Political competition over property rights enforcement

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Abstract

I analyze an economic mechanism that captures the idea that competition in the political arena helps good economic outcomes. In the model, heterogeneous agents can choose to appropriate others' resources. A qualified electorate votes over proposals by two candidate office holders to determine the property rights enforcement regime. The outside option in the political game is being a citizen under the opponent's regime and is generally better for more productive candidates. That is why the less productive candidate wins the election. He implements a regime that depends on the loser's productivity. As a consequence, two societies with the same productivity distribution and the same office holder, but electoral runners-up with different productivity, face different alternatives and choose different levels of enforcement. The less productive the loser, the more constrained is the office holder and the better is enforcement and the economy's outcome–with more secure property rights, more economic activity, and higher welfare. Easier access to the political arena for more people increases the likelihood of better outcomes while extending the franchise alone does not.

Keywords: Political process, political institution, property rights.
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1 Introduction

I focus on the establishment of secure property rights to analyze an economic mechanism that captures the idea that competition in the political arena helps good economic outcomes. I study a model in which a society chooses a property rights enforcement regime in a political process. Participation in that political process is constrained in two dimensions. One dimension is access to political competition, i.e., who can propose regimes. It determines a society's choice set. The other dimension is membership in the qualified electorate, i.e., who can vote over those proposed regimes. It determines the society's social ordering over that choice set.

A strategic interaction in the political game shapes the regime choice by determining the set of alternatives a society can actually choose from. In contrast to approaches that study the induced preferences of the politically powerful in effective median voter models, I study induced choice sets.[1] These allow me to think about different outcomes in societies that have similar initial economic conditions both when political elites are narrow and when elections are held with virtually full suffrage.[2] *I show that it matters who gets to propose regimes, not who gets to pick one.* Better outcomes–more secure property rights, more economic activity, and higher welfare–are more likely with more competition of preferences and ideas; they don't respond to extensions of the franchise. More competition means that more people have an easier time being active in the political arena.

Evidently, the security of rights to property, i.e., the extent to which people are safe from expropriation of their resources, be it by the government or by other private agents, differs across countries.[3] It matters for economic outcomes and growth as it affects the expected returns to all sorts of investments and thus many individual decisions.[4] In order to understand

[1]As examples of the induced-preferences approach from the literature that analyzes the interaction of economic rents and political power in shaping property rights, see Acemoglu (2003) on the role of limited commitment, Acemoglu (2008) on distortions from redistribution and entry barriers, Acemoglu (2006) on direct and indirect extraction of rents, and Acemoglu and Robinson (2001) on inefficient redistribution as a result of the interplay of socio-economic groups.

[2]It seems evident that most countries hold elections. However, North et al. (2006) (pp. 66-67) argue that, "although Argentina, Mexico, Russia, and the United States all hold elections, they are not all democracies in the same way; or, put differently, elections do not mean the same thing in the four countries", due to differences in the degree of political competition.

[3]See, e.g., Easterly and Levine (2003), Acemoglu et al. (2005), and Acemoglu and Johnson (2005).

[4]Many scholars have provided investigations into the importance of, broadly speaking, institutions for economic development and growth. Knack and Keefer (1995) and Barro (1996) find strong evidence that property rights institutions are of major importance in determining economic growth. Easterly and Levine (2003) report evidence that endowments affect long run economic outcomes through institutions only. Similar results are presented in Acemoglu and Johnson (2005) and Acemoglu et al. (2005). Rodrik et al. (2004) argue that institutions are the single most important determinant of development. On the more theoretical side, see, e.g., Murphy et al. (1993), Grossman and Kim (1995, 1996), and Benhabib and Rustichini (1996) for effects of weak property rights economic decisions; Besley and Ghatak (2010) provide an overview. More generally, there is a large related literature on rent-seeking and appropriation. See, e.g., Hirshleifer (1988) and Skaperdas (1992).

economic development, or the lack of it, we have to understand how secure property rights are established and why countries might fail to do so. Here, I focus on societies' choices of enforcement regimes and ask why these might differ in societies with similar economic fundamentals? I take the view that different equilibrium outcomes must originate in at least one of two separately determined ingredients for the social choice of an enforcement regime: the social ordering of alternatives or the set of alternatives available. *Since societies constrain participation in the determination of these ingredients to varying degrees, which constraints must be relaxed in order to improve economic outcomes and why?* The answers I propose are that societies with similar economic fundamentals might choose different outcomes because they have endogenously available different alternatives to choose from. These alternatives in turn differ due to variations in political institutions that determine who can actively engage in the political arena.

I derive these answers from a static one-period model in which individuals choose one of two occupations. They can either produce with heterogeneous productivity or, instead, engage in appropriation and basically steal from each other.[5] How much they can steal from each other is regulated by the level of enforcement implemented. That enforcement level is chosen in a political process as follows. There is a finite set of agents in the economy that can actively engage in the political arena. Two of them are endogenously determined to become political candidates in electoral competition for office.[6] In a one-shot political game, the two candidates propose a regime consisting of a tax rate and an enforcement level. The tax receipts are used to pay for both the enforcement level and the candidate's compensation when in office. That leads the candidates to prefer high taxes and weak enforcement. Then, a subset of the population–the qualified electorate–votes over those proposed regimes to choose one by simple majority. Given a level of enforcement, voters prefer low taxes. The winner of the election implements the regime he proposed and receives the implied payoff. The loser continues as a citizen under the regime implemented by the winner. Thus, a candidate's outside option in the

[5] The model is stylized in the sense that I don't take a stand on what appropriation is. One can think of corruption, extortion, or fraud as well as outright theft. In fact, appropriators could be thought of as implementing expropriation by the government. So, this paper connects to several literatures. One example is the literature on crime started by Becker (1968); most closely related are Imrohoroglu et al. (2000) and Benoît and Osborne (1995). Neither focuses on the kind of strategic interaction analyzed here. In fact, they focus on induced preferences over a fixed continuous choice set. Another example is the literature on corruption. For a positive analysis see, e.g., Rose-Ackerman (1975); for an analysis of its consequences see, e.g., Acemoglu and Verdier (2000); for an analysis of the optimal provision of incentives, see e.g., Becker and Stigler (1974). Aidt (2003) provides an overview.

[6] My setup shares this stage with citizen-candidate models as introduced by Osborne and Slivinski (1996) and Besley and Coate (1997). In this literature, candidates cannot commit and run with their preferred policy as a platform. In my model, however, an agent's regime preferences when in office and when not in office are not aligned. In fact, each agent's ideal regime once in office is outright dictatorship. Moreover, my model has endogenous rents from holding office and a deterministic voting equilibrium. One candidate runs and loses with certainty. He does so to constrain the set of possible regimes that can be implemented and, in fact, he "dictates" the outcome. For a somewhat more general discussion of selection into politics see Besley (2005).

political game is his out-of-office payoff determined by the regime proposed by his opponent.[7] A strategic interaction arises so that the choice set facing the electorate depends on the loser to-be's productivity. The winner to-be cannot divert too much of the taxes raised away from their use in enforcement. Because, if he did, the loser to-be would be better off getting into office himself. So, the loser to-be's outside option constrains the winner to-be's discretion and thereby the payoff he can reap from being in office. And since the outside option is worse the lower the productivity of a candidate is, less productive losers to-be are more restrictive. It follows that losers to-be with different productivity lead to different choice sets and thus different outcomes. In particular, less productive losers imply favorable alternatives for the electorate to choose from. Favorable alternatives are outcomes with more secure property rights, more economic activity and higher welfare. This is the sense in which I study induced choice sets and not only the induced preferences of a politically powerful group as in effective median voter models.[8]

The model predicts that weaker property rights enforcement reduces productive activity, output, and welfare but raises in-office payoff. That is, office holders in societies with insecure property rights receive high payoffs.[9] From a political economy point of view, the model predicts that the less productive candidate wins the election. That is, the teacher rather than the engineer ends up in office. More interestingly, it creates a mechanism–the quality of the runner-up–through which two societies, with the same productivity distribution and the same office holder in terms of productivity, generically choose different levels of enforcement. Forgetting about the election's runner-up, two societies may look similar in all relevant dimensions and yet choose different regimes. Outcomes differ because the set of alternatives the qualified electorate, and thus society, can choose from differ. This distinguishes my paper from the literature that focuses on differences in induced preferences over a fixed continuous choice set leading to different outcomes. In my model, in fact, two societies with different outcomes can have the same preferences over any given set of alternatives–but the sets they face differ.

[7]The important and likely not unrealistic aspect is that a candidate's outside option depends on both his productivity and the implemented regime. For the loser to move on as a citizen is a simple way to model that.

[8]The literature on agenda setting and proposal power (e.g., Baron and Ferejohn (1989), Harrington (1990)) analyzes sequential settings where a single proposal competes against an alternative that is exogenous to the stage game, e.g., a status quo or a previous round's outcome. The strategic interaction amounts to "vote buying" from the electorate by offering the expected utility from proposal rejection to a sufficient number of agents. The sequential structure and the stochastic proposal power assignment handle the intransitive social preferences stemming from majority rule (see, e.g., McKelvey (1976), Schofield (1983)). Importantly, in these models, there is no distinction between the electorate and the candidates, which is needed for the discussion of constraints to participation I provide. There is also a somewhat less related literature on agenda setting through issue salience (e.g., Glazer and Lohmann (1999)). It concerns owning and disowning policy issues through commitment and reducing a high-dimensional policy space to a lower dimensional space of electorally salient issues for decision making.

[9]It seems consistent with anecdotal evidence that autocrats tend to do relatively better than leaders in established democratic societies.

Furthermore, this mechanism–arising from the strategic interaction in proposing regimes that society can choose from–matters for how political institutions affect economic outcomes. As a consequence, and different from the literature, easier access to the political arena for more people increases the likelihood of better outcomes while extending the franchise alone does not. Political institutions determine who can participate in a society's decision making process. One dimension is proposing policies or regimes. For lack of a better model of how and why agents are presented with an opportunity to actively engage in the political arena, I randomly draw a finite subset from the population that can do so. While that draw is random, political institutions determine the nature of that draw. They determine how many agents are drawn from which groups within society. One could draw five agents from the upper percentile of the income distribution in society or five million agents from the whole population. Since less productive losers imply better outcomes, all agents want unproductive candidates. So, the two least productive agents that were drawn into that set run for office. Political institutions that allow for these two least productive agents to be more likely to be very unproductive, improve the likelihood of better outcomes. Examples are just drawing more agents or lowering minimum productivity requirements (i.e., requirements in potentially related dimension like, e.g., education, income, or wealth). That is, societies should allow for more people to have an easier time engaging in the political arena. The intuition is that large groups of agents with diverse characteristics and thus diverse tastes over economic outcomes lead to more political competition. More political competition implies a higher probability of tighter constraints on the winner to-be. This in turn improves the likelihood of good outcomes.

The other dimension of society's decision making process is choosing one of the proposed regimes. Again, political institutions determine the qualified electorate. However, the expected payoffs for all agents in any electorate are determined in the underlying economy, i.e., in the whole population. The social ordering over any given set of alternatives remains unchanged and so does the outcome. For an illustration, suppose an economy starts out with a narrow ruling elite. That elite can be thought of as a small group of agents with similar characteristics and thus similar tastes over economic outcomes. Assume that this elite exclusively can vote over proposed regimes and a subset of it exclusively can propose regimes to be chosen from. If the elite were extended by allowing more people to vote over available regimes, the society's outcome would not change unless more competition in proposing regimes was allowed for, too.[10] However, allowing for more political competition, even within that narrow ruling elite, improves the likelihood of better outcomes. So, one might expect to see, on average, more secure property rights and more economic activity in societies with rather competitive

[10]That is, changes in the political institutions do not imply better outcomes (as discussed, e.g., by North et al. (2007), section IV).

political systems and few constraints on who can be active in the political arena.[11]

In models that focus on the analysis of induced preferences of the politically powerful, the decisive group chooses an optimal regime from a given continuum of choices. Reasonably enough, differences in decisive groups that are relevant for policy preferences, due to, e.g., an extension of the franchise, imply different outcomes. However, in models with this feature, once the franchise cannot be extended any further, different outcomes must originate in the initial economic conditions. By contrast, across countries, my model offers an explanation for different outcomes in societies that hold elections with virtually full suffrage without resorting to differences in economic fundamentals. Within countries, but across time, it offers an argument for why societies that hold elections might benefit from movements towards removing constraints on who–which groups in society–can engage in the political arena. Moreover, the underlying mechanism in my model offers an explanation of why quasi-dictatorships, i.e., societies with a narrow ruling elite and very little political competition, might do as well as established democracies. Thus, economically successful one-party dictatorships do not have to be at odds with the view that institutions cause growth.[12] In addition, the model offers a rationalization for why restrictions like land ownership on all sorts of activities in the political arena, including voting, tend to be removed over time. Finally, the model's predictions can be used to inform empirical analysis about what indicators we should look at more carefully.

2 The model

The basic environment Consider a static one-period economy with a unit measure of agents indexed by $\iota \in [0,1]$ and a single consumption good. Preferences are risk neutral, i.e., $u(c) = c$.[13] Agents are heterogeneous with respect to their productivity $w \in [0,1]$. Assume that w is drawn from a publicly known distribution with cumulative distribution function $F(w)$ and differentiable density $f(w)$ on the support $[0,1]$. Without loss of generality, order agents in $[0,1]$ according to their productivity. I call w return to market activity,

[11] Due to the model's static nature, the trade-off between resource diversion today and resource diversion tomorrow is absent. The possibility of diverting fewer resources today to induce investments that allow for a larger pie from which resources can be diverted tomorrow matters. However, what seems to be more important for investment today is not how secure rights to property are today but how secure these rights are expected to be tomorrow. A simple dynamic version of this model, where the political process starts over every period and the only intertemporal link is investment into productivity would capture that aspect through the political institutions I analyze. I do not discuss the implications in this paper.

[12] Compare, e.g., Acemoglu and Johnson (2005) and Glaeser et al. (2004) for the mixed evidence on the causal link between institutions and growth.

[13] The model works exactly the same as long as the utility function $u : \mathbb{R} \to \mathbb{R}$ is strictly increasing, concave, and satisfies $u(0) = 0$, $u(1) = 1$, and $u(\Pi_{i=1,\dots,k} x_i) = \Pi_{i=1,\dots,k} u(x_i)$. CRRA utility of the specification $u(x) = x^{1-\eta}$, where the coefficient of relative risk aversion satisfies $\eta \in [0,1)$, complies with these restrictions. That is, upon establishing equilibrium existence by the appropriate technical assumptions paralleling the ones made below, any equilibrium looks qualitatively the same as with linear utility.

productivity, and skill interchangeably and use it to refer to an agent with productivity level w. In particular, w, w', and w'' refer to generic productivity levels and, thus, agents. Finally, agents are endowed with one unit of time that is supplied inelastically to one of two sectors. An agent with productivity $w \in [0,1]$ can decide to either produce w units of the consumption good or engage in appropriation activities. There is also an autarkic activity, e.g., home production, that gives αw, for some small nonnegative $\alpha < 1$, which is neither taxable nor appropriable. If agents are indifferent between production and appropriation, then they choose appropriation while, if they are indifferent between one of the two occupations and home production, then they choose the occupation. The availability of a home production activity makes the analysis robust to changes in some of the assumptions and simplifies it in special cases. In most of the analysis, I assume that α is small enough to never bind and ignore it unless stated otherwise.[14] Let Ω, Ω^c, and Ξ be the sets of producers, appropriators, and home producers with measures ω, ω^c, and ξ respectively. These are equilibrium objects. Producers pay a proportional tax $\tau \in [0,1]$ on their income.[15] After production and tax payments and before consumption, agents are randomly matched with each other. That is, every agent can meet either an appropriator, a producer, or a home producer. I assume that the probability p of any agent meeting an appropriator equals the measure of appropriators, ω^c, while the probability q of any agent meeting a producer equals the measure of producers, ω.[16] If a producer with productivity w is matched with an appropriator, he loses a fraction

[14] In particular, it adds robustness with respect to, e.g., the tie breaking rule in the occupational choice and the technology's independence of the office holder's productivity. It simplifies the analysis as it implies a bound on payoffs. Since the special cases of a dictator as well as "anarchy" are needed to properly specify the payoffs in the selection game lateron, I formulate the model and the definition of competitive equilibrium including this option. The assumption "α is small enough" is made more precise in section 3.3.

[15] The assumption that $\tau(w) = \tau$ for all $w \in [0,1]$ considerably simplifies the analysis. In principle, a nonlinear tax schedule does not change the workings of the model as long as I restrict attention to continuous tax functions that (strictly) preserve the income ranking of agents. More precisely, it would be sufficient to require that $\tau : [0,1] \to (-1,1)$ is a continuous function satisfying $(1-\tau(w))w > (1-\tau(w'))w'$ for all $w > w'$. Assuming a linear tax then merely is a simplification. For more details, see the discussion of proposition 2. Notice that the mechanism of interest acts through the strategic interaction in the political game. By its nature, it does not hinge on the dimension of the policy space and is completely untouched by constraints on admissible tax functions. The loser's outside option will always constrain the winner to-be and the less productive candidate will always win. Also, the office holder doesn't care for saving the resources from being wasted in enforcement. Since the cost function is very flat in the beginning, likely always some combination of enforcement and redistribution would prevail. So, again, not allowing for the latter is a simplification.

[16] These matching probabilities arise as a special case of a more general matching technology. Assume for the moment that $\omega^c = 1-\omega$, i.e., there are only producers and appropriators. Let the measure of matches between producers and appropriators be given by $M(\omega, 1-\omega) = \mu\omega^\alpha(1-\omega)^\beta$, where $\mu > 0$, $\alpha, \beta \in [0,1]$. Define $\phi \equiv \frac{\omega}{1-\omega}$. The probability of a producer meeting an appropriator is $p = \frac{M(\omega,1-\omega)}{\omega} = \frac{\mu\omega^\alpha(1-\omega)^\beta}{\omega} = \frac{\mu(1-\omega)^\beta}{\omega^{1-\alpha}}$. Similarly, the probability of an appropriator meeting a producer is $q = \frac{M(\omega,1-\omega)}{1-\omega} = \frac{\mu\omega^\alpha(1-\omega)^\beta}{1-\omega} = \frac{\mu\omega^\alpha}{(1-\omega)^{1-\beta}}$. Note that $q = \phi p$. The special case adopted here is $\mu = 1-\omega$, $\alpha = 1$, $\beta = 1-\alpha$. Regarding the qualitative properties of the matching probabilities, this simplification is innocuous, i.e., the effects of a change in the relative measures are unaltered.

θ of his resources and keeps $(1-\theta)(1-\tau)w$.[17] The expression $1-\theta$ can be thought of as representing the quality of property rights enforcement.[18] If he meets another producer or a home producer, then they just chat and walk off. On the other hand, if an appropriator meets a producer with productivity w, he runs off with the fraction $\theta(1-\tau)w$. If he meets another appropriator or a home producer, then there is nothing to appropriate and both walk off empty-handed.

The enforcement technology There is a technology that enforces (secures) the fraction $1-\theta$ of a producer's output in a meeting with an appropriator at a cost $g(\theta)$. I assume that $g : [0,1] \to \mathbb{R}_+$ is twice continuously differentiable on the interior of its domain, strictly decreasing and strictly convex, $g'(\theta) < 0$ and $g''(\theta) > 0$. Moreover, I assume that perfect enforcement is not affordable, $g(0) \geq 1$, and no enforcement does not cost anything, $g(1) = 0$. For technical reasons the limit conditions $\lim_{\theta\to 0} g'(\theta) \leq -1$ and $\lim_{\theta\to 1} g'(\theta) > -\infty$ are imposed. I don't rule out fixed costs. As long as the technology does not depend too much on the office holder's productivity and potential office holders are sufficiently productive, the results don't change.[19] It is possible to overturn them by allowing for the technology to vary a lot with the office holder's productivity.[20] However, I argue that being good at doing business does not imply being good at providing a favorable environment for doing business. The political dimension in this model is not even the latter but actually unrelated to doing business per se. Moreover, a productivity-dependent technology blurs the implications of the strategic interaction.

