



On the optimality of policy choices in the face of biased beliefs, retrospective voting and the down-up problem

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Abstract

Previous literature has shown that voters' biased beliefs regarding policy outcomes incentivize the selection of seemingly better, but socially worse, policies. It has also shown that voters' tendency to gauge an incumbent's competence by the present state of the economy (retrospective voting) could counteract biased beliefs. In this article, we argue that, when the advantageous consequences of a measure of policy only accrue with considerable lag (the down-up problem), retrospective voting instead amplifies the effects of biased beliefs. Still, we find that it may nevertheless be optimal for an incumbent to select good long-term policies if the incumbent is strongly motivated by the success of the chosen policies. Finally, we investigate the robustness of these conclusions by considering an incumbent bias, limited accountability, and the introduction of incentive and threshold contracts.

1 Introduction

A crucial question in any democracy is whether its institutional framework and incentive schemes lead political agents to choose policies that foster voters' welfare (Buchanan 1989; Besley 2004; Gersbach 2012; Besley et al. 2016). Any plausible answer to this question must consider the motivations, limitations and behavioral patterns of both voters and political agents.

As everyday experience and, evermore, systematic evidence show, human beings are far from omniscient agents of unlimited computational capacity. Instead, their cognition and behavior are adjusted to the epistemic and practical circumstances of everyday, social life (Ross 2007). This means that their action is often based on incom-

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plete and sometimes misleading information, processed with all sorts of inferential shortcuts that enable decision-making *in loco* and real-time. An upshot of this is that humans are also prone to systematic error and bias. Voters, of course, are no different, as evidence from psychology (Redlawsk 2006; Richard and Redlawsk 2006), political science (Althaus 1998; Bergmann 2018) or economics (Caplan 2002, 2007) growingly shows.

Models that wish to begin to capture the variegated tapestry of real voters' behavior must go beyond the consistency criteria that would define an abstract notion of 'rationality' or of 'rational voter'. Indeed, in a well-known work, Caplan (2007) calls the rational voter "a myth", and there is a growing concern with accounting for behavioral and cognitive biases in political choice (Bischoff and Siemers 2013; Diermeier and Li 2017; Apolte and Müller 2022).

A well-studied departure from the ideal voter is the voter with biased beliefs. Frankovic (2016, 2018), for instance, shows that the public often holds inaccurate beliefs, particularly when they align with prior political preferences. Lee et al. (2021), on the other hand, offer evidence to the effect that government officials "have more accurate factual beliefs" (p. 1326) than voters. One of the consequences of biases in voters' beliefs is an increased likelihood that a policy with good outcomes for voters is, nevertheless, unpopular, or vice-versa. This has been studied by many (for a survey see Benczes and Szabó 2022). Bischoff and Siemers (2013), in particular, develop a dynamic party competition model that, besides biased beliefs, also takes into account another important regularity in voters' behavior: their propensity to vote retrospectively, i.e., to assess the competence of a political agent based on their estimates of the state of the economy.¹

One of the conclusions of Bischoff and Siemers (2013) is that political agents face a trade-off. A bad yet popular policy bolsters election outcomes today, but its nefarious later consequences harm election outcomes tomorrow. The authors find that, in the most empirically plausible settings, policies will form "a mediocre mix of either good yet unpopular or popular though bad policies" (Bischoff and Siemers 2013, p.164), a conclusion with strong echoes in the literature (Dornbusch and Edwards 1990; Rovira Kaltwasser 2009; Acemoglu et al. 2013; Mudde and Rovira Kaltwasser 2017, 2018; Benczes and Szabó 2022). Crucially, however, they also show that retrospective voting counteracts the potentially deleterious effects of biased voting and thus could foster the selection of socially better policies.

In this article, we study policy choices whose effects are felt with a lag that is significant with respect to the electoral cycle. In structural or supply side policies such a long lag is especially likely. Here, the "self-correction mechanism" provided by retrospective voting in Bischoff and Siemers (2013) is unavailable. In fact, retrospective voting should instead amplify the effect of biased beliefs, further incentivizing political agents to choose a bad policy.

Indeed, policies improving overall welfare sometimes have a negative short and medium-term effect on both the economy and welfare, as their advantages and benefits only accrue or become evident to voters much later on. This phenomenon may be called

¹ On retrospective voting, see Fair (1996); Lewis-Beck (1986); Duch and Stevenson (2006); Manacorda et al. (2011); Bechtel and Hainmueller (2011)

the down-up problem. Policies to fight climate change, population ageing, or mounting public debt offer examples. The down-up problem often results in policy myopia or short-termism, as political agents favor their own short-term goals over long-term welfare (Rogoff 1990; MacKenzie 2016; Boston 2017).

In this paper, we extend the model of Bischoff and Siemers (2013) to accommodate the down-up problem. It is introduced by assuming, in contrast with Bischoff and Siemers (2013), that important consequences of a measure of policy are lagged to such a degree that they are only evident in the subsequent electoral term, as in the works of Gersbach (2003, 2004) and Müller (2007). As in the latter contribution, our strategy hinges on considering the complex motivations of political agents. We assume that they care not only about (re)election, but also about the results of their policies (Adams et al. 2005; Shieh and Pan 2010).

As for biased beliefs and retrospective voting, we follow Bischoff and Siemers (2013), incorporating the former through voters' estimates of the goodness of a measure of policy, and the latter through their assessment of a political agent's competence upon observation of the state of the economy.

Like Bischoff and Siemers (2013), we deduce that policy choices in equilibrium could range from socially optimal to socially pernicious. We therefore show that these authors' conclusion that the incumbent may choose a good long term policy-mix when voters have biased beliefs is robust to the introduction of the down-up problem. However, we also further elucidate what it takes for this to happen in the face of this problem. We show that two conditions are necessary and jointly sufficient: the incumbent must not worry only about reelection *and* must set enough store by the success of the chosen policies.

We believe this result to be insightful and non-trivial. If Bischoff and Siemers (2013) conclude that retrospective voting corrects inefficiencies brought by biased beliefs, making the selection of good policies a possible outcome, we show that when down-up issues are considered, such an outcome only results if the political agent is motivated to undertake socially good policies.

We also extend our baseline model by considering three extensions, the first two adapted from Bischoff and Siemers (2013). First, we introduce an incumbent bias to capture the empirical fact that an elected politician has greater chances of reelection (Alesina and Rosenthal 1995). Second, we investigate limited accountability, capturing the fact that a political agent does not fully control the outcome of a measure of policy (Kiewiet 2000; Leigh 2009; Duch and Stevenson 2010). Third, we address incentive and threshold contracts seeking to motivate political agents to choose socially desirable policies (as developed by Gersbach (2003, 2004); Gersbach and Liessem (2008); Müller (2007), surveyed in Gersbach (2012) and further extended in Gersbach (2017); Gersbach and Ponta (2017); Britz et al. (2022)).

