Political Competition over Property Rights Enforcement*

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Abstract

I study what level of tax-financed property rights enforcement societies choose in elections. The competitiveness of these elections is determined by restrictions on who can run for office, which define a political elite. Two candidates from this political elite run for office, proposing enforcement levels and tax rates. The election winner keeps the budget surplus but has to take into account the loser’s outside option, which thus determines the policy outcome. More competitive elections are associated with more secure property rights. Lifting restrictions on who can run for office may benefit society more than lifting restrictions on who can vote.

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JEL classification: D72, O17, P16.

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1 Introduction

The security of property rights matters for economic outcomes (see, e.g., Knack and Keefer 1995; Hall and Jones 1999). Why does it vary across countries? Much of the existing literature on property rights focuses on policies chosen by politically powerful groups (see, e.g., Acemoglu 2003, 2006, 2008). However, most countries today choose policies based on how their population votes. In 2000, 170 countries held regular elections with on average 98.5% of the adult population eligible to vote. But, as North et al. (2006, pp. 66-67) argue, “elections do not mean the same thing” across countries. Given well-defined property rights, what determines the level of their enforcement chosen in elections? Why might this choice vary across countries with similar economic fundamentals?

North et al. (2006, p. 67) emphasize the role of political competition in how elections work; and elections are not equally competitive across countries. For the year 2000, of those 170 countries with regular elections, 123 allow for direct comparison with Polity IV’s measure of the Competitiveness of Executive Recruitment. In only 65 of them, executives were chosen by “election,” in 27 by “selection,” in 31 by an intermediate selection process. The least competitive category called “selection,” as opposed to the most competitive category called “election,” includes, e.g., “rigged, unopposed elections” as well as “selection within an institutionalized single party” (see Marshall et al. 2016, p. 21). In this subset of 123 countries, Polity IV’s Competitiveness of Executive Recruitment thus effectively measures the competitiveness of elections. The correlation of this measure with the World Bank’s governance indicators Rule of Law and Control of Corruption is 0.55 and 0.52, respectively. That is, more competitive elections are associated with the perception of more secure property rights.

This paper emphasizes one aspect of political competition: broad access to political activities. Societies with similar economic fundamentals may choose different outcomes in elections because they have different alternatives available to choose from. These alternatives differ due to variations in restrictions on who can be active in the political arena and run for office. Such restrictions may be formal property or educational qualifications for office as prevalent in history (see, e.g., Miller 1900) as well as the importance of connections or status established by economic success or inheritance as still prevalent today (see, e.g., Dal Bó et al. 2009). The latter type of implicit restrictions encompasses the existence of narrow political elites in countries that hold elections in which virtually all adults can vote.

In the model I present in Section 2, some individuals can “steal” from others who produce

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1For a prominent example focusing on agency problems, see Acemoglu and Verdier (1998).
2Data from Paxton et al. (2003), via Bruce Moon’s web page: http://www.lehigh.edu/~bm05/democracy/suffrage_data.html. The authors require evidence of regular elections but do not judge their fairness (p. 95).
3See, e.g., Diamond (2002) on various concepts and classifications of electoral regimes and their prevalence.
with heterogeneous productivity. Here, I think of stealing as a synonym for unproductive and purely redistributive activities such as corruption, extortion, fraud, or outright theft. I assume that the act of producing output establishes the right to consume it and to exclude others from consuming it. Enforcing this right against those who steal makes property rights secure. I focus on public enforcement that is financed by taxation.\footnote{See, e.g., Besley and Persson (2009, 2010) on state capacity for taxation and property rights enforcement. Herrera and Martinelli (2013) study investment in state capacity in oligarchic and democratic societies.} As an extreme case, one can think of a kleptocratic state lacking well-defined property rights assignments as one in which such rights are well-defined and assigned to producers, but severe taxation (or expropriation) and unimpeded stealing prevail (see, e.g., Acemoglu et al. 2004).\footnote{Also see, for example, Olson (1993); Moselle and Polak (2001); Konrad and Skaperdas (2012).}

The level of enforcement regulates how much can be stolen. It is chosen by society in a political process. Political institutions determine how many individuals from which groups in society can be active in the political arena, i.e., can run for office. Two individuals from this politically active population choose to become candidates in electoral competition. They each propose a tax rate and a level of enforcement. The population votes over the proposals to decide the outcome. If political activity is restricted to those five individuals with the highest incomes—instead of open to five million individuals with many different income levels—then the population constitutes a large non-elite group that votes over policies proposed by members of a narrow political elite.\footnote{Bidner et al. (2014), for example, rationalize the existence of elections in such environments.} If not everybody can vote, then voters themselves can constitute a narrow elite within which, potentially, not everybody can run for office.

I show in Section 3 that a strategic interaction in the political game shapes society’s choice by determining the set of alternatives voters can choose from. The regimes the candidates propose for the election depend on the loser to-be’s outside option, which is characterized by their productivity. Therefore, different losers to-be, with different productivity, induce different alternatives for voters to choose from, and thus different outcomes. Two initially otherwise identical societies with different election losers choose different levels of enforcement and see different levels of property rights security.

In line with the correlations mentioned above, the model suggests that we are more likely to see more secure property rights in societies with more competitive political environments.\footnote{More generally, Besley et al. (2010) argue that competition may lead political parties to choose policies that further economic performance and growth. They find evidence supporting their argument in U.S. data. Padovano and Ricciuti (2009) find similar results using data from Italy. Svaleryd and Vlachos (2009) study the effects of both political competition and media coverage on political rents in Sweden.} Allowing five million individuals to be politically active and run for office, rather than only those five with the highest incomes, induces a favorable set of alternatives for voters to choose from. At the same time, given two alternatives, allowing more people to vote does not change the election outcome. It follows that lifting restrictions on who can vote only has an effect if it coincides with lifting restrictions on who can run for office. This prediction is due to the
absence of the economic mechanisms at work in models of the extension of voting rights, like Acemoglu and Robinson (2000, 2001), Lizzeri and Persico (2004), and Gradstein (2007). In a different context and without the strategic interaction I focus on, Corvalan et al. (2017) make a similar point.

The model can capture both decision making in narrow political elites and in elections in which virtually all adults can vote. It connects different outcomes in societies in which everybody can vote to the competitiveness of elections in the sense of implicit and explicit restrictions on who can run for office. If more productive projects in the model are interpreted to be positively correlated with more education or greater wealth, then the model offers a justification for lifting landholding, wealth, or literacy requirements for political activities (see, e.g., Miller 1900; also see Engerman and Sokoloff 2005 on voting rights).

My setup shares a selection stage with citizen-candidate models introduced by Osborne and Slivinski (1996) and Besley and Coate (1997). However, I assume that candidates can commit to electoral platforms as they otherwise implement outright dictatorship once in office. I therefore have a second stage in which political competition gives rise to a second strategic interaction that would be absent otherwise. Messner and Polborn (2004), for example, model a set of potential candidates for office that differ in competence in office and their exogenous opportunity cost or office benefits. In my model, potential candidates differ with respect to the productivity of the project they execute when not in office. The rents from holding office and the office holder’s opportunity costs arise endogenously from the electoral competition. In equilibrium, one candidate runs and loses with certainty to “dictate” the outcome. While Messner and Polborn (2004) rationalize some restrictions on those who can run for certain positions, my results suggest that, in the context of this paper, restrictions should be lifted.

Acemoglu (2005) models a ruler that raises taxes from citizens to spend some of the receipts on a productive public good and consume the rest. The ruler’s policy choice is constrained by either an opportunity to avoid paying taxes or the threat of replacement in the future. By contrast, I focus on constraints arising from competition in the political arena, however intense it may be, and their effects on societies’ choices through the alternatives available to voters. The intuition of the outcome of the political game here is related to the one described by Gersbach (2009) in a citizen-candidate model with a focus on politician remuneration. In his environment, candidate politicians competitively propose their wage in office. In equilibrium, a more competent candidate collects a rent determined by the exogenous competence of the competitor. The proposed wage is just high enough to make the voters indifferent between the candidates. In my model, the candidate with the less productive project collects a rent that depends on both the productivity of the competitor’s project and the endogenous policy outcome. The election winner makes the election loser indifferent between being in office and

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9 The model generates in-office rents from weak institutions and kleptocratic states nonetheless.
not being in office. Finally, Polo (1999) studies under what conditions the winner of a two-candidate election can capture political rents. He focuses on uncertain voter preferences over candidate attributes. By contrast, I focus on strategic interactions arising from candidates' outside options and restricted access to the political arena.

I describe the model in Section 2, present its predictions in Section 3, and discuss my assumptions and the robustness of the model predictions in Section 4, before I conclude.

2 The Model

The Environment. There is a large finite number $p + a + 1$ of risk neutral agents. Except for one idle individual, each agent belongs to one of two mutually exclusive groups of $p$ producers and $a$ appropriators. There are (at least three) more producers than appropriators: $p - 2 > a > 0$. I discuss this assumption and the case of $p - 2 < a$ in Section 4.2.

Each of the $p$ producers has one of $p$ projects with publicly observable, heterogeneous productivities collected in the set $\mathcal{W} = \{w_1, w_2, \ldots, w_p\}$, where $w_{i+1} > w_i > 0$ for all $i = 1, \ldots, p - 1$. A project produces a quantity equal to its productivity of the consumption good. To simplify notation, I normalize aggregate output to one, i.e., $\sum w_i = 1$. The assumption that output is fixed is not essential because the economic mechanism works through outside options. I discuss and relax this assumption in Section 4.3, which includes Proposition 6.

Producers earn the proceeds accruing to their projects, say $w$. I often refer to a specific producer using the productivity of the associated project. They then pay proportional taxes with rate $\tau \in [0, 1]$ on that income $w$ and are expropriated of a fraction $\theta \in [0, 1]$ of their after-tax income $(1 - \tau)w$. For simplicity, neither enforcement nor appropriation activities target specific groups. That is, when producing $w$, a producer consumes $(1 - \theta)(1 - \tau)w$. The expression $(1 - \theta)(1 - \tau)$ determines exactly what fraction of their output producers can consume. It thus captures the security of property rights, both against private agents and the state. The expression $(1 - \theta)$ represents the secure fraction of after-tax income and thus the level of property rights enforcement. Relative to the implemented enforcement, after-tax income itself, and thus the expression $(1 - \tau)$, represents the extent to which the state, i.e., the office holder, grabs resources.

The $a$ appropriators engage in a sector for unproductive and purely redistributive activity. That sector appropriates a fraction $\theta \in [0, 1]$ of all after-tax income in the economy before it can be consumed. The focus is on appropriation activities that do not require any specialized ability, as opposed to potentially skill-intensive activities such as, e.g., financial fraud. Each appropriator receives some fixed nonzero share of all appropriated resources so that the shares add up to one. Equal shares are a special case. Unequal shares reflect the varying effectiveness of appropriation activities as well as, possibly, connections to and roles within a corrupt elite.

Enforcing the property rights to a fraction $(1 - \theta)$ of after-tax income requires society
to incur a cost $g(1 - \theta)$. The function $g : [0, 1] \rightarrow \mathbb{R}_+$ is twice continuously differentiable, strictly increasing, with derivative $g'(1 - \theta) > 0$, and strictly convex, with second derivative $g''(1 - \theta) > 0$, on $(0, 1)$. Perfect enforcement is unaffordable, $g(1) \geq 1$, no enforcement is costless, $g(0) = 0$, and fixed costs, if any, are low enough, $1 > \lim_{(1 - \theta) \rightarrow 0} g(1 - \theta) \geq 0$.

**The Political Process.** Society chooses the secure fraction $(1 - \theta)$ and the tax rate $\tau$ to raise the funds to pay for it in a political process. At the outset, a number $n \leq p$ of producers associated with the most productive projects are presented with an opportunity to actively engage in the political arena. They belong to the set of potential candidates, $N = \{w^N_1, \ldots, w^N_n\} = \{w_{p+1-n}, \ldots, w_p\} \subseteq W$, that can choose to run for office. Appropriorators and the idle individual can never run for office. This assumption captures the idea that elite status, political and otherwise, is determined by economic success and its sources, as reflected by the associated project, and the implied visibility and involvement in relevant networks. Formal property or educational qualifications for office (see Miller 1900) tend to favor those best equipped for economic success. In fact, causality may well be reverse: in many societies, being a member of the elite might be a prerequisite for economic success.

Given $N$, there may be an election that decides who wins the office. At most two candidates can run for office, and running is costless. All agents in $N$ decide whether or not to run. The productivities of the projects of all agents in $N$, the environment, and the below structure of the game are common knowledge among all agents in $N$. Let $N' \subseteq N$ be the set of potential candidates who choose to run. If there is no candidate for office, then the “anarchy” regime is that no taxes are collected and no enforcement is put in place: $(\theta^a, \tau^a) = (1, 0)$. If there is only one candidate, then that agent becomes a dictator and enacts some regime $(\theta^d, \tau^d)$. If there are exactly two candidates, then the two of them run for office in an election. If there are more than two potential candidates that want to run, then two of them are drawn at random, with equal probability. I refer to the candidates as $w_L$ and $w_H$, where $w_L < w_H$. All noncandidate producers and appropriators can vote in the election. Candidates and the idle individual cannot vote. This assumption simplifies the exposition but is otherwise immaterial. The candidates compete by simultaneously announcing and committing to enact a regime, i.e., a proportional tax rate $\tau$ and a level of enforcement $(1 - \theta)$, where $(\theta, \tau) \in [0, 1]^2$. I refer to the regimes the candidates $w_L$ and $w_H$ propose as $(\theta_L, \tau_L)$ and $(\theta_H, \tau_H)$, respectively.

After the proposals have been announced, a preference shock realizes. With a small probability $\varepsilon > 0$, voters that are indifferent between the proposed regimes prefer a candidate that is public-spirited in the following sense: Given the opponent’s proposal, the maximum in-office payoff that the candidate can get from any regime that has a positive probability of winning the election is strictly less than the payoff from losing the election, which is this candidate’s opportunity cost of getting into office. That is, given the proposed regimes, with

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10 This shock does not affect the characteristics of equilibrium of this stage. See Section 4.1 for a discussion.
Table 1

Stages and Timing

<table>
<thead>
<tr>
<th>Stage 1: Selection Game</th>
<th>Stage 2: Political Game</th>
<th>Stage 3: Underlying Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) The set $N$ is fixed.</td>
<td>1.) $w_L$ and $w_H$ propose regimes.</td>
<td>1.) Producers produce, pay taxes.</td>
</tr>
<tr>
<td>2.) The agents in $N$ select candidates $w_L$ and $w_H$.</td>
<td>2.) The shock realizes.</td>
<td>2.) Enforcement is set up.</td>
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<td></td>
<td>3.) The office holder is elected.</td>
<td>3.) Appropriation takes place.</td>
</tr>
<tr>
<td></td>
<td>4.) The regime is enacted.</td>
<td>4.) All agents consume.</td>
</tr>
</tbody>
</table>

probability $\varepsilon$, voters that are indifferent between the regimes vote for the candidate whose payoff from losing the election is strictly higher than the highest possible in-office payoff this candidate could get from a regime that has a chance to win the election. If both or none of the candidates are public-spirited in this sense, then no candidate has an advantage. With probability $1 - \varepsilon$, only the proposed regimes matter to voters. Then, voters vote sincerely for one candidate or abstain if they are indifferent. The candidate that receives the majority of all votes cast wins the election. Ties are split with a fair coin flip. The assumption that $p - 2 > a$ implies that the majority of voters are producers. (I discuss the case of $p - 2 < a$ in Section 4.2.)

The election winner becomes society’s top executive, serves as full-time office holder, and cannot execute their project. The assumption that the office holder has to give up their project altogether is not essential. I discuss and relax this assumption in Section 4.4, which includes Proposition 7. The office holder’s payoff $\tilde{w}$ equals total tax receipts minus the cost of implementing $(1 - \theta)$. It is not subject to taxation or appropriation—e.g., because the security around the top executive is generally high. The idle individual, who has no income otherwise, takes over and executes the election winner’s project, at the expense of being subject to taxation and appropriation. The role of this assumption is technical in nature as it lends tractability without having to impose more structure. I discuss the details and possible economic interpretations in Section 4.5. The election loser executes their productive project, given the regime enacted by the winner.

