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ABSTRACT

When voters fear that politicians may have a right-wing bias or that they may be influenced or corrupted by the rich elite, signals of true left-wing conviction are valuable. As a consequence, even a moderate politician seeking reelection chooses "populist' policies - i.e., policies to the left of the median voter - as a way of signaling that he is not from the right. Truly right-wing politicians respond by choosing more moderate, or even left-of-center policies. This populist bias of policy is greater when the value of remaining in office is higher for the politician; when there is greater polarization between the policy preferences of the median voter and right-wing politicians; when politicians are indeed more likely to have a hidden right-wing agenda; when there is an intermediate amount of noise in the information that voters receive; when politicians are more forward-looking; and when there is greater uncertainty about the type of the incumbent. We show that similar results apply when some politicians can be corrupted or influenced through other non-electoral means by the rich elite. We also show that 'soft term limits' may exacerbate, rather than reduce, the populist bias of policies.

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1 Introduction

There has recently been a resurgence of 'populist' politicians in many developing countries, particularly in Latin America. Hugo Chávez in Venezuela, the Kirchners in Argentina, Evo Morales in Bolivia, Alan García in Peru, and Rafael Correa in Ecuador are some of the examples. The label 'populist' is often used to emphasize that these politicians use the rhetoric of aggressively defending the interests of the 'common man' against the privileged elite.[1] Hawkins (2003), for example, describes the rise of Hugo Chávez in Venezuela in these terms, and writes:

> "If we define populism in strictly political terms—as the presence of what some scholars call a charismatic mode of linkage between voters and politicians, and a democratic discourse that relies on the idea of a popular will and a struggle between 'the people' and 'the elite'—then Chavismo is clearly a populist phenomenon."

Given the high levels of inequality in many of these societies, political platforms built on redistribution are not surprising. But populist rhetoric and policies frequently appear to be to the left of the median voter's preferences, and such policies arguably often harm rather than help the majority of the population. In the context of macroeconomic policy, Rudiger Dornbush and Sebastian Edwards (1991) emphasized this 'left of the median' aspect of populism and wrote:

> "Populist regimes have historically tried to deal with income inequality problems through the use of overly expansive macroeconomic policies. These policies, which have relied on deficit financing, generalized controls, and a disregard for basic economic equilibria, have almost unavoidably resulted in major macroeconomic crises that have ended up hurting the poorer segments of society."

We offer a simple model of 'populism' defined, following Dornbusch and Edwards (1991), as the implementation of policies receiving support from a significant fraction of the population, but ultimately hurting the economic interests of this majority.[2] More formally, populist policies will be those that are to the left of the political bliss point of the median voter but still receive support

[1] The American Heritage Dictionary defines populism as "a political philosophy supporting the rights and power of the people in their struggle against the privileged elite." See http://www.answers.com/topic/populism.

[2] We focus on left-wing populism which has been particularly prevalent in 20th century Latin America. In the United States, in addition to left-wing populism of the Democratic presidential candidate William Jennings Bryan or the Louisiana senator 'Kingfish' Huey Long, a distinctive 'right-wing populism' has been prevalent (e.g., Norris, 2005). Right-wing populism typically combines anti-elitism with some right-wing agenda (e.g., anti-communism in the case of Wisconsin Senator Joseph McCarthy or the state-rights agenda of the Alabama governor and presidential candidate George Wallace, or small-government conservatism in the case of the Tea Party these days). A model combining left- and right-wing extremists and different types of 'populist policies' is presented in Section 5.2.

from the median voter. The key challenge is therefore to understand why politicians adopt such policies and receive electoral support after doing so. Our starting point is that, as the above examples suggest, the economies in question feature high levels of inequality and sufficiently weak political institutions which enable the rich elites to have a disproportionate influence on politics relative to their numbers. In fact, in many of these societies political corruption and 'political betrayal,' where politicians using redistributive rhetoric end up choosing policies in line with the interests of the rich elite, are quite common.[3] This implies that voters often distrust politicians and believe that they may adopt a rhetoric of redistribution, of leveling the playing field, and of defending the interests of the 'common man,' but then will pursue policies in the interests of the rich elite. This makes it valuable for politicians to signal to voters that they do not secretly have a 'right-wing agenda' and are not 'in the pockets' of the rich elite.

Formally, an incumbent politician chooses a policy x on the real line, and obtains utility both from remaining in office and also from the distance between the policy and his 'political bliss point' or ideal point (e.g., Wittman, 1973, Calvert, 1985, Besley and Coate, 1997, Osborne and Slivinski, 1996). An incumbent politician can be of two types: (1) moderate, and (2) right-wing. We also consider an extension where the preferences of the right-wing politicians are endogenized in the sense that they are derived as a result of the bargaining between a moderate but corruptible politician and the rich elite.[4] We normalize the political bliss point of the median voter to 0, and assume that this is also the bliss point of moderate politicians.[5] The bliss point of right-wing politicians is to the right of the median voter's bliss point and we denote it by $b > 0$ (for 'bias'). Voters observe a noisy signal s of the policy x of the incumbent, and decide whether to reelect him for a second term or replace him with a new politician. Reflecting our discussion in the previous paragraph, the median voter's main concern is that the politician may in truth be a right-winger and will implement a right-wing policy in his second term (or that he is dishonest and will be corrupted by the rich elite).

Our main result is that in order to signal that he is not right-wing, moderate politicians will choose 'populist' policies to the left of the median voter's bliss point, i.e., $x < 0$. Moreover, a truly right-wing politician will also choose a policy to the left of his bliss point, i.e., $x < b$, and may even choose a policy to the left of the median (i.e., $x < 0$) when the value of political office

[3] Examples of politicians and parties using populist rhetoric but then choosing policies in line with business and elite interests include the PRI in Mexico, the policies of traditional parties in Venezuela and Ecuador, Fujimori in Peru and Menem in Argentina.

[4] Although this alternative might be a better representation of the fears of many voters in democracies with weak institutions, we start with our baseline model without corruption because it illustrates the main ideas in a more transparent manner.

[5] Our results do not require the preferences of the moderate politician to coincide with those of the median voter; it is sufficient for them to be closer to those of the median voter than the preferences of the right-wing politician.

is sufficiently high. It is interesting that what produces the left-wing (populist) bias in politics is precisely the *strength* of right-wing groups (in that either the incumbent politician may be secretly aligned with these groups or they can bribe and influence him). Because of their fear of reelecting a politician who is a right-winger, voters support politicians choosing policies to the left of their preferences, which can loosely be interpreted as policies that are not in their 'best interest' as in our definition of populism.[6]

In addition to providing a novel explanation for the emergence of populist policies and leaders, our model is tractable and leads to a range of intuitive comparative static results.[7] First, policies are more likely to be populist (or will have greater left-wing bias) when the value of reelection to politicians is greater, since in this case both moderate and right-wing politicians will try to signal to voters by choosing more left-wing policies. Second, populist policies are also more likely when the probability that the politician is a right-winger is higher. Third, they are also more likely when the probability that a politician can be corrupted is greater. Fourth, we also show that, provided that the noise is sufficiently large, populist policies are also more likely when there is greater 'polarization' in society, meaning a bigger gap between the political bliss points of the moderate politician (and the median voter) and the right-wing politician. This is because, with greater polarization, the benefit from reelection to both types of politicians is greater, encouraging more populist policies in the first period.[8] Fifth, populist bias is greater when voters receive an intermediate amount of information about policies; when voters receive too little information, choosing populist policies has little signaling value for politicians, and when there is little noise, voters are unlikely to confuse the two types of politicians, again dulling the incentives to signal. Sixth, populist bias is also greater when there is greater uncertainty about the type of incumbent politicians because both very secure politicians and those unlikely to win reelection have less incentive to signal. Finally, politicians that are more forward-looking

[6] In a model of right-wing populism, a similar logic would encourage policies biased to the right. In particular, voters with right-wing views may support policies to the right of their bliss point because they may be afraid that some politicians are secret left-wingers or even communists. See Section 5.2.

[7] In applying these insights to the Latin American context one must confront the issue of 'soft term limits'. Most Latin American presidents of the postwar era have been term limited, but many have been able to use constitutional referendums and other means to stand for a second term, and/or to significantly increase their powers.

For example, recently, Colombian president Álvaro Uribe changed the constitution and was elected for a second term in 2006. Bolivian president Evo Morales got approval of new constitution with relaxed term limits in January 2009. In February 2009, a constitutional amendment allowing the Venezuelan president Hugo Chávez to completely avoid term limits was approved. In Ecuador, Rafael Correa won approval to extend his term in office. In October 2009, the Nicaraguan constitutional court declared executive term limits to be unconstitutional, allowing president Daniel Ortega to run for a second term. We discuss the implications of soft term limits in greater detail in Section 5.3 ensure that these may exacerbate the populist bias of policies.

[8] Counteracting this effect is that greater polarization also makes it more costly for right-wing politicians to adopt populist policies. We describe the conditions under which this second effect is dominated.

(discount the future less) are more likely to be populists because they are more willing to adopt policies away from their bliss point in order to gain electoral advantage.

All these results continue to hold in the version of the model where right-wing bias of some politician results because of corruption. Interestingly, in this version, we also find that the rich elite may be worse off precisely because of their ability to bribe politicians. In particular, the anticipation of such bribes to dishonest politicians changes the political equilibrium towards more left-wing policies in the initial period, which is costly to the elite. This again highlights that the underlying problem leading to populist politics in this model is the weakness of democratic institutions and the potential non-electoral power of the elite.

Our paper is related to a number of literatures. First, there is now a sizable literature on signaling in elections. Formal models that incorporate 'the cost of betrayal' and signaling concerns into the platform choice by a politician seeking his first election date back to Banks (1990) and Harrington (1993). In both models, voters learn about candidates' behavior through repeated sampling. Callander and Wilkie (2007) consider signaling equilibria in elections in which participating politicians have different propensities to misinform voters about their true preferences. Kartik and McAfee (2007) study a spatial model of elections in which a candidate might be of a type committed to fulfill his campaign pledge. Thus, a political position is a signal to the voters about the candidate's 'honesty'. As a result, a candidate who is perceived to be more likely to stick to his positition might win on an unpopular platform over an opponent who caters to the median voter's preferences.

Second, our paper is also related to several other works that use models in which politicians or decision-makers have private information and are judged on the basis of performance or messages that they send. Prendergast (1993) shows that workers have an incentive to conform to the opinions and expectations of their superiors. Morris (2001) studies 'political correctness' using a model of communication incorporating related insights. Canes-Wrone, Herron, and Shotts (2001) and Maskin and Tirole (2004) use similar ideas to show why leaders or elected officials may 'pander' to the electorate. None of these papers discuss or derive populist bias in politics. In addition, the framework we present is more tractable than many of the models used in past work (because voters observe noisy signals rather than choices), and as a result, it generates a unique equilibrium and a rich set of comparative statics.[9]

[9] See also Alesina and Tabellini (2007) and Schultz (2008). Binswanger and Prufer (2009) use a similar model, enriched with heterogeneous priors and level k reasoning, to discuss political pandering and the implications of direct and indirect democracy. They show that indirect democracy can lead to "populism" defined very differently than here—meaning that politicians, conditional on their information, still put positive weight on the prior beliefs of voters.

Third, our paper is also related to various models of political agency. Austen-Smith and Banks (1989), Besley (2005, 2006) and Persson and Tabellini (2000) present several different approaches to political agency and the selection of politicians of different competences (see also Caselli and Morelli, 2004, Messner and Polborn, 2004, Mattozzi and Merlo, 2007, and Acemoglu, Egorov, and Sonin, 2010). Diermeier, Keane, and Merlo (2005) model and estimate the careers of US congressmen.

Fourth, our work is related to the emerging literature on the elite capture of democratic politics. Acemoglu and Robinson (2008) and Acemoglu, Ticchi and Vindigni (2010) emphasize how a rich elite may be able to capture democratic politics and prevent redistributive policies. Bates and La Ferrara (2001), Lizzeri and Persico (2005) and Padro-i-Miquel (2007), among others, construct models in which certain forms of democratic competition may be detrimental to the interests of the majority. Acemoglu, Robinson and Torvik (2011) analyze a model of endogenous checks and balances. They show that in weakly-institutionalized democracies, voters may voluntarily dismantle checks and balances on presidents as a way of increasing their rents and making them more expensive to bribe for a better organized rich elite lobby. None of these papers note or analyze the possibility of populist (left of the median) policies.

Finally, our paper is also related to a few papers investigating other aspects of populist politics and the causes of 'left-wing' politics in developing countries. Sachs (1989) discusses 'the populist cycle,' where high inequality leads to policies that make all groups worse off (because voters are shortsighted). Alesina (1989) emphasizes how redistributive policies are captured by special interest groups. Di Tella and MacCulloch (2009) provide evidence that poorer countries have more left-wing governments and link this to corruption. They suggest a model in which corruption by bureaucrats signals to voters that the rich elite are not 'fair,' and the voters, who are assumed to directly care about fairness, react to this information by moving to the left. Di Tella and MacCulloch's focus is thus closely related, but their model and proposed explanation are very different from ours.

The rest of the paper is organized as follows. Section 2 introduces a basic model with politicians differing in their policy preferences. In Section 3 we analyze the equilibria of the model and study the comparative statics. In Section 4, we supplement our analysis by studying the case where some politicians can accept bribes from the elite. Section 5 discusses four extensions. Section 6 concludes. Appendix A contains the main proofs, while Appendix B, which is available online, contains the remaining proofs.

2 Model

There is a population consisting of two groups of citizens, a rich elite and a poor majority, and a pool of politicians. Policy space is represented by $\mathbb{R}$. There are two periods, $t = 1, 2$, and in each period there is a politician in power who chooses policy $x_t \in \mathbb{R}$. Citizens only care about policy outcomes. In particular, we assume that the utility of citizen i is given by

$$u_i(x_1, x_2) = u^r(x_1, x_2) = -\sum_{t=1}^{2} (x_t - \gamma^r)^2 \tag{1}$$

if the citizen is rich, and by

$$u_i(x_1, x_2) = u^m(x_1, x_2) = -\sum_{t=1}^{2} (x_t - \gamma^m)^2 \tag{2}$$

if he is poor. Throughout, the superscript r stands for 'rich' or 'right-wing,' and m for 'moderate' or 'median voter'.[10] These preferences imply that both types of citizens are averse to deviations from their bliss policy. Without loss of generality, we set $\gamma^m = 0$, and $\gamma^r = b > 0$. We interpret this as the poor preferring more 'left-wing' policies, such as creating a more level playing field, redistribution or investment in public goods favoring the poor, whereas the rich prefer lower redistribution. Policies corresponding to $x < 0$ are thus to the left of the preferences of the poor. The assumption that there is no discounting is adopted to save on notation.[11]

Since there are only two groups of voters, and the poor form the majority, the median voter is a poor agent, and $\gamma^m = 0$ corresponds to the political bliss point of the median voter.

The politicians care about policy, office, and potentially bribes. Their utility is given by

$$v(x_1, x_2) = \sum_{t=1}^{2} \left\{ -\alpha (x_t - \gamma)^2 + W \mathbf{I}_{\{\text{in office at } t\}} + (B_t - C) \mathbf{I}_{\{\text{accepted bribe at } t\}} \right\}. \tag{3}$$

Here, x_t is the policy implemented at time t (by this or another politician), γ is the politician's ideal policy, and $\alpha > 0$ is the sensitivity to policy choice (relative to voters' sensitivity, which we normalized to 1); W is the utility from being in office, B_t is the bribe that he may receive at time t, and C is the cost he has to incur if he accepts a bribe. We consider two possible alternative assumptions about the politicians' type. First, we assume that there are two types of politician that differ in their policy preferences (and do not allow bribes). A fraction μ of politicians are 'moderates' and have a political bliss point identical to that of the median voter (a poor

[10] Note that these preferences are single peaked. This ensures that all of our results generalize to an environment where, instead of two groups, there is a distribution of preferences (γ's), provided that the moderate politician is closer to the median voter than is the right-wing politician. We chose the model with two groups to highlight that populist policies are not adopted to cater to the preferences of some subgroup—in our model, they will always be to the left of the preferences of all voters.

[11] In Section 5.1, we show that all our results hold with any degree of discounting and less discounting by politicians increases populism.

agent) with political bliss point $\gamma = 0$. Motivated by the discussion of Latin American politics in the Introduction, where voters may be concerned about politicians choosing more right-wing policies than they would like, we assume that the remaining fraction $1 - \mu$ are 'right-wingers' and have a political bliss point coinciding with that of the rich, $\gamma = b$. Voters do not directly observe the type of the politician (so this type may be interpreted as the 'secret' leaning of the politician). The assumption that these political bliss points coincide with those of poor and rich voters again serves to reduce notation. The important feature is that poor voters should prefer to have a moderate in office in the second period. Second, in Section 4, we consider a variant where all politicians have the same policy preferences but differ in their honesty/corruptability. In this version of the model, a fraction μ are 'honest,' while the remaining fraction $1 - \mu$ are 'dishonest' and thus can be bribed by the elite. This assumption endogenizes the policies of right-wing politicians as an outcome of bargaining between politicians and the elite. The results we obtain in these two variants are very similar.

At the end of the first period, there is an election in which the median voter decides whether to reelect the incumbent politician or appoint a new one from the pool of potential politicians. In particular, we model this by assuming that at the end of the first period there is a challenger of unknown type running against the incumbent. Prior to the elections, voters receive a noisy (common) signal $s = x_1 + z$ about the policy x_1 chosen by the incumbent in the first period, where z is noise. Our interpretation for why voters observe a signal rather than the actual policy is that both the exact nature and the (welfare) implications of policies take time to be fully realized and understood, and also depend on (potentially unobserved) conditions. All voters use this signal to update their priors about the politician's type and vote on the reelection of the incumbent politician. We assume that they do so in a forward-looking ('rational') manner and vote to retain the incumbent only if their posterior that he is a moderate type (or honest in the version in Section 4) is sufficiently high that they receive at least as high utility retaining him as appointing a new politician.

We will look for a pure-strategy perfect Bayesian equilibrium of the game (in undominated strategies), which ensures that the incumbent politician will be kept in power if the expected utility of poor voters is at least as high if he remains in power as if a new politician is appointed.[12]

The timing of events can be summarized as follows:

1. The politician in power at time $t = 1$ chooses policy $x_1 \in \mathbb{R}$.

2. Voters obtain the signal $s = x_1 + z$.

[12] The requirement that the perfect Bayesian equilibrium should be in undominated strategies is for the usual reason that in voting games, non-intuitive equilibria can be supported when voters use weakly dominated strategies.

3. Elections take place, and each voter either supports the incumbent or the contender.[13]

4. The politician in power at time $t = 2$ (the incumbent or newly elected politician) chooses policy $x_2 \in \mathbb{R}$.

5. All agents learn the realizations of x_1 and x_2, and payoffs are realized (according to (1) – (3)).

We next impose the following two assumptions, which will be useful in establishing well-defined unique best responses.

Assumption 1 *The noise variable z has a distribution with support on $(-\infty, +\infty)$ with c.d.f. $F(z)$ and p.d.f. $f(z)$. The p.d.f. $f(z)$ is symmetric around 0 and everywhere differentiable, and satisfies $f'(z) < 0$ for all $z > 0$ (and thus $f'(z) > 0$ for all $z < 0$).*

This assumption ensures that the density f is single-peaked. Naturally, any mean zero normal distribution $\mathcal{N}\left(0, \sigma^2\right)$ as well as several other standard distributions satisfy this assumption.

Assumption 2 *The p.d.f. of the noise variable z is sufficiently smooth in the sense that*

$$\left|f'(z)\right| < \frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}} \tag{4}$$

for all z.

