# Who Runs When?

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**Abstract**

When are good candidates willing to run for office? I analyze a dynamic model of elections in which voters learn about politicians' competence by observing governance outcomes. In each period, the country faces either a crisis or business as usual. A crisis has two key features: it exacerbates the importance of the officeholder's competence and, as a consequence, the informativeness of his performance. I show that electoral accountability has the perverse consequence of discouraging good candidates from running in times of crisis. Precisely when the voter needs him the most, the potential candidate who is most likely to be competent chooses to stay out of the race to preserve his electoral capital. In contrast with results in the existing literature, this adverse selection emerges even if running is costless and if office is more valuable than the outside option.

James Madison, father of the US constitution, believed that democratic elections serve primarily the purpose of allowing citizens to select good political leaders: 'the aim of every political Constitution is, or ought to be, first to obtain for rulers men who possess most virtue to discern (...) the common good of society' (Federalist Papers 57). Similarly, V.O. key (1956, p. 10) argued that 'the nature of the workings of government depends ultimately on the men who run it'. Indeed, a growing empirical literature highlights that political leaders' competence has a critical impact on a country's performance (e.g. Jones and Olken 2005, Besley, Montalvo and Reynal-Querol, 2011).

The health of a democratic system thus depends crucially on the answer to two questions. First, can voters identify good politicians to be (re)elected and bad ones to be thrown out? Second, are high-quality politicians willing to run for office in the first place? Attempts to answer the first question abound in the the formal theoretical literature. Much less attention has instead been devoted to the second. This paper aims at filling this gap. In particular, rather than focusing solely on *whether* competent individuals self-select into politics (as in the extant literature), I investigate *when* good candidates choose to enter the race. I thus present a dynamic model of elections to study how the environment conditions — i.e., whether the country is experiencing a moment of crisis or a period of business as usual — influence the endogenous supply of good political candidates.

I show that a stark inefficiency emerges in equilibrium: the quality of the pool of candidates is lower in periods of crisis, i.e., precisely when the country most needs a competent leader. Thus, voters get the *wrong candidates* at the *wrong time*. Crucially, this result holds true even if running is costless, and holding office is more valuable than the outside option. Indeed, this adverse selection does not arise due to weak electoral incentives, as is the case in the extant literature. Quite the opposite, it emerges precisely as a perverse consequence of accountability. The contribution of this paper is therefore twofold. First, it highlights how the rational 'calculus of candidacy' (Rohde 1979) goes beyond a simple comparison of the *exogenous* cost of running and the expected rents from office. Instead, it includes *endogenous* costs of holding office that arise when we consider politicians' dynamic electoral incentives. Secondly, it identifies a perverse consequence of electoral accountability that had been previously overlooked.

This inefficiency emerges in a setting with three key ingredients. First, potential candidates are forward-looking career politicians: their (per-period) utility from holding office is always higher than the outside option, but when choosing whether to run today they also consider how this may

impact their future payoff. Second, they face some (albeit potentially small) uncertainty about their own political ability, and differ in their reputation (i.e., the initial probability of being a competent type). And finally, exogenous crises (e.g., global recessions, wars, natural disasters) amplify the impact of the officeholder's ability on governance outcomes.

Thus, a crisis represents a test: precisely because the officeholder's competence matters the most during times of crisis, this is also when the governance outcome reveals most information about his ability. Here, the model builds on results in the retrospective voting literature highlighting that exogenous crises can represent an opportunity for the incumbent to prove himself, but also irreparably damage his standing if he is unable to deliver an effective response (see Healy and Malhotra 2013 for a review).

In a world with these features, even if running is costless and holding office is always more valuable than the outside option, potential candidates will strategically time their entry in the electoral arena. When they fear exposing themselves as an incompetent type, they may choose to stay out of the race in times of crisis if the expected value of getting to office in the future is higher than the payoff from being elected today. I analyze two settings under which this may hold true.

First, I consider a two-period model where politicians' payoff from being in office is higher if they deliver a good governance outcome. This resonates with results in Fong et al. (2019), who show that politicians are motivated by legacy concerns, and have a desire to be positively remembered after leaving office. A crisis reduces the likelihood that an incompetent type is able to deliver a good outcome. Since potential candidates are unsure of their own ability, crises decrease the *static* expected value of holding office. This setup allows me to easily illustrate the logic behind the results, and to analyze how different types of office benefits, i.e., monetary rents versus legacy concerns, influence potential candidates' entry decision.

Second, I analyze an alternative (infinite-horizon) model where politicians only care about the monetary rents from being in office, but they consider how the timing of their entry in the electoral arena influences the probability of being reelected for a second term. Recall that the environment conditions (i.e., whether the country is experiencing a crisis or undergoing a period of business a usual) determine how much information the voters will obtain about the incumbent's ability. Thus, even if the static office payoff is the same in all periods, in this model a crisis still influences the *dynamic* value of being elected today.

In these settings, potential candidates will evaluate how holding office today influences their electoral chances in the future. In this sense, being in office during a crisis is a risky gamble. Straightforwardly, the lower the probability of being competent, the higher this risk. Naive intuition may suggest that positive selection should emerge in equilibrium, with the best (in expectation) potential candidate in the pool being more likely to run in times of crisis. Instead, the opposite is true.

While the best potential candidate has the highest chances of being able to manage a crisis (and thus faces lower risk), he also has the most to lose from failing (and thus has a higher *endogenous* opportunity cost). In fact, new information can only hurt his future electoral chances: if the voter learns nothing new, this candidate will still have an electoral advantage in the future. The best potential candidate therefore experiences *fear of failure*: has incentives to stay out of the race when a crisis is likely and only enter during periods of business as usual. He does so to prevent the voter from obtaining new information about his true ability and thus preserve his electoral capital for the future, when a crisis is less likely and the value of holding office is higher.[1]

In contrast, the worst (in expectation) potential candidate never has anything to lose. Indeed, holding office during a crisis can only increase his future electoral chances, by allowing him to prove himself and thus improve his reputation. As such, he has incentives to *gamble for resurrection*: is always willing to enter the race when a crisis is likely to emerge. Thus, under some conditions, only the worst candidate is willing to run for office during times of crisis.

The model discussed so far is one of pure selection. It abstracts from two issues typically at the core of political agency models: asymmetric information and moral hazard. Potential candidates do not have any private information about their own ability, and, once in office, cannot take any strategic action to improve their performance, which is solely a function of their type and the state of the world. In the second part of the paper, I relax each of these assumptions (in turn), and analyze potential candidates' incentives under these richer strategic environments.

When potential candidates have some (imperfect) private information about their true ability, their entry choice sends a potentially informative signal to the voters (as in Gordon et al. 2007). Intuitively, this may generate strategic incentives that go in the opposite direction as those discussed

[1]Because even if his underlying type is a bad one, he will be able to deliver a good outcome and enjoy the associated legacy payoff (legacy-payoff model), or get reelected for a second term (infinite-horizon model).

above, whereby potential candidates that are willing to run signal that they are confident in their own ability to solve a crisis. Nonetheless, I show that the adverse selection equilibrium always emerges. The equilibrium is not unique but it is often likely to represent a focal point of the game, since it is the one that provides all potential candidates with the highest expected utility.

Next, I consider a setting where the incumbent's performance is a function not only of his type and the state of the world, but also of his effort choice. Here, the officeholder's effort choice (correctly conjectured by the voter in equilibrium) determines the informativeness of the governance outcome (as in Ashworth et al. 2017). In principle, potential candidates could therefore eliminate the risk associated with holding office during a crisis if they can commit to a level of effort that ensures outcomes reveal little information. I show that this is not enough to always eliminate the adverse selection documented above. Further, a familiar trade-off emerges: the voter can never at the same time attract the most competent politician to office and incentivize him to exert effort.

Taken together, the results of this paper uncover an inefficiency that can be more or less severe, but is unlikely to leave any democracy immune. The source of this inefficiency lies at the core of the accountability relationship between the voters and their representatives. Voters cannot credibly commit to ignoring valuable information that may be generated about the incumbent. Precisely when competence matters the most, the officeholder's performance reveals most information about his true ability. Paradoxically, the candidate who is most likely to be competent also has the most to lose from new information. Adverse selection—with regards to both *which* candidate is willing to run, and *when*—then emerges as a perverse consequence of electoral accountability. In Online Appendix E, I provide some suggestive evidence that this inefficiency is more than a mere theoretical possibility. I analyze data on US Gubernatorial candidates and show that the probability that neither party is able to field a high-quality candidate almost doubles during periods of (national-level) economic recession, jumping from 15% to 28%.[2] While this analysis is obviously just a first step in evaluating the empirical relevance of my model, it opens promising avenues for future research.

[2]This analysis is further discussed in the Conclusion section.

# Literature Review

This project contributes to the literature on the endogenous supply of good politicians (Caselli and Morelli 2004, Messner and Polborn 2004, Dal Bo et al. 2006, Mattozzi and Merlo 2008, Fedele and Natticchioni 2013, Brollo 2013). This literature builds on the intuition that 'potential candidates for political office will be influenced in their decision whether to enter the competition—as in any other profession—by financial considerations' (Messner and Polborn 2004, p. 2423). Thus, these works typically focus on *static* settings, where potential candidates compare the expected returns from office to their outside option in the private market. Political ability and private-market salary are assumed to be correlated, therefore good politicians also have higher opportunity cost of running for office. This potentially generates adverse selection, whereby low-ability individuals are more likely to enter politics.

My paper contributes to this literature in two ways. First, I expand the 'calculus of candidacy' (Rodhe 1979) to incorporate politicians' dynamic electoral incentives. Second, I analyze *when* (rather than simply whether) good candidates are willing to enter the race. The key intuition is that potential candidates with long-term political ambitions consider how *holding office* today influences their electoral chances in the future. These strategic considerations may depend crucially on the environment conditions, i.e., the realization of a period-specific state of the world (crisis, or business as usual). Thus, even when running is costless and holding office is more valuable than the outside option (so that running would always be *statically* optimal), potential candidates face the strategic choice of when to enter the race.

In this perspective, this work is most closely related to Banks and Kiewiet (1989) and Jacobson (1989). Jacobson argues that good potential candidates may choose not to run when the political or economic conditions make it hard to beat the incumbent, in order not to waste valuable resources (see also, among others, Stone and Maisel 2003). Banks and Kiewiet's formal model uncovers a similar 'incumbency scare-off' effect: good candidates may prefer to run during open-seat elections rather than challenge an electorally leading incumbent. This result emerges because in their model a candidate can only enter the race once, which generates an opportunity cost of *running* for office when the chances of winning are low. This is in sharp contrast with the model presented here, where *holding* office has a potential opportunity cost. Substantively, my model complements this

literature by providing a rationale for why even weak incumbents may face no serious challenge or, in open-seat elections, *neither* party may be able to field a high-quality candidate: in my setting, even a sure winner may sometimes be unwilling to run.

Here, the cost of holding office is rooted in information. Potential candidates anticipate that the voters would look at their performance to update their beliefs about their competence. In turn, such updated beliefs would inform their electoral choices in the future. This is a well-known dynamics in political economy,[3] but my paper is the first one to analyze how it influences the endogenous supply of competent candidates.

Finally, my work is also in close conversation with a recent literature in formal theory that highlights how events outside of the officeholders' control may nonetheless impact their electoral fortunes, by altering the inferences voters draw upon observing their performance in office (Ashworth et al. 2017). My model complements these works. I focus on how crises influence the endogenous supply of good politicians, whereas Ashworth et al. (2017) take the pool of candidates as given but analyze the relationship between disasters and information under a less stylized setting than what I consider here.[4]

## Legacy-Payoff Model

Consider a game with two time periods and an election in each. At the beginning of the game, each party $P \in \{1, 2\}$ draws one potential candidate $C_P$ from the pool of its members. Each potential candidate $i \in \{C_1, C_2\}$ is one of two types, good ($\theta_i = 1$) or bad ($\theta_i = 0$). Potential candidates' (hereafter, PCs) true types are unknown to all players, who share common prior beliefs that $prob(\theta_i = 1) = q_i$ (formally, $i$ is draw from a pool containing a proportion $q_i$ of good types). Within this framework, $q_i$ can be interpreted as $i$'s reputation or political capital. Intuitively, $q_i$ also captures a measure of $i$'s expected quality. I assume $q_1 > q_2$, and therefore refer to $C_1$ as the ex-ante advantaged potential candidate, and to $C_2$ as the disadvantaged one.