[17] I assume that the fraction of resources that an appropriator can acquire is independent of his productivity. The activities of interest are outright theft, simple fraud, property crimes, and corruption rather than more skill-intensive crimes like, e.g., financial fraud. I abstract from appropriation targeted at producers of particular productivity levels. These assumptions simplify the analysis and affect the results. In particular, in combination with other assumptions, they potentially affect the existence of pooling equilibria.

[18] A measure of the security of property rights in this model is $p(1-\theta) + (1-p) = (1-p\theta)$. This captures the identifcation problem which is part of the motivation for this paper. Secure property rights can prevail for any enforcement regime if the probability of meeting an appropriator is small as well as for any probability of meeting an appropriator if the enforcement is strong. For societies that are similar in the relevant dimension of heterogeneity, given the same θ, the occupation decisions and thus the probability p should be similar. Similarly, facing the same set of alternatives when choosing an enforcement regime, they should choose the same regime. That is, the equilibrium outcome in rather similar societies must orginate in the set of alternatives available to society. This is the focus of this paper.

[19] Sufficient conditions for the technology are $-g_w(\theta; w) < \alpha$ for all $(\theta, w) \in (0,1)^2$ and $g_{\theta w}(\theta; w) = 0$ for all $\theta < \bar{\theta}$ and $w \in [0,1]$, where $\bar{\theta}$ is determined by the economy's fundamentals as shown below. A sufficient (but by no means necessary) condition for the set of potential candidates is that they have at least the median productivity. Some qualifying restrictions need obvious adjustments.

[20] The results would go through, if one where to assume that there are agents that cannot operate the technology but for all agents that can, the technology is independent of the productivity. Assume that, for instance, running the technology requires a minimum productivity level. Then, the analysis below would still go through unaltered for the set of agents that can run it.

The political process In the beginning of the period, a finite number n of potential candidate politicians, $N = \{w_1, \ldots, w_n\}$, are drawn from the population. Without loss of generality, I assume that they are ordered according to their productivity, where w_1 and w_n refer to the lowest and the highest productivity, respectively. Given N, there potentially is an election that decides who is to be in charge of administering the technology. At most two agents can run for office.[21] Each agent in N can observe all others' marginal productivities and decides whether or not he wants to run.[22] Let N' be the set of potential candidates who choose to run. If there is no candidate for office, then the "anarchy" regime is given by $(\theta, \tau) = (1, 0)$, i.e., no taxes are paid and no enforcement takes place at all. If there is only one candidate, then he becomes a dictator. 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, then two of them are drawn at random with equal probability for all candidates. I refer to the candidates for office as w_L and w_H, where $w_L < w_H$. They compete by simultaneously announcing and committing to implement an effective (actually collected) proportional tax rate $\tau \in [0, 1]$ and a secure fraction $(1 - \theta)$, $(\theta, \tau) \in [0, 1]^2$, where the former raises the funds to pay for the latter.[23] The rest of the population votes for one candidate according to their preferences over regimes proposed. The regime voted for by the majority wins. Assume that draws between candidates (regimes) are split with equal probability of success on both the individual (a single voter) and the aggregate (the voting body) level. The agent that wins the election and becomes the office holder assumes a full time occupation that is administrative and can neither produce, nor home produce, nor appropriate. He receives a payoff $\tilde{w}$ which is the residual from subtracting the cost of implementing θ from the tax receipts. This payoff is

[21]Intuitively, allowing for more than two candidates to run for office should not affect the results. The reason is that, as becomes clear below, the winner to-be has to observe all other candidates' outside options. The most binding one is the one of the least productive opponent. The comparative statics would not change. So, the outcome would most likely be that it does not matter who runs, besides the two least productive agents among all potential candidates. So, all results should remain unaltered.

[22]The assumption that only a subset N of the population can choose whether or not to run for office accounts for the perception that, in reality, not everybody can run for office. Possible restrictions on the set of agents that can do so are, e.g., a minimum education requirement or some kind of connections or status established by inheritance or economic success.

[23]While the commitment assumption is not innocuous (see Ferejohn (1986) and Barro (1973) for some treatment of the problem), notice that this assumption per se does neither rule out in-office rents from weak institutions nor that a society looks similar to one run by a dictator. Without commitment, once in office, independent of his productivity and model parameters, all agents would choose to implement a dictatorship and everybody knows that. So, commitment basically rules out outright dictatorship after an election. There are conceivable assumptions, some wild, some reasonable, that ensure that the office holders are deterred from deviating from their proposed schedule. As an example, consider a situation, where the office holder's security is waived upon making any nontrivial set of taxpayers worse off than proposed and that the agents in that set can overthrow him, appropriate all his resources, and distribute them equally amongst them, which would be a dominant strategy in the case of deviation. This solution is somewhat related to the solution to the malfeasance problem Becker and Stigler (1974) suggest.

Stage 1: Selection game	Stage 2: Political game	Stage 3: Competitive equilibrium
1.) The set N is drawn. 2.) The agents in N select w_L and w_H.	1.) w_L and w_H propose regimes. 2.) The shock realizes. 3.) The office holder w_o is elected and enacts his regime.	1.) All agents but w_o either produce and pay taxes or don't. 2.) They meet, interact, and consume.

Table 1: Timeline within the period.

neither subject to appropriation nor taxation (consider it to be a net payoff).[24] I assume that the productivity of a voter is not observable ex ante so that nobody can be excluded from voting because he would be an appropriator under some regime. In section 3.4, I develop additional notation to analyze restrictions in two dimensions of participation in the process, political competition (section 3.4.1) and the qualified electorate (section 3.4.2).[25]

Equilibrium selection As specified so far, the model has multiple equilibria. The reason for and the nature of this multiplicity is discussed in section 4.1. I assume that there is an $\varepsilon > 0$ but small probability of a preference shock after the proposals have been announced. If it is realized, then agents' preferences become lexicographic in the sense that if they are indifferent between the policy regimes proposed, then they care for a somewhat ideologic aspect. Independent of the regime proposed, if a candidate runs for office despite, given his opponent's proposal, all platforms he could win with give him a strictly lower payoff in office than out of office under the regime his opponent proposed, then voters vote for him rather than randomizing. However, if this condition holds for both agents, then indifferent voters keep randomizing. The shock does not affect the nature of equilibrium or show up in any way other than selecting one from a set of qualitatively identical equilibria so that it can be characterized. It does not affect the nature of the mechanism at work but simply allows me to precisely describe it. For further discussion of the shock and alternative ways of equilibrium selection, see sections 4.2 and 4.3.

[24] This assumption is without loss of generality with respect to taxation. Assume that the office holder pays the same tax rate as everybody else. Let t be the tax rate, T the tax revenue collected from producers, g the expenditure for enforcement, and w the wage for the office holder. Then, the balanced budget constraint reads $w + g = T + tw$ or $(1-t)w = T - g$. Defining $\tilde{w} \equiv (1-t)w$ gives the suggested interpretation. With respect to appropriation, this assumption reflects the perception that office holders' resources tend to be more secure than generic citizens' resources.

[25] Conceivable simplifications that reduce the policy space to one dimension, besides making the model less refutable, tend to either miss the strategic interaction or actually complicate the analysis. As one example, one may assume that the enforcement policy θ simultaneously determines both τ and $\tilde{w}$ through exogenous maps with appropriate monoticity assumptions (which are testable predictions of my model contributing to it being falsifiable). This imposes a hump shaped off-equilibrium voter payoff in both occupations which complicates the analysis and adds an additional pooling equilibrium as well as cases in which equilibria don't exist. As another example, one may assume that the winner of the election receives his out-of-office payoff as in-office payoff. Then, the outcome is one of two cases depending only on whether the more productive candidate's productivity w_H is above or below a threshold that is completely determined by fundamentals. In either case, the regime is determined by fundamentals only, too. Moreover, clear statements about the comparative statics with respect to restrictions to participation can not be derived.

Timing The exact timing in the economy is summarized in table 1. In the beginning of the period, the set of potential candidates N is drawn from the population. They decide whether or not to enter the electoral competition to determine two candidates running for office. Then, the two candidates propose regimes and, after the preference shock realizes, the qualified electorate votes over the alternatives presented. The majority winner implements his regime. Thereafter, given the prevailing regime, agents engage in activities of their choice. Producers produce and pay taxes. Then, agents are randomly matched and interact with each other. Here, appropriators try to appropriate resources from producers. Finally, agents consume.

Assumption 1. *I maintain the following two technical assumptions. Let* $\bar{w} \equiv F^{-1}(\frac{1}{2})$ *and* $\bar{\theta} \equiv \bar{w}(1 - \int_{\bar{w}}^{1} F(w)dw)^{-1}$.

1. *The distribution of productivities is unimodal with the mode being greater than or equal to the median and satisfies*

$$\left(\int_{\bar{w}}^{1} w f(w) dw\right)^{2} \leq \bar{w}^{2} f(\bar{w}) \left(1 - \int_{\bar{w}}^{1} F(w) dw\right).$$

2. *The cost function* g *satisfies* $-\frac{g'(\bar{\theta})\bar{\theta}}{g(\bar{\theta})} \leq 1$, *i.e., the absolute value of the elasticity of* g *with respect to* θ *evaluated at* $\bar{\theta}$ *is less than or equal to 1.*

These assumptions are simple and seem easy to satisfy.[26]

3 Analysis

This economy evolves in three stages, the selection game, the political game, and the competitive equilibrium in occupational choice. I take as given the economic fundamentals summarized by the distribution function F for returns to market activity, the technology characterized by the cost function g, and the home production technology characterized by α. The equilibrium concept is subgame perfect equilibrium. That is, I require a Nash equilibrium to be played at every stage of the economy. For the purpose of as compact an equilibrium definition as possible, I abstract from anarchy and dictatorship here. If the equilibrium of

[26] Example distributions satisfying assumption 1.1 are the uniform distribution on $[0, 1]$ as well as, by way of numerical test, the Normal distribution $\mathcal{N}(\mu, \sigma)$ on $[0, 1]$ with $\mu = \frac{1}{2}$ and $\sigma \leq \frac{1}{2}$. Notice that assumption 1.1 refers to the ex ante distribution of productivities rather than income. Since the ex post income distribution is a truncated version of the productivity distribution, the mode either remains unaltered or becomes the lower bound of the support while the median moves to the right. As long as the distribution is logarithmically concave, the mean does so, too. This implies that, despite the above assumption, the mode of the income distribution can be smaller than its median. Moreover, a left-truncation of a symmetric distribution is right-skewed with a "mass point" at the lower bound w^* of the support $[w^*, 1]$ of the ex post income distribution. This feature allows for an approximation of right-skewed income distributions.

the selection game were to produce either one of these outcomes, i.e., $|N'| < 2$, then the political game would not be played but I would still require an equilibrium in the underlying economy as it is defined below. The implemented regime would depend only on the economic fundamentals (see appendix C).

Definition 1 (Equilibrium)**.** *Given a set of potential candidates N, an equilibrium in the economy is a set N' of potential candidates who choose to run, a pair of candidates $\{w_L, w_H\}$, a pair of policy regimes $\{(\theta_L, \tau_L), (\theta_H, \tau_H)\}$ proposed, conditional probabilities of winning for each candidate, an equilibrium regime (θ^*, τ^*), sets Ω of producers, Ω^c of appropriators, and Ξ of home producers, and probabilities p and q of meeting appropriators and producers, respectively, such that:*

1. *N' is an equilibrium of the candidate selection game.*
2. *If $|N'| = 2$, then $\{w_L, w_H\} = N'$; if $|N'| > 2$, then $\{w_L, w_H\}$ is an equal probability draw from N'.*
3. *$\{(\theta_L, \tau_L), (\theta_H, \tau_H)\}$ and the probabilities of winning constitute an equilibrium of the political game given the candidates $\{w_L, w_H\}$ and (θ^*, τ^*) is the outcome of a random draw from $\{(\theta_L, \tau_L), (\theta_H, \tau_H)\}$ with those probabilities of winning attached to (θ_L, τ_L) and (θ_H, τ_H), respectively.*
4. *The sets Ω of producers, Ω^c of appropriators, and Ξ of home producers together with the probabilities p and q are a competitive equilibrium in the underlying economy given the regime (θ^*, τ^*).*

For generality, this definition contains random draws. In equilibrium, however, everything is deterministic. I solve for the equilibrium by backwards induction. I start by describing the competitive equilibrium given any regime (θ, τ). To be precise, I set up the problem agent w faces and define the competitive equilibrium including the option of home production. After having stated these, as argued above, this option is ignored for the rest of the analysis. Then, I study the choice of (θ, τ) in the political game given the candidates' productivities. Finally, I analyze the selection from potential candidates to candidates before studying the effects of changes in the underlying political institutions. I specify the strategies agents have available, the payoff functions these map into, and the definition of equilibrium in the respective stage along the way. All proofs can be found in appendix E.

3.1 The underlying economy given a regime

In this section, I focus on the underlying economy. Given any regime (θ, τ), there is a unique competitive equilibrium in occupational choices.[27] As expected, worse enforcement encourages

[27] The equilibrium is unique since a complementarity in appropriation is absent. It is absent as I impose the equilibrium condition that the probability of meeting a producer equals the measure of producers in the

more appropriation activity and leads to less secure property rights. I first describe strategies, payoff functions, and the definition of an equilibrium of the underlying economy. Then, I discuss equilibrium existence and uniqueness as well as some comparative statics.

3.1.1 Strategies, payoffs, and equilibrium definition

Given a regime (θ, τ), an agent $w \in [0, 1]$ chooses $(\chi_w^\alpha, \chi_w) \in \{0, 1\}^2$. If w chooses $\chi_w^\alpha = 1$, then he produces at home. If $\chi_w^\alpha = 0$, then w chooses his occupation as a producer indicated by $\chi_w = 1$ or as an appropriator indicated by $\chi_w = 0$. An appropriator who is matched with a producer gets a payoff proportional to a draw from the set of productivities of producers net of taxes. That is, given (θ, τ), his ex ante expected payoff of being matched with a producer is given by $\int_{w\in\Omega} \theta(1 - \tau)wf(w|w \in \Omega)dw = (1 - \tau)v(\theta)$, where $v : [0, 1] \to [0, 1]$ is given by $v(\theta) = \theta \int_{w\in\Omega} wf(w|w \in \Omega)dw$. Given Ω, $(1 - \tau)v(\theta)$ is the same for all appropriators as it is independent of the appropriator's productivity. With p and q being the probabilities that a producer meets an appropriator and an appropriator meets a producer, respectively, agent w's expected payoff from being a producer is $pu[(1-\theta)(1-\tau)w] + (1-p)u[(1-\tau)w] = (1-\theta p)(1-\tau)w$. His expected payoff from being an appropriator is given by $qu[(1-\tau)v(\theta)] + (1-q)u[0] = q(1-\tau)v(\theta)$. The outside option of home production yields αw for sure. Agents choose their occupation in order to maximize expected payoff so that the objective function is given by $(1 - \chi_w^\alpha)(\chi_w(1 - \theta p)(1 - \tau)w + (1 - \chi_w)q(1 - \tau)v(\theta)) + \chi_w^\alpha \alpha w$. An equilibrium is defined as follows.

Definition 2 (Competitive equilibrium given a regime (θ, τ))**.** *Given a regime (θ, τ), a competitive equilibrium in this economy is a distribution of agents, as summarized by the sets of producers, Ω, appropriators, Ω^c, and home producers $\Xi = [0, 1]\backslash(\Omega \cup \Omega^c)$ together with probabilities p and q of meeting appropriators and producers, respectively, such that:*

1. *Given p and q, all agents $w \in [0, 1]$ maximize expected payoffs, i.e., w's occupational choice (χ_w^α, χ_w) solves*

$$(1) \qquad \max_{(\chi_w^\alpha, \chi_w)\in\{0,1\}^2} \{(1 - \chi_w^\alpha)[\chi_w(1 - \theta p)(1 - \tau)w + (1 - \chi_w)q(1 - \tau)v(\theta)] + \chi_w^\alpha \alpha w\},$$

   where $v(\theta) = \theta \int_{w\in\Omega} wf(w|w \in \Omega)dw$.

economy. A sufficient condition for the complementarity to be absent is that the ratio of the probability of meeting a producer (which is a function of the measure of producers) divided by the measure of producers is greater than or equal to one (e.g., because producers are visible while appropriators are somewhat sneaky) and non-increasing in the measure of producers. This implies that there are weakly decreasing returns to appropriation. I am not after explaining different outcomes by a multiple equilibrium argument. Rather, I am after an explanation along the lines of institutions. A unique equilibrium is a welcomed simplification.

2. *The "good's market" clears, i.e.,*

$$(1-\tau)\int_{w\in\Omega} wf(w)dw + \int_{w\in\Xi} \alpha wf(w)dw = \int_0^1 c_\iota d\iota, \tag{2}$$

where c_ι denotes consumption of agent $\iota \in [0,1]$.

3. *The probabilities p and q are given by $p = \omega^c$ and $q = \omega$ where $\Xi = \{w \in [0,1] : \chi_w^\alpha = 1\}$, $\Omega = \{w \in [0,1] : \chi_w^\alpha = 0 \wedge \chi_w = 1\}$ and $\Omega^c = \{w \in [0,1] : \chi_w^\alpha = 0 \wedge \chi_w = 0\}$.*

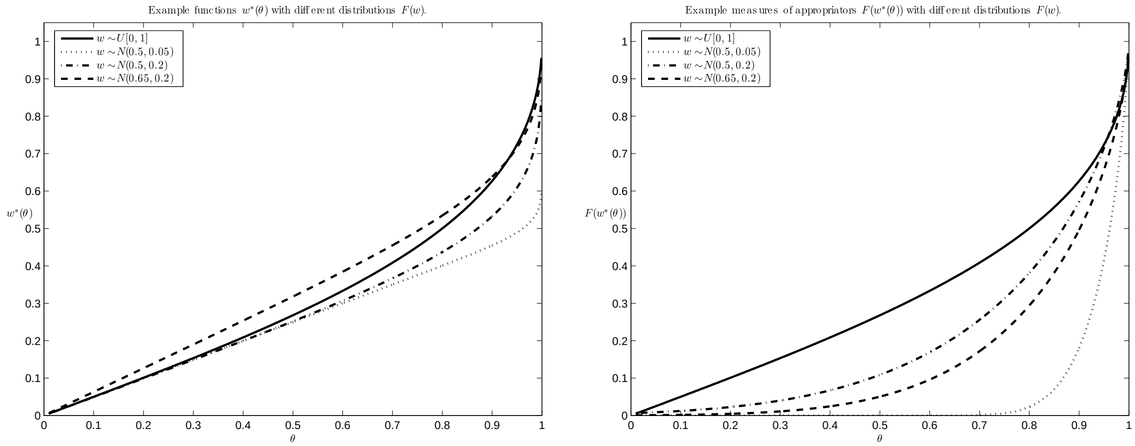
Notice that, given the setup, the market clearing condition (2) is satisfied automatically since after production and appropriation, no trade is taking place. In particular, appropriation is purely redistributive.

3.1.2 Equilibrium of the underlying economy given a regime

In the following, unless stated otherwise, I assume that α is small enough and impose $\chi_w^\alpha = 0$ for all $w \in [0,1]$. Then, $\Xi = \emptyset$, $\Omega = \{w \in [0,1] : \chi_w = 1\}$, $\Omega^c = \{w \in [0,1] : \chi_w = 0\} = [0,1]\backslash\Omega$, and $\omega^c = 1-\omega$. In equilibrium, an appropriator's payoff is independent of his productivity while a producer's payoff increases in it. As a consequence, there is a cutoff productivity so that every agent with a lower productivity than that appropriates and everybody else produces.[28] Moreover, since $qv(\theta) \geq 0$, agent 0 always chooses to appropriate and every equilibrium features appropriation. Thus, I can simplify the notation and write $v(\theta) = \theta\int_{w^*}^1 wf(w|w > w^*)dw = \theta\int_{w^*}^1 w\frac{f(w)}{1-F(w^*)}dw$. It also implies that $p = F(w^*)$ and $q = 1-F(w^*)$. Then, an appropriator's expected payoff can be written as $\nu : [0,1]^2 \to [0,1]$, $\nu(\theta,\tau) = q(1-\tau)v(\theta) = (1-\tau)\theta\int_{w^*}^1 wf(w)dw$, while a producer's expected payoff is given by $(1-F(w^*)\theta)(1-\tau)w$. In any equilibrium, the marginal agent (who is an appropriator) equalizes payoffs from production and appropriation. The following proposition describes the equilibrium.