The Timing. Table 1 summarizes the timing. At the outset, the potential candidates are fixed. They decide whether or not to enter the electoral competition to determine two candidates that run for office. Then, the two candidates propose regimes and, after the preference shock is realized, the qualified electorate votes over the alternatives presented. The majority winner enacts the proposed regime. Thereafter, producers execute their projects, generate income, and pay taxes. Then, enforcement is implemented. After that, the appropriation sector appropriates and redistributes resources from producers. Finally, all agents consume.
3 Analysis

The economy evolves in three stages: the selection game given a set of potential candidates, the political game given two candidates, and the underlying economy given a regime. I take the economic fundamentals summarized by the set of project productivities $W$ and the enforcement technology $g$ as given. The equilibrium concept is subgame perfect equilibrium: All potential candidates’ decisions to run for office are best responses to all other potential candidates’ decisions, taking as given that each candidate’s regime proposal in the political game is a best response to the other candidate’s regime proposal. I solve the model backwards. I first describe the underlying economy given any regime $(\theta, \tau)$ and the outcome under anarchy, dictatorship, and direct democracy. Then, I study the choice of $(\theta, \tau)$ in the political game given the productivities of the candidates’ projects. Finally, I analyze the selection from potential candidates to candidates and the effects of changes in the underlying political institutions. I specify the available strategies, the payoffs these map into, and the definition of equilibrium of the respective stage along the way. I collect all proofs in Appendix A.

3.1 The Economy Given a Regime

The payoff of producers is determined by a payoff factor that can be captured by the quasi-concave function $\varphi : [0, 1]^2 \rightarrow [0, 1]$, given by $\varphi(\theta, \tau) = (1 - \theta)(1 - \tau)$, and the productivity of their project. Given a regime $(\theta, \tau)$ enacted by the office holder, a producer $w_i$’s payoff is

$$\varphi(\theta, \tau)w_i = (1 - \theta)(1 - \tau)w_i.$$

By taking over and executing the office holder’s project, the idle individual becomes a producer, and aggregate output is 1. The resources that the appropriation sector acquires and distributes to its members are given by the quasiconcave function $\nu : [0, 1]^2 \rightarrow [0, 1]$, given by

$$\nu(\theta, \tau) = \theta(1 - \tau).$$

Every appropriator receives a nonzero share of $\nu(\theta, \tau)$ so that the shares add up to one. The office holder’s payoff is given by the strictly concave function $\tilde{w} : [0, 1]^2 \rightarrow \mathbb{R}$, defined as

$$\tilde{w}(\theta, \tau) = \tau - g(1 - \theta).$$

The first part, $\tau$, are all collected taxes; the second part, $g(1 - \theta)$, is the cost of enforcing the secure fraction $(1 - \theta)$ of after-tax income. Similar formulations can be found in, e.g., Polo (1999), Acemoglu (2005). I ignore the feasibility constraint $\tau \geq g(1 - \theta)$, as it never binds.
3.2 Anarchy, Dictatorship, and Direct Democracy

By assumption, the anarchy regime is \((\theta^a, \tau^a) = (1, 0)\). That is, no taxes are raised, no enforcement is implemented, and property rights are perfectly insecure. In this case, producers have a payoff of zero, while appropriators obtain a positive payoff, as they are sharing all output amongst them.

The political process may deliver a dictator whose problem is to maximize in-office payoff,

\[
\max_{(\theta, \tau) \in [0,1]^2} \tilde{w}(\theta, \tau).
\]

The solution is \((\theta^d, \tau^d) = (1, 1)\). The dictator taxes away all production and does not implement any enforcement whatsoever. The associated payoff is \(\tilde{w}^d = \tilde{w}(\theta^d, \tau^d) = 1\). Producers and appropriators consume nothing. The dictator is rich, the population is poor.

If this society were a direct democracy, then the enacted regime would maximize the majority’s payoff, subject to budget balance. If the majority were appropriators, then they would choose anarchy. If the majority were producers, as I assume here, then they would choose some taxation and enforcement. To the extent that appropriation represents redistribution from productive to unproductive agents, these predictions resemble results in Meltzer and Richard (1981).

3.3 The Political Game Given Two Candidates

In this section, I show that the candidate with the less productive project wins the election, but the enacted regime is dictated by the productivity of the loser’s project. Thus, the set of alternatives voters face depends on and changes with the loser, which leads to different regimes and outcomes given the same fundamentals and office holder. I first specify strategies and payoffs and define the equilibrium of the subgame, which I then describe. Recall that the candidates and the regimes they propose are \(w_L, w_H, (\theta_L, \tau_L)\), and \((\theta_H, \tau_H)\), where \(w_L < w_H\).

3.3.1 Strategies, Payoffs, and Subgame Equilibrium Definition

Facing the set of proposals \{\((\theta_L, \tau_L), (\theta_H, \tau_H)\)\}, every voter evaluates the associated payoffs. All \(p - 2\) noncandidate producers vote for regime \((\theta, \tau)\) over the alternative regime \((\theta', \tau')\) if

\[
\varphi(\theta, \tau) > \varphi(\theta', \tau')
\]

and, disregarding the preference shock, abstain if

\[
\varphi(\theta, \tau) = \varphi(\theta', \tau').
\]
That is, as noncandidate producers constitute the majority of voters, if \( \varphi(\theta, \tau) > \varphi(\theta', \tau') \), then \((\theta, \tau)\) wins the election over \((\theta', \tau')\) with certainty. Similarly, all \( a \) appropriators vote for regime \((\theta, \tau)\) over the alternative regime \((\theta', \tau')\) if

\[
\nu(\theta, \tau) > \nu(\theta', \tau')
\]

and, disregarding the preference shock, abstain if

\[
\nu(\theta, \tau) = \nu(\theta', \tau').
\]

When proposing regimes, candidates \( w_L \) and \( w_H \) take into account the probabilities of winning the election determined by voting. In specifying the probabilities of winning, it is convenient to let \( \sigma = (\theta, \tau) \). Given the productivities of the candidates’ projects \( w_i \) and \( w_{-i} \) and the proposals \( \sigma_i = (\theta_i, \tau_i) \) and \( \sigma_{-i} = (\theta_{-i}, \tau_{-i}) \), let

\[
\text{Prob}\{ w_i \text{ wins } | w_i, w_{-i}, \{(\theta_i, \tau_i), (\theta_{-i}, \tau_{-i})\} \} = P(\sigma_i, \sigma_{-i}; w_i, w_{-i}) = \text{Prob}\{ w_i \text{ wins } | w_i, w_{-i}, \{(\theta_i, \tau_i), (\theta_{-i}, \tau_{-i})\} \}
\]

be the probability that candidate \( w_i, i \in \{L, H\} \), wins the election. Disregarding the preference shock, the probability of the regime \((\theta, \tau)\) winning over the alternative regime \((\theta', \tau')\) is zero if \( \varphi(\theta, \tau) < \varphi(\theta', \tau') \) or \( \varphi(\theta, \tau) = \varphi(\theta', \tau') \) and \( \nu(\theta, \tau) < \nu(\theta', \tau') \), one half if and only if all voters are indifferent, and one if \( \varphi(\theta, \tau) > \varphi(\theta', \tau') \) or \( \varphi(\theta, \tau) = \varphi(\theta', \tau') \) and \( \nu(\theta, \tau) > \nu(\theta', \tau') \), respectively. A necessary condition for the preference shock to be effective is that the majority of voters—the noncandidate producers—are indifferent between the regimes. If producers prefer one regime over the other, then they vote for it and it wins the election with certainty, irrespective of the preference shock. If producers are indifferent between the proposed regimes and for (only) one candidate, given the opponent’s proposal, all platforms with positive probability of winning give a payoff in office that is lower than the payoff from losing, then that candidate is preferred by all producers if public-spiritedness happens to matter. That is, with probability \( \varepsilon > 0 \) all producers vote for this candidate, who then wins the election, even if appropriators vote for the opponent.

Candidate \( w_i, i \in \{L, H\} \), proposes \((\theta_i, \tau_i)\) to maximize their expected payoff and solve

\[
\text{(PP)} \quad \max_{(\theta_i, \tau_i) \in [0, 1]^2} \{ P(\sigma_i, \sigma_{-i}; w_i, w_{-i}) \tilde{w}(\theta_i, \tau_i) + (1 - P(\sigma_i, \sigma_{-i}; w_i, w_{-i}))\varphi(\theta_{-i}, \tau_{-i}) w_i \}.
\]

The objective is the sum of the in-office payoff the proposal implies when winning, weighted by the probability of winning, and the out-of-office payoff under the opponent’s proposal when losing, weighted by the probability of losing. An equilibrium of this stage is defined as follows.

**Definition 1 (Equilibrium of the political game given two candidates).** Given two candidates \( w_L \) and \( w_H \), an equilibrium of the political game is a set of proposals \( \{(\theta_L, \tau_L), (\theta_H, \tau_H)\} \) such that, for all \( i \in \{L, H\} \), given \( (\theta_{-i}, \tau_{-i}) \), \(-i \in \{L, H\}\setminus\{i\}\), \((\theta_i, \tau_i)\) solves problem \(\text{(PP)}\).
3.3.2 Equilibrium of the Political Game Given Two Candidates

The following proposition characterizes the equilibrium of the political game.

Proposition 1. Given two candidates $w_{L}$ and $w_{H}$, the political game has an equilibrium. In every equilibrium, candidate $w_{L}$ proposes the same regime and wins the election with certainty, while candidate $w_{H}$ proposes more enforcement. The more productive the loser’s project is, that is, the higher $w_{H}$, the worse is enforcement, the less secure are property rights, the lower are the producers’ payoffs, and the higher is the office holder’s payoff.

The winning regime $(\theta_{L}, \tau_{L})$ is the single relevant object, and it is unique. While the majority of voters are producers, in equilibrium, the decisive voters in the election are the appropriators in the electorate. The reason is as follows. The payoff from production equals a payoff factor determined by the prevailing regime, multiplied by the productivity of the producer’s project. In equilibrium, both regimes offer the same payoff factor to producers. Offering a strictly higher payoff factor than the other candidate wins the election with certainty. But it also invites a small increase in the tax rate to win the election with a strictly higher payoff in office. Therefore, producers must be indifferent and the regime that offers appropriators the higher payoff, through less enforcement, wins the election. That is, not only are appropriators the cause of the need for enforcement in the first place, they are also the decisive voters that determine the level of enforcement being implemented. To the extent that the chosen level of enforcement is low, those agents who live off appropriation activities are an obstacle to society choosing to implement more secure property rights.

The office holder can extract resources from the economy by setting high taxes and offering low enforcement expenditure. The loser to-be constrains the office holder to-be’s discretion on such extraction through two channels. First, the loser to-be’s proposal gives voters an alternative the winner to-be’s proposal has to beat. Second, the winner to-be’s regime proposal is constrained by the loser to-be’s outside option. In equilibrium, the loser to-be has to weakly prefer losing the election and executing the project under the regime enacted by the winner to-be to getting into office with a regime proposal that at least ties the election. Therefore, the winner to-be cannot set “too high” taxes and divert “too much” of the receipts away from their use in enforcement. High taxes and weak enforcement give the winner to-be a high in-office payoff but offer the loser to-be a low payoff in production. Once this payoff from production is too low, relative to the winner to-be’s in-office payoff, the loser to-be wants to get into office. In equilibrium, this constraint is binding and the winning regime solely depends on the productivity of the loser to-be’s project, who thus determines (dictates) the equilibrium regime. It follows that two economies with the same technology, the same set of productive projects, and the same office holder may choose to implement different regimes. Different election losers to-be lead to different alternatives facing the respective voters, who then choose different outcomes.
Candidate $w_L$ wins the election because candidate $w_H$ has the better project and thus faces higher opportunity costs. In equilibrium, the winner-to-be’s in-office payoff cannot be greater than the loser-to-be’s payoff in production under the winner’s regime. Otherwise, the loser-to-be could profitably deviate to a regime proposal that stands a chance to win the office, with a higher payoff. Therefore, in any scenario in which candidate $w_H$ wins the election, the associated in-office payoff is constrained by candidate $w_L$’s outside option, whose project is less productive. That is, rather than holding office, $w_H$ would prefer to execute the project under the regime put in place. Thus, in equilibrium, $w_H$ loses the election and produces, while $w_L$ holds office for a payoff that $w_H$ would accept, too, i.e.,

$$\tilde{w}(\theta_L, \tau_L) = \varphi(\theta_L, \tau_L)w_H.$$ (1)

The fact that the productivity of the loser-to-be’s project determines the equilibrium regime has implications for variations in $w_H$. Given any regime, a candidate with a more productive project at hand requires a higher in-office payoff to be indifferent between holding office and executing the project. Facing an opponent that requires a high in-office payoff allows the candidate who eventually wins the election to also ask for a higher in-office payoff—setting high taxes and diverting a lot of resources, which lowers production payoffs—than in a case where the opponent requires a rather low payoff to hold office. In other words, a worse outside option for the loser-to-be requires a lower in-office compensation to induce indifference. The winner-to-be faces a tighter (binding) constraint, which restricts discretion more and leads to a favorable set of alternatives the electorate can choose from. Therefore, the less productive the loser-to-be’s project is, the lower $w_H$, the better is the enforcement implemented and the more secure are property rights. This result suggests that societies whose leaders and runners-up (or, more generally, politicians) do not have too high out-of-office earning potentials (before any effects of having served in office), relative to the population, should do better than societies whose political leaders have extremely high relative earning potentials. It does not say that we should expect to see uneducated or unskilled political leaders. In addition, ignoring economic fundamentals, one might expect only small differences among established democratic societies but larger differences between those and autocratic or oligarchic societies. In the latter, the earning potential of the political elites and their associates is likely relatively higher, compared to the rest of the population, than in the former. Finally, the office holder’s payoff increases with the loser’s productivity. That is, in societies with weak enforcement and insecure property rights in equilibrium, office holders capture high payoffs. This implication is consistent with anecdotal evidence that autocrats tend to accumulate relatively more wealth while in office than leaders in established democratic societies (see, e.g., Acemoglu et al. 2004).

The majority rule equilibrium here is induced by the institutional structure of the political

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process, a possibility pointed out by Plott (1967) and emphasized by Shepsle and Weingast (1981). While the candidates have no incentive to deviate, there exist regimes in the policy space that would command a majority over the winning proposal. Any regime that increases the payoff of producers would win the election. In fact, being a producer, the loser would prefer such a regime. However, proposing it would guarantee an in-office payoff that is strictly less than the payoff the loser gets from production under the currently winning regime. No agent that is not a candidate can propose it. The winner to-be has no incentive to propose it and, in fact, would like to extract more resources. Trying to do so, however, means to lose the election and being left with a payoff from production that is strictly less than the in-office payoff associated with the initially winning proposal. Thus, nobody can profitably deviate.

Given the outcome of the political game between any two candidates, I can analyze the selection of potential candidates into electoral competition.

3.4 The Selection Game Given a Set of Potential Candidates

At this stage, all potential candidates want agents with rather unproductive projects to run because election losers with worse outside options imply preferred outcomes. Thus, in equilibrium, the two potential candidates with the least productive projects run for office. I first specify strategies and payoffs and define the equilibrium of the subgame to then analyze it.

3.4.1 Strategies, Payoffs, and Subgame Equilibrium Definition

Consider the set \( N = \{w_1^N, \ldots, w_n^N\} \) of potential candidates, with their indices collected in \( J = \{1, \ldots, n\} \). For any \( j \in J \), let \( N_j = N \setminus \{w_j^N\} \) be the set of all agents in \( N \), except \( w_j^N \). Each agent \( w_j^N \in N \) chooses \( \chi_j \in \{0, 1\} \), where \( \chi_j = 1 \) indicates running (if drawn when more than two want to run), while \( \chi_j = 0 \) indicates not running. A strategy profile for \( N \) is given by \( \{\chi_j\}_{j \in J} \), a profile for \( N_k \) is given by \( \{\chi_j\}_{j \in J \setminus \{k\}} \). Any such strategy profiles can be summarized by the sets \( N' = \{w_j^N \in N : \chi_j = 1\} \) and \( N'_k = \{w_j^N \in N_k : \chi_j = 1\} \), collecting the agents that want to run. Let \( n'_k = |N'_k| \).

