{1-\hat{\rho}_1(g;c_h)}{1-\hat{\rho}_1(g;c_l)} = \frac{1-\frac{H(g)-c_h-1/2}{2-H(g)+c_h}}{1-\frac{H(g)-c_l-1/2}{2-H(g)+c_l}} \geq 1$$

is increasing in g. To see that it is increasing in g, observe that

$$\frac{\partial}{\partial H}\frac{1-\hat{\rho}_1(g;c_h)}{1-\hat{\rho}_1(g;c_l)} = \frac{[1-\hat{\rho}_1(g;c_l)]\frac{\partial}{\partial H}[1-\hat{\rho}_1(g;c_h)] - [1-\hat{\rho}_1(g;c_h)]\frac{\partial}{\partial H}[1-\hat{\rho}_1(g;c_l)]}{[1-\hat{\rho}_1(g;c_l)]^2}.$$

Since $\frac{H(g)-1/2-c_h}{2-H(g)+c_h} < \frac{H(g)-1/2-c_l}{2-H(g)+c_l}$, if $\frac{H(g)-1/2-c_h}{2-H(g)+c_h} > 0$, then $\frac{H(g)-1/2-c_l}{2-H(g)+c_l} > 0$. Suppose

$\frac{H(g)-1/2-c_h}{2-H(g)+c_h} > 0$, so $\hat{\rho}_1(g,c_l) > \hat{\rho}_1(g,c_h) > 0$. Then, $\frac{\partial}{\partial H}\frac{1-\hat{\rho}_1(g;c_h)}{1-\hat{\rho}_1(g;c_l)} \geq 0$

$$\iff [1-\hat{\rho}_1(g;c_l)]\frac{\partial}{\partial H}[1-\hat{\rho}_1(g;c_h)] \geq [1-\hat{\rho}_1(g;c_h)]\frac{\partial}{\partial H}[1-\hat{\rho}_1(g;c_l)]$$
$$\iff [1-\hat{\rho}_1(g;c_l)]\frac{\partial}{\partial H}\hat{\rho}_1(g;c_h) \leq [1-\hat{\rho}_1(g;c_h)]\frac{\partial}{\partial H}\hat{\rho}_1(g;c_l)$$
$$\iff \frac{3[1-\hat{\rho}_1(g;c_l)]}{2(2-H+c_h)^2} \leq \frac{3[1-\hat{\rho}_1(g;c_h)]}{2(2-H+c_l)^2}$$
$$\iff (2-H+c_l)^2 - (2-H+c_l)^2\frac{H-c_l-1/2}{2-H+c_l} \leq (2-H+c_h)^2 - (2-H+c_h)^2\frac{H-c_h-1/2}{2-H+c_h}$$
$$\iff (2-H+c_l)\Big(2-H+c_l-H+c_l+1/2\Big) \leq (2-H+c_h)\Big(2-H+c_h-H+c_h+1/2\Big)$$
$$\iff (2-H+c_l)\Big(\frac{3}{2}-2H+2c_l\Big) \leq (2-H+c_h)\Big(\frac{3}{2}-2H+2c_h\Big).$$

Notice that $(2-H+c)\Big(\frac{3}{2}-2H+2c\Big)$ is increasing in c for $H \in [0,1]$:

$$\frac{\partial}{\partial c}(2-H+c)\Big(\frac{3}{2}-2H+2c\Big) = \frac{11}{2} - 4H + 4c = 4(1-H) + \frac{3}{2} + 4c > 0$$

Therefore, for $c_h > c_l$, $\frac{\partial}{\partial H}\frac{1-\hat{\rho}_1(g;c_h)}{1-\hat{\rho}_1(g;c_l)} > 0$.

Because $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)}$ is decreasing in g and $\frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)}$ is increasing in g, so $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)}$ is decreasing in g.

Suppose $\frac{H(g)-1/2-c_h}{2-H(g)+c_h} < 0 < \frac{H(g)-1/2-c_l}{2-H(g)+c_l}$, so $\hat{\rho}_1(g,c_l) > \hat{\rho}_1(g,c_h) = 0$. Then, $\frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} = \frac{1}{1-\hat{\rho}_0(g,c_l)}$ is increasing in g since $\hat{\rho}_0(g,c_l)$ is increasing in g. So, $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)}$ is decreasing in g.

Suppose that $\frac{H(g)-1/2-c_l}{2-H(g)+c_l} < 0$, so $\hat{\rho}_1(g,c_l) = \hat{\rho}_1(g,c_h) = 0$. Then, $\frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} = 1$, so $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)}$ is decreasing in g.