Proposition 1 (Competitive equilibrium given a regime (θ,τ))**.** *Given a regime (θ,τ), there exists a unique equilibrium for all $\theta \in [0,1]$. The cutoff w^* is a $\mathcal{C}^2[(0,1)]$, strictly convex, and strictly increasing function of θ with $w^*(0) = 0$ and $w^*(1) = 1$. More unequal economies in the sense of a mean preserving spread of the distribution of market returns have higher cutoff productivities. Richer economies in the sense of a first order stochastically dominant distribution of market returns have higher cutoff productivities.*

[28] Fix $\theta \in [0,1]$ and consider any equilibrium. If $\Omega = \emptyset$ or $\Omega^c = \emptyset$, then they are intervals trivially. Assume $\Omega \neq \emptyset$ and $\Omega^c \neq \emptyset$. Fix agent $w \in \Omega$. Hence, $(1-\theta p)w' > (1-\theta p)w > qv(\theta)$ for all agents $w' > w$ so that $w' \in \Omega$. Similarly, fix agent $w \in \Omega^c$. Hence, $(1-\theta p)w' < (1-\theta p)w \leq qv(\theta)$ for all agents $w' < w$ so that $w' \in \Omega^c$. Thus, both Ω and Ω^c are intervals. Since $qv(\theta)$ is constant while $(1-\theta p)w$ is continuous and strictly increasing in w, there is w^* such that $(1-\theta p)w^* = qv(\theta)$. It follows that, in an equilibrium, there exists a w^* such that $w^* \in \Omega^c$ and $w \in \Omega$ if and only if $w > w^*$.



(a) $w^*(\theta)$ for different distributions.

(b) $F(w^*(\theta))$ for different distributions.

Figure 1: Example functions $w^*(\theta)$ deriving from different distributions $F(w)$ in panel 1(a) and example measures of appropriators $F(w^*(\theta))$ from different distributions in panel 1(b).

Notice that for θ high enough, i.e., $w^*(\theta)$ close enough to one, the home production option becomes relevant. I disregard this here. The last two parts of the proposition say that both more inequality and a favorable productivity distribution (i.e., shifted to the right) lead to a higher cutoff productivity level. However, a higher cutoff value w^* does not imply more appropriation per se as this depends on how $F(w^*)$ changes. Figure 1 provides some examples to illustrate these results by comparing similar distributions with respect to mean and variance. In particular, panel 1(a) plots the implied cutoff productivity $w^*(\theta)$ while panel 1(b) plots the associated measure of appropriators $F(w^*(\theta))$. The latter shows that, in richer economies, despite a higher cutoff productivity, the measure of appropriators, i.e., the incidence of appropriation, might be lower than in poorer economies.

To summarize, given (θ, τ), the competitive equilibrium can be characterized by the single object $w^*(\theta)$. For later reference, let $\bar{w} \equiv F^{-1}(\frac{1}{2})$ be the median (agent's) productivity in the economy and $\bar{\theta}$, given by $w^*(\bar{\theta}) = \bar{w}$, the median enforcement. That is, from (23), $\bar{\theta} \equiv \bar{w}(1 - \int_{\bar{w}}^1 F(w)dw)^{-1}$ is the choice of θ that implies that the cutoff productivity equals the median agent's productivity. Also, define $\varphi : [0,1]^2 \to [0,1]$ by $\varphi(\theta, \tau) = (1 - F(w^*(\theta))\theta)(1 - \tau)$ and recall that $\nu : [0,1]^2 \to [0,1]$ is given by $\nu(\theta, \tau) = (1-\tau)\theta \int_{w^*(\theta)}^1 wf(w)dw$. Both $\varphi(\theta, \tau)$ and $\nu(\theta, \tau)$ are continuous on the interior of their domain. Finally, the economy's output given enforcement θ is $y(\theta) = \int_{w^*(\theta)}^1 wf(w)dw$ and the egalitarian welfare measure ignoring the office holder is given by[29]

$$\mathcal{W}(\theta,\tau) = \varphi(\theta,\tau)\left(1 - \int_{w^*(\theta)}^{1} F(w)dw\right).$$

The outcome in the underlying economy determines the qualified electorate's voting behavior as well as the office candidates' outside options in the electoral competition. Having analyzed its equilibrium, I next turn to the political game between two office candidates.

3.2 The political game given two candidates

In this section, I show that, due to the more productive agent's comparative advantage in productive activity, the less productive candidate wins the election. The regime he implements must provide the loser with a high enough payoff to distract him from holding office. In equilibrium, the set of alternatives the electorate faces depends on and changes with the loser to-be's productivity. Societies' regimes differ since they face different choice sets implied by different runners-up in the election. The worse the loser's outside option is, the smaller is the payoff that he would require in office to be indifferent. Therefore, the winner cannot ask for too high an in-office payoff himself which, in effect, leads to a favorable set of alternatives for the electorate to choose from. Again, I first specify the strategies and payoff functions in the political game and provide the equilibrium definition. Then, I describe the equilibrium. If there is need to refer to the office holder, then I use w_o. When I refer to the players of the political game, w_L and w_H, using indices, then I use i and $-i$ to indicate $i \in \{L, H\}$ and $-i \in \{L,H\}\backslash\{i\}$. Equivalently, I use the notation $w_i \in \{w_L, w_H\}$ and $w_{-i} \in \{w_L, w_H\}\backslash\{w_i\}$.

3.2.1 Strategies, payoffs, and equilibrium definition

By the above analysis, for any agent with productivity w', given a regime (θ,τ), the occupational choice problem implies a value function defined by

$$\begin{aligned} (3) \qquad V(\theta,\tau;w') &\equiv \max\{\varphi(\theta,\tau)w', \nu(\theta,\tau)\} \\ &= \max\left\{(1-\theta F(w^*(\theta)))(1-\tau)w', \theta(1-\tau)\int_{w^*(\theta)}^{1} wf(w)dw\right\}, \end{aligned}$$

[29] Notice that, in equilibrium,

$$\int_0^1 V(\theta,\tau;w)f(w)dw = \int_0^{w^*(\theta)} \nu(\theta,\tau)f(w)dw + \int_{w^*(\theta)}^1 \varphi(\theta,\tau)wf(w)dw.$$

From here, the statement is obtained by plugging in the equilibrium condition $\nu(\theta,\tau) = \varphi(\theta,\tau)w^*(\theta)$, factoring out, and integrating by parts.

which is continuous in its arguments. Notice that, given the regime (θ, τ), w''s occupational choice is independent of the tax rate τ as $V(\theta, \tau; w') = (1-\tau)V(\theta, 0; w')$ and that $V(\theta, \tau; w')$ is weakly increasing in w' and strictly so if $w' > w^*(\theta)$. Moreover, in general, w''s preferences over (θ, τ) are not single peaked (see figure 2 below). Facing the set of proposals $\{(\theta_L, \tau_L), (\theta_H, \tau_H)\}$, every voter w' evaluates $V(\theta_L, \tau_L; w')$ and $V(\theta_H, \tau_H; w')$ and votes for the regime that provides him with the higher expected payoff. That is, voter w' chooses and announces $(\chi^L_{w'}, \chi^H_{w'}) \in \{0,1\}^2$ so as to solve

$$\text{(VP)} \qquad \max_{(\chi^L_{w'}, \chi^H_{w'}) \in \{0,1\}^2} \chi^L_{w'} V(\theta_L, \tau_L; w') + \chi^H_{w'} V(\theta_H, \tau_H; w') \quad s.t. \quad \chi^L_{w'} + \chi^H_{w'} = 1.$$

The constraint implies that exactly one of the control variables is chosen to equal one. If he is indifferent, i.e., $V(\theta_L, \tau_L; w') = V(\theta_H, \tau_H; w')$, and the preference shock is neutral, then w' randomizes with equal probabilities assigned to $\{\chi^L_{w'} = 1, \chi^H_{w'} = 0\}$ and $\{\chi^L_{w'} = 0, \chi^H_{w'} = 1\}$.[30] Aggregation of individual votes through majority rule and equal probability randomization in case of a draw implies the following map to the equilibrium regime:

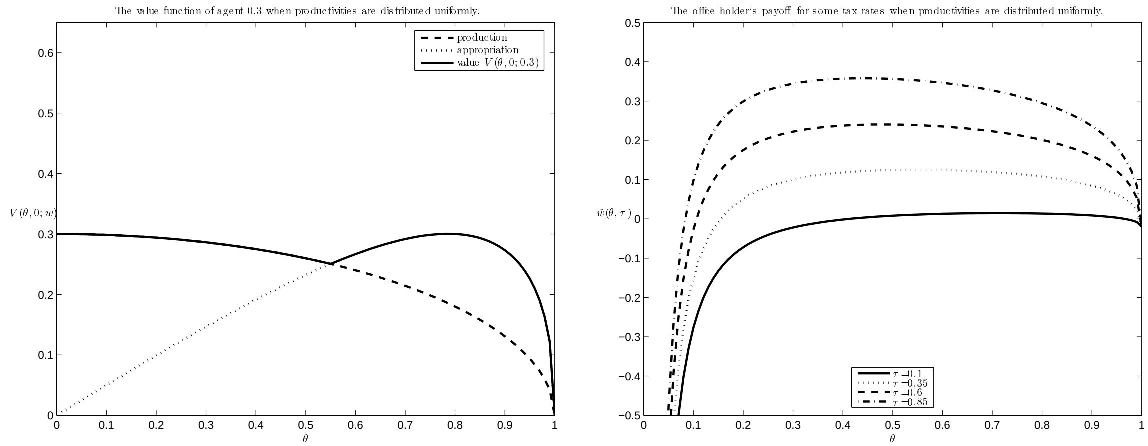
$$(4) \qquad (\theta^*, \tau^*) = \begin{cases} (\theta_L, \tau_L) & \text{if } \int_0^1 \chi^L_w f(w)dw > \frac{1}{2}, \\ \text{draw with probability } \frac{1}{2} & \text{if } \int_0^1 \chi^L_w f(w)dw = \frac{1}{2}, \\ (\theta_H, \tau_H) & \text{if } \int_0^1 \chi^L_w f(w)dw < \frac{1}{2}. \end{cases}$$

In the specification and description of the probabilities of winning it is notationally convenient to refer to a regime as $\sigma = (\theta, \tau)$. Given the candidates w_i and w_{-i} and their proposals $\sigma_i = (\theta_i, \tau_i)$ and $\sigma_{-i} = (\theta_{-i}, \tau_{-i})$, let $P(\sigma_i, \sigma_{-i}; w_i, w_{-i}) = Prob\{w_i \text{ wins}|w_{-i}, \{(\theta_i, \tau_i), (\theta_{-i}, \tau_{-i})\}\}$ be the probability of candidate w_i, $i \in \{L, H\}$, winning the election given his opponent's productivity w_{-i}, $-i \in \{L, H\} \backslash \{i\}$, and both the regime he proposes and the one proposed by his opponent. Whenever the proposals are such that the preference shock is neutral, the probabilities of winning are zero, one half, or one if the measure of voters voting for a proposal is less than, equal to, or greater than one half, respectively. In cases in which the shock has bite, the probabilities are close to these values, but, in particular, they are never zero or one. A general formulation of these probabilities can be found in appendix B.1. Given any $(\theta, \tau) \in [0,1]^2$, a balanced budget implies that an office holder gets $\tilde{w} : [0,1]^2 \to \mathbb{R}$ defined by

$$(5) \qquad \tilde{w}(\theta, \tau) = \tau \int_{w^*(\theta)}^1 w f(w)dw - g(\theta).$$

I maintain the following assumptions.

[30] The results remain unaltered if indifferent voters abstain from voting as long as the simple majority of all votes casted is sufficient to win the election.



(a) Value function of agent 0.3. (b) The office holder's payoff for some tax rates.

Figure 2: Some payoff and value functions for the example economy.

Assumption 2. *Both $\tilde{w}(\theta, \tau)$ and $\varphi(\theta, \tau)$ are strictly quasiconcave in (θ, τ). Given τ, both $\tilde{w}(\theta, \tau)$ and $\nu(\theta, \tau)$ are strictly quasiconcave in θ.*

I derive sufficient conditions for assumption 2 in appendix A. In appendix D I lay out a simple economy that satisfies assumptions 1 and 2. I use it to illustrate some results and refer to it as the "example economy." Figure 2, in panel 2(a), depicts the payoff and value functions for agent $w' = 0.3$ in the example economy when $\tau = 0$. Taxes enter multiplicative so that they do not alter the picture. This example clearly shows that voters' preferences over regimes are not necessarily single-peaked in even the enforcement dimension alone. Additionally, panel 2(b) depicts the in-office payoff for any θ and a few tax rates. For later reference, I state the following optimization problem.

$$\text{(P)} \qquad \max_{(\theta,\tau)\in[0,1]^2} \tau \int_{w^*(\theta)}^{1} wf(w)dw - g(\theta) \quad s.t. \quad (1 - F(w^*(\theta))\theta)(1-\tau) \geq \bar{\varphi},$$

or more compactly

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

where $\bar{\varphi} \in [0, 1)$ is some nonnegative constant. By assumption 2, problem (P) has a unique solution for any $\bar{\varphi} \in [0, 1)$ (see lemma 2 in appendix E).

Now, agent w_i, $i \in \{L, H\}$, faces the problem of proposing a regime (θ_i, τ_i) so as to maximize his expected payoff given the regime (θ_{-i}, τ_{-i}) proposed by agent w_{-i}, $-i \in \{L, H\} \backslash \{i\}$. That is, he solves the problem

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

The objective function is given by the sum of the in-office payoff the regime he proposes implies in the case of winning the election weighted by the probability of winning and the payoff as a citizen under the regime proposed by his opponent in case he loses the election weighted by the probability of losing. An equilibrium in this stage is defined as follows.

Definition 3 (Equilibrium of the political game with candidates w_L and w_H)**.** *Given a pair of candidates $\{w_L, w_H\}$, an equilibrium in the political game is a pair of proposals $\{(\theta_L,\tau_L),(\theta_H,\tau_H)\}$ and probabilities $P(\sigma_L,\sigma_H;w_L,w_H)$ and $P(\sigma_H,\sigma_L;w_H,w_L)$ of winning such that:*

1. *Given (θ_{-i},τ_{-i}), $-i \in \{L,H\}\backslash\{i\}$, and the function defined in* (15)*, for all agents $i \in \{L,H\}$, (θ_i,τ_i) solves problem* (PP)*.*

2. *$P(\sigma_L,\sigma_H;w_L,w_H)$ and $P(\sigma_H,\sigma_L;w_H,w_L)$ are determined by* (15)*.*

Notice that the function (15) (see appendix B.1) implies optimization on the part of the voters.[31] Voters and voting simply determine the map from regimes proposed to payoffs received. The actual political game is played between agents w_L and w_H when proposing regimes.

3.2.2 Equilibrium of the political game given two candidates

There are two aspects to the analysis of the political game. One is the determination of the probabilities of winning the election as functions of the proposed regimes, i.e., the social ordering over alternatives. The other one is the strategic interaction of the candidates in proposing the choice set given these probability maps. To characterize the probabilities of winning, it is necessary to study the voters' behavior which delivers a median voter result. While the statement of this intermediate result can be found in appendix E, lemma 4, I summarize its implications here. It says that, if the median voter strictly prefers one proposed regime over the other, then more than half of the population does so and it wins the election. If the median voter is indifferent and the platforms place enforcement on opposite sides of the median enforcement $\bar{\theta}$, then the voting body is perfectly divided and the election ties. In both these cases, the preference shock is irrelevant since for it to matter at least one half of

[31] In a model with a finite number of voters, imposing that voters solve problem (VP) amounts to requiring a Nash equilibrium in the voting subgame with the exclusion of weakly dominated strategies (see, e.g., Besley and Coate (1997)). For any agent, not voting for the maximal argument is only optimal (by indifference) given all others' actions, if the equilibrium profile is such that it does not matter for the outcome what this agent's vote is. Here, agents have measure zero and are never pivotal.

the population has to be indifferent. If the proposed regimes are pooled, then each candidate wins with probability one half as long as the shock is neutral while one candidate has a slightly higher chance of winning if it is not. If both proposed regimes offer better (similarly, worse) than median enforcement and leave the median voter indifferent, then the regime offering enforcement closer to median enforcement wins for sure if the shock is neutral while it wins with high probability but not for sure otherwise. Using this result, I provide an exact characterization of the probability of agent i winning the election given he proposes (θ_i, τ_i) while his opponent proposes (θ_{-i}, τ_{-i}) in appendix B.2. When playing the political game, the candidates take this probability map as given. With respect to the strategic interaction, consider any candidate's problem (PP) and observe that, given his opponent's proposal, he proposes a rgime that wins the election if and only if he can propose a regime that wins him the election and makes him better off in office than he would be out of office under his opponent's regime.

More generally, the following proposition is one of the main results and characterizes the equilibrium in the political game. I explain its predictions after its statement.

Proposition 2 (Equilibrium of the political game with candidates w_L and w_H). *Given the candidates w_L and w_H, an equilibrium exists. There is a $w_p < \bar{w}$ such that, whenever $w_H \leq w_p$, then the winning (and implemented) regime (θ^*, τ^*) in any equilibrium of the political game, irrespective of whether it is pooling or separating, satisfies $(\theta^*, \tau^*) = (\theta_p, \tau_p)$, $\theta_p < \bar{\theta}$, where (θ_p, τ_p) is the unique pooling equilibrium independent of both w_L and w_H and solves the system*

$$\Psi_1(\theta) = \Psi_2(\theta) \tag{6}$$

$$\tau_p(\theta_p) = \frac{\theta_p \int_{w^*(\theta_p)}^{1} wf(w)dw + g(\theta_p)}{(1+\theta_p)\int_{w^*(\theta_p)}^{1} wf(w)dw} \tag{7}$$

where $\Psi_1(\theta)$ and $\Psi_2(\theta)$ are given by

$$\Psi_1(\theta) = \int_{w^*(\theta)}^{1} wf(w)dw - g(\theta), \ \Psi_2(\theta) = \frac{[-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)]\int_{w^*(\theta)}^{1} wf(w)dw}{(1+\theta)^{-1}\theta^{-1}w^*(\theta)F(w^*(\theta))},$$

and $w_p = w^*(\theta_p)$. If $w_H > w_p$, then a pooling equilibrium does not exist and, in any separating equilibrium of the political game, the set of proposals $\{(\theta_L, \tau_L), (\theta_H, \tau_H)\}$ is such that w_L proposes worse enforcement, $\theta_L > \theta_H$, w_L wins the election with probability 1, i.e., $(\theta^*, \tau^*) = (\theta_L, \tau_L)$, the median voter $\bar{w}$ produces in equilibrium, i.e., $\theta^* = \theta_L < \bar{\theta}$, and is indifferent between the proposed regimes, i.e., $V(\theta_L, \tau_L; \bar{w}) = V(\theta_H, \tau_H; \bar{w})$, and w_L gets w_H's out-of-

office payoff, i.e., $\tilde{w}(\theta_L, \tau_L) = V(\theta_L, \tau_L; w_H)$*. Moreover,* $\{(\theta_L, \tau_L), (\theta_H, \tau_H)\}$ *satisfies*

$$\psi_1(\theta_L; w_H) = \psi_2(\theta_L; w_H) \tag{8}$$

$$\tau_L = \frac{(1 - F(w^*(\theta_L))\theta_L)w_H + g(\theta_L)}{(1 - F(w^*(\theta_L))\theta_L)w_H + \int_{w^*(\theta_L)}^{1} wf(w)dw} \tag{9}$$

$$\varphi_H = (1 - F(w^*(\theta_L))\theta_L)(1 - \tau_L) \tag{10}$$

$$(\theta_H, \tau_H) \in T_H(\theta_L, \varphi_H), \tag{11}$$

where $T_H(\theta_L, \varphi_H) = \{(\theta, \tau) \in [0,1]^2 : (1 - F(w^*(\theta))\theta)(1 - \tau) = \varphi_H \quad \text{and} \quad \theta < \theta_L\}$ *and* $\psi_1(\theta; w_H)$ *and* $\psi_2(\theta; w_H)$ *are given by*

$$\psi_1(\theta; w_H) = \int_{w^*(\theta)}^{1} wf(w)dw - g(\theta)$$

$$\psi_2(\theta; w_H) = \frac{(-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta))\left(\int_{w^*(\theta)}^{1} wf(w)dw + (1 - F(w^*(\theta))\theta)w_H\right)}{\theta^{-1}w^*(\theta)F(w^*(\theta))}.$$

The winning (and implemented) regime $(\theta^*, \tau^*) = (\theta_L, \tau_L)$ *is unique. Finally, enforcement, output, welfare, taxpayers', appropriators', and the office holder's payoff are continuous functions of* w_H *and differentiable with respect to* w_H *for all* $w_H \neq w_p$*. If* $w_H > w_p$*, then enforcement worsens with* w_H*, output, welfare, and both taxpayers' and appropriators' payoffs decrease in* w_H*, and the office holder's payoff increases in* w_H*. If* $w_H \leq w_p$*, then all these measures are constant in* w_H*.*

This result allows for a few conclusions. Given (θ_L, τ_L), and thus φ_H, any proposal $(\theta_H, \tau_H) \in T_H(\theta_L, \varphi_H)$ is a best response. That is, the losing proposal is indeterminate and any distribution over any subset of $T_H(\theta_L, \varphi_H)$ would do. However, the winning proposal, which is the single relevant object, is unique.