Lemma 1 in Appendix A shows that this assumption implies that $f(0) < \frac{2}{b}$. In other words, values close to zero are not too likely, and there is a sufficient probability that there will be large (negative or positive) realizations of the noise, i.e., $\Pr\left(|z| > \frac{b}{4}\right) > \frac{1}{4}$. This feature ensures that there is sufficient uncertainty, which will guarantee that the relevant second-order conditions hold and thus the existence and uniqueness of equilibrium. It is straightforward to see that a normal distribution would satisfy this assumption if its variance is sufficiently large, in particular, if $\sigma^2 > \frac{\frac{b^2}{2} + \frac{W}{2\alpha}}{\sqrt{2\pi e}}$. One can also verify that until Section 4, it would be sufficient to impose (4) only for $|z| < b$.

3 Analysis

We proceed by backward induction. At date $t = 2$, the politician in power solves the problem

$$\max_{x_2 \in \mathbb{R}} -\alpha \left(x_2 - \gamma\right)^2,$$

[13] For simplicity, we assume that whenever a voter is indifferent, she supports the incumbent. In equilibrium this happens with zero probability.

and therefore chooses his bliss point $x_2 = \gamma$ (which equals $\gamma^m = 0$ for a moderate politician and $\gamma^r = b$ for a right-wing politician). This implies that the poor majority strictly prefers to have a moderate politician to a right-wing politician in power at date $t = 2$. Since the contender is a moderate with probability μ, the incumbent will win the elections only if the voters' posterior that he is moderate is no less than μ.

Let us denote the equilibrium policy that a moderate politician chooses at time $t = 1$ by $x_1 = m$, and the policy that a right-wing politician chooses by $x_1 = r$. It is intuitive that $m < r$, and this result is formally established in Proposition 1. Clearly, the probability density of signal s when policy x is chosen is given by $f(s - x)$. Given the prior μ, Bayesian updating gives the posterior that the incumbent is a moderate by

$$\hat{\mu} = \frac{\mu f(s - m)}{\mu f(s - m) + (1 - \mu) f(s - r)}. \tag{5}$$

Inspection of (5) shows that the posterior $\hat{\mu}$ satisfies $\hat{\mu} \geq \mu$ if and only if

$$f(s - m) \geq f(s - r). \tag{6}$$

Intuitively, the right-hand side of (5) depends on m and r only through the likelihood ratio $\frac{\mu f(s-m)}{(1-\mu)f(s-r)}$, which must be at least $\frac{\mu}{1-\mu}$ (the corresponding ratio for the contender) if the incumbent is to be reelected; hence $\frac{f(s-m)}{f(s-r)} \geq 1$. By Assumption 1, $f(\cdot)$ is symmetric and single-peaked, and thus (6) is equivalent to

$$s \leq \frac{m + r}{2}. \tag{7}$$

The incumbent will be reelected if and only if condition (7) is satisfied. Therefore, the expected probability of reelection for an incumbent as a function of his choice of policy x is

$$\begin{aligned} \pi(x) &= \Pr\left(x + z \leq \frac{m + r}{2}\right) \\ &= F\left(\frac{m + r}{2} - x\right). \end{aligned} \tag{8}$$

Note that this probability does not depend on the type of the incumbent, only on his choice of policy (since his type is private and does not affect the realization of the signal beyond his choice of policy).

We next establish that the policy choice of a moderate politician is always to the left of that of the right-winger, i.e., $m < r$, and summarize the discussion about incumbent reelection.

Proposition 1 *Denote the equilibrium policy of a moderate politician at $t = 1$ by $x_1 = m$ and that of a right-wing politician by $x_1 = r$. Then:*

1. *$m < r$, i.e., moderate politicians always choose a more left-wing policy than right-wing politicians;*

2. *the incumbent politician is reelected if and only if $s \leq \frac{m+r}{2}$.*

Proof. See Appendix A. ■

Let us next investigate choices at date $t = 1$ more closely. A moderate incumbent solves the following problem at date $t = 1$:

$$\max_{x \in \mathbb{R}} -\alpha x^2 + W\pi(x) - (1-\mu)\alpha b^2 (1 - \pi(x)). \tag{9}$$

Here $-\alpha x^2$ is this politician's first period utility, W is his second period utility if he is reelected (since in this case he will choose $x_2 = 0$, i.e., equal to his political bliss point), and $-(1-\mu)\alpha b^2$ is his expected second period utility if he is not reelected (with probability μ the contender is a moderate and will choose $x_2 = 0$, while with probability $1 - \mu$, a right-winger will come to power and will choose $x_2 = b$). The first-order condition for this problem is

$$-2\alpha x - \left(W + (1-\mu)\alpha b^2\right) f\left(\frac{m+r}{2} - x\right) = 0. \tag{10}$$

Similarly, a right-wing incumbent solves the problem

$$\max_{x \in \mathbb{R}} -\alpha (x-b)^2 + W\pi(x) - \mu\alpha b^2 (1 - \pi(x)). \tag{11}$$

The explanation for this expression is identical and relies on the fact that the right-wing incumbent will incur utility cost αb^2 only if he is not reelected and is replaced by a moderate politician. The first-order condition for this problem is

$$-2\alpha (x-b) - \left(W + \mu\alpha b^2\right) f\left(\frac{m+r}{2} - x\right) = 0. \tag{12}$$

In equilibrium, (10) must hold when $x = m$, and (12) must hold when $x = r$. The symmetry of f implies

$$f\left(\frac{m+r}{2} - m\right) = f\left(\frac{r-m}{2}\right) = f\left(\frac{m-r}{2}\right) = f\left(\frac{m+r}{2} - r\right),$$

so the equilibrium can be characterized in terms of the intersection of two reaction curves:[14]

$$-2\alpha m - \left(W + (1-\mu)\alpha b^2\right) f\left(\frac{r-m}{2}\right) = 0, \tag{13}$$

$$-2\alpha (r-b) - \left(W + \mu\alpha b^2\right) f\left(\frac{r-m}{2}\right) = 0. \tag{14}$$

[14] Note, however, that these are not 'best response maps' as we have already substituted for the equilibrium conditions that (10) must hold at $x = m$ and (12) at $x = r$.

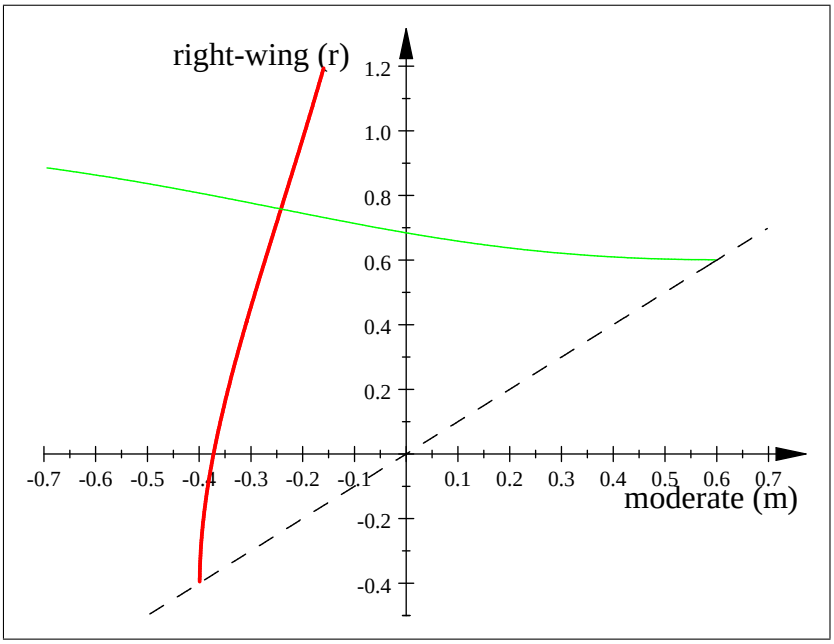

Figure 1: Reaction curves of moderate (red/thick) and right-wing (green/thin) politicians. The distribution f is taken to be normal and the parameter choices are $W = \mu = \sigma = \frac{1}{2}$ and $b = \alpha = 1$.

Mathematically, (10) depicts the equilibrium value of the policy of moderate politicians, m, when right-wing politicians are choosing policy r. Conversely, (12) depicts the equilibrium value of the policy of right-wingers when moderates are choosing m. Figure 1 plots these two curves in the relevant region $m < r$.

Conditions (13) and (14) immediately imply that $m < 0$ and $r < b$, i.e., both types of politicians in equilibrium choose policies which lie to the left of their political bliss points. For a moderate politician, this implies a populist policy choice—i.e., to the left of the median voter's political bliss point (we will also see that we might even have $r < 0$). This is for an intuitive reason: for both types of politicians, a move to the left starting from their political bliss points creates a second-order loss in the first period, but delivers a first-order increase in the probability of reelection and thus a first-order expected gain.

The result that there will be a left bias in policies does not rely on positive benefits from holding office ($W > 0$), though we will establish later that higher levels of W increase this bias. This is because even when $W = 0$, each politician wants to be reelected because otherwise his preferred policy will be implemented with probability less than one. This effect alone is sufficient for a left bias in policy choice of both types.

Inspection of Figure 1 also provides a more detailed intuition for the results and the unique-

ness of equilibrium. The reaction curve of moderate politicians is upward-sloping, while the reaction curve of right-wing politicians is downward-sloping. Formally, these statements follow from differentiating (10) and (12) with respect to m and r. The key observation is that the median voter will decide whether to reelect the incumbent politician depending on whether $\frac{f(s-m)}{f(s-r)}$ exceeds 1. A politician may ensure that he is reelected with an arbitrarily large probability if he chooses an extreme left-wing policy, but this is clearly costly as the policy would be very far away from his bliss point. The relevant trade-off for both types of politicians is therefore between choosing a policy close to their bliss point on the one hand and deviating from their bliss point and increasing their reelection probability on the other. But how much this deviation will increase their reelection probability depends on the expectations of the median voter concerning what types of policies both types of politicians will adopt. Formally, the question is whether a small change in policy will increase $\frac{f(s-m)}{f(s-r)}$ from below 1 to above 1 (which thus requires that $\frac{f(s-m)}{f(s-r)}$ is in some ε-neighborhood of 1). Suppose, for example, that right-wing politicians are expected to choose a more left-wing policy than before. This would make the policies of the two types closer, and it becomes harder for voters to distinguish one type of politician from another (equivalently, $\frac{f(s-m)}{f(s-r)}$ is more likely to be in any given ε-neighborhood of 1). In response, it would be optimal for moderate politicians to choose an even more left-wing policy in order to distinguish themselves and get reelected with a high probability. This is the reason why (13) is upward-sloping.

Why is (14) downward-sloping? Consider the situation in which moderate politicians are expected to choose more left-wing policies. One might, at first, expect that the same reasoning should push right-wing politicians to also choose more left-wing policies. But since $m < r$, a further shift to the left by moderate politicians will make it more likely that the median voter will be able to distinguish moderate than right-wing politicians (or more formally, $\frac{f(s-m)}{f(s-r)}$ is now less likely to be in any given ε-neighborhood of 1, and thus a small shift to the left by right-wing politicians is less likely to win them the election). This reduces the potential gains from choosing further left-wing policies for right-wing politicians and encourages them to choose policies more in line with their own policy preferences.

The above discussion ensures the uniqueness of equilibrium. Then characterizing this equilibrium is straightforward. Let us combine (13) and (14) to obtain

$$r = m\frac{W + \mu\alpha b^2}{W + (1-\mu)\,\alpha b^2} + b. \tag{15}$$

Therefore, the equilibrium level of populist bias (of moderate politicians), $p = |m| = -m$, is given by

$$2\alpha p = \left(W + (1-\mu)\,\alpha b^2\right) f\left(\frac{p}{2}\alpha b^2 \frac{1-2\mu}{W + (1-\mu)\,\alpha b^2} + \frac{b}{2}\right). \tag{16}$$

Proposition 2 *There exists a unique (perfect Bayesian) equilibrium (in pure strategies). In this equilibrium, politicians choose their preferred policy in the second period. In the first period, politicians choose policies which lie to the left of their preferred policy. In particular, moderate politicians necessarily choose a 'populist' policy to the left of the political bliss point of the median voter.*

Proof. See Appendix A. ■

Proposition 2 thus shows that a unique equilibrium always exists (given our assumptions), and that this equilibrium will always feature leftist bias by both types of politicians, and populist policies (to the left of the median voter) by moderate politicians. The intuition for this result was already provided above.

We next provide several comparative static results, first focusing on the populist bias of the moderate politician, $p = |m|$.

Proposition 3 *The populist bias of moderate politicians, $p = |m|$, is higher when:*

1. *W is higher (i.e., politicians value being in office more);*
2. *μ is lower (i.e., moderate politicians are rarer);*
3. *α is lower, provided that $W \neq 0$ (i.e., changing political positions is relatively costless for politicians).*

Proof. See Appendix A. ■

These comparative static results are fairly intuitive. A higher utility from remaining in office increases the incentives for reelection and thus encourages greater signaling by choosing more left-wing policies. Consequently, moderate politicians end up choosing more populist policies. The comparative static result with respect to α has a similar intuition: when α is lower, this utility from choosing a policy different from their bliss point is less important relative to the gain of utility from remaining in office, and this encourages more signaling and thus more left-wing policies by both politicians.

The comparative statics with respect to μ—the share of politicians that are moderate—is a little more subtle. When μ is lower, the probability that a new politician will be moderate is lower. This makes it more costly for moderate politicians not to be reelected and induces them to choose policies further to the left. There is a countervailing effect, however, because the same calculus implies that right-wing politicians have less to fear from not being reelected, which makes them choose policies less to the left; because the reaction curve of moderate politicians

is upward-sloping, this effect induces them to also choose policies less to the left and thus closer to the preferences of the median voter. Nevertheless, when the density f is not too large (in particular, when it satisfies Assumption 2), the latter effect is dominated, and the populist bias of moderate politicians increases.

We next investigate the comparative statics of the policy choice of right-wing politicians. To do this, let us substitute for m from (15) into (14). Denoting the "bias" of right-wing politicians by $q = |r - b| = b - r > 0$ (the inequality follows from (14)), we obtain

$$2\alpha q = \left(W + \mu\alpha b^2\right) f\left(\frac{q}{2}\alpha b^2 \frac{(1-2\mu)}{W + \mu\alpha b^2} + \frac{b}{2}\right) \tag{17}$$

Notice the similarity between this expression and (16), which underlies the similar comparative statics summarized in the next proposition.

Proposition 4 *The populist bias of right-wing politicians, $q = |r - b|$, is higher when:*

1. *W is higher (i.e., politicians value being in office more);*
2. *μ is higher (i.e., moderate politicians are more frequent);*
3. *α is lower, provided that $W \neq 0$ (i.e., changing political positions is relatively costless for politicians).*

Proof. See Appendix A. ■

These results for W and α are the same as for moderate politicians in Proposition 3, and the intuition is similar: to get reelected, right-wing politicians need to pretend to be moderate ones; higher W makes this even more important and lower α makes it less costly, hence their bias of right-wing politicians is higher. The comparative statics with respect to μ is the opposite: a higher μ now makes it less likely that following a loss in the elections the next politician in power will be right-wing and implement the incumbent's desired policy b.

The question of whether the bias of right-wing politicians will be large enough so that they actually choose populist policies $r < 0$ (i.e., whether $q > b$) is of particular interest. When this is the case, not only moderate but also right-wing politicians will choose populist policies. The next result gives an answer to this question.

Proposition 5
1. *In the absense of direct benefits from holding office (i.e., if $W = 0$), right-wing politicians never choose policies to the left of median voter's political bliss point, i.e., $q < b$ and $r > 0 > m$.*
2. *For $W > 0$ large enough, the equilibrium involves $q > b$, i.e., $m < r < 0$.*

Proof. See Appendix A. ■

When there are no direct benefits or rents from holding office (i.e., $W = 0$), then right-wing politicians will never bias their policies so much to the left as to end up to the left of the median. This is because the cost of not getting reelected is to see the political bliss point of a moderate politician, which is the same as the median voter's bliss point, implemented.[15] Higher benefits from holding office, on the other hand, increase the left bias of not only moderate politicians, but also of right-wing politicians. Consequently, for sufficiently high values of W, remaining in office is so valuable for right-wing politicians that they may also end up choosing populist policies.

Our next result shows that under an additional assumption on the form of the noise, an increase in polarization (corresponding to a bigger gap between the bliss points of moderate and right-wing politicians) also increases populist bias, provided that the utility from holding office is not too large. To simplify the conditions needed for the results to hold, we will impose that the distribution of the noise z is normal. The proof of the proposition suggests that this assumption can be replaced by a stronger version of Assumption 2.

Proposition 6 *Suppose that noise z is normally distributed. Then:*

1. *If W is sufficiently small (close to 0) and $\sigma > \frac{b}{2}$, then an increase in polarization b increases the populist bias of moderate politicians.*

2. *As W increases, the effect of polarization on the populist bias diminishes.*

Proof. See Appendix A. ■

This proposition shows that, under additional assumptions as stated, populist policies are more likely when there is greater 'polarization' in society, meaning a bigger gap between the political bliss points of the median voter and the moderate politician on the one hand and that of the right-wing politician on the other. There is a simple intuition underlying this result: with greater polarization, the benefit from reelection to both types of politicians is greater, encouraging more populist policies in the first period. However, the result is not unambiguous (hence the need for imposing the additional conditions) because there is also a countervailing effect: greater polarization also makes it more difficult for right-wing politicians to masquerade as moderate ones, which also decreases the need for moderate ones to choose populist policies. If the signal is sufficiently noisy and if politicians do not care too much about the office, the

[15] This result continues to hold, a fortiori, if the future is discounted. But if the second period is more important in politicians' uility than the first period, then there may be populist bias in right-wing politicians' choices even with $W = 0$.

second effect is dominated. As incumbents begin to care about the office more, there will be more populism for any degree of polarization (Proposition 3), and further polarization will not have a major impact.

We next investigate the relationship between the noisiness of signal z and the bias of moderate and right-wing politicians. To do this in a tractable way, let us again assume that distribution of z is normal, which enables us to measure noisiness of the signal z by its variance σ^2. The next proposition summarizes our results.

Proposition 7 *Suppose that noise z is normally distributed with variance σ^2. An increase in σ^2 first increases and then decreases the left bias of both moderate and right-wing politicians, p and q. Both of these biases are maximized when*

$$\sigma = \sigma^* \equiv \frac{b}{4}\left(1+\sqrt{1+(1-2\mu)\sqrt{\frac{8}{\pi e}}}\right).$$

(If σ^* is such that it does not satisfy Assumption 2, then populist bias is decreasing in variance for all feasible values of σ).

Proof. See Appendix A. ■

The intuition behind this nonmonotonicity is simple. When there is little noise, politicians only have limited incentives to bias policy as voters are unlikely to confuse the two types of politicians. When there is too much noise, on the other hand, the resulting signal is often very different from the policy and politicians' incentives to signal by biasing policy are again limited. Proposition 7 thus highlights that populist bias (of both moderate and right-wing politicians) is driven neither by very precise nor very imprecise information about politicians' policy choices, but is in fact more likely to occur for 'moderate' informativeness of policy signals.

Finally, since the populist bias of politics in this model is driven by politicians' efforts to get reelected, it is useful to consider whether term limits would improve welfare. Here we investigate this question focusing on 'hard term limits,' returning to the issue of 'soft term limits,' which can be violated by sufficiently popular politicians, in Section 5.3.