Therefore,

$$\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)}$$

is decreasing in g for any g if $c_h < H(g) - H(g-1)$.

2. There exists a small enough g such that $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} > 0$.

   First, $\varphi(g) \geq 0$ if and only if $\frac{h(g-1)}{h(g)} \geq 1$, which holds if and only if $g \geq 1/2$. Thus, for $g < 1/2$, $\varphi(g) < 0$ and $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} = \frac{1+c_l\varphi(g)}{1+c_h\varphi(g)} > 1 \iff 1+c_l\varphi(g) > 1+c_h\varphi(g) \iff c_l < c_h$.

   At the same time, for a small enough g, $\frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} = \frac{1-\hat{\rho}_1(g;c_h)}{1-\hat{\rho}_1(g;c_l)} = 1$ since $\frac{H(g)-1/2-c_l}{2-H(0)+c_l} <$

$0 \iff H(g) - 1/2 - c_l$, so $\hat{\rho}_1(g; c_h) = \hat{\rho}_1(g; c_l) = 0$.[1]

3. Also, there exists a large enough $g < 1/2$ such that $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} - \frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} < 0$. Notice that $\frac{\hat{I}(g,c_h)}{\hat{I}(g,c_l)} \leq 1$ if $g \geq 1/2$ and $\frac{\hat{R}(g,c_l)}{\hat{R}(g,c_h)} = \frac{1-\hat{\rho}_1(g;c_h)}{1-\hat{\rho}_1(g;c_l)} \geq 1$.

■

Consider the case where $\hat{\kappa}(g, c) = 1$, so $\hat{c}(g, c) = H(g) - H(g - 1)$.

Claim 2 *There exists a unique $g^\dagger \leq 1/2$ that solves*

$$\frac{I_B(g)}{\hat{I}(g, c)} - \frac{\hat{R}(g, c)}{R_B(g)} = 0$$

because

1. $\frac{I_B(g)}{\hat{I}(g,c)} \geq 1$ *if and only if* $g \leq 1/2$*;*
2. $\frac{I_B(g)}{\hat{I}(g,c)}$ *is decreasing in* g *for* $g \leq 1/2$*;*
3. $\frac{\hat{R}(g,c)}{R_B(g)} \geq 1$*. Also, it is weakly increasing in* g *for* $g \leq 1$*.*

Proof for Claim 2.

1. Notice that for $\hat{\kappa}(g, c) \in [0, 1]$,

$$\hat{I}(g, c) = \frac{h(g)}{[1 - \hat{\kappa}(g, c)]h(g) + \hat{\kappa}(g, c)h(g - 1)}$$

is a spread of $I_B(g) = \frac{h(g)}{h(g-1)}$ around $g = 1/2$:

$$\begin{aligned}\hat{I}(g, c) \geq I_B(g) &\iff [1 - \hat{\kappa}(g, c)]h(g) + \hat{\kappa}(g, c)h(g - 1) \leq h(g - 1) \\ &\iff h(g) \leq h(g - 1) \iff g \geq 1/2.\end{aligned}$$

2. Observe

$$\frac{I_B(g)}{\hat{I}(g, c)} = \frac{[1 - \hat{\kappa}(g, c)]h(g) + \hat{\kappa}(g, c)h(g - 1)}{h(g - 1)} = \frac{h(g)}{h(g - 1)} + \hat{\kappa}(g, c) - \frac{h(g)}{h(g - 1)}\hat{\kappa}(g, c).$$

Then,

[1] In our model, because the probability of winning the election is 1/2, g such that $\frac{H(0)-1/2-c_l}{2-H(0)+c_l} < 0 \iff 1/2 - [1 - H(g)] - c < 0$ is around $g = 0$. However, for an arbitrary probability of winning the election after the status quo, p, there exists such a g that $p - [1 - H(g)] - c < 0$ by the monotonicity of g.

$$\frac{\partial}{\partial g}\frac{I_B(g)}{\hat{I}(g,c)} = \frac{\partial}{\partial g}\left(\frac{h(g)}{h(g-1)} + \hat{\kappa}(g,c) - \frac{h(g)}{h(g-1)}\hat{\kappa}(g,c)\right)$$
$$= \frac{\partial}{\partial g}\frac{h(g)}{h(g-1)} + \frac{\partial}{\partial g}\hat{\kappa}(g,c) - \frac{\partial}{\partial g}\Big(\frac{h(g)}{h(g-1)}\hat{\kappa}(g,)\Big)$$
$$= \frac{h(g-1)h'(g) - h(g)h'(g-1)}{[h(g-1)]^2} + \frac{c[h(g-1)-h(g)]}{[H(g)-H(g-1)]^2}$$
$$+ \frac{h(g)}{h(g-1)}\frac{c[h(g-1)-h(g)]}{[H(g)-H(g-1)]^2} + \frac{c}{H(g)-H(g-1)}\frac{h(g-1)h'(g)-h(g)h'(g-1)}{[h(g-1)]^2} < 0$$