A producer's payoff is a factor determined by the prevailing regime multiplied by (a monotone transformation of) his productivity. Since, in equilibrium, the median voter is indifferent between producing under either regime, all agents that would be producers under either regime are indifferent between the proposed regimes. An immediate implication is that the agents that are appropriators under at least one of the regimes are the decisive voters in the election.[32] In fact, a set of proposals that has all voters choose production in both regimes cannot

[32] While the intuition I provide here is not, the observation itself actually is more general than it appears. As long as the utility function u satisfies $u(0) = 0$, $u(1) = 1$, and $u(\Pi_{i=1,\dots,k}x_i) = \Pi_{i=1,\dots,k}u(x_i)$ and the tax function τ is continuous and satisfies $\tau(w) \in (-1, 1)$ and $(1 - \tau(w))w > (1 - \tau(w'))w'$ for all $w > w'$, in any equilibrium, the voters that are producers under either proposed regime are indifferent and the ones that appropriate under at least one of the regimes are decisive. The reason is that there is an asymmetry in the way the payoffs can be altered. While changing the payoffs of a subset of appropriators directly changes the payoffs of all appropriators, the same is not true for producers. One can always redistribute away the surplus

be an equilibrium.[33] Consider an agent that would choose to be an appropriator under exactly one regime. Since his payoff from production is the same under either regime, he prefers the one under which he appropriates as it provides a higher expected payoff that is independent of his rather low productivity. But then this regime will also be preferred by agents that prefer to appropriate under either regime since it provides a higher appropriation payoff. Therefore, the regime that offers a higher payoff to appropriators wins the election. An intuitively appealing interpretation of this prediction is that agents that end up living off appropriation activities are an obstacle to implementing better institutions and thus outcomes.

While the loser's proposal simply provides the voting body with an alternative, there is a second channel through which he constrains the extraction of resources by both high taxes and low enforcement expenditure the office holder can implement. The value of his outside option enters sort of an incentive compatibility constraint to be observed by and, thus, restricting the discretion of the winner to-be. The lower the out-of-office payoff the winner to-be offers the loser to-be relative to his own in-office payoff, the stronger is the loser to-be's incentive to get into office. This incentive compatibility constraint is binding in equilibrium so that, in fact, the outcome solely depends on the loser's productivity who thus determines (dictates) the equilibrium regime. This is one of the main results. It implies that two economies with the same productivity distribution and the same office holder can have different regimes implemented since the runner-up in the election differs leading to different choice sets facing the respective electorates.

Somewhat more specifically, there is a $\theta_p \in (0, \bar{\theta})$, which is completely determined by the economic fundamentals, such that there is no pooling equilibrium if $w_H > w^*(\theta_p) \equiv w_p$. Moreover, if a pooling equilibrium exists, then it is unique and the enforcement level implemented is independent of both w_L and w_H. This result derives from the requirement that, in a pooling equilibrium, both candidates have to be indifferent between the same in-office payoff and their out-of-office payoff. Thus, both agents have to be appropriators if they don't get into office, implying that their productivities do not affect their out-of-office payoffs and, hence, do not matter for the outcome. It follows that there is a unique outcome (θ_p, τ_p)

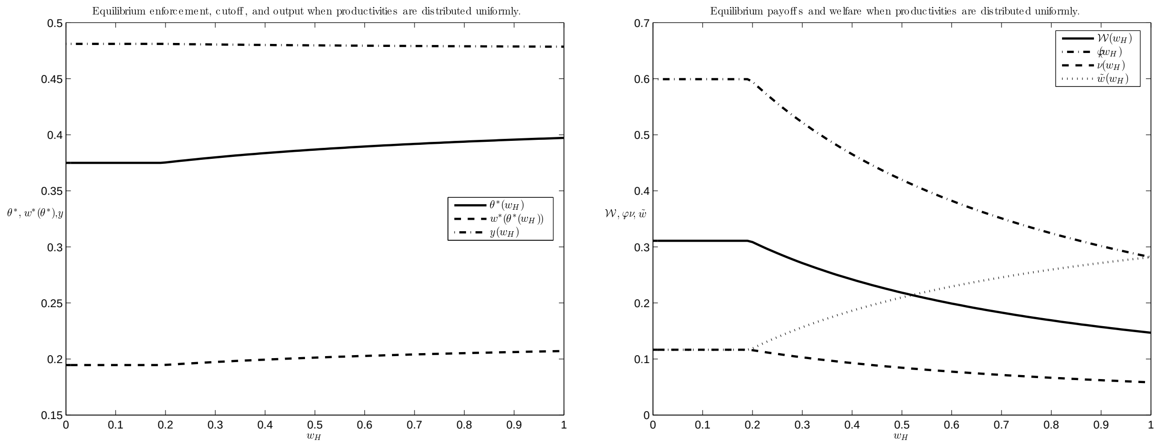
of a set of producers in one regime over the other to use those funds somewhere else without necessarily (i.e., directly and not only through second-order equilibrium effects) affecting other producers' payoffs.

[33] Again, more generally, there can neither be an equilibrium in which all voters choose to produce under either regime nor can there be one in which all voters choose to appropriate under either regime nor can there be one in which all voters are appropriators under the same regime but producers under the other. The reason is that winning with probability one requires strict preference by some set of voters with positive measure. But then, in these cases, there would always be an incentive to slightly increase the taxes on some subset of voters and still win the election. Notice also that, in a separating equilibrium, it cannot be the case that all voters, or the electorate altogether for that matter, are indifferent. In this case, each candidate has a probability of one half of winning the election but their outside option values (if not also the implied in-office payoffs) differ. That is, at least one agent wants to deviate by proposing a regime that loses the election or wins it with probability one.

prevailing in pooling equilibria, irrespective of the candidates' productivities. Therefore, this equilibrium cannot arise if $w_H > w^*(\theta_p)$. This last observation implies that pooling equilibria could be ruled out by simply assuming that $w_H \geq w_p$. Also, the outcome of any separating equilibrium with $w_H \leq w^*(\theta^*)$, irrespective of who wins the election, looks like the outcome of a pooling equilibrium, i.e., $\theta^* = \theta_p$. The reason is that, as in a pooling equilibrium, the associated out-of-office payoff for the loser is an appropriator's payoff which is independent of his productivity. What is more, there is no separating equilibrium in which w_H, proposing any regime (θ_H, τ_H), wins the election with probability one and $w_H > w^*(\theta_H)$. The intuition is that w_H would prefer to stay out of office in this case since his in-office payoff is constrained by his opponent's out-of-office payoff who has a lower productivity. So, again, if $w_H \geq w_p$, then H never wins in a separating equilibrium. These observations imply that, without loss of generality, I can assume for the rest of the analysis that all equilibria are separating, w_L always wins the election with probability one, and, in the case where $w_H \leq w^*(\theta_p)$, w_L wins the election with the regime (θ_p, τ_p). The intuition is that w_L's outside option is worse than w_H's so that he is satisfied with an in-office payoff that would be too low for the more productive candidate to be willing to serve in office. As a consequence, the teacher rather than the engineer ends up in office.

The comparative statics results build on the fact that the productivity of only one candidate, the election's runner-up, determines the equilibrium. The intuition is that a more productive agent has a better outside option under any regime than a less productive agent. It requires a higher in-office compensation for him to be indifferent between holding office and not holding office. Facing an opponent that asks for a high in-office payoff allows the candidate who eventually wins the election to also ask for a higher in-office payoff himself and still win than in a case where he is facing an opponent that would require a rather low payoff to hold office. Looking at it from the other side, a worse outside option for the loser requires a lower in-office compensation to make him indifferent. So, the winner to-be faces a tighter (binding) incentive compatibility constraint so that his discretion is more restricted which leads to a favorable set of alternatives the electorate can choose from.[34] Therefore, the less productive the loser, the better the enforcement implemented until it levels off at θ_p when his productiviy falls below w_p. As a consequence, output and welfare are higher. Finally, the office holder's payoff increases with w_H. That is, in a society where enforcement is weak and property rights are insecure, the office holder receives a higher payoff than in one where property rights are rather secure. Figure 3 illustrates these comparative statics results for the example economy. Abusing notation, variables of interest are plotted as functions of w_H. The enforcement and cutoff variables as well as output in panel 3(a) are rather flat. (However, output does de-

[34] This mechanism works through the regimes proposed and has general equilibrium effects on, e.g., the tax receipts, through the incentive structure in the underlying economy.



(a) Enforcement, cutoff, and output.

(b) Payoffs and welfare.

Figure 3: Comparative statics for the example economy.

crease.) This characteristic seems to derive from the fact that both the cost function and the distribution (which is uniform) are rather flat for most or all of their respective domain.

There is a large literature showing that equilibria in majority rule settings exist only under very special conditions, see, e.g., Plott (1967), McKelvey (1976, 1979), Schofield (1978, 1983), and many others. However, as Plott (1967) points out and Shepsle and Weingast (1981) emphasize, the institutional structure of the political process can induce an equilibrium. While the two candidates have no incentive to change their proposals, there exist proposals in the policy space that would command a majority over the winning proposal. Given a regime (θ, τ), the gradient vector is identical for all $F(w^*(\theta))$ appropriators and linearly dependent for all $(1 - F(w^*(\theta)))$ producers. Thus, as an example, proposing a regime that increases the payoff of the current majority, i.e., equilibrium producers, wins the election. In fact, being out of office, the loser to-be may prefer that himself (e.g., if he is a producer or if the tax rate were decreased). However, he won't propose it since he would win and be in office with a lower payoff than he gets out of office under the currently winning regime. No agent that is not a candidate can propose it. Also, the winner to-be's in-office policy preferences are opposed to the very same agent's out-of-office policy preferences. The gradient of his payoff is strictly positive as he always wants to extract more resources. Moving in this direction will, however, lose him the election and leave him with a lower out-of-office payoff than the in-office payoff asscociated with the initially winning proposal. As a consequence, there is a set of proposals so that no candidate can profitably deviate.

The reason why the preference shock helps in the political game is that the election winner can only be sure to win if he proposes a regime that makes the loser's out-of-office payoff less than or equal to the maximum attainable in-office payoff when winning. At the same time, equilibrium requires that the loser's out-of-office payoff be greater than or equal to the winner's in-office payoff. Since the loser's maximum attainable in-office payoff when winning is also attainable for the winner, the winner gets that payoff which is then to be equalized with the loser's out-of office payoff. This way, agents basically coordinate on an equilibrium. If the announcement of proposals were made sequentially, then there exists a unique equilibrium outcome (in terms of the implemented regime) for $\varepsilon = 0$. The reason is that sequentiality pins down the first mover's belief of his opponent's play to be the best response to his proposal. A possible interpretation of this timing assumption is that there is an incumbent office holder that has a first mover advantage. It could be due to, e.g., having established a policy platform during the previous term or exerting control over the media (e.g., in dictatorial-like societies). As a consequence, if an incumbent has a first mover advantage, then as long as he stays in office, the loser's productivity determines the outcome and can lead to either improvements or deterioration of property rights. In case he loses the election he forces the new office holder to be indifferent between being in office and out of office. So, the new office holder's productivity determines the outcome at this point. In general, a change in office improves property rights initially. For further discussion, see section 4.3.

Given the outcome of the political game between any two candidates, I can next analyze the decisions of potential candidates to enter into electoral competition.

3.3 The selection game given a set of potential candidates

Here, I show that the outcome of the candidate selection is very simple. Since unproductive runners-up imply outcomes preferred by everybody (but the winner to-be), all potential candidates want rather unproductive agents to run. So, in equilibrium, the candidates for office will be among the least productive potential candidates. I start by specifying strategies, payoffs, and the definition of equilibrium of the selection game before analyzing the latter. Some additional notation is needed.

3.3.1 Strategies, payoffs, and equilibrium definition

Consider the ordered set $N = \{w_1, \ldots, w_n\}$ of potential candidates and let $J = \{1, \ldots, n\}$ be the index set. That is, N is the set of all agents that get to play the selection game. For any $j \in J$, let $N_j = N \backslash \{w_j\}$ be the set of all agents other than w_j that play the game. Each agent $w_j \in N$ chooses $\chi_j^s \in \{0, 1\}$, where $\chi_j^s = 1$ means to select into running (if allowed to in the case were a random draw decides who gets to run). A strategy profile for N is given by $\{\chi_j^s\}_{j \in J}$, a profile for N_k is given by $\{\chi_j^s\}_{j \in J \backslash \{k\}}$. Any such strategy profiles can be summarized by the sets $N' = \{w_j \in N : \chi_j^s = 1\}$ and $N'_k = \{w_j \in N_k : \chi_j^s = 1\}$

collecting the agents that selected 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 combination $\{w, w'\}$ were selected to run for office.[35] Finally, let $(\theta(w'), \tau(w'))$ be the respective regime in the case when $\{w, w'\}$ compete for office and w' determines the outcome. Let $\mathbb{I}_{\{a>b\}}$ and $\mathbb{I}_{\{a\geq b\}}$ be the indicator functions that equal 1 whenever the expression in brackets is true and 0 otherwise.

Recall that, if N' is a singleton, then that agent becomes a dictator, if N' is empty, then the anarchy regime $(\theta, \tau) = (1, 0)$ is adopted. Appendix C analyses the cases of anarchy and dictatorship. In both cases there exists a unique outcome and I denote the value functions (expected payoffs) of an agent with productivity w in the anarchy regime and in a dictatorship by $V^a(w)$ and $V^d(w)$, respectively, and a dictator's payoff in office by $\tilde{w}^d$. Since home production provides for a lower bound on payoffs, the equilibrium expected payoff of all agents (but a possible dictator) under either regime is smaller than or equal to α. A dictator's payoff $\tilde{w}^d$ is weakly decreasing in α. Let $(\bar{\bar{\theta}}, \bar{\bar{\tau}}, \bar{\bar{\varphi}})$ be the outcome of the political game when $w_H = 1$. Given the comparative statics results in proposition 2, the taxpayers' and appropriators' payoffs decrease in w_H. That is, $\bar{\bar{\varphi}}$ is the smallest possible producer payoff coefficient the political game can generate. Moreover, w_p is the smallest marginal agent. Thus, any agent in any equilibrium of the political game, always gets at least the smallest possible producer payoff $\bar{\bar{\varphi}} w_p$. To see this, let θ^* and τ^* denote the equilibrium enforcement and tax that imply the equilibrium payoff factor φ^* for producers. For all $w_H \leq 1$, $\varphi^* \geq \bar{\bar{\varphi}}$ so that $\varphi^* w \geq \bar{\bar{\varphi}} w > \bar{\bar{\varphi}} w_p$, if $w > w^*(\theta^*) \geq w_p$. If $w \leq w^*(\theta^*)$, then the appropriators' payoff equals $\nu(\theta^*, \tau^*) = \varphi^* w^*(\theta^*) \geq \varphi^* w_p \geq \bar{\bar{\varphi}} w_p$. The following assumption makes precise what "α small enough" means.

Assumption 3. *Both a dictator's payoff and the smallest possible producer payoff are strictly greater than α, i.e., $\tilde{w}^d = \tilde{w}^*(\alpha) > \alpha$ and $\bar{\bar{\varphi}} w_p > \alpha$.*

Notice that the dictator's payoff $\tilde{w}^d$, the pooling equilibrium cutoff productivity w_p, and the payoff factor $\bar{\bar{\varphi}}$ are independent of w_L and w_H, strictly positive, and completely determined by economic fundamentals.[36] So, this assumption just requires to choose a sufficiently small α.

Now, consider any agent $w_j \in N$. If $n'_j = 0$, then not running implies $(\theta, \tau) = (1, 0)$ and the

[35] This wording is correct since proposition 2 allows us to disregard pooling equilibria and assume that all equilibria are separating and w_L wins the election. In any case, x is used to determine the probabilities of outcomes not winners.

[36] This statement is true due to the assumption that the technology is independent of the office holder's productivity. If this assumption were dropped, then the dictator's payoff depends on the dictator's productivity and a pooling equilibrium might not even exist.

payoff $V^a(w_j)$ as derived in appendix section C.1. Running means to become the dictator yielding payoff $\tilde{w}^d$. That is, the objective function is given by

$$(1-\chi_j^s)V^a(w_j)+\chi_j^s\tilde{w}^d.$$

If $n_j'=1$, then not running implies dictatorship by somebody else and thus yields $V^d(w_j)$. If w_j decides to run, then he receives $V(\theta(w'),\tau(w');w')$ whenever he wins, i.e., $w_j<w'$, while he gets $V(\theta(w_j),\tau(w_j);w_j)$ if he loses. The objective function is

$$(1-\chi_j^s)V^d(w_j)+\chi_j^s\left(\mathbb{I}_{\{w_j<w'\}}V(\theta(w'),\tau(w');w')+\mathbb{I}_{\{w_j>w'\}}V(\theta(w_j),\tau(w_j);w_j)\right).$$

Finally, suppose that $n_j'>1$. The probability of any particular combination of agents in N_j' to be selected to compete for office is given by $\frac{2}{n_j'(n_j'-1)}$. The number of combinations $\{w,w'\}$, $w,w'\in N_j'$, where $(\theta(w'),\tau(w'))$ is the (implemented) equilibrium outcome of the political game is $x_j(w')$. Therefore, the probability of a particular schedule $(\theta(w'),\tau(w'))$ to be implemented is $\frac{2x_j(w')}{n_j'(n_j'-1)}$.[37] Thus, the payoff from not running is

$$\sum_{w'\in N_j'}\frac{2x_j(w')}{n_j'(n_j'-1)}V(\theta(w'),\tau(w');w_j).$$

If w_j decides to select himself into the running, then all previously possible combinations are still possible but arise with the lower probability of $\frac{2}{n_j'(n_j'+1)}$.[38] When w_j gets to run for office facing some $w'\in N_j'$, then he wins whenever $w_j<w'$ getting $V(\theta(w'),\tau(w');w')$ and loses when $w_j>w'$ getting $V(\theta(w_j),\tau(w_j);w_j)$. So, his expected payoff from running is $\sum_{w'\in N_j'}\frac{2x_j(w')}{n_j'(n_j'+1)}V(\theta(w'),\tau(w');w_j)+\sum_{w'\in N_j':w_j<w'}\frac{2}{n_j'(n_j'+1)}V(\theta(w'),\tau(w');w')+\sum_{w'\in N_j':w_j>w'}\frac{2}{n_j'(n_j'+1)}V(\theta(w_j),\tau(w_j);w_j)$. Thus, the objective function is given by

$$(1-\chi_j^s)\sum_{w'\in N_j'}\frac{2x_j(w')}{n_j'(n_j'-1)}V(\theta(w'),\tau(w');w_j)+\chi_j^s\left(\sum_{w'\in N_j'}\frac{2x_j(w')}{n_j'(n_j'+1)}V(\theta(w'),\tau(w');w_j)\right.$$
$$\left.+\sum_{w'\in N_j':w_j<w'}\frac{2}{n_j'(n_j'+1)}V(\theta(w'),\tau(w');w')+\sum_{w'\in N_j':w_j>w'}\frac{2}{n_j'(n_j'+1)}V(\theta(w_j),\tau(w_j);w_j)\right).$$

[37] It can be verified that $\frac{2x_j(w')}{n_j'(n_j'-1)}\leq 1$ and $\sum_{w'\in N_j'}\frac{2x_j(w')}{n_j'(n_j'-1)}=\frac{2}{n_j'(n_j'-1)}\sum_{w'\in N_j'}x_j(w')=1$.