It is straightforward to see that with (hard) term limits restricting politicians to a single term, politicians will set policy equal to their bliss point. Let us focus on the effects of term limits on the welfare of poor voters as given by (2).[16] Term limits will have three effects on the welfare of poor voters. First, the policy choice of moderate politicians in the first period will be closer to their bliss point. Second, the policy choice of right-wing politicians will generally

[16] We can also consider a utilitarian social welfare measure, which will be similar provided that poor voters are sufficiently more numerous.

be further away from their bliss point (unless without term limits, they would have chosen such extreme populist policies that they are further to the left of the median voter's bliss point than they would have been to the right with policies in line with their preferences). Third, the likelihood of a moderate politician in the second period will be lower (since poor voters would lose the ability to select only politicians who are likely to be moderate).

The next proposition shows that the welfare of poor voters may be higher or lower under term limits, and also characterizes the effect of various parameters on whether term limits will increase their welfare. It shows that despite the populist bias of policies in the absence of (strong) term limits, term limits may make (poor) voters worse off—particularly when the populist bias of policy is limited because of politicians' low benefits from holding office (low W) or because of their strong policy concerns (high α).

Proposition 8 *The welfare of poor voters (and the utalitarian welfare of the society as a whole) can be higher or lower under term limits. Higher W and lower α make it more likely that welfare is higher under terms limits. The absence of term limits is better for poor voters if politicians are not office-motivated (W is low), or if policy preferences, rather than reelection concerns, determine their policy choices (α is high).*

Proof. See Appendix A. ■

4 Corruption

We have so far assumed that politicians have policy preferences that are private information and some politicians may (secretly) have right-wing preferences. Politicians then choose policies to signal to the voters that they do not have such right-wing preferences. While such policy preferences are plausible, a complementary and perhaps empirically more important reason why some politicians may have more right-wing preferences than the median voter may be that they are (unduly) influenced or even captured by the elite. This is particularly relevant in weak democracies, such as many in Latin America, where the elite have several non-electoral means of influencing politics (including lobbying or direct bribery) and may have a disproportionate impact on policies. In this section, we investigate the implications of voters' concern that politicians may be unduly influenced by the rich elite. In doing so, we endogenize the extent of the right-wing preferences of some (corruptible) politicians, which will now depend on the intensity of their preferences relative to the preferences of the elite.

To focus on the role of political corruption in underpinning populism, we now assume that politicians are identical in terms of their policy preferences and suppose, without any loss of

generality, that these coincide with the preferences of the median voter. But only a fraction μ of politicians are 'honest' in the sense that they cannot or will not accept bribes; the remaining $1-\mu$ share are 'dishonest' and thus corruptible. The bribing process is potentially 'imperfect'. We capture this by assuming that whenever there is such a transaction, the parties must incur cost $C \geq 0$ to avoid being detected. This introduces a parameter that will be useful for comparative statics (and we could set $C = 0$). More precisely, let us assume that it is the politician who incurs the cost C. The surplus of the transaction is split between the rich elite and the politician in power, and the politician receives a share χ (of the remaining surplus, i.e., the surplus minus the cost C).

In this new setup, the corruptible politicians will de facto become more right-wing, as their policies will be the result of bargaining with the elite which favors policy b. Honest politicians, on the other hand, will prefer policy 0, as did moderates in the previous setting. To simplify the analysis, for the rest of this section we assume that the noise z is normally distributed, and also that

$$\frac{W}{\alpha} < b^2. \tag{18}$$

Under these assumptions, we can establish the existence and uniqueness of pure-strategy equilibrium.

The timing of the new game is therefore as follows.

1. The politician in power at time $t = 1$ and the elite bargain over x_1 (if the politician is dishonest), and the politician chooses policy $x_1 \in \mathbb{R}$.

2. Voters obtain the signal $s = x_1 + z$.

3. Voters vote, and decide whether to replace the current incumbent with a random one drawn from the pool of potential politicians.

4. The politician in power at time $t = 2$ (the incumbent or newly elected politician), if dishonest, bargains with the elite over x_2. The politician chooses policy $x_2 \in \mathbb{R}$.

5. All agents learn the realizations of x_1 and x_2, and payoffs are realized according to (1) – (3).

The timing and the structure of the game is very similar to that in Section 2, except for the bargaining between the politician and the elite in stages 1 and 4. Note that parameter α, which has so far captured the intensity of politicians' policy preferences, may now be given different/complementary interpretations. First, a small α may also correspond to (or result

from) a large size of the elite, which would make bribing politicians relatively inexpensive for the elite, so that the policy choice of the politician is easier to manipulate. Conversely, a large α could be interpreted as the elite constituting a relatively small group of the population. Second, a large α can also be interpreted as the politician standing in for a large bureaucracy, thus increasing the monetary and transactional costs of bribing.

As before, we start our analysis with the second period. Then, an honest politician will choose his bliss point, $x_2^h = 0$. A corruptible politician, on the other hand, will bargain with the elite, and the equilibrium policy is determined from the joint maximization of the sum of their surpluses (as long as the surplus exceeds C). Namely, they maximize

$$\max_{x_2^c \in \mathbb{R}} \left(-\alpha \left(x_2^c\right)^2 - \left(x_2^c - b\right)^2 \right),$$

which yields

$$x_2^c = \frac{b}{1+\alpha}. \tag{19}$$

Naturally, a higher α, which corresponds either to a greater weight on politician's preferences or smaller elite that will benefit from biasing the policy, implies a policy closer to the politician's political bliss point. As a consequence, the second period joint utility of a dishonest politician in power and the elite is

$$W - \frac{\alpha b^2}{\alpha + 1} - C,$$

and the gain in utility, as compared to the status-quo $W - b^2$ (since without the bribe, the politician would choose $x_2^c = 0$), is $\frac{b^2}{\alpha+1} - C$. This means that bribing in the second period will occur only if

$$C < \frac{b^2}{\alpha + 1}. \tag{20}$$

In this case, we can simply determine the bribe B_2 from the equation

$$-\alpha \left(x_2^c\right)^2 + B_2 - C = \chi \left(\frac{b^2}{\alpha+1} - C \right),$$

which implies

$$B_2 = \left(\chi + \frac{\alpha}{\alpha+1} \right) \frac{b^2}{\alpha+1} + (1-\chi)\, C.$$

Interestingly, the effect of the intensity of politician's preferences α on the bribe is nonmonotonic: the bribe reaches its maximum at $\alpha = \frac{1-\chi}{1+\chi}$; for lower α, the bribe is smaller because the politician is very cheap to persuade, and for very large α, the politician is too hard to bribe, hence in the limit the bribe vanishes.

The following proposition characterizes several useful features of the equilibrium.

Proposition 9 *Suppose that z is normally distributed and* (18) *and* (20) *hold. Then:*

1. *In the second period, honest politicians choose* $x_2^h = 0$*, while corrupt politicians choose* $x_2^c = \frac{b}{1+\alpha}$*;*

2. *In the first period, honest and corrupt politicians choose policies* $x_1^h = m$ *and* $x_1^c = r$ *such that* $m < r$*;*

3. *The median voter prefers to have an honest politician in the second period, and reelects the incumbent politician if and only if he receives a signal*

$$s \leq \frac{m+r}{2}.$$

Proof. See Appendix B. ■

Part 1 of Proposition 9 was established earlier, while Parts 2 and 3 are similar to the results established in Proposition 1 in the case without bribery.

Let us next turn to the first-period problem. If the second period involves no bribing, then in the first period politicians have no "reelection concerns" because in this case voters are indifferent between the incumbent and the challenger (and we have assume that when indifferent, they reelect the incumbent). As a consequence, politicians will solve an identical problem in the first period, and thus the solution is the same and involves no corruption either. The interesting case where dishonest politicians accept bribes in the second period (which is the case when (20) holds) is the one studied in Proposition 9. In this case, the probability of reelection of a politician who chooses policy x is again given by (8). An honest politician does not accept bribes and thus solves the problem

$$\max_{x \in \mathbb{R}} -\alpha x^2 + W\pi(x) - (1-\mu)\,\alpha \left(\frac{b}{1+\alpha}\right)^2 (1-\pi(x)). \tag{21}$$

Note that this problem is the same as (9), except that when the honest incumbent is replaced by a dishonest politician, his utility is $-\alpha\left(\frac{b}{1+\alpha}\right)^2$ instead of $-\alpha b^2$ (since the second period policy in this case will be given by (19)). This maximization problem gives the first-order condition

$$-2\alpha x - \left(W + (1-\mu)\frac{\alpha b^2}{(1+\alpha)^2}\right) f\left(\frac{m+r}{2} - x\right) = 0. \tag{22}$$

A dishonest politician bargains with the elite both in the first and second periods. In the first period, bargaining—anticipating the second-period choices—gives the following joint maximization problem

$$\max_{x \in \mathbb{R}} \left\{ \begin{array}{c} -\alpha x^2 - (x-b)^2 + \left(W - \frac{\alpha b^2}{\alpha+1} - C\right)\pi(x) \\ -(1-\mu)\left(\frac{\alpha b^2}{\alpha+1} + \left(\chi + \frac{\alpha}{\alpha+1}\right)\frac{b^2}{\alpha+1} + (1-\chi)\,C\right)(1-\pi(x)) - \mu b^2 (1-\pi(x)) \end{array} \right\}. \tag{23}$$

The first two terms relate to the first period's utilities of the incumbent and the elite, respectively. If this (dishonest) politician is reelected, then together with the elite he jointly obtains second-period utility $W - \frac{\alpha b^2}{\alpha+1} - C$. If he is not reelected but another dishonest politician comes to power, their joint utility is $-\frac{\alpha b^2}{\alpha+1} - B_2$ (the same policy is implemented and the elite have to pay the same second-period bribe, but the current incumbent receives neither the direct benefits from holding office nor the bribes, nor has he to pay the cost C). Finally, if an honest politician is elected, the incumbent and the elite together obtain $-b^2$. The first-order condition of their maximization problem, after simplification, gives:

$$-2\alpha x - 2(x-b) - \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2} + (\chi+\mu-\mu\chi)\left(\frac{b^2}{\alpha+1} - C\right)\right) f\left(\frac{m+r}{2} - x\right) = 0. \tag{24}$$

Since first-order conditions (22) and (24) must be satisfied in equilibrium for $x = m$ and $x = r$, respectively, the equilibrium is now characterized by the following two equations:

$$-2\alpha m - \left(W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2}\right) f\left(\frac{r-m}{2}\right) = 0 \tag{25}$$

and

$$-2\alpha r - 2(r-b) - \left(W + \frac{(1-\mu)\alpha b^2}{(\alpha+1)^2} + (\chi+\mu-\mu\chi)\left(\frac{b^2}{\alpha+1} - C\right)\right) f\left(\frac{r-m}{2}\right) = 0. \tag{26}$$

From (25) and (26), we obtain

$$r = \frac{1}{\alpha+1}\left(b + \frac{\alpha m\left(W + \frac{(1-\mu)\alpha b^2}{(\alpha+1)^2} + (\chi+\mu-\mu\chi)\left(\frac{b^2}{\alpha+1} - C\right)\right)}{W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2}}\right).$$

Plugging this into (25) and denoting, as before, the populist bias (of honest politicians) by $p = |m| = -m$, we have the following equilibrium condition for populist bias:

$$2\alpha p = \left(W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2}\right) f\left(\frac{b}{2(1+\alpha)} + p\frac{W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2} - \alpha(\chi+\mu-\mu\chi)\left(\frac{b^2}{\alpha+1} - C\right)}{2(1+\alpha)\left(W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2}\right)}\right). \tag{27}$$

The next proposition follows from our analysis so far and from this expression.

Proposition 10 *Suppose that z is normally distributed and* (18) *and* (20) *hold (*(20) *ensures that there is corruption in the second period when the politician is dishonest). Then:*

1. *There exists a unique equilibrium (in pure strategies). In this equilibrium, honest politicians choose populist policies in the first period (i.e., $m < 0$). Dishonest politicians accept a bribe.*

2. *If W and χ are sufficiently small, then dishonest politicians will not choose populist policies, i.e., $r > 0$. If, on the other hand, W is sufficiently high, dishonest politicians will choose populist policies, i.e., $r < 0$.*

Proof. See Appendix B. ■

The intuition for why honest politicians now choose populist policies is similar to before: a small move to the left starting from their political bliss point has a second-order cost in terms of first-period utility, and a first-order gain in terms of the probability of reelection and second-period utility. The last part of the result suggests that if dishonest politicians do not value being in power per se (obtaining neither direct benefits from being in office nor positive rights), then the equilibrium will never involve populist policies in the first period. This is because reelection has limited benefits for dishonest politicians and this makes populist policies jointly too costly for the elite and the politician. The converse case is more interesting. In this case, even though dishonest politicians are effectively representing the wishes of the elite (because of bribery), they will still choose populist policies in the first period so as to increase their likelihood of coming to power and obtaining higher utility (from the benefit of holding office, and perhaps from a higher share of surplus from corruption) in the second period.

The comparative static results of populist bias are again intuitive, but they also help us to further clarify the nature of the results in this case.

Proposition 11 *Suppose that z is normally distributed and* (18) *and* (20) *hold . Then, the populist bias of honest politicians, $p = |m|$, is higher when:*

1. *W is higher (greater direct utility from holding office);*
2. *C is lower (greater gains from the election for dishonest politicians because bribing is more efficient);*
3. *χ is higher (dishonest politicians have higher bargaining power vis-à-vis the elite);*
4. *μ is lower (honest politicians are relatively rare).*

Proof. See Appendix B. ■

A higher W makes both politicians value reelection more; they thus engage in more signaling (by choosing more populist policies). A lower C increases the joint utility of the elite and the incumbent in case of reelection, and this makes dishonest politicians choose more left-wing policies, which in turn enables honest politicians to do the same. A higher χ makes holding office more valuable for dishonest politicians. This again makes them seek office more aggressively by

choosing policies that are more left-wing, and honest politicians respond by also changing their policies to the left. Since they were already to the left of the median voter, this increases the populist bias of honest politicians. Finally, if honest politicians are rare, it makes them even more willing to signal because the population's prior is that dishonest politicians are the norm, not the exception.

Our discussion so far suggests that the potential corruption of politicians empowers the elite to secure policies that are more favorable to their interest. However, as we emphasized in the Introduction, there is a countervailing effect: the fact that the elite will be able to influence politics leads to equilibrium signaling by choosing more left-wing policies. In fact, we have seen that this always makes honest politicians choose populist policies to the left of the preferences of the median voter. This raises the possibility that the elite's ability to bribe politicians may actually harm them (by creating a strong left-wing bias in the first period). The next proposition shows that when W is sufficiently large, the elite may be worse off when they are able to bribe—as compared to a hypothetical world where they are never able to influence politics via bribes.

Proposition 12 *Suppose that z is normally distributed and* (18) *and* (20) *hold. There exists $\bar{W}$ such that if $W > \bar{W}$, the elite are better off when* (20) *does not hold (i.e., if C is high enough) as compared to the case in which it holds (or in the extreme, where $C = 0$).*

Proof. See Appendix B. ■

Intuitively, when politicians receive sufficient rents from holding office, policy choices by both honest and dishonest politicians will be more to the left, and as a result, despite their ability to bribe dishonest politicians, the elite will end up with first-period policies that are very far from their preferences. In this case, they may have lower utility than in a situation without the possibility of bribery (which would have led to the implementation of the median voter's bliss point in both periods). This result thus shows that weak institutions, which normally empower the elite, may in the end create sufficient policy distortions so as to make them worse off, because of the endogenous response of democratic policies, even if democracy works only imperfectly.

5 Extensions

In this section, we consider several extensions of the baseline model of Section 3.

5.1 Discounting

We have so far suppressed discounting. Suppose now that politicians discount the future with discount factor $\delta \in (0, 1]$. It is straightforward to see that discounting by voters has no effect

on the equilibrium and that all of our results hold for any $\delta > 0$. More interestingly, the next proposition shows that populism is increasing in δ.

Proposition 13 *The populist biases of both moderate and right-wing politicians, $p = |m|$ and $q = |r - b|$, are increasing in δ.*

Proof. See Appendix B. ■

The intuition for this result is simple: adopting populist policies is costly for both types of politicians but they are willing to do this to increase their chances of reelection. The more 'forward-looking' they are (i.e., the less they discount the future) the more willing they will be to adopt populist policies. This result is also interesting in part because it shows that populism does not arise because voters or politicians are short-sighted or do not care about the future. On the contrary, it is politicians' concerns about future reelection that fuels populism.

5.2 Right-Wing and Left-Wing Extremism

Motivated by Latin American politics, we have so far focused on a model in which the possibility that politicians may be secretly right-wing (or influenced by the rich elite) creates a populist bias in policies. In practice, fear of left leanings of politicians may also induce a bias to the right in their policies in an effort to signal that they are not secretly left-wing. In this subsection, we briefly characterize the structure of equilibria when political extremists may be either left-wing or right-wing. We will show that voters will not reelect any incumbent that generates a signal that is extreme to either side, and we will also show that policy will be endogenously biased in the opposite direction from the preferences of the extremist that is more likely.

Suppose that, as before, with probability μ the politician is a moderate and has bliss point $\gamma^m = 0$. With complementary probability $1 - \mu$, the politician is an extremist; he is right-wing with probability $\mu^r \in (0, 1 - \mu)$ with bliss point $\gamma^r = b > 0$, and left-wing with probability μ^l with bliss point $\gamma^l = -b$. The assumption that the absolute value of the biases of the two extremists are the same is adopted to simplify notation and algebra, and ensures that the median voter is equally averse to either type of extremist. Throughout this subsection, we hold μ fixed and vary μ^l and μ^r so that $\mu^l + \mu^r = 1 - \mu$. This enables us to study how the likelihood of the two classes of extremists affects the equilibrium policy biases. We also simplify the analysis by assuming that z is normally distributed with variance σ^2 and that σ^2 is sufficiently high.

Clearly, in the second period, each politician is going to choose his ideal policy $x_2 \in \{-b, 0, b\}$, and thus the median voter will reelect the incumbent only if the posterior that the incumbent is moderate, $\hat{\mu}$, is at least μ. To characterize the first period strategies x_1 of the three types of politicians, let us denote the policy choices of left-wing, moderate, and right-wing politicians by

l, m, and r, respectively. In Appendix B, we prove that in equilibrium we must have $l < m < r$. We simplify the analysis here by imposing this property. When the median voter observes signal s, then his posterior that the politician is moderate will be

$$\hat{\mu} = \frac{\mu f(s-m)}{\mu f(s-m) + \mu^l f(s-l) + \mu^r f(s-r)}. \tag{28}$$

The condition $\hat{\mu} \geq \mu$ simplifies to

$$\mu^l \left(f(s-m) - f(s-l)\right) + \mu^r \left(f(s-m) - f(s-r)\right) \geq 0, \tag{29}$$

which, given the normal distribution, is equivalent to

$$\mu^l \left(1 - \exp\left(-\frac{1}{\sigma^2}(m-l)\left(s - \frac{l+m}{2}\right)\right)\right) + \mu^r \left(1 - \exp\left(\frac{1}{\sigma^2}(r-m)\left(s - \frac{r+m}{2}\right)\right)\right) \geq 0. \tag{30}$$

In Appendix B, we show that the set of signals s for which (30) is satisfied is an interval $[s_l, s_h]$, where these thresholds are given by $s_l = s_l(l, m, r)$ and $s_h = s_h(l, m, r)$ as functions of the policy choices of the three types of politicians. Moreover, $-\infty < s_l < \frac{l+m}{2}$ and $\frac{m+r}{2} < s_h < +\infty$. This implies that a politician is perceived to be moderate and is reelected if the realized policy (signal) is not too extreme in either direction.