if and only if

$$\begin{aligned}
&[h(g-1)h'(g) - h(g)h'(g-1)][H(g)-H(g-1)]^2 + c[h(g-1)-h(g)][h(g-1)]^2 \\
&+h(g)c[h(g-1)-h(g)]h(g-1) + c[h(g-1)h'(g)-h(g)h'(g-1)][H(g)-H(g-1)] \\
&= [h(g-1)h'(g)-h(g)h'(g-1)][H(g)-H(g-1)]\Big[c + [H(g)-H(g-1)]\Big] \\
&+c[h(g-1)][h(g-1)-h(g)][h(g-1)+h(g)] < 0.
\end{aligned}$$

Recall that $[h(g-1)h'(g) - h(g)h'(g-1)] < 0$ due to the property of log-concave functions (Bagnoli and Bergstrom, 2006) (See Proof for Proposition 2). Since $[H(g) - H(g-1)]\Big[c + [H(g)-H(g-1)]\Big] > 0$, $[h(g-1)h'(g) - h(g)h'(g-1)][H(g) - H(g-1)]\Big[c + [H(g)-H(g-1)]\Big] < 0$.

Notice that $[h(g-1)-h(g)][h(g-1)+h(g)] = [h(g-1)]^2 - [h(g)]^2 < 0$ for $g < 1/2$ since $[h(g-1)]^2 - [h(g)]^2 < 0 \iff h(g-1) < h(g) \iff g < 1/2$. Since $c[h(g-1)] > 0$, $c[h(g-1)][h(g-1)-h(g)][h(g-1)+h(g)] < 0$ for $g < 1/2$.

3. $\hat{R}(g,c) \leq R_B(g)$ since

$$\hat{R}(g,c) \geq R_B(g) \iff \frac{1-\hat{\rho}_0(g)}{1-\hat{\rho}_1(g,c)} \geq \frac{1-\hat{\rho}_0(g)}{1-\rho_{B1}(g,c)} \iff \hat{\rho}_1(g,c) \geq \rho_{B1}(g,c).$$

If

$$\frac{H(g)-c-1/2}{2-H(g)+c} \geq \frac{H(g-1)-1/2}{2-H(g-1)},$$

then $\hat{\rho}_1(g,c) \geq \rho_{B1}(g,c)$.

Since $\frac{T-1/2}{2-T}$ is increasing in T,

$$\frac{H(g)-c-1/2}{2-H(g)+c} \geq \frac{H(g-1)-1/2}{2-H(g-1)} \iff H(g)-c \geq H(g-1) \iff H(g)-H(g-1) \geq c.$$

There exists $g_0(c) > 0$ such that $\frac{H(g)-c-1/2}{2-H(g)+c} \leq 0$ for $g \leq g_0(c)$. Notice that $\frac{H(g-1)-1/2}{2-H(g-1)} \leq 0$ for $g \leq 1$. Thus, for $\frac{\hat{R}(g,c)}{R_B(g)} = \frac{1}{1-\hat{\rho}_1(g,c)} \geq 1$ and strictly increasing in g for $g \in [g_0(c), 1]$.

Argument Solve

$$\frac{I_B(g)}{\hat{I}(g,c)} - \frac{\hat{R}(g,c)}{R_B(g)} = 0.$$

For $g > 1/2$, $\frac{I_B(g)}{\hat{I}(g,c)} < 1$ and $\frac{\hat{R}(g,c)}{R_B(g)} \geq 1$, so $\frac{I_B(g)}{\hat{I}(g,c)} < \frac{\hat{R}(g,c)}{R_B(g)}$.

For $g \leq 1/2$, $\frac{I_B(g)}{\hat{I}(g,c)} \geq 1$ and decreasing. If $g_0(c) > 1/2$, then $\frac{\hat{R}(g,c)}{R_B(g)} = 1$, so $\frac{I_B(g)}{\hat{I}(g,c)} \geq \frac{\hat{R}(g,c)}{R_B(g)}$ if and only if $g \geq 1/2$.