Fixing \( j \in J \), for all \( w' \in N'_j \), define \( x_j(w') = |\{w \in N'_j : w < w'\}| \) to be the number of agents \( w \) in \( N'_j \) that would win the election against \( w' \) if the pair \( \{w, w'\} \) were selected to run for office. Abusing notation slightly, let \((\theta(w'), \tau(w'))\) denote the regime when \( w' \) loses the election and determines the outcome. Then, \( x_j(w') \) is the number of pairs \( \{w, w'\} \subseteq N'_j \), with \((\theta(w'), \tau(w'))\) as the equilibrium outcome of the political game. The probability of any particular pair of agents in a set with \( \hat{n} \) members to be selected to compete for office is given by \( \pi(\hat{n}) = 2/|\hat{n}(\hat{n} - 1)| \). Then, given any strategy profile \( N'_j \), agent \( w_j^N \)'s expected payoff of
That is, the expected payoff of not running is zero if \( n_j' \leq 1 \), because not running implies either anarchy if \( n_j' = 0 \), or a dictatorship if \( n_j' = 1 \). The expected payoff of not running when \( n_j' > 1 \) is a weighted average of the payoffs implied by all possible regimes, where the weights are the probabilities of those regimes arising as the outcome of the election. The payoff associated with the regime \((\theta(w'), \tau(w'))\) is \( \varphi(\theta(w'), \tau(w'))w_j^N \); the probability of the regime \((\theta(w'), \tau(w'))\) to be implemented as the outcome of the political game is \( \pi(n_j')x_j(w') \).\(^\text{12}\)

Similarly, given any strategy profile \( N_j' \), agent \( w_j^N \)'s expected payoff of running is

\[
V_1(n_j') = \begin{cases} \tilde{w}^d & \text{if } n_j' = 0, \\ \pi(n_j' + 1) \left[ \sum_{w' \in N_j'} x_j(w') \varphi(\theta(w'), \tau(w'))w_j^N \right. \\ \left. + \sum_{w_j^N < w'} w_j^N \varphi(\theta(w'), \tau(w'))w' + \sum_{w_j^N > w'} \varphi(\theta(w_j^N), \tau(w_j^N))w_j^N \right] & \text{if } n_j' > 0. \end{cases}
\]

That is, the payoff of running is the dictator payoff \( \tilde{w}^d \) if \( n_j' = 0 \), because in that case running makes \( w_j^N \) a dictator. If at least one other agent is running, i.e., \( n_j' > 0 \), then the expected payoff of running weights the payoffs from all possible regimes by the probability of those regimes being implemented as the outcome of the political game. If \( w_j^N \) chooses to run, then every pair of candidates arises with probability \( \pi(n_j' + 1) = 2/[2(n_j' + 1)n_j'] \).\(^\text{13}\) Thus, if \( n_j' > 1 \), then all outcomes that can arise when \( w_j^N \) chooses not to run can still arise when \( w_j^N \) is not selected to run, but each one has a lower probability to realize. In the case that \( w_j^N \) is selected to run against \( w' \in N_j' \) in the election, \( w_j^N \) wins if \( w_j^N < w' \), getting a payoff \( \tilde{w}(\theta(w'), \tau(w')) = \varphi(\theta(w'), \tau(w'))w' \), which follows from (1), and loses if \( w_j^N > w' \), getting a payoff \( \varphi(\theta(w_j^N), \tau(w_j^N))w_j^N \).

\(^\text{12}\)As \( x_j(w') \) cannot exceed \( n_j' - 1 \), while \( n_j' \geq 2 \) in this case, \( \pi(n_j')x_j(w') \leq 1 \). As \( \sum_{w' \in N_j'} x_j(w') \) sums the integers from 0 to \( n_j' - 1 \), \( \sum_{w' \in N_j'} \pi(n_j')x_j(w') = \frac{2}{n_j'(n_j' - 1)} \sum_{w' \in N_j'} x_j(w') = 1 \).

\(^\text{13}\)As \( \sum_{w' \in N_j'}(x_j(w') + 1) \) sums the integers from 1 to \( n_j' \), \( \sum_{w' \in N_j'} \pi(n_j' + 1)x_j(w') + \sum_{w' \in N_j'} \pi(n_j' + 1) = \frac{2}{n_j'(n_j' + 1)} \sum_{w' \in N_j'}(x_j(w') + 1) = 1 \).
Combining (2) and (3), agent $w_j^N \in N$ chooses $\chi_j$ to maximize expected payoff and solve

$$\max_{\chi_j \in \{0,1\}} (1 - \chi_j)V_0(n_j') + \chi_jV_1(n_j').$$

An equilibrium of the selection game is defined as follows.

**Definition 2** (Equilibrium of the selection game given a set of potential candidates). *Given a set $N$ of potential candidates, an equilibrium of the selection game is a set $N'$, or, equivalently, a strategy profile $\{\chi_j\}_{j \in J}$, such that, for all $w_j^N \in N$, given $N'_j$, $\chi_j$ solves (SP).*

### 3.4.2 Equilibrium of the Selection Game Given a Set of Potential Candidates

The following result characterizes the equilibrium outcome of the selection game.

**Proposition 2.** *Given a set $N$ of potential candidates, the selection game has a unique equilibrium $N' = N$ if $|N| \leq 2$ and $N' = \{w_1^N, w_2^N\}$ otherwise.*

Every potential candidate strictly prefers running to enduring anarchy or a dictatorship. What is more, due to the strategic interaction in the political game, agents with unproductive projects can increase their otherwise low payoff by running for office. By choosing to run, potential candidate $w_1^N$ has a positive probability of competing for office. If competing, $w_1^N$ wins with certainty and receives an in-office payoff equal to the production payoff of the more productive loser of the election. Independent of who the loser is, $w_1^N$ is always better off winning against that loser in electoral competition for the associated payoff than not running and executing the project under the same regime implemented as an outcome of the political game between the loser and another agent. Thus, $w_1^N$ runs. Given that $w_1^N$ runs, $w_2^N$ also prefers running since it gives a positive probability of $w_2^N$ competing for office. (In fact, running is dominant for $w_2^N$ irrespective of $w_1^N$’s decision.) When competing for office against $w_1^N$, $w_2^N$ loses with certainty and receives the highest possible payoff as $w_2^N$ has the least productive project an election loser can have. (Recall that the less productive a project the loser has available, the better is the outcome.) Competing against anybody else, $w_2^N$ wins and receives an in-office payoff equal to the more productive loser’s production payoff under the resulting regime. Irrespective of who the loser is in that case, $w_2^N$ is always better off in office than executing the project under the same regime. Given that $w_1^N$ and $w_2^N$ run, all other agents prefer to refrain from running so as to guarantee that $w_2^N$ competes with $w_1^N$, thereby maximizing the expected payoff from production of all other potential candidates. The equilibrium is unique and $w_1^N$ wins the election, while $w_2^N$ determines the outcome.

### 3.5 Political Institutions

A full equilibrium with a unique outcome exists because it does at each stage. In this section, I focus on political institutions that determine certain elite groups within society. I refer to
those agents who can engage in activities in the political arena, such as running for office, as the political elite and to those agents who are entitled to vote as the qualified electorate. This way, I distinguish between voters and those who can participate in the process that determines the alternatives voters can choose from. At the same time, both the political elite and the qualified electorate represent concepts of elite. An important aspect of elites is that its members are “well-connected,” which is likely to result in higher returns to market activity.\textsuperscript{14} I therefore assume that the political elite consists entirely of producers, and the majority of voters in any restricted qualified electorate are producers as well. I show that, in this model, more political competition, even within a narrow elite that can vote, leads to better outcomes, but allowing more people to vote, without more competition, does not.

3.5.1 The Political Elite

I stylize the selection of individuals that are presented with an opportunity to actively engage in the political arena by assuming that the political elite is identical with the economic elite. That is, only the producers with the most productive projects may choose to run for office.\textsuperscript{15} While this restriction may represent formal property and educational qualifications, it does not need to be formal. The productivity of an agent’s project may well be a function of how well connected that agent is with and within elite groups. It may arise from networks and status established by inheritance or (previous) economic success. The political institutions then determine whose projects are productive enough to enjoy the privilege of access to the political arena. The number \( n \) of potential candidates identifies this institution in the model. For any \( n \leq p \), the agents \( w_{p+1-n}, \ldots, w_p \) constitute the set \( N \) of potential candidates. Therefore, the number \( n \) is a metric of political competition in the sense of how broad the political elite is. It can be a very small number of five agents at the top of the income distribution in society or a very large number of five million. Proposition 3 obtains.

**Proposition 3.** A broader political elite, a larger \( n \), implies more secure property rights.

This result derives from the insight that the equilibrium outcome depends only on the productivity of the project of agent \( w_2^N \). Easier access to the political arena for more agents implies better outcomes. More generally, being a member of the political and economic elite might only offer a positive probability of becoming a potential candidate, while non-members have no chance of getting an opportunity to be active in the political arena. Then, political fundamentals that make losers with unproductive projects more likely favor better outcomes. An example is drawing more potential candidates with less restrictive productivity requirements. Everything that increases the probability of the productivity of project \( w_2^N \)

\textsuperscript{14}See, e.g., North et al. (2007) on elites and limited access to both political and economic activities.

\textsuperscript{15}A similar approach to elites in the context of the extension of voting rights can be found in, e.g., Gradstein (2007). In the same context, the (all identical) rich form an elite in, e.g., Acemoglu and Robinson (2000, 2001).
being low improves the likelihood of good outcomes. Or, easier access to the political arena does not imply better outcomes but makes them more likely.

The interpretation is that better outcomes with more secure property rights are more likely when running for office is less restricted. It suggests that societies should lift restrictions on who can be politically active, be it by removing requirements like land ownership or by revolting against a narrow political elite. In politically more open societies, the winner to-be is more likely to face opponents with unattractive outside options who impose tighter constraints on office holder discretion and thus dictate better outcomes. Societies that recruit executives from narrow groups of, relative to the population, well educated high-income individuals instead are likely to see weak property rights and high rents from holding office.

To the extent that project productivities may reflect educational outcomes and democracies allow easier access to activities in the political arena, at first, Proposition 3 seems to suggest that more democratic societies select less educated office holders. Such a prediction contradicts the findings in Besley and Reynal-Querol (2011) and Besley et al. (2011): democracies are more likely to select highly educated leaders than autocracies, and it matters for growth. However, in the model here, the productivity of a project represents the value of a candidate’s outside option. It may well be more connected to an agent’s elite status—connections and past economic success or inherited status—than it is related to education. Due to its static nature, the model cannot speak to implications for growth.

For the same reason, the model does not speak to endogenous change of the political institutions. Nonetheless, one may wonder whether a narrow political elite would oppose relaxing the restrictions on political activities. After all, its members are producers whose payoffs would increase if restrictions were relaxed. However, the payoffs of both candidates in the election increase with the productivity of the loser to-be’s project. In addition, with broader access to political activities, the winner to-be stands to lose the rent accruing to the comparative advantage in office. Without more structure and further information about the composition of the political elite (or a more realistic model of it) it is not clear which effect dominates. A hypothetical incumbent may thus not want to propose such a relaxation. If nobody else can propose it (e.g., in the sense of Plott 1967 and Shepsle and Weingast 1981), restrictions on political activities may persist.

Finally, notice that, while members of the political elite face the same payoff factor as non-member producers, they do realize the highest payoffs in society (by assumption).

### 3.5.2 The Qualified Electorate

The other dimension of political institutions determines the qualified electorate, that is, who can vote over the proposed regimes. By assumption, the majority of voters in the population are producers. I assume that this is the case in every qualified electorate, also in those that
are restricted so that not everybody can vote. Therefore, qualified electorates do not deliver anarchy as the election outcome. (See Section 4 for a discussion.) In addition, the political game has an equilibrium only if the qualified electorate is admissible in the following sense.

**Definition 3.** A qualified electorate is admissible if it contains at least one appropriator.

If the qualified electorate consisted of producers only, then any winning regime in the political game that offers producers a strictly higher payoff than the alternative invites a profitable deviation to a slightly higher tax rate. However, both candidates proposing regimes that offer the same payoff to producers, giving positive probability of winning to both, allows profitable deviations because one candidate has a better outside option than the other. Thus, with a producers-only electorate, an equilibrium of the political game does not exist. If income and wealth are imperfectly correlated, family ties matter, or being in the elite offers opportunities for appropriation, such as corruption, then an elite with respect to voting rights may well contain unproductive agents that engage in appropriation. The following result obtains.

**Proposition 4.** All admissible qualified electorates result in the same equilibrium outcome.

This result derives from two features of equilibrium in this environment. First, while the majority of voters are producers, in equilibrium, the decisive voters in every admissible electorate are appropriators. Second, changing the electorate that determines the voting outcome does not affect the payoffs associated with the proposed regimes. That is, given two regime proposals, in equilibrium, the decisive voters in all admissible qualified electorates, appropriators, prefer the same one. Hence, the voting outcomes are the same in all admissible qualified electorates. Thus, the equilibrium proposals are the same, unless the candidates differ. It follows that the equilibrium outcomes are the same, even if more people are allowed to vote, unless more people are allowed to run for office, too. The equilibrium outcome does change, of course, if an initial extension of voting rights changes the occupation of the majority of the voters. As I discuss in Section 4.2, if the majority of voters are appropriators, then the equilibrium outcome is either anarchy or a dictatorship (see Proposition 5).

Corvalan et al. (2017) derive a similar result in the context of redistribution in a citizen-candidate model with distinct wealth requirements for the rights to vote and to run for office. The context here is the map from political institutions to the security of property rights, which gives rise to an additional strategic interaction. Although unfit to study endogenous change of political institutions, this prediction suggests a possible explanation for a persistent lack of secure property rights during times of voting rights extension. One explanation suggested by Acemoglu and Robinson (2006, 2008) distinguishes between de facto and de jure political power. Here, the de facto power of deciding the outcome is always with the voting body—however narrow or wide it may be. Focusing on voting rights might just not be enough.
Finally, I ignore a number of potentially important economic mechanisms. For example, in the model here, a universal right to vote plays no role in preventing a majority from taking advantage of a minority, which would provide one justification for it (see Gersbach 2004).

4 Discussion

In this section, I discuss some of my modeling choices that simplify the analysis.

4.1 Preferences, Technology, and The Number of Candidates

I assume that all agents are risk neutral. As the model is, curvature has no effect. Without the preference shock, the model would exhibit multiple equilibria in the political game. These equilibria are qualitatively identical in the sense that producers are indifferent between the proposed regimes and the same candidate wins by proposing less enforcement. The preference shock selects equilibria so that I can characterize them. It does not affect the qualitative characteristics of equilibrium or the mechanism at work. The shock’s interpretation is that voters may value public-spiritedness. In this case, if the proposed regimes offer equal payoffs, they prefer candidates that run for office despite their highest possible payoff from winning being strictly less than their payoff from losing promised by the other candidate’s proposal.

I assume that the enforcement technology is independent of an agent’s productivity. That is, all agents are equally “productive” in office, while their productivity varies in production. However, as interpreted in the model, the productivity is not associated with a producer but with a project, which is potentially transferable. If interpreted differently, an enforcement technology that is sensitive enough to a candidate’s productivity can overturn the unproductive candidate’s comparative advantage in office. Despite that, considering a productivity-independent enforcement technology is of interest because (i) an advantage for skilled businesspersons is not obvious, even if the political dimension was related to doing business per se, and (ii) a productivity-dependent enforcement technology blurs the implications of the strategic interaction.

The results remain unchanged if the process of appropriation and redistribution of the acquired resources is subject to some deadweight loss occurring due to destruction or damage. This loss could be captured by an increasing function \( v : \mathbb{R}_+ \to \mathbb{R}_+ \) that maps the appropriated resources into a weakly smaller but strictly positive quantity of resources available for distribution among appropriators. As long as each appropriator still receives some fixed nonzero share of the remaining resources, adding this assumption does not affect the results.

Intuitively, the results should carry over to the case in which more than two candidates can actually run for office: the winner to-be would have to observe all other candidates’ outside options, and the tightest and binding constraint is the outside option of the opponent with the
least productive project. However, the assumption that only two candidates can run for office simplifies both the analysis and the exposition by fixing the number of players in the political game to two. Without it, the number of players in the political game can be anything from two to \( n \), which considerably complicates the characterization of equilibrium. Ignoring the strategic interaction in the political game, see, e.g., Osborne and Slivinski (1996) for details.

### 4.2 Fixed Occupations

In the underlying economy, agents have fixed occupations and thus belong to fixed groups of producers and appropriators. This environment can be thought of as a reduced-form version of one in which agents have the choice to take up an occupation in production or appropriation, similar to Murphy et al. (1993) and Acemoglu (1995); and under all conceivable regimes outside anarchy, at least one agent chooses to engage in appropriation, but never more than about half of the population. (I discuss economic activity in Section 4.3.) While I assume that \( p - 2 > a \), the exact numbers and proportions do not matter for the equilibrium outcome. Allowing for \( a > 1 \) lends generality to the discussion of franchise extensions as individuals from either group as well as from both groups can be added. For completeness, I report here that the political process delivers either anarchy or a dictatorship if the majority of voters are appropriators, which is the case when \( p - 2 < a \).

**Proposition 5.** If \( p - 2 < a \), then the equilibrium outcome is either anarchy or a dictatorship.

In the proof it becomes clear that an election delivers anarchy if the majority of voters are appropriators, as one would expect from the discussion of the anarchy regime in Section 3.2.

### 4.3 Economic Activity

My focus is on how political institutions affect society’s choice of an enforcement regime. I opted for simplicity and assumed that individual production and thus aggregate output is fixed. This assumption is not essential because the economic mechanism works through the outside options of the players, not the size of the pie. In this section, I alter the model to allow for individual and thus aggregate output to depend on the security of property rights. I then show that Proposition 1 is unaffected. In particular, if the election loser’s project, i.e., their outside option, is more productive, then the winning regime in the equilibrium of the political game provides less secure property rights, a higher payoff for the office holder, and lower payoffs for producers.