For a politician choosing policy $x_1 = x$ in the first period, the probability of reelection is therefore given by

$$\pi(x) = \Pr(s_l < x + z < s_h) = F(s_h - x) - F(s_l - x).$$

Thus, a moderate incumbent solves the problem

$$\max_{x \in \mathbb{R}} -\alpha x^2 + W\pi(x) - (1-\mu)\alpha b^2 (1 - \pi(x)),$$

which uses the fact that either type of extremist will choose the policy that is b away from his bliss point, implying a disutility of b^2 for the moderate type. The first-order condition for a modern incumbent is therefore

$$-2\alpha x - \left(W + (1-\mu)\alpha b^2\right)\left(f(s_h - x) - f(s_l - x)\right) = 0. \tag{31}$$

Our focus on sufficiently high variance σ^2 ensures that the second-order condition is also satisfied.

The problem of a left-wing incumbent also factors in the probability μ^r of a right-wing extremist coming to power in the next period and choosing a policy $2b$ away from his bliss point, as well as the probability μ that a moderate will come to power and choose a policy b away from his bliss point. This problem can thus be written as

$$\max_{x \in \mathbb{R}} -\alpha (x+b)^2 + W\pi(x) - \left(\mu\alpha b^2 + \mu^r \alpha (2b)^2\right)(1 - \pi(x)),$$

and has first-order condition

$$-2\alpha\left(x+b\right)-\left(W+\left(\mu+4\mu^{r}\right)\alpha b^{2}\right)\left(f\left(s_{h}-x\right)-f\left(s_{l}-x\right)\right)=0. \tag{32}$$

Similarly, for a right-wing incument, the problem is

$$\max_{x\in\mathbb{R}}-\alpha\left(x-b\right)^{2}+W\pi\left(x\right)-\left(\mu\alpha b^{2}+\mu^{l}\alpha\left(2b\right)^{2}\right)\left(1-\pi\left(x\right)\right),$$

with the first-order condition

$$-2\alpha\left(x-b\right)-\left(W+\left(\mu+4\mu^{l}\right)\alpha b^{2}\right)\left(f\left(s_{h}-x\right)-f\left(s_{l}-x\right)\right)=0. \tag{33}$$

In equilibrium, (31), (32), and (33) must hold for $x=m,l,r$, respectively. This implies that the following three conditions characterize an equilibrium

$$\begin{aligned}
-2\alpha\left(l+b\right)-\left(W+\left(\mu+4\mu^{r}\right)\alpha b^{2}\right)\left(f\left(s_{h}-l\right)-f\left(s_{l}-l\right)\right) &= 0, && (34)\\
-2\alpha m-\left(W+\left(1-\mu\right)\alpha b^{2}\right)\left(f\left(s_{h}-m\right)-f\left(s_{l}-m\right)\right) &= 0, && (35)\\
-2\alpha\left(r-b\right)-\left(W+\left(\mu+4\mu^{l}\right)\alpha b^{2}\right)\left(f\left(s_{h}-r\right)-f\left(s_{l}-r\right)\right) &= 0. && (36)
\end{aligned}$$

The next proposition establishes the existence of a unique equilibrium. To prove this result, we use the fact that the thresholds are given by $s_l=s_l\left(l,m,r\right)$ and $s_h=s_h\left(l,m,r\right)$ as functions of policies, and write (34) – (36) as a mapping from the space of policies (l,m,r) into itself, and show that this mapping is (locally) a contraction.

Proposition 14 *Suppose that z is normally distributed and σ is sufficiently large. Then there exists a unique (perfect Bayesian) equilibrium in pure strategies. In this equilibrium, politicians choose their preferred policy in the second period. In the first period, the left-wing, moderate and right-wing politicians choose policies l, m and r, respectively, and we have $l<m<r$, $|m|<|r|$ and $|m|<|l|$ (i.e., the moderate politician chooses a policy closer to the median voter's bliss point 0 than either of the extremist politician types). The incumbent is reelected if the signal s is within a certain interval $[s_l,s_h]$.*

Proof. See Appendix B. ■

The next proposition characterizes a number of comparative statics results of the policy choices of the three types of politicians.

Proposition 15 *Suppose that z is normally distributed and σ is sufficiently large. Then:*

1. *If $\mu^l=\mu^r$, then moderate politicians choose their ideal policy $m=0$ in the first period, while both extremist types choose policies more moderate than their true preferences, i.e., the left-wing politician chooses $l\in(-b,0)$ and the right-wing politician chooses $r\in(0,b)$. Moreover, $|l|=|r|$.*

2. *As μ^l decreases or μ^r increases (keeping $\mu^l + \mu^r = 1 - \mu$ constant), the policy of moderate politician m decreases. Similarly, an increase in μ^l (and a decrease in μ^r) leads to an increase in m. In other words, moderate politicians bias their first-period policy choice in the direction of the type of extremist that is less likely.*

3. *There exist μ' and μ'' where $0 < \mu' < \mu'' < 1 - \mu$ and $\mu' + \mu'' = 1 - \mu$ such that: (a) if $\mu^l < \mu'$ (and thus $\mu^r > \mu''$), then a further decrease in μ^l leads to a lower l and a higher r (i.e., both extremists choose even more extreme policies); (b) likewise, if $\mu^l > \mu''$ (and thus $\mu^r < \mu'$), then a further decrease in μ^r leads to a higher r and a lower l (again, both extremist types choose more extreme policies); (c) if $\mu^l, \mu^r \in (\mu', \mu'')$, then l and r increase as μ^r increases, and decrease as μ^l increases (i.e., extremists adjust their policies in the direction of the type that becomes more likely).*

Proof. See Appendix B. ■

This proposition establishes several important results. First, when their likelihoods are the same, the two types of extremists choose symmetric policies and moderate politicians choose their ideal policy $m = 0$. Because both extremists would like to masquerade as a moderate, their policies are closer to the median's bliss point. Second, as one type of extremist becomes less likely, we approach the results from the baseline model. In particular, as μ^l becomes sufficiently low, i.e., a left-wing extremist is very unlikely, the policy of a moderate politician m becomes more populist, and the policy of right-wing extremist becomes closer to his bliss point (increases). The intuition is that, as μ^l decreases, a moderate politician has a higher chance of reelection if he persuades the voters that he is not right-wing, whereas a right-wing politician has less to fear from defeat and thus less incentive to signal by choosing a more moderate policy (for a left-wing extremist has now become less likely). Third, a decline in the likelihood of a left-wing extremist (from the symmetric case) has a nonmonotonic effect on the policy choices of left-wing extremist politicians. This is because the probability that a politician is a right-wing extremist is now higher and left-wing politicians are thus more afraid of losing power click calendar; this induces them to choose more moderate policies to masquerate as a moderate. However, once this likelihood is sufficiently small, voters become tolerant of left-wing signals (because they are not afraid of left-wing extremists) and this encourages left-wing politicians to adopt more extremist left-wing policies.

These results imply that more extremist policies are more likely to emerge in asymmetric situations where the probability that the incumbent is one type of extremist is (significantly) higher than the other type. In such situations, moderate politicians will attempt to signal their type by choosing policies with the opposite bias. If this asymmetry is very pronounced, the

most extreme policies will be chosen by the rarer type of extremist (though these policies will also occur more rarely since these types are rare).

5.3 Soft Term Limits

The examples discussed in Footnote 7 in the Introduction show that many politicians, particularly in Latin America, are subject to 'soft term limits,' meaning that they are limited to a single term of office but this is often violated if the politician is sufficiently popular. Here we discuss the implications of this type of soft term limits and show that, under certain circumstances, they may increase rather than reduce the populist bias of policy.

Recall that in our baseline model the incumbent politician is reelected if the posterior that he is moderate was at least μ. Suppose now that the incumbent is reelected if this posterior is at least ν. Soft term limits can be modeled by assuming that $\nu \geq \mu$. In this interpretation, a value of ν equal to μ means no term limits, a value of 1 designates hard term limits as already discussed in Proposition 8, and intermediate values correspond to soft term limits which can be overcome by sufficiently popular politicians. As ν declines, term limits become softer. In what follows, we also allow $\nu < \mu$, which can be interpreted as a form of 'incumbency advantage'.

We again simplify the analysis by assuming that z is normally distributed and σ is sufficiently large. Once again, in any equilibrium, $m < r$, and we use this fact and the expressions that follow. The citizens' posterior that the incumbent is moderate equals $\hat{\mu}$ given by (5). Therefore, the incumbent is reelected when

$$\frac{\mu f(s-m)}{\mu f(s-m) + (1-\mu) f(s-r)} \geq \nu, \tag{37}$$

or equivalently when

$$\frac{f(s-m)}{f(s-r)} \geq h, \tag{38}$$

where

$$h \equiv \frac{\nu/(1-\nu)}{\mu/(1-\mu)}. \tag{39}$$

Clearly, h is an increasing function of ν for all $\mu \in (0,1)$. As ν increases from 0 to 1, h goes from 0 to $+\infty$. Given the assumption that z is normally distributed, this implies that the incumbent will be reelected if

$$s \leq s^* = \frac{m+r}{2} - \frac{\sigma^2 \ln h}{r-m}, \tag{40}$$

which immediately implies that a higher ν makes reelection less likely for any given m and r.

The maximization problems of the two types of politicians are similar to the ones before and

imply the following two first-order conditions:

$$\begin{aligned} -2\alpha m - \left(W + \alpha\left(1-\mu\right)b^2\right) f\left(s^* - m\right) &= 0; \\ -2\alpha\left(r-b\right) - \left(W + \alpha\mu b^2\right) f\left(s^* - r\right) &= 0. \end{aligned}$$

Again as in the baseline model, we obtain that there will be a populist bias for moderate politicians' policies (i.e., $m < 0$), and right-wing politicians will choose policies to the left of their true preferences (i.e., $r < b$). Our main result in this subsection is summarized in the next proposition.

Proposition 16 *Suppose that z is normally distributed and σ is sufficiently high. Then there exists a unique (perfect Bayesian) equilibrium. There exists $\nu^* > \mu$ such that the populist bias of moderate politicians, $p = |m|$, is increasing in ν if $\nu < \nu^*$, and it is decreasing in ν if $\nu < \nu^*$. There also exists $\nu^{**} < \mu$ such that the populist bias of right-wing politicians, $q = |r - b|$, is increasing in ν if $\nu < \nu^{**}$, and it is decreasing in ν if $\nu < \nu^{**}$.*

Proof. See Appendix B. ■

This proposition establishes an inverse U-shaped relationship between populist biases and ν. For moderate politicians, as ν increases starting from μ, populist bias increases. This means, somewhat paradoxically, that soft term limits may lead to more populist policies. Intuitively, soft term limits increase the incumbent's incentives to become popular (to overcome these term limits) and this encourages populist policies. The same reasoning also applies to right-wing incumbents, though their populist bias starts increasing already after ν exceeds ν^{**}. Ultimately, however, these term limits also make it more difficult for the incumbent to get reelected and this tends to reduce the populist biases of both types of incumbents. In particular, populist bias disappears as ν tends to 1 and term limits become hard (thus verifying the results discussed in the context of Proposition 8).

The following pattern is also interesting: because the populist bias of right-wing politicians peaks at $\nu^{**} < \mu < \nu^*$, soft term limits at first create polarization, in the sense that an increase in ν starting from μ induces moderate politicians to choose policies further to the left and right-wing politicians to opt for populist further to the right.

5.4 Asymmetric Priors

We have so far limited attention to environments where the prior that the incumbent politician is moderate, μ, is the same as the likelihood that a newly elected politician will be moderate. In practice, these two probabilities may differ, for example because voters have received additional

information about the incumbent. This information may come in the form of news, say, that the incumbent spends time with members of the elite and/or enjoys a lavish lifestyle. It may also come in the form of some observable characteristics of the incumbent which are (or at least are believed to be) correlated with political preferences. For instance, a politician born in a rich or aristocratic family may be thought to have pro-elite (right-wing) preferences, while one who spent a decade in jail for anti-government protests may be viewed as less likely to be pro-elite. We now investigate how such factors affect the likelihood of populist policies.

Let us denote the prior that the incumbent is moderate by λ. Once again, as $m < r$, we have that the incumbent will be reelected when

$$\frac{\lambda f(s-m)}{\lambda f(s-m) + (1-\lambda) f(s-r)} \geq \mu, \tag{41}$$

or, equivalently when

$$\frac{f(s-m)}{f(s-r)} \geq \tilde{h} \equiv \frac{\mu/(1-\mu)}{\lambda/(1-\lambda)}. \tag{42}$$

This is similar to the case of soft term limits, and as in that case, it implies that the populist bias of moderate politicians is inverse U-shaped in the ratio $\tilde{h}$. The following proposition can then be established using a similar argument (proof omitted).

Proposition 17 *Suppose that z is normally distributed and σ is sufficiently high. Then there exists a unique (perfect Bayesian) equilibrium. In this equilibrium, moderate politicians choose populist policies $m < 0$, and right-wing politicians bias their policies left, so $r < b$. Moreover, there exists $\lambda^* < \mu$ such that the populist bias of moderate politicians, $p = |m|$, is increasing in λ if $\lambda < \lambda^*$, and it is decreasing in λ if $\lambda > \lambda^*$.*

The results in this proposition are intuitive. If λ is either close to 0 or to 1, the populist bias tends to 0 because there is little uncertainty about the incumbent politician's type and consequently, about his chances of reelection. This result also highlights that it is uncertainty about the incumbent's type that encourages populist policies, and as a result, populist bias is greatest when there is little additional information is known about incumbents (beyond the prior that he is a moderate with probability μ).

Another important implication of Proposition 17 is that populist bias is greatest when the incumbent is believed to be somewhat less likely to be moderate than average (i.e., at $\lambda^* < \mu$). This is also intuitive: a politician suspected of having a right-wing agenda has more to gain by signaling that he is moderate (particularly if his chances to get reelected are not too small). This result also suggests that politicians potentially associated with the elite (because of their family or educational background) may have particularly strong incentives to adopt populist

policies. It further suggests that additional information about an incumbent may make him more or less likely to pursue populist policies. For example, if the prior about the incumbent is around λ^*, any additional information will reduce populist bias, whereas starting from a prior of μ, news suggesting that the incumbent politician has right-wing associations or views will at first increase populist bias.

6 Conclusion

In this paper, we presented a simple theory of populist politics. Populist politics is interpreted as (some) politicians adopting policies that are harmful to the rich elite but are not in the best interest of the poor majority or the median voter. Such policies, which may, at least on the surface, involve defending the rights of the poor against the elite, establishing redistributive programs and leveling the playing field, are to the left of the bliss point of the median voter, but still receive support from the median because they signal that the politician does not have a secret right-wing agenda and is not unduly influenced by the rich elite. The driving force of populist politics is the weakness of democratic institutions, which makes voters believe that politicians, despite their rhetoric, might have a right-wing agenda or may be corruptible or unduly influenced by the elite. Populist policies thus emerge as a way for politicians to signal that they will choose future policies in line with the interests of the median voter.

We show that moderate politicians will necessarily choose policies to the left of the median voter's preferences, and even right-wing politicians (or those that are captured and bribed by the elite) may end up choosing policies to the left of the median voter. This populist (leftist) bias of policy is greater when the value of remaining in office is higher for the politician; when there is greater polarization between the policy preferences of the median voter and right-wing politicians; when politicians are indeed likely to have a hidden right-wing agenda; and when there is an intermediate amount of noise in the information that voters receive.

When (some) politicians can be bribed, we also find that the efficiency of the process of bribery and the share of the surplus that politicians can capture also encourage populism (because they make politicians more eager to get reelected). Interestingly, in this case, the elite may be worse off than in a situation in which institutions are stronger and bribery is not possible (because the equilibrium populist bias of first-period policies is more pronounced).

Our paper and model have been partly motivated by Latin American politics, where populist policies and rhetoric as well as fears of politicians reneging on their redistributive agenda and being excessively influenced by rich and powerful elites have been commonplace. Nevertheless, the ideas here can be applied to other contexts. Our analysis in Section 5.2 shows that when

voters are afraid of a secret left-wing agenda, the equilibrium may lead to 'right-wing populist' policies. Similarly, if bureaucrats are expected to show a bias in favor of a particular group or a particular type of policy, they may have incentives to be biased in the opposite direction to dispel these notions and guarantee good performance evaluation. Finally, our model has focused on a two-period economy to communicate the basic ideas in the clearest fashion. In a multi-period setup, politicians may choose biased policies for several periods. Despite the tractability of our basic model, the infinite-horizon extension turns out to be challenging and is an open area for future research.

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Appendix A: Proofs

The following Lemma clarifies the role and consequences of Assumption 2.

Lemma 1 *Suppose that Assumption 2 holds. Then:*

1. $f(0) < \frac{2}{b}$ *(even* $f(0) < \frac{3}{2b}$*);*
2. $\Pr\left(|z| > \frac{b}{4}\right) > \frac{1}{4}$.

Proof of Lemma 1. **Part 1.** Assumption 2 implies that $|f'(x)| < \frac{2}{b^2}$ if $|x| < b$. Hence, whenever $|x| < b$, we have $|f(x) - f(0)| \leq \frac{2}{b^2}|x|$. This implies $f(x) \geq f(0) - \frac{2}{b^2}|x|$. We then

have

$$\begin{aligned} 1 &= \int_{-\infty}^{+\infty} f(x)\,dx > \int_{-b/2}^{+b/2} f(x)\,dx \\ &\geq \int_{-b/2}^{+b/2} \left(f(0) - \frac{2}{b^2}|x| \right) dx = bf(0) - 2\int_0^{+b/2} \frac{2}{b^2} x dx \\ &= bf(0) - \frac{4}{b^2}\frac{1}{2}\left(\frac{b}{2}\right)^2 = bf(0) - \frac{1}{2}. \end{aligned}$$

This immediately implies $bf(0) < \frac{3}{2}$, and thus $f(0) < \frac{3}{2b} < \frac{2}{b}$.

Part 2. We have

$$\Pr\left(|z| < \frac{b}{4}\right) = \int_{-b/4}^{+b/4} f(x)\,dx < \int_{-b/4}^{+b/4} f(0)\,dx < \frac{b}{2}\frac{3}{2b} = \frac{3}{4}.$$

Hence, $\Pr\left(|z| > \frac{b}{4}\right) > \frac{1}{4}$. ■

Proof of Proposition 1.

Part 1. Consider three cases: $m < r$, $m > r$, and $m = r$. By Bayes rule, the median voter's posterior that the politician is moderate

$$\hat{\mu} = \frac{\mu f(s-m)}{\mu f(s-m) + (1-\mu) f(s-r)}.$$

If $m = r$, then $\hat{\mu} = \mu$, and thus, by assumption, the incumbent is necessarily reelected. The moderate and right-wing incumbents then choose their bliss points, so $m = 0 < b = r$, which contradicts $m = r$.

If $m \neq r$, then $\hat{\mu} \geq \mu$ if and only if

$$f(s-m) \geq f(s-r),$$

which simplifies to $s \leq (m+r)/2$ if $m < r$ and to $s \geq (m+r)/2$ if $m > r$. But if $m > r$, the likelihood of reelection is given by

$$\pi(x) = \Pr(x + z \geq (m+r)/2) = 1 - F((m+r)/2 - x) = F(x - (m+r)/2)$$

(the last equality follows from the symmetry of distribution). Hence, moderate and right-wing incumbents solve problems

$$\begin{aligned} &\max_x -\alpha x^2 + W\pi(x) - (1-\mu)\alpha b^2 (1 - \pi(x)), \\ &\max_x -\alpha (x-b)^2 + W\pi(x) - \mu\alpha b^2 (1 - \pi(x)), \end{aligned}$$

respectively.