Consider $g_0(c) < 1/2$. At $g = g_0(c)$, $\frac{I_B(g)}{\hat{I}(g,c)} > 1 = \frac{\hat{R}(g,c)}{R_B(g)}$. At $g = 1/2$, $\frac{I_B(g)}{\hat{I}(g,c)} = 1 < \frac{\hat{R}(g,c)}{R_B(g)}$. Since $\frac{I_B(g)}{\hat{I}(g,c)}$ is decreasing and $\frac{\hat{R}(g,c)}{R_B(g)}$ is increasing in g for $g \in (g_0(0), 1/2)$, there exists a unique $g^\dagger \in (g_0(0), 1/2)$ such that $\frac{I_B(g)}{\hat{I}(g,c)} \geq \frac{\hat{R}(g,c)}{R_B(g)}$ if and only if $g \leq g^\dagger$ by the intermediate value theorem.

■

A.4 Proof for Proposition 4

1. It is straightforward that

$$\rho_0^*(q,c) < \rho_{B0}^*(q) \iff \frac{H(g^*(q,c)) - 1/2}{2 - H(g^*(q,c))} < \frac{H(g_B^*(q)) - 1/2}{2 - H(g_B^*(q))}$$

if and only if $g^*(q,c) < g_B^*(q) \iff g^*(q,c) < g^\dagger \iff q < q^\dagger$.

2. It is sufficient to show that $\rho_1(g^*, c) < \rho_{B1}(g_B^*)$ cannot hold if $\kappa^*(q,c) \leq 1$.

Suppose $\rho_{B1}(g_B^*) > \rho_1(g^*, c)$ for $\kappa^*(q,c) \leq 1$. Then

$$\rho_{B1}(g_B^*) > \rho_1(g^*, c) \iff \frac{H(g_B^* - 1) - 1/2}{2 - H(g_B^* - 1)} > \frac{H(g^*) - c - 1/2}{2 - H(g^*) + c}$$
$$\iff H(g_B^* - 1) > H(g^*) - c \iff c > H(g^*) - H(g_B^* - 1).$$

Because

$$H(g-1) - 1/2 = 0 \iff g = 1,$$

$g^* > g_B^* = 1$ since $1 > 1/2 \geq g^\dagger$. Therefore, if $\rho_{B1}(g_B^*) > 0$ then $g^* > g_B^* \iff H(g^* - 1) > H(g_B^* - 1)$, which implies that

$$H(g^*) - H(g_B^* - 1) > H(g^*) - H(g^* - 1).$$

Recall

$$\kappa^*(q,c) = \frac{c}{H(g^*) - H(g^* - 1)} \leq 1 \iff H(g^*) - H(g^* - 1) \geq c$$

by assumption. Thus, $H(g^*) - H(g_B^* - 1) > H(g^*) - H(g^* - 1) \geq c$ if $\rho_{B1}(g_B^*) > 0$. However, $\rho_{B1}(g_B^*) > \rho_1(g^*, c) \iff c > H(g^*) - H(g_B^* - 1)$, which is a contradiction.

3. Recall that when $g_0(c) < 1/2$, then there exists a unique $g^\dagger \in (g_0(c), 1/2)$ that solves $\frac{I_B(g)}{\hat{I}(g,c)} - \frac{\hat{R}(g,c)}{R_B(g)} = 0$. Therefore, if $g_0(c) < 1/2$, for $g^* \in (g_0, g^\dagger)$, $g^* < g_B^*$ and $\rho_1(g^*, c) > \rho_{B1}(g_B^*) = 0$.

   Since $g_0(c)$ solves $H(g) = 1/2 + c$, $g_0(c)$ is increasing in c and there exists a unique $c^\dagger$ such that $g_0(c) < 1/2$ for $c < c^\dagger$.

   Let $q^{\dagger\dagger}$ denote q such that $g^*(q, c) = g_0(c)$. If $c \geq c^\dagger$, $g_0(c) \geq 1/2 = g^\dagger \iff q^{\dagger\dagger} \geq q^\dagger$. If $c < c^\dagger$, $g_0(c) < g^\dagger \iff q^{\dagger\dagger} < q^\dagger$.

B Robustness: If resistance can damage ineffective reform

Suppose that the bureaucrats can resist an ineffective reform and horizontally shift the density of g from $h(g)$ to $h(g - \alpha)$ such that $\alpha \geq 0$.