These extensions offer the following main conclusions: (i) an incumbent bias leads the incumbent to choose better policies; (ii) limited accountability can increase the quality of the policies chosen, and, finally, (iii) threshold and incentive contracts can also increase the quality of the policies chosen, but there are circumstances in which the opposite is true.

This article is organized as follows. In Sect. 2, we discuss the assumptions and workings of the model. Its equilibrium is characterized in Sect. 3. The extensions to the baseline model are treated in Sect. 4. Section 5 discusses the results and concludes.

2 Framework

2.1 Point of departure: Bischoff and Siemers (2013)'s model

Our model builds on that of Bischoff and Siemers (2013). Here, there is a continuum $i \in [0, 1]$ of voters and two competing parties that run for term t on their respective policy platforms. There is no abstention, and the elected party implements the promised platform, η_t ,² which determines the macroeconomic performance (a_t), voter i 's income (y_{it}) and utility at t :

$$U_{it} = U_{it}(a_{it}(\eta_t), y_{it}(\eta_t)) \equiv U_{it}(\eta_t) \quad (1)$$

Before implementation, however, the voter can but estimate the effect a policy platform would have on her utility:

$$\hat{U}_{it} \equiv \hat{U}_{it}(\eta_t) \quad (2)$$

Policy platforms can be good (η_g), bad (η_b) or any linear combination of the two ($0 \leq \beta \leq 1$ denoting the weight of the bad policy). To capture biased beliefs, Bischoff and Siemers (2013) assume that a majority of voters incorrectly estimates that $\hat{U}_{it}(\eta_b) > \hat{U}_{it}(\eta_g)$, i.e., that the bad policy is best for them, while, in fact $U_{it}(\eta_g) > U_{it}(\eta_b)$ holds.

Besides \hat{U}_{it} , in Bischoff and Siemers (2013)'s model voter i 's behavior also hinges on her perception of candidates' competence, or *valence* (γ). This perception results from her comparison of the economy's performance in $t - 1$ ($a_{t-1}(\eta_{t-1})$) with a subjective benchmark (\bar{a}_i). A better (worse) than expected performance is associated with a higher (lower) valence for the party in power in the previous period, the incumbent (I): $\gamma_{it}^I(\eta_{t-1}) > (<) 0$. The opposition party (O) has a valence of zero: $\gamma_{it}^O = 0$. Both parties are assumed to be, in fact, equally competent.

Voting behaviour is probabilistic. The probability of i 's voting for party $j \in \{I, O\}$, π_{it}^j , depends on the difference in the estimated utilities of the running platforms, corrected by differences in perceived valence. As these two components are assumed to be additively separable, the expected vote share for each party is given by:

$$\Pi_t^j \left(\hat{U}_{it}^j(\eta_t^j), \hat{U}_{it}^{-j}(\eta_t^{-j}), \gamma_{it}^j, \gamma_{it}^{-j} \right) = \int_{i=0}^1 \pi_{it}^j di = \Lambda_t^j \left(\eta_t^j, \eta_t^{-j} \right) + V_t^j \left(\gamma_{it}^j, \gamma_{it}^{-j} \right) \quad (3)$$

² A list of all notation is presented in Appendix C.

where Λ_t^j and V_t^j are the policy-related and the valence-related vote shares of party j , respectively. The policy-related share is further defined by (see Bischoff and Siemers 2013, pp.171–172):

$$\Lambda_t^j(\eta_t^j, \eta_t^{-j}) = \frac{1}{2} + (\beta_t^j - \beta_t^{-j}) \cdot f \tag{4}$$

where $f > 0$ accounts for the effects of biased beliefs. As for the valence-related share, it is given by³

$$V_t^I(\eta_{t-1}^I) = \beta_{t-1}^I \cdot (-v) + (1 - \beta_{t-1}^I) \cdot v = (1 - 2\beta_{t-1}^I) \cdot v \tag{5}$$

$$V_t^O(\eta_{t-1}^O) \equiv -V_t^I(\eta_{t-1}^I) \tag{6}$$

Competing parties are assumed to be perfectly informed office-seekers and to behave non-cooperatively with a horizon of two periods. They select their running platform by considering its impact on election probability today and discounted valence tomorrow, i.e., the platform that maximizes:

$$\Theta_t^j = \Pi_t^j(\hat{U}_{it}^j, \hat{U}_{it}^{-j}, \gamma_{it}^j, \gamma_{it}^{-j}) + \delta E(V_{t+1}^j) \tag{7}$$

where $\delta \in (0, 1]$ is the discount factor that captures the time preference of both politicians and voters.

In this setup, the parties face a clear trade-off: running on a worse policy for term t may bolster the odds of an election victory, but its implementation will damage voters’ perceptions of the party in the future. In other words, retrospective voting may alleviate the effect of biased beliefs and promote the selection of better policy platforms.

2.2 Modeling the down-up problem

In Bischoff and Siemers (2013)’s model, as just summarily described, the effect of a policy platform on voters’ utility is exhausted during the term of its implementation t . Its only subsequent impact is on the parties’ valence in the election for term $t + 1$. However, there are policies that are painful (agreeable) to voters when first implemented, and whose overall beneficial (harmful) effects are not immediately obvious, but only felt after the election for a subsequent term (the down-up problem). Such policies are often necessary to address major issues, such as climate change, population ageing, mounting public debt, and others.⁴

To study the down-up problem, we modify Bischoff and Siemers (2013)’s model in several ways. Instead of two parties running for term t , we assume that an already elected incumbent, unconstrained by electoral promises, chooses and implements a

³ To ensure that the probabilities remain between 0 and 1, Bischoff and Siemers (2013) assumed that $\frac{1}{2} + f + v \leq 1$. We adopt the same condition throughout.

⁴ Ever more studies examine alternative political and institutional frameworks that facilitate or hinder governance and policy with a long-term perspective (Jacobs 2016; Boston 2017; Bernauer 2013; González-Ricoy and Gosseries 2016; Jacobs 2011; Jacques 2021; Lindvall 2017; Morel et al. 2011)

policy-platform for term t that affects voters in both t and $t + 1$. The opposition runs for term $t + 1$.⁵ The election for term $t + 1$ now takes place at the end of term t , when the future effects of the implemented policy are yet unperceived by voters.

Voter i 's real utilities at t therefore now depend on both η_t and η_{t-1} :

$$U_{it} \equiv U_{it}(\eta_t, \eta_{t-1}) \quad (8)$$

The down-up problem itself is captured by imposing, for all voters, that the bad policy produces better results immediately, at t , $U_{it}(\eta_{gt}, \eta_{t-1}) < U_{it}(\eta_{bt}, \eta_{t-1})$, but that the good policy is, indeed, better overall:

$$U_{it}(\eta_{gt}, \eta_{t-1}) + \delta U_{it+1}(\eta_{t+1}, \eta_{gt}) > U_{it}(\eta_{bt}, \eta_{t-1}) + \delta U_{it+1}(\eta_{t+1}, \eta_{bt}) \quad (9)$$

Biased beliefs impose, however, that voters at t fail to appreciate that the good policy is better overall.⁶

If, due to the down up problem, a bad policy has a better outcome during the term of its implementation, unlike Bischoff and Siemers (2013)'s model, then it should yield positive valence ($v > 0$) to the incumbent in the election for the subsequent term. In other words,⁷

$$V_t^I(\eta_t^I) = \beta_t^I \cdot v + (1 - \beta_t^I) \cdot (-v) = v \cdot (2\beta_t^I - 1) \quad (10)$$

As in Bischoff and Siemers (2013), the opposition enjoys the symmetrical valence.