We have

$$\begin{aligned}
-\alpha m^2 + WF\left(\frac{m-r}{2}\right) - (1-\mu)\,\alpha b^2 F\left(\frac{r-m}{2}\right) &\geq -\alpha r^2 + WF\left(\frac{r-m}{2}\right) - (1-\mu)\,\alpha b^2 F\left(\frac{m-r}{2}\right), \\
-\alpha\,(r-b)^2 + WF\left(\frac{r-m}{2}\right) - \mu\alpha b^2 F\left(\frac{m-r}{2}\right) &\geq -\alpha\,(m-b)^2 + WF\left(\frac{m-r}{2}\right) - \mu\alpha b^2 F\left(\frac{r-m}{2}\right).
\end{aligned}$$

Adding these inequalities, dividing by α and simplifying, we get

$$-m^2 - (r-b)^2 \geq -r^2 - (m-b)^2 + b^2\left(2F\left(\frac{m-r}{2}\right) - 1\right)(2\mu - 1)$$

Further simplification yields

$$m - r \leq \frac{1}{2} b\left(2F\left(\frac{m-r}{2}\right) - 1\right)(1 - 2\mu).$$

If $m > r$, then this condition implies $1 - 2\mu > 0$. However, then we have

$$\frac{m-r}{2} \leq \frac{b}{2}\left(F\left(\frac{m-r}{2}\right) - \frac{1}{2}\right).$$

Due to concavity of F for positive arguments (see Assumption 1), this is only possible if

$$f(0) \geq \frac{2}{b}.$$

However, in that case Assumption 2 is violated.

Part 2. By part 1, the only remaining possibility is $m < r$. The statement for this case is proved in the text. ■

Proof of Proposition 2. The second derivatives for (9) and (11) are

$$-2\alpha + \left(W + (1-\mu)\,\alpha b^2\right) f'\left(\frac{m+r}{2} - x\right) < 0$$

and

$$-2\alpha + \left(W + \mu\alpha b^2\right) f'\left(\frac{m+r}{2} - x\right) < 0,$$

respectively. Assumption 2 ensures that both are satisfied. Once this is true, we find that (13) implies an increasing m as a function of r whenever $m < r$, whereas (14) implies a decreasing r as a function of m whenever $m < r$. Consequently, if an equilibrium exists, it is unique, since these "best-response" curves may intersect only once. The existence result trivially follows from (16): clearly, the left-hand side and the right-hand side have an intersection at some positive p.
■

Proof of Proposition 3. Part 1. Let us rewrite (16) as

$$G(p, W, \alpha, \mu) = 0, \tag{A1}$$

where

$$G\left(p,W,\alpha,\mu\right)=\left(W+\left(1-\mu\right)\alpha b^{2}\right)f\left(\frac{p}{2}\alpha b^{2}\frac{1-2\mu}{W+\left(1-\mu\right)\alpha b^{2}}+\frac{b}{2}\right)-2\alpha p.$$

Let us define

$$y\equiv\frac{r-m}{2}=\frac{p}{2}\alpha b^{2}\frac{1-2\mu}{W+\left(1-\mu\right)\alpha b^{2}}+\frac{b}{2}>0, \tag{A2}$$

where the second equality follows from (13) and (14), and $\frac{r-m}{2}$is positive from Proposition 1). Since $f\left(x\right)<\frac{2}{b}$ for any x, we have

$$p<\left(W+\left(1-\mu\right)\alpha b^{2}\right)\frac{1}{b\alpha},$$

and thus

$$\begin{aligned}y &= \frac{p}{2}\alpha b^{2}\frac{1-2\mu}{W+\left(1-\mu\right)\alpha b^{2}}+\frac{b}{2}\\ &< \frac{1}{2}\left(W+\left(1-\mu\right)\alpha b^{2}\right)\frac{1}{b\alpha}\alpha b^{2}\frac{1}{W+\left(1-\mu\right)\alpha b^{2}}+\frac{b}{2}\\ &= \frac{b}{2}+\frac{b}{2}=b.\end{aligned}$$

Consequently, by Assumption 2,

$$\left|f'\left(y\right)\right|<\frac{1}{\frac{b^{2}}{2}+\frac{W}{2\alpha}}. \tag{A3}$$

In addition, (A1) implies

$$p=\frac{W+\left(1-\mu\right)\alpha b^{2}}{2\alpha}f\left(y\right). \tag{A4}$$

Now differentiating G with respect to p and W:

$$\begin{aligned}\frac{\partial G}{\partial p} &= \alpha b^{2}\frac{1-2\mu}{2}f'\left(y\right)-2\alpha\\ &< \alpha b^{2}\frac{1}{2}\frac{1}{\frac{b^{2}}{2}+\frac{W}{2\alpha}}-2\alpha=\frac{\alpha}{1+\frac{W}{\alpha b^{2}}}-2\alpha<0.\end{aligned}$$

Differentiating it with respect to W:

$$\begin{aligned}\frac{\partial G}{\partial W} &= f\left(y\right)-\frac{p}{2}\alpha b^{2}\frac{1-2\mu}{\left(W+\left(1-\mu\right)\alpha b^{2}\right)}f'\left(y\right)>f\left(y\right)-\frac{p}{2}\alpha b^{2}\frac{1}{\left(W+\left(1-\mu\right)\alpha b^{2}\right)}\frac{1}{\frac{b^{2}}{2}+\frac{W}{2\alpha}}\\ &= f\left(y\right)-\frac{1}{4}f\left(y\right)b^{2}\frac{1}{\frac{b^{2}}{2}+\frac{W}{2\alpha}}\geq f\left(y\right)-\frac{1}{2}f\left(y\right)>0,\end{aligned}$$

where we used (A3) and (A4). Combining these two expressions, we have

$$\frac{\partial p}{\partial W}=-\frac{\partial G/\partial W}{\partial G/\partial p}>0,$$

and thus p is increasing in W.

Part 2. Let us differentiate G with respect to μ. We have

$$\begin{aligned}\frac{\partial G}{\partial \mu} &= -\alpha b^2 f(y) - \frac{p}{2}\alpha b^2 \frac{\alpha b^2 + 2W}{W + (1-\mu)\alpha b^2} f'(y) \\ &< -\alpha b^2 f(y) + \frac{p}{2}\alpha b^2 \frac{\alpha b^2 + 2W}{W + (1-\mu)\alpha b^2} \frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}} \\ &= \alpha b^2 f(y)\left(-1 + \frac{1}{4\alpha}\frac{\alpha b^2 + 2W}{\frac{b^2}{2} + \frac{W}{2\alpha}}\right) = \alpha b^2 f(y)\left(-1 + \frac{\alpha b^2 + 2W}{2\alpha b^2 + 2W}\right) < 0\end{aligned}$$

(we again used (A3) and (A4)). This implies that

$$\frac{\partial p}{\partial \mu} = -\frac{\partial G/\partial \mu}{\partial G/\partial p} < 0,$$

and hence p is decreasing in μ.

Part 3. Observe that (A1) may be rewritten as

$$\left(\frac{W}{\alpha} + (1-\mu)b^2\right) f\left(\frac{p}{2}b^2 \frac{1-2\mu}{\frac{W}{\alpha} + \mu b^2} + \frac{b}{2}\right) - 2p = 0. \tag{A5}$$

Consequently, if $W = 0$, then equilibrium populist bias p does not depend on α. If $W > 0$, then, since (A5) only depends on W and α through $\frac{W}{\alpha}$, an increase in α has the same effect as a decrease in W. In other words, p is decreasing in α. This completes the proof. ■

Proof of Proposition 4. **Part 1.** The proof closely follows that of Proposition 3. Let us rewrite (17) as

$$\tilde{G}(q, W, \alpha, \mu) = 0, \tag{A6}$$

where

$$\tilde{G}(q, W, \alpha, \mu) = \left(W + \mu\alpha b^2\right) f\left(\frac{q}{2}\alpha b^2 \frac{1-2\mu}{W + \mu\alpha b^2} + \frac{b}{2}\right) - 2\alpha q.$$

Take $y = \frac{r-m}{2}$, then $y > 0$ by Proposition 2, and thus

$$y = \frac{q}{2}\alpha b^2 \frac{1-2\mu}{W + \mu\alpha b^2} + \frac{b}{2} > 0$$

Notice that, since $f(x) < \frac{2}{b}$ for any x, then

$$q < \left(W + \mu\alpha b^2\right)\frac{1}{b\alpha},$$

and thus

$$\begin{aligned} y &= \frac{q}{2}\alpha b^2 \frac{1-2\mu}{W + \mu\alpha b^2} + \frac{b}{2} < \frac{1}{2}\left(W + \mu\alpha b^2\right)\frac{1}{b\alpha}\alpha b^2 \frac{1}{W + \mu\alpha b^2} + \frac{b}{2} \\ &= \frac{b}{2} + \frac{b}{2} = b. \end{aligned}$$

Consequently, by Assumption 2,

$$\left|f'(y)\right| < \frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}}. \tag{A7}$$

In addition, (A6) implies

$$q = \frac{W + \mu\alpha b^2}{2\alpha} f(y). \tag{A8}$$

We now differentiate $\tilde{G}$ with respect to q and W. We have

$$\begin{aligned} \frac{\partial \tilde{G}}{\partial q} &= \alpha b^2 \frac{1-2\mu}{2} f'(y) - 2\alpha \\ &< \alpha b^2 \frac{1}{2} \frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}} - 2\alpha = \frac{\alpha}{1 + \frac{W}{\alpha b^2}} - 2\alpha < 0. \end{aligned}$$

Differentiating by W yields

$$\begin{aligned} \frac{\partial \tilde{G}}{\partial W} &= f(y) - \frac{q}{2}\alpha b^2 \frac{1-2\mu}{(W + \mu\alpha b^2)} f'(y) > f(y) - \frac{q}{2}\alpha b^2 \frac{1}{(W + \mu\alpha b^2)} \frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}} \\ &= f(y) - \frac{1}{4} f(y) b^2 \frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}} \geq f(y) - \frac{1}{2} f(y) > 0; \end{aligned}$$

here, we used (A7) and (A8). This implies that

$$\frac{\partial q}{\partial W} = -\frac{\partial \tilde{G}/\partial W}{\partial \tilde{G}/\partial q} > 0,$$

and thus q is increasing in W.

Part 2. Let us differentiate $\tilde{G}$ with respect to μ. We have

$$\frac{\partial \tilde{G}}{\partial \mu} = \alpha b^2 f(y) - \frac{q}{2}\alpha b^2 \frac{\alpha b^2 + 2W}{W + (1-\mu)\alpha b^2} f'(y) > 0$$

($f'(y) < 0$ since $y > 0$). This implies that

$$\frac{\partial q}{\partial \mu} = -\frac{\partial \tilde{G}/\partial \mu}{\partial \tilde{G}/\partial q} > 0,$$

and hence q is increasing in μ.

Part 3. Observe that (A6) may be rewritten as

$$\left(\frac{W}{\alpha} + \mu b^2\right) f\left(\frac{q}{2} b^2 \frac{1-2\mu}{\frac{W}{\alpha} + \mu b^2} + \frac{b}{2}\right) - 2q = 0. \tag{A9}$$

Consequently, if $W = 0$, then equilibrium bias q does not depend on α. If $W > 0$, then, since (A9) only depends on W and α through $\frac{W}{\alpha}$, an increase in α has the same effect as a decrease in W. In other words, q is decreasing in α. This completes the proof. ■

Proof of Proposition 5. **Part 1.** If $W = 0$, an elite politician would never choose $x_1 < 0$. Indeed, in this case he would get at most $-(b - x_1)^2 < -b^2$, even if his ideal policy is implemented in the second period. At the same time, he can always guarantee getting $-b^2$ by choosing $x_1 = b$ (in that case, x_2 will be either 0 or b, depending on the election result and new politician's type). Consequently, $x_1 = b$ would be a profitable deviation, and thus $x_1 < 0$ may not be the case in an equilibrium if $W = 0$.

Part 2. If $W > 0$ is sufficiently large, $x_1 < 0$ is possible for both politicians. Indeed, r and m are linked by

$$r = m\frac{W + \mu\alpha b^2}{W + (1-\mu)\alpha b^2} + b.$$

If W is sufficiently large, equilibrium populism p can be made arbitrarily large (otherwise in (16), the argument of f would be bounded from below, and thus the right-hand side could be arbitrarily large, which is incompatible with the left-hand side being bounded). But then m may be arbitrarily large (in absolute value) negative number, and thus r will also become negative, since $\frac{W+\mu\alpha b^2}{W+(1-\mu)\alpha b^2}$ has a limit as $W \to \infty$. This completes the proof. ■

Proof of Proposition 6. **Part 1.** A normal distribution is characterized by density

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{x^2}{2\sigma^2}}.$$

One can easily check that $\left|\frac{\partial f}{\partial x}\right|$ reaches its maximum at $x = \pm\sigma$, and this maximum equals $\frac{1}{\sqrt{2\pi e}\sigma^2}$. For Assumption 2 to hold, it would be sufficient to require that

$$\sigma^2 > \frac{\frac{b^2}{2} + \frac{W}{2\alpha}}{\sqrt{2\pi e}}. \tag{A10}$$

This inequality (A10) is obviously satisfied if $W = 0$ and $b < 2\sigma$.

Now, differentiate G with respect to b. We have

$$\frac{\partial G}{\partial b} = 2(1-\mu)\alpha b f(y) + \frac{W^2 + 2\alpha b(p + b - 2p\mu - b\mu)W + \alpha^2 b^4 (1-\mu)^2}{2(W + (1-\mu)\alpha b^2)} f'(y).$$

If $W = 0$, we have

$$\begin{aligned}\frac{\partial G}{\partial b} &= 2(1-\mu)\alpha b f(y) + \frac{\alpha b^2 (1-\mu)}{2} f'(y) \\ &= \frac{(1-\mu)\alpha b f(y)}{2}\left(4 + b\frac{f'(y)}{f(y)}\right).\end{aligned}$$

For a normal distribution,

$$\frac{f'(y)}{f(y)} = -\frac{y}{\sigma^2},$$

and thus, using (A10), we get that if $W = 0$,

$$\frac{\partial G}{\partial b} = \frac{(1-\mu)\,\alpha b f(y)}{2}\left(4 - b\frac{y}{\sigma^2}\right) > 0$$

whenever $b^2 < 4\sigma^2$ (because $0 < y < b$). Therefore, for b not too large (or if σ is sufficiently large), then

$$\frac{\partial p}{\partial b} = -\frac{\partial G/\partial b}{\partial G/\partial p} > 0$$

(it is worth noting that for this result, we would not need the assumption about normal distribution).

Part 2. Recall that $y \equiv \frac{r-m}{2}$, and rewrite (A2) as

$$2\alpha p \frac{1-2\mu}{W + (1-\mu)\,\alpha b^2} = 2\frac{2y-b}{b^2};$$

then (A1) implies

$$(1-2\mu)\,f(y) - 2\frac{2y-b}{b^2} = 0,$$

which can be rewritten as

$$\frac{1-2\mu}{4} f(y)\, b^2 - y + \frac{b}{2} = 0. \tag{A11}$$

From (A11), y does not depend on W or α. As W varies, so does p, and in such a way that $\frac{p}{W+(1-\mu)\alpha b^2}$ remains constant (this follows from (A1)). This implies that $\frac{\partial G}{\partial p} = 0$, and

$$\frac{d\frac{\partial G}{\partial b}}{dW} = -\frac{f'(y)}{2b}(b - 4y).$$

Now, since $f'(y) < 0$, $y > \frac{b}{4}$ implies that $\frac{\partial G}{\partial b} < 0$. To show that this is the case, we write

$$y = f(y)\, b^2 \frac{1-2\mu}{4} + \frac{b}{2},$$

which we obtain from (A1), satisfies $y > \frac{b}{4}$. We can rewrite the equation as

$$\frac{y}{b} = \frac{1}{\sqrt{2\pi}}\frac{b}{\sigma} e^{-\frac{1}{2}\frac{y^2}{b^2}\frac{b^2}{\sigma^2}} \frac{1-2\mu}{4} + \frac{1}{2}.$$

Denote $\frac{y}{b} = z$, $\frac{b}{\sigma} = k$; then this equation may be rewritten as $g(z) = \frac{1}{2}$, where

$$g(z) = z - \frac{1}{\sqrt{2\pi}} k e^{-\frac{1}{2}k^2 z^2} \frac{1-2\mu}{4};$$

obviously,

$$g(z) < z + \frac{1}{4\sqrt{2\pi}} k e^{-\frac{1}{2}k^2 z^2}.$$

Suppose, to obtain a contradiction, that $z < \frac{1}{4}$. Then on the interval $0 < k < \sqrt[4]{8\pi e}$ (which captures all values of $k = \frac{b}{\sigma}$ that satisfy (A10), function $ke^{-\frac{1}{2}k^2z^2}$ is monotonically increasing, and thus does not exceed its value at $k = \sqrt[4]{8\pi e}$. Therefore,

$$g(z) < z + \frac{\sqrt[4]{8\pi e}}{4\sqrt{2\pi}} e^{-\sqrt{2\pi e}z^2}.$$

One can easily check that the right-hand side is monotonically increasing in z on $\left(0, \frac{1}{4}\right)$, and therefore does not exceed

$$\frac{1}{4} + \frac{\sqrt[4]{8\pi e}}{4\sqrt{2\pi}} e^{-\frac{\sqrt{2\pi e}}{16}} < \frac{1}{2}.$$

This leads us to a contradiction, meaning that for no $z < \frac{1}{4}$ it is possible that $g(z) = \frac{1}{2}$. This completes the proof. ■

Proof of Proposition 7. Let us treat G as a function of σ, too. To differentiate G with respect to σ at points where (A1) holds, consider

$$\frac{\partial(\sigma G(\cdot))}{\partial \sigma} = \sigma \frac{\partial G}{\partial \sigma} + G(\cdot) = \sigma \frac{\partial G}{\partial \sigma}.$$

We have

$$\begin{aligned}
\frac{\partial(\sigma G(\cdot))}{\partial \sigma} &= \left(W + (1-\mu)\alpha b^2\right) \frac{1}{\sqrt{2\pi}} \frac{\partial}{\partial \sigma} \left(\exp\left(-\frac{y^2}{2\sigma^2}\right)\right) - 2\alpha p \\
&= \left(W + (1-\mu)\alpha b^2\right) \frac{1}{\sqrt{2\pi}} \frac{y^2}{\sigma^3} \exp\left(-\frac{y^2}{2\sigma^2}\right) - 2\alpha p \\
&= \left(W + (1-\mu)\alpha b^2\right) \frac{y^2}{\sigma^2} f(y) - 2\alpha p \\
&= \left(W + (1-\mu)\alpha b^2\right) f(y) \left(\frac{y^2}{\sigma^2} - 1\right),
\end{aligned}$$

where we used (A4) to get the last inequality. We have

$$\frac{\partial p}{\partial \sigma} = -\frac{\partial G/\partial \sigma}{\partial G/\partial p} = -\frac{1}{\sigma} \frac{\partial(\sigma G)/\partial \sigma}{\partial G/\partial p},$$

hence $\frac{\partial p}{\partial \sigma} > 0$ (< 0) if and only if $\frac{y}{\sigma} > 1$ (< 1). To study whether $\frac{y}{\sigma}$ is greater than or less than 1 we will use (A11).