[38] Again, $\sum_{w'\in N_j'}\frac{2x_j(w')}{n_j'(n_j'+1)}+\sum_{w'\in N_j'}\frac{2}{n_j'(n_j'+1)}=\frac{2}{n_j'(n_j'+1)}\sum_{w'\in N_j'}(x_j(w')+1)=1$.

Combining these, agent $w_j \in N$, given N'_j, faces the problem

(SP)

$$\max_{\chi_j^s \in \{0,1\}} (1-\chi_j^s) \left(\mathbb{I}_{\{n'_j=0\}} V^a(w_j) + \mathbb{I}_{\{n'_j=1\}} V^d(w_j) + \mathbb{I}_{\{n'_j>1\}} \sum_{w' \in N'_j} \frac{2x_j(w')}{n'_j(n'_j-1)} V(\theta(w'), \tau(w'); w_j) \right)$$
$$+ \chi_j^s \Bigg(\mathbb{I}_{\{n'_j=0\}} \tilde{w}^d + (1-\mathbb{I}_{\{n'_j=0\}}) \Big(\sum_{w' \in N'_j} \frac{2x_j(w')}{n'_j(n'_j+1)} V(\theta(w'), \tau(w'); w_j)$$
$$+ \sum_{w' \in N'_j : w_j < w'} \frac{2}{n'_j(n'_j+1)} V(\theta(w'), \tau(w'); w') + \sum_{w' \in N'_j : w_j > w'} \frac{2}{n'_j(n'_j+1)} V(\theta(w_j), \tau(w_j); w_j) \Big) \Bigg).$$

An equilibrium in the selection game is defined as follows.

Definition 4 (Equilibrium of the selection game given a set N 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 $\{\chi_j^s\}_{j \in J}$, such that for each agent $w_j \in N$, given N'_j, χ_j^s solves (SP).*

Having specified this stage's strategies and payoffs and defined the equilibrium of the stage game, I can analyze its outcome.

3.3.2 Equilibrium of the selection game given a set of potential candidates

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

Proposition 3 (Equilibrium of the selection game given a set N of potential candidates)**.** *Given a set N of potential candidates, assume that assumption 3 holds. If $|N| \leq 2$, then there is a unique equilibrium and $N' = N$. Suppose that $|N| > 2$. If $|N \cap [0, w_p]| \leq 2$, then there is a unique equilibrium and $N' = \{w_1, w_2\}$, i.e., w_2 determines the equilibrium regime. If $|N \cap [0, w_p]| > 2$, then a profile N' is an equilibrium if and only if it is a subset selected from $N \cap [0, w_p]$ and all equilibria implement the regime $(\theta^*, \tau^*) = (\theta_p, \tau_p)$.*

A sufficient condition for a unique equilibrium is a minimum productivity requirement of $\underline{w} \geq w_p$.[39] In any case, the equilibrium regime is always unique. Only w_1 and w_2 have a dominant strategy as long as at most the dominated strategy of the other one of the two is removed. However, if there had been other Nash equilibria, then the ones analyzed here would be (weakly) payoff dominant since, by proposition 2, $V(\theta(w'), \tau(w'); w) = \max\{v(\theta(w'), \tau(w')), \varphi(\theta(w'), \tau(w'))w\}$ decreases weakly in w'.

To provide intuition, I focus on the case where $N \subset [w_p, 1]$. Due to the strategic interaction

[39] In the example economy, $w_p < 0.2$ so that more than 80% of the agents in the economy could be selected into the set N.

in the political game, rather unproductive agents can increase their otherwise low payoff by running for office. If w_1 chooses to run, then he has positive probability of competing for office. If he gets to compete, then he wins for sure and receives an in-office payoff equal to the expected out-of-office payoff of the more productive loser of the election. Independent of who the loser is, w_1 is always better off winning against him for the associated payoff than not running and getting his own out-of-office payoff under whatever regime is implemented as an outcome of the political game between two other agents. Thus, w_1 runs. Given that w_1 runs, running is a dominant strategy for w_2 since it gives him a positive probability of competing for office. (In fact, it is so even if w_1 does not run as, in this case, his considerations parallel the ones of w_1 just described.) If w_2 were to compete for office against w_1, then he would lose for sure and receive the highest possible expected payoff. If he were to compete against anybody else, he would win and receive an in-office payoff equal to the more productive loser's out-of-office payoff under the resulting regime. Irrespective of who the loser is, w_2 is always better off in office than being out of office under the same regime. Given that w_1 and w_2 run, the dominant strategy for all other agents is to refrain from running to guarantee that w_2 competes with w_1 thereby maximizing all other agents' expected payoff.

Without loss of generality, I conclude that only w_2 matters for the outcome. If $|N \cap [0, w_p]| \leq 2$, then w_2 determines the regime and if $w_2 \leq w_p$, then $(\theta^*, \tau^*) = (\theta_p, \tau_p)$. If $|N \cap [0, w_p]| > 2$, then $w_2 < w_p$ and, again, the outcome is (θ_p, τ_p). That is, w_2 summarizes all relevant information.

I can now combine the separate analyses of the three stages to study some comparative statics with respect to the underlying political institutions and ask what effect constraints to participation and their relaxation have on an economy's outcome.

3.4 Constraints to participation

Since an equilibrium with a unique outcome exists at each stage, there also exists a full equilibrium with a unique outcome. I now show that, in this economy, it is not important who gets to choose a regime from the available alternatives. What matters is who gets to engage in political competition to (potentially) propose the alternatives to choose from. The reason is that the choice set depends on and changes with the runner-up while all qualified electorates order given alternatives in the same way. First, I consider restrictions on participation in political competition. Then, I ask how constraints to participation in the voting body affect the outcome.

3.4.1 Access to political competition

This section concerns openness of political competition to a large number of agents facing mild restrictions. I model participation constraints as the number of potential candidates drawn, a minimum productivity requirement as well as the mass of rather unproductive agents that can potentially compete for office. I assume that there can be n potential candidates in N and that there is a $\underline{w} \in [0,1]$ such that only agents with $w \geq \underline{w}$ can become potential candidates, where $\underline{w}$ represents a minimum productivity requirement for running for office.[40] Let the probability of being selected into the set N associated with $\underline{w}$ be represented by the cumulative distribution function $\Gamma(z)$ with continuous density $\gamma(z)$ and support $[\underline{w}, 1]$. The random draw of the set N is a simple model of how a society's potential candidates come about.[41] Further, I assume that for any $\underline{w}' > \underline{w}$, the associated distribution function $\Gamma'(z)$ is a truncation of $\Gamma(z)$. Proposition 4 shows how access to political competition affects the outcome prevailing in the described society.

Proposition 4 (Access to political competition)**.** *Every change in political institutions that increases the probability of the second smallest productivity among the potential candidates to be small increases the likelihood of better outcomes. In particular, the more potential candidates are drawn, i.e., the larger $n = |N|$, and the less restrictive the productivity requirements are, i.e., the smaller $\underline{w}$, the more likely are better institutions and higher welfare. Moreover, let Γ' first order stochastically dominate Γ. Then, better institutions and higher welfare are more likely under Γ.*

The proof of this result makes use of the insight that the equilibrium outcome of this society depends only on the productivity of the agent w_2. It says that a society in which entering activities in the political arena is less restricted is likely to provide for both better enforcement and higher welfare. The reason is that, in politically more open societies, the winner to-be

[40] This requirement does not need to be institutional. Suppose that the marginal productivity is a function of how well connected an agent is with elite groups.

[41] For lack of a better model of how and why agents are presented with an opportunity to actively engage in the political arena, I randomly draw a finite subset from the population that can do so. What is more important than the randomness introduced here is that political institutions determine the nature of these draws–how many candidates are drawn from which subsets of society. As an alternative, suppose that a society's set of potential candidates is drawn by the following deterministic rule. The ordered set N collects n agents with a minimum productivity w_1 and a maximum productivity w_n in such a way that the distance between two successive agents' productivity, $w_{j+1} - w_j$, is equal for all $j = 1, \ldots, n-1$, i.e., $N = \{w_1, w_1 + \frac{w_n - w_1}{n-1}, w_1 + 2\frac{w_n - w_1}{n-1}, \ldots, w_1 + (n-2)\frac{w_n - w_1}{n-1}, w_n\}$. With this rule, $\underline{w} = w_1$ corresponds to the minimum productivity requirement, n is the same as before, and, fixing w_1, decreasing w_n increases the weight on less productive agents as a first order stochastically dominated distribution would do. For this particular model of the selection process, the results hold exactly as reported but in a deterministic rather than probabilistic sense. Moreover, the relevant aspect is the mechanism, not the outcome. Here, it's not the draw of N per se that is interesting but the fundamentals that determine the nature of that draw. If the distributions governing it and the political institutions differ enough, then the statements are beyond a random outcome to the extent that they are either deterministic or one can at least use qualifiers like "almost surely".

is more likely to face a rather unproductive opponent who imposes tighter (binding incentive compatibility) constraints on his discretion and, thus, the likelihood of better outcomes is higher. (However, easier access to the political arena for more people does not necessarily imply better outcomes.) The important aspect is not so much the randomness of the draws but rather their nature as determined by the political fundamentals. A society in which the political fundamentals allow only a couple of draws from the very high end of the distribution will with probability close to one do a lot worse than one in which the fundamentals allow for millions of draws from the whole population. As an example, one would expect, e.g., Russia to have less secure rights to property and a higher payoff for the office holder than most Western European societies since the only potential opponents for the current Russian regime seems to be a narrow set of oligarchs with high outside option values.

3.4.2 Qualified electorate or elites

In this model, a qualified electorate that is not equal to the population forms an elite as featured prominently in the literature (see, e.g., Acemoglu (2006)). An important aspect of elites is that its members are "well-connected" which is likely to be associated with higher returns to market activity. In the same spirit, North et al. (2007) distinguish between a country's population and its citizens. Only the latter have access to certain economic and political activities and organizations which creates rents. Therefore, I assume that the median return to market activity in the elite, $\bar{w}^e$, is not less than in the whole population, i.e., $\bar{w}^e \geq \bar{w}$.[42]

Let E denote the qualified electorate, i.e., the set of agents that are qualified to vote. Let $\chi_e \in \{0, 1\}$ be an indicator of an agent belonging to the electorate or not, where $\chi_e = 1$ indicates membership. Let $f_{w\chi_e} : [0, 1] \times \{0, 1\} \to \mathbb{R}_+$, $f_{w\chi_e}(z, \chi) = P(\chi_e = \chi | w = z) f_w(z)$ be the continuous density function with differentiable marginal f_w. $P(\chi_e = 1 | w = z)$ is the probability that an agent with productivity z belongs to the electorate. Then, the assumption employed in the analysis so far is that $P(\chi_e = 1 | w = z) = 1$ for all $z \in [0, 1]$. In the following, I assume that $P(\chi_e = 1 | w = z) \in (0, 1]$ for all $z \in [0, 1]$ so that, potentially, the electorate is a strict subset of the population forming an elite. I require it to have full support in the productivity dimension, i.e., $f_{w\chi_e}(z, 1) > 0$ for all $z \in [0, 1]$, so as to make it admissible in the sense that an equilibrium exists.[43] To ease exposition, let $m_e = \int_0^1 f_{w\chi_e}(z, 1) dz$ and

[42] The assumption that $\bar{w}^e \geq \bar{w}$, while intuitive, is sufficient but not necessary. Intuitively, it rules out cases where the elite's median voter chooses to be an appropriator under the winning regime. One could probably guess and verify that, in equilibrium, he would choose to produce as long as $\bar{w}^e \geq w^*(\hat{\theta}(1))$. However, since this assumption does not seem crazy, I use it to work around this complication.

[43] The assumption that the electorate E has full support in the productivity dimension ensures that it contains both equilibrium appropriators and producers to-be and is thus sufficient (but not necessary) for an equilibrium to exist. There does not exist an equilibrium in which all members of the electorate choose to engage in the same occupation and, moreover, do choose the same occupation under either proposed regime.

define $F_e(x) = {m_e}^{-1} \int_0^x f_{w\chi_e}(z,1)dz$ as an auxiliary cumulative distribution function for the electorate. The median productivity of the elite is defined as satisfying $F_e(\bar{w}^e) = \frac{1}{2}$. The maps from the regimes proposed to the probabilities of winning and from the voting behavior to the regime implemented parallel the ones before. For example, the regime implied by optimal voting behavior in the elite is given by

$$(\theta^*, \tau^*) = \begin{cases} (\theta_L, \tau_L) & \text{if } m_e^{-1} \int_0^1 \chi_w^L f_{w\chi_e}(w,1)dw > \frac{1}{2}, \\ \text{draw with probability } \frac{1}{2} & \text{if } m_e^{-1} \int_0^1 \chi_w^L f_{w\chi_e}(w,1)dw = \frac{1}{2}, \\ (\theta_H, \tau_H) & \text{if } m_e^{-1} \int_0^1 \chi_w^L f_{w\chi_e}(w,1)dw < \frac{1}{2}. \end{cases} \tag{12}$$

The following result obtains.

Proposition 5 (Qualified electorate)**.** *Fix the set N of potential candidates. Every (admissible) qualified electorate produces the same outcome as if the whole population were qualified to vote.*

Whenever the qualified electorate is admissible, then the outcome is the same and, in particular, it is the same as if the whole population votes. The intuition derives from two aspects. First, the set of decisive voters is the set of agents that are appropriators under at least one of the proposed regimes. Second, there is a disconnection of the productivity distribution within the electorate from the productivity distribution in the economy. While the electorate determines the voting outcome, the appropriation and production payoffs associated with proposed regimes are determinined by the relevant distribution in the population which does not change with the electorate. Therefore, all admissible qualified electorates prefer the same proposal, i.e., order a given set of alternatives in the same way. The voting outcomes do not differ and, thus, the proposed alternatives do not differ unless the candidates do. It follows that the equilibrium outcomes are the same.

To illustrate, fix an initial elite and pick an initial set of potential candidates from it.[44] Extending the elite to any bigger set does not change the outcome unless the economic fundamentals or the potential candidates change. More importantly, given the constraints on

To that extent, I consider it technical in nature. In, e.g., Acemoglu (2008), the elite may also contain rather unproductive agents. Alternatively, one could assume that there are cutoffs that determine the set E, or any combination of these two approaches. For example, let $E = [\underline{\underline{w}}, \overline{\overline{w}}] \subset [0,1]$ for some $\underline{\underline{w}} > 0$ and $\overline{\overline{w}} \leq 1$, which would amount to setting $P(\chi_e = 1 | w = z) = 1$ if and only if $z \in [\underline{\underline{w}}, \overline{\overline{w}}]$. In this case, a complication may arise. In particular, if $\underline{\underline{w}} \geq \bar{w}$, then an equilibrium in the political game does not exist. Whether one thinks that the assumption maintained here are reasonable or not probably depends on what one thinks determines the elite set, i.e., what restricts the franchise, income or wealth. In this model, there is no wealth dimension and w represents only income. In a situation where the correlation of income with wealth is positive but not perfect, the elite set might have full support in the distribution of productivities but a higher median.

[44] The realistic assumption that potential candidates also have to be qualified to vote implies the assumption that even in the case where a narrow elite decides which regime is to be implemented, there is competition of ideas and preferences over regimes within this elite and not everybody can run for office.

access to political competition, the ex ante (before the set of potential candidates is drawn) likelihood of outcomes is determined by the second order statistic of the distribution Γ, which remains unchanged. So, unless these restrictions are relaxed, extending the franchise does not even increase the likelihood of better outcomes. As a further consequence, consider an extension of the franchise that changes the median voter. Since the order the qualified electorate assigns to a given set of alternatives is unchanged, if the choice set does not change, the outcome remains the same. This result differs from what one would expect using median voter models. The reason is as follows. In the median voter model, the choice set is a continuum and the median voter is decisive in the sense that he actually chooses the outcome (from a continuous space) to maximize his objective function. Heterogeneity in a relevant dimension then implies that different decisive median voters choose different outcomes. By contrast, here, simply changing the criterion according to which alternatives are ranked, i.e., extending the franchise, does not affect the order of alternatives in a given set. Thus, the choice set determined in the political game remains unchanged and so does the choice.

Together, propositions 4 and 5 imply that increasing the franchise does not provide for better outcomes while allowing for more political competition, even within a possibly narrow elite, improves outcomes in a probabilistic sense.

4 Discussion

In this section, I briefly discuss the reason for the multiplicity of equilibria in the political game and equilibrium selection.

4.1 Multiplicity

Assume for the moment that $\varepsilon = 0$, i.e., there is no preference shock. Suppose agents w and w', $w' > w$, compete for office. To simplify the argument by saving on references to additional intermediate results assume that $w \geq \bar{w}$. An equilibrium set of proposals $\{(\theta, \tau), (\theta', \tau')\}$ where (θ, τ) wins the election has to satisfy $\theta' < \theta < \bar{\theta}$ and $V(\theta, \tau; \bar{w}) = V(\theta', \tau'; \bar{w})$ or $(1-\tau)(1-F(w^*(\theta))\theta) = (1-\tau')(1-F(w^*(\theta'))\theta')$. This implies that $V(\theta, \tau; w') > V(\theta', \tau'; w)$. Finally, $\{(\theta, \tau), (\theta', \tau')\}$ has to satisfy $\tilde{w}(\theta, \tau) \geq V(\theta', \tau'; w)$, $\tilde{w}(\theta, \tau) \geq \tilde{w}(\theta', \tau')$, $V(\theta, \tau; w') \geq \tilde{w}(\theta, \tau)$, and (θ, τ) solves problem (P) with $\bar{\varphi} = (1-\tau')(1-F(w^*(\theta'))\theta')$. In particular, any set of proposals that satisfies the above and either $V(\theta, \tau; w') = \tilde{w}(\theta, \tau) > V(\theta', \tau'; w)$, $V(\theta, \tau; w') > \tilde{w}(\theta, \tau) = V(\theta', \tau'; w)$, or $V(\theta, \tau; w') > \tilde{w}(\theta, \tau) > V(\theta', \tau'; w)$ is an equilibrium. Given (θ', τ'), the winner w cannot profit from deviating. Asking a higher in-office payoff loses the election for sure (recall that (θ, τ) solves problem (P) with the appropriate $\bar{\varphi}$) so that he is at most indifferent between deviating and not deviating. Asking a lower in-office payoff decreases his payoff. Similarly, given (θ, τ), the loser cannot profit from deviating. Proposing a regime that wins the election with positive probability yields him a payoff from winning that is at most equal to the winner's in-office payoff which is weakly less than his payoff from not deviating. Any other regime that does not win the election does not change payoffs. In fact, the equilibrium where $V(\theta, \tau; w') = \tilde{w}(\theta, \tau) > V(\theta', \tau'; w)$ is the one that is selected by the preference shock. When the incumbent has a first mover advantage, then both the equilibria where $V(\theta, \tau; w') = \tilde{w}(\theta, \tau) > V(\theta', \tau'; w)$ and $V(\theta, \tau; w') > \tilde{w}(\theta, \tau) = V(\theta', \tau'; w)$ can be selected depending on whether or not the incumbent is the less productive agent in the competition. If the winner to-be of the election has a first mover advantage, then the equilibrium always satisfies $V(\theta, \tau; w') = \tilde{w}(\theta, \tau) > V(\theta', \tau'; w)$. Notice that, however, all these equilibria are qualitatively the same in the sense that the same candidate wins offering worse enforcement.