Clearly, retrospective voting no longer counteracts biased beliefs in promoting the selection of a better policy. Under these assumptions, a pure office-seeker incumbent would (trivially) never implement a better policy. However, besides office-seeking, parties and politicians may be directly motivated by the effects of the policies they implement (Evans 2018).⁸ Accordingly, we generalize candidates' objective functions to accommodate both motivations. We take a leaf from Müller (2007), who assumes that the political agent is concerned with the social impact of the chosen policies,

⁵ As we show in appendix B, the mechanisms guiding policy choices would be similar if we explicitly modeled the election leading to term t . This suggests that our results are robust. The argument becomes, however, involved, sacrificing ease of exposition for little insight. We also assume that voters do not punish the incumbent for violations of electoral promises. In an extension of the baseline model, available upon request, we show that accounting for such penalizations would incentivize the choice of policies better aligned with promises, but the mechanisms guiding such choices would remain the same, suggesting, again, that our results are robust. Evidence also indicates that trustworthiness is less relevant to voters than attention to public opinion or the pursuit of common interests (Werner 2019) and that not all promises are perceived as election pledges (Dupont et al. 2019).

⁶ As in Bischoff and Siemers (2013), biased beliefs make it so that the implementation of the bad policy marginally increases election probability, as measured by f .

⁷ We assume that valence only depends on the policy implemented in the period and that previous policies are disregarded. This dovetails the evidence of voters' short-sightedness (Urminsky and Zauberman (2015); Weaver (1986); Jacobs and Matthews (2012, 2017); MacKenzie (2016)).

⁸ Baudewyns and Camatarrì (2020)'s empirical findings suggest that candidates' decision to run is not solely linked to either policy or office-seeking motives. On the compatibility of the two, see Warwick (2005); Linhart (2013); Wagner and Meyer (2014). The two motives could be further subdivided (Fox and Lawless 2005; Rohde 1979; Fowler and McClure 1989; Maestas et al. 2006).

but only while holding office. That impact can offer a private gain in addition to the satisfaction and advantages of holding office.

We introduce both motivations in an additively separable way. The office-seeking motivation is captured by a lump-sum value $Z > 0$. The policy-seeking motivation is captured with a function similar to a voter’s utility: $W_t^j \equiv W_t^j(\eta_t, \eta_{t-1})$. Thus, it will also be true that $W_t^j(\eta_{gt}, \eta_{t-1}) < W_t^j(\eta_{bt}, \eta_{t-1})$ and

$$W_t^j(\eta_{gt}, \eta_{t-1}) + \delta W_{t+1}^j(\eta_{t+1}, \eta_{gt}) > W_t^j(\eta_{bt}, \eta_{t-1}) + \delta W_{t+1}^j(\eta_{t+1}, \eta_{bt}). \tag{11}$$

The incumbent is perfectly informed and chooses the policy platform at t that maximises:

$$\Theta_t^I(\eta_t) = (1 - m) Z + m W_t^I(\eta_t, \eta_{t-1}) + \delta \Pi_t^I \left[(1 - m) Z + m W_{t+1}^I(\eta_{t+1}, \eta_t) \right] \tag{12}$$

The parameter $0 \leq m \leq 1$ measures the motivational weight of implementing good policies. In other words, a high m indicates more of a “policy success-seeker”, while a low m more of an “office-seeker”.

Regarding the, also perfectly informed, opposition, it runs against the incumbent for term $t + 1$. Since, as in Bischoff and Siemers (2013), the incumbent and the opposition behave non-cooperatively, they both run on the bad platform in the election for period $t + 1$. This is less obvious in our setup than in Bischoff and Siemers (2013), since in their model political agents are pure office seekers, while now they have two sources of motivation. However, as with voters, a bad policy yields a higher policy payoff in the term of implementation, while any effects after term $t + 1$ are outside the horizon of the game. We may thus focus on the incumbent’s policy choice in term t . In other words, we can consider $W_t^I(\eta_t, \eta_{t-1}) \equiv W_t^I(\eta_t)$ and $W_{t+1}^I(\eta_{t+1}, \eta_t) \equiv W_{t+1}^I(\eta_t)$ from the point of view of the incumbents’ strategic choice.

3 Political equilibrium

To deduce the political equilibrium, for simplicity and without loss of generality, we normalize the utility of the good policy in term t and the utility of the bad policy in $t + 1$ to zero, that is, $W_t^I(\eta_{gt}) = 0$ and $W_{t+1}^I(\eta_{bt}) = 0$. As a result, given (11), we have $\delta W_{t+1}^I(\eta_{gt}) > W_t^I(\eta_{bt})$. We also recall that, as in Bischoff and Siemers (2013), we assume that the policy platform chosen by the incumbent can be purely good, η_g , purely bad, η_b , or any linear combination of the two ($0 \leq \beta \leq 1$ denoting the weight of the bad policy).

The incumbent’s payoff, as given by (12), can therefore be expressed as:

$$\Theta_t^I(\beta_t) = (1 - m) Z + m \beta_t W_t^I(\eta_{bt}) + \delta Q \left[(1 - m) Z + m (1 - \beta_t) W_{t+1}^I(\eta_{gt}) \right] \tag{13}$$

where $Q = \frac{1}{2} + (f + v)(2\beta_t - 1)$ is the probability of reelection. It reflects the fact that, in the face of the down-up problem, the choice of a bad policy not only bolsters the probability of reelection through the effect of biased beliefs, as measured by f ,

but also, unlike Bischoff and Siemers (2013)'s model, through its impact on valence, as measured by v .

For ease of exposition, we define:

- Q^{max} to denote the maximum reelection probability, given by $(\frac{1}{2} + f + v)$ and obtained when the purely bad policy is chosen ($\beta_t = 1$).
- Q^{min} to denote the minimum reelection probability, given by $(\frac{1}{2} - f - v)$ and obtained when the purely good policy is chosen ($\beta_t = 0$).
- Q'_β to denote the marginal impact on the reelection probability of worsening the policy platform ($\frac{\partial Q}{\partial \beta}$), given by $2(f + v)$.