At the beginning of each period, $C_1$ and $C_2$ simultaneously choose whether to run for office. If $C_P$ is unwilling to run, party $P$ resorts to a reserve candidate $R_P$. For simplicity, I assume that the

[3] See Ashworth 2012 for a review.

[4] See also discussion in footnote 12.

reserve candidates ($R_1$ and $R_2$) are known to be bad types with probability one. This assumption is without much loss of generality: all that matters is that $R_P$ has lower reputation than $C_P$.[5] Once the candidates are endogenously determined, a representative voter $V$ chooses whom to elect.

In each period, the country either faces a period of business as usual ($\omega_t = 0$), or it experiences a negative shock ($\omega_t = 1$). A shock is an *exogenous* crisis: it may represent, for example, a period of economic hardship, a war or a natural disaster. Players share common prior beliefs that $prob(\omega_t = 1) = \bar{p}$. At the beginning of each period, they observe a public signal $\chi_t \in \{0, 1\}$ indicating the likelihood of a crisis arising during the upcoming term, where $prob(\chi_t = 0|\omega_t = 0) = prob(\chi_t = 1|\omega_t = 1) = \psi \in (\frac{1}{2}, 1]$. Notice that at $\psi = 1$ players can perfectly anticipate whether a crisis is going to emerge in the upcoming term (equivalently, the state realization is observed at the beginning of each period, prior to the candidates' entry choice).

In each period, the officeholder produces either a good governance outcome ($o_t = g$) or a bad one ($o_t = b$). The probability of a good outcome realization is a function of the state of the world $\omega_t$ and the officeholder's type $\theta_i$:

$$prob(o_t = g) = 1 - \omega_t + \omega_t\theta_i. \tag{1}$$

This formulation reflects the assumption that exogenous shocks amplify the effect of the incumbent's type on his performance. The officeholder always produces a good outcome during periods of business as usual ($\omega_t = 0$). Instead, if a crisis arises ($\omega_t = 1$) the incumbent's type determines the outcome realization. A good type ($\theta_i = 1$) always delivers a good outcome in times of crisis, while a bad type ($\theta_i = 0$) never does.[6]

Finally, let us define the players' payoffs. PCs are office motivated. Their payoff in each period out of office is normalized to 0. Instead, the value of holding office has two components: monetary rents $k$ and legacy payoffs $\gamma$. While the monetary rents are always accrued by the officeholder,

[5] Generally speaking, the existence of the reserve candidates $R_1$ and $R_2$ is imposed merely for aesthetic purposes, to avoid equilibria with uncontested elections, but it has no effect on the key insights of the paper.

[6] The specific parametrization adopted here is for simplicity. As long as $prob(o_t = g|\omega_t = 1, \theta_t = 1) - prob(o_t = g|\omega_t = 1, \theta_t = 0) > prob(o_t = g|\omega_t = 0, \theta_t = 1) - prob(o_t = g|\omega_t = 0, \theta_t = 0)$, crises amplify the effect of competence and the implications of the model continue to hold (assuming incumbents are ousted after failing to successfully manage a crisis).

the legacy payoffs are conditional on delivering a good performance. Thus, $\gamma$ may represent the 'warm glow feeling' a politician experiences when he produces a good governance outcome, or (in a reduced-form) the instrumental value of a good performance (above and beyond the immediate electoral success). Since this paper focuses on incentives and disincentives to *hold* office, I consider a setting in which running is costless.[7] Finally, the voter pays a cost $\lambda$ in each period in which $o_t = b$, whereas her payoff from a good outcome $o_t = g$ is normalized to 0.

To sum up, the game proceeds as follows:

1. Nature draws PCs' types $\theta_{C_1}, \theta_{C_2} \in \{0, 1\}$ and first-period state $\omega_1 \in \{0, 1\}$;
2. Players observe public signal $\chi_1 \in \{0, 1\}$;
3. $C_1$ and $C_2$ simultaneously choose whether to run;
4. $V$ decides whom to elect;
5. $\omega_1$ realizes and is publicly observed;
6. The fist period governance outcome $o_1 \in \{g, b\}$ realizes and is publicly observed;
7. Second period starts and nature draws $\omega_2$;
8. The game proceeds as above.

To avoid trivialities, I exclude equilibria in weakly dominated strategies. Since running for office is costless, this implies that a PC's entry decision is conditional on winning the election (this amounts to an indifference breaking rule).

### Discussion

Before proceeding to the analysis, two aspects of the PCs' preferences are worth noting.

**Legacy payoffs.** In the baseline model, the legacy payoff of delivering a good performance ($\gamma$) is the same under both states of the world. However, it seems natural that delivering a good outcome under a crisis may be more valuable than performing well during normal times. After all,

[7] Notice that, because I model a deterministic election process, this assumption has no impact on the qualitative results other than avoiding equilibria with uncontested elections.

wartime presidents such as Churchill or FDR are remembered precisely for their leadership during turbulent times. In Appendix B, I analyze an amended version of the baseline model where I allow for this possibility. I show that all of the results presented below continue to hold even if the legacy payoff from producing a good governance outcome is higher under a crisis.

**Impact of Bad Outcomes.** In the setup described above, governance outcomes influence a PC's payoff only when in office. However, we may argue that public-minded PCs – just like the voter – pay a cost $\lambda$ whenever a bad outcome is produced, regardless of whether they are in office or not. Alternatively, the incumbent's performance may indirectly influence the other PCs' expected payoff. For example, a bad outcome today may increase the probability of a crisis tomorrow. In Appendix B I show that even under these alternative assumptions all the qualitative results mirror those emerging in the baseline model.

## Analysis

First, let us emphasize that entering the race is always statically optimal for all PCs:

**Remark 1.** *Running for office always (weakly) increases a PC's* static *payoff (i.e., his expected utility in the current period).*

The expected *per-period* value of holding office is always higher than the outside option ($k + \gamma \times prob(o_t = g) \geq k > 0$). Further, running is costless. Thus, absent any dynamic considerations all PCs would always enter the race.

The second period is the last of the game, therefore Lemma 2 follows straightforwardly:

**Lemma 1.** *Both $C_1$ and $C_2$ always have a (weakly) dominant strategy to run for office in the second period.*

These results emphasize that if a PC chooses to stay out of the race in the first period, it must be because doing so increases his future expected payoff. To understand why this may be the case, it is useful to first focus on the voter's electoral choice.

### The Voter's Problem

The voter cares about governance outcomes. In each period, she therefore elects the candidate who is most likely to deliver a good performance.[8] Straightforwardly, her first-period electoral choice is simply a function of her prior beliefs over the candidates' abilities. In contrast, the voter's choice in the second-period election is informed by the incumbent's performance. This paper builds on a key intuition: the inferences that voters draw upon observing the governance outcome are a function of the state of the world. Thus, the same outcome may convey different information under different environments. In other words, crises have an informational value. Precisely because crises amplify the effect of competence on outcomes, they also increase the informativeness of the incumbent's performance.[9]

Given the parametric assumptions adopted here, this effect emerges starkly. Denote $\mu_i$ the posterior probability that incumbent $i$ is a good type. Recall that $q_i$ is the prior probability that $i$ is a good type and $o_1$ is the first-period governance outcome. The following Lemma holds:

**Lemma 2.**

- *Suppose that* $\omega_1 = 0$. *Then,* $\mu_i = q_i$*;*
- *Suppose that* $\omega_1 = 1$. *We have that:*
  - *if* $o_1 = g$, *then* $\mu_i = 1$*;*
  - *if instead* $o_1 = b$, *then* $\mu_i = 0$.

Under a period of business as usual ($\omega_1 = 0$), both types are always able to deliver a good outcome. Thus, the officeholder's performance is uninformative, and the voter's beliefs always remain at the prior. In contrast, an exogenous crisis ($\omega_1 = 1$) provides the voter with a test of the incumbent's political ability, and therefore an opportunity to learn. Thus, although the crisis is

[8] Notice that, because both types always deliver a good performance under normal times, in the second period the voter is indifferent between all candidates if she can perfectly anticipate that no crisis will emerge (i.e., if $\chi_2 = N$ and $\psi = 1$). Here, I assume that she breaks indifference in favor of the candidate who is most likely to be a good type. This is equivalent to allowing for an arbitrarily small probability that a bad type would fail to deliver a good outcome even absent a crisis.

[9] The notion of informativeness adopted here is analogous to Blackwell's (1954): for any two experiments $E$ and $E'$, $E'$ is more informative when the posterior distribution induced by $E$ is a mean-preserving spread of the posterior distribution induced by $E'$. Here, the experiment 'holding office in times of crisis' is more informative than the experiment 'holding office during normal times'.

fully exogenous, it may influence the incumbent's electoral chances. Indeed, the voter's decision in the second period may be different under different states of the world, even fixing the governance outcome.

Denote $\sigma_i$ the probability that incumbent $i$ is re-elected after holding office in the first period. The following holds:

**Remark 2.**

- *Suppose that* $\omega_1 = 0$*. Then, in equilibrium* $\sigma_{C_1} = 1$ *and* $\sigma_{C_2} = 0$*;*
- *Suppose that* $\omega_1 = 1$*. We have that:*
  - *if* $o_1 = g$*, then in equilibrium* $\sigma_{C_1} = \sigma_{C_2} = 1$*;*
  - *if instead* $o_1 = b$*, then in equilibrium* $\sigma_{C_1} = \sigma_{C_2} = 0$*.*

During normal times, the incumbent always delivers a good outcome. This always guarantees $C_1$'s survival, but is never enough for the ex-ante disadvantaged $C_2$ to get reelected. In contrast, under $\omega_1 = 1$ a good performance is always necessary and sufficient for the incumbent to win reelection.

### The Potential Candidates' First-Period Problem

With this in mind, consider the PCs' incentives in the first period. First, it is easy to see that no PC has any reason to stay out of the race when $\chi_1 = 0$:

**Lemma 3.** *Both PCs have a weakly dominant strategy to run under* $\chi_1 = 0$*.*

If a crisis arises, an incumbent whose true type is $\theta_i = 0$ will be unable to deliver a good outcome and enjoy the associated legacy payoff. Thus, the *static* value of office at time $t$ is decreasing in the probability that $\omega_t = 1$. The signal $\chi_1 = 0$ indicates that a crisis today is less likely than a crisis tomorrow.[10] Therefore, holding office today is more valuable than getting elected tomorrow, and both PCs have a weakly dominant strategy to enter the race in the first period under $\chi_1 = 0$.

This is easy to see if we compare a PC's expected utility from being elected in the first period (conditional on the public signal realization) to the expected payoff from being in office in the

[10] $\frac{\bar{p}(1-\psi)}{\bar{p}(1-\psi)+(1-\bar{p})\psi} < \bar{p}$.

second. Denote $p_1(\chi_1)$ the probability of a crisis at $t = 1$ conditional on public signal $\chi_1$. Then, $i$'s expected payoff from being elected in the first period conditional on $\chi_1 = 0$ is:

$$\underbrace{k + \gamma_{C_i}[q_i + (1 - q_i)(1 - p_1(0))]}_{\textit{Static} \text{ payoff from office at } t=1} + \underbrace{V_2}_{\text{Continuation value}} \quad , \tag{2}$$

where $V_2$ is $i$'s continuation value (i.e., the expected payoff from holding office tomorrow weighted by the probability of being reelected).

Next, consider the the expected value of being in office in the second period. Recall that, given the martingale property of beliefs, the expected posterior probability of a shock in the second period is equal to the prior $\bar{p}$. Therefore, the ex-ante expected value of being in office at $t = 2$ is:

$$k + \gamma_{C_i}[q_i + (1 - q_i)(1 - \bar{p})]\,. \tag{3}$$

Recall that $p_1(0) < \bar{p}$. Thus:

$$k + \gamma_{C_i}[q_i + (1 - q_i)(1 - p_1(0))] + V_2 > k + \gamma_{C_i}[q_i + (1 - q_i)(1 - \bar{p})]. \tag{4}$$

Therefore, irrespective of how this may influence their future electoral chances (i.e., even if $V_2 = 0$), neither PC has any reason to stay out of the race under $\chi_1 = 0$.