Define

$$\kappa_0(g) = \begin{cases} \frac{c}{H(g+\alpha)-H(g)} & \text{if } \frac{c}{H(g+\alpha)-H(g)} \leq 1 \\ 1 & \text{if } \frac{c}{H(g+\alpha)-H(g)} > 1 \end{cases}$$

$$\kappa_1(g) = \begin{cases} \frac{c}{H(g)-H(g-1)} & \text{if } \frac{c}{H(g)-H(g-1)} \leq 1 \\ 1 & \text{if } \frac{c}{H(g)-H(g-1)} > 1 \end{cases}$$

$$I_\alpha(g, c) = \frac{\kappa_0 h(g) + (1 - \kappa_0) h(g + \alpha)}{\kappa_1 h(g - 1) + (1 - \kappa_1) h(g)}$$

$$\rho_{\alpha 0}(g, c) = \begin{cases} \frac{H(g+\alpha)+\frac{1}{2}-\kappa_0[H(g+\alpha)+H(g)]}{2-H(g+\alpha)+\kappa_0[H(g+\alpha)+H(g)]} & \text{if } \frac{H(g+\alpha)+\frac{1}{2}-\kappa_0[H(g+\alpha)+H(g)]}{2-H(g+\alpha)+\kappa_0[H(g+\alpha)+H(g)]} \in [0, 1] \\ 1 & \text{if } \frac{H(g+\alpha)+\frac{1}{2}-\kappa_0[H(g+\alpha)+H(g)]}{2-H(g+\alpha)+\kappa_0[H(g+\alpha)+H(g)]} > 1 \\ 0 & \text{if } \frac{H(g+\alpha)+\frac{1}{2}-\kappa_0[H(g+\alpha)+H(g)]}{2-H(g+\alpha)+\kappa_0[H(g+\alpha)+H(g)]} < 0 \end{cases}$$

$$\rho_{\alpha 1}(g, c) = \begin{cases} \frac{H(g)+\frac{1}{2}-\kappa_1[H(g)-H(g-1)]}{2-H(g)+\kappa_1[H(g)-H(g-1)]} & \text{if } \frac{H(g)+\frac{1}{2}-\kappa_1[H(g)-H(g-1)]}{2-H(g)+\kappa_1[H(g)-H(g-1)]} \in [0, 1] \\ 1 & \text{if } \frac{H(g)+\frac{1}{2}-\kappa_1[H(g)-H(g-1)]}{2-H(g)+\kappa_1[H(g)-H(g-1)]} > 1 \\ 0 & \text{if } \frac{H(g)+\frac{1}{2}-\kappa_1[H(g)-H(g-1)]}{2-H(g)+\kappa_1[H(g)-H(g-1)]} < 0 \end{cases}$$

$$R_\alpha(g, c) = \frac{1 - \rho_{\alpha 0}(g, c)}{1 - \rho_{\alpha 1}(g, c)}.$$

Lemma A3 *For g such that $\kappa_0(g) \geq \kappa_1(g)$, $I_\alpha(g, c)$ and $R_\alpha(g, c)$ are decreasing in g.*

Proof. For x, y such that $x \leq y$, define

$$\hat{\kappa}(g; x, y) := \begin{cases} \frac{c}{H(g+x)-H(g-y)} & \text{if } \frac{c}{H(g+x)-H(g-y)} \leq 1 \\ 1 & \text{if } \frac{c}{H(g+x)-H(g-y)} > 1 \end{cases}$$

$$\iota(g; x, y) := h(g+x) + \hat{\kappa}(g; x, y)[h(g-y) - h(g+x)]$$

$$\hat{\rho}(g; x, y) := \frac{H(g+x) + \frac{1}{2} - \hat{\kappa}(g; x, y)[H(g+x) - H(g-y)]}{2 - H(g+x) + \hat{\kappa}(g; x, y)[H(g+x) - H(g-y)]}.$$

$$I_\alpha(g) = \frac{\iota(g; \alpha, 0)}{\iota(g; 0, 1)} \qquad R_\alpha(g) = \frac{1 - \hat{\rho}(g; \alpha, 0)}{1 - \hat{\rho}(g; 0, 1)}$$

$$I(g) = \frac{\iota(g; 0, 0)}{\iota(g; 0, 1)} \qquad R(g) = \frac{1 - \hat{\rho}(g; 0, 0)}{1 - \hat{\rho}(g; 0, 1)}$$

$I(g)R(g) = \frac{1-q}{q}$ is equivalent to

$$\log \iota(g; 0, 0) - \log \iota(g; 0, 1) + \log[1 - \hat{\rho}(g; 0, 0)] - \log[1 - \hat{\rho}(g; 0, 1)] = \log \frac{1-q}{q}$$

and $I_\alpha(g)R_\alpha(g) = \frac{1-q}{q}$ is equivalent to

$$\log \iota(g; \alpha, 0) - \log \iota(g; 0, 1) + \log[1 - \hat{\rho}(g; \alpha, 0)] - \log[1 - \hat{\rho}(g; 0, 1)] = \log \frac{1-q}{q}.$$