Proposition 1 *Given the definitions of Q^{max} , Q^{min} and Q'_β :*

- (a) $\beta_t = 0$ if $\delta m W_{t+1}^I(\eta_{gt}) (Q^{min} - Q'_\beta) \geq m W_t^I(\eta_{bt}) + \delta(1 - m) Z Q'_\beta$.
- (b) $\beta_t = 1$ if $\delta m W_{t+1}^I(\eta_{gt}) Q^{max} \leq m W_t^I(\eta_{bt}) + \delta(1 - m) Z Q'_\beta$.
- (c) $\beta_t \in (0, 1)$ if $\frac{m W_t^I(\eta_{bt}) + \delta(1 - m) Z Q'_\beta}{Q^{max}} < \delta m W_{t+1}^I(\eta_{gt})$
 $< \frac{m W_t^I(\eta_{bt}) + \delta(1 - m) Z Q'_\beta}{(Q^{min} - Q'_\beta)}$.

Proof See Appendix A. □

Proposition 1 identifies conditions that are sufficient to ensure that the incumbent chooses the purely good policy (case a), the purely bad policy (case b), or a mixture (case c). As in Bischoff and Siemers (2013), all three are, therefore, possible, so this result is robust. In their original model, however, the trade-off driving the results was between bolstering the odds of election today versus those of election tomorrow, as retrospective voting penalized more popular, but worse, policies. In the model revised to account for the down-up problem, retrospective voting instead further incentivizes the selection of worse policies. The key trade-off is now between the reelection probability and a lower incumbent satisfaction with the policy choice.

In the interpretation of Proposition 1, a crucial magnitude is given by:

$$m W_t^I(\eta_{bt}) + \delta(1 - m) Z Q'_\beta \tag{14}$$

It is the sum of the incumbent's satisfaction with a bad policy in the term of its implementation ($m W_t^I(\eta_{bt})$) and the marginal future electoral benefits that choosing a worse policy today would bring ($\delta(1 - m) Z Q'_\beta$). Even though the worsening of the implemented policy platform has a constant marginal impact on the reelection probability, the expected benefit is higher, the higher the reelection probability.

A purely good policy is chosen (case a), if the present value of the future satisfaction derived from choosing the good policy ($\delta m W_{t+1}^I(\eta_{gt})$), weighed by the loss in reelection probability from not implementing any bit of the bad policy platform, is high enough to compensate (14). In other words, the purely good policy is chosen, *ceteris paribus*, if the incumbent values the effect of its policies high enough.

In the other extreme, if it values it so little that even with the highest odds of reelection ($\delta m Q^{max} W_{t+1}^I(\eta_{gt})$) does not compensate (14), then the purely bad policy is chosen (case b).

The effects of biased beliefs and retrospective voting, measured by f and v , are also key. If $Q^{min} \leq Q'_\beta$, then $3(f + v) \geq \frac{1}{2}$, and only case (b) is possible. Also noteworthy is whether the incumbent is more or less of an office-seeker. The lower the m , the higher the β_t . In other words, the more a political agent seeks the perks of being in office, the higher the fraction of the bad policy implemented. Indeed, if $m = 0$ the purely bad platform is always implemented (case b). This case is a simple extension of Bischoff and Siemers (2013)'s model to a context characterised by the down-up problem. In the face of this problem, valence does not counteract the effect of biased beliefs, so a pure office-seeker ($m = 0$) always selects the bad platform, which motivates our considering policy-seeking politicians too.

4 Extensions of the baseline model

We now offer three extensions of the baseline model. First, we introduce an incumbent bias, to capture the regularity that incumbents tend to enjoy higher odds of reelection. Second, we introduce limited accountability to capture the fact that policy outcomes are not all within the control of the political agent. Finally, we assess the impact of threshold and incentive contracts on the behaviour of the incumbent.

4.1 Incumbent bias

Incumbent bias refers to the often observed tendency of officeholders to benefit from an electoral advantage over challengers. Many reasons have been adduced to explain the bias. Incumbents benefit from greater resources, established networks, access to voters, name recognition, and others (Fouirnaies and Hall 2014; Meirowitz 2008; Carson et al. 2007; Hirano and Snyder 2009; Gordon and D., L. 2009; Hall and Snyder 2015).

As in Bischoff and Siemers (2013), an incumbent bias may be captured by introducing a parameter $\rho^{Inc} > 0$ into the reelection probability. The incumbent assesses the impact of the bias in favour of reelection. The payoff function for the incumbent then reads:

$$\Theta_t^I(\beta_t) = (1 - m) Z + m \beta_t W_t^I(\eta_{bt}) + \delta \left(Q + \rho^{Inc} \right) \left[(1 - m) Z + m (1 - \beta_t) W_{t+1}^I(\eta_{gt}) \right] \quad (15)$$

Proposition 2 *In equilibrium, the higher the incumbent bias, the better the chosen policy platform: $\frac{\partial \beta_t}{\partial \rho^{Inc}} < 0$.*

Proof See Appendix A. □

An incumbent bias allows the incumbent to select a better policy while enjoying a higher reelection probability than would be the case absent the bias. The incumbent

can benefit from the good policy results in the second period without having to build as much valence through the selection of a worse policy platform. This is an important result, as this advantage allows the incumbent to undertake better policies without as much regard for immediate results.

As in Bischoff and Siemers (2013), the bias counteracts the effect of retrospective voting. In that model, retrospective voting incentivizes the selection of better policies. If the incumbent enjoys a positive bias, there is less need to choose a better policy to build valence. By contrast, if the down-up problem is at issue, retrospective voting incentivizes the selection of a worse policy platform. Symmetrically, an incumbent bias now fosters the selection of a better policy platform.

4.2 Limited accountability

The outcomes of any policy always partly transcend the political agent that is behind it. Among other possibilities, they often depend on the policies of other actors. This is not, however, always obvious to voters. Consequently, an incumbent may be punished or rewarded independently of the responsibility for a policy outcome. This affects both the incumbent's valence and the policy payoff. As in Bischoff and Siemers (2013), we extend our model to capture this by letting both magnitudes depend not only on β_t , as before, but also on a nondeterministic $0 < \beta_t^{ex} < 1$, which might be interpreted as the, not always predictable, strategy of other, exogenous actors. The fraction of the outcome the incumbent knows to control is captured by the coefficient k ($0 < k < 1$). They further depend on exogenous stochastic shocks, ε .