Suppose instead that the players observe public signal $\chi_1 = 1$. Now, holding office in the future is in expectation more valuable (since $p_1(1) > \bar{p}$). Therefore, when choosing whether to run, PCs consider both the expected (static) value of holding office today, and how it influences the probability of being elected tomorrow (i.e., the *endogenous* opportunity cost of office). As Lemma 2 highlights, a crisis is a test: if the country experiences a negative shock, the incumbent's performance will reveal his true ability. The officeholder then risks exposing himself as a bad type and losing the second-period election. Straightforwardly, this risk is higher the lower the probability of being a good type. One might naively conclude that positive selection will emerge in equilibrium, so that the PC who is most likely to solve a crisis has the strongest incentives to run when the public signal indicates that a crisis is likely. Instead, the opposite is true:

**Proposition 1.** *There exist unique* $\underline{\psi}$, $\bar{q}_2(\psi)$ *and* $\bar{q}_1(\psi, q_2)$ *s.t. in equilibrium*

- $C_1$ *chooses to stay out of the race under* $\chi_1 = 1$ *if and only if* $\psi > \underline{\psi}$, $q_2 < \bar{q}_2$ *and* $q_1 < \bar{q}_1$.

*In contrast, $C_2$ always chooses to run under both $\chi_1 = 1$ and $\chi_1 = 0$.*

The inefficiency is stark: in equilibrium, the voter sometimes gets the wrong candidate at the wrong time. The ex-ante disadvantaged $C_2$, who has the lowest reputation (i.e., expected quality), is always willing to run for office. Instead, the PC who is most likely to be competent sometimes chooses to stay out of the race. To make matters even worse, he does so precisely when the voter needs him the most: the country is very likely to experience a crisis ($\chi_1 = 1$, and the signal's precision $\psi$ is sufficiently large), and the other candidate has a very low reputation.

To understand this result, consider the strategic incentives faced by the disadvantaged $C_2$. First, suppose that $C_1$ chooses to enter the race. Straightforwardly, $C_2$ would always lose the first-period election and (since running is costless) is therefore always indifferent between entering or staying out. Next, suppose that $C_1$ chooses to sit the first-period election out. Recall that, given his initial disadvantage, $C_2$ can win in the second period only if he improves his relative reputation, that is if the voter updates positively about his type, or negatively about $C_1$'s ability. If $C_1$ stays out of the race in the first period, the voter will not receive new information about his competence. Thus, $C_2$ will always lose tomorrow if he also chooses to stay home today. Conversely, if $C_2$ gets to office today, he will be able to get reelected for a second term if the country experiences a crisis and he proves able to solve it (Remark 2). Thus, holding office during times of crisis always improves $C_2$'s future electoral prospects, irrespective of how unlikely he is to be able to deliver a good governance outcome. This ex-ante disadvantaged potential candidate therefore always has (weakly) dominant strategy to enter the race: irrespective of how likely a crisis is to arise, and how unlikely he is to be able to solve it, $C_2$ is always willing to *gamble for his resurrection*.

The advantaged $C_1$ faces different incentives. While he has the highest chances of being able to manage a crisis (and thus faces lower risk), he also possesses valuable electoral capital (and thus has higher opportunity cost). Therefore, $C_1$ faces a tradeoff, and will choose to enter the race if

and only if:

$$k+\gamma[q_1+(1-p_1(1))(1-q_1)]+\underbrace{[1-p_1(1)+p_1(1)q_1]}_{\text{Prob. of } C_1 \text{ being reelected}}k \tag{5}$$
$$+\underbrace{[q_1+(1-p_1(1))(1-q_1)(1-\bar{p})]}_{\text{Prob. of good outcome at } t=2 \text{ conditional on being reelected}}\gamma >$$
$$[k+\gamma(1-\bar{p}+q_1\bar{p})]\underbrace{[1-p_1(1)+p_1(1)(1-q_2)]}_{\text{Prob. of } C_2 \text{ being ousted}}.$$

The left-hand side is $C_1$'s expected overall payoff of being elected today. The right-hand side is the expected second-period payoff if he chooses to stay out today. (5) highlights that information can only hurt $C_1$'s future electoral chances. Given his initial reputation advantage, $C_1$ always wins at $t=2$ if no crisis emerges at $t=1$, and thus the voter learns nothing new about his own (or his opponent's) ability. Instead, if $C_1$ gets to office today and $\omega_1=1$, he will lose the second-period election if he is unable to solve the crisis. Therefore, $C_1$ experiences *fear of failure*: he has incentives to avoid the gamble (i.e., holding office when a crisis is likely) even if he is more likely to succeed. On the other hand, if he chooses to stay out of the race in the first period, $C_1$ must consider the possibility that his initially disadvantaged opponent may turn out to be a competent type and prove himself during a crisis. This would, in turn, shatter $C_1$'s own future electoral prospects. Thus, the higher is the likelihood that $C_2$ is a competent type, the stronger are $C_1$'s incentives to enter the race in times of crisis.

Given the above reasoning, the equilibrium conditions are intuitive. Rearranging (5), we get that $C_1$ chooses to stay out when:

$$q_1 < 1-\frac{(\gamma+k)(1+q_2p_1(1))}{p_1(1)[2\gamma+k-\gamma\bar{p}(1-q_2)]}=\bar{q}_1\,. \tag{6}$$

When $C_1$ is not sufficiently confident in his own ability (i.e., $q_1$ is not too high) he will stay out of the race during times of crisis, so as to avoid exposing himself as an incompetent type and preserve his political capital for the future. For (6) to be possible to satisfy, $p_1(1)$ must be sufficiently large (i.e., the public signal $\chi_1=1$ must be sufficiently accurate), and $C_2$ must be sufficiently unlikely to be a competent type.

The above discussion highlights that, while the adverse selection documented in Proposition 1 is stark, it is not unconditional: when $C_1$ is sufficiently likely to be a good type, he always prefers to take the gamble rather than giving up office in the first period. Comparative statics on the threshold $\bar{q_1}$ therefore give us an indication of when we should expect the inefficiency to be more or less severe.

**Corollary 1.** *The probability (in the sense of set inclusion) that $C_1$ enters the race in the first period is decreasing in $\gamma$ and increasing in $k$ ($\frac{\partial \bar{q_1}}{\partial \gamma} > 0$ and $\frac{\partial \bar{q_1}}{\partial k} < 0$).*

The more $C_1$ cares about delivering good governance outcomes, the more he values holding office during normal times rather than under a crisis. This, in turns, increases his incentives to stay out of the race after observing a signal $\chi_1 = 1$. Instead, increasing the material rents $k$ has the opposite effect: $C_1$ becomes more reluctant to give up office today even if this increases the probability of being elected tomorrow. Notice that Corollary 1 is consistent with results in Dal Bó et al. (2013) showing that higher political salaries (in the model, $k$) help attract a better candidate pool both in terms of quality and motivation. In particular, since $\frac{\partial \bar{q_1}}{\partial \gamma} > 0$ but $\frac{\partial \bar{q_1}}{\partial k} < 0$, an implication of the model is that, as $k$ increases, $C_1$ is willing to enter the race under higher values of both $\gamma$ and $q_1$.

Finally, Corollary 2 shows that the adverse selection documented in Proposition 1 is stronger under crises that are more predictable:

**Corollary 2.** *Suppose that the true first-period state is $\omega_1 = 1$ (i.e., a crisis will emerge in the first period). Then, the probability (in the sense of set inclusion) that $C_1$ enters the race in the first period is decreasing in the public signal's accuracy $\psi$.*

Recall that $C_1$ always chooses to enter after observing $\chi_1 = 0$. Thus, the public signal's informativeness ($\psi$) only influences his incentives to run for office under $\chi_1 = 1$. Conditional on this realization, a more informative signal implies that a crisis is more likely to actually materialize, which lowers $C_1$'s incentives to enter the race. $C_1$ will thus choose to stay out for higher values of $q_1$ (i.e., $\frac{\partial \overline{q_1}}{\partial \psi} > 0$). Further, an increase in $\psi$ implies that, conditioning on $\omega_1 = 1$, the players are more likely to observe the correct signal $\chi_1 = 1$. Both forces thus push in the same direction, and the probability that $C_1$ enters the race under an (upcoming) crisis decreases.

Let me emphasize that the nature of the inefficiency documented in Proposition 1 is different from seemingly similar results presented in the literature. Extant works highlight the difficulty of

attracting good politicians if the value of holding office is too low to compensate for their outside option. In other words, adverse selection emerges due to weak electoral incentives. Here, the opposite is true. In this model, running is costless and holding office is always more valuable than the outside option. The inefficiency emerges precisely as a perverse consequence of electoral accountability. The voter cannot credibly commit to ignoring valuable information that may be revealed about the incumbent. Precisely because competence matters the most in times of crisis, this is also when governance outcomes are most informative. The PC who is most likely to survive a crisis is also the one who has the most to lose, and is therefore unwilling to take the risk. These results speak to an open debate in the literature: is voter competence actually good for voters? Scholars have argued that a rational and more informed electorate may paradoxically induce officeholders to exert less effort, or adopt worse policies (Ashworth et al. 2014). This paper suggests that the problem runs even deeper, as it may prevent voters from attracting competent politicians to office in the first place.

## Infinite-Horizon Model: Isolating the Information Channel

So far, I assumed that exogenous shocks influence PCs' expected utility from office via two channels: legacy payoffs (exogenous static channel) and information (endogenous dynamic channel). When PCs only live for two electoral cycles, both channels are necessary to generate the inefficiency documented in Proposition 1. If politicians do not obtain any ego rents from delivering a good performance (i.e., if $\gamma = 0$) all PCs always choose to run for office in equilibrium. Since the value of holding office is the same in both periods, a PC would in fact never give up office today to increase his electoral chances tomorrow.

Suppose instead that we allow PCs to consider a longer time horizon. Here, even if the static value of holding office is the same in all periods, the dynamic opportunity cost may not be: getting to office during times of crisis, rather than a period of business as usual, changes the amount of information the voter will obtain about the incumbent's ability. This, in turns, impacts the probability of being able to get reelected for a second term.

To isolate the impact of this information channel, I consider an amended version of the game that lasts for infinitely many periods, $t \in \{1, 2, ..., \infty\}$, and I assume that PCs care exclusively

about the material rents from office $k$ (i.e., $\gamma = 0$). Officeholders are subject to a two-terms limit. When an incumbent leaves office — whether because he hits the term limit or is outvoted — he cannot re-enter the pool of candidates. His party then draws a replacement (potential) candidate from the same pool. Notice that this implies that all PCs belonging to the same party are ex-ante identical. Thus, the prior probability of any PC from Party 1 being a good type is $q_1$, and the prior for Party 2 PCs is $q_2$, with $q_1 > q_2$.[11] This allows me to consider, in the equilibrium analysis, a generic PC from Party 1 and a generic PC from Party 2.

## The Analysis

Here, I focus on the benchmark case in which PCs are fully patient, which clearly illustrates their strategic incentives. In Appendix C I extend the analysis to consider impatient PCs.

The following holds:

**Proposition 2.** *Suppose PCs are fully patient. Then, for all* $0 < q_2 < q_1 < 1$ *the game has a unique equilibrium:*

- *PCs from Party 1 always choose to enter the race under* $\chi_t = 0$ *and stay out under* $\chi_t = 1$*;*
- *PCs from Party 2 always choose to enter the race under* $\chi_t = 1$ *and stay out under* $\chi_t = 0$*.*

Recall that, here, the value of being in office is the same in each period, regardless of the governance outcome. However, a politician who wins office for a first term and then is outvoted loses his political capital and any future electoral prospects. Thus, PCs' strategic problem is to choose the right time to enter the electoral arena, so as to maximize the chances of remaining in office for two consecutive terms.

Consider first a PC from Party 1. This potential candidate faces similar incentives to those emerging in the two-period model. He is ex-ante more likely be competent than any randomly drawn challenger. Thus, he enjoys a reputation advantage and is always guaranteed reelection for a second term if he gets to office during normal times, when no new information is generated about his type. Instead, if he holds office during a crisis, he will be ousted if he fails to deliver a good

[11] There is a slight technical difficulty associated with the fact that the pool depletes over time. To bypass this problem, I assume that whenever a party draws a new potential candidate, another politician with the same true type is born into the pool.

governance outcome. Thus, the tiniest amount of uncertainty over his ability to successfully manage a crisis is enough to induce this candidate to stay out of the race when a crisis is likely. Even if the probability of being competent is arbitrarily close to one, PCs from Party 1 will therefore *always* choose to stay home under $\chi_t = 1$, and wait for a better time to enter the race.

The opposite holds for a PC from Party 2. Recall that governance outcomes are uninformative under $\omega_t = 0$. Therefore, an incumbent from Party 2 would only be reelected if his potential challenger decides not to run. Conversely, a crisis potentially allows the ex-ante disadvantaged incumbent to prove himself, thereby increasing the probability that he wins reelection even if the challenger enters the race. Therefore, PCs from Party 2 maximize the chance of being elected for two consecutive terms if they get to office during challenging times, even if the probability of being competent is arbitrarily close to zero. This, in turn, generates incentives to stay out of the race under $\chi_t = 0$.