In general, a payoff dominance criterion has no bite in selecting one of these equilibria. To see this, assume that $w_H > w_L \geq \bar{w}$. Consider the constraint $V(\theta_L, \tau_L; w_H) \geq \tilde{w}(\theta_L, \tau_L) \geq V(\theta_H, \tau_H; w_L)$ which, since in equilibrium the constraint in problem (P) is binding, can be written as $\varphi(\theta_L, \tau_L) w_H \geq \tilde{w}(\theta_L, \tau_L) \geq \varphi(\theta_L, \tau_L) w_L$. Suppose that $\varphi(\theta_L, \tau_L) w_H > \tilde{w}(\theta_L, \tau_L) = \varphi(\theta_L, \tau_L) w_L$. Then, moving to the equilibrium in which $\varphi(\theta_L, \tau_L) w_H = \tilde{w}(\theta_L, \tau_L) > \varphi(\theta_L, \tau_L) w_L$ requires increasing $\tilde{w}(\theta_L, \tau_L)$ while decreasing both $\varphi(\theta_L, \tau_L)$ and $\bar{\varphi} = \varphi(\theta_H, \tau_H)$, since again in equilibrium the constraint in problem (P) is binding. That is, w_L's payoff increases while w_H's payoff decreases.

There is a second source of multiplicity. For concreteness, consider the case where, in equilibrium, $\{(\theta, \tau), (\theta', \tau')\}$ satisfies $V(\theta, \tau; w') = \tilde{w}(\theta, \tau) > V(\theta', \tau'; w)$. Since $w \geq \bar{w}$, $V(\theta', \tau'; w) = (1 - \tau')(1 - F(w^*(\theta'))\theta')w$. Together with (θ, τ), any regime (θ'', τ'') that satisfies $(1 - \tau'')(1 - F(w^*(\theta''))\theta'') = (1 - \tau')(1 - F(w^*(\theta'))\theta')$ and $\theta'' < \theta$ would constitute a Nash equilibrium of the political game. However, in all these equilibria, the winner of the election, the regime implemented, and the equilibrium payoffs are the same. Thus, the equilibrium regime (θ, τ) is unique while the losing proposal is indeterminate.

4.2 Preference shock

In the political game, I use a preference shock to select a set of equilibria with a unique equilibrium regime and an indeterminate losing proposal. For simplicity, I refer to any such set as a unique equilibrium. The trick works through altering the probabilities of winning. However, none of the qualitative results that would characterize the continuum of equilibria is affected. The interpretation I have in mind is as follows. If an agent runs for office making a proposal while the best in-office payoff he can ask when winning is strictly less than his outside payoff when he loses, voters might perceive him to be an idealistic kind of person. The idea is that, given that agents select themselves into running, his behavior might be associated with characteristics like being dedicated, or willing to take on responsibility or similar things. This consideration is assumed to be completely independent of the proposal actually made by that agent, i.e., whether or not he actually proposed the regime that would give him the maximum attainable in-office payoff.

Somewhat more obvious foci for the shock where analyzed. None of them was successful in selecting a unique equilibrium. As an example, assuming that voters prefer the agent that asks the lower in-office payoff would not remove the multiplicity. The in-office payoffs end up equalized but the level still depends on the beliefs on the opponents' play that are still not pinned down. Also, assuming that voters prefer a productive office holder or that there is a small probability of mistakes in the aggregation of votes renders equilibria nonexistent altogether. In both cases, no incentive compatible proposal gives a probability one of winning or losing.

Suppose there was a reasonable way to select the equilibrium that satisfies $\tilde{w}(\theta, \tau) = V(\theta', \tau'; w)$ so that $\tilde{w}(\theta, \tau) = V(\theta, \tau; w)$ since $w \geq \bar{w}$.[45] In this case, the equilibrium outcome of the political game depends on the office holder's productivity. That is, two societies with the same productivity distribution and the same office holder implement the same regime. However, the results concerning the constraints to participation still hold. To see this, notice that the comparative statics of the political game equilibrium are with respect to w_L but unaltered otherwise. In the selection game, w_1 still has a (weakly) dominant strategy of running as he would win and implement the best possible outcome. This way he gets an in-office payoff equal to his out-of-office payoff under the best possible regime rather than an out-of-office payoff under a worse one. His opponent is indeterminate but does not matter since w_1 wins the election. The comparative statics with respect to the political fundamentals depend on the behavior of the first order statistic, implying that the results on access to political competition are unaltered. The analysis of the qualified electorate is not touched at all.

Finally, in a this stylized model, it is not clear why an agent should care for anything else but expected utility from consumption provided by the regime. However, in equilibrium, the shock does not "show up", i.e., it does neither affect the outcome nor introduce an additional source of uncertainty nor alter the qualitative characteristics of equilibria as compared to the set of equilibria if the shock were absent. It simply selects one equilibrium from the set of all qualitative alike equilibria.

[45] In fact, further complications may arise here when $\bar{w} > w$.

4.3 Sequentiality

If there is an incumbent office holder, then the agents running for office are not in the same position. In dictatorial regimes, the incumbent often has some control over the media. In any regime, the office holder has revealed at least some information about his general policy platform over the previous term. In some regimes, potential opponents have to run for candidacy within the opposition before running for office. Thus, one could be inclined to assume that the incumbent has a first mover advantage the implications of which are briefly described in the discussion of proposition 2. However, another possible and not any more arbitrary assignment of the first mover advantage could allow the winner to move first. The interpretation could be along the lines of something like momentum. If the incumbent wins, he uses the fact that he has established some sort of successful policy platform in the previous term. If the opposition wins, then it wins because it has strong foundations in the voting body and clearly stands for a position opposing the incumbent. This assignment would select the exact same equilibrium as the preference shock.

5 Conclusion

In this paper, I address the question for what reasons similar societies would choose different levels of property rights enforcement and ask what role constraints to participation in the decision making process play? I analyze a mechanism arising from strategic interaction in a political game. It implies that the choice set facing society and thus the decision outcome depends on the loser to-be's productivity. As a consequence, looking at the productivity distribution and the office holder only, two societies generally implement different regimes while they appear to be very similar in these supposedly relevant dimensions. Important implications are that easier access to the political arena for more people increases the likelihood of better outcomes while extending the franchise alone does not. These results suggest at least two conclusions. The strategic interactions in the separate determination of the choice set and the social ordering might be important and spurring political competition is more essential for good outcomes than extending the franchise.

A Sufficient conditions for assumption 2

Consider the functions $\varphi : [0,1]^2 \to \mathbb{R}$, $\nu : [0,1]^2 \to \mathbb{R}$, and $\tilde{w} : [0,1]^2 \to \mathbb{R}$ given by

$$\begin{aligned}
\varphi(\theta,\tau) &= (1 - F(w^*(\theta))\theta)(1-\tau) \\
\nu(\theta,\tau) &= (1-\tau)\theta \int_{w^*(\theta)}^{1} wf(w)dw \\
\tilde{w}(\theta,\tau) &= \tau \int_{w^*(\theta)}^{1} wf(w)dw - g(\theta).
\end{aligned}$$

Condition 1. *A set of sufficient conditions for assumption 2 to hold is*

$$-\frac{f'(w)w}{f(w)} \leq 1 + \bar{\theta},\ \forall w, \tag{13}$$

$$-\frac{g''(\theta)\theta}{g'(\theta)} \geq \frac{2\bar{\theta}\bar{w}f(\bar{w})}{(1-\frac{1}{2}\bar{\theta})^2},\ \forall \theta < \bar{\theta}, \tag{14}$$

where $\bar{w} = F^{-1}(\frac{1}{2})$ *and* $\bar{\theta} = \bar{w}\left(1 - \int_{\bar{w}}^{1} F(w)dw\right)^{-1}$.

To see that, first, fix τ and consider $\nu(\theta,\tau)$. This function of θ is strictly concave (and thus strictly quasiconcave) if and only if

$$\begin{aligned}
&\frac{\partial}{\partial\theta}(1-\tau)\left[\int_{w^*(\theta)}^{1} wf(w)dw - \theta w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta)\right] \\
&= -(1-\tau)\theta f(w^*(\theta))w^{*\prime}(\theta)^2\left[3 + \frac{w^*(\theta)f'(w^*(\theta))}{f(w^*(\theta))} + \theta^2 f(w^*(\theta))w^{*\prime}(\theta)\right] < 0.
\end{aligned}$$

So it is sufficient to have $3 + \theta^2 f(w^*(\theta))w^{*\prime}(\theta) \geq -\frac{w^*(\theta)f'(w^*(\theta))}{f(w^*(\theta))}$ which holds trivially for all $w \leq \bar{w}$ (and thus $\theta \leq \bar{\theta}$). If $w > \bar{w}$, then it is sufficient to satisfy $3 \geq -\frac{w^*(\theta)f'(w^*(\theta))}{f(w^*(\theta))}$.
Now, given τ, consider $\tilde{w}(\theta,\tau)$. This function of θ is strictly concave (and thus strictly quasiconcave) if and only if

$$\begin{aligned}
&\frac{\partial}{\partial\theta}[-\tau w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)] \\
&= -\tau\left[w^{*\prime}(\theta)^2[f(w^*(\theta)) + w^*(\theta)f'(w^*(\theta))] + w^*(\theta)f(w^*(\theta))w^{*\prime\prime}(\theta)\right] - g''(\theta) < 0.
\end{aligned}$$

Thus, it is sufficient to have that

$$\begin{aligned}
&w^{*\prime}(\theta)^2[f(w^*(\theta)) + w^*(\theta)f'(w^*(\theta))] + w^*(\theta)f(w^*(\theta))w^{*\prime\prime}(\theta) \\
&= w^{*\prime}(\theta)^2 f(w^*(\theta))\left(1 + \frac{w^*(\theta)f'(w^*(\theta))}{f(w^*(\theta))} + 2\theta F(w^*(\theta)) + \theta^2 f(w^*(\theta))w^{*\prime}(\theta)\right) \geq 0.
\end{aligned}$$

This condition is satisfied whenever $\theta \leq \bar{\theta} \leq \theta_{mod}$ since then $f'(w^*(\theta)) \geq 0$. If $\theta > \bar{\theta}$,

$$1 + \frac{w^*(\theta) f'(w^*(\theta))}{f(w^*(\theta))} + 2\theta F(w^*(\theta)) + \theta^2 f(w^*(\theta)) w^{*\prime}(\theta) > 1 + \frac{w^*(\theta) f'(w^*(\theta))}{f(w^*(\theta))} + 2\bar{\theta} F(\bar{w})$$

so that it is sufficient to require that $-\frac{w f'(w)}{f(w)} \leq 1 + \bar{\theta}$ for all $w > \bar{w}$.

Next, consider the bordered Hessians for either function. They are given by

$$H_\varphi = \begin{bmatrix} 0 & -(1-\tau)[F(w^*(\theta)) + \theta f(w^*(\theta)) w^{*\prime}(\theta)] & -(1 - F(w^*(\theta))\theta) \\ \cdot & -(1-\tau)[2f(w^*(\theta))w^{*\prime}(\theta) + \theta f'(w^*(\theta)) w^{*\prime}(\theta)^2 + \theta f(w^*(\theta)) w^{*\prime\prime}(\theta)] & [F(w^*(\theta)) + \theta f(w^*(\theta)) w^{*\prime}(\theta)] \\ \cdot & \cdot & 0 \end{bmatrix}$$

$$H_{\tilde{w}} = \begin{bmatrix} 0 & -\tau w^*(\theta) f(w^*(\theta)) w^{*\prime}(\theta) - g'(\theta) & \int_{w^*(\theta)}^1 w f(w) dw \\ \cdot & -\tau \left[w^{*\prime}(\theta)^2 [f(w^*(\theta)) + w^*(\theta) f'(w^*(\theta))] + w^*(\theta) f(w^*(\theta)) w^{*\prime\prime}(\theta) \right] - g''(\theta) & -w^*(\theta) f(w^*(\theta)) w^{*\prime}(\theta) \\ \cdot & \cdot & 0 \end{bmatrix}$$

We are looking for sufficent conditions that imply that, for all (θ, τ), $(-1)^k Det(H_j^k) > 0$ for $k = 1, 2$ and $j = \varphi, \tilde{w}$. Clearly, for all (θ, τ),

$$\begin{aligned} (-1)^1 Det(H_\varphi^1) &= (1-\tau)^2 [F(w^*(\theta)) + \theta f(w^*(\theta)) w^{*\prime}(\theta)]^2 > 0 \\ (-1)^1 Det(H_{\tilde{w}}^1) &= [-\tau w^*(\theta) f(w^*(\theta)) w^{*\prime}(\theta) - g'(\theta)]^2 > 0. \end{aligned}$$

Then,

$$\begin{aligned} \frac{Det(H_\varphi^2)}{(1-\tau)} = (1 - F(w^*(\theta))\theta) \Big[& 2 \left(F(w^*(\theta)) + \theta f(w^*(\theta)) w^{*\prime}(\theta) \right)^2 \\ & + (1 - F(w^*(\theta))\theta)[2f(w^*(\theta)) w^{*\prime}(\theta) + \theta f'(w^*(\theta)) w^{*\prime}(\theta)^2 + \theta f(w^*(\theta)) w^{*\prime\prime}(\theta)] \Big]. \end{aligned}$$

This expression can be rewritten to equal

$$\begin{aligned} & \theta^{-1} w^*(\theta) f(w^*(\theta)) \Bigg(\theta \left[4F(w^*(\theta)) + \frac{2F(w^*(\theta))^2 (1 - F(w^*(\theta))\theta)}{w^*(\theta) f(w^*(\theta))} + \frac{w^*(\theta) f(w^*(\theta))}{(1 - F(w^*(\theta))\theta)} + \theta w^{*\prime}(\theta) f(w^*(\theta)) \right] \\ & \qquad + 2 + \frac{w^*(\theta) f'(w^*(\theta))}{f(w^*(\theta))} \Bigg) \\ & > \theta^{-1} w^*(\theta) f(w^*(\theta)) \left(4\theta F(w^*(\theta)) + 2 + \frac{w^*(\theta) f'(w^*(\theta))}{f(w^*(\theta))} \right) \end{aligned}$$

so that it is sufficient to require that $4\theta F(w^*(\theta)) + 2 + \frac{w^*(\theta) f'(w^*(\theta))}{f(w^*(\theta))} \geq 0$. This condition is satisfied whenever $\theta \leq \bar{\theta} \leq \theta_{mod}$ since then $f'(w^*(\theta)) \geq 0$. If $\theta > \bar{\theta}$, then

$$4\theta F(w^*(\theta)) + 2 + \frac{w^*(\theta) f'(w^*(\theta))}{f(w^*(\theta))} > 4\bar{\theta} F(\bar{w}) + 2 + \frac{w^*(\theta) f'(w^*(\theta))}{f(w^*(\theta))} = 2(1 + \bar{\theta}) + \frac{w^*(\theta) f'(w^*(\theta))}{f(w^*(\theta))}.$$

Thus it is sufficient to require $-\frac{wf'(w)}{f(w)} \leq 2(1+\bar{\theta})$ for all $w > \bar{w}$.

Similarly,

$$\begin{aligned}
Det(H^2_{\tilde{w}}) = &\left(\int_{w^*(\theta)}^1 wf(w)dw\right)\Bigg[-2\left(-\tau w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)\right)w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) \\
&+\left(\int_{w^*(\theta)}^1 wf(w)dw\right)\left(\tau\left[w^{*\prime}(\theta)^2[f(w^*(\theta)) + w^*(\theta)f'(w^*(\theta))] + w^*(\theta)f(w^*(\theta))w^{*\prime\prime}(\theta)\right] + g''(\theta)\right)\Bigg] \\
&> 0
\end{aligned}$$

if and only if

$$\begin{aligned}
\left(\int_{w^*(\theta)}^1 wf(w)dw\right)&\left(\tau\left[w^{*\prime}(\theta)^2[f(w^*(\theta)) + w^*(\theta)f'(w^*(\theta))] + w^*(\theta)f(w^*(\theta))w^{*\prime\prime}(\theta)\right] + g''(\theta)\right) \\
&> 2\left(-\tau w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)\right)w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta).
\end{aligned}$$

The condition $-\frac{wf'(w)}{f(w)} \leq 1+\bar{\theta}$ for all $w > \bar{w}$ is sufficient for the left hand side to always be greater than or equal to $g''(\theta)\left(\int_{w^*(\theta)}^1 wf(w)dw\right)$. Additionally, as shown above, this condition implies that, given τ, $\tilde{w}(\theta,\tau)$ is strictly quasiconcave. Thus, assumption 2 can be used to prove that $\tilde{w}(\cdot,\tau)$ has a unique maximum argument which is strictly less than $\bar{\theta}$ (see lemma 3). This implies that the right hand side is negative for all $\theta \geq \bar{\theta}$. When $\theta < \bar{\theta}$, notice further, that, under the above condition, the left hand side is increasing in τ, while the right hand side is decreasing in τ. Hence, with higher τ, this inequality is easier to satisfy. So, if it is satisfied at $\tau = 0$, then it is satisfied for all $\tau \in [0,1]$. Thus, it is sufficient to require that

$$g''(\theta)\left(\int_{w^*(\theta)}^1 wf(w)dw\right) \geq -2g'(\theta)w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta)$$

for all $\theta < \bar{\theta}$. This expression can be rewritten to yield

$$\begin{aligned}
\frac{g''(\theta)}{-g'(\theta)} &\geq \frac{2w^*(\theta)^2 f(w^*(\theta))}{\theta(1-F(w^*(\theta))\theta)\int_{w^*(\theta)}^1 wf(w)dw} \\
\frac{g''(\theta)\theta}{-g'(\theta)} &\geq \frac{2w^*(\theta)^2 f(w^*(\theta))}{\theta^{-1}w^*(\theta)(1-F(w^*(\theta))\theta)^2} \\
\frac{g''(\theta)\theta}{-g'(\theta)} &\geq \frac{2\theta w^*(\theta)f(w^*(\theta))}{(1-F(w^*(\theta))\theta)^2}
\end{aligned}$$

Since the right hand side is increasing in θ and we are concerned with $\theta < \bar{\theta}$ and $\bar{\theta} \leq \theta_{mod}$, it is sufficient to require that

$$\frac{g''(\theta)\theta}{-g'(\theta)} \geq \frac{2\bar{\theta}\bar{w}f(\bar{w})}{(1-\frac{1}{2}\bar{\theta})^2},$$

for all $\theta < \bar{\theta}$.