The incumbent's valence now becomes:

$$\begin{aligned} V_t^I(\beta_t, \beta_t^{ex}) &= k[\beta_t \cdot v + (1 - \beta_t)(-v)] + (1 - k)[\beta_t^{ex} \cdot v + (1 - \beta_t^{ex})(-v)] + \varepsilon \\ &= v[k(2\beta_t - 1) + (1 - k)(2\beta_t^{ex} - 1)] + \varepsilon \end{aligned} \quad (16)$$

The incumbent forms an expectation as to the value of the nondeterministic variables, β_t^{ex} and ε , with $0 < E(\beta_t^{ex}) < 1$ and $E(\varepsilon) = 0$, respectively. The (expected) payoff at t then reads:

$$\begin{aligned} \Theta_t^I(\beta_t) &= (1 - m)Z + mW_t^I(\eta_{bt})[k\beta_t + (1 - k)E(\beta_t^{ex})] + \delta Q_l \\ &\quad \cdot \left\{ (1 - m)Z + mW_{t+1}^I(\eta_{gt})[k(1 - \beta_t) + (1 - k)(1 - E(\beta_t^{ex}))] \right\} \end{aligned} \quad (17)$$

In this new setup, the probability of reelection, now denoted by Q_l to emphasize the existence of limited accountability, is given by $Q_l = \frac{1}{2} + (f + kv)(2\beta_t - 1) + (1 - k)v(2E(\beta_t^{ex}) - 1)$.⁹ The marginal impact on the reelection probability of worsening the policy platform ($\frac{\partial Q_l}{\partial \beta}$) is now $Q'_{\beta l} = 2(f + kv)$, while the minimum reelection probability, Q_l^{min} , changes to $\frac{1}{2} - f - kv + (1 - k)v(2E(\beta_t^{ex}) - 1)$.

⁹ Recall that $1/2 + f + v \leq 1$, ensuring $0 \leq Q_l \leq 1$.

Proposition 3 *Suppose the incumbent faces limited accountability. Given the definitions of Q_l^{min} and $Q'_{\beta l}$:*

- If $E(\beta_t^{ex})$ increases, i.e., if the incumbent expects a worse strategy by exogenous actors, the incumbent’s policy platform becomes better. In other words, $\frac{\partial \beta_t}{\partial E(\beta_t^{ex})} < 0$.
- If the fraction of control, i.e., k , increases, all outcomes are possible:

- (a) The policy platform becomes better, i.e., $\frac{\partial \beta_t}{\partial k} < 0$, if: $\frac{v W_t^I(\eta_{bt})}{\delta Q_{\beta l}^{\prime 2} W_{t+1}^I(\eta_{gt})} + \frac{(1 - m) Z}{2mk^2 W_{t+1}^I(\eta_{gt})} + \frac{1}{2k^2} > v \frac{Q_l^{min}}{Q_{\beta l}^{\prime 2}} + E(\beta_t^{ex}) \left[\frac{Q'_{\beta l} + 2k^2 v}{2k^2 Q'_{\beta l}} \right]$;
- (b) The policy platform becomes worse, i.e., $\frac{\partial \beta_t}{\partial k} \geq 0$, if: $\frac{v W_t^I(\eta_{bt})}{\delta Q_{\beta l}^{\prime 2} W_{t+1}^I(\eta_{gt})} + \frac{(1 - m) Z}{2mk^2 W_{t+1}^I(\eta_{gt})} + \frac{1}{2k^2} < v \frac{Q_l^{min}}{Q_{\beta l}^{\prime 2}} + E(\beta_t^{ex}) \left[\frac{Q'_{\beta l} + 2k^2 v}{2k^2 Q'_{\beta l}} \right]$;
- (c) The policy platform remains the same, i.e., $\frac{\partial \beta_t}{\partial k} = 0$, if: $\frac{v W_t^I(\eta_{bt})}{\delta Q_{\beta l}^{\prime 2} W_{t+1}^I(\eta_{gt})} + \frac{(1 - m) Z}{2mk^2 W_{t+1}^I(\eta_{gt})} + \frac{1}{2k^2} = v \frac{Q_l^{min}}{Q_{\beta l}^{\prime 2}} + E(\beta_t^{ex}) \left[\frac{Q'_{\beta l} + 2k^2 v}{2k^2 Q'_{\beta l}} \right]$;

Proof See Appendix A. □

According to Proposition 3, when the strategy of exogenous actors bolsters the incumbent’s valence, the latter chooses a better policy platform, as valence becomes a (marginally) lesser concern. A higher payoff in the second period is consequently achievable through the selection of a better policy. This is similar to Bischoff and Siemers (2013).

As for the fraction of control, k , Proposition 3 establishes that its effect on the quality of the policy platform can go either way. This contrasts with Bischoff and Siemers (2013), where an increase in the fraction of control unequivocally increases the quality of the policy platform. In their model, when the incumbent enjoys greater control, both parties are motivated to increase valence, i.e., to improve their policy platforms. In ours, on the other hand, due to the down-up problem, the desire to increase valence leads to the symmetrical result. Hence, Proposition 3 predicts that an increase in the fraction of control may lead to worse policy platforms instead (case b).

This said, the improvement predicted by Bischoff and Siemers (2013) is also possible (case a). It hinges on the relative magnitude of the benefit of holding office (Z), the payoff at t of the bad policy ($W_t^I(\eta_{bt})$), and the payoff at $t + 1$ of the good policy ($W_{t+1}^I(\eta_{gt})$). When the incumbent enjoys greater control over policy outcomes, a relatively lower payoff of the good policy at $t + 1$ incentivizes the choice of a better policy platform to compensate. This rationale is different than what drives the results in Bischoff and Siemers (2013), since in their model political agents are pure office

seekers. Finally, the fraction of control may be irrelevant (case c) when cases (a) and (b) balance out.

4.3 Incentive and threshold contracts

A proposal to address the down-up problem is the adoption of incentive contracts (Gersbach 2003, 2004; Müller 2007). Incentive contracts make the utility of political agents dependent on the outcomes they can influence (Gersbach 2012). This can be achieved through a reward of a monetary or intangible nature. The reward would be granted during or after the term ends, conditional on the outcome of the policies implemented while in office. For instance, there are scholars supporting linking the pay of members of congress to the growth in real domestic product (McPike 2011).

An alternative to incentive contracts are threshold contracts, suggested by Liessem (2008); Gersbach and Liessem (2008). These contracts identify “a performance level that a politician must reach by the end of a term to obtain the right to stand for reelection” (Gersbach 2012, p.824). The performance level could be defined by candidates during the campaign or set by an external authority, such as a court.¹⁰

Extant examples of measures similar to incentive or threshold contracts often address budget issues. The No Budget, No Pay Law in the U.S. (Public Law No: 113–3, 2013) suspends the debt ceiling and penalizes Congress members for not passing budget bills on time. New York has a similar law (N.Y. LEGIS. LAW §5), and California’s Proposition 1F (CAL. CONST. art. III, §8, amended 2009) prohibits pay raises for state officials in deficit years. In Italy, mayors face sanctions for overspending (Grembi et al. 2016).

Devising either kind of contract faces challenges. First, the tasks and challenges of officeholders are not determined in advance. Second, it is difficult to objectively assess the outcomes of their actions. Third, enforcement is problematic (Gersbach 2017; Britz et al. 2022).

To study incentive contracts in our model, we take a leaf from Müller (2007). In his model, a political agent seeking reelection must make future income dependent on the results of the chosen policies. Adapting to our model, we impose that the incumbent is only allowed to run for reelection after accepting a contract that establishes that the compensation in the second term ($t + 1$) includes a reward that is proportional to the policy payoff in that period¹¹: $\sigma (1 - \beta_t) W_{t+1}^I$, where $0 < \sigma \leq 1$.