These results show that the adverse selection documented in Proposition 1 continues to emerge, even if exogenous crises influence PCs' expected payoff from holding office solely via information. This has an important implication: the key inefficiency uncovered in this paper arises irrespective of whether competence is needed most in times of crisis or during periods of 'business as usual'. Whenever the incumbent's performance is a function of his ability, governance outcomes are always more informative under realizations of the state of the world for which the effect of competence is amplified.[12] Suppose that crises mute the effect of the officeholder's type rather than amplifying it. Then, the voter benefits the most from a competent politician during normal times, but this is also the state under which governance outcomes are most informative. As a consequence, the PC who is most likely to be competent experiences fear of failure and has incentives to stay out of the race under $\chi_t = 0$, running for office only during periods of crisis. Again, the voter gets the wrong candidates at the wrong time.

[12] Ashworth et al. 2017 show that this holds generally, regardless of the specific assumptions on the function mapping the incumbent's ability and the state of the world to outcomes, as long as this function satisfies the monotonic likelihood ratio property.

# Beyond Self-Selection

For presentation purposes, I have so far abstracted from issues typically at the core of political agency models: moral hazard and asymmetric information. In this section, I discuss if and how introducing these additional elements impacts the models' conclusions (formal proofs are in the online Appendix D). Here, I focus on the infinite-horizon setting where $\gamma = 0$, but the results are qualitatively identical if moral hazard and asymmetric information are incorporated in the legacy-payoff model.[13]

## Moral hazard

The baseline model is one of pure selection: officeholders cannot invest effort to improve their performance, which is determined solely by their type and the state of the world. While this is a useful simplification to isolate the mechanism behind the results, it suppresses an important channel through which politicians' strategic choices may impact voter learning. A recent literature in fact emphasizes that, even absent any private information, the officeholder's effort choice influences the inferences voters draw upon observing his performance. 'From the voters' perspective, the governance outcome (...) is the realization of a statistical experiment that generates information about the incumbent' (Ashworth et al. 2017: 1). Different levels of effort generate different experiments. Therefore, the incumbent's effort choice determines the informativeness of his performance (*ibid*).

Here, I analyze whether the adverse selection documented in the baseline survives in this richer strategic setting. I extend the model to allow the probability of a good outcome to be a function of the incumbent's effort choice. Formally, after observing the state realization $\omega_t$, the officeholder chooses a level of effort $e_t \in [0, 1]$, at a cost $-\frac{e_t^2}{2}$. In line with the career concerns framework (Holmstrom 1999), the voter does not observe the incumbent's effort choice. I consider a setting where effort and ability are complements (i.e., the impact of the office holder's effort on his performance is increasing in the probability of being a good type).[14] Given effort $e_t$, the probability of a good

[13] Complete analysis of these extensions to the legacy-payoff model is available upon request.

[14] In Appendix D, I also analyze the case in which effort and competence are substitutes, and show that the results are qualitatively identical.

outcome in this setting is:

$$p(o_t = g|\omega_t, \theta, e_t) = [1 - \omega_t + \omega_t\theta_i]\,(\frac{e_t + \xi}{1 + \xi})\,. \tag{7}$$

This formulation implies that, as in the baseline, governance outcomes are uninformative under $\omega_t = 0$. Under a crisis ($\omega_t = 1$), a good outcome is a perfect signal of competence. The informativeness of a bad outcome instead depends on the level of effort the voter expects from the incumbent. Denote $\mu_1(1, o_t = b, e^a)$ the posterior probability that a Party 1 incumbent is a good type, conditional on a bad outcome in times of crisis and the conjectured effort $e^a$. We have:

$$\mu_1(1, o_t = b, e^a) = \frac{q_1(1 - \frac{e^a+\xi}{1+\xi})}{q_1(1 - \frac{e^a+\xi}{1+\xi}) + 1 - q_1}\,. \tag{8}$$

The lower $e^a$, the less informative a bad outcome is, the higher $\mu_i(1, o_t = b, e^a)$.

As a consequence, the possibility of multiple equilibria arises. Suppose that a politician from Party 1 is in office in the first period. The voter may expect him to exert a sufficiently low level of effort that $\mu_1(1, o_t = b, e^a) > q_2$, or she may conjecture an effort choice higher than this threshold. Depending on parameter values, one or both of these conjectures are sustainable in equilibrium (the voter does not observe the incumbent's effort choice but, in equilibrium, her conjecture must be correct):

**Lemma 4.** *There exist unique $\widehat{q_2} \leq \widetilde{q_2}$ s.t.*

- *An equilibrium in which an incumbent from Party 1 is always reelected exists if and only if $q_2 < \widetilde{q_2}$ (unconditional retention);*
- *An equilibrium in which an incumbent from Party 1 is ousted after a bad outcome under $\omega_1 = 1$ and reelected otherwise exists if and only if $q_2 \geq \widehat{q_2}$ (conditional retention).*

Moving backwards, consider the PCs strategy. Straightforwardly, if an incumbent from Party 1 is always reelected in equilibrium, PCs from Party 1 are always willing to run and, once in office, will exert no effort. Conversely, adverse selection always emerges in a conditional retention equilibrium:

**Proposition 3.** *Suppose the voter uses a conditional retention strategy in equilibrium. Then, all PCs from Party 1 always enter under $\chi_t = 0$ and stay out otherwise, and all PCs from Party 2 always enter under $\chi_t = 1$ and stay out otherwise.*

If the voter commits to a conditional retention strategy, PCs face the same strategic incentives that emerge in the baseline model. Therefore, their optimal entry strategy is identical.

A Corollary of Lemma 4 establishes that, for a sufficiently large $\xi$, the conditional retention strategy is the only one that is sustainable in equilibrium:

**Corollary 3.** *Suppose that $1 + \xi > \frac{q_1(1-q_2)}{q_2(1-q_1)}$. Then, $\widehat{q_2} = \widetilde{q_2} = 0$.*

Beyond establishing the (conditional) robustness of Proposition 2, these results reveal a trade-off: the voter can never induce the best PC to enter the race *and* incentivize him to exert effort. If the voter uses a conditional retention strategy that (indirectly) rewards effort, she induces the best PC to stay out of the race if $\chi_t = 1$. Under the unconditional retention equilibrium, no adverse selection ever emerges. However, because his reelection chances do not depend on his performance, an incumbent from Party 1 never exerts any effort in equilibrium. This confirms the intuition that emerges in the baseline model: the root of the inefficiency documented in this paper lies with the voter's commitment problem (i.e., her inability to commit to ignoring valuable information that governance outcomes may reveal about the incumbent).

The one between accountability and selection is a familiar tradeoff in the political agency literature (dating back to Fearon 1999). I have shown that this trade-off may impact not only voters' ability to recognize a good incumbent (as, e.g., in Ashworth et al. 2017), but also their capacity to attract competent politicians to office.

## Asymmetric Information

So far, I assumed that PCs have no private information about their own underlying ability. Abstracting from the signaling problem that would generate from asymmetric information allowed me to focus on the 'gambling' aspect of the candidates' choice. However, it is important to analyze if and how the players' incentives and strategies change if PCs have some private information about their true type. For example, Gordon et al. (2007) consider a model with endogenous entry where the fact itself that the challenger is willing to run conveys information to the voters about his own

ability relative to the incumbent's (and show that positive self-selection emerge as a result).[15] In my setting, no adverse selection can ever emerge if PCs know their true type with absolute certainty. However, I show that the inefficiency documented in Proposition 2 survives even if PCs observe arbitrarily informative private signals.

Suppose that, upon being drawn from the pool, each PC observes a private signal of his own ability $\phi_i \in \{0, 1\}$, accurate with probability $p_\phi < 1$. Denote $\widehat{\mu}_i(\phi_i)$ the (interim) posterior probability that candidate $i$ is a good type, as a function of his private information. To avoid trivialities, let $\widehat{\mu}_1(0) < q_2 < q_1 < \widehat{\mu}_2(1)$. I assume that an off-the-equilibrium-path deviation to entering the race under $\chi_t = 0$ leads the voter to form interim posterior $\widehat{\mu}_i(0)$, and an unexpected exit leads her to form beliefs $\widehat{\mu}_i(1)$. The converse holds under $\chi_t = 1$: an unexpected entry leads the voter to form interim posterior $\widehat{\mu}_i(1)$, while an unexpected exit induces posterior $\widehat{\mu}_i(0)$. In short, entering when a crisis is likely (unlikely) induces the voter to believe the candidate observed a good (bad) signal about his own ability. This refinement follows the spirit of Cho and Kreps (1987) (adapted to a repeated game).[16]

The following holds:

**Proposition 4.** *The game always has a Perfect Bayesian Equilibrium where*

- *PCs from Party 1 enter the race under $\chi_t = 0$ and stay out under $\chi_t = 1$, regardless of the private signal $\phi_1$, and*
- *PCs from Party 2 enter the race under $\chi_t = 1$ and stay out under $\chi_t = 0$, regardless of the private signal $\phi_2$.*

During a crisis, the governance outcome perfectly reveals the officeholder's type. As a consequence, a bad performance in office would damage a politician's reputation above and beyond any positive signaling value that being willing to run might have. The strategic problem is therefore equivalent to the baseline model: the gambling aspect dominates the signaling one.

To see this, consider the strategic incentives facing a PC from Party 1 under $\chi_1 = 1$. By entering the race (and thus deviating from the conjectured strategy), he would signal to the voter that he observed private information $\phi_1 = 1$. This would increase the voter's interim posterior on

[15] See also Caillaud and Tirole 2002 for a model where candidate entry signals electorally valuable information.
[16] See Online Appendix p. 13.

his ability. However, this is payoff-irrelevant. If no crisis emerges, a Party 1 incumbent is reelected during normal times even if entering the race does not improve his interim reputation. If instead a crisis does materialize, the governance outcome will still determine the voter's electoral choice.[17] Therefore, PCs from party 1 face the same strategic incentives as in the baseline model.

Similarly for PCs from Party 2. Entering the race when the public signal indicates that a crisis is unlikely does not improve their reputation. Therefore, as in the baseline, their optimal strategy is to only enter the race under $\chi_t = 1$.

Notice that Proposition 4 holds under any arbitrarily informative private signal $\phi_i$ (i.e., even if $p_\phi$ is arbitrarily close to 1). Regardless of how large is the asymmetry of information between the voter and the PCs (and even if PCs are almost certain of their true ability), it is not enough to always incentivize the best potential candidate to enter the race. Indeed, while the adverse selection equilibrium is not unique (as it is often the case in signaling games),[18] the analysis demonstrates that the inefficiency may be hard to escape:

**Proposition 5.** *Suppose that $\bar{p} > \frac{1}{2}$. Then, all PCs expected utility in the adverse selection equilibrium is higher than in any other equilibrium.*

Despite the equilibrium multiplicity, the adverse selection equilibrium may therefore emerge as a natural focal point of the game.

# Conclusion: Avenues for Future Research

Do the right candidates choose to run for office at the right time? I have addressed this question by analyzing a model of repeated elections, in which potential candidates are career politicians who differ in the probability of being a competent type. The key feature of the model is that, in each period, the country faces either a normal situation or a crisis. A crisis amplifies both the importance of the office-holder's competence, and the informativeness of governance outcomes. I have shown that, in a world with these features, electoral accountability may have the perverse consequence of discouraging good candidates from running in times of crisis, precisely when the voter needs them the most. Here, I conclude with a brief discussion of potential avenues for future research.

[17] Notice that this does not require that governance outcomes are fully informative during crises. It simply requires outcomes to be more informative than PCs' private signals.

[18] See Proposition 3A at p. 16 in the Online Appendix.

**Avenues for empirical research.** From a theoretical standpoint, the inefficiency uncovered in this paper seems to be extremely robust to altering the model in several directions. An obvious next step would be to investigate whether it emerges empirically: do we actually observe that high-quality candidates are less likely to run for office during periods of crisis? To the best of my knowledge, the empirical literature has yet to provide an answer to this question, which therefore opens avenues for future research.