As shown above, in the case with normal distribution, Assumption 2 is equivalent to (A10). Hence, there are always feasible values of σ such that $\sigma > b$; since $y < b$ as proved earlier in the Proof of Proposition 3, in this case $\frac{y}{\sigma} < 1$, and p is decreasing in σ. At the same time, for some parameter values $\frac{y}{\sigma} > 1$ is possible. Take, for instance, $W = 0$, then (A10) is satisfied whenever $\frac{\sigma}{b} > \frac{1}{\sqrt[4]{8\pi e}}$, in particular if $b = 1$ and $\sigma = 0.4$. If we let $\mu = \frac{1}{2}$, then (A11) implies $y = \frac{b}{2} = \frac{1}{2}$, and thus $\frac{y}{\sigma} = \frac{5}{4} > 1$.

Given that p is decreasing in σ if σ is large enough, in order to prove that p is first increasing in σ and then decreasing, but never vice versa, it suffices to prove that $\frac{y}{\sigma}$ is decreasing in σ in points where $\frac{y}{\sigma}=1$. Denote $x=\frac{y}{\sigma}$ and rewrite (A11) as

$$\frac{1-2\mu}{4}\frac{1}{\sqrt{2\pi}}\exp\left(-\frac{x^2}{2}\right)b^2-x\sigma^2+\frac{b}{2}\sigma=0. \tag{A12}$$

We have

$$\begin{aligned}\frac{\partial x}{\partial\sigma} &= -\frac{-2x\sigma+\frac{b}{2}}{-x\frac{1-2\mu}{4}b^2\frac{1}{\sqrt{2\pi}}\exp\left(-\frac{x^2}{2}\right)b^2-\sigma^2}\\ &= -\frac{-2x\sigma+\frac{b}{2}}{-x\left(x\sigma^2-\frac{b}{2}\sigma\right)-\sigma^2},\end{aligned}$$

where we used (A12) in the last equality. If $x=1$, then

$$\frac{\partial x}{\partial\sigma}=-\frac{-\left(\sigma^2-\frac{b}{2}\sigma\right)-\sigma^2}{-2\sigma+\frac{b}{2}}=-\frac{-2\sigma^2+\frac{b}{2}\sigma}{-2\sigma+\frac{b}{2}}=-\sigma<0.$$

This proves that $\frac{y}{\sigma}$ may equal 1 for only one value of σ, and thus p is increasing in σ if $\sigma<\sigma^*$ and decreasing in σ if $\sigma>\sigma^*$.

To find σ^*, we plug $x=1$ into the equation (A12) and get the equation for σ^*:

$$\left(\frac{\sigma^*}{b}\right)^2-\frac{1}{2}\frac{\sigma^*}{b}-\frac{1-2\mu}{4}\frac{1}{\sqrt{2\pi e}}=0.$$

We thus have σ^* as the larger root of this equation, so

$$\sigma^*=\frac{b}{4}\left(1+\sqrt{1+(1-2\mu)\sqrt{\frac{8}{\pi e}}}\right)$$

(this is a real number for any μ, since $\pi e>8$).

Now, rewrite (15) as

$$q=p\frac{W+\mu\alpha b^2}{W+(1-\mu)\alpha b^2}.$$

This equation is linear and does not involve σ. Hence, if σ increases, either both p and q increase or both p and q decrease. In particular, the results above apply. Hence, the maximum of both p and q is achieved at the same σ^*, at this σ^*, $y=\sigma^*$, and the maximal biases equal

$$\begin{aligned}p\left(\sigma=\sigma^*\right) &= k\left(W+(1-\mu)\alpha b^2\right),\\ q\left(\sigma=\sigma^*\right) &= k\left(W+\mu\alpha b^2\right),\end{aligned}$$

where

$$k=\begin{cases}\frac{\sqrt{1+(1-2\mu)\sqrt{\frac{8}{\pi e}}}-1}{2(1-2\mu)\alpha b} & \text{if } \mu\neq\frac{1}{2}\\ \frac{1}{\alpha b\sqrt{2\pi e}} & \text{if } \mu=\frac{1}{2}\end{cases}.$$

■

Proof of Proposition 8. Let us denote the probability of having a moderate politician in the second period (without term limits) by λ. Notice that the equilibrium probability of reelection of a moderate politician is $F\left(\frac{r-m}{2}\right)$, and the probability of reelection of a right-wing politician is $F\left(\frac{m-r}{2}\right) = 1 - F\left(\frac{r-m}{2}\right)$. Consequently,

$$\begin{aligned}
\lambda &= \mu F\left(\frac{r-m}{2}\right) + \mu\left(1 - F\left(\frac{r-m}{2}\right)\right)\mu + (1-\mu)\left(1 - \left(1 - F\left(\frac{r-m}{2}\right)\right)\right)\mu \\
&= \mu\left(\mu + 2(1-\mu) F\left(\frac{r-m}{2}\right)\right), \\
1 - \lambda &= (1-\mu)\left(1 - \mu\left(2F\left(\frac{r-m}{2}\right) - 1\right)\right)
\end{aligned}$$

Indeed, this happens if (a) moderate politician is reelected, (b) moderate politician is not reelected, but a moderate comes instead, and (c) right-wing politician is replaced by a moderate. Therefore, without term limits poor voters obtain utility

$$V^n = -\mu m^2 - (1-\mu) r^2 - (1-\mu)\left(1 - \mu\left(2F\left(\frac{r-m}{2}\right) - 1\right)\right) b^2,$$

and their utility with term limits is

$$V^t = -2(1-\mu) b^2.$$

We have

$$V^n - V^t = -\mu m^2 - (1-\mu) r^2 + (1-\mu)\left(1 + \mu\left(2F\left(\frac{r-m}{2}\right) - 1\right)\right) b^2, \tag{A13}$$

and we need to find when it is positive or negative.

Thus, recalling that $p = |m|$ and rewriting (A13) as

$$V^n - V^t = -\mu p^2 - (1-\mu)(2y - p)^2 + (1-\mu)(1 + \mu(2F(y) - 1)) b^2, \tag{A14}$$

it suffices to prove that for fixed y, the right-hand side of (A14) is positive for small $p < p^*$ and negative for $p > p^*$ (provided that p takes feasible values).

Differentiating the right-hand side of (A14) with respect to p yields

$$4y - 2p - 4y\mu = -2(p - 2y(1-\mu)).$$

Consequently, $V^n - V^t$ is decreasing in p for $p > 2y(1-\mu)$, and there is $p^* > 2y(1-\mu)$ such that for $p > p^*$ it is negative. It now suffices to proof that for $p < 2y(1-\mu)$ the right-hand side

of (A14) is positive. But it is increasing for such values, and hence it suffices to prove that the value at the minimal feasible p is positive.

Suppose first that $\mu \geq \frac{1}{2}$. Then (A11) implies $y \leq \frac{b}{2}$. Take $p = 0$ (p cannot be negative), then

$$\begin{aligned} V^n - V^t &= -(1-\mu)(2y)^2 + (1-\mu)(1+\mu(2F(y)-1))b^2 \\ &\geq -(1-\mu)b^2 + (1-\mu)(1+\mu(2F(y)-1))b^2 \\ &= (1-\mu)b^2\mu(2F(y)-1) > 0. \end{aligned}$$

Now suppose that $\mu < \frac{1}{2}$; then (A11) implies $y > \frac{b}{2}$. Here, for $p = 0$, $V^n - V^t$ may be negative, but $p = 0$ is infeasible in this case. Indeed, we have $r = 2y + m$; now $r < b$ implies $m < b - 2y$, and thus $p = -m > 2y - b$. We thus substitute $p = 2y - b$ to obtain

$$\begin{aligned} V^n - V^t &= -\mu(2y-b)^2 - (1-\mu)b^2 + (1-\mu)(1+\mu(2F(y)-1))b^2 \\ &= -\mu(2y-b)^2 + (1-\mu)\mu(2F(y)-1)b^2. \end{aligned}$$

Notice that (A11) implies

$$2y - b = f(y)b^2\frac{1-2\mu}{2},$$

and we also have

$$2F(y) - 1 = 2(F(y) - F(0)) = 2\int_0^y f(x)\,dx > 2yf(y) > bf(y),$$

since $f(x)$ is decreasing for $x > 0$. Consequently,

$$V^n - V^t > -\mu\left(f(y)b^2\frac{1-2\mu}{2}\right)^2 + (1-\mu)\mu b^3 f(y).$$

Then, using $f(y) < \frac{2}{b}$, we obtain

$$\begin{aligned} V^n - V^t &> -\mu\left(f(y)b^2\frac{1-2\mu}{2}\right)^2 + (1-\mu)\mu b^3 f(y) \\ &\geq \mu f(y)\left(-\frac{1}{4}f(y)b^4 + \frac{1}{2}b^3\right) \\ &> \mu f(y)\left(-\frac{1}{2}b^3 + \frac{1}{2}b^3\right) = 0. \end{aligned}$$

In both cases, we have shown that $V^n - V^t > 0$ at the minimal value of p, and therefore for all $p < 2y(1-\mu)$. Consequently, $V^n - V^t < 0$ if and only if p exceeds some threshold p^*. By Proposition 3, this is more likely if W is larger or α is smaller, and the opposite is more likely if W is smaller and α is larger. ■

Appendix B: Omitted Proofs—Not For Publication

Proof of Proposition 9.

Part 1. Proved in the text.

Part 2. We first prove that when (20) is satisfied, pure-strategy Perfect Bayesian equilibria necessarily have bribes in the first period. First suppose that $m = r$. This would mean that the probability of reelection is the same for all policy realizations. If so, honest politicians would choose $m = 0$, and dishonest ones must choose $r = 0$ as $m = r$. But since (20) is satisfied, the elite and the dishonest incumbent would bargain to $r = \frac{b}{\alpha+1}$, which violates $m = r$.

Second, suppose that $m < r$. Then the honest politicians solve problem (21), whereas corrupt politicians solve

$$\max_{x\in\mathbb{R}} -\alpha x^2 + \left(W + \chi\left(\frac{b^2}{\alpha+1} - C\right)\right)\pi(x) - (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2}(1-\pi(x));$$

indeed, he gets W plus some part of surplus if he is reelected, but loses $\frac{\alpha b^2}{(\alpha+1)^2}$ if he is replaced by another dishonest politician. The equilibrium choices of the honest and dishonest politicians are thus given by

$$\begin{aligned} -2\alpha m - \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2}\right) f\left(\frac{r-m}{2}\right) &= 0, \\ -2\alpha r - \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2} + \chi\left(\frac{b^2}{\alpha+1} - C\right)\right) f\left(\frac{r-m}{2}\right) &= 0, \end{aligned}$$

implying, from (20), that $r < m$. This yields a contradiction. The argument leading to a contradiction to $m > r$ is similar. Consequently, pure-strategy Perfect Bayesian equilibria always include bribes.

Now focus on equilibria bribes in the first period and condition. We next establish that $m \leq r$. Suppose, again to obtain a contradiction, that $m > r$. Then, similarly to the proof of Proposition 1, we can show that the incumbent must be reelected if and only if $s \geq \frac{m+r}{2}$, so the probability of reelection, given policy choice x, is

$$\pi(x) = \Pr\left(x + z \geq \frac{m+r}{2}\right) = 1 - F\left(\frac{m+r}{2} - x\right) = F\left(x - \frac{m+r}{2}\right).$$

Honest politicians would solve (21) and dishonest politicians (with the elite) would solve (23);

since honest ones choose m over r and dishonest do the opposite, we have

$$\begin{aligned}
& -\alpha m^2 + \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2}\right) F\left(\frac{m-r}{2}\right) \\
\geq\ & -\alpha r^2 + \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2}\right)\left(1 - F\left(\frac{m-r}{2}\right)\right); \\
& -\alpha r^2 - (r-b)^2 + \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2} + ((1-\mu)\chi + \mu)\left(\frac{b^2}{\alpha+1} - C\right)\right)\left(1 - F\left(\frac{m-r}{2}\right)\right) \\
\geq\ & -\alpha m^2 - (m-b)^2 + \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2} + ((1-\mu)\chi + \mu)\left(\frac{b^2}{\alpha+1} - C\right)\right) F\left(\frac{m-r}{2}\right).
\end{aligned}$$

Adding these inequalities and simplifying, we obtain

$$(m-b)^2 - (r-b)^2 \geq ((1-\mu)\chi + \mu)\left(\frac{b^2}{\alpha+1} - C\right)\left(2F\left(\frac{m-r}{2}\right) - 1\right).$$

This, together with $m > r$, implies $m > b$.

The policy choice m satisfies the following first-order condition:

$$-2\alpha m + \left(W + \frac{(1-\mu)\alpha b^2}{(\alpha+1)^2}\right) f\left(\frac{m-r}{2}\right) = 0.$$

If $m > b$, then

$$f\left(\frac{m-r}{2}\right) > \frac{2b}{\left(\frac{W}{\alpha} + \frac{(1-\mu)b^2}{(\alpha+1)^2}\right)} > \frac{b}{\left(\frac{W}{2\alpha} + \frac{b^2}{2}\right)}.$$

Since $f(0) > f\left(\frac{m-r}{2}\right)$ and $|f'(x)| < \frac{1}{\frac{W}{2\alpha} + \frac{b^2}{2}}$, we must have that

$$\begin{aligned}
1 &= \int_{-\infty}^{+\infty} f(x)\,dx > \int_{-b}^{+b} f(x)\,dx \\
&\geq \int_{-b}^{+b}\left(f(0) - \frac{1}{\frac{W}{2\alpha} + \frac{b^2}{2}}|x|\right)dx = 2bf(0) - 2\int_{-0}^{+b}\frac{1}{\frac{W}{2\alpha} + \frac{b^2}{2}}x dx \\
&= 2bf(0) - 2\frac{1}{\frac{W}{2\alpha} + \frac{b^2}{2}}\frac{1}{2}b^2 = 2bf(0) - \frac{b^2}{\frac{W}{2\alpha} + \frac{b^2}{2}} \\
&> \frac{2b^2}{\left(\frac{W}{2\alpha} + \frac{b^2}{2}\right)} - \frac{b^2}{\frac{W}{2\alpha} + \frac{b^2}{2}} = \frac{b^2}{\frac{W}{2\alpha} + \frac{b^2}{2}}.
\end{aligned}$$

This is only possible if $\frac{W}{2\alpha} + \frac{b^2}{2} > b^2$, which contradicts (18).

Finally, suppose that $m \leq r$ and there is bribing in the first period. Then the same line of argument establishes that pure-strategy perfect Bayesian equilibria must involve $m < r$. The existence and uniqueness of such equilibrium is proved in the proof of Part 1 of Proposition 10.

Part 3. The proof is analagous to the proof of Proposition 1 and is omitted. ■

Proof of Proposition 10. Part 1. Notice that under Assumption 2, problems (21) and (23) are concave. Indeed, take (21); the second derivative with respect to x is

$$-2\alpha + \left(W + \frac{(1-\mu)\,\alpha b^2}{(1+\alpha)^2}\right) f'\left(\frac{m+r}{2} - x\right) < 0,$$

since $1+\alpha > 1$ and thus $W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2} < W + (1-\mu)\,\alpha b^2$. For problem (23), the second derivative with respect to x equals, after simplifications,

$$-2\alpha - 2 + \left(W + (1-\mu)\,\frac{\alpha b^2}{(\alpha+1)^2} + (\chi + \mu - \mu\chi)\left(\frac{b^2}{\alpha+1} - C\right)\right) f'\left(\frac{m+r}{2} - x\right).$$

For this to be negative, it suffices to prove that

$$(\chi + \mu - \mu\chi)\left(\frac{b^2}{\alpha+1} - C\right) f'\left(\frac{m+r}{2} - x\right) < 2.$$

Indeed, we have

$$(\chi + \mu - \mu\chi)\left(\frac{b^2}{\alpha+1} - C\right) f'\left(\frac{m+r}{2} - x\right) < \frac{b^2}{\alpha+1}\frac{1}{\frac{W}{2\alpha} + \frac{b^2}{2}} < 2;$$

here, we used Assumption 2. As in the Proposition 2 we get that equilibrium is determined by the intersection of m as an increasing function of r and of r as a decreasing function of m. This ensures that equilibrium is unique if it exists. As the first-period policy of an honest politician is given by (25), we obtain $m < 0$.

To complete the proof of existence, notice first that the existence of solution to equations (25)–(26) follows with a similar argument to Proposition 2. It now remains to prove that the elite and the dishonest politician would indeed find it optimal to agree on a bribe in this case, i.e., that the gain from bribing is sufficiently high. To do this, take m and r, and let l be the policy that the dishonest politician would choose if he does not get a bribe; as we showed in the proof of Proposition 9, $l < m$, as his desire to get reelected is higher. Let $n = l + \frac{b}{\alpha+1}$. Denote the joint expected utility of the elite and the dishonest politician if policy x is chosen by $W(x)$. We need to prove that $W(r) - W(l) > C$.

Since r maximizes $W(x)$, we have

$$W(r) - W(l) \geq W(n) - W(l).$$

Using the fact that $\pi(l) - \pi(n) \leq (n-l)\sup_{x\in[l,n]} f(x) \leq (n-l) f(0)$, we have

$$\begin{aligned}
& W(n) - W(l) - C \\
= \; & -\alpha n^2 - (n-b)^2 + \alpha l^2 + (l-b)^2 \\
& - \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2} + (\chi + \mu - \mu\chi)\left(\frac{b^2}{\alpha+1} - C\right)\right)(\pi(l) - \pi(n)) - C \\
= \; & \frac{b}{\alpha+1}\left(2b - (1+\alpha)\left(2l + \frac{b}{\alpha+1}\right)\right) \\
& - \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2} + (\chi + \mu - \mu\chi)\left(\frac{b^2}{\alpha+1} - C\right)\right)(\pi(l) - \pi(n)) - C \\
= \; & \left(\frac{b^2}{\alpha+1} - C\right)(1 - (\chi + \mu - \mu\chi)(\pi(l) - \pi(n))) - 2bl - \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2}\right)\frac{b}{\alpha+1} f(0) \\
> \; & -2bm - \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2}\right)\frac{b}{\alpha+1} f(0) \\
= \; & \frac{b}{\alpha}\left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2}\right) f(y) - \left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2}\right)\frac{b}{\alpha+1} f(0),
\end{aligned}$$

where $y = \frac{r-m}{2}$. It thus suffices to prove that

$$\frac{f(y)}{f(0)} > \frac{\alpha}{\alpha+1}.$$

Given that f is the c.d.f. of a normal distribution, this may be rewritten as

$$\frac{y^2}{\sigma^2} < 2\ln\left(1 + \frac{1}{\alpha}\right). \tag{B-1}$$

To show that this is true, we use the formula for y which we obtain in the proof of Proposition 11. We have

$$y = p\frac{W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2} - \alpha(\chi + \mu - \mu\chi)\left(\frac{b^2}{\alpha+1} - C\right)}{2(\alpha+1)\left(W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2}\right)} + \frac{b}{2(1+\alpha)} < \frac{p}{2(1+\alpha)}.$$

Consequently,

$$\begin{aligned}
\frac{y}{\sigma} &< \frac{1}{2(1+\alpha)}\frac{p}{\sigma} = \frac{1}{2(1+\alpha)}\frac{1}{2\alpha}\left(W + (1-\mu)\frac{\alpha b^2}{(\alpha+1)^2}\right) f(y)\frac{1}{\sigma} \\
&< \frac{1}{2(\alpha+1)}\left(\frac{W}{2\alpha} + \frac{b^2}{2}\right) f(0)\frac{1}{\sigma} = \frac{1}{2\sqrt{2\pi}(\alpha+1)}\left(\frac{W}{2\alpha} + \frac{b^2}{2}\right)\frac{1}{\sigma^2} \\
&\leq \frac{\sqrt{2\pi e}}{2\sqrt{2\pi}(\alpha+1)} = \frac{\sqrt{e}}{2(\alpha+1)}.
\end{aligned}$$

This implies

$$\frac{y^2}{\sigma^2} < \frac{e}{4}\frac{1}{(\alpha+1)^2} < \frac{1}{(\alpha+1)^2}.$$

However, since $2\ln\left(1+\frac{1}{\alpha}\right) > \frac{1}{(\alpha+1)^2}$ for all α, (B-1) holds. We thus have shown that $W(r) - W(l) > C$, and thus bribing follows.