To make this point as simply as possible, suppose that the output of a producer’s project depends on the amount of time or effort they devote to implementing it. This work effort is independent of the project’s productivity and increases with the security of property rights. It is captured by the function \( t : [0, 1] \rightarrow [0, 1] \) that maps the security of property rights \((1 - \theta)\)
into work effort \(l(1 - \theta) \in [0, 1] \). Assume that \(l(0) = 0\); for all \(1 - \theta \in (0, 1)\), \(l(1 - \theta) > 0\),

\[
(4) \quad l'(1 - \theta) > 0, \quad l''(1 - \theta) \leq 0, \quad \frac{l'(1 - \theta)(1 - \theta)}{l(1 - \theta)} \leq 1, \quad -\frac{l''(1 - \theta)(1 - \theta)}{l'(1 - \theta)} \leq 3;
\]

and that

\[
(5) \quad \lim_{(1 - \theta) \to 0} l'(1 - \theta) > 0, \quad \lim_{(1 - \theta) \to 0} l'(1 - \theta)(1 - \theta) \geq 0, \quad \lim_{(1 - \theta) \to 1} l'(1 - \theta) < 1.
\]

That is, individual economic activity \(l(1 - \theta)\) and thus output \(l(1 - \theta)w\) is an increasing and concave function of the security of property rights. Finally, let \(g''(1 - \theta) \geq 0\) for all \((1 - \theta) \in (0, 1)\) and, in addition to the assumptions on the technology \(g\) already made,

\[
(6) \quad \lim_{(1 - \theta) \to 0} g(1 - \theta) = 0, \quad \lim_{(1 - \theta) \to 0} g'(1 - \theta) = 0, \quad \lim_{(1 - \theta) \to 1} g'(1 - \theta) > 1.
\]

Following these assumptions, given a regime \((\theta, \tau)\), a producer \(w_i\)’s payoff is

\[
(7) \quad \varphi(\theta, \tau)w_i = \varphi(\theta, \tau)l(1 - \theta)w_i = (1 - \theta)(1 - \tau)l(1 - \theta)w_i.
\]

The new producer payoff factor \(\varphi(\theta, \tau)\) is nonnegative for all \((\theta, \tau) \in [0, 1]^2\) and strictly increasing in both \((1 - \theta)\) and \((1 - \tau)\). Assume that it is quasiconcave. Given a regime \((\theta, \tau)\), because \(\sum_i w_i = 1\), aggregate output, before taxation and appropriation, is given by

\[
\sum_i l(1 - \theta)w_i = l(1 - \theta).
\]

That is, aggregate economic activity and thus output decrease with less secure property rights.

The office holder’s payoff is given by the function \(\hat{\varphi} : [0, 1]^2 \to \mathbb{R}_+\), defined as

\[
(8) \quad \hat{\varphi}(\theta, \tau) = \tau l(1 - \theta) - g(1 - \theta),
\]

which is strictly increasing in \(\tau\) for all \(\tau \in (0, 1)\) and \(\theta \in (0, 1)\). Assume that \(\hat{\varphi}(\theta, \tau)\) is quasiconcave. Finally, given a regime \((\theta, \tau)\), an appropriator’s payoff is some nonzero share of

\[
(9) \quad \hat{\nu}(\theta, \tau) = \theta(1 - \tau)l(1 - \theta).
\]

For this altered environment with the above assumptions, the following result obtains.

**Proposition 6.** Under the above assumptions, Proposition 1 holds unchanged.

That is, Proposition 1 is unaffected. Both in autarky and with a dictator—who simply chooses \((\theta, \tau)\) to maximize \(\hat{\varphi}(\theta, \tau)\), a problem discussed at the top of the proof of Proposition 6—the producer payoff factor equals zero. Therefore, all other results in Section 3 remain
unaffected as well. Due to the unchanged effects of variations in $w_H$ on the outcome of the political game, the mechanics of the rest of the analysis remain unchanged. The related proofs only require notational adjustments. The reason for this result is that the relevant economic mechanism works through the outside options of the players, not the size of the pie. The simplifying assumption that economic activity is unaffected by the property rights enforcement regime is not driving the results.

Finally, as an example, functional forms for $g$ and $l$ that satisfy all of the above assumptions are $g(1 - \theta) = (1 - \theta)^2$ and $l(1 - \theta) = (1 - \theta)^{1/2}$.

4.4 Office Holders Hold Office Full-Time

I maintain the assumption that societies’ top executives hold office full-time and cannot execute their project. In many cases where the precedent is that presidents divest from businesses to reduce the potential for an actual or perceived conflict of interest, this assumption seems to be a reasonable simplification. With regards to more oligarchic and even kleptocratic states that hold elections, any business the top executives might operate may well benefit from or outright build on the executives’ very position at the top of the state. The endogenous rents from holding office in the model capture some of these aspects.

However, in this section, I alter the model to relax the assumption that the office is held full-time. I then show that Proposition 1 is unaffected. In particular, if the election loser’s project, i.e., their outside option, is more productive, then the winning regime in the equilibrium of the political game provides less secure property rights, a higher payoff for the office holder, and lower payoffs for producers.

Suppose that an office holder can execute a fraction $(1 - \gamma) \in (0, 1)$ of their project, and that the idle individual takes over and executes the remaining fraction $\gamma \in (0, 1)$ of it. The project proceeds accruing to the office holder are subject to both taxation and appropriation. Then, the office holder’s payoff is given by the function $\tilde{w} : [0, 1]^3 \rightarrow \mathbb{R}_+$, defined as

$$\tilde{w}(\theta, \tau; w) = \tilde{w}(\theta, \tau) + \varphi(\theta, \tau)(1 - \gamma)w = \tau - g(1 - \theta) + (1 - \theta)(1 - \tau)(1 - \gamma)w,$$

which is strictly increasing in $\tau$ for all $\tau \in (0, 1)$ because $1 > (1 - \theta)(1 - \gamma)w$. Assume that $\tilde{w}(\theta, \tau; w)$ is quasiconcave in $(\theta, \tau)$ for all $w \in \mathcal{W} \subset [0, 1]$. All other payoffs remain unchanged.

For this altered environment with the above assumptions, the following result obtains.

**Proposition 7.** Under the above assumptions, Proposition 1 holds unchanged.

That is, Proposition 1 is unaffected. Both in autarky and with a dictator—who simply chooses $(\theta, \tau)$ to maximize $\tilde{w}(\theta, \tau; w)$, giving the regime $(1, 1)$—the producer payoff factor equals zero. Therefore, all other results in Section 3 remain unaffected as well. Due to the unchanged effects of variations in $w_H$ on the outcome of the political game, the mechanics of
the rest of the analysis remain unchanged. The related proofs only require minor adjustments to the payoff expressions for the office holder in the selection game. The reason for this result is the fact that as before, all else equal, agents with more productive projects face higher opportunity costs of holding office as long as they have to give up at least some fraction of their project to do so. The simplifying assumption that office holders hold office full-time and have to forgo their project altogether is not driving the results.

A sufficient condition for the above assumptions to be satisfied that involves only the cost function \( g \) is that 
\[
2g'(1 - \theta) + g''(1 - \theta)\theta \geq 2
\]
for all \((1 - \theta) \in (0, 1)\). An example of such a cost function is 
\[
g(1 - \theta) = (1 - \theta)^2.
\]
Of course, the restrictions on \( g \) can be less restrictive, if one is willing to also restrict other fundamentals, such as \( \gamma \) and \( W \).

4.5 The Idle Individual

The role of the idle individual is technical in nature as it lends tractability without having to impose more structure. By taking over and executing the office holder’s project, the idle individual makes sure that, all else equal, aggregate output is independent of the office holder’s identity. Due to the finite number of agents, if the office holder’s project is not executed, then office holders with different projects imply different aggregate output, irrespective of the policies they put in place.

With the appropriate alternative assumption that there is no idle individual that executes the office holder’s project, all qualitative results pertaining to the equilibrium of the political game are unaffected. However, the equilibrium regime would also depend on the productivity of the project of candidate \( w_L \), the office holder to-be. Similar to the dependence on \( w_H \), a more productive project \( w_L \) lowers the enforcement enacted. Yet, without additional assumptions, the overall effect of a more productive project \( w_L \) on the producer payoff factor is ambiguous as the tax rate decreases, too. Assuming that an idle individual takes over and executes the office holder’s project works around this complication without having to impose more structure. The assumption that the idle individual does not participate in the political process is made for convenience, but is otherwise immaterial.

As to the economic interpretation of this assumption, the idle individual can be thought of as making a take-it-or-leave-it offer to acquire and execute the election winner’s project. Being unable to execute it while in office, the project has no value to the election winner. Therefore, the idle individual can acquire it at no cost. An alternative interpretation is that no project is revolutionary enough to ensure that, even with time, no other individual can come up with a close enough substitute that can, e.g., compete for the same market. Then, the idle individual can be thought of as someone who, while the election winner transitions into office, develops a project that captures the market the office holder’s project would have appealed to.
5 Conclusion

I study how a strategic interaction in a political game shapes a society’s choice of a property rights enforcement regime by determining the induced choice set facing it. The model offers explanations for differences in the security of property rights among countries that hold elections. It traces those differences back to political institutions that determine how competitive these elections are. One implication is that two societies may implement very different regimes—as implied by election losers with different productivity—while they initially appear to be very similar in many supposedly relevant dimensions, such as economic fundamentals and office holders, as characterized by their productive projects. Another implication is that easier access to activities in the political arena for more people leads to better outcomes while, once elections are held, allowing more people to vote without allowing more people to run for office does not. The model does not capture the trade-off between diverting resources today and inducing investments into a larger pie to divert resources from tomorrow. Future work could embed a similar political process into a dynamic model with a role for the expected future security of property rights; and it could more fully endogenize economic activity, potentially with a role in determining project productivities. In such a setting, different political institutions in the sense of this paper may generate divergent paths of economic development.

A Appendix

Proposition 1

Proof. The proof proceeds in a number of steps. Each step makes a statement and then proves it. I describe what an equilibrium has to look like, find all candidate equilibria (all of which have the same unique winning regime), and show that they in fact are equilibria. Recall that the majority of voters are producers and notice that the preference shock therefore can have bite only if producers are indifferent.

1. In equilibrium, the proposed regimes \((\theta, \tau)\) and \((\theta', \tau')\) satisfy \(\varphi(\theta, \tau) = \varphi(\theta', \tau') > 0\). Suppose for a contradiction that \(\varphi(\theta, \tau) \neq \varphi(\theta', \tau')\). Without loss of generality assume that \(w\) proposes the regime \((\theta, \tau)\) such that \(\varphi(\theta, \tau) > \varphi(\theta', \tau')\), which means that \(w\) wins the election with certainty. Note that \(\varphi(\theta, \tau) > \varphi(\theta', \tau') \geq 0\) implies that \((1 - \theta) > 0\) and \((1 - \tau) > 0\). Then, by continuity, \(w\) can deviate to proposing \((\theta'', \tau'') = (\theta, \tau + \epsilon)\) for a small enough \(\epsilon > 0\) and reduce \((1 - \tau)\) slightly so that \(\varphi(\theta'', \tau'') > \varphi(\theta', \tau')\) and \(w\) still wins, with a higher payoff because \(\hat{w}(\cdot, \cdot)\) is strictly increasing in \(\tau\), a contradiction. Thus, \(\varphi(\theta, \tau) = \varphi(\theta', \tau')\). Now, suppose for a contradiction that \(\varphi(\theta, \tau) = \varphi(\theta', \tau') = 0\). At least one of the candidates has a positive probability of losing and thus getting a payoff of 0. By continuity, that candidate can profitably deviate to proposing \((\theta'', \tau'') = (1 - \epsilon, 1 - \epsilon)\) for a small enough \(\epsilon > 0\) to win the


2. In equilibrium, if \( w_o \) proposes \((\theta, \tau)\) and wins the election with positive probability over the opponent’s regime proposal \((\theta', \tau')\), then \( \bar{w}(\theta, \tau) \geq \varphi(\theta', \tau')w_o \). Suppose for a contradiction that \( \varphi(\theta', \tau')w_o > \bar{w}(\theta, \tau) \). Then, \( w_o \) can profitably deviate to proposing \((\theta'', \tau'') = (\theta, 1)\), which loses the election with certainty, as \( \varphi(\theta', \tau') > 0 = \varphi(\theta'', \tau'') \), where the inequality follows from Step 1, thereby giving \( w_o \) a higher expected payoff, a contradiction.

3. In equilibrium, if \( w_o \) proposes \((\theta, \tau)\) and wins the election with positive probability over the opponent’s regime proposal \((\theta', \tau')\), then \( \bar{w}(\theta, \tau) \geq \varphi(\theta', \tau') \). Suppose for a contradiction that \( \bar{w}(\theta', \tau') > \bar{w}(\theta, \tau) \). Then, each candidate wins with positive probability. Thus, from Steps 2 and 1, respectively. Then, by continuity, \( w_o \) can profitably deviate to proposing \((\theta'', \tau'') = (\theta, \tau - \epsilon)\) for a small enough \( \epsilon > 0 \), such that \( \bar{w}(\theta', \tau') > \bar{w}(\theta, \tau) \), to win the election with certainty, as it offers all voters a strictly higher payoff than \((\theta', \tau')\), and enjoy a higher expected payoff because \( \bar{w}(\theta'', \tau'') \) is greater than any convex combination of \( \bar{w}(\theta, \tau) \) and \( \varphi(\theta', \tau')w_o \), a contradiction.

4. In equilibrium, if \( w_o \) proposes \((\theta', \tau')\) and loses with positive probability against the opponent’s regime proposal \((\theta, \tau)\), then \( \varphi(\theta, \tau)w_o \geq \bar{w}(\theta', \tau') \). Suppose for a contradiction that \( \bar{w}(\theta', \tau') > \bar{w}(\theta, \tau) \). Note that \( \bar{w}(\theta, \tau) \geq \bar{w}(\theta', \tau') \) by Step 3 as \((\theta, \tau)\) wins with positive probability. Then, by continuity, \( w_o \) can profitably deviate to proposing \((\theta'', \tau'') = (\theta, \tau - \epsilon)\) for a small enough \( \epsilon > 0 \), win the election with certainty, as \((\theta'', \tau'')\) offers all voters a strictly higher payoff than \((\theta', \tau')\), and enjoy a higher expected payoff than before because \( \bar{w}(\theta'', \tau'') \) can be made arbitrarily close to \( \bar{w}(\theta, \tau) \), a contradiction.

5. In equilibrium, \((\theta_L, \tau_L) \neq (\theta_H, \tau_H)\). Suppose for a contradiction that \((\theta_L, \tau_L) = (\theta_H, \tau_H) = (\theta, \tau)\). Then, each candidate wins with positive probability. Thus, from Steps 4 and 2 it must hold that \( \varphi(\theta, \tau)w_L \geq \bar{w}(\theta, \tau) \geq \varphi(\theta, \tau)w_H > \varphi(\theta, \tau)w_L \), a contradiction.

6. In equilibrium, \( w_L \) wins with certainty. Suppose for a contradiction that \( w_L \) wins the election with positive probability. Then, since \( \varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H) \) from Step 1, it must hold from Steps 2 and 4 that \( \bar{w}(\theta_L, \tau_L) \geq \varphi(\theta_L, \tau_L)w_H = \varphi(\theta_H, \tau_H)w_H > \varphi(\theta_H, \tau_H)w_L \leq \bar{w}(\theta_H, \tau_H) \), a contradiction.