As a result, the payoff reads:

$$\begin{aligned} \Theta_t^I(\beta_t) &= (1 - m) Z + m \beta_t W_t^I(\eta_{bt}) \\ &+ \delta Q \left[(1 - m) Z + m (1 + \sigma) (1 - \beta_t) W_{t+1}^I(\eta_{gt}) \right] \end{aligned} \quad (18)$$

These assumptions lead to the following proposition:

¹⁰ These contracts are surveyed in Gersbach (2012) and further discussed in Gersbach (2017) and Britz et al. (2022).

¹¹ The policy payoff depends on η_t , hence on the quality of the chosen platform. Instead of the policy payoff, which is a directly unobservable magnitude, the target could be a level of macroeconomic performance (a_t), which would also depend on η_t and, consequently, on β_t .

Proposition 4 For $0 < \sigma \leq 1$, two outcomes are possible:

- (a) If $0 < m \leq 1$, the higher the σ , that is, the more the future utility depends on the economic performance in the second term, the better the chosen policy platform, i.e., $\frac{\partial \beta_t}{\partial \sigma} < 0$;
- (b) If $m = 0$, then $\frac{\partial \beta_t}{\partial \sigma} = 0$, that is, the incentive contract has no effect on the chosen policy platform.

Proof See Appendix A. □

In face of the down-up problem and retrospective voting, as here modeled, if the incumbent is in some degree concerned with the success of its policies, an incentive contract of the kind considered here fosters better policies, as in Gersbach (2003, 2004). However, without policy motivated incumbents, the incentive contract has no effect on the chosen policy platform. In other words, a purely bad policy platform could still be implemented.

As the reward depends on the economic results of the period, the type of contract just considered is more of a short-term contract. Alternatively, we could devise a longer-term incentive contract, according to which the politician’s reward would be delayed until the next period in office or after retirement (Gersbach 2012). In the first case, the incumbent has a greater incentive to choose the bad policy, as more benefits would accrue at $t + 1$ from applying it at t . In the second case, the reward would not depend on the reelection probability and the contract would indeed offer a greater incentive to choose the good policy. On the other hand, such a contract would face an increased difficulty in the definition of which results are due to the politician in office and which to the retired politician.

To investigate whether threshold contracts fare better, we seek inspiration in Gersbach and Liessem (2008). Here, an incumbent is only eligible for reelection if a contractually set performance level is achieved.

We introduce them into our model by assuming that the incumbent signs a contract according to which the chosen policy platform must have a fraction of the bad policy, β_t , below a prespecified value, that is $\beta_t \leq \bar{\beta}$, which measures a minimum quality of the policy the incumbent must ensure. Otherwise, the incumbent will be barred from standing for reelection.¹²

With these assumptions, we deduce the following proposition:

Proposition 5 Suppose a threshold contract imposing $\beta_t \leq \bar{\beta}$ and let β^* be the optimal choice of β_t if no such contract were in force. Given the definitions of Q'_β and Q^{min} for the baseline model:

- (a) When $\beta^* \leq \bar{\beta}$, $\beta_t = \beta^*$, as defined by conditions (a), (b) and (c) in proposition 1.
- (b) When $\beta^* > \bar{\beta}$

$$(i) \beta_t = \bar{\beta} \text{ if } m(1 - \bar{\beta}) W_t^I(\eta_{bt}) < \delta \left(Q^{min} + \bar{\beta} Q'_\beta \right) \\ \left[(1 - m) Z + m(1 - \bar{\beta}) W_{t+1}^I(\eta_{gt}) \right]$$

¹² The definition of $\bar{\beta}$ would require common knowledge of η_g . We could instead define the threshold as corresponding to observable macro variables. Still, as the macroeconomic performance a_t depends on η_t , it will also be contingent on β_t .

$$(ii) \beta_t = 1 \text{ if } m(1 - \bar{\beta}) W_t^I(\eta_{bt}) \geq \delta \left(Q^{min} + \bar{\beta} Q'_\beta \right) \\ [(1 - m) Z + m(1 - \bar{\beta}) W_{t+1}^I(\eta_{gt})]$$

Proof See Appendix A. □

When the optimal policy choice is not worse than the threshold, the contract is not binding, and the incumbent chooses the same platform as in its absence (case a). When the optimal policy choice is worse than the threshold, the threshold contract is binding and the incumbent faces a dilemma: either to run for reelection and choose $\bar{\beta}$, or forego reelection and ignore what happens in $t + 1$. In this latter case, the incumbent has no incentive to choose any other than the purely bad policy as it is the only one that yields a positive result in period t .

If the payoff from choosing $\bar{\beta}$, which enables running for reelection, is higher than the payoff of choosing the purely bad policy, which maximizes the payoff at t but forestalls the reelection, the incumbent chooses $\bar{\beta}$. Here, the contract incentivizes the incumbent to choose a better policy than in its absence (case b.i). Threshold contracts could thus enhance the quality of the policy platforms chosen.

However, if the payoff from choosing $\bar{\beta}$ is lower than the payoff of choosing the purely bad policy, the incumbent chooses the latter (case b.ii). *In for a penny, in for a pound*, the threshold contract would in this case worsen the policy platform chosen. Threshold contracts thus expand the set of circumstances in which the purely bad policy platform is the best response.

Even though our model is not intended to throw light on the creation these contracts, it offers noteworthy suggestions. For instance, if the threshold contract results from an electoral campaign, as in Gersbach and Liessem (2008), voters' biased beliefs could lead to the selection of a high $\bar{\beta}$, reinforcing the conclusion that threshold contracts need not make a positive difference to the policy platform chosen. This problem will still hold in the presence of sophisticated threshold contracts, such as, "vote-share contracts", which are contingent upon the actual results of an election and require incumbents to obtain a specific majority of the votes to stand for reelection (Gersbach 2012). This makes the reelection process more challenging for incumbents compared to first-time candidates and may reinforce the need to apply bad policies in order to get more votes in the reelection.

An alternative to both incentive and threshold contracts, proposed by Gersbach and Ponta (2017), is offering politicians the choice between a flexible and a fixed pension plan. This would encourage office seekers to choose better policies without desincentivizing policy seekers from enacting beneficial long-term policies.

5 Discussion and conclusion

This article models the policy choices of an incumbent in the presence of biased beliefs, retrospective voting, and the down-up problem. In the face of the latter problem, retrospective voting reinforces the effect of biased beliefs in incentivizing the selection of socially pernicious policies. Our findings suggest, however, that when incumbents are genuinely motivated to achieve policy success and when the long-term benefits of

policies are sufficiently valued, they may still opt for socially beneficial policies. Our analysis also reveals that an incumbency bias and the anticipation of limited accountability can nudge incumbents towards policies that yield long-term societal benefits. This indicates that, especially at times when structural reforms are called for, there might be an advantage to keeping government in office and even for that government to lose some control over policy outcomes. Similarly, implementing incentive and threshold contracts emerges as a potentially valuable tool for aligning incumbents' choices with socially optimal outcomes. However, the effectiveness of such mechanisms is contingent upon the specific design of the contracts and, under the circumstances of our model, may still require an appropriate inherent motivation of the incumbent.