Notice that $\log \iota(g; \alpha, 0)$ is a horizontal shift of $\log \iota(g; 0, 0)$ to the right and $\log[1 - \hat{\rho}(g; \alpha, 0)]$ is a horizontal shift of $\log[1 - \hat{\rho}(g; 0, 0)]$ to the right for g such that $\hat{\kappa}(g; \alpha, 0) \geq (\hat{\kappa}(g; 0, 1)$, so $I_\alpha(g)R_\alpha(g)$ is a horizontal shift of $I(g)R(g)$ to the right. Because a horizontal shift of a monotone function is monotone, $I_\alpha(g)R_\alpha(g)$ is monotone for g such that $\hat{\kappa}(g; \alpha, 0) \geq \hat{\kappa}(g; 0, 1)$. ■

Lemma A4 *For g such that $\kappa_0(g) \geq \kappa_1(g)$, there exists a unique $g^\dagger_\alpha$ $I_\alpha(g)R_\alpha(g) \geq I_B(g)R_B(g)$.*

Proof. $I_\alpha(g)R_\alpha(g) = I_B(g)R_B(g)$ if and only if

$$\frac{I_\alpha(g)}{I_B(g)} = \frac{R_B(g)}{R_\alpha(g)} \iff \frac{\iota(g; \alpha, 0)}{\iota(g; 0, 1)} \frac{\iota(g; 1, 1)}{\iota(g; 0, 0)} = \frac{1 - \hat{\rho}(g; 0, 0)}{1 - \hat{\rho}(g; 1, 1)} \frac{1 - \hat{\rho}(g; 0, 1)}{1 - \hat{\rho}(g; \alpha, 0)}.$$

By the same logic as in the proof above, if $\hat{\kappa}(g; \alpha, 0) \geq \hat{\kappa}(g; 0, 1)$, $\frac{I_\alpha(g)}{I_B(g)}$ and $\frac{R_B(g)}{R_\alpha(g)}$ are respectively horizontal shifts of $\frac{I(g)}{I_B(g)}$ and $\frac{R_B(g)}{R(g)}$, which are monotone in g. ■

Lemma A5 *For g such that $\kappa_1 \leq 1$, there here exists a $\alpha^\dagger \in (0, 1)$ such that $\kappa_1 \leq \kappa_0$ if $\alpha \in [0, \alpha^\dagger]$.*

Proof. $\kappa_1 \leq \kappa_0$ iff $H(g) - H(g-1) \geq H(g+\alpha) - H(g) \iff 2H(g) \geq H(g+\alpha) + H(g-1)$. Notice that $H(g+\alpha) + H(g-1)$ is monotonically increasing in g and α and less than $2H(g)$ for any g when $\alpha = 0$ (by the FOSD), so there exists $\alpha^\dagger$ such that there exists g such that $2H(g) < H(g+\alpha) + H(g-1)$ if $\alpha > \alpha^\dagger$. ■

Proposition A1 *For $\alpha \in [0, \alpha^\dagger)$,*

1. *$\kappa_1(g) \leq \kappa_0(g)$;*
2. *there exists a unique pure strategy equilibrium exists*
3. *there exists unique $q_\alpha^\dagger$ such that $g_\alpha^* > g_B^*$;*

Proof. Results follow from lemmas above. ■

C Countervailing Effects of Resistance on Voter Learning

C.1 Understanding Learning Effects

As the incumbent can strategically choose whether to introduce reform or not and bureaucrats can resist reform, g is an *obfuscated* signal of the reform's true value of ω. To understand the effect of strategic obfuscation on the voter's learning, consider the benchmark case where neither player intervenes with g, and the voter observes $g = x + \eta$.

Suppose that, for an arbitrary cutoff g', the voter concludes that the reform will work if he observes a "positive" signal $g \geq g'$ and it will not work if he observes a "negative" signal $g < g'$. Then, we can define four events, shown in Table 1.

Table 1: Confusion Matrix for Voter Inference

Actual condition		Prediction: $g < g'$	Prediction: $g > g'$
	$\omega = 1$	FN	TP
	$\omega = 0$	TN	FP
		False omission rate (FOR) $\frac{FN}{TN+FN}$	Positive predictive value (PPV) $\frac{TP}{TP+FP}$

Notes: FN denotes false negatives; TN denotes true negatives; TP denotes true positives; FP denotes false positives.