7. In equilibrium, the regime \((\theta_L, \tau_L)\) that wins the election with certainty solves

\[
(P) \quad \max_{(\theta, \tau) \in [0,1]^2} \bar{w}(\theta, \tau) \quad \text{s.t.} \quad \varphi(\theta, \tau) \geq \tilde{\varphi} = \varphi(\theta_H, \tau_H).
\]

Suppose not. Suppose for a contradiction that \((\theta_L, \tau_L)\) wins the election with certainty and violates the constraint so that \( \varphi(\theta_L, \tau_L) < \varphi(\theta_H, \tau_H) \). Then, \((\theta_H, \tau_H)\) wins the election with certainty, a contradiction. Suppose for a contradiction that \((\theta_L, \tau_L)\) wins the election with certainty but does not solve \((P)\). Then, there is a \((\theta', \tau')\) such that \( \bar{w}(\theta', \tau') > \bar{w}(\theta_L, \tau_L) \) and \( \varphi(\theta', \tau') \geq \tilde{\varphi} \). Then, by continuity, \( w_L \) could deviate to proposing \((\theta'', \tau'') = (\theta', \tau' - \epsilon) \)
for a small enough $\epsilon > 0$ so that $\bar{w}(\theta', \tau' - \epsilon) > \bar{w}(\theta_L, \tau_L)$ and $\varphi(\theta', \tau' - \epsilon) > \varphi(\theta', \tau') \geq \bar{\varphi} = \varphi(\theta_H, \tau_H)$ to win the election with certainty and enjoy a higher payoff, a contradiction. Therefore, solving Problem (P) (note that $\theta < 1$ and $\tau < 1$), $(\theta_L, \tau_L)$ and $(\theta_H, \tau_H)$ satisfy

\begin{align}
(10) & \quad g'(1 - \theta_L)(1 - \theta_L) = (1 - \tau_L), \\
(11) & \quad \varphi(\theta_H, \tau_H) = \varphi(\theta_L, \tau_L).
\end{align}

8. In equilibrium, $\varphi(\theta_L, \tau_L)w_H = \bar{w}(\theta_L, \tau_L)$. As $w_L$ wins with certainty, from Steps 4 and 2, $\varphi(\theta_L, \tau_L)w_H \geq \bar{w}(\theta_L, \tau_L) \geq \varphi(\theta_H, \tau_H)w_L$. Suppose for a contradiction that $\varphi(\theta_L, \tau_L)w_H > \bar{w}(\theta_L, \tau_L)$. Given $(\theta_L, \tau_L)$, as $(\theta_L, \tau_L)$ solves Problem (P) and $\varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H)$, the highest in-office payoff a regime $(\theta', \tau')$ with positive probability of winning can promise $w_H$ is $\bar{w}(\theta_L, \tau_L)$, which is strictly less than $w_H$’s payoff from losing, $\varphi(\theta_L, \tau_L)w_H$. Thus, producers, who are the majority, are indifferent between the proposed regimes and candidate $w_H$ runs for office despite, given $w_L$’s proposal, all winning platforms give a payoff in office that is strictly less than their payoff from losing. The same is not true for $w_L$ because $\bar{w}(\theta_L, \tau_L) \geq \varphi(\theta_H, \tau_H)w_L$. Therefore, due to the preference shock, with probability $\epsilon > 0$, the majority of voters vote for $w_H$, who thus wins the election with positive probability, a contradiction. Therefore,

\begin{align}
(12) & \quad \varphi(\theta_L, \tau_L)w_H = \bar{w}(\theta_L, \tau_L) = \tau_L - g(1 - \theta_L).
\end{align}

9. In equilibrium, $\nu(\theta_L, \tau_L) > \nu(\theta_H, \tau_H)$ so that $\theta_H < \theta_L$. Suppose for a contradiction that $\nu(\theta_L, \tau_L) \leq \nu(\theta_H, \tau_H)$. As $\varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H)$, $w_H$ wins with positive probability, a contradiction. Thus, $\nu(\theta_L, \tau_L) > \nu(\theta_H, \tau_H)$, that is, $\theta_L(1 - \tau_L) > \theta_H(1 - \tau_H)$, which with $\varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H)$ implies that $(1 - \tau_L) > (1 - \tau_H)$. Thus, again with $\varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H)$, it follows that $(1 - \theta_L) < (1 - \theta_H)$ or

\begin{align}
(13) & \quad \theta_H < \theta_L.
\end{align}

That is, $w_H$ proposes more enforcement.

10. Collecting equations (10)–(13) gives

\begin{align}
(14) & \quad \varphi(\theta_L, \tau_L)w_H = \tau_L - g(1 - \theta_L), \\
(15) & \quad g'(1 - \theta_L)(1 - \theta_L) = (1 - \tau_L), \\
(16) & \quad \varphi(\theta_H, \tau_H) = \varphi(\theta_L, \tau_L) \quad \text{and} \quad \theta_H < \theta_L.
\end{align}

Now, (14) and (15) are two equations in two unknowns that can be solved for $(\theta_L, \tau_L)$, and the solution has to be interior. Then, any regime $(\theta_H, \tau_H)$ that satisfies (16) makes for an
equilibrium. Therefore, consider equations (14) and (15). From (15),
\begin{equation}
(17)
(1 - \tau_L) = g'(1 - \theta_L)(1 - \theta_L) \quad \text{and thus} \quad \tau_L = 1 - g'(1 - \theta_L)(1 - \theta_L).
\end{equation}
Plugging these into (14) using \(\varphi(\theta_L, \tau_L) = (1 - \theta_L)(1 - \tau_L)\) and rewriting gives
\[g'(1 - \theta_L)(1 - \theta_L) ((1 - \theta_L)w_H + 1) = 1 - g(1 - \theta_L).\]
Let \(h : (0,1) \times \mathbb{R}_+ \to \mathbb{R}\) be given by
\[h((1 - \theta); w_H) = g'(1 - \theta)(1 - \theta) ((1 - \theta)w_H + 1) + g(1 - \theta) - 1.\]
This function \(h\) is strictly increasing in both its arguments and, fixing \(w_H\), approaches negative and positive values when \((1 - \theta)\) approaches zero and one, respectively. Thus, for any \(w_H \in \mathbb{R}_+\) (or in \(W\)), there exists a unique \((1 - \theta_L)\) such that \(h((1 - \theta_L); w_H) = 0\) and that \((1 - \theta_L)\) is strictly smaller the higher \(w_H\) is. The unique \((1 - \theta_L)\) implies a unique \((1 - \tau_L)\) via (17). Clearly, \((1 - \tau_L) > 0\). From \(h((1 - \theta_L); w_H) = 0\) follows that \((1 - \tau_L) < 1\) as well because the sum of \(g'(1 - \theta_L)(1 - \theta_L)\), multiplied by a factor greater than 1, and a positive quantity \(g(1 - \theta_L)\) equals 1. Thus, \((1 - \tau_L) \in (0,1)\). Moreover, again from (17), this \((1 - \tau_L)\) is strictly increasing in \((1 - \theta_L)\). So, a higher \(w_H\) strictly decreases both \((1 - \theta_L)\) and \((1 - \tau_L)\) and thus \(\varphi(\theta_L, \tau_L)\), while it strictly increases \(\varphi(\theta_L, \tau_L) = \tau_L - g(1 - \theta_L)\).

11. Finally, neither candidate can profitably deviate. By construction, given \((\theta_H, \tau_H)\), \(w_L\) cannot increase expected payoffs by deviating. No other proposal that wins with positive probability gives a higher in-office payoff as \((\theta_L, \tau_L)\) solves Problem (P). Deviating to proposing a regime that loses the election, \(w_L\) would earn a strictly smaller payoff because \(\varphi(\theta_L, \tau_L)w_H = \varphi(\theta_H, \tau_H)w_H > \varphi(\theta_H, \tau_H)w_L\). Similarly, given \((\theta_L, \tau_L)\), \(w_H\) cannot increase expected payoffs by deviating. Any deviation that still loses the election does not change payoffs and the maximum in-office payoff of a proposal \((\theta', \tau')\) that gives \(w_H\) a positive probability of winning, and thus observes \(\varphi(\theta', \tau') > \varphi(\theta_L, \tau_L)\), is \(\varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H)\), is \(\varphi(\theta_L, \tau_L) = \varphi(\theta_L, \tau_L)w_H\). Thus, the set of proposals described is an equilibrium. \(\blacksquare\)

Proposition 2

Proof. I find the unique pure strategy equilibrium by iterated elimination of strictly dominated strategies. Consider any agent \(w^N_j \in N\) and let \(n^i_j \leq 1\). Not running implies either anarchy or some other agent’s dictatorship, and each yields a payoff of zero. Running yields a strictly positive payoff either as the dictator or through the election. Thus, if \(n^i_j \leq 1\), then \(w^N_j\) strictly prefers to run. It follows directly that all agents in \(N\) run when \(|N| \leq 2\).

Suppose \(|N| > 2\). Suppose \(n^i_j > 1\). Recall that by equation (1), candidate \(w^N_i\)’s pay-
off from winning against a candidate \( w' > w_i^N \) is \( \bar{w}(\theta(w'), \tau(w')) = \varphi(\theta(w'), \tau(w'))w' > \varphi(\theta(w'), \tau(w'))w_i^N \). First, consider \( w_i^N \) and any strategy profile \( N'_1 \) of the agents in \( N_1 \) such that \( n'_1 > 1 \). Recall that \( \sum_{w' \in N_1} \pi(n'_1)x_1(w') = \sum_{w' \in N'_1} \frac{2x_1(w')}{n'_1(w'_1-1)} = 1 \) (see footnote 12) and note further that \( \sum_{w' \in N'_1} \frac{1}{n'_1} = 1 \). As \( w' > w_i^N \) for all \( w' \in N'_1 \), it follows that \( \varphi(\theta(w'), \tau(w'))w' > \varphi(\theta(w'), \tau(w'))w_i^N \) for all \( w' \in N'_1 \). Therefore, \( w_i^N \)'s expected payoff from running is given by, adapting (3) for \( w_i^N \) and \( n'_1 > 1 \), replacing \( \pi(n'_1 + 1) \) and \( \pi(n'_1) \),

\[
\sum_{w' \in N'_1} \frac{2x_1(w')}{n'_1(n'_1 + 1)} \varphi(\theta(w'), \tau(w'))w_i^N + \sum_{w' \in N'_1} \frac{2}{n'_1(n'_1 + 1)} \varphi(\theta(w'), \tau(w'))w' \\
= \frac{n'_1 - 1}{n'_1 + 1} \sum_{w' \in N_1} \frac{2x_1(w')}{n_1(n'_1 - 1)} \varphi(\theta(w'), \tau(w'))w_i^N + \left( 1 - \frac{n'_1 - 1}{n'_1 + 1} \right) \sum_{w' \in N_1} \frac{1}{n_1} \varphi(\theta(w'), \tau(w'))w' \\
> \sum_{w' \in N_1} \frac{2x_1(w')}{{n'_1(n'_1 - 1)}} \varphi(\theta(w'), \tau(w'))w_i^N,
\]

which is \( w_i^N \)'s expected payoff from not running, when adapting (2) for \( w_i^N \) and \( n'_1 > 1 \).

The strict inequality derives from the convex combination of two weighted averages of payoffs implied by the same regimes for two reasons. First, the first weighted average puts more weight on low-payoff regimes than on high-payoff ones: Given a set of potential candidates that want to run, agents with very productive projects would lose against many others and thus oftentimes determine the outcome when drawn as one of the candidates. Similarly, agents with very unproductive projects would win against many others and thus not as often determine the outcome when drawn as one of the candidates. It follows that low-producer-payoff regimes, due to more productive losers (see Proposition 1), are more likely—as they are the outcome of a larger number of pairs selected to run for office—than high-producer-payoff regimes, due to less productive losers—as they are the outcome of a smaller number of pairs selected to run for office. At the same time, the second weighted average weights all regime payoffs equally. Second, for each individual regime, the associated payoff for \( w_i^N \) is higher in the second weighted average, because \( \varphi(\theta(w'), \tau(w'))w' > \varphi(\theta(w'), \tau(w'))w_i^N \) for all \( w' \in N'_1 \). Thus, for any \( N'_1, n'_1 > 1 \), \( w_i^N \) strictly prefers running over not running. Combining this conclusion with the case when \( n'_1 \leq 1 \), for \( w_i^N \) running strictly dominates not running.

Next, consider agent \( w_i^N \). Consider any strategy profile \( N'_2 \) of the agents in \( N_2 \) such that \( n'_2 > 1 \). If \( w_i^N \notin N'_2 \), then the analysis is exactly the same as for agent \( w_i^N \) above and \( w_i^N \) strictly prefers running over not running. Suppose that \( w_i^N \in N'_2 \). Then, since \( x_2(w_i^N) = 0 \) and \( \varphi(\theta(w'), \tau(w'))w' > \varphi(\theta(w'), \tau(w'))w_i^N \) for all \( w' \in N'_2 \backslash \{ w_i^N \} \) as well as, by Proposition 1, \( \varphi(\theta(w_i^N), \tau(w_i^N))w_i^N > \varphi(\theta(w'), \tau(w'))w_i^N \) for all \( w' \in N'_2 \backslash \{ w_i^N \} \), \( w_i^N \)'s expected payoff
from running is given by, adapting (3) for $w_2^N$ and $n_2' > 1$, replacing $\pi(n_2' + 1)$ and $\pi(n_2')$,

$$
\sum_{w' \in N_2'} \frac{2x_2(w')}{{n}_2'(n_2' + 1)} \varphi(\theta(w'), \tau(w'))w_2^N + \sum_{w' \in N_2' \setminus \{w_1^N\}} \frac{2}{{n}_2'(n_2' + 1)} \varphi(\theta(w'), \tau(w'))w' \\
+ \frac{2}{{n}_2'(n_2' + 1)} \varphi(\theta(w_2^N), \tau(w_2^N))w_2^N
$$

$$
= \frac{n_2' - 1}{{n}_2' + 1} \sum_{w' \in N_2'} \frac{2x_2(w')}{{n}_2'(n_2' - 1)} \varphi(\theta(w'), \tau(w'))w_2^N \\
+ \left(1 - \frac{n_2' - 1}{{n}_2' + 1}\right) \left(\sum_{w' \in N_2' \setminus \{w_1^N\}} \frac{1}{{n}_2'} \varphi(\theta(w'), \tau(w'))w' + \frac{1}{{n}_2'} \varphi(\theta(w_2^N), \tau(w_2^N))w_2^N\right)
$$

$$
> \sum_{w' \in N_2'} \frac{2x_2(w')}{{n}_2'(n_2' - 1)} \varphi(\theta(w'), \tau(w'))w_2^N,
$$

which is $w_2^N$'s expected payoff from not running, when adapting (2) for $w_2^N$ and $n_2' > 1$. The strict inequality derives from the convex combination of two weighted averages of payoffs for three reasons. First, by the same argument as above, the first weighted average puts more weight on low-payoff regimes than on high-payoff ones, while the second one weights all regime payoffs equally. Second, the payoffs associated with all regimes included in both averages are higher for each regime in the second average. Third, while the second average includes all regimes included in the first, it includes an additional regime with an associated payoff that is greater than the payoffs associated with all regimes entering the first average. Therefore, for any $N_2'$, $n_2' > 1$, $w_1^N \in N_2'$, $w_2^N$ strictly prefers running over not running. Combining this conclusion with the cases when $w_1^N \notin N_2'$ and when $n_2' \leq 1$, respectively, for $w_2^N$ running strictly dominates not running.

Next, consider agent $w_n^N$. Consider any strategy profile $N_n'$ of the agents in $N_n$ such that $w_1^N, w_2^N \in N_n'$, so that $n_n' \geq 2$. By Proposition 1, $\varphi(\theta(w_n^N), \tau(w_n^N))w_n^N < \varphi(\theta(w'), \tau(w'))w_n^N$ for all $w' \in N_n'$ so that $w_n^N$'s expected payoff from running is, adapting (3) for $w_n^N$ and $n_n' > 1$, replacing $\pi(n_n' + 1)$ and $\pi(n_n')$,

$$
\sum_{w' \in N_n'} \frac{2x_n(w')}{{n}_n'(n_n' + 1)} \varphi(\theta(w'), \tau(w'))w_n^N + \sum_{w' \in N_n'} \frac{2}{{n}_n'(n_n' + 1)} \varphi(\theta(w_n^N), \tau(w_n^N))w_n^N
$$

$$
= \sum_{w' \in N_n'} \frac{2x_n(w')}{{n}_n'(n_n' + 1)} \varphi(\theta(w'), \tau(w'))w_n^N + {n}_n' \frac{2}{{n}_n'(n_n' + 1)} \varphi(\theta(w_n^N), \tau(w_n^N))w_n^N
$$

$$
= \frac{n_n' - 1}{{n}_n' + 1} \sum_{w' \in N_n'} \frac{2x_n(w')}{{n}_n'(n_n' - 1)} \varphi(\theta(w'), \tau(w'))w_n^N + \left(1 - \frac{n_n' - 1}{{n}_n' + 1}\right) \varphi(\theta(w_n^N), \tau(w_n^N))w_n^N
$$

$$
< \sum_{w' \in N_n'} \frac{2x_n(w')}{{n}_n'(n_n' - 1)} \varphi(\theta(w'), \tau(w'))w_n^N,
$$

29
which is \( w_n^N \)’s expected payoff from not running, when adapting (2) for \( w_n^N \) and \( n'_n > 1 \). The strict inequality derives from the convex combination since \( \sum_{w' \in N'_n} \frac{2x_n(w')}{n'(n'_n-1)} = 1 \), so that \( \sum_{w' \in N'_n} \frac{2x_n(w')}{n'(n'_n-1)} \varphi(\theta(w'),\tau(w'))w_n^N > \varphi(\theta(w_n^N),\tau(w_n^N))w_n^N \), because \( \varphi(\theta(w'),\tau(w'))w_n^N > \varphi(\theta(w_n^N),\tau(w_n^N))w_n^N \) for all \( w' \in N'_n \). That is, given that \( w_1^N \) and \( w_2^N \) run (i.e., their strictly dominated strategies of not running being eliminated), for \( w_n^N \) not running strictly dominates running.