In Online Appendix E, I take a first preliminary step in this direction. I analyze how the quality of the pool of candidates for Gubernatorial elections in the US varies during periods of *national-level* economic recession, with data on all open-seat elections from 1982 to 2016 (from Hirano and Snyder 2019). This analysis builds on the assumption that potential candidates are able to observe (or anticipate) a national-level recession,[19] and the likely ripple effects at the state level, by the time they have to take the final decision whether to run or not. In line with the predictions of the theory, I find that the average share of races in which neither party is able to field a high-quality candidate almost doubles in times of crisis (jumping from 15% to 28%). Identifying this raw correlation is, obviously, just a first step in evaluating the empirical relevance of the theory. Besides investigating the causal nature of this relationship, future research should confirm that it also emerges for other offices[20] and under different kinds of negative shocks (e.g., wars, disasters, or even the Covid-19 pandemic). Differences in the timing and nature of crises (i.e., their predictability) could also be leveraged to evaluate the comparative statics from Corollary 2. Finally, Corollary 1 implies that high-quality candidates that are willing to run in times of crisis should tend to put less weight on the warm glow feeling of delivering a good performance (relative to the pool of candidates in normal times). Surveys of potential candidates (such as Fox and Lawless 2011) or politicians (such as Carreri, forthcoming) could therefore assess the role that different kinds of office benefits and motivations play in generating the inefficiency identified in this paper (complemeting, e.g., Dal Bó et al. 2013).

**Avenues for theoretical research.** This paper has focused on a world in which voters care exclusively about politicians' competence. A natural direction to develop this research agenda is to

[19] Several observable indicators, such as a rise in unemployment or a reduction of consumer spending, often precede the official start of a recession (Stock and Watson 2012: 6).

[20] Keeping in mind that the argument applies most naturally to executive offices, where attribution of responsibility for governance outcome is more straightforward.

integrate within this framework the ideological dimension of voters' and politicians' preferences. A relevant question is if (and when) ideology mitigates or exacerbates the inefficiency documented in this paper, and what is the overall effect on voters' welfare.

I speculate that ideology may influence the adverse selection problem via two channels. From the demand side, as ideological polarization between politicians increases, the competence dimension becomes less relevant for electoral outcomes. In other words, ideological polarization may allow voters to credibly commit to ignoring (at least in part) information that governance outcomes reveal about the office holder. This may, in turn, mitigate the adverse selection problem highlighted in this paper, with ambiguous implications for voters' welfare. On the supply side, we may argue that a crisis alters the set of policies that can be feasibly implemented by the office holder. For example, a crisis may expand this set by lowering resistance against economic reforms, or may contract it by imposing stricter budget constraints. This would, in turn, alter ideologically motivated politicians' expected utility from being in office during challenging times, with increased polarization either mitigating or worsening the inefficiency highlighted in this paper. Future research formalizing these intuitions would help clarify the conditions under which increased ideological polarization may improve voters' overall welfare, and identify scenarios in which the impact would instead be harmful.

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# Who Runs When? Appendix

## Contents

# 1 Appendix A: the Legacy-Payoff Model

## 1.1 Proof of Lemma 2

Let $\mu_i(\omega_1, o_1)$ be the posterior probability that incumbent $i$ is a good type given outcome $o_1$ under state $\omega_1$. Then, we have: $\mu_i(0, g) = \frac{q_i}{q_i+(1-q_i)} = q_i$, $\mu_i(1, g) = \frac{q_i}{q_i} = 1$ and $\mu_i(1, g = b) = \frac{0}{1-q_i} = 0$.

## 1.2 Proof of Proposition 1

From the reasoning in the main body, $C_2$ is always willing to run under $\chi_1 = 1$. Instead $C_1$'s incentives. Instead, $C_1$ chooses not to run at $t = 1$ if and only if:

$$[k + \gamma(q_1 + (1 - q_1)(1 - \bar{p}))][1 - p_1(1) + p_1(1)(1 - q_2)] > \tag{1}$$
$$k + q_1[2\gamma + k] + (1 - q_1)(1 - p_1(1))[\gamma + k + \gamma(1 - \bar{p})],$$

where $p_1(1) = prob(\omega_1 = 1|\chi_1 = 1) = \frac{\psi\bar{p}}{\psi\bar{p}+(1-\psi)(1-\bar{p})}$. (1) reduces to:

$$q_1 < 1 - \frac{(\gamma + k)(1 + p_1(1))}{p_1(1)[2\gamma + k - \gamma\bar{p}(1 - q_2)]} = \overline{q_1}. \tag{2}$$

Given $q_1 > q_2$, the above requires:

$$(1 - q_2)p_1(1)(2\gamma + k - \gamma\bar{p}(1 - q_2)) - (\gamma + k)(1 + q_2p_1(1)) > 0. \tag{3}$$

(3) establishes an upper bound $q_2 < \overline{q_2}$, and must always be satisfied at $q_2 = 0$. This requires:

$$p_1(1)(2\gamma + k - \gamma\bar{p}) - \gamma - k > 0, \tag{4}$$

which reduces to:

$$p_1(1) > \frac{\gamma + k}{[2\gamma + k - \gamma\bar{p}]} = \underline{p_1}. \tag{5}$$

Substituting $p_1(1) = \frac{\psi\bar{p}}{\psi\bar{p}+(1-\psi)(1-\bar{p})}$, the above establishes a lower bound $\psi > \underline{\psi}$.

### 1.3 Proof of Corollary 1

From inspection of 2.

### 1.4 Proof of Corollary 2

*Proof.* From inspection of 2 and the observation that $p_1(1)$ is increasing in $\psi$. □

## 2 Appendix B: Robustness

### 2.1 State-Dependent Legacy Payoffs

Consider an amended version of the baseline model in which an office-holder's legacy payoff from a good performance is higher under $\omega_t = 1$. Formally, $i$'s payoff from being in office at time $t$ is

$$k + \mathbb{I}\,(1 - \omega_t)\,\gamma + \mathbb{I}\,\omega_t\,\Gamma\,, \tag{6}$$

where $\mathbb{I} = 1$ if $o_t = g$ and $\mathbb{I} = 0$ otherwise.

As in the baseline, $C_2$ always has a weakly dominant strategy to run under both realizations of the public signal. In contrast, $C_1$ finds it optimal to stay out of the race if and only if:

$$\begin{aligned} k + (1 - p_1(\chi_1))\gamma + p_1(\chi_1)q_1\Gamma + [q_1 + (1 - p_1(\chi_1))(1 - q_1)]k + \bar{p}q_1\Gamma + (1 - p_1(\chi_1))(1 - q_1)(1 - \bar{p})\gamma < \\ [k + (1 - \bar{p})\gamma + \bar{p}q_1\Gamma][1 - p_1(\chi_1) + p_1(\chi_1)(1 - q_2)]\,, \end{aligned} \tag{7}$$

where $p_1(\chi_1)$ is the probability of a crisis at $t = 1$ conditional on the realization of the public signal.

Notice that the condition always fails at at $p_1(0) < \bar{p}$, therefore $C_1$ always enters the race under $\chi_1 = 0$. Next, suppose instead that $\chi_1 = 1$. Then, the above reduces to

$$q_1 < \frac{p_1(1)[(1 - q_2)(k + \gamma(1 - \bar{p})) + \gamma] - (k + \gamma)}{p_1(1)[\gamma(1 - \bar{p}) + \Gamma(1 + \bar{p}q_2) + k]} = \overline{q_1}_{\nu(S)}. \tag{8}$$

Given $q_1 > q_2$, the above requires:

$$p_1(1)[(1-q_2)(k+\gamma(1-\bar{p}))+\gamma] - (k+\gamma) - q_2 p_1(1)[\gamma(1-\bar{p})+\Gamma(1+\bar{p}q_2)+k] > 0. \tag{9}$$

The LHS is decreasing in $q_2$, therefore it establishes an upper bound $q_2 < \overline{q_2}_{\nu(S)}$. $\overline{q_2}_{\nu(S)} > 0$ iff:

$$p_1(1)[k+\gamma(2-\bar{p})] - (k+\gamma) > 0. \tag{10}$$

Substituting $p_1(1) = \frac{\psi\bar{p}}{\psi\bar{p}+(1-\psi)(1-\bar{p})}$, the above establishes a lower bound $\psi > \underline{\psi}_{\nu(S)}$.

## 2.2 Impact of Bad Outcomes

### 2.2.1 Public-minded potential candidates

Consider an amended model where PCs are public minded. Each PC i's per-perid utility is

$$\mathbb{I}_I(k+\mathbb{I}_g\gamma) - (1-\mathbb{I}_g)\lambda, \tag{11}$$

where $\mathbb{I}_I = 1$ if $i$ in office at time $t$ and $\mathbb{I}_I = 0$ otherwise, and $\mathbb{I}_g = 1$ if $o_t = g$ and $\mathbb{I}_g = 0$ otherwise.

As in the baseline model, $C_2$ has a weakly dominant strategy to always enter. Further, $C_1$ has no reason to stay out under $\chi_1 = 0$. Suppose instead $\chi_1 = 1$. Then, $C_1$ stays out if and only if:

$$\begin{aligned} p_1(1)(1-q_2)(\gamma(1-(1-q_1)\bar{p}) - (1-q_1)\lambda\bar{p} - \lambda + k) + (1-p_1(1))(\gamma(1-(1-q_1)\bar{p}) - (1-q_1)\lambda\bar{p} + k) > \\ k + q_1(2\gamma+k) + (1-q_1)(1-p_1(1))(\gamma(1-\bar{p}) - \lambda\bar{p} + \gamma + k) - p_1(1)(1-q_1)((1-q_2)\lambda\bar{p} + \lambda). \end{aligned} \tag{12}$$

This reduces to:

$$q_1 < 1 - \frac{(\gamma+k)(1+q_2p_1(1)) + \lambda(1-q_2)p_1(1)}{p_1(1)[2\gamma+k-\gamma\bar{p}(1-q_2)+\lambda]} = \overline{q_1}_\lambda. \tag{13}$$

Given $q_1 > q_2$, the above requires:

$$(1-q_2)p_1(1)[2\gamma+k-\gamma\bar{p}(1-q_2)+\lambda] - (\gamma+k)(1+q_2p_1(1)) - \lambda(1-q_2)p_1(1) > 0. \tag{14}$$

This establishes an upper bound $q_2 < \overline{q_2}_\lambda$ and must be satisfied at $q_2 = 0$:

$$p_1(1)(2\gamma + k - \gamma\bar{p} + \lambda) - [(\gamma + k) + \lambda p_1(1)] > 0. \tag{15}$$

Substituting $p_1(1) = \frac{\psi\bar{p}}{\psi\bar{p}+(1-\psi)(1-\bar{p})}$, the above establishes a lower bound $\psi > \underline{\psi}_\lambda$.

### 2.2.2 A bad outcome today increases the probability of a crisis tomorrow

Consider an amended version of the baseline model where the probability of a negative shock in the second period is a function of the first period governance outcome: $prob(\omega_2 = C|o_1 = g) = \bar{p}$ and $prob(\omega_2 = C|o_1 = b) = \alpha\bar{p}$, where $\alpha \in (1, \frac{1}{\bar{p}})$. As in the baseline model, $C_2$ has a weakly dominant strategy to always enter. Further, $C_1$ has no reason to stay out when $\chi_1 = 0$. Suppose instead $\chi_1 = 1$. Then, $C_1$ chooses not to run iff:

$$\begin{aligned}[k + \gamma(q_1 + (1 - q_1)(1 - \bar{p}))](1 - p_1(1)) + p_1(1))(1 - q_2)[k + \gamma(q_1 + (1 - q_1)(1 - \alpha\bar{p})] > \\ k + q_1[2\gamma + k] + (1 - q_1)(1 - p_1(1))[\gamma + k + \gamma(1 - \bar{p})],\end{aligned} \tag{16}$$

which reduces to:

$$q_1 < 1 - \frac{(\gamma + k)(1 + q_2 p_1(1)))}{p_1(1))[2\gamma + k - \gamma\bar{p}(\alpha(1 - q_2))]} = \overline{q_1}_\alpha \tag{17}$$

Given $q_1 > q_2$, the above requires:

$$1 - q_2 - \frac{(\gamma + k)(1 + q_2 p_1(1)))}{p_1(1)(1 - \beta)[2\gamma + k - \gamma\bar{p}\alpha(1 - q_2)]} > 0. \tag{18}$$

The above establishes a lower bound on $p_1(1)$, i.e., $\psi > \underline{\psi}_\alpha$ and must always be satisfied at $\psi = 1$:

$$(1 - q_2)[2\gamma + k - \gamma\bar{p}(\alpha(1 - q_2))] - (\gamma + k)(1 + q_2) > 0. \tag{19}$$

This condition establishes an upper bound $q_2 < \overline{q_2}_\alpha$ (notice that (19) is always satisfied at $q_2 = 0$).