The voter faces a Goldilocks problem in choosing the optimal g', i.e., he cannot be either too lenient or too stringent. If he is too lenient and chooses a low g', then a positive signal $g \geq g'$ does not necessarily mean that the reform outperforms the status quo. Thus, he wants to pick a high enough g' so that the positive predictive value (PPV), i.e.

$$\Pr[\omega = 1 | g \geq g'] = \frac{\Pr[TP]}{\Pr[TP] + \Pr[FP]}$$

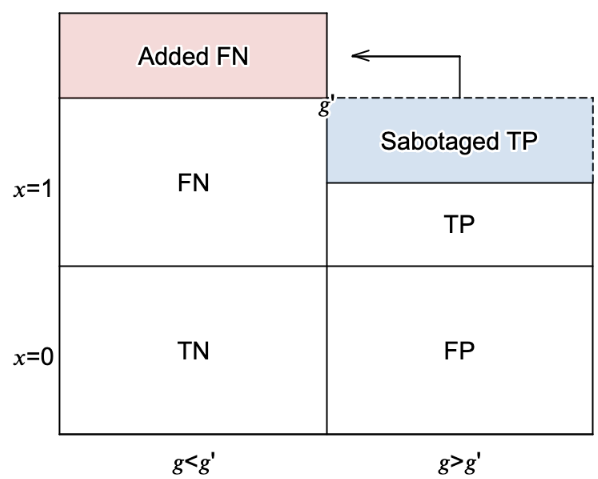
is large enough. This ensures that the reform is a better choice than the status quo in expectation, given $g \geq g'$.

On the other hand, if the voter is too stringent so that g' is too high, he risks not choosing the reform when it is better than the status quo. So, he wants to pick a low enough g' such that the false omission rate (FOR), i.e.

$$\Pr[\omega = 1 | g < g'] = \frac{\Pr[FN]}{\Pr[TN] + \Pr[FN]}$$

is small. This ensures that the reform is expected to perform worse than the status quo given $g < g'$. Evidently, at the cutoff g', the voter is indifferent between the risk of true positives and false negatives.

Figure A1: The Effect of Resistance on Voter Learning



The blue shaded area "resistanced TP" illustrates the PPV effect. The red shaded area "Added FN" illustrates the FOR effect.

Now, consider the additional obfuscation through bureaucratic resistance. Assume bureaucrats resist reform that would otherwise be successful and supported by voters (i.e., $\omega = 1$ and $g > g'$). Hence, with resistance, some of the true positives turn into false negatives with probability $(1 - \kappa')$. This change has two countervailing effects. Figure A1 provides the intuition for this result. Firstly, it *decreases* $\Pr[\omega = 1 | g \geq g']$ by lowering $\Pr[TP]$ (the blue shaded area "resistanced TP"). Intuitively, knowing that resistance lowers the likelihood that the voter observes $g > g'$ when it is indeed valuable (i.e. when $\omega = 1$), the voter is inclined to attribute a high $g > g'$ to mere luck rather than its actual value (i.e., a false positive). Formally, for the probability of resistance $1 - \kappa'$,

$$\Pr[\omega = 1 | g \geq g'] = \frac{\kappa' \Pr[TP]}{\kappa' \Pr[TP] + \Pr[FP]} < \frac{\Pr[TP]}{\Pr[TP] + \Pr[FP]}.$$

We call this the *PPV effect.*

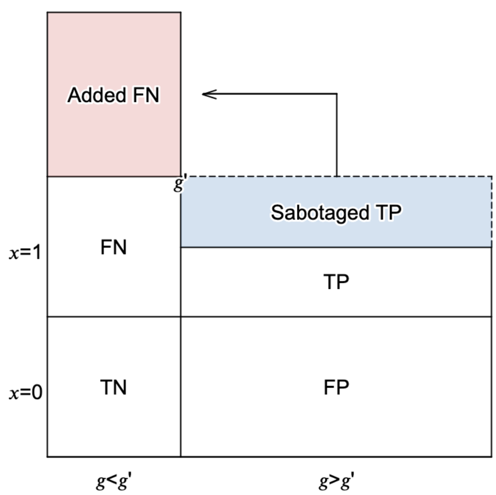
Secondly, the change from TP to FN *increases* $\Pr[\omega = 1|g < g']$ by increasing $\Pr[FN]$ (the red shaded area "Added FN"). Namely, when the voter takes into account the fact that some of the negative signals that he observes are due to resistance, his evaluation of the reform given a negative signal will increase as resistance becomes more likely. That is,

$$\Pr[\omega = 1|g < g'] = \frac{\Pr[FN] + (1 - \kappa')\Pr[TP]}{\Pr[FN] + (1 - \kappa')\Pr[TP] + \Pr[TN]} > \frac{\Pr[FN]}{\Pr[FN] + \Pr[TN]}.$$

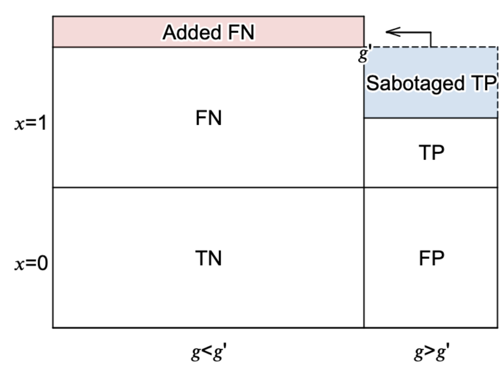
We call this the *FOR effect*.