B The probability of winning the election

B.1 A general formulation

In this section, I provide a general formulation of the probability of winning. Letting w_i and w_{-i} be the candidates and $\sigma_i = (\theta_i, \tau_i)$ and $\sigma_{-i} = (\theta_{-i}, \tau_{-i})$ their proposals, let $P(\sigma_i, \sigma_{-i}; w_i, w_{-i}) = Prob\{w_i \text{ wins}|w_{-i}, \{(\theta_i, \tau_i), (\theta_{-i}, \tau_{-i})\}\}$ be the probability of candidate w_i, $i \in \{L, H\}$, winning the election given his opponent's productivity w_{-i}, $-i \in \{L, H\}\backslash\{i\}$, and both the regime he proposes and the one proposed by his opponent. To account for the implications of the preference shock, a bit notation needs to be introduced. Let $\mathcal{I}(\sigma_i, \sigma_{-i}) = \{w \in [0,1] : V(\sigma_i; w) = V(\sigma_{-i}; w)\}$ be the set of all agents that are indifferent between the two proposals. Similarly, let $\mathcal{I}^+(\sigma_i, \sigma_{-i}) = \{w \in [0,1] : V(\sigma_i; w) > V(\sigma_{-i}; w)\}$ and $\mathcal{I}^-(\sigma_i, \sigma_{-i}) = \{w \in [0,1] : V(\sigma_i; w) < V(\sigma_{-i}; w)\}$ be the sets of all agents that prefer proposals σ_i and σ_{-i}, respectively. Any one set can be empty and $\mathcal{I}^+(\sigma_i, \sigma_{-i}) = \mathcal{I}^-(\sigma_{-i}, \sigma_i)$. The following lemma is helpful.

Lemma 1. *The sets $\mathcal{I}(\sigma_i, \sigma_{-i})$, $\mathcal{I}^+(\sigma_i, \sigma_{-i})$, and $\mathcal{I}^-(\sigma_i, \sigma_{-i})$ are intervals.*

Proof. Consider first $\mathcal{I}(\sigma_i, \sigma_{-i})$. If $\mathcal{I}(\sigma_i, \sigma_{-i}) = \emptyset$ or $|\mathcal{I}(\sigma_i, \sigma_{-i})| = 1$, then, trivially, it is an interval. Let $|\mathcal{I}(\sigma_i, \sigma_{-i})| > 1$ and $w, w' \in \mathcal{I}(\sigma_i, \sigma_{-i})$, $w < w'$. Consider any $w'' \in (w, w')$. Suppose for a contradiction that $w'' \notin \mathcal{I}(\sigma_i, \sigma_{-i})$, i.e., $V(\sigma_i; w'') \neq V(\sigma_{-i}; w'')$. If $\theta_i = \theta_{-i}$. Suppose that $\tau_i \neq \tau_{-i}$. Since all agents choose the same occupation under either regime, $\mathcal{I}(\sigma_i, \sigma_{-i}) = \emptyset$. Thus, if $\theta_i = \theta_{-i}$, then $\tau_i = \tau_{-i}$ and $\mathcal{I}(\sigma_i, \sigma_{-i}) = [0,1]$. Suppose that $\theta_i \neq \theta_{-i}$. Without loss of generality, assume that $\theta_i < \theta_{-i}$. There are three cases, $w'' \leq w^*(\theta_i)$, $w^*(\theta_i) < w'' \leq w^*(\theta_{-i})$, and $w^*(\theta_{-i}) < w''$. If $w'' \leq w^*(\theta_i)$, then $\nu(\sigma_i) \neq \nu(\sigma_{-i})$ which, since $w < w''$, implies that $w \notin \mathcal{I}(\sigma_i, \sigma_{-i})$, a contradiction. If $w^*(\theta_{-i}) < w''$, then $\varphi(\sigma_i) \neq \varphi(\sigma_{-i})$ which, since $w'' < w'$, implies that $w' \notin \mathcal{I}(\sigma_i, \sigma_{-i})$, a contradiction. If $w^*(\theta_i) < w'' \leq w^*(\theta_{-i})$, then $\varphi(\sigma_i)w'' \neq \nu(\sigma_{-i})$. On the one hand, if $\varphi(\sigma_i)w'' < \nu(\sigma_{-i})$, then $\varphi(\sigma_i)w < \nu(\sigma_{-i})$ and $\nu(\sigma_i) < \varphi(\sigma_i)w'' < \nu(\sigma_{-i})$ so that $V(\sigma_{-i}; w) = \nu(\sigma_{-i}) > \max\{\varphi(\sigma_i)w, \nu(\sigma_i)\} = V(\sigma_i; w)$. That is $w \notin \mathcal{I}(\sigma_i, \sigma_{-i})$, a contradiction. On the other hand, if $\varphi(\sigma_i)w'' > \nu(\sigma_{-i})$, then $\varphi(\sigma_i)w' > \nu(\sigma_{-i})$. Since $w, w' \in \mathcal{I}(\sigma_i, \sigma_{-i})$, it has to hold that $\varphi(\sigma_i) = \varphi(\sigma_{-i})$ and $\nu(\sigma_i) = \nu(\sigma_{-i})$ which implies that $w^*(\theta_i) = w^*(\theta_{-i})$. Since w^* is strictly increasing on $(0,1)$, $\theta_i = \theta_{-i}$, a contradiction. Therefore, by contradiction, $w'' \in \mathcal{I}(\sigma_i, \sigma_{-i})$ and $\mathcal{I}(\sigma_i, \sigma_{-i})$ is an interval.
Consider next $\mathcal{I}^+(\sigma_i, \sigma_{-i})$. If $\mathcal{I}^+(\sigma_i, \sigma_{-i}) = \emptyset$ or $|\mathcal{I}^+(\sigma_i, \sigma_{-i})| = 1$, then, trivially, it is an interval. Let $|\mathcal{I}^+(\sigma_i, \sigma_{-i})| > 1$. Suppose that $\theta_i = \theta_{-i}$. If $\tau_i = \tau_{-i}$, then $\mathcal{I}(\sigma_i, \sigma_{-i}) = [0,1]$ and, thus, $\mathcal{I}^+(\sigma_i, \sigma_{-i}) = \emptyset$. If $\tau_i > \tau_{-i}$, then $\mathcal{I}^-(\sigma_i, \sigma_{-i}) = [0,1]$ and, thus, $\mathcal{I}^+(\sigma_i, \sigma_{-i}) = \emptyset$. If $\tau_i < \tau_{-i}$, then $\mathcal{I}^+(\sigma_i, \sigma_{-i}) = [0,1]$. Suppose that $\theta_i \neq \theta_{-i}$. Assume that $w, w' \in \mathcal{I}^+(\sigma_i, \sigma_{-i})$, $w < w'$, and consider $w'' \in (w, w')$. Suppose for a contradiction that $w'' \notin \mathcal{I}^+(\sigma_i, \sigma_{-i})$, i.e., $V(\sigma_i; w'') \leq V(\sigma_{-i}; w'')$. If $\theta_i < \theta_{-i}$, then there are three case, $w'' \leq w^*(\theta_i)$, $w^*(\theta_i) < w'' \leq w^*(\theta_{-i})$, and $w^*(\theta_{-i}) < w''$. If $w'' \leq w^*(\theta_i)$, then $w < w'' \leq w^*(\theta_i) <$

$w^*(\theta_{-i})$, so that $w'' \notin \mathcal{I}^+(\sigma_i, \sigma_{-i})$ implies that $w \notin \mathcal{I}^+(\sigma_i, \sigma_{-i})$, a contradiction. If $w^*(\theta_{-i}) < w''$, then $w^*(\theta_i) < w^*(\theta_{-i}) < w'' < w'$, so that $w'' \notin \mathcal{I}^+(\sigma_i, \sigma_{-i})$ implies that $w' \notin \mathcal{I}^+(\sigma_i, \sigma_{-i})$, a contradiction. If $w^*(\theta_i) < w'' \leq w^*(\theta_{-i})$, then $\varphi(\sigma_i)w < \varphi(\sigma_i)w'' \leq \nu(\sigma_{-i})$ and $\nu(\sigma_i) < \varphi(\sigma_i)w'' \leq \nu(\sigma_{-i})$. That is, $V(\sigma_{-i}; w) \geq \nu(\sigma_{-i}) > \max\{\varphi(\sigma_i)w, \nu(\sigma_i)\} = V(\sigma_i; w)$, which implies $w \notin \mathcal{I}^+(\sigma_i, \sigma_{-i})$, a contradiction. If $\theta_{-i} < \theta_i$, then $w'' \leq w^*(\theta_{-i})$, $w^*(\theta_{-i}) < w'' \leq w^*(\theta_i)$, or $w^*(\theta_i) < w''$. If $w'' \leq w^*(\theta_{-i})$, then $w < w'' \leq w^*(\theta_{-i}) < w^*(\theta_i)$ and $w'' \notin \mathcal{I}^+(\sigma_i, \sigma_{-i})$ implies $w \notin \mathcal{I}^+(\sigma_i, \sigma_{-i})$, a contradiction. If $w^*(\theta_i) < w''$, then $w^*(\theta_{-i}) < w^*(\theta_i) < w'' < w'$ and $w'' \notin \mathcal{I}^+(\sigma_i, \sigma_{-i})$ implies $w' \notin \mathcal{I}^+(\sigma_i, \sigma_{-i})$, a contradiction. If $w^*(\theta_{-i}) < w'' \leq w^*(\theta_i)$, then $\varphi(\sigma_i)w'' \leq \nu(\sigma_i) \leq \varphi(\sigma_{-i})w'' < \varphi(\sigma_{-i})w'$ so that $\varphi(\sigma_i) \leq \varphi(\sigma_{-i})$ and $\nu(\sigma_i) < \varphi(\sigma_{-i})w'$. That is, $V(\sigma_{-i}; w') \geq \varphi(\sigma_{-i})w' \geq \max\{\varphi(\sigma_i)w', \nu(\sigma_i)\} = V(\sigma_i; w')$ which contradicts $w' \in \mathcal{I}^+(\sigma_i, \sigma_{-i})$. Therefore, by contradiction, $w'' \in \mathcal{I}^+(\sigma_i, \sigma_{-i})$ and $\mathcal{I}^+(\sigma_i, \sigma_{-i})$ is an interval. Since $\mathcal{I}^-(\sigma_i, \sigma_{-i}) = \mathcal{I}^+(\sigma_{-i}, \sigma_i)$, this completes the proof. Q.E.D.

Let $\mathcal{M}(\sigma_i, \sigma_{-i}) \equiv F(\sup \mathcal{I}(\sigma_i, \sigma_{-i})) - F(\inf \mathcal{I}(\sigma_i, \sigma_{-i}))$ be the measure of the set of agents that are indifferent between the two proposals. Define $\mathcal{M}^+(\sigma_i, \sigma_{-i})$ and $\mathcal{M}^-(\sigma_i, \sigma_{-i})$ analogously. Additionally, define

$$T(w_i) = \{\sigma \in [0,1]^2 : \forall \sigma' \in [0,1]^2$$
$$\Big((\mathcal{M}^+(\sigma', \sigma) + \frac{1}{2}\mathcal{M}(\sigma', \sigma) \geq \frac{1}{2}) \Rightarrow (\tilde{w}(\sigma'; w_i) < V(\sigma; w_i))\Big)\}$$

to be the set of regimes σ for which any platform σ' that could win the election for candidate w_i without the preference shock offers him a worse in-office payoff than the payoff of losing. Then, $\mathcal{T}^+(w_i, w_{-i}) = \{(\sigma, \sigma') \in [0,1]^4 : \sigma \notin T(w_{-i}), \sigma' \in T(w_i)\}$ is the set of sets of proposals where the preference shock favors candidate w_i, $\mathcal{T}^-(w_i, w_{-i}) = \{(\sigma, \sigma') \in [0,1]^4 : \sigma \in T(w_{-i}), \sigma' \notin T(w_i)\}$ is the set of sets of proposals where the preference shock favors candidate w_{-i}, while $\mathcal{T}(w_i, w_{-i}) = (\mathcal{T}^+(w_i, w_{-i}) \cup \mathcal{T}^-(w_i, w_{-i}))^c = [0,1]^4 - (\mathcal{T}^+(w_i, w_{-i}) \cup \mathcal{T}^-(w_i, w_{-i}))$ is the set of proposals where the preference shock is neutral. Then, for all $\varepsilon \geq 0$, the probability of w_i's proposal σ_i winning over w_{-i}'s proposal σ_{-i} is given by $Prob\{w_i \text{ wins} | w_{-i}, \{(\theta_i, \tau_i), (\theta_{-i}, \tau_{-i})\}\} = P(\sigma_i, \sigma_{-i}; w_i, w_{-i}) =$

$$
(15) \quad \begin{cases}
1 & \text{if } (\mathcal{M}^+(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) > \frac{1}{2}) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}(w_i,w_{-i})),\\
1 & \text{if } (\mathcal{M}^+(\sigma_i,\sigma_{-i}) > \frac{1}{2}),\\
1 & \text{if } (\mathcal{M}^+(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) > \frac{1}{2}) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}^+(w_i,w_{-i})),\\
1-\frac{1}{2}\varepsilon & \text{if } (\mathcal{M}^+(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) > \frac{1}{2} = \mathcal{M}^+(\sigma_i,\sigma_{-i})) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}^-(w_i,w_{-i})),\\
1-\varepsilon & \text{if } (\mathcal{M}^+(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) > \frac{1}{2} > \mathcal{M}^+(\sigma_i,\sigma_{-i})) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}^-(w_i,w_{-i})),\\
\frac{1}{2}(1+\varepsilon) & \text{if } (\mathcal{M}^+(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) = \frac{1}{2}) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}^+(w_i,w_{-i})),\\
\frac{1}{2} & \text{if } (\mathcal{M}^+(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) = \frac{1}{2}) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}(w_i,w_{-i})),\\
\frac{1}{2}(1-\varepsilon) & \text{if } (\mathcal{M}^+(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) = \frac{1}{2}) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}^-(w_i,w_{-i})),\\
\varepsilon & \text{if } (\mathcal{M}^-(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) > \frac{1}{2} > \mathcal{M}^-(\sigma_i,\sigma_{-i})) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}^+(w_i,w_{-i})),\\
\frac{1}{2}\varepsilon & \text{if } (\mathcal{M}^-(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) > \frac{1}{2} = \mathcal{M}^-(\sigma_i,\sigma_{-i})) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}^+(w_i,w_{-i})),\\
0 & \text{if } (\mathcal{M}^-(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) > \frac{1}{2}) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}^-(w_i,w_{-i})),\\
0 & \text{if } (\mathcal{M}^-(\sigma_i,\sigma_{-i}) > \frac{1}{2}),\\
0 & \text{if } (\mathcal{M}^+(\sigma_i,\sigma_{-i}) + \frac{1}{2}\mathcal{M}(\sigma_i,\sigma_{-i}) < \frac{1}{2}) \wedge ((\sigma_i,\sigma_{-i}) \in \mathcal{T}(w_i,w_{-i})).
\end{cases}
$$

B.2 The specific formulation given intermediate results

In this section, I report the specific function that assigns probabilities of winning the election which I derive from lemma 4 in appendix E. If $\tilde{w}^*(w_i,\varphi_i) \geq V(\theta_{-i},\tau_{-i};w_i)$ for all $i \in \{L,H\}$ or $\tilde{w}^*(w_i,\varphi_i) < V(\theta_{-i},\tau_{-i};w_i)$ for all $i \in \{L,H\}$, then

$$
(16) \qquad P(\sigma_i,\sigma_{-i};w_i,w_{-i}) = \begin{cases}
1 & \text{if } V(\theta_i,\tau_i;\bar{w}) > V(\theta_{-i},\tau_{-i};\bar{w})\\
1 & \text{if } V(\theta_i,\tau_i;\bar{w}) = V(\theta_{-i},\tau_{-i};\bar{w}) \text{ and } \theta_{-i} < \theta_i \leq \bar{\theta}\\
1 & \text{if } V(\theta_i,\tau_i;\bar{w}) = V(\theta_{-i},\tau_{-i};\bar{w}) \text{ and } \bar{\theta} \leq \theta_i < \theta_{-i}\\
\frac{1}{2} & \text{if } V(\theta_i,\tau_i;\bar{w}) = V(\theta_{-i},\tau_{-i};\bar{w}) \text{ and } \theta_i = \theta_{-i}\\
\frac{1}{2} & \text{if } V(\theta_i,\tau_i;\bar{w}) = V(\theta_{-i},\tau_{-i};\bar{w}) \text{ and } \theta_{-i} < \bar{\theta} < \theta_i\\
\frac{1}{2} & \text{if } V(\theta_i,\tau_i;\bar{w}) = V(\theta_{-i},\tau_{-i};\bar{w}) \text{ and } \theta_i < \bar{\theta} < \theta_{-i}\\
0 & \text{if } V(\theta_i,\tau_i;\bar{w}) < V(\theta_{-i},\tau_{-i};\bar{w})\\
0 & \text{if } V(\theta_i,\tau_i;\bar{w}) = V(\theta_{-i},\tau_{-i};\bar{w}) \text{ and } \theta_i < \theta_{-i} \leq \bar{\theta}\\
0 & \text{if } V(\theta_i,\tau_i;\bar{w}) = V(\theta_{-i},\tau_{-i};\bar{w}) \text{ and } \bar{\theta} \leq \theta_{-i} < \theta_i.
\end{cases}
$$

If $\tilde{w}^*(w_i, \varphi_i) < V(\theta_{-i}, \tau_{-i}; w_i)$ and $\tilde{w}^*(w_{-i}, \varphi_{-i}) \geq V(\theta_i, \tau_i; w_{-i})$, then

$$(17) \qquad P(\sigma_i, \sigma_{-i}; w_i, w_{-i}) = \begin{cases} 1 & \text{if } V(\theta_i, \tau_i; \bar{w}) > V(\theta_{-i}, \tau_{-i}; \bar{w}) \\ 1 & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_{-i} < \theta_i \leq \bar{\theta} \\ 1 & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \bar{\theta} \leq \theta_i < \theta_{-i} \\ \frac{1}{2}(1+\varepsilon) & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_i = \theta_{-i} \\ \frac{1}{2} & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_{-i} < \bar{\theta} < \theta_i \\ \frac{1}{2} & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_i < \bar{\theta} < \theta_{-i} \\ 0 & \text{if } V(\theta_i, \tau_i; \bar{w}) < V(\theta_{-i}, \tau_{-i}; \bar{w}) \\ 0 & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_i < \theta_{-i} \leq \bar{\theta} \\ 0 & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \bar{\theta} \leq \theta_{-i} < \theta_i. \end{cases}$$

If $\tilde{w}^*(w_i, \varphi_i) \geq V(\theta_{-i}, \tau_{-i}; w_i)$ and $\tilde{w}^*(w_{-i}, \varphi_{-i}) < V(\theta_i, \tau_i; w_{-i})$, then

$$(18) \qquad P(\sigma_i, \sigma_{-i}; w_i, w_{-i}) = \begin{cases} 1 & \text{if } V(\theta_i, \tau_i; \bar{w}) > V(\theta_{-i}, \tau_{-i}; \bar{w}) \\ 1-\varepsilon & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_{-i} < \theta_i < \bar{\theta} \\ 1-\varepsilon & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \bar{\theta} < \theta_i < \theta_{-i} \\ 1-\frac{1}{2}\varepsilon & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_{-i} < \theta_i = \bar{\theta} \\ 1-\frac{1}{2}\varepsilon & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \bar{\theta} = \theta_i < \theta_{-i} \\ \frac{1}{2}(1-\varepsilon) & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_i = \theta_{-i} \\ \frac{1}{2} & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_{-i} < \bar{\theta} < \theta_i \\ \frac{1}{2} & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_i < \bar{\theta} < \theta_{-i} \\ \varepsilon & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_i < \theta_{-i} < \bar{\theta} \\ \varepsilon & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \bar{\theta} < \theta_{-i} < \theta_i \\ \frac{1}{2}\varepsilon & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \theta_i < \theta_{-i} = \bar{\theta} \\ \frac{1}{2}\varepsilon & \text{if } V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) \text{ and } \bar{\theta} = \theta_{-i} < \theta_i \\ 0 & \text{if } V(\theta_i, \tau_i; \bar{w}) < V(\theta_{-i}, \tau_{-i}; \bar{w}). \end{cases}$$

C Anarchy and dictatorships

C.1 Anarchy

In order to properly define the payoffs in the selection game, I need to analyze the outcome when nobody chooses to run for office. Suppose there are no candidates for office and the "anarchy" regime prevails, i.e., $(\theta, \tau) = (1, 0)$. The problem to be considered is the one including the option of home production. The following result obtains.