# 3 Appendix C: the Infinite-Horizon Model

Here, I assume that the voter fully discounts the future (i.e., she maximizes per-period payoff). This ensures that, in each period, the candidate with the highest reputation wins the election irrespective of incumbency status. This is not necessarily true in equilibrium with a forward looking voter. When choosing between a term limited incumbent and a challenger that is less likely to be competent but can run again in the following period, a forward looking voter would under some conditions elect the challenger. This is because the term limit would otherwise prevent her from efficiently using all the available information when making her electoral decision in the next period.

I restrict my attention to Markov strategies. Here, a player's Markov strategy maps in each period $t$ the public signal $\chi_t$ and the 'kind' of election (whether it is open seat and, if not, the identity of the incumbent) into a probability distribution over entry decisions.

## 3.1 Proof of Proposition 2

PCs are fully patient (i.e., their discount factor is equal to 1). Furthermore, since they are infinitely lived, regardless of the strategy played by the opponent, the probability of getting to office once over the course of the game is 1 for each of them. In addition, recall that when an incumbent is outvoted he cannot re-enter the pool of candidates. As such, each PC's strategic problem simply amounts to identifying the entry choice that maximizes the probability of being in office for two consecutive terms. It is straightforward to see that these strategies coincide with the ones identified in Proposition 2. A Party 1 incumbent is always reelected if $\omega_t = 0$ during his first term in office. In contrast, he will be ousted after delivering a bad outcome under a crisis (unless he runs unopposed). Thus, this PC's expected dynamic value from getting to office in period $t$ is *decreasing* in the probability that $\omega_t = 1$. Therefore, PCs from Party 1 have a strictly dominant strategy to run under $\chi_t = 0$ and stay home otherwise. Consider instead PCs from Party 2. An incumbent from Party 2 that gets to office under $\omega_t = 0$ will only be able to get re-elected if his potential challenger decides to stay out of the race. In contrast, the probability of being re-elected after a

crisis is strictly positive even in a contested election. PCs from party 2 therefore have a strictly dominant strategy to run under $\chi_t = 1$ and stay home otherwise.

## 3.2 Imperfectly Patient Potential Candidates

Next, I consider imperfectly patient players. Formally, I assume that PCs discount their future payoff by a common factor $\delta \in (0,1)$. For simplicity, I assume that $\psi = 1$, i.e. the public signal is perfectly informative (equivalently, $\omega_t$ realizes before the PCs' entry choice).

**Proposition (1A).** *For all $\delta \in (0,1)$ there exist unique $\widehat{q_2}(\delta) > 0$ and $\widehat{q_1}(\delta) < 1$ such that:*

- $q_1 < \widehat{q_1}(\delta) \iff$ *potential candidates from from Party 1 have strictly dominant strategy to run under $\chi_t = 0$ and stay home under $\chi_t = 1$; and*
- $q_2 > \widehat{q_2}(\delta) \iff$ *potential candidates from from Party 2 have strictly dominant strategy to run under $\chi_t = 1$ and stay home under $\chi_t = 0$.*

*Proof.* Consider first a randomly drawn PC from Party 2. Straightforwardly, any strategy prescribing PCs from Party 2 to stay home under $\chi_t = 1$ is strictly dominated. Consider instead the PC's strategy under $\chi_t = 0$. Suppose he follows the strategy to stay home under $\chi_1 = 0$ and run otherwise. Then we can write his expected discounted payoff in any subgame s.t. $\chi_t = 0$ as:

$$0 + \delta V_2(\delta, q_2). \tag{20}$$

Two things are worth noticing. (i) $\frac{\partial V_2(\delta,q_2)}{\partial q_2} > 0$ . The prescribed strategy would imply that a politician from Party 2 will only get to office under times of crisis. The ex-ante probability of being re-elected after serving a first term during times of crisis is increasing in the probability of being competent, therefore $V_2(\delta, q_2)$ is increasing in $q_2$ (ii) $\frac{\partial V_2(\delta,q_2)}{\partial \delta} > 0$ : the more patient the PC is, the higher his future expected payoff (fixing his opponents' strategies).

Suppose instead that the PC chooses to enter the race. Then, we can write his expected payoff

(conditional on winning the election) as:

$$k + \delta k p(unopposed)\,, \tag{21}$$

where $p(unopposed)$ is the probability that the PC drawn from Party 1 chooses not to run. Recall in fact that an incumbent from Party 2 who served a first term during a period of business as usual will never win against a randomly drawn challenger from Party 1. Thus, this incumbent will only be re-elected if the other party is unable to field a viable candidate.

Thus, necessary and sufficient condition for the conjectured strategy to be strictly dominant is:

$$V_2(\delta, q_2) - \frac{k}{\delta} - kp(unopposed) > 0. \tag{22}$$

Recall that $V_2(\delta, q_2)$ is increasing in both $q_2$ and $\delta$. Straightforwardly, fixing $p(unopposed)$ (that is, fixing the other players' strategies), the LHS is increasing in $q_2$ and increasing in $\delta$. Thus, the above condition establishes a lower bound $q_2 > \widehat{q_2}(\delta)$ where $\widehat{q_2}(\delta)$ is decreasing in $\delta$. Is is straightforward to see that $\widehat{q_2}(0) = 1$: a completely impatient politician would never choose to skip an election. Further, Proposition 2 establishes that $\widehat{q_2}(1) = 0$. Thus, for all $\delta \in (0, 1)$, $\widehat{q_2}(\delta) \in (0, 1)$.

Consider now a randomly drawn PC from Party 1. Straightforwardly, any strategy prescribing PCs from Party 1 to stay home under $\chi_t = 0$ is strictly dominated. Consider instead the PC's strategy under $\chi_t = 1$. Suppose the PC follows the strategy to stay home under $\chi_1 = 1$ and run otherwise. Then we can write his expected discounted payoff in any subgame s.t. $\chi_t = 1$ as

$$0 + \delta V_1(\delta). \tag{23}$$

Notice that (i) $V_1(\delta)$ is not a function of $q_1$. If a randomly drawn PC from Party 1 only chooses to run during normal times, his probability of being re-elected for a second term after getting to office is not a function of $q_1$ (indeed, it is always 1). As such, his expected discounted payoff from the prescribed strategy is independent of $q_1$. (ii) $V_1(\delta)$ is increasing in $\delta$: the more patient the politician

is, the higher his future expected payoff (fixing his opponents' strategies).

Suppose instead that the PC chooses to enter the race. Then, we can write his expected payoff (conditional on winning the election) as:

$$k + \delta k(q_1 + (1 - q_1)p(unopposed)\,. \tag{24}$$

Thus, necessary and sufficient condition for the prescribed strategy to be strictly dominant is:

$$V_1(\delta) - \frac{k}{\delta} - k(q_1 + (1 - q_1)p(unopposed)) > 0. \tag{25}$$

Recall that $V_1(\delta)$ is not a function of $q_1$, but is increasing in $\delta$. Straightforwardly, fixing $p(unopposed)$ (that is, fixing the other players' strategies), the LHS is decreasing in $q_1$ and increasing in $\delta$. Thus, the above condition establishes an upper bound $q_1 < \widehat{q_1}(\delta)$ where $\widehat{q_1}(\delta)$ is increasing in $\delta$. Is is straightforward to see that $\widehat{q_1}(0) = 0$: a completely impatient politician would never choose to skip an election. Further, Proposition 2 establishes that $\widehat{q_1}(1) = 1$. This concludes the proof. □

# 4 Appendix D: Beyond Self-Selection

## 4.1 Moral Hazard

Notice that in this setting a term limited incumbent always exerts zero effort. This implies that the voter may find it optimal to oust the incumbent, even if the challenger has lower reputation. This would, intuitively, eliminate the dynamic channel that lies at the core of my model. Therefore, I impose the following assumption to guarantee that an incumbent who is a good type with probability 1 is always reelected, and that an incumbent from Party 1 who maintains his initial reputation is re-elected against an untried challenger from Party 2 (notice that this also implies that Party 1 PCs always win in open seat elections):

**Assumption 1.** $\xi > \max\{\frac{q_1}{1-q_1}, \frac{q_2}{q_1-q_2}\}$

Formally, these conditions guarantee that the voter prefers to re-elect an incumbent with higher reputation even if the challenger is expected to exert effort of 1 in the first period in office. [1]

We can now pin down the voter's equilibrium retention strategy as a function of the governance outcome, state of the world, incumbent's expected ability and his conjectured level of effort ($e^a$).[2]

**Lemma (1A).** *Suppose that $\omega_t = 0$. Then, an incumbent from Party 1 would always be re-elected and an incumbent from Party 2 would always be ousted. Suppose instead that $\omega_t = 1$. Then,*

- *A Party 2 incumbent would always be reelected after delivering $o_t = g$ and ousted otherwise;*
- *A Party 1 incumbent would always be reelected after delivering $o_t = g$;*
- *Fixing a conjectured level of effort $e^a$, there exists a unique $q_2^\dagger(e^a) \in [0,1]$ s.t.*
  - *When $q_2 > q_2^\dagger(e^a)$ the voter would prefer to oust an incumbent from Party 1 after $o_t = b$*
  - *When $q_2 < q_2^\dagger(e^a)$ the voter would prefer to reelect an incumbent from Party 1 after $o_t = b$*

*Proof.* First, notice that (as in the baseline model), governance outcomes are uninformative under $\omega_t = 0$. Therefore, given Assumption 1, under $\omega_t = 0$ the voter always retains any Party 1 incumbent and replaces any Party 2 incumbent. Next, suppose that $\omega_t = 1$. Notice that $\mu_i(1, g, e^a) = 1$, therefore (given Assumption 1) any incumbent will always be re-elected after a good outcome. Further, $\mu_2(1, b, e^a) < q_1$, therefore a Party 2 incumbent is always ousted after a bad outcome. Finally, consider the last point. Notice that, if $\omega_{t+1} = 0$, the voter expects both a term limited incumbent and a first period office holder to exert zero effort in the next period (since under $\omega = 0$ the incumbent's re-election chances are not a function of his performance). This implies that the voter's re-election choice is conditional on $\omega_{t+1} = 1$. Denote $\mu_i(1, o_t, e^a)$ the posterior probability that incumbent $i$ is a good type, conditional on $\omega_t = 1$, the observed outcome and the conjectured level of effort $e^a$. The voter will find it optimal to retain a Party 1 incumbent after $o_t = b$ iff:

$$\mu_1(1, b, e^a)\frac{\xi}{1+\xi} > q_2\frac{e_2^*(q_2, 1) + \xi}{1+\xi}, \tag{26}$$

[1] I assume that $k < 1$, to guarantee interior effort.

[2] As in the baseline model, we can focus on contested elections.

where $\mu_1(1,b,e^a) = \frac{q_1(1-\frac{e^a+\widehat{\xi}}{1+\xi})}{q_1(1-\frac{e^a+\xi}{1+\xi})+1-q_1}$ and $e_2^*(q_2,1)$ is the equilibrium effort an incumbent from Party 2 would exert under $\omega = 1$. Given the voter's retention strategy, $e_2^*(q_2,1)$ maximizes $kq_2(\frac{e+\xi}{1+\xi}) - \frac{e^2}{2}$. Thus, we have: $e_2^*(q_2,1) = \frac{kq_2}{1+\xi}$. Therefore, fixing $e^a$, there exists a $q_2^\dagger(e^a) \in [0,1]$ s.t. the voter strictly prefer to oust the Party 2 incumbent after $o_t = b$ if $q_2 > q_2^\dagger(e^a)$ and she prefers to retain him if otherwise. $q_2^\dagger(e^a)$ is s.t. (26) holds with equality.

□

#### 4.1.1 Proof of Lemma 4

Suppose that the voter retains a Party 1 incumbent who delivered a bad outcome under $\omega_t = 1$ with probability $\sigma$. Then, the incumbent's equilibrium effort satisfies $e_1^*(S,q_1) = \frac{kq_1(1-\sigma)}{1+\xi}$. Recall that, in equilibrium, the voter's conjecture about the incumbent's effort choice must be correct. Thus, an unconditional retention equilibrium (i.e., $\sigma = 1$) can be sustained if and only if:

$$\frac{q_1(1-\frac{\xi}{1+\xi})}{q_1(1-\frac{\xi}{1+\xi})+1-q_1}\frac{\xi}{1+\xi} \geq q_2(\frac{kq_2+\xi(1+\xi)}{(1+\xi)^2}). \tag{27}$$

Notice that the the LHS is not a function of $q_2$, while the RHS is increasing in $q_2$. The condition is always satisfied at $q_2 = 0$ but always fails at $q_2 = q_1$. Thus, there exists a unique $\widetilde{q_2}$ s.t. the unconditional retention equilibrium exists if and only if $q_2 < \widetilde{q_2}$. $\widetilde{q_2}$ is s.t. (27) holds with equality.