Abundant empirical evidence buttresses the importance of candidates that care about the quality of the policies implemented (Perry and Wise 1990; Naff and Crum 1999; Vandenabeele 2009; Fedele and Naticchioni 2016). Still, this only begs the question of how to design a democratic set-up that fosters the selection of such candidates. Given biased beliefs and the assumption that bad policies produce better results in the short term, parties have an incentive to select "office-seekers", who have better chances of electoral victory.

With its division of powers between national and regional governments, federalism makes it possible for politicians to transition between local, subnational, and federal levels of government, and vice versa (Borchert and Stolz 2011; Edinger and Jahr 2015; Francis and Kenny 2000; Semenova and Dowding 2023). This possibility offers promising avenues to address the challenge of selecting candidates motivated by policy payoffs over short-term electoral gains. It increases scrutiny by allowing governance at multiple levels, making the actions and policies of incumbents more visible. Federally structured governments perform better compared to unitary states in terms of indices of democracy and the safeguarding of rights, as well as in enhancing quality of life (Kincaid 2010). This indicates that such heightened scrutiny makes it more difficult for office-seekers to prioritize short-term gains without facing repercussions. Federalism also encourages diverse policy experimentation, with regions acting as laboratories to demonstrate the long-term benefits of sound policies (Stansel 2005; Pierson 1995; Shin 2019). This can shift voter preferences towards candidates prioritizing long-term benefits. Furthermore, in a federal system, regional and local governments are closer to their constituencies (Oates 1972, 1999), enhancing the electorate's ability to assess candidates' motivations and track records. This proximity favors those genuinely committed to policy payoffs. Moreover, federalism fosters political diversity and competition (Tiebout 1956; Qian and Roland 1998; Weingast 1995; Koethenbueger 2011; Balaguer-Coll et al. 2010; Breton 1998; Crowley and Sobel 2011), thus preventing monopolization of power based on short-term policy gains and incentivizing parties to build reputations for effective governance. This relates to our extension about limited accountability, where the incumbent might have an incentive to apply better policies when there is less control over policy outcomes. Finally, federalism often leads to higher levels of civic engagement and political participation (Inman and Rubinfeld 2020; Bowler and Donovan 2002; Lane and Ersson 2005), with engaged electorates demanding more accountability and supporting candidates committed to public service.

Adjusting the compensation for holding office represents another strategy to promote the selection of candidates motivated by policy success rather than electoral victory (Smart and Strum 2004; Caselli and Morelli 2004; Besley 2004; Mattozzi and Merlo 2008). In our model, compensations such as higher wages do not have a role in the first period. However, in the second period, a higher wage could increase the desirability of holding office, and therefore foster worse policies to ensure reelection. A similar conclusion is found in Smart and Strum (2004). Contrasting with this, Caselli and Morelli (2004), Besley (2004) and Mattozzi and Merlo (2008) conclude that increasing politicians' pay increases their quality. Our results on incentive contracts indicate that a link between compensation and policy outcomes might indeed lead to better policies, but the motivation of political agents is still of the essence. Furthermore, higher compensation could attract individuals with a strong commitment to policy payoffs, who might otherwise be deterred by the financial sacrifices associated with political office.

Summing up, the main conclusion of this work is that, in the setting we investigate, some self-correction mechanism as in Bischoff and Siemers (2013), or external incentives as in Gersbach (2004) and Müller (2007), are not necessarily sufficient for ensuring that a good policy is chosen and implemented. The latter further requires that two elements be present, first, that the political agent is to a certain degree motivated to apply a good policy and, second, that the benefits perceived are sufficiently high. Still, we emphasize that we have focused on policies whose positive effects take a considerable lag to be observed and felt, and therefore that our results are particularly applicable to measures of policy seeking structural change.

Appendix A

Proof of Proposition 1 Based on (13), the first order condition for the optimal choice of β is given by:

$$\begin{aligned} \frac{\partial \Theta_t^I(\beta_t)}{\partial \beta_t} &= 0 \\ \Leftrightarrow \beta_t &= \frac{mW_t^I(\eta_{bt}) + 2\delta(f+v)(1-m)Z - \delta mW_{t+1}^I(\eta_{gt})\left(\frac{1}{2} - 3f - 3v\right)}{4\delta mW_{t+1}^I(\eta_{gt})(f+v)} \end{aligned} \quad (\text{A1})$$

Therefore, we have $\beta_t = 0$ if $\delta mW_{t+1}^I(\eta_{gt})\left(\frac{1}{2} - 3(f+v)\right) \geq mW_t^I(\eta_{bt}) + 2\delta(1-m)Z(f+v)$ and $\beta = 1$ if $\delta mW_{t+1}^I(\eta_{gt})\left(\frac{1}{2} + f + v\right) \leq mW_t^I(\eta_{bt}) + 2\delta(1-m)Z(f+v)$. Using the definitions for the probabilities, we reach proposition 1. \square

Proof of Proposition 2 Using (15), we get:

$$\frac{\partial \beta_t}{\partial \rho^{Inc}} = -\frac{1}{4(f+v)} < 0 \quad (\text{A2})$$

\square

Proof of Proposition 3 Given the definitions of $Q'_{\beta l}$ and Q_l^{min} and using (17), we get:

$$\frac{\partial \beta_t}{\partial E(\beta_t^{ex})} = -\frac{(1-k)}{2k} - \frac{2(1-k)v}{2Q'_{\beta l}} < 0, \text{ for all } k \text{ with } 0 < k < 1 \tag{A3}$$

We can also deduce from (17):

$$\begin{aligned} \frac{\partial \beta_t}{\partial k} &= -\frac{vW_t^I(\eta_{bt})}{\delta Q_{\beta l}^{\prime 2} W_{t+1}^I(\eta_{gt})} - \frac{(1-m)Z}{2mk^2 W_{t+1}^I(\eta_{gt})} - \frac{1}{2k^2} \\ &\quad + v\frac{Q_l^{min}}{Q_{\beta l}^{\prime 2}} + E(\beta_t^{ex})\frac{Q'_{\beta l} + 2k^2v}{2k^2 Q'_{\beta l}} \end{aligned} \tag{A4}$$

Then, we have $\frac{\partial \beta_t}{\partial k} < (> (=) 0$ if $\frac{vW_t^I(\eta_{bt})}{\delta Q_{\beta l}^{\prime 2} W_{t+1}^I(\eta_{gt})} + \frac{(1-m)Z}{2mk^2 W_{t+1}^I(\eta_{gt})} + \frac{1}{2k^2} > (< (=) v\frac{Q_l^{min}}{Q_{\beta l}^{\prime 2}} + E(\beta_t^{ex})\frac{Q'_{\beta l} + 2k^2v}{2k^2 Q'_{\beta l}}$. □

Proof of Proposition 4 Using (18), we get:

$$\frac{\partial \beta_t}{\partial \sigma} = \begin{cases} -\frac{W_t^I(\eta_{bt})}{4\delta W_{t+1}^I(\eta_{gt})(f+v)(1+\sigma)^2} - \frac{(1-m)Z}{2mW_{t+1}^I(\eta_{gt})(1+\sigma)^2} < 0 \text{ if } 0 < m \leq 1 \\ 0 \text{ if } m = 0 \end{cases} \tag{A5}$$

□

Proof of Proposition 5 Based on (13), absent a threshold contract, the first order condition for the optimal choice of β is given by (A1): this is defined as β^* .