Part 2. We can apply the reasoning we used in the proof of Proposition 5. If W and χ are both close to 0, then the dishonest incumbent has not reelection motives except for influence the policy choice. Consequently, the incumbent and the elite will jointly choose $x_1 > 0$, since otherwise they would be better off choosing policy $\frac{b}{\alpha+1}$ in the first period, and then playing equilibrium strategies in the second. On the other hand, if W is sufficiently high, we can again show that neither m nor r are bounded from below, and thus $r < 0$ follows. ■

Proof of Proposition 11. Part 1. Let us rewrite (27) as

$$H(p, W, C, \mu, \chi) = 0, \tag{B-2}$$

where

$$H(p, W, C, \mu, \chi) = \left(W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2}\right) f(y) - 2\alpha p,$$

where

$$y = p\frac{W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2} - \alpha(\chi + \mu - \mu\chi)\left(\frac{b^2}{\alpha+1} - C\right)}{2(\alpha+1)\left(W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2}\right)} + \frac{b}{2(1+\alpha)} > 0$$

($y > 0$ because it equals $\frac{r-m}{2}$, which is positive by Proposition 10). By Assumption 2,

$$\left|f'(y)\right| < \frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}}. \tag{B-3}$$

In addition, (B-2) implies

$$p = \frac{W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2}}{2\alpha} f(y). \tag{B-4}$$

We now differentiate H with respect to p and W. We have

$$\begin{aligned}
\frac{\partial H}{\partial p} &= \frac{W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2} - \alpha(\chi + \mu - \mu\chi)\left(\frac{b^2}{\alpha+1} - C\right)}{2(\alpha+1)} f'(y) - 2\alpha \\
&< \frac{\frac{(1-\mu)\alpha b^2}{(1+\alpha)^2} - \frac{\alpha b^2}{1+\alpha}}{2(1+\alpha)} f'(y) - 2\alpha = -\frac{\alpha b^2}{2}\frac{\alpha+\mu}{(1+\alpha)^3} f'(y) - 2\alpha \\
&< \frac{\alpha b^2}{2}\frac{1}{(1+\alpha)^2}\frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}} - 2\alpha \leq \frac{b^2\alpha}{2}\frac{1}{(1+\alpha)^2}\frac{2}{b^2} - 2\alpha \\
&\leq \alpha - 2\alpha < 0
\end{aligned}$$

(since $f'(y) < 0$, $\frac{\partial H}{\partial p}$ would achieve its maximum at $W = 0$, $\chi = 1$, $C = 0$). Differentiating with respect to W yields

$$\begin{aligned}\frac{\partial H}{\partial W} &= f(y) + \frac{p\alpha(\mu + (1-\mu)\chi)\left(\frac{b^2}{1+\alpha} - C\right)}{2(1+\alpha)\left(W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2}\right)} f'(y) \\ &> f(y) - \frac{(\mu + (1-\mu)\chi) b^2}{4(1+\alpha)^2} \frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}} f(y) > f(y) - \frac{b^2}{4}\frac{2}{b^2} f(y) > 0.\end{aligned}$$

Hence,

$$\frac{\partial p}{\partial W} = -\frac{\partial G/\partial W}{\partial G/\partial p} > 0,$$

and thus p is increasing in W.

Part 2. Differentiate H with respect to C. Clearly,

$$\frac{\partial H}{\partial C} < 0,$$

and therefore

$$\frac{\partial p}{\partial C} < 0,$$

so p is decreasing in C.

Part 3. Differentiate H with respect to χ. We have

$$\frac{\partial H}{\partial \chi} = -p\frac{(1-\mu)\alpha\left(\frac{b^2}{1+\alpha} - C\right)}{2(1+\alpha)} f'(y) > 0;$$

we used the condition (20) that suggests that C is not high enough to prevent second-period corruption. Therefore,

$$\frac{\partial p}{\partial \chi} = -\frac{\partial G/\partial \chi}{\partial G/\partial p} > 0,$$

and thus p is increasing in χ.

Part 4. Differentiate H with respect to μ. We have

$$\begin{aligned}
\frac{\partial H}{\partial \mu} &= -\frac{\alpha b^2}{(1+\alpha)^2} f(y) - \frac{p}{2} \frac{\alpha\left(\frac{b^2}{1+\alpha} - C\right)}{(1+\alpha)^3} \frac{W(1+\alpha)^2(1-\chi) + \alpha b^2}{W + \frac{(1-\mu)\alpha b^2}{(1+\alpha)^2}} f'(y) \\
&= -\frac{\alpha b^2}{(1+\alpha)^2} f(y) - \frac{f(y)}{4\alpha} \frac{\alpha\left(\frac{b^2}{1+\alpha} - C\right)}{(1+\alpha)^3} \left(W(1+\alpha)^2(1-\chi) + \alpha b^2\right) f'(y) \\
&< -\frac{\alpha b^2}{(1+\alpha)^2} f(y) - \frac{f(y)}{4\alpha} \frac{\alpha b^2}{(1+\alpha)^4} \left(W(1+\alpha)^2(1-\chi) + \alpha b^2\right) f'(y) \\
&= \frac{\alpha b^2}{(1+\alpha)^2} f(y) \left(-1 - \frac{1}{4\alpha} \frac{1}{(1+\alpha)^2} \left(W(1+\alpha)^2(1-\chi) + \alpha b^2\right) f'(y)\right) \\
&< \frac{\alpha b^2}{(1+\alpha)^2} f(y) \left(-1 + \left(W\frac{1-\chi}{4\alpha} + \frac{b^2}{4(1+\alpha)^2}\right) \frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}}\right) \\
&< \frac{\alpha b^2}{(1+\alpha)^2} f(y) \left(-1 + \left(W\frac{1}{2\alpha} + \frac{b^2}{2}\right) \frac{1}{\frac{b^2}{2} + \frac{W}{2\alpha}}\right) = 0.
\end{aligned}$$

Consequently,

$$\frac{\partial p}{\partial \mu} = -\frac{\partial G/\partial \mu}{\partial G/\partial p} < 0,$$

and thus p is decreasing in μ. This completes the proof. ■

Proof of Proposition 12. If W is high enough, then for $C = 0$, both m and r can be arbitrarily low in the first period. In that case, the utility of the elite may be arbitrarily low, whereas for C sufficiently high, there is no corruption, and the utility of the elite is given by $-2b^2$, as all politicians will choose $x_1 = x_2 = 0$. Consequently, there exists $\bar{W}$ such that for $W > \bar{W}$, the elite is worse off under $C = 0$. This completes the proof. ■

Proof of Proposition 13. The maximization problems of moderate and right-wing politicians, respectively, are now given by

$$\begin{aligned}
&\max_{x \in \mathbb{R}} -\alpha x^2 + \delta\left(W\pi(x) - (1-\mu)\alpha b^2(1-\pi(x))\right), \\
&\max_{x \in \mathbb{R}} -\alpha(x-b)^2 + \delta\left(W\pi(x) - \mu\alpha b^2(1-\pi(x))\right).
\end{aligned}$$

The equilibrium is thus characterized by two first-order conditions

$$\begin{aligned}
-2\alpha m - \delta\left(W + (1-\mu)\alpha b^2\right) f\left(\frac{r-m}{2}\right) &= 0, \\
-2\alpha(r-b) - \delta\left(W + \mu\alpha b^2\right) f\left(\frac{r-m}{2}\right) &= 0.
\end{aligned}$$

Therefore, $p = |m|$ and $q = |r - b|$ satisfy

$$\begin{aligned} 2\alpha p - \delta\left(W + (1-\mu)\,\alpha b^2\right) f\left(\frac{p}{2}\alpha b^2 \frac{1-2\mu}{W + (1-\mu)\,\alpha b^2} + \frac{b}{2}\right) &= 0, \\ 2\alpha q - \delta\left(W + \mu\alpha b^2\right) f\left(\frac{q}{2}\alpha b^2 \frac{1-2\mu}{W + \mu\alpha b^2} + \frac{b}{2}\right) &= 0. \end{aligned}$$

As in the proofs of Propositions 3 and 4, the left-hand sides are increasing in p and q, and are decreasing in δ. Hence $\frac{\partial p}{\partial \delta} > 0$ and $\frac{\partial q}{\partial \delta} > 0$. ■

Proof of Proposition 14. Let $X \subset \mathbb{R}^3$ be the (open) set defined by

$$(l, m, r) \in X \Longleftrightarrow l < m < r.$$

We will first prove that the set of signals s that satisfy (30) is a (closed) interval $[s_l, s_h]$ such that $-\infty < s_l < \frac{l+m}{2}$ and $\frac{m+r}{2} < s_h < +\infty$ whenever $(l, m, r) \in X$. Indeed, as s becomes close to $-\infty$, the first term becomes negative, and arbitrarily large in absolute value (since the exponent tends to $+\infty$), while the second term tends to 0, so the left-hand side of (30) is negative. Likewise, as s becomes large and positive, the first term tends to 0 and the second becomes large and negative, so the left-hand side is negative. At the same time, if we pick $s = \frac{l+m}{2}$ or $s = \frac{m+r}{2}$, then one term is positive and the other is zero, so the left-hand side is positive. It now suffices to prove that the left-hand side of (30) is a concave function of s. This follows by observing that the derivative with respect to s,

$$\mu^l \frac{1}{\sigma^2}(m-l)\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s - \frac{l+m}{2}\right)\right) - \mu^r \frac{1}{\sigma^2}(r-m)\exp\left(\frac{1}{\sigma^2}(r-m)\left(s - \frac{m+r}{2}\right)\right),$$

is a decreasing function of s.

We have thus shown that for all $(l, m, r) \in X$, there are exactly two different solutions to the equation

$$\mu^l\left(1 - \exp\left(-\frac{1}{\sigma^2}(m-l)\left(s - \frac{l+m}{2}\right)\right)\right) + \mu^r\left(1 - \exp\left(\frac{1}{\sigma^2}(r-m)\left(s - \frac{m+r}{2}\right)\right)\right) = 0; \tag{B-5}$$

we can denote the lesser of them as $s_l(l, m, r)$ and the greater as $s_h(l, m, r)$.

Let us prove that $\frac{\partial s}{\partial x}\frac{s-y}{\sigma^3}\exp\left(-\frac{(s-y)^2}{2\sigma^2}\right)$, where $s \in \{s_l, s_h\}$, and $x, y \in \{l, m, r\}$ in all possible combinations (18 totally) are each $o(1)$ as $\sigma \to \infty$, provided that $(l, m, r) \in X_\rho$ for ρ chosen below. We choose ρ in the following way. Consider the function

$$Q(b, s) = \frac{1 - \exp\left(-b\left(s + \frac{b}{2}\right)\right)}{1 - \exp\left(-b\left(s - \frac{b}{2}\right)\right)} - \exp\left(-b\left(s + \frac{b}{2}\right)\right)$$

for $s \in \left(\frac{b}{2}, \infty\right)$. One can verify that for all $s \in \left(\frac{b}{2}, \infty\right)$,

$$Q(b,s) \geq 2e^{-b^2}\sqrt{e^{b^2}-1}. \tag{B-6}$$

To see this, notice that $\lim_{s\to\frac{b}{2}+0} Q(b,s) = +\infty$ and $\lim_{s\to+\infty} Q(b,s) = 1$. In addition, if $e^{b^2} < 2$, then $s_0 = \frac{\ln\left(e^{-\frac{1}{2}b^2} - \sqrt{1-e^{-b^2}}\right)}{-b}$ is a local minimum on $\left(\frac{b}{2}, +\infty\right)$, and $Q(b,s_0) = 2e^{-b^2}\sqrt{e^{b^2}-1}$. Since $2e^{-b^2}\sqrt{e^{b^2}-1} \leq 1$ for all b (with equality achieved if $e^{b^2} = 2$), we have that $Q(b,s)$ is bounded from below by $2e^{-b^2}\sqrt{e^{b^2}-1}$ for all b, so (B-6) holds.

Consider now the function

$$\begin{aligned}\bar{Q}(b,s,\rho) &= \frac{1-2\rho}{1+2\rho}\frac{1-\exp\left(-b(1-2\rho)\left(s+\frac{b(1-2\rho)}{2}\right)\right)}{1-\exp\left(-b(1+2\rho)\left(s-\frac{b(1-2\rho)}{2}\right)\right)} \\ &\quad -\exp\left(-b(1-2\rho)\left(s+\frac{b(1-2\rho)}{2}\right)\right).\end{aligned}$$

By continuity, we can choose $\rho^* > 0$ such that for all $\rho \in [0,\rho^*]$ and for all $s > \frac{b(1-2\rho)}{2}$,

$$Q(b,s,\rho) \geq e^{-b^2}\sqrt{e^{b^2}-1}.$$

Next, for $\rho \in [0,\rho^*]$ and $\sigma \geq 1$ consider the function

$$\begin{aligned}\hat{Q}(b,s,\rho,\sigma) &= \bar{Q}\left(\frac{b}{\sigma},\frac{s}{\sigma},\rho\right) = \frac{1-2\rho}{1+2\rho}\frac{1-\exp\left(-\frac{1}{\sigma^2}b(1-2\rho)\left(s+\frac{b(1-2\rho)}{2}\right)\right)}{1-\exp\left(-\frac{1}{\sigma^2}b(1+2\rho)\left(s-\frac{b(1-2\rho)}{2}\right)\right)} \\ &\quad -\exp\left(-\frac{1}{\sigma^2}b(1-2\rho)\left(s+\frac{b(1-2\rho)}{2}\right)\right).\end{aligned}$$

Applying the previous result, we immediately get that for $s > \frac{b}{2}$,

$$\hat{Q}(b,s,\rho,\sigma) \geq e^{-\left(\frac{b}{\sigma}\right)^2}\sqrt{e^{\left(\frac{b}{\sigma}\right)^2}-1} \geq e^{-\left(\frac{b}{\sigma}\right)^2}\sqrt{\left(\frac{b}{\sigma}\right)^2} \geq e^{-b^2}\frac{b}{\sigma}$$

(where we used the fact that $e^x > 1+x$ for all $x > 0$ and that $\sigma \geq 1$).

Consider now the following function:

$$\tilde{Q}(l,m,r,s,\sigma) = \frac{r-m}{m-l}\frac{1-\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right)}{1-\exp\left(-\frac{1}{\sigma^2}(r-m)\left(s-\frac{m+r}{2}\right)\right)} - \exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right),$$

defined on $X \cap \left\{s > \frac{m+r}{2}\right\}$. For each $\rho \in \left(0,\frac{1}{3}\right)$, let $X_\rho \subset \mathbb{R}^3$ be the compact set given by

$$(l,m,r) \in X_\rho \Longleftrightarrow \left\{\begin{array}{c} -b-\rho b \leq l \leq -b+\rho b \\ -\rho b \leq m \leq \rho b \\ b-\rho b \leq r \leq b+\rho b \end{array}\right. .$$

Now observe that if $(l,m,r) \in X_\rho$, then the four values, $m-l, -(l+m), r-m, m+r$ lie on $[b(1-2\rho), b(1+2\rho)]$, which implies

$$\tilde{Q}(l,m,r,s,\sigma) \geq \hat{Q}(b,s,\rho,\sigma) \geq e^{-b^2}\frac{b}{\sigma}.$$

We are now ready to estimate $\frac{\partial s}{\partial x}\frac{s-y}{\sigma^3}\exp\left(-\frac{(s-y)^2}{2\sigma^2}\right)$. Suppose, for example, that $s = s_h$. Since s_h is the larger root of (B-5), consider the function

$$L(s) = \mu^l\left(1-\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right)\right)+\mu^r\left(1-\exp\left(\frac{1}{\sigma^2}(r-m)\left(s-\frac{m+r}{2}\right)\right)\right);$$

we then have

$$\frac{\partial s}{\partial x} = -\frac{\partial L/\partial x}{\partial L/\partial s}.$$

As argued above, $\partial L/\partial s$ is negative at $s = s_h$, so consider

$$\left|\frac{\partial L}{\partial s}\right| = \mu^r\frac{1}{\sigma^2}(r-m)\exp\left(\frac{1}{\sigma^2}(r-m)\left(s-\frac{m+r}{2}\right)\right)-\mu^l\frac{1}{\sigma^2}(m-l)\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right).$$

Consider the following two possibilities separately.

If $\mu^r \geq 6\mu^l$ (so $\mu^r \geq \frac{6}{7}(1-\mu)$ and $\mu^l \leq \frac{1}{7}(1-\mu)$), then (since $s_h > \frac{m+r}{2} > \frac{l+m}{2}$)

$$\begin{aligned}\left|\frac{\partial L}{\partial s}\right| &> \frac{1}{\sigma^2}\left(\mu^r(r-m)-\mu^l(m-l)\right)\\ &> \frac{1}{\sigma^2}\left(\mu^r\frac{b}{3}-\mu^l\frac{5b}{3}\right) \geq \frac{b}{\sigma^2}\frac{1-\mu}{21}.\end{aligned}$$

Otherwise, if $\mu^r < 6\mu^l$ (so $\mu^l > \frac{1}{7}(1-\mu)$), then, substituting for μ^r/μ^l from (B-5), we get

$$\begin{aligned}\left|\frac{\partial L}{\partial s}\right| &= \mu^l\frac{1}{\sigma^2}(m-l)\left(\frac{\mu^r(r-m)\exp\left(\frac{1}{\sigma^2}(r-m)\left(s-\frac{m+r}{2}\right)\right)}{\mu^l(m-l)}-\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right)\right)\\ &= \mu^l\frac{1}{\sigma^2}(m-l)\times\left(-\frac{(r-m)\exp\left(\frac{1}{\sigma^2}(r-m)\left(s-\frac{m+r}{2}\right)\right)}{(m-l)}\frac{1-\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right)}{1-\exp\left(\frac{1}{\sigma^2}(r-m)\left(s-\frac{r+m}{2}\right)\right)}\right.\\ &\quad\left.-\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right)\right)\\ &= \mu^l\frac{1}{\sigma^2}(m-l)\left(\frac{r-m}{m-l}\frac{1-\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right)}{1-\exp\left(-\frac{1}{\sigma^2}(r-m)\left(s-\frac{m+r}{2}\right)\right)}-\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right)\right)\\ &= \mu^l\frac{1}{\sigma^2}(m-l)\,\tilde{Q}(l,m,r,s,\sigma).\end{aligned}$$

Consequently, if $(l,m,r) \in X_\rho$, then

$$\left|\frac{\partial L}{\partial s}\right| \geq \frac{1}{7}(1-\mu)\frac{1}{\sigma^2}\frac{1}{3}be^{-b^2}\frac{b}{\sigma} \geq \frac{1-\mu}{21\sigma^3}b^2e^{-b^2}.$$

This implies that, given $\sigma \geq 1$ and $b^2 e^{-b^2} \leq 1$, that in both cases

$$\left|\frac{\partial L}{\partial s}\right| \geq \frac{1-\mu}{21\sigma^3} b^2 e^{-b^2}. \tag{B-7}$$

It is straightforward to check (or invoke the symmetry argument) that inequality (B-7) would hold for $s = s_l$ as well.