Next, conjecture an equilibrium in which $\sigma = 0$. An equilibrium of this form exist if and only if:

$$\frac{q_1(1-\frac{\frac{kq_1}{1+\xi}+\widehat{\xi}}{1+\xi})}{q_1(1-\frac{\frac{kq_1}{1+\xi}+\xi}{1+\xi})+1-q_1}\frac{\xi}{1+\xi} < q_2(\frac{kq_2+\xi(1+\xi)}{(1+\xi)^2}). \tag{28}$$

(28) is always satisfied at $q_2 = q_1$ and fails at $q_2 = 0$. Thus, there exists a unique $\widehat{q_2}$ s.t. the unconditional retention equilibrium exists if and only if $q_2 > \widehat{q_2}$. $\widehat{q_2}$ is s.t. (28) holds with equality. Finally, notice that $\widehat{q_2} \leq \widetilde{q_2}$.

### 4.1.2 Proof of Corollary 3

The condition guarantees that $\mu_1(1, b, 0) < q_2$, which is sufficient to ensure that the voter always prefers to oust an incumbent from Party 1 after a bad outcome in times of crisis.

### 4.1.3 Proof of Proposition 3

First, notice that Party 2 PCs have a strictly dominant strategy to enter the race under $\chi_t = 1$ and stay out otherwise. In particular, notice that the possibility to exert effort does not alter this: their equilibrium dynamic value of being elected at time $t$ is decreasing in the probability that $\omega_t = 1$.

Similarly, under a conditional retention strategy, Party 1 PCs face the same incentives that emerge in the baseline. If they get to office under $\omega_t = 0$, they are guaranteed reelection and need exert no effort. Under $\omega_t = 1$, reelection is conditional on $o_t = g$ and requires effort. Straightforwardly, (fully patient) Party 1 PCs find it optimal to stay home under $\chi_t = 1$ and enter otherwise.

### 4.1.4 Moral Hazard - Substitutes

In this section I analyze an alternative version of the Moral Hazard model. Formally, I assume that, given level of effort $e \in [0, 1]$, the probability that an an incumbent of type $\theta_i$ produces a good governance outcome in state $\omega_t$ is:

$$(\omega_t\theta_i + 1 - \omega_t) + [1 - (\omega_t\theta_i + 1 - \omega_t)]e\xi^{\dagger}, \tag{29}$$

where $\xi^{\dagger} < 1$. (29) implies that effort and type are **substitutes**: the marginal impact of the incumbent's effort on the governance outcome is *decreasing* in the probability that $\theta_i = 1$.

As in the complements case, in this setting a term-limited incumbent always exerts $e = 0$, which may induce the voter to prefer a freshman candidate with lower expected ability to a term limited incumbent (as long as the incumbent is not a competent type for sure). Assumption 2 guarantees that an incumbent from Party 1 that maintains his initial reputation is re-elected against a challenger from Party 2 (even if a freshman candidate is expected to exert effort 1 in the first period in office):

**Assumption 2.** $\xi^{\dagger} < \frac{q_1 - q_2}{1 - q_2}$

The voter's equilibrium retention strategy is analogous to the two periods model:

**Lemma (2A).** *Suppose that $\omega_1 = 0$. Then, an incumbent from Party 1 would always be reelected and one from Party 2 would always be ousted, irrespective of the (anticipated) effort choice ($e^a$).*

*Suppose instead that $\omega_1 = 1$. Then,*

- *A Party 1 incumbent would always be re-elected after delivering $o_t = g$, and ousted otherwise;*
- *A Party 2 incumbent would always be ousted after delivering $o_t = b$;*
- *Fixing an anticipated level of effort $e^a$, there exists a unique $q_1^{\dagger}(e^a) \in [0, 1]$ s.t.*
  - *When $q_1 > q_1^{\dagger}(e^a)$ the voter would prefer to oust an incumbent from Party 2 after $o_t = g$*
  - *When $q_1 < q_1^{\dagger}(e^a)$ the voter would prefer to reelect an incumbent from Party 2 after $o_t = g$*

*Proof.* Notice that, as in the baseline, governance outcomes are uninformative under $\omega_t = 0$. Therefore, any Party 1 incumbent is always retained and any Party 2 incumbent is always ousted. Further, under $\omega_t = 1$ bad outcomes induce a posterior of 0. Finally, consider the last point. Recall that a second-term office holder always exerts effort 0. Therefore, the voter chooses to retain a Party 2 incumbent who delivered a good outcome in times of crisis if and only if:

$$\mu_2(1, g, e^a) > q_1 + (1 - q_1) e_1^*(1, q_1) \xi^{\dagger}, \tag{30}$$

where $\mu_2(1, g, e^a) = \frac{q_2}{q_2 + (1 - q_2) e^a \xi^{\dagger}}$ is the posterior probability that the incumbent is a good type, given conjectured level of effort $e^a$, and $e_1^*(1, q_1) = (1 - q_1)\xi^{\dagger} k$ is the equilibrium effort choice of a Party 1 incumbent in his first period in office under $\omega_t = 1$.

Notice that the LHS is not a function of $q_1$, while $\frac{\partial RHS}{\partial q_1} > 0$. (30) fails at $q_1 = 1$ and is satisfied at $q_1 = q_2$. Thus, for each $e^a$ there exists a unique $q_1^{\dagger}(e^a)$ s.t. the voter prefers to retain the incumbent if $q_1 < q_1^{\dagger}(e^a)$, and oust him otherwise. $q_1^{\dagger}(e^a)$ is s.t. (30) holds with equality. □

Next, I show that the unconditional retention strategy (whereby a Party 2 incumbent is never re-elected) cannot be sustained in equilibrium.

**Lemma (3A).** *In equilibrium, the voter re-elects a Party 2 incumbent who delivered a good outcome in times of crisis with strictly positive probability.*

*Proof.* Let $\sigma \in [0,1]$ be the retention probability after a good outcome in times of crisis. Then, a party 2 incumbent's equilibrium effort choice satisfies $e_2^*(1,q_2) = (1-q_2)\sigma\xi^\dagger k$. From Lemma 2A, we know that $\sigma = 0$ can be sustained in equilibrium if and only if $\mu_2(1,g,0) \leq q_1 + (1-q_1)e_1^*(1)\xi^\dagger$. However, notice that $\mu_2(1,g,0) = 1$: if the incumbent exerts effort 0, a good outcome is a perfect signal of competent. Therefore, the conjectured equilibrium does not exist. □

Finally, I characterize the PCs' optimal entry choice.

**Proposition (2A).** *In equilibrium, all PCs from Party 1 enter under $\chi_t = 0$ and stay out under $\chi_t = 1$, and all PCs from Party 2 enter under $\chi_t = 1$ and stay out under $\chi_t = 0$.*

*Proof.* Notice that under $\omega_t = 0$ a Party 1 incumbent is guaranteed re-election while exerting effort 0. Straightforwardly, this implies that the expected (dynamic) payoff of getting to office in time $t$ is decreasing in the probability of a crisis. Thus, these PCs' optimal entry choice is as in the baseline. Next, consider Party 2 PCs. In equilibrium, a good outcome in times of crisis ensures re-election with positive probability. Therefore, these PCs face the same strategic problem they face in the baseline. In particular, notice that getting to office under $\omega_t = 1$ and exerting effort 0 would yield a Party 2 incumbent a strictly higher payoff than getting to office under $\omega_t = 0$. Thus, the expected (dynamic) payoff of entering the race at time $t$ is increasing in the probability of a crisis. □

## 4.2 Asymmetric Information

Here, I adopt the following refinement for out of equilibrium beliefs: an unexpected entry by candidate $i$ under $\chi_t = 0$ leads the voter to form interim posterior $\widehat{\mu}_i(0)$, and an unexpected exit leads her to form interim posterior $\widehat{\mu}_i(1)$. The converse holds under $\chi_t = 1$: an unexpected entry

induces beliefs $\widehat{\mu}_i(1)$, and an unexpected exit induces $\widehat{\mu}_i(0)$. This refinement follows the spirit of D1 (Cho and Kreps 1987), adapted to a repeated game: assuming that the voter's interim posterior is fixed after the first off-the-equilibrium-path deviation (i.e., her beliefs in the remainder of the game do not change as a function of the PC's entry strategy),[3] applying D1 to this first deviation gives us the above restriction for out of equilibrium beliefs.[4] The logic is intuitive. An incumbent who is more likely to be competent is also more likely to be reelected under $\omega_t = 1$. Therefore, a low type benefits more than a high type from an off-the-equilibrium path deviation to staying out under $\chi_t = 1$ (entering under $\chi_t = 0$), and a high type benefits more from an off-the-equilibrium path deviation to staying out under $\chi_t = 0$ (entering under $\chi_t = 1$).

First, notice that under $\omega_t = 1$ governance outcomes determine the incumbent's electoral fate, regardless of the voter's interim posterior:

**Remark (1A).** *All incumbents are always re-elected after a good outcome in times of crisis and ousted after a bad outcome in times of crisis.*

*Proof.* This follows straightforwardly from the fact that governance outcomes in times of crisis are fully informative, while the informativeness of PCs' private signals is bounded away from 1. □

**Lemma (4A).** *Regardless of the private signal $\phi_i$, all PCs from Party 2 always enter the race under $\chi_t = 1$ and stay out under $\chi_t = 0$.*

*Proof.* First, it is easy to see that there can be no separating or semi-separating equilibrium in which a high type is more likely than a low type to enter under $\chi = 0$. A high type's expected payoff from getting to office under $\chi_t = 1$ is higher than a low type's. Therefore, if the low type (weakly) prefers

[3] This is not necessarily true in a PBE: because off-the-equilibrium-path beliefs are not restricted, the voter could potentially reach a new posterior in every period following a first deviation (until the PC enters a race and is hit by a crisis). Here, I exclude this possibility by assuming that, after the voter reaches a degenerate belief on the probability that $i$ observed signal $\phi_i = 1$, her beliefs on $\phi_i$ can no longer change. In the same spirit, I also assume that if PC $i$ separates at time $t$, an off-the-equilibrium-path deviation in the remainder of the game has no impact on interim beliefs.

[4] This refinement does not pin down out of equilibrium beliefs in a period in which PC $i$ pools on entering the race but loses. I assume that following a deviation the voter forms the same beliefs that survive the refinement conditional on $i$ winning the election under the same realization of $\chi_t$.

to stay out under $\chi_t = 0$, the low high must (strictly) prefer to stay out as well. Similarly, there can be no separating or semi-separating equilibrium in which a low type is more likely than a high type to enter under $\chi = 0$. Entering the race under $\chi_t = 0$ induces interim posterior $\widehat{\mu}_2(0) < q_2$, which would in turn imply that a Party 2 incumbent would only be re-elected if a crisis emerges and he is able to solve it. Regardless of the impact on the voter's interim beliefs, a deviation to staying out under $\chi_t = 0$ and entering under $\chi_t = 1$ is always profitable. Similarly, pooling on entering the race can never be sustained: as above, entering the race induces interim posterior $\widehat{\mu}_2(0) < \widehat{\mu}_1(0) < q_1$. A deviation to staying out induces $\widehat{\mu}_2(h) > q_1$ and is always profitable. Thus, in equilibrium Party 2 PCs must be pooling on staying out under $\chi_t = 0$.

Next, consider $\chi_t = 1$. First, there can be no separating or semi-separating equilibrium in which a low type enters with higher probability under $\chi = S$. A high type's expected payoff from getting to office under $\chi_t = 1$ is higher than a low type's. Therefore, if the low type (weakly) prefers to enter under $\chi_t = 1$, the high type must (strictly) prefer to enter as well. Next, there can be no separating or semi-separating equilibrium in which a high type enters with higher probability under $\chi_t = 1$. This would imply that, conditional on staying out, the voter forms interim posterior lower than $q_2$, which in turn determines that the low type prefers to get to office under $\chi_t = 1$. Thus, Party 2 PCs must be pooling on entering under $\chi_t = 1$ (pooling on staying out can never be sustained since it would imply that these PCs never get to office).