Assume a threshold contract according to which the incumbent must select a fraction of the bad policy, β_t , below a prespecified value, that is $\beta_t \leq \bar{\beta}$, to be able to stand for reelection. Assuming that β^* is lower or equal to $\bar{\beta}$, we reach case (a) of the proposition by reasoning as in the proof of Proposition 1. If β^* is higher than $\bar{\beta}$, the incumbent is barred from reelection. The incumbent must then compare the payoff from choosing a purely bad policy (maximizing the payoff in the first period and not running for reelection) and given by $mW_t^I(\eta_{bt}) + (1-m)Z$, with the payoff from choosing $\bar{\beta}$ (offering a chance for reelection), given by $m\bar{\beta}W_t^I(\eta_{bt}) + (1-m)Z + \delta[\frac{1}{2} + (f+v)(2\bar{\beta}-1)][(1-m)Z + m(1-\bar{\beta})W_{t+1}^I(\eta_{gt})]$. Given the definitions of Q'_{β} and Q^{min} , we deduce cases (b) of the proposition. □

Appendix B

Suppose that, instead of an incumbent and an opposition, there are two equal, competing parties ($j = A; B$), as in Bischoff and Siemers (2013), which offer policy platform

η_t^A, η_t^B respectively. In the election for term t , voters choose between these two platforms. Again, the parties consider two terms. Similarly to Bischoff and Siemers (2013), both parties' payoff functions include the party's probability of being elected for term t as well as the expected valence effect for the next election. Moreover, we add to the parties' payoff the policy benefit accrued in the next term,¹³

The resulting payoff function for party j reads:

$$\begin{aligned} \Theta_t^j(\beta_t^j, \beta_t^{-j}) = & \frac{1}{2} + v_0^j + (\beta_t^j - \beta_t^{-j}) f + \delta [\\ & \left(\frac{1}{2} + v_0^j + (\beta_t^j - \beta_t^{-j}) f \right) \\ & \times \left((1 - m) (2\beta_t^j - 1) v + m (1 - \beta_t^j) W_{t+1}(\eta_{gt}) \right) \\ & + \left(\frac{1}{2} - v_0^j - (\beta_t^j - \beta_t^{-j}) f \right) \\ & \times \left((1 - m) (2\beta_t^{-j} - 1) v + m (1 - \beta_t^{-j}) W_{t+1}(\eta_{gt}) \right)] \end{aligned} \quad (B6)$$

The β_t^j that maximizes the payoff is:

$$\beta_t^j = \frac{-f - 2\delta(1 - m)v \left(\frac{1}{2} - f + v_0^j \right) + \delta m W_{t+1}(\eta_{gt}) \left(\frac{1}{2} + v_0^j \right) - 2\delta f m W_{t+1}(\eta_{gt}) \beta_t^{-j}}{2\delta f (2v(1 - m)) - m W_{t+1}(\eta_{gt})} \quad (B7)$$

β_t^{-j} is similar, but with $-v_0^j$ instead of v_0^j . Solving the system, we get:

$$\begin{aligned} \beta_t^j = & \frac{4\delta f [mf W_{t+1}(\eta_{gt}) + (1 - m)v]}{1 - (4\delta mf W_{t+1}(\eta_{gt}))^2} - \\ & \frac{2\delta^2 \left[m^2 f W_{t+1}(\eta_{gt})^2 + 4(1 - m)^2 v^2 \left(\frac{1}{2} - f + v_0^j \right) - 4m(1 - m)vf W_{t+1}(\eta_{gt}) \left(\frac{3}{2} - 2f + v_0^j \right) \right]}{1 - (4\delta mf W_{t+1}(\eta_{gt}))^2} \end{aligned} \quad (B8)$$

β_t^{-j} is similar, but with $-v_0^j$ instead of v_0^j .

Despite the unilluminating complexity of this version of the model, the political agents still weigh the benefits of the good policy payoff in the next period against the benefits of holding office and winning elections. The former will contribute to better policies and the latter to worse ones. As a result, when down-up issues are considered and in the presence of biased beliefs and retrospective voting, good policies are only implemented if the political agents are motivated beyond mere office-seeking.

¹³ In relation to the model of Sect. 2.2 for simplicity, we do not consider the benefit from holding office Z and the policy payoff of the bad policy in the first term, $W_t(\eta_{bt})$.

Appendix C

List of Symbols

η_t	Policy platform chosen in period t
η_g	Good policy platform
η_b	Bad policy platform
β_t	Fraction of bad policy chosen in period t
a_t	Macroeconomic performance in period t
\bar{a}_i	Voter i 's subjective benchmark of the macroeconomic performance
y_{it}	Voter i 's income in period t
U_{it}	Voter i 's utility in period t
\hat{U}_{it}	Voter i 's estimated utility in period t
γ_{it}^I	Voter i 's perception of incumbent' competence in period t
γ_{it}^O	Voter i 's perception of opposition' competence in period t
π_{it}^j	Probability of voters i voting for party j in period t
Π_t^j	Expected vote share for party j in period t
Λ_t^j	Policy-related vote shares of party j in period t
V_t^j	Valence-related vote shares of party j in period t
f	Biased beliefs effect on the election probability
v	Valence effect on the election probability
Θ_t^j	Politician j 's payoff in period t
Z	Lump-sum value that the politician gets from being in office
W_t^j	Benefit the politician gets in period t from the policy she implements
δ	Discount factor
Q	Probability of incumbent's reelection
Q^{\max}	The incumbent's maximum reelection probability
Q^{\min}	The incumbent's minimum reelection probability
Q'_β	The incumbent's marginal impact on the reelection probability of worsening the policy platform
ρ^{Inc}	Incumbent bias
β_t^{ex}	Strategy of other, exogenous actors in period t
ϵ	Exogenous stochastic shocks
k	Fraction of the outcome the incumbent knows to control
Q_l	Probability of incumbent's reelection with limited accountability
Q_l^{\min}	The incumbent's minimum reelection probability with limited accountability
$Q'_{\beta l}$	The incumbent's marginal impact on the reelection probability of worsening the policy platform with limited accountability
σ	The proportion of the policy payoff in the second term that is given as a reward to the incumbent
$\bar{\beta}$	The minimum quality of the policy the incumbent must ensure under a threshold contract
β^*	The optimal choice β_t if the threshold contract were not in force

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Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

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