Next, consider agent \( w_{n-1}^N \). Consider any strategy profile \( N_{n-1}' \) of the agents in \( N_{n-1} \) with \( w_1^N, w_2^N \in N_{n-1}' \) and \( w_3^N \notin N_{n-1}' \). The problem for \( w_{n-1}^N \) now looks exactly as the one for \( w_n^N \) above. Thus, analysis and result are the same so that, given the iterated elimination of strictly dominated strategies, for \( w_{n-1}^N \) not running strictly dominates running. By iteration, the same argument then holds for agents \( w_{n-2}^N, \ldots, w_3^N \). That is, only \( w_1^N \) and \( w_2^N \) select themselves into running and therefore run for office.

**Proposition 3**

*Proof.* In equilibrium, the agent that determines the outcome is the second smallest element of the set \( N, w_2^N \). It follows directly from Proposition 1 that a larger \( n \), which decreases \( w_2^N = w_{p+2-n} \), implies better enforcement and more secure property rights. □

**Proposition 4**

*Proof.* Every admissible electorate has at least one appropriator and the majority of voters are producers. By assuming \( p - 2 > a > 0 \), these are also the only assumptions made in the case when the whole population can vote. Therefore, the entire analysis and thus the equilibrium outcome are exactly the same as if the whole population were allowed to vote. □

**Proposition 5**

*Proof.* I solve the model backwards, first the political game, then the selection game.

**First,** consider an equilibrium in the political game between two candidates \( w \) and \( w' \), who propose the regimes \((\theta, \tau)\) and \((\theta', \tau')\), respectively. At least one candidate wins with positive probability and at least one candidate loses with positive probability. Without loss of generality, suppose that candidate \( w \), proposing the regime \((\theta, \tau)\), wins the election with positive probability. Then, the regime \((\theta, \tau)\) must make appropriators at least indifferent among both proposed regimes, otherwise it would lose the election with certainty. That is, \( \nu(\theta, \tau) \geq \nu(\theta', \tau') \geq 0 \). I proceed in a number of steps.

1. Suppose for a contradiction that \( \nu(\theta, \tau) > \nu(\theta', \tau') \). Then, \( w \) wins with certainty and gets payoff \( \tilde{w}(\theta, \tau) \). By continuity, \( w \) can profitably deviate to proposing the regime \((\theta'', \tau'') = (\theta, \tau + \epsilon) \) for a small enough \( \epsilon > 0 \) such that \( \nu(\theta'', \tau'') > \nu(\theta', \tau') \) to still win with certainty and enjoy a higher payoff \( \tilde{w}(\theta'', \tau'') > \tilde{w}(\theta, \tau) \), a contradiction. Thus, \( \nu(\theta, \tau) = \nu(\theta', \tau') \).
2. Suppose for a contradiction that $\nu(\theta, \tau) = \nu(\theta', \tau') = 0$. With positive probability, candidate $w'$ collects a payoff $\varphi(\theta, \tau)w' \leq w' < 1$ from losing. Irrespective of whether or not candidate $w'$ wins with positive probability and what their payoff is in that case, even if it is the dictator payoff of 1, $w'$ can profitably deviate to proposing a regime $(\theta'', \tau'') = (1, 1 - \epsilon)$ for a small enough $\epsilon > 0$. Doing so, $w'$ offers appropriators a positive payoff $\nu(\theta'', \tau'') = \epsilon > 0 = \nu(\theta, \tau)$ and thus wins the election with certainty, securing payoff $\tilde{\nu}(\theta'', \tau'')$. This deviation is profitable as $\epsilon$ can be chosen small enough to yield a higher payoff than the relevant convex combination of 1 and $w'$, a contradiction. Thus, $\nu(\theta, \tau) = \nu(\theta', \tau') > 0$, $\theta > 0$, and $\tau < 1$.

3. Suppose for a contradiction that $\theta < 1$. There are two cases: (i) $\tilde{\nu}(\theta, \tau) < \varphi(\theta', \tau')w$; and (ii) $\tilde{\nu}(\theta, \tau) \geq \varphi(\theta', \tau')w$. In case (i), since $\nu(\theta, \tau) = \nu(\theta', \tau') > 0$ and thus $\theta' > 0$ and $\tau' < 1$, candidate $w$ can profitably deviate to proposing the regime $(\theta'', \tau'') = (\theta', \tau' + \epsilon)$ for a small enough $\epsilon > 0$ so as to lose the election with certainty, because $\nu(\theta', \tau') > \nu(\theta'', \tau'')$, and secure payoff $\varphi(\theta', \tau')w > \tilde{\nu}(\theta, \tau)$, a contradiction. In case (ii), $w$ can profitably deviate to proposing the regime $(\theta'', \tau'') = (\theta + \epsilon, \tau)$ for some small enough $\epsilon > 0$ to win the election with certainty, because $\nu(\theta + \epsilon, \tau) > \nu(\theta, \tau) = \nu(\theta', \tau')$. This deviation is profitable because the certain payoff is $\tilde{\nu}(\theta + \epsilon, \tau) > \tilde{\nu}(\theta, \tau) \geq \varphi(\theta', \tau')w$, a contradiction. Therefore, $\theta = 1$.

4. Suppose for a contradiction that $(\theta, \tau) = (1, \tau)$ for some $\tau > 0$. With positive probability, $w'$ loses the election, getting $\varphi(1, \tau)w' = 0$. The payoff $w$ collects when winning is $\tilde{\nu}(1, \tau) = \tau > 0$. As $\nu(1, \tau) = (1 - \tau) = \theta'(1 - \tau') = \nu(\theta', \tau')$, it follows that $\tilde{\nu}(1, \tau) = \tau \geq \tau' - g(1 - \theta') = \tilde{\nu}(\theta', \tau')$: if $\theta' < 1$, then $g(1 - \theta') > 0$ and $(1 - \tau) < (1 - \tau')$ so that $\tau' < \tau$; if $\theta' = 1$, then $\tau' = \tau$. Thus, $w'$ can profitably deviate to proposing $(\theta'', \tau'') = (1, 1 - \tau - \epsilon)$ for a small enough $\epsilon > 0$ to win the election and collect payoff $\tau - \epsilon > 0$ with certainty, since $\nu(1, \tau - \epsilon) > \nu(1, \tau)$. This deviation is profitable because $\epsilon$ can be chosen small enough to yield a higher payoff than the relevant convex combination of $\tilde{\nu}(\theta', \tau') \leq \tau$ and 0, a contradiction. Hence, $(\theta, \tau) = (1, 0)$, which is the anarchy regime and maximizes appropriators’ payoffs.

5. Suppose for a contradiction that $(\theta', \tau') \neq (1, 0)$. Then, as $(\theta, \tau) = (1, 0)$ uniquely maximizes the payoffs of appropriators, it follows that $\nu(\theta, \tau) > \nu(\theta', \tau')$, a contradiction (see Step 1). Therefore, $(\theta, \tau) = (\theta', \tau') = (1, 0)$ and both candidates win with equal probability.

6. Neither candidate can profitably deviate: both candidates win with equal probability and as $\varphi(1, 0) = \tilde{\nu}(1, 0) = 0$, their payoff is zero with certainty; deviating to proposing any other regime loses the election with certainty, implying certain payoff zero as well.

**Second**, consider an equilibrium in the selection game. If nobody ran, then deviating to running yields the dictator payoff, a contradiction. Therefore, at least one agent runs for office. For all other potential candidates, irrespective of whether or not they run for office, their payoff is zero: either they are subject to taxation by a dictator or the implemented regime is anarchy. Therefore, any profile with at least one agent running is an equilibrium: deviating to running or not running, respectively, yields payoff zero and is not profitable. The equilibrium outcome is a dictatorship if only one agent runs and anarchy otherwise. ■
Proposition 6

Proof. This proof replicates the proof of Proposition 1. I proceed in steps to describe what an equilibrium has to look like, find all candidate equilibria (all of which have the same unique winning regime), and show that they in fact are equilibria. Each step makes a statement and then proves it. The relevant payoff functions are given by (7)–(9).

Let \((\tilde{\theta}, \tilde{\tau})\) solve the problem of the unconstrained maximization of \(\hat{w}(\theta, \tau)\), i.e.,

\[
(\tilde{\theta}, \tilde{\tau}) \in \arg \max_{(\theta, \tau) \in [0, 1]^2} \tau l(1 - \theta) - g(1 - \theta).
\]

Because \(l(1 - \theta) > 0\) for all \((1 - \theta) > 0\) and due to \(l(1 - \theta) - g(1 - \theta)\) being strictly concave and satisfying \(l(0) - g(0) = 0\), \(l(1) - g(1) \leq 0\), and \(\lim_{(1 - \theta) \to 0} (l'(1 - \theta) - g'(1 - \theta)) > 0\), \((\tilde{\theta}, \tilde{\tau})\) is unique, and \((\tilde{\theta}, \tilde{\tau}) = (\hat{\theta}, 1)\), where \(\hat{\theta} \in (0, 1)\) solves \(l'(1 - \hat{\theta}) = g'(1 - \hat{\theta})\). The payoffs associated with \((\hat{\theta}, 1)\) are \(\hat{w}(\hat{\theta}, 1) > 0\), \(\hat{\nu}(\hat{\theta}, 1)w_i = 0\), and \(\hat{\nu}(\hat{\theta}, 1) = 0\), respectively.

1. In equilibrium, the proposed regimes \((\theta, \tau)\) and \((\theta', \tau')\) satisfy \(\hat{\varphi}(\theta, \tau) = \hat{\varphi}(\theta', \tau') > 0\). Suppose for a contradiction that \(\hat{\varphi}(\theta, \tau) \neq \hat{\varphi}(\theta', \tau')\). Without loss of generality assume that \(w\) proposes the regime \((\theta, \tau)\) such that \(\hat{\varphi}(\theta, \tau) > \hat{\varphi}(\theta', \tau')\), which means that \(w\) wins the election with certainty. Note that \(\hat{\varphi}(\theta, \tau) > \hat{\varphi}(\theta', \tau') > 0\) implies that \((1 - \theta) > 0\) and \((1 - \tau) > 0\). Then, by continuity, \(w\) can deviate to proposing \((\theta'', \tau'') = (\theta, \tau + \epsilon)\) for a small enough \(\epsilon > 0\) and reduce \((1 - \tau)\) slightly so that \(\hat{\varphi}(\theta'', \tau'') > \hat{\varphi}(\theta', \tau')\) and \(w\) still wins, with a higher payoff \(\hat{w}(\theta'', \tau'') > \hat{w}(\theta', \tau')\), a contradiction. Thus, \(\hat{\varphi}(\theta, \tau) = \hat{\varphi}(\theta', \tau')\). Now, suppose for a contradiction that \(\hat{\varphi}(\theta, \tau) = \hat{\varphi}(\theta', \tau') = 0\). Then, at least one of the candidates has a positive probability of losing and thus getting a payoff of 0. By continuity, this candidate can profitably deviate to proposing \((\theta''', \tau''') = (\hat{\theta}, 1 - \epsilon)\) for a small enough \(\epsilon > 0\) to win the election with certainty, as \(\hat{\varphi}(\theta'', \tau'') > 0\), and enjoy a higher expected payoff because \(\hat{w}(\theta'', \tau'')\) can be made arbitrarily close to the unconstrained maximum \(\hat{w}(\hat{\theta}, 1)\), a contradiction.

2. In equilibrium, if \(w_o\) proposes \((\theta, \tau)\) and wins the election with positive probability over the opponent’s regime proposal \((\theta', \tau')\), then \(\hat{w}(\theta, \tau) \geq \hat{w}(\theta', \tau')w_o\). Suppose for a contradiction that \(\hat{w}(\theta', \tau')w_o > \hat{\nu}(\theta, \tau)\). Then, \(w_o\) can profitably deviate to proposing \((\theta'', \tau'') = (\theta, 1)\), which loses the election with certainty, as \(\hat{\varphi}(\theta', \tau') > 0 = \hat{\varphi}(\theta'', \tau'')\), where the inequality follows from Step 1, thereby giving \(w_o\) a higher expected payoff, a contradiction.

3. In equilibrium, if \(w_o\) proposes \((\theta, \tau)\) and wins the election with positive probability over the opponent’s regime proposal \((\theta', \tau')\), then \(\hat{w}(\theta, \tau) \geq \hat{w}(\theta', \tau')\). Suppose for a contradiction that \(\hat{w}(\theta', \tau') > \hat{\nu}(\theta, \tau) \geq \hat{\varphi}(\theta', \tau')w_o > 0\), where the last two inequalities follow from Steps 2 and 1, respectively. Then, by continuity, \(w_o\) can profitably deviate to proposing the regime \((\theta''', \tau''') = (\theta', \tau' - \epsilon)\) for a small enough \(\epsilon > 0\), such that \(\hat{w}(\theta'', \tau'') > \hat{w}(\theta, \tau) \geq \hat{\varphi}(\theta', \tau')w_o\), to win the election with certainty, as it offers all voters a strictly higher payoff than \((\theta', \tau')\), and enjoy a higher expected payoff because \(\hat{w}(\theta'', \tau'')\) is greater than any convex combination
of $\hat{w}(\theta, \tau)$ and $\hat{\phi}(\theta', \tau')w_\omega$, a contradiction.

4. In equilibrium, if $w_{-o}$ proposes $(\theta', \tau')$ and loses with positive probability against the opponent’s regime proposal $(\theta, \tau)$, then $\hat{\phi}(\theta, \tau)w_{-o} \geq \hat{w}(\theta, \tau)$. Suppose for a contradiction that $\hat{w}(\theta, \tau) > \hat{\phi}(\theta, \tau)w_{-o} > 0$. Note that $\hat{w}(\theta, \tau) \geq \hat{w}(\theta', \tau')$ by Step 3 as $(\theta, \tau)$ wins with positive probability. Then, by continuity, $w_{-o}$ can profitably deviate to proposing $(\theta'', \tau'') = (\theta, \tau - \epsilon)$ for a small enough $\epsilon > 0$, win the election with certainty, as $(\theta'', \tau'')$ offers all voters a strictly higher payoff than $(\theta, \tau)$, and enjoy a higher expected payoff because $\hat{w}(\theta'', \tau'')$ can be made arbitrarily close to $\hat{w}(\theta, \tau)$, a contradiction.

5. In equilibrium, $(\theta_L, \tau_L) \neq (\theta_H, \tau_H)$. Suppose for a contradiction that $(\theta_L, \tau_L) = (\theta_H, \tau_H)$. Then, each candidate wins with positive probability. Thus, from Steps 4 and 2 it must hold that $\hat{\phi}(\theta, \tau)w_L \geq \hat{w}(\theta, \tau) \geq \hat{\phi}(\theta, \tau)w_H > \hat{\phi}(\theta, \tau)w_L$, a contradiction.

6. In equilibrium, $w_L$ wins with certainty. Suppose for a contradiction that $w_H$ wins the election with positive probability. Then, since $\hat{\phi}(\theta_H, \tau_H) = \hat{\phi}(\theta_H, \tau_H)$ from Step 1, it must hold from Steps 2 and 4 that $\hat{w}(\theta_H, \tau_H) \geq \hat{\phi}(\theta_L, \tau_L)w_H = \hat{\phi}(\theta_H, \tau_H)w_H > \hat{\phi}(\theta_H, \tau_H)w_L \geq \hat{w}(\theta_H, \tau_H)$, a contradiction.