□

### 4.2.1 Proof of Proposition 4

From Lemma 4A, Party 2 PCs have no profitable deviation. Consider now PCs from Party 1. In the conjectured adverse selection equilibrium, they remain in office for two consecutive terms if no crisis emerges, or if a crisis emerges and they are able to solve it. The same holds after an off-the-equilibrium-path deviation to only entering the race under $\chi_t = 1$. However, the probability of a crisis is higher under $\chi_t = 1$, which implies that this deviation always decreases a Party 1 PC's expected payoff. The conjectured equilibrium always exists.

**Proposition (3A).** *The game always has a PBE where all PCs from Party 1 always enter the race, and all PCs from Party 2 always enter under $\chi_t = 1$ and stay out under $\chi_t = 0$. Further, the game always has a Perfect Bayesian Equilibrium where all PCs from Party 1 always enter under $\chi_t = 0$ and stay out under $\chi_t = 1$, and all PCs from Party 2 always enter under $\chi_t = 1$ and stay out under $\chi_t = 0$. No other Perfect Bayesian Equilibrium exists (beyond the one identified in Proposition 4).*

*Proof.* First, consider the equilibrium in which all Party 1 PCs always enter the race. Under $\chi_t = 0$, a Party 1 PC enters the race and (conditional on winning) is always re-elected if no crisis emerges. The probability of being in re-elected is therefore $1 - p_t(0) + p_t(0)\widehat{\mu_1}(\phi_i)$. A deviation to staying out improves this PC's interim reputation but, due to the coarse nature of elections, does not affect his electoral chances under normal times. Therefore, following the conjectured deviation, the probability of being in office for two consecutive terms if entering the race in times of crisis is $1-p_t(1)+p_t(1)\widehat{\mu_1}(\phi_i) < 1-p_t(0)+p_t(0)\widehat{\mu_1}(\phi_i)$. The deviation is never profitable. Suppose instead that $\chi_t = 1$. In the conjectured equilibrium, a Party 1 incumbent is re-elected with probability $1 - p_t(1) + p_t(1)\widehat{\mu_1}(\phi_i)$. Conjecture a deviation to staying out of the race. This deviation induces interim posterior $\widehat{\mu_1}(0) < q_2$, which implies that, upon getting to office, this PC would not be able to remain in office for two consecutive periods if no crisis emerges in his first term. Therefore, the deviation is never profitable and the conjectured equilibrium always exists.

Next, consider the equilibrium in which all Party 1 PCs enter the race under $\chi_t = 1$ and stay out otherwise. The above reasoning shows that no player has a profitable deviation under $\chi_t = 1$. Consider instead $\chi_t = 0$. A deviation to entering the race induces an interim posterior $\widehat{\mu_1}(0) < q_2$. Conditional on the voter reaching these beliefs, a Party 1 PC would prefer to be in office under $\omega_t = 1$. Therefore, the deviation is never profitable and the conjectured equilibrium always exists.

Finally, there can be no equilibrium in which Party 1 PCs play a separating or semi-separating strategy. Consider $\omega_t = 0$. If entering the race induces posterior $\widehat{\mu_1}(0) > q_2$, a deviation to always entering is profitable. In contrast, if $\widehat{\mu_1}(0) < q_2$, a deviation to staying out is profitable. Suppose instead that entering induces posterior $\widehat{\mu_1}(0) = q_2$. Notice that this is possible only if, in equilibrium,

the low type enters for sure and the high type mixes.[5] In this case, staying out induces posterior $\widehat{\mu}_1(1) > q_2$. Thus, both types have a profitable deviation to always stay out and wait for the next period in which $\chi_t = 0$. Thus, Party 1 PCs must be adopting a pooling strategy under $\chi_t = 0$.

Next, consider $\omega_t = 1$. As for the Party 2 PCs, there can be no separating or semi-separating equilibrium in which the low type enters with higher probability under $\chi_t = 1$. Conjecture instead a fully separating equilibrium in which the high type enters under $\chi_t = 1$. In the conjectured equilibrium, staying out of the race under $\chi_t = 1$ induces an interim posterior $\widehat{\mu}_1(0) < q_2$. Conditional on the voter reaching these beliefs, a Party 1 PC would prefer to be in office under $\omega_t = 1$. Therefore, the low type would always find it profitable to imitate the high type, and the conjectured equilibrium never exists. For a similar reasoning there can be no equilibrium in which Party 1 PCs adopt a mixed strategy under $\chi_t = 1$, and staying out induces posterior lower than $q_2$. Next, notice that if staying out induces a posterior higher than $q_2$, both types have a profitable deviation to stay out (waiting one more period always increases the PC 's expected payoff). Finally, suppose that staying out induces a posterior equal to $q_2$ (which is possible if the high type mixes and the low type stays out for sure). Then, it must be the case than in any subsequent period staying out of the race under $\chi_t = 1$ would induce posterior strictly lower than $q_2$, and the mixing can no longer be sustained. Therefore, a Party 1 PC can only be adopting a mixed strategy in the first period in which he encounters a signal $\chi_t = 1$. Further, notice that there can be no equilibrium in which the PC always enters the race under $\chi_t = 0$ in subsequent periods: both types would have a profitable deviation to stay out upon observing $\chi_t = 0$, so as to regain their electoral advantage (by inducing posterior $\mu_1(1)$),[6] and enter the race after that. Thus, the conjectured equilibrium may only be sustained if the Party 1 PC adopts a mixed strategy upon first observing signal $\chi_t = 1$, and in subsequent periods pools on entering the race under $\chi_t = 1$ and on staying out under $\chi_t = 0$. However, notice that in this case both types would have a profitable deviation to always enter upon first observing signal $\chi_t = 1$ (since in this first period doing so induces interim posterior $\widehat{\mu}_1(1)$ and

[5] Recall that, as for Party 2 PCs, the low type must be entering with weakly higher probability than the high type under $\omega_t = 0$.

[6] Recall that the voter's interim beliefs would be fixed after this first deviation.

guarantees reelection if no crisis emerges). Thus, no mixed strategy can be sustained in equilibrium.

### 4.2.2 Proof of Proposition 5

First, consider PCs from Party 1. Given the martingale property of posterior beliefs, the expected posterior that $i$ is a good type equals $q_i$, and the expected posterior probability of a crisis at time $t$ equals $\bar{p}$.[7] Thus, in the adverse selection equilibrium, a Party 1 PC's ex-ante probability of being in office for two terms is $(1-p_t(0))+p_t(0)q_1+p_t(0)(1-q_1)[\bar{p}(1-\psi)+(1-\bar{p})\psi]$. Suppose instead that the PC only enters the race under $\chi_t=1$. Then, the ex-ante probability of being in office for two terms is $(1-p_t(1))+p_t(1)q_1+p_t(1)(1-q_1)[\bar{p}(1-\psi)+(1-\bar{p})\psi]$. Finally, consider the unconditional entry equilibrium. The probability that a Party 1 PC remains in office fo two consecutive terms is $(1-\bar{p})+\bar{p}q_1+\bar{p}(1-q_1)[\bar{p}(1-\psi)+(1-\bar{p})\psi]$. Straightforwardly, we have:

$$\begin{aligned}(1-p_t(0))+p_t(0)q_1+p_t(0)(1-q_1)[\bar{p}(1-\psi)+(1-\bar{p})\psi]> \\ (1-\bar{p})+\bar{p}q_1+\bar{p}(1-q_1)[\bar{p}(1-\psi)+(1-\bar{p})\psi]> \\ (1-p_t(1))+p_t(1)q_1+p_t(1)(1-q_1)[\bar{p}(1-\psi)+(1-\bar{p})\psi].\end{aligned} \tag{31}$$

Consider now PCs from Party 2. In the adverse selection equilibrium, their ex-ante probability of being to office for two terms is $\bar{p}q_2+(1-\bar{p}q_2)[\bar{p}\psi+(1-\bar{p})(1-\psi)]$: a Party 2 incumbent wins the second period election if a crisis emerges in the first term and he is able to solve it, or if the *second* period public signal indicates a crisis, thus inducing his opponent to stay out of the race. Similarly, if Party PCs candidates only enter under $\chi_t=1$, a Party 2 PC is in office for two terms with probability $\bar{p}q_2+(1-\bar{p}q_2)[\bar{p}(1-\psi)+(1-\bar{p})\psi]$. In the unconditional entry equilibrium, a Party 2 incumbent is reelected with probability $\bar{p}q_2$. Straightforwardly, if and only if $\bar{p}>\frac{1}{2}$ we have that:

$$\bar{p}q_2+(1-\bar{p}q_2)[\bar{p}\psi+(1-\bar{p})(1-\psi)]>\bar{p}q_2, \tag{32}$$

[7] Precisely, the probability of a crisis in the first period in which $i$ is drawn from the pool.

and

$$\bar{p}q_2 + (1 - \bar{p}q_2)[\bar{p}\psi + (1 - \bar{p})(1 - \psi)] > \bar{p}q_2 + (1 - \bar{p}q_2)[\bar{p}(1 - \psi) + (1 - \bar{p})\psi]. \quad (33)$$

□

# 5 Appendix E: an Analysis of Gubernatorial Elections

The aim of this section is not to provide a test of the model, but simply to take a first step in that direction and present some suggestive evidence that the inefficiency it highlights may be more than a mere theoretical possibility. To this aim, I analyze data on gubernatorial candidates in the US, from 1892 to 2016 (from Hirano and Snyder 2019). In my model, a potential candidate's quality is represented by the prior probability of being a competent type ($q_i$). This finds a clear correspondence in the dataset, that captures candidates' expected 'ability to perform the tasks associated with the office they are seeking' (Hirano and Snyder 2019: 89) and thus deliver a good governance outcome (p. 94). This measure is coded as a a binary variable, taking value one if the candidate has prior relevant experience (i.e., in a major statewide executive position or as the mayor of a major city), and zero otherwise.[8] While in my model quality is a continuous variable, the results have a clear analogue under a binary measure. My theory predicts that the average quality of the pool of candidates (or, equivalently, the expected quality of the best candidate) should be lower in times of crisis. Further, we know from Proposition 1 that the best potential candidate will choose to stay out of the race (and thus his party will have to resort to the reserve candidate) only if the opponent is very unlikely to be competent. Under a binary measure of quality, these results imply the probability that *neither* party is able to field a high-quality candidate should increase

[8]While previous experience is a standard measure of quality in the literature, it is somewhat problematic in my setting: if a candidate has previous experience this implies that voters have potentially more information about his true type, and this information may be good or bad. However, we could argue (in line with my assumption in the infinite-horizon model), that if an elected official is exposed to a shock and reveals himself as a low type, he is ousted and can never re-enter the pool of candidates, whether for the same position or for higher office. Under this assumption, candidates with previous relevant experience are, on average, of higher quality. Nonetheless, future research should evaluate the robustness of the results to alternative measures of quality.

during periods of crisis (in the model, in periods in which the public signal indicates an upcoming crisis). Thus, I focus on open-seat elections and code my outcome variable as the share of races in year $t$ in which neither party is able to field a high-quality candidate. I consider the whole pool of primary candidates (rather than looking directly at the general election), in order to isolate (as much as possible) the supply-side problem from potential strategic considerations at the party level. Finally, I use the NBER coding of *national-level* recessions to identify exogenous (to the individual state and governor) crises.[9] Thus, I run the following regression:

$$y_t = \alpha + \beta S_t + \epsilon_t \tag{34}$$

$y_t$ is the share of open-seat races in year $t$ where no primary candidate is a high-quality one. $S_t$ is a binary indicator taking value one if a national-level recession occurs during year $t$ and zero otherwise.[10]

In line with the predictions of the theory, the coefficient $\beta$ is positive. In a non-crisis year, roughly 15% of all open-seat races see both parties unable to field a high-quality candidate (i.e., no high-quality candidate takes part in either primary). In a crisis year, this share jumps to 28% on average (p. value 0.018).[11]

[9]Let me note that the analysis in Jacobson (1989) is somewhat related. Jacobson looks at how national economic conditions influence the likelihood that incumbents faces a high-quality challenger in congressional elections. He finds that high-quality challengers are more likely to run when a co-partisan of the incumbent is in the White House, and national economic conditions are poor. The mechanism hypothesized is orthogonal to mine: the incumbent's party is blamed for poor economic outcomes at the national level, which reduces the incumbent's electoral strength. This increases the likelihood that a challenger is able to win, thereby attracting high-quality challengers to the race. Here, I focus on open-seat elections, where this mechanism has no bite (recall that my outcome variable is the probability that *neither* party is able to filed a high-quality candidate).

[10]In some states primaries occur several months before the general election. Reassuringly, the results are robust to coding $t$ as a non-crisis year if the the recession only emerges the second half.

[11]These results are robust to clustering the standard errors at the state level.