Which effect dominates depends on the initial level of g'. See Figure A2 for an illustration. If g' is high enough so that $g \geq g'$ is rare, the voter is more worried about false positives than false negatives—the FOR effect is low and dominated by the PPV effect.[2] In contrast, if g' is low, the voter faces higher risks of false negatives—the FOR effect is more likely to dominate the PPV effect.[3] Taken together, the effect of resistance on voter behavior depends on what type of wrong inference the voter is most worried about. If the PPV effect dominates the FOR effect, the voter is better off being more stringent and choosing a higher g'. In contrast, if the FOR effect dominates the PPV effect, the voter is better off being more lenient and choosing a lower g'.

Figure A2: Resistance's Effects on Voter Inference Conditional on g'



(a) When g' is low: FOR dominates PPV; resistance decreases g'



(b) When g' is high: PPV dominates FOR; resistance increases g'

It is noteworthy that this result depends on the assumption that bureaucrats can only change TP into FN by sabotaging the reform. For instance, even if bureaucrats do not know ω when they make their decision on resistance, as long as resistance can affect g's distribution only when the reform actually works, the logic above holds.

[2]We provide calculations of these quantities based on Figure A2 in the next section.

[3]The logic above is similar to that of the main results in Heo and Landa (2024). For further formal discussion on the decision problems with a stochastic process, see Patty and Penn (2023).

C.2 Example of Learning Effects

Here, we provide a specific example for the results discussed in Section C.1, fixing the values of g' to those shown in Figure A2. The area of each cell represents the probability of each event and adds up to one. In both panels, the ex-ante total probability of successful reform $\Pr[\omega = 1] = \Pr[TP] + \Pr[FN] = 1/2$. Without resistance,

$$\Pr[\omega = 1 | g \geq g'] = \Pr[\omega = 1 | g < g'] = \frac{1}{2}.$$

If bureaucrats resist, they do so with probability 1/2, and TP (blue shaded area in broken lines, "resistanced TP") becomes FN (red shaded area in solid lines, "Added FN").

In Panel (a), the voter's cutoff is high ($g' = 0.7$), so observing a high signal is rare ($\Pr[g \geq g'] = 0.3$). As resistance decreases $\Pr[TP]$ by 50%,

$$\Pr[\omega = 1 | g \geq g'] = \frac{\Pr[TP]}{\Pr[TP] + \Pr[FP]} = \frac{0.3 * 0.5 * 0.5}{0.3 * 0.5 * 0.5 + 0.3 * 0.5} = \frac{1}{3} < \frac{1}{2},$$

and

$$\Pr[\omega = 1 | g < g'] = \frac{\Pr[FN]}{\Pr[FN] + \Pr[TN]} = \frac{0.7 * 0.5 + 0.3 * 0.5 * 0.5}{0.7 * 0.5 + 0.3 * 0.5 * 0.5 + 0.7 * 0.5} = \frac{0.85}{1.55} \approx 0.548 > \frac{1}{2}.$$

Evidently, the PPV effect is larger than the FOR effect.

In Panel (b), the voter's cutoff is low ($g' = 0.3$), so a positive signal is relatively more prevalent ($\Pr[g \geq g'] = 0.7$). Without resistance,

$$\Pr[\omega = 1 | g \geq g'] = \Pr[\omega = 1 | g < g'] = \frac{1}{2}.$$

As resistance decreases $\Pr[TP]$ by 50%,

$$\Pr[\omega = 1 | g \geq g'] = \frac{\Pr[TP]}{\Pr[TP] + \Pr[FP]} = \frac{0.7 * 0.5 * 0.5}{0.7 * 0.5 * 0.5 + 0.7 * 0.5} = \frac{1}{3} < \frac{1}{2},$$

and

$$\Pr[\omega = 1 | g < g'] = \frac{\Pr[FN]}{\Pr[FN] + \Pr[TN]} = \frac{0.3 * 0.5 + 0.7 * 0.5 * 0.5}{0.3 * 0.5 + 0.7 * 0.5 * 0.5 + 0.3 * 0.5} = \frac{0.65}{0.95} \approx 0.684 > \frac{1}{2}.$$

Here, the FOR effect is larger and dominates the PPV effect. For the general result, see the Appendix of Heo and Landa (2024).