7. In equilibrium, the regime $(\theta_L, \tau_L)$ that wins the election with certainty solves

$$(P') \quad \max_{(\theta, \tau) \in [0,1]^2} \hat{w}(\theta, \tau) \quad s.t. \quad \hat{\phi}(\theta, \tau) \geq \hat{\phi} \equiv \hat{\phi}(\theta_H, \tau_H).$$

Suppose not. Suppose for a contradiction that $(\theta_L, \tau_L)$ wins the election with certainty and violates the constraint so that $\hat{\phi}(\theta_L, \tau_L) < \hat{\phi}(\theta_H, \tau_H)$. Then, $(\theta_H, \tau_H)$ wins the election with certainty, a contradiction. Suppose for a contradiction that $(\theta_L, \tau_L)$ wins the election with certainty but does not solve $(P')$. Then, there is a $(\theta', \tau')$ such that $\hat{w}(\theta', \tau') > \hat{w}(\theta_L, \tau_L)$ and $\hat{\phi}(\theta', \tau') \geq \hat{\phi}$. Then, by continuity, $w_L$ could deviate to proposing $(\theta'', \tau'') = (\theta', \tau' - \epsilon)$ for a small enough $\epsilon > 0$ so that $\hat{w}(\theta', \tau' - \epsilon) > \hat{w}(\theta_L, \tau_L)$ and $\hat{\phi}(\theta', \tau' - \epsilon) \geq \hat{\phi}$. Then, by continuity, $\hat{w}(\theta', \tau')$ can be made arbitrarily close to $\hat{w}(\theta_H, \tau_H)$ to win the election with certainty and enjoy a higher payoff, a contradiction. Therefore, solving Problem $(P')$ (note that $\theta < 1$ and $\tau < 1$), $(\theta_L, \tau_L)$ and $(\theta_H, \tau_H)$ satisfy

$$(18) \quad \frac{(g'(1 - \theta_L) - l'(1 - \theta_L))(1 - \theta_L)}{l(1 - \theta_L)} = (1 - \tau_L),$$
$$\hat{\phi}(\theta_H, \tau_H) = \hat{\phi}(\theta_L, \tau_L).$$

8. In equilibrium, $\hat{\phi}(\theta_L, \tau_L)w_H = \hat{w}(\theta_L, \tau_L)$. As $w_L$ wins with certainty, from Steps 4 and 2, $\hat{\phi}(\theta_L, \tau_L)w_H \geq \hat{w}(\theta_L, \tau_L) \geq \hat{\phi}(\theta_H, \tau_H)w_L$. Suppose for a contradiction that $\hat{\phi}(\theta_L, \tau_L)w_H > \hat{w}(\theta_L, \tau_L)$. Given $(\theta_L, \tau_L)$, as $(\theta_L, \tau_L)$ solves Problem $(P')$ and $\hat{\phi}(\theta_L, \tau_L) = \hat{\phi}(\theta_H, \tau_H)$, the highest in-office payoff a regime $(\theta', \tau')$ with positive probability of winning can promise $w_H$ is $\hat{w}(\theta_L, \tau_L)$, which is strictly less than $w_H$’s payoff from losing, $\hat{\phi}(\theta_L, \tau_L)w_H$. Thus, producers, who are the majority, are indifferent between the proposed regimes and candidate
$w_H$ runs for office despite, given $w_L$’s proposal, all winning platforms give a payoff in office that is strictly less than their payoff from losing. The same is not true for $w_L$ because $\hat{\nu}(\theta_L, \tau_L) \geq \hat{\phi}(\theta_H, \tau_H)w_L$. Therefore, due to the preference shock, with probability $\varepsilon > 0$, the majority of voters vote for $w_H$, who thus wins the election with positive probability, a contradiction. Therefore,

\begin{equation}
\hat{\phi}(\theta_L, \tau_L)w_H = \hat{w}(\theta_L, \tau_L) = \tau_Ll(1 - \theta_L) - g(1 - \theta_L).
\end{equation}

9. In equilibrium, $\hat{\nu}(\theta_L, \tau_L) > \hat{\nu}(\theta_H, \tau_H)$ so that $\theta_H < \theta_L$. Suppose for a contradiction that $\hat{\nu}(\theta_L, \tau_L) \leq \hat{\nu}(\theta_H, \tau_H)$. As $\hat{\phi}(\theta_L, \tau_L) = \hat{\phi}(\theta_H, \tau_H)$, $w_H$ wins with positive probability, a contradiction. Thus, $\hat{\nu}(\theta_L, \tau_L) > \hat{\nu}(\theta_H, \tau_H)$, that is, $\theta_L(1 - \tau_L)l(1 - \theta_L) > \theta_H(1 - \tau_H)l(1 - \theta_H)$, which with $\hat{\phi}(\theta_L, \tau_L) = \hat{\phi}(\theta_H, \tau_H)$ implies that $(1 - \tau_L)l(1 - \theta_L) < (1 - \tau_H)l(1 - \theta_H)$. Thus, again with $\hat{\phi}(\theta_L, \tau_L) = \hat{\phi}(\theta_H, \tau_H)$, it follows that $(1 - \theta_L) < (1 - \theta_H)$ or

\begin{equation}
\theta_H < \theta_L.
\end{equation}

That is, $w_H$ proposes more enforcement.

10. Collecting equations (18)–(21) gives

\begin{equation}
\hat{\phi}(\theta_L, \tau_L)w_H = \tau_Ll(1 - \theta_L) - g(1 - \theta_L),
\end{equation}

\begin{equation}
\frac{(g'(1 - \theta_L) - l'(1 - \theta_L))(1 - \theta_L)}{l(1 - \theta_L)} = (1 - \tau_L),
\end{equation}

\begin{equation}
\hat{\phi}(\theta_H, \tau_H) = \hat{\phi}(\theta_L, \tau_L) \text{ and } \theta_H < \theta_L.
\end{equation}

Now, (22) and (23) are two equations in two unknowns that can be solved for $(\theta_L, \tau_L)$, and the solution has to be interior. Then, any regime $(\theta_H, \tau_H)$ that satisfies (24) makes for an equilibrium. Therefore, consider equations (22) and (23). From (23),

\begin{equation}
(1 - \tau_L) = \frac{(g'(1 - \theta_L) - l'(1 - \theta_L))(1 - \theta_L)}{l(1 - \theta_L)}
\end{equation}

and thus

\begin{equation}
\tau_L = 1 - \frac{(g'(1 - \theta_L) - l'(1 - \theta_L))(1 - \theta_L)}{l(1 - \theta_L)}.
\end{equation}

It will have to be verified that $\tau_L \in (0, 1)$. Plugging (25) and (26) into (22) using $\hat{\phi}(\theta_L, \tau_L) = (1 - \theta_L)(1 - \tau_L)l(1 - \theta_L)$ and rewriting gives

\[ (g'(1 - \theta_L) - l'(1 - \theta_L))(1 - \theta_L)[1 + (1 - \theta_L)w_H] = l(1 - \theta_L) - g(1 - \theta_L). \]
Let \( h : (0, 1) \times \mathbb{R}_+ \to \mathbb{R} \) be given by

\[
    h((1 - \theta); w_H) = (g'(1 - \theta) - l'(1 - \theta))(1 - \theta)[1 + (1 - \theta)w_H] - (l(1 - \theta) - g(1 - \theta)).
\]

Fix any \( w_H \in \mathbb{R}_+ \). As \( (1 - \theta) \) approaches zero, this function is nonpositive because

\[
    \lim_{(1 - \theta) \to 0} h((1 - \theta); w_H) \leq \lim_{(1 - \theta) \to 0} g'(1 - \theta)(1 - \theta) - \lim_{(1 - \theta) \to 0} l'(1 - \theta)(1 - \theta) \leq 0,
\]

due to properties of \( l \) and \( g \), (5)-(6). As \( (1 - \theta) \) approaches one, it is strictly positive since

\[
    \lim_{(1 - \theta) \to 1} h((1 - \theta); w_H) = (\lim_{(1 - \theta) \to 1} g'(1 - \theta) - \lim_{(1 - \theta) \to 1} l'(1 - \theta))(1 - \theta)[1 + w_H] + g(1) - l(1)
\]

\[
    \geq (\lim_{(1 - \theta) \to 1} g'(1 - \theta) - \lim_{(1 - \theta) \to 1} l'(1 - \theta))[1 + w_H]
\]

\[
    > (1 - \lim_{(1 - \theta) \to 1} l'(1 - \theta))[1 + w_H]
\]

\[
    > (1 - 1)[1 + w_H] = 0,
\]

due to properties of \( l \) and \( g \), (5)-(6). At \( (1 - \bar{\theta}) \in (0, 1) \), as shown at the top of the proof, \( l(1 - \bar{\theta}) - g(1 - \bar{\theta}) > 0 \), i.e., \( \hat{w}(\bar{\theta}, 1) > 0 \), and \( l'(1 - \bar{\theta}) - g'(1 - \bar{\theta}) = 0 \). Thus, at \( (1 - \bar{\theta}) \),

\[
    h((1 - \bar{\theta}); w_H) = (g'(1 - \bar{\theta}) - l'(1 - \bar{\theta}))(1 - \bar{\theta})[1 + (1 - \bar{\theta})w_H] - (l(1 - \bar{\theta}) - g(1 - \bar{\theta}))
\]

\[
    = -(l(1 - \bar{\theta}) - g(1 - \bar{\theta})) < 0.
\]

It follows that there exists \( (1 - \theta_L) \in (0, 1) \) such that \( h((1 - \theta_L); w_H) = 0 \). In fact, there is a unique such \( (1 - \theta_L) \) because \( h \) is a strictly convex function of \( (1 - \theta) \) that attains nonpositive values for low \( (1 - \theta) \), strictly negative values for intermediate \( (1 - \theta) \), and strictly positive values for high \( (1 - \theta) \). The strict convexity can be seen from the fact that the derivative of \( h \) with respect to \( (1 - \theta) \) is increasing in \( (1 - \theta) \) because, due to \( g''(\cdot) \geq 0 \) and \( g''(\cdot) > 0 \),

\[
    h_{(1 - \theta)}((1 - \theta); w_H) = (g''(1 - \theta) - l''(1 - \theta))(1 - \theta)[1 + (1 - \theta)w_H]
\]

\[
    + (g'(1 - \theta) - l'(1 - \theta))[1 + (1 - \theta)w_H]
\]

\[
    + (g'(1 - \theta) - l'(1 - \theta))(1 - \theta)w_H - (l'(1 - \theta) - g'(1 - \theta))
\]

\[
    = (g''(1 - \theta) - l''(1 - \theta))(1 - \theta)[1 + (1 - \theta)w_H]
\]

\[
    + 2(g'(1 - \theta) - l'(1 - \theta))[1 + (1 - \theta)w_H]
\]

\[
    = [1 + (1 - \theta)w_H] \left( 2g'(1 - \theta) + g''(1 - \theta)(1 - \theta)
\]

\[
    - 2l'(1 - \theta) + l''(1 - \theta)(1 - \theta) \right),
\]

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is increasing in \((1 - \theta)\) if \(2l'(1 - \theta) + l''(1 - \theta)(1 - \theta)\) is nonincreasing in \((1 - \theta)\), which is the case due to the properties listed in \((4)\): if \(l''(1 - \theta) = 0\), then it holds trivially; if \(l''(1 - \theta) < 0\), then it holds due to the fact that this expression’s derivative satisfies

\[
2l''(1 - \theta) + l''(1 - \theta) + l''(1 - \theta)(1 - \theta) \leq 0 \iff 3 \geq \frac{l''(1 - \theta)(1 - \theta)}{l''(1 - \theta)}.
\]

Therefore, there exists a unique \((1 - \theta_L) \in (0, 1)\) such that \(h((1 - \theta_L); w_H) = 0\). Because \(h((1 - \theta); w_H) < 0\), it follows that \((1 - \theta_L) > (1 - \bar{\theta})\). Given the unique \((1 - \theta_L)\), there is a unique \((1 - \tau_L)\) via \((25)\):

\[
(1 - \tau_L) = \frac{g'(1 - \theta_L) - l'(1 - \theta_L)}{l((1 - \theta_L))}.
\]

Because \(l(1 - \theta) - g(1 - \theta)\) is strictly concave, \(l'(1 - \theta) - g'(1 - \bar{\theta}) = 0\), and \((1 - \theta_L) > (1 - \bar{\theta})\), it follows that \(g'(1 - \theta_L) - l'(1 - \theta_L) > 0\) so that \((1 - \tau_L) > 0\). Also, \(\tau_L > 0\) since \(l(1 - \theta_L) > (g'(1 - \theta_L) - l'(1 - \theta_L)(1 - \theta_L))\): if \(l(1 - \theta_L) \leq (g'(1 - \theta_L) - l'(1 - \theta_L))(1 - \theta_L),\) then

\[
0 = h((1 - \theta_L); w_H)
= (g'(1 - \theta_L) - l'(1 - \theta_L))(1 - \theta_L)[1 + (1 - \theta_L)w_H] - (l(1 - \theta_L) - g(1 - \theta_L))
\geq l(1 - \theta_L)[1 + (1 - \theta_L)w_H] - l(1 - \theta_L) + g(1 - \theta_L)
= l(1 - \theta_L)(1 - \theta_L)w_H + g(1 - \theta_L)
> 0,
\]
a contradiction. Therefore, \(\tau_L \in (0, 1)\).

As \((1 - \bar{\theta})\) is determined by \(l'(1 - \bar{\theta}) = g'(1 - \bar{\theta})\) and thus independent of \(w_H\), \(h((1 - \bar{\theta}); w_H) < 0\), and \(g'(1 - \theta) - l'(1 - \theta) > 0\) for all \((1 - \theta) > (1 - \bar{\theta})\), a higher \(w_H\) increases \(h((1 - \theta); w_H)\) for all \((1 - \theta) > (1 - \bar{\theta})\). Thus, as \((1 - \theta_L) > (1 - \bar{\theta})\) for all \(w_H\), it follows that a higher \(w_H\) implies a smaller \((1 - \theta_L)\). From \((27)\), it follows that a smaller \((1 - \theta_L)\) implies a smaller \((1 - \tau_L)\) as well because as functions of \((1 - \theta)\), and due to

\[
g''(1 - \theta) - l''(1 - \theta) > 0,
\]

the nominator increases with \((1 - \theta)\) while the denominator decreases with \((1 - \theta)\) since

\[
\frac{l'(1 - \theta)(1 - \theta) - l(1 - \theta)}{(1 - \theta)^2} \leq 0 \iff \frac{l'(1 - \theta)(1 - \theta)}{l(1 - \theta)} \leq 1,
\]

which holds due to the properties listed in \((4)\).

Thus, for any \(w_H \in W\), there exists a unique \((1 - \theta_L)\) such that \(h((1 - \theta_L); w_H) = 0,\)
and that \((1-\theta_L)\) is strictly smaller the higher \(w_H\) is. The unique \((1-\theta_L)\) implies a unique \((1-\tau_L)\), which is strictly increasing in \((1-\theta_L)\). So, a higher \(w_H\) strictly decreases both \((1-\theta_L)\) and \((1-\tau_L)\) and thus \(\varphi(\theta_L, \tau_L)\). Given the regime, using (26), the in-office payoff is

\[
\tau_L l(1-\theta_L) - g(1-\theta_L) = \left(1 - \frac{g'(1-\theta_L) - l'(1-\theta_L)}{l(1-\theta_L)}\right) l(1-\theta_L) - g(1-\theta_L) \\
= l(1-\theta_L) - g(1-\theta_L) - (g'(1-\theta_L) - l'(1-\theta_L)) (1-\theta_L).
\]

This office holder payoff decreases in \((1-\theta_L)\) since the derivative w.r.t. \((1-\theta_L)\) satisfies

\[
2 (l'(1-\theta_L) - g'(1-\theta_L)) - (g''(1-\theta_L) - l''(1-\theta_L)) (1-\theta_L) < 0
\]

because \(g''(\cdot) > 0, l''(\cdot) \leq 0,\) and \((1-\theta_L) > (1-\tilde{\theta})\) for all \(w_H\), so that \(l'(1-\theta_L) - g'(1-\theta_L) < 0\). Thus, a higher \(w_H\), via a strictly lower \((1-\theta_L)\), strictly increases the in-office payoff.

11. Finally, neither candidate can profitably deviate. By construction, given \((\theta_H, \tau_H)\), \(w_L\) cannot increase expected payoffs by deviating. No other proposal that wins with positive probability gives a higher in-office payoff as \((\theta_L, \tau_L)\) solves Problem \((P')\). Deviating to proposing a regime that loses the election, \(w_L\) would earn a strictly smaller payoff because \(\hat{w}(\theta_L, \tau_L) = \hat{\varphi}(\theta_L, \tau_L) w_H = \hat{\varphi}(\theta_H, \tau_H) w_H > \hat{\varphi}(\theta_H, \tau_H) w_L\). Similarly, given \((\theta_L, \tau_L)\), \(w_H\) cannot increase expected payoffs by deviating. Any deviation that still loses the election does not change payoffs and the maximum in-office payoff of a proposal \((\theta', \tau')\) that gives \(w_H\) a positive probability of winning, and thus observes \(\hat{\varphi}(\theta', \tau') = \hat{\varphi}(\theta_L, \tau_L) = \hat{\varphi}(\theta_H, \tau_H)\), is \(\hat{w}(\theta_L, \tau_L) = \hat{\varphi}(\theta_L, \tau_L) w_H\). Thus, the set of proposals described is an equilibrium. ■

**Proposition 7**

**Proof.** This proof replicates the proof of Proposition 1 up to a point from which on it proceeds in exactly the same way, except for carrying around a factor \(\gamma\). I proceed in steps to describe what an equilibrium has to look like, find all candidate equilibria (all of which have the same unique winning regime), and show that they in fact are equilibria. Each step makes a statement and then proves it. Recall that the majority of voters are producers.