Consider now the derivatives

$$\begin{aligned}
\frac{\partial L}{\partial l} &= -\mu^l \frac{1}{\sigma^2}(s-l)\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right), \\
\frac{\partial L}{\partial m} &= \frac{1}{\sigma^2}(s-m)\left(\mu^l \exp\left(-\frac{1}{\sigma^2}(m-l)\left(s-\frac{l+m}{2}\right)\right)+\mu^r \exp\left(\frac{1}{\sigma^2}(r-m)\left(s-\frac{m+r}{2}\right)\right)\right), \\
\frac{\partial L}{\partial r} &= -\mu^r \frac{1}{\sigma^2}(s-r)\exp\left(\frac{1}{\sigma^2}(r-m)\left(s-\frac{m+r}{2}\right)\right).
\end{aligned}$$

We have

$$\begin{aligned}
\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s_h-\frac{l+m}{2}\right)\right) &< 1, \\
\exp\left(\frac{1}{\sigma^2}(r-m)\left(s_l-\frac{m+r}{2}\right)\right) &< 1,
\end{aligned}$$

and from (B-5) we also have

$$\exp\left(-\frac{1}{\sigma^2}(m-l)\left(s_l-\frac{l+m}{2}\right)\right) < \frac{\mu^l+\mu^r}{\mu^l}, \tag{B-8}$$

$$\exp\left(\frac{1}{\sigma^2}(r-m)\left(s_h-\frac{m+r}{2}\right)\right) < \frac{\mu^l+\mu^r}{\mu^r}. \tag{B-9}$$

Consequently, for any $s \in \{s_l, s_h\}$ and $x \in \{l, m, r\}$, we have

$$\left|\frac{\partial L}{\partial x}\right| \leq 2(1-\mu)\frac{1}{\sigma^2}|s-x|. \tag{B-10}$$

To proceed, consider the term $|s-x|$. Notice that (B-8) and (B-9) imply that for σ large enough

$$\begin{aligned}
s_l &> -2\frac{\sigma^2}{b}\ln\frac{\mu^l+\mu^r}{\mu^l}, \\
s_h &< -2\frac{\sigma^2}{b}\ln\frac{\mu^l+\mu^r}{\mu^r}.
\end{aligned}$$

Let us define $k_l(\sigma) \equiv \frac{s_l}{\sigma^2}$ and $k_h(\sigma) \equiv \frac{s_h}{\sigma^2}$, which are bounded functions. From (B-5) we obtain that as $\sigma \to \infty$, $k_l(\sigma)$ and $k_h(\sigma)$ tend to the two solutions of the equation

$$\mu^l\left(1-\exp\left(-(m-l)k\right)\right)+\mu^r\left(1-\exp\left((r-m)k\right)\right),$$

which are also bounded away from 0 for $(l,m,r) \in X_\rho$ for $\rho < \hat{\rho}$ for some $\hat{\rho}$ small enough. Let $\rho = \min(\rho^*, \hat{\rho})$. Therefore, there exist positive constants K_1 and K_2 such that whenever σ is large enough,

$$K_1 < \frac{|s_l|}{\sigma^2}, \frac{|s_h|}{\sigma^2} < K_2. \tag{B-11}$$

It is now straightforward to see that for σ large enough, we have $|s-y| > \frac{|s|}{2}$, and thus the following holds:

$$\begin{aligned} \exp\left(-\frac{(s-y)^2}{2\sigma^2}\right) &\leq \exp\left(-\frac{s^2}{4\sigma^2}\right) \\ &\leq \exp\left(-\frac{\sigma^2 K_1}{4}\right) < \frac{1}{\sigma^3}. \end{aligned}$$

Hence, for large σ:

$$\begin{aligned} \left|\frac{\partial s}{\partial x}\frac{s-y}{\sigma^3}\exp\left(-\frac{(s-y)^2}{2\sigma^2}\right)\right| &= \left|\frac{\partial L/\partial x}{\partial L/\partial s}\right|\frac{|s-y|}{\sigma^3}\exp\left(-\frac{(s-y)^2}{2\sigma^2}\right) \\ &\leq \frac{2(1-\mu)\frac{1}{\sigma^2}|s-x||s-y|}{\frac{1-\mu}{21\sigma^3}b^2e^{-b^2}\sigma^3}\exp\left(-\frac{(s-y)^2}{2\sigma^2}\right) \\ &\leq \frac{42}{b^2e^{-b^2}\sigma^2}\frac{s^2}{4}\frac{1}{\sigma^3} \\ &\leq \frac{42}{4b^2e^{-b^2}\sigma^2}(K_2)^2\sigma^4\frac{1}{\sigma^3} < \frac{K}{\sigma} \end{aligned}$$

for some constant K. Remember that this has been proved for $(l,m,r) \in X_\rho$.

Now consider

$$Z = \begin{pmatrix} Z_l \\ Z_m \\ Z_r \end{pmatrix} = \begin{pmatrix} l(s_l, s_h) \\ m(s_l, s_h) \\ r(s_l, s_h) \end{pmatrix}$$

defined as the functions introduced in (34)–(36). We will prove that there exists $\rho \in \left(0, \frac{1}{3}\right)$ such that for σ large enough, mapping A given by

$$A(l,m,r) = Z\left(l\left(s_l(l,m,r)\right), m\left(\left(s_l(l,m,r)\right)\right), r\left(s_l(l,m,r)\right)\right)$$

maps X into X_ρ and is a contraction on X_ρ. First, clearly X_ρ is mapped into X_ρ. Consider next the Jacobian of mapping A. It consists of derivatives of the kind $\frac{\partial Z_x(x(s_l(l,m,r)))}{\partial y}$ for $x, y \in \{l,m,r\}$. Consider, for example, $x = y = l$. The function Z_l is obtained from (34). Denote

$$Y_l(l, Z_l) = -2\alpha(Z_l + b) + \left(W + (\mu + 4\mu^r)\alpha b^2\right)\left(f\left(s_h(l,m,r) - Z_l\right) - f\left(s_l(l,m,r) - Z_l\right)\right).$$

We have

$$\frac{\partial Y_l}{\partial Z_l} = -2\alpha + \left(W + (\mu + 4\mu^r)\alpha b^2\right)\left(\frac{s_h - Z_l}{\sqrt{2\pi}\sigma^3}\exp\left(-\frac{(s_h - Z_l)^2}{2\sigma^2}\right) - \frac{s_l - Z_l}{\sqrt{2\pi}\sigma^3}\exp\left(-\frac{(s_l - Z_l)^2}{2\sigma^2}\right)\right),$$

so for large σ, $\left|\frac{\partial Y_l}{\partial Z_l}\right| > \alpha$. Likewise,

$$\frac{\partial Y_l}{\partial l} = -\left(W + (\mu + 4\mu^r)\,\alpha b^2\right)\left(\frac{\partial s_h}{\partial l}\frac{s_h - Z_l}{\sqrt{2\pi}\sigma^3}\exp\left(-\frac{(s_h - Z_l)^2}{2\sigma^2}\right) - \frac{\partial s_l}{\partial l}\frac{s_l - Z_l}{\sqrt{2\pi}\sigma^3}\exp\left(-\frac{(s_l - Z_l)^2}{2\sigma^2}\right)\right);$$

if σ is large enough, then $\left|\frac{\partial Y_l}{\partial l}\right| < \frac{\alpha}{2}$. This already implies that $\frac{\partial Z_l}{\partial l} < \frac{1}{2}$; the same may be proved in a similar way for the other derivatives. This implies that mapping A is a contraction on X_ρ for σ large enough.

We have thus proved that for σ large enough, there exists a unique equilibrium $(l, m, r) \in X_\rho$. However, for σ large enough, A maps any element of X into X_ρ, so for large σ, there may be no other fixed points of mapping A, and therefore no other monotonic equilibria. It remains to prove that there are no non-monotonic equilibria. However, it is quite easy to see that for σ high enough, politicians' best responses will lie arbitrarily close to $-b, 0, b$ for left-wing, moderate, and right-wing types, respectively, so there will be no non-monotonic equilibria. This completes the proof. ■

Proof of Proposition 15. **Part 1.** If $\mu^l = \mu^r$, then mapping A maps symmetric triples $(-x, 0, x)$ to similar triples. As any such sequence converges to the equilibrium because A is a contraction for σ large enough, this property holds in the equilibrium as well. This also implies $s_l + s_h = 0$. Now, inequalities $l > -b$ and $r < b$ follow from (34) and (36).

Part 2. The equilibrium values of l, m, r are given by the equation

$$\begin{pmatrix} l \\ m \\ r \end{pmatrix} - \begin{pmatrix} Z_l\left(s_l\left(l,m,r\right), s_h\left(l,m,r\right)\right) \\ Z_m\left(s_l\left(l,m,r\right), s_h\left(l,m,r\right)\right) \\ Z_r\left(s_l\left(l,m,r\right), s_h\left(l,m,r\right)\right) \end{pmatrix} = 0.$$

Suppose that μ^l decreases (and μ^r increases accordingly); we can parametrize $\mu^r = \frac{1-\mu}{2} - \delta$, $\mu^l = \frac{1-\mu}{2} + \delta$. To differentiate the implicit function, notice first that if σ is sufficiently large, then the derivatives of Z with respect to any of l, m, r are arbitrarily close to 0, and thus the matrix of derivatives of the left-hand side with respect to l, m, r is close to unit matrix. To determine the signs, it therefore suffices to differentiate Z_l, Z_m, Z_r with respect to δ. If σ is large enough, then the derivatives of $f\left(s - x\right)$ for $s \in \{s_l, s_h\}$ and $x \in \{l, m, r\}$ with respect to μ^l and μ^r are negligible. Now, both s_l and s_h are increasing in δ, as follows from (B-5). More precisely, we need to write the equations for the equilibrium values of s_l and s_h, notice that the $Z_x\left(s_l, s_h\right)$ has an arbitrarily small derivative with respect to δ, and therefore only the direct inclusion of δ in (B-5) through μ^l and μ^r should matter. This, together with $s_l < m < s_h$, implies that m decreases in δ. This implies that for all δ, $f\left(s_h - r\right) - f\left(s_l - r\right) > 0$, and therefore r is increasing in δ. As for l, $f\left(s_h - l\right) - f\left(s_l - l\right) < 0$ in the neighborhood of $\delta = 0$, and therefore

l is increasing in that neighborhood. However, as δ increases enough so that μ^l is sufficiently close to 0, then s_l will tend to $-\infty$ whereas s_h will remain finite. This means that for such δ, $f(s_h - l) - f(s_l - l) > 0$, and l will increase in δ.

Part 3. The proof is similar to the proof of Part 2 and is omitted. ■

Proof of Proposition 16.

The policy choice of a right-wing politician can be written as

$$r = b + m\frac{W + \alpha\mu b^2}{W + \alpha(1-\mu)b^2}\frac{1}{h} = b + m\frac{k}{h},$$

where the second equality defines

$$k \equiv \frac{W + \alpha\mu b^2}{W + \alpha(1-\mu)b^2}$$

This implies

$$r - m = b + m\left(\frac{k}{h} - 1\right).$$

The populist bias of moderate politicians, $p = |m|$, is given by the equation

$$2\alpha p - \left(W + \alpha(1-\mu)b^2\right)\frac{1}{\sqrt{2\pi}\sigma}\exp\left(-\frac{\left(\frac{r-m}{2} + \frac{\sigma^2 \ln h}{r-m}\right)^2}{2\sigma^2}\right) = 0. \tag{B-12}$$

Denoting $\xi = \frac{1}{h}$, we can rewrite this as

$$A(p, \xi) = 0,$$

where

$$A(p,\xi) = 2\alpha p - \left(W + \alpha(1-\mu)b^2\right)\frac{1}{\sqrt{2\pi}\sigma}\exp\left(-\frac{\left(\frac{b-p(k\xi-1)}{2} + \frac{\sigma^2 \ln \xi}{b-p(k\xi-1)}\right)^2}{2\sigma^2}\right). \tag{B-13}$$

Notice first that $p \to 0$ as $\sigma \to \infty$ uniformly in ξ; indeed, (B-12) implies

$$p < \frac{W + \alpha(1-\mu)b^2}{2\sqrt{2\pi}\alpha}\frac{1}{\sigma}.$$

We can similarly prove that $r \to b$ as $\sigma \to \infty$ uniformly in ξ, which implies that $b - p(k\xi - 1) = r - m \to b$, and hence $p(k\xi - 1) \to 0$ uniformly in σ. In what follows, we can assume that $b - p(\xi k - 1) \in \left(\frac{b}{2}, \frac{3b}{2}\right)$. Now, observe that $A(p, \xi)$ is increasing in p and, moreover, $\frac{\partial A}{\partial p}$ is bounded away from 0 if σ is large enough, again uniformly by ξ. Indeed,

$$\frac{\partial A}{\partial p} = 2\alpha + \left(W + \alpha(1-\mu)b^2\right)\frac{1}{\sqrt{2\pi}\sigma^3}\left(-\frac{\xi k}{2} + \frac{\sigma^2 \xi k \ln \xi}{(b - p(\xi k - 1))^2}\right)\exp\left(-\frac{\left(\frac{b-p(\xi k-1)}{2} + \frac{\sigma^2 \ln \xi}{b-p(\xi k-1)}\right)^2}{2\sigma^2}\right).$$

We see that $-\frac{\xi k}{2}+\frac{\sigma^2\xi k\ln\xi}{(b-p(\xi k-1))^2}>-\frac{ek}{2}-\frac{4\sigma^2 ek}{b^2}$ if $\xi\leq e$ and $-\frac{\xi k}{2}+\frac{\sigma^2\xi k\ln\xi}{(b-p(\xi k-1))^2}>\xi k\left(\frac{4\sigma^2}{9b^2}-\frac{1}{2}\right)>0$ if $\xi>e$, provided that $\sigma^2>\frac{9}{8}b^2$. In both cases, $\frac{1}{\sigma^2}\left(-\frac{\xi k}{2}+\frac{\sigma^2\xi k\ln\xi}{(b-p(\xi k-1))^2}\right)$ is bounded from below uniformly in ξ, and thus $\frac{\partial A}{\partial p}$ tends to 2α uniformly in ξ as $\sigma\to\infty$.

Let us now differentiate A with respect to ξ. We have

$$\begin{aligned}\frac{\partial A}{\partial\xi} &= \left(W+\alpha\left(1-\mu\right)b^2\right)\frac{1}{\sqrt{2\pi}\sigma^3}\left(\frac{b-p\left(k\xi-1\right)}{2}+\frac{\sigma^2\ln\xi}{b-p\left(k\xi-1\right)}\right)\\ &\quad\times\exp\left(-\frac{\left(\frac{b-p(k\xi-1)}{2}+\frac{\sigma^2\ln\xi}{b-p(k\xi-1)}\right)^2}{2\sigma^2}\right)\frac{d\left(\frac{b-p(k\xi-1)}{2}+\frac{\sigma^2\ln\xi}{b-p(k\xi-1)}\right)}{d\xi}. \qquad \text{(B-14)}\end{aligned}$$

The last expression is positive for σ large enough (again uniformly in ξ). Thus:

$$\frac{d\left(\frac{b-p(k\xi-1)}{2}+\frac{\sigma^2\ln\xi}{b-p(k\xi-1)}\right)}{d\xi}=-\frac{pk}{2}+\sigma^2\left(\frac{1}{\xi\left(b-p\left(k\xi-1\right)\right)}+\frac{pk\ln\xi}{\left(b-p\left(k\xi-1\right)\right)^2}\right). \qquad \text{(B-15)}$$

If $\xi>e$, (B-15) is greater than $-\frac{pk}{2}+\sigma^2\frac{4pk}{9b^2}>0$ (for $\sigma^2>\frac{9}{8}b^2$). If $\xi\in[1,e]$, then (B-15) is at least as large as $-\frac{pk}{2}+\sigma^2\frac{3}{2be}>0$ for large σ (because $p\to 0$ uniformly). Finally, if $\xi<1$, notice that $pk\left|\ln\xi\right|=pk\xi\frac{\left|\ln\xi\right|}{\xi}\leq\frac{pk\xi}{e}<\frac{p}{e}+\frac{b}{2}$, since we established earlier that $p\left(k\xi-1\right)\to 0$ uniformly in σ; this implies that for σ large the right-hand side of (B-15) is positive for large σ for all values of ξ.

The sign of $\frac{\partial A}{\partial\xi}$, therefore, depends on the sign of $\frac{b-p(k\xi-1)}{2}+\frac{\sigma^2\ln\xi}{b-p(k\xi-1)}$. Note that $\frac{b-p(k\xi-1)}{2}=\frac{r-m}{2}>0$, and thus if $\xi\geq 1$ (i.e., $h\leq 1$), then it is strictly positive. Moreover, as $\xi\to 0$, it tends to $-\infty$, i.e., becomes negative for ξ sufficiently close to 0. For $\xi<1$, we need to study how it varies with ξ, keeping in mind that p is a function of ξ. Let us prove that $\frac{\partial A}{\partial\xi}=0$ at exactly one point. Clearly, $\frac{\partial A}{\partial\xi}=0$ can only be true if $\frac{b-p(k\xi-1)}{2}+\frac{\sigma^2\ln\xi}{b-p(k\xi-1)}=0$, and on the other hand, it implies $\frac{dp}{d\xi}=0$. Differentiating with respect to ξ, we get

$$\begin{aligned}\frac{d}{d\xi}\left(\frac{b-p\left(\xi\right)\left(k\xi-1\right)}{2}+\frac{\sigma^2\ln\xi}{b-p\left(\xi\right)\left(k\xi-1\right)}\right) &= -\frac{pk}{2}+\sigma^2\left(\frac{1}{\xi\left(b-p\left(k\xi-1\right)\right)}+\frac{pk\ln\xi}{\left(b-p\left(k\xi-1\right)\right)^2}\right)\\ &\quad+\left(\frac{-k\xi}{2}+\frac{\sigma^2 k\xi\ln\xi}{\left(b-p\left(k\xi-1\right)\right)^2}\right)\frac{dp}{d\xi}\\ &= -\frac{pk}{2}+\sigma^2\left(\frac{1}{\xi\left(b-p\left(k\xi-1\right)\right)}+\frac{pk\ln\xi}{\left(b-p\left(k\xi-1\right)\right)^2}\right).\end{aligned}$$

If now suffices to prove that it is necessarily positive whenever $\frac{\partial A}{\partial\xi}=0$ (this would imply that $\frac{\partial A}{\partial\xi}=0$ may hold at just one ξ, because $\frac{b-p(k\xi-1)}{2}+\frac{\sigma^2\ln\xi}{b-p(k\xi-1)}$ then can change it sign only from negative to positive). But we already established that this is true for σ large enough and for all ξ. This shows that $\frac{\partial A}{\partial\xi}<0$ for $\xi<\xi^*$ and $\frac{\partial A}{\partial\xi}>0$ for $\xi>\xi^*$, where $\xi^*<1$. Since

$$\frac{dp}{d\xi}=-\frac{\partial A/\partial\xi}{\partial A/\partial p},$$

this implies that $\frac{dp}{d\xi} > 0$ if and only if $\xi > \xi^*$, which is equivalent to $\frac{dp}{dh} > 0$ if and only if $h < h^* = \frac{1}{\xi^*} > 1$. This proves that $\frac{dp}{d\nu} > 0$ if and only if $\nu < \nu^*$, where $\nu^* = \frac{h^*\mu}{1-\mu+h^*\mu} > \mu$.

The proof that $q = |r - b|$ is increasing in ν for $\nu < \nu^{**}$ and increasing in ν for $\nu > \nu^{**}$, where $\nu^{**} < \mu$, is similar and is omitted. ■