1. **In equilibrium, the proposed regimes \((\theta, \tau)\) and \((\theta', \tau')\) satisfy \(\varphi(\theta, \tau) = \varphi(\theta', \tau') > 0\).** Suppose for a contradiction that \(\varphi(\theta, \tau) \neq \varphi(\theta', \tau')\). Without loss of generality assume that \(w\) proposes the regime \((\theta, \tau)\) such that \(\varphi(\theta, \tau) > \varphi(\theta', \tau')\), which means that \(w\) wins the election with certainty and payoff \(\hat{w}(\theta, \tau; w)\). Note that \(\varphi(\theta, \tau) > \varphi(\theta', \tau') \geq 0\) implies that \((1-\theta) > 0\) and \((1-\tau) > 0\). Then, by continuity, \(w\) can deviate to proposing \((\theta'', \tau'') = (\theta, \tau + \epsilon)\) for a small enough \(\epsilon > 0\) and reduce \((1-\tau)\) slightly so that \(\varphi(\theta'', \tau'') > \varphi(\theta', \tau')\) and \(w\) still wins, with a higher payoff because \(\hat{w}(\cdot, \cdot; w)\) is strictly increasing in \(\tau\), a contradiction. Thus, \(\varphi(\theta, \tau) = \varphi(\theta', \tau')\). Now, suppose for a contradiction that \(\varphi(\theta, \tau) = \varphi(\theta', \tau') = 0\). At least
one of the candidates has a positive probability of losing and thus getting a payoff of 0. By continuity, that candidate can profitably deviate to proposing \((\theta'', \tau'') = (1 - \epsilon, 1 - \epsilon)\) for a small enough \(\epsilon > 0\) to win the election with certainty, as \(\varphi(\theta'', \tau'') > 0\), and enjoy a higher expected payoff because \(\tilde{w}(\theta'', \tau''; w)\) can be made arbitrarily close to the dictator payoff—from getting all the output via the regime \((1, 1)\), which maximizes \(\tilde{w}(\theta, \tau; w)\)—a contradiction.

2. In equilibrium, if \(w_o\) proposes \((\theta, \tau)\) and wins the election with positive probability over the opponent’s regime proposal \((\theta', \tau')\), then \(\tilde{w}(\theta, \tau; w_o) \geq \varphi(\theta', \tau')w_o\). Suppose for a contradiction that \(\varphi(\theta', \tau')w_o > \tilde{w}(\theta, \tau; w_o)\). Then, \(w_o\) can profitably deviate to proposing \((\theta'', \tau'') = (\theta, 1)\), which loses the election with certainty, as \(\varphi(\theta', \tau') > 0 = \varphi(\theta'', \tau'')\), where the inequality follows from Step 1, thereby giving \(w_o\) a higher expected payoff, a contradiction.

3. In equilibrium, if \(w_o\) proposes \((\theta, \tau)\) and wins the election with positive probability over the opponent’s regime proposal \((\theta', \tau')\), then \(\tilde{w}(\theta, \tau; w_o) \geq \tilde{w}(\theta', \tau'; w_o)\). Suppose for a contradiction that \(\tilde{w}(\theta', \tau'; w_o) > \tilde{w}(\theta, \tau; w_o) \geq \varphi(\theta', \tau')w_o > 0\), where the last two inequalities derive from Steps 2 and 1, respectively. Then, by continuity, \(w_o\) can profitably deviate to proposing the regime \((\theta'', \tau'') = (\theta', \tau' - \epsilon)\) for a small enough \(\epsilon > 0\), such that \(\tilde{w}(\theta'', \tau''; w_o) > \tilde{w}(\theta, \tau; w_o) \geq \varphi(\theta', \tau')w_o\) to win the election with certainty, as it offers all voters a strictly higher payoff than \((\theta', \tau')\), and enjoy a higher expected payoff because \(\tilde{w}(\theta'', \tau''; w_o)\) is greater than any convex combination of \(\tilde{w}(\theta, \tau; w_o)\) and \(\varphi(\theta', \tau')w_o\), a contradiction.

4. In equilibrium, if \(w_{-o}\) proposes \((\theta', \tau')\) and loses with positive probability against the opponent’s regime proposal \((\theta, \tau)\), then \(\varphi(\theta, \tau)w_{-o} \geq \tilde{w}(\theta, \tau; w_{-o})\). Suppose for a contradiction that \(\tilde{w}(\theta, \tau; w_{-o}) > \varphi(\theta, \tau)w_{-o}\). By Step 1, \(\varphi(\theta, \tau) = \varphi(\theta', \tau') > 0\). There are two cases: (i) \(\tilde{w}(\theta', \tau'; w_{-o}) \geq \tilde{w}(\theta, \tau; w_{-o})\); (ii) \(\tilde{w}(\theta', \tau'; w_{-o}) < \tilde{w}(\theta, \tau; w_{-o})\). First, suppose that \(\tilde{w}(\theta', \tau'; w_{-o}) \geq \tilde{w}(\theta, \tau; w_{-o}) > \varphi(\theta, \tau)w_{-o}\). Then, by continuity, \(w_{-o}\) can profitably deviate to proposing the regime \((\theta'', \tau'') = (\theta', \tau' - \epsilon)\) for a small enough \(\epsilon > 0\), such that \(\tilde{w}(\theta'', \tau''; w_{-o}) > \varphi(\theta, \tau)w_{-o}\), to win the election with certainty, as it offers all producers a strictly higher payoff than \((\theta, \tau)\), and enjoy a higher expected payoff because \(\tilde{w}(\theta'', \tau''; w_{-o})\) can be made arbitrarily close to \(\tilde{w}(\theta', \tau'; w_{-o})\), a contradiction. Second, suppose that \(\tilde{w}(\theta', \tau'; w_{-o}) < \tilde{w}(\theta, \tau; w_{-o})\). Then, by continuity, \(w_{-o}\) can profitably deviate to proposing \((\theta'', \tau'') = (\theta, \tau - \epsilon)\) for a small enough \(\epsilon > 0\), such that \(\tilde{w}(\theta'', \tau''; w_{-o}) > \max\{\tilde{w}(\theta', \tau'; w_{-o}), \varphi(\theta, \tau)w_{-o}\}\), win the election with certainty, as \((\theta'', \tau'')\) offers all voters a strictly higher payoff than \((\theta, \tau)\), and enjoy a higher expected payoff, a contradiction.

5. In equilibrium, \((\theta_L, \tau_L) \neq (\theta_H, \tau_H)\). Suppose for a contradiction that \((\theta_L, \tau_L) = (\theta_H, \tau_H) = (\theta, \tau)\). Then, each candidate wins with positive probability. Thus, it must hold from Steps 2 and 4 that \(\tilde{w}(\theta, \tau; w_L) = \varphi(\theta, \tau)w_L\) and \(\tilde{w}(\theta, \tau; w_H) = \varphi(\theta, \tau)w_H\), or

\[
\tilde{w}(\theta, \tau) + \varphi(\theta, \tau)(1 - \gamma)w_L = \varphi(\theta, \tau)w_L \Rightarrow \tilde{w}(\theta, \tau) = \varphi(\theta, \tau)\gamma w_L,
\]

\[
\tilde{w}(\theta, \tau) + \varphi(\theta, \tau)(1 - \gamma)w_H = \varphi(\theta, \tau)w_H \Rightarrow \tilde{w}(\theta, \tau) = \varphi(\theta, \tau)\gamma w_H.
\]
implying $\tilde{w}(\theta, \tau) = \varphi(\theta, \tau)\gamma w_H > \varphi(\theta, \tau)\gamma w_L = \tilde{w}(\theta, \tau)$, a contradiction.

6. In equilibrium, $w_L$ wins with certainty. Suppose for a contradiction that $w_H$ wins the election with positive probability. Then, by Steps 2 and 1, $\tilde{w}(\theta_H, \tau_H; w_H) > \varphi(\theta_L, \tau_L)w_L = \varphi(\theta_H, \tau_H)w_H$. Thus, it must hold that $\tilde{w}(\theta_H, \tau_H) \geq \varphi(\theta_H, \tau_H)\gamma w_H > \varphi(\theta_H, \tau_H)\gamma w_L$. It then follows that $\tilde{w}(\theta_H, \tau_H) + \varphi(\theta_H, \tau_H)(1-\gamma)w_L > \varphi(\theta_H, \tau_H)\gamma w_L + \varphi(\theta_H, \tau_H)(1-\gamma)w_L$, implying that $\tilde{w}(\theta_H, \tau_H; w_L) > \varphi(\theta_H, \tau_H)w_L$, which contradicts the result in Step 4, because $w_L$ loses with positive probability.

7. In equilibrium, the regime $(\theta_L, \tau_L)$ that wins the election with certainty solves

\begin{equation}
(P'') \max_{(\theta, \tau) \in [0,1]^2} \tilde{w}(\theta, \tau) + \varphi(\theta, \tau)(1-\gamma)w_L \quad \text{s.t.} \quad \varphi(\theta, \tau) \geq \bar{\varphi} \equiv \varphi(\theta_H, \tau_H).
\end{equation}

Suppose for a contradiction that $(\theta_L, \tau_L)$ wins the election with certainty and violates the constraint so that $\varphi(\theta_L, \tau_L) < \varphi(\theta_H, \tau_H)$. Then, $(\theta_H, \tau_H)$ wins the election with certainty, a contradiction. Suppose for a contradiction that $(\theta_L, \tau_L)$ wins the election with certainty but does not solve $(P'')$. Then, there is a $(\theta', \tau')$ such that $\tilde{w}(\theta', \tau'; w_L) > \tilde{w}(\theta_L, \tau_L; w_L)$ and $\varphi(\theta', \tau') \geq \bar{\varphi}$. Then, by continuity, $w_L$ could deviate to proposing $(\theta'', \tau'') = (\theta', \tau' - \epsilon)$ for a small enough $\epsilon > 0$ so that $\tilde{w}(\theta', \tau' - \epsilon; w_L) > \tilde{w}(\theta_L, \tau_L; w_L)$ and $\varphi(\theta', \tau' - \epsilon) > \varphi(\theta', \tau') \geq \bar{\varphi} = \varphi(\theta_H, \tau_H)$ to win the election with certainty and enjoy a higher payoff, a contradiction. Therefore, solving Problem $(P'')$ (note that $\theta < 1$ and $\tau < 1$), $(\theta_L, \tau_L)$ and $(\theta_H, \tau_H)$ satisfy

\begin{equation}
g'(1-\theta_L)(1-\theta_L) = (1-\tau_L),
\end{equation}

\begin{equation}
\varphi(\theta_H, \tau_H) = \varphi(\theta_L, \tau_L).
\end{equation}

Notice for later reference that the system $(28)$–$(29)$ is identical to the system $(10)$–$(11)$, and that a solution $(\theta_L, \tau_L)$ to Problem $(P'')$ is independent of the productivity $w_L$ of the agent who solves it.

8. In equilibrium, $\varphi(\theta_L, \tau_L)w_H = \tilde{w}(\theta_L, \tau_L; w_H)$. As $w_L$ wins with certainty, from Steps 4 and 2, $\varphi(\theta_L, \tau_L)w_H \geq \tilde{w}(\theta_L, \tau_L; w_H) > \tilde{w}(\theta_L, \tau_L; w_L) \geq \varphi(\theta_H, \tau_H)w_L$. Suppose for a contradiction that $\varphi(\theta_L, \tau_L)w_H > \tilde{w}(\theta_L, \tau_L; w_H)$. Given $(\theta_L, \tau_L)$, as $(\theta_L, \tau_L)$ solves Problem $(P'')$, the solution to which is independent of the productivity $w_L$ as implied by $(28)$–$(29)$, and $\varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H)$, the highest in-office payoff a regime $(\theta', \tau')$ with positive probability of winning can promise $w_H$ is $\tilde{w}(\theta_L, \tau_L; w_H)$, which is strictly less than $w_H$’s payoff from losing, $\varphi(\theta_L, \tau_L)w_H$. Thus, producers, who are the majority, are indifferent between the proposed regimes and candidate $w_H$ runs for office despite, given $w_L$’s proposal, all winning platforms give a payoff in office that is strictly less than their payoff from losing. The same is not true for $w_L$ because $\tilde{w}(\theta_L, \tau_L; w_L) \geq \varphi(\theta_H, \tau_H)w_L$. Therefore, due to the preference shock, with probability $\epsilon > 0$, the majority of voters vote for $w_H$, who thus wins the election with positive
probability, a contradiction. Therefore,

\[ \varphi(\theta_L, \tau_L) w_H = \check{w}(\theta_L, \tau_L; w_H) = \check{w}(\theta_L, \tau_L) + \varphi(\theta_L, \tau_L)(1 - \gamma)w_H. \]

**9.** In equilibrium, \( \nu(\theta_L, \tau_L) > \nu(\theta_H, \tau_H) \) so that \( \theta_H < \theta_L \). Suppose for a contradiction that \( \nu(\theta_L, \tau_L) \leq \nu(\theta_H, \tau_H) \). As \( \varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H) \), \( w_H \) wins with positive probability, a contradiction. Thus, \( \nu(\theta_L, \tau_L) > \nu(\theta_H, \tau_H) \), that is, \( \theta_L(1 - \tau_L) > \theta_H(1 - \tau_H) \), which with \( \varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H) \) implies that \((1 - \tau_L) > (1 - \tau_H) \). Thus, again with \( \varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H) \), it follows that \((1 - \theta_L) < (1 - \theta_H) \) or

\[ \theta_H < \theta_L. \]

That is, \( w_H \) proposes more enforcement.

**10.** Collecting equations (28)–(31), using \( \check{w}(\theta_L, \tau_L) = \tau_L - g(1 - \theta_L) \), gives

\[ \varphi(\theta_L, \tau_L) \gamma w_H = \tau_L - g(1 - \theta_L), \]

\[ g'(1 - \theta_L)(1 - \theta_L) = (1 - \tau_L) \]

\[ \varphi(\theta_H, \tau_H) = \varphi(\theta_L, \tau_L) \text{ and } \theta_H < \theta_L. \]

The system (32)–(34) is exactly the same as the system (14)–(16), except for the factor \( \gamma > 0 \) multiplying \( w_H \) in equation (32). It follows that the rest of the description of the (candidate) equilibrium regimes is exactly as before, except for \( \gamma \) multiplying \( w_H \). Therefore, the description of the (candidate) equilibria of the political game and the effects of variations in the productivity \( w_H \) of the election loser for \((1 - \theta_L), (1 - \tau_L)\), and \( \varphi(\theta_L, \tau_L) \) are exactly as before. As to the office holder payoff, in equilibrium, using (33), it can be written as

\[ \check{w}(\theta_L, \tau_L; w_L) = \check{w}(\theta_L, \tau_L) + \varphi(\theta_L, \tau_L)(1 - \gamma)w_L = \tau_L - g(1 - \theta_L) + (1 - \theta_L)(1 - \tau_L)(1 - \gamma)w_L = 1 - g'(1 - \theta_L)(1 - \theta_L) - g'(1 - \theta_L) + g'(1 - \theta_L)(1 - \theta_L)^2(1 - \gamma)w_L. \]

This expression is strictly decreasing in \((1 - \theta_L)\) because the derivative w.r.t. \((1 - \theta_L)\) is

\[ - (g''(1 - \theta_L)(1 - \theta_L) + 2g'(1 - \theta_L)) [1 - (1 - \theta_L)(1 - \gamma)w_L] < 0, \]

as \( w_L < 1 \). Thus, a higher \( w_H \) decreases \((1 - \theta_L)\) and thus increases the office holder payoff.

**11.** Finally, neither candidate can profitably deviate. By construction, given \((\theta_H, \tau_H)\), \( w_L \) cannot increase expected payoffs by deviating. No other proposal that wins with positive probability gives a higher in-office payoff as \((\theta_L, \tau_L)\) solves Problem (P”). Deviating to proposing a regime that loses the election, \( w_L \) would earn a strictly smaller payoff because,
as \((\theta_L, \tau_L)\) satisfies (32),

\[
\tilde{w}(\theta_L, \tau_L) = \varphi(\theta_L, \tau_L)\gamma w_H > \varphi(\theta_L, \tau_L)\gamma w_L \\
\Rightarrow \tilde{w}(\theta_L, \tau_L) + \varphi(\theta_L, \tau_L)(1 - \gamma)w_L > \varphi(\theta_L, \tau_L)w_L = \varphi(\theta_H, \tau_H)w_L,
\]

where the last equality follows from (34). Similarly, given \((\theta_L, \tau_L)\), \(w_H\) cannot increase expected payoffs by deviating. Any deviation that still loses the election does not change payoffs and, as the solution to Problem \((P'')\) is independent of the productivity of the agent who solves it, the maximum in-office payoff of a proposal \((\theta', \tau')\) that gives \(w_H\) a positive probability of winning, and thus observes \(\varphi(\theta', \tau') \geq \varphi(\theta_L, \tau_L) = \varphi(\theta_H, \tau_H)\), is \(\tilde{w}(\theta_L, \tau_L) + \varphi(\theta_L, \tau_L)(1 - \gamma)w_H = \varphi(\theta_L, \tau_L)w_H\), where the equality follows from (32). Thus, the set of proposals described is an equilibrium. \(\blacksquare\)

References