Proposition 6 (Anarchy)**.** *In the anarchy equilibrium, there is a* $w^a \in [0,1]$ *such that* $w \in \Omega^c$ *for all* $w \leq w^a$ *and* $w \notin \Omega^c$ *for all* $w > w^a$*. It is characterized by* $p = 1-\alpha$, $w^a = F^{-1}(1-\alpha)$, *and* $\Xi \neq \emptyset$ *and the payoffs are given by* $V^a : [0,1] \to [0,\alpha]$,

$$V^a(w) = \begin{cases} \alpha w^a & \text{if } w \leq w^a, \\ \alpha w & \text{if } w > w^a. \end{cases}$$

Proof. First, all sets Ω, Ω^c, and Ξ are nonempty. Clearly, $0 \in \Omega^c$, since $qv(1) \geq \alpha \cdot 0 = 0$ so that, by assumption, 0 chooses appropriation over both production and home production. Thus, $\Omega^c \neq \emptyset$. Suppose that $\Xi = \emptyset$, i.e., $\chi_w^\alpha = 0$ for all $w \in [0,1]$. Then, by the same argument as before, there exists a w^* such that $w \in \Omega^c$ for all $w \leq w^*$, $w \in \Omega$ for all $w > w^*$, and $(1-p)w^* = q\int_{w^*}^1 \frac{wf(w)}{1-F(w^*)}dw$ with $p = F(w^*)$ and $q = 1-F(w^*)$, so that $(1-F(w^*))w^* = \int_{w^*}^1 wf(w)dw$. Rewriting yields $w^* - 1 + \int_{w^*}^1 F(w)dw = 0$. The left hand side is $h(x;1) = x - 1 + \int_x^1 F(w)dw$ as defined before. Noting that $h(0;1) = \int_0^1 F(w)dw - 1 < 0$, $h(1;1) = 0$, and $h_x(x;1) = 1 - F(x) > 0$ for all $x < 1$, it follows that $h(x;1) = 0$ if and only if $x = 1$, i.e., $w^* = 1$. Thus, $\Omega^c = [0,1]$ and $q = 0$, so that $qv(1) = 0 < \alpha w$ for all $w > 0$. That is, this cannot be an equilibrium since agent $w > 0$ did not choose his occupation optimally. Hence, $\Xi \neq \emptyset$. Now, suppose that $\Omega = \emptyset$. Then, $q = 0$ and thus $qv(1) = 0 < \alpha w < w$ for all $w > 0$. So, $\Omega^c = \{0\}$, since agent 0 is indifferent and thus chooses to appropriate by assumption, and $p = 0$, so that $\Omega = (0,1]$ and $\Xi = \emptyset$ yielding a contradiction. Thus, $\Omega \neq \emptyset$. Next, assume that $1-p > \alpha$. Then, $(1-p)w > \alpha w$ for all $w \in (0,1]$ so that $(0,1] \cap \Xi = \emptyset$. Since $0 \in \Omega^c$, $\Xi = \emptyset$ which yields a contradiction. Suppose that $1-p < \alpha$. Then, $(1-p)w < \alpha w$ for all $w \in (0,1]$ so that $\Omega \cap (0,1] = \emptyset$. Since $0 \in \Omega^c$, $\Omega = \emptyset$, which yields a contradiction. Therefore, $1-p = \alpha$.
Next, define w^a to satisfy $(1-p)w^a = \alpha w^a = qv(1)$. Consider any agent $w < w^a$. Then, $(1-p)w = \alpha w < (1-p)w^a = qv(1)$ and $w \in \Omega^c$. Consider any agent $w > w^a$. Then, $(1-p)w = \alpha w > (1-p)w^a = qv(1)$ and $w \notin \Omega^c$. It follows that, if $w \leq w^a$, then $w \in \Omega^c$ and $V^a(w) = qv(1) = (1-p)w^a = \alpha w^a$ while, if $w > w^a$, then $w \in (\Omega \cup \Xi)$ and $V^a(w) = (1-p)w = \alpha w$. Finally, $\Omega^c = [0, w^a]$ and $\omega^c = F(w^a)$. Since $1-\alpha = p = \omega^c$, it follows that $w^a = F^{-1}(1-\alpha)$. Q.E.D.

The anarchy equilibrium is determined by the economic fundamentals. There is an interval $[0, w^a]$ of agents that choose to be appropriators. Agents with a productivity greater than w^a are distributed between production and home production so that the probability of being expropriated is such that they are indifferent between being producers or home producers. All agents get a payoff less than or equal to α, strictly smaller when the productivity is less than 1. Let $\mathcal{W}^a = \mathcal{W}(1,0)$ denote welfare under anarchy. Then, it is given by $\mathcal{W}^a = \alpha\left(1 - \int_{w^a}^1 F(w)dw\right)$.

C.2 A dictator

Similarly, I need to analyze the dictator outcome. Suppose for the moment that, in the beginning of the period, only one agent selects himself into running. Then this agent becomes a dictator and maximizes his payoff by choosing (θ, τ). He has to observe a participation constraint that simplifies to $(1-\theta F(w^*(\theta)))(1-\tau) \geq \alpha$. If $(1-\theta F(w^*(\theta)))(1-\tau) < \alpha$, then all agents prefer producing at home over producing in the market. Observing the constraint ensures positive production.[46] Thus, the dictator solves problem (P) with $\bar{\varphi} = \alpha$. Let (θ_D, τ_D) denote the solution and let $w^d = w^*(\theta_D)$.

Proposition 7 (Dictatorship)**.** *There is a unique dictator equilibrium regime (θ_D, τ_D) and it solves*

$$\zeta_1(\theta_D) = \zeta_2(\theta_D) \tag{19}$$

$$\tau_D = 1 - \alpha(1 - F(w^*(\theta_D))\theta_D)^{-1}, \tag{20}$$

where

$$\zeta_1(\theta) = -w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta) \quad \textit{and} \quad \zeta_2(\theta) = \frac{\alpha\theta^{-1}w^*(\theta)F(w^*(\theta))}{(1 - F(w^*(\theta))\theta)}.$$

θ_D satisfies $\theta_D < \bar{\theta}$. A higher value of α improves both institutions and taxpayers' welfare. Moreover, payoffs are given by $V^d : [0,1] \to [0, \alpha]$,

$$V^d(w) = \begin{cases} \alpha w^d & \text{if } w \leq w^d, \\ \alpha w & \text{if } w > w^d. \end{cases}$$

Egalitarian welfare is given by $\mathcal{W}^d = \alpha\left(1 - \int_{w^d}^1 F(w)dw\right)$. If $\alpha \leq \frac{1}{2}$, then welfare is higher under anarchy than under dictatorship, i.e., $\mathcal{W}^a > \mathcal{W}^d$.

Proof. By lemma 2, the unique solution to the dictator's problem solves

$$(1 - F(w^*(\theta))\theta)(1 - \tau) = \alpha$$
$$-\tau w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta) = \theta^{-1}w^*(\theta)[F(w^*(\theta)) + \theta f(w^*(\theta))w^{*\prime}(\theta)](1 - \tau).$$

The first equation implies $\tau(\theta; \alpha) = 1 - \frac{\alpha}{(1-F(w^*(\theta))\theta)}$ and $1 - \tau(\theta; \alpha) = \frac{\alpha}{(1-F(w^*(\theta))\theta)}$, so that the second equation can be rewritten to

$$-\frac{(1 - F(w^*(\theta))\theta) - \alpha}{(1 - F(w^*(\theta))\theta)}w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)$$
$$= \theta^{-1}w^*(\theta)[F(w^*(\theta)) + \theta f(w^*(\theta))w^{*\prime}(\theta)]\frac{\alpha}{(1 - F(w^*(\theta))\theta)}$$

[46] Here, the tie breaking rule makes it necessary to require $\alpha > 0$. Suppose $\alpha = 0$. Then, the participation constraint reads $(1 - \theta F(w^*(\theta)))(1 - \tau) \geq 0$ and is satisfied trivially. If the constraint holds with equality, then nobody produces since $q\nu(\theta, \tau) \geq 0$ and, by assumption, if indifferent between production and appropriation, agents choose appropriation. So, the constraint needs to be slack for production of appropriable resources to take place. That is, the participation constraint actually is $(1 - \theta F(w^*(\theta)))(1 - \tau) > 0$. However, for any $\epsilon > 0$, if $(1 - \theta F(w^*(\theta)))(1 - \tau) = \epsilon$, then increasing the tax τ slightly such that the strict inequality still holds would increase the in-office payoff. Thus, a solution does not exist.

or

$$-w^*(\theta_D)f(w^*(\theta_D))w^{*\prime}(\theta_D) - g'(\theta_D) = \frac{\alpha\theta_D^{-1}w^*(\theta_D)F(w^*(\theta_D))}{(1-F(w^*(\theta_D))\theta_D)} \tag{21}$$

To simplify notation, define

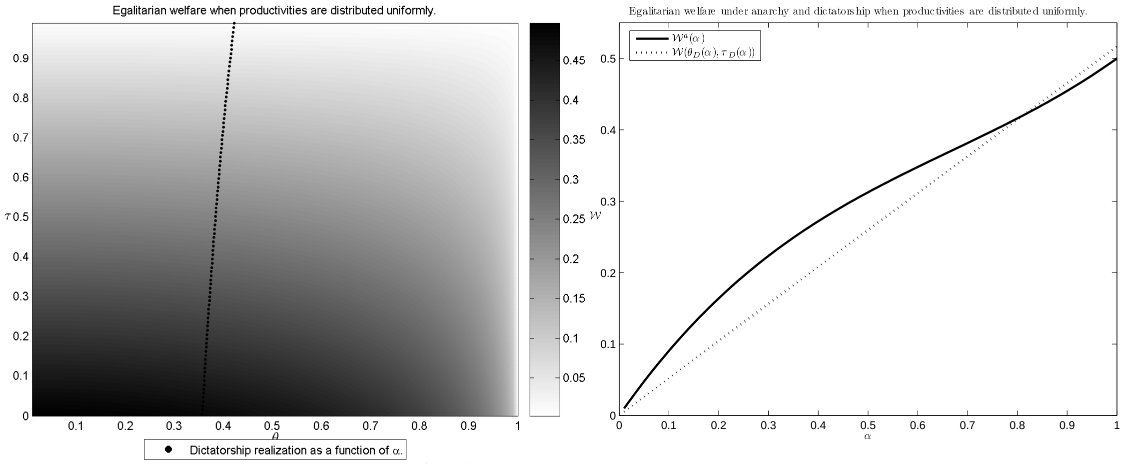
$$\zeta_1(\theta) = -w^*(\theta_D)f(w^*(\theta_D))w^{*\prime}(\theta_D) - g'(\theta_D)$$
$$\zeta_2(\theta) = \frac{\alpha\theta_D^{-1}w^*(\theta_D)F(w^*(\theta_D))}{(1-F(w^*(\theta_D))\theta_D)}.$$

Notice that, given w_D, $\zeta_1(\theta) \geq 0$ for all $\theta \leq \hat{\theta}(1)$, strictly so if $\theta < \hat{\theta}(1)$, and $\zeta_1(\theta) < 0$ for all $\theta > \hat{\theta}(1)$. It is strictly decreasing for all $\theta < \hat{\theta}(1)$. As to ζ_2, the denominator is decreasing in θ, while the nominator is increasing in θ. Thus, $\zeta_2(\theta) > 0$ for all $\theta \in (0,1)$ and is strictly increasing in θ. This implies that there is a unique intersection of $\zeta_1(\theta)$ and $\zeta_2(\theta)$ at some $\theta < \hat{\theta}(1)$. Denote it by θ_D. Given that θ_D is unique, so is $\tau_D = \tau(\theta_D;\alpha) = 1 - \frac{\alpha}{(1-F(w^*(\theta_D))\theta_D)}$.
The first order conditions imply that $(1-F(w^*(\theta_D))\theta_D)(1-\tau_D) = \alpha$. Obviously, a higher α increases expected payoffs for tax payers. As to enforcement, $\frac{\partial\zeta_1(\theta)}{\partial\alpha} = 0$ while $\frac{\partial\zeta_2(\theta)}{\partial\alpha} > 0$ whenever $\theta > 0$ so that θ_D decreases with α.
If $w \leq w^d$, then w is an appropriator and gets $V^d(w) = \theta_D(1-\tau_D)\int_{w^d}^1 wf(w)dw = (1-\tau_D)(1-F(w^*(\theta_D))\theta_D)w^d = \alpha w^d$. If $w > w^d$, then w is a producer and gets $V^d(w) = (1-\tau_D)(1-F(w^*(\theta_D))\theta_D)w = \alpha w$.
Welfare is defined as before so that $\mathcal{W}^d = \alpha\left(1-\int_{w^d}^1 F(w)dw\right)$. If $\alpha \leq \frac{1}{2}$, then $w^a \geq \bar{w} > w^d$, while again $\alpha\left(1-\int_x^1 F(w)dw\right)$ is strictly increasing in x. So $\mathcal{W}^a > \mathcal{W}^d$. Q.E.D.

That is, the regime in a dictatorship is determined by the economic fundamentals. The condition $\alpha \leq \frac{1}{2}$ is sufficient for the welfare comparison result. Since I assume that α is small, generically, anarchy provides for higher welfare than dictatorship. Figure 4 depicts the welfare function and compares welfare under anarchy and dictatorship. Panel 4(a) plots the value of the egalitarian welfare function for all combinations (θ,τ). The doted line depicts the (θ,τ)-realizations under dictatorship as functions of the value α of the outside option. A better outside option, a higher α, increses welfare. Panel 4(b) compares welfare under anarchy and dictatorship depending on α. Under dictatorship, when $\alpha = 1$, welfare is greater than 0.5. This derives from the fact that the tax would have to be a subsidy to ensure participation in this case (see appendix D). Clearly, no dictator would ever choose to pay both the cost for enforcement and a subsidy. In fact, this is not feasible.

D A simple example economy

In this section, I lay out the details for an example economy. I assume that F is uniform over $[0,1]$ so that $F(w) = w$ and $f(w) = 1$ and that the cost function is given by $g(\theta) = 0.01\left(1+\theta^{-\frac{3}{2}}\right)$ when $\theta < 1$ and $g(1) = 0$. That is, there is a fixed cost of 0.02. Figure 5 depicts the class of cost functions g belongs to. Notice that $\bar{w} = \frac{1}{2}$ and $\bar{\theta} = \bar{w}(1-\int_{\bar{w}}^1 F(w)dw)^{-1} =$



(a) Egalitarian welfare given (θ, τ).

(b) Egalitarian anarchy and dictatorship welfare.

Figure 4: Egalitarian welfare in the example economy ignoring the office holder.

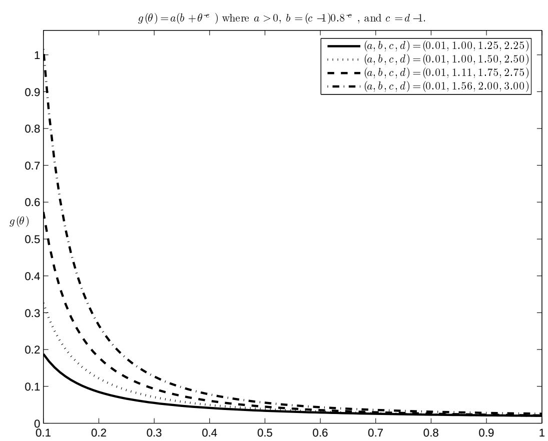


Figure 5: Example functions $g(\theta)$ that satisfy assumption 2 when productivities are distributed uniformly.

$\frac{1}{2}(1 - \int_{\frac{1}{2}}^{1} w dw)^{-1} = \frac{4}{5}$.

Claim 1. *F and g jointly satisfy assumption 2.*

Proof. F has to satisfy $\left(\int_{\bar{w}}^{1} wf(w)dw\right)^2 \leq \bar{w}^2 f(\bar{w})\left(1 - \int_{\bar{w}}^{1} F(w)dw\right)$ which due to F being uniform on $[0, 1]$ simplifies to $\left(\int_{\frac{1}{2}}^{1} wdw\right)^2 \leq \frac{1}{4}\left(1 - \int_{\frac{1}{2}}^{1} wdw\right)$ or $\frac{9}{2} \leq 5$ which holds true. Moreover, f satisfies equation (13) of condition 1. Next, g is strictly decreasing and strictly convex on the interior of its domain. Additionally, g has to satisfy $-\frac{g'(\bar{\theta})\bar{\theta}}{g(\bar{\theta})} \leq 1$ and $-\frac{g''(\theta)\theta}{g'(\theta)} \geq \frac{2\bar{\theta}\bar{w}f(\bar{w})}{(1-\frac{1}{2}\bar{\theta})^2}$ for all $\theta < \bar{\theta}$, where $\bar{\theta} = \bar{w}\left(1 - \int_{\bar{w}}^{1} F(w)dw\right)^{-1} = \frac{4}{5}$. Thus, these can be written as $-g'(\frac{4}{5})\frac{4}{5} \leq g(\frac{4}{5})$ and $-\frac{g''(\theta)\theta}{g'(\theta)} \geq \frac{20}{9}$. In general, consider the family of functions given by $g(\theta) = a(b + \theta^{-c})$ parameterized by (a, b, c), where a simply scales the image and let $d > 0$. Then, for the conditions to hold, (a, b, c) has to satisfy $ca\bar{\theta}^{-c} \leq a(b + \bar{\theta}^{-c})$ iff $b \geq (c-1)\bar{\theta}^{-c}$ and $\frac{c(c+1)a\theta^{-c-1}}{ca\theta^{-c-1}} \geq d$ iff $c \geq d - 1$. Now, letting $d = \frac{20}{9}$, $c = \frac{3}{2} \geq \frac{11}{9} = d - 1$ and $b = 1 \geq \frac{1}{2}\left(\frac{5}{4}\right)^{\frac{3}{2}} \approx 0.7$ are satisfied. Q.E.D.

In the following, I basically list the model outcome without further elaboration.

The underlying economy given (θ, τ) The function h is given by $h(x; \theta) = \theta^{-1}x - 1 + \int_x^1 w dw = \frac{1}{2}(2\theta^{-1}x - 1 - x^2)$. Thus, given $\theta \in [0, 1]$, $w^*(\theta)$ solves $x^2 - 2\theta^{-1}x + 1 = 0$ and, since $w^*(\theta) \in [0, 1]$, we have

$$w^*(\theta) = \theta^{-1} - (\theta^{-2} - 1)^{\frac{1}{2}}.$$

The implied payoff functions are

$$\begin{aligned}
&\varphi(\theta, \tau) = (1-\tau)(1 - w^*(\theta)\theta) = (1-\tau)(1-\theta^2)^{\frac{1}{2}} \\
&\nu(\theta, \tau) = (1-\tau)\theta \int_{w^*(\theta)}^1 w dw = (1-\tau)\frac{1}{2}\theta(1 - w^*(\theta)^2) = (1-\tau)[(\theta^{-2}-1)^{\frac{1}{2}} - \theta(\theta^{-2}-1)] \\
&V(\theta, \tau; w') = (1-\tau)\max\{\varphi(\theta, 0)w', \nu(\theta, 0)\} \\
&\tilde{w}(\theta, \tau) = \tau \int_{w^*(\theta)}^1 w dw - g(\theta) = \frac{1}{2}\tau(1 - w^*(\theta)^2) - 0.01\left(1 + \theta^{-\frac{3}{2}}\right).
\end{aligned}$$

The economy's output is given by

$$y(\theta) = \int_{w^*(\theta)}^1 w dw = \frac{1}{2}(1 - w^*(\theta)^2).$$

The egalitarian welfare function for generic citizens is

$$\mathcal{W}(\theta, \tau) = \varphi(\theta, \tau)\left(1 - \int_{w^*(\theta)}^1 w dw\right) = (1-\tau)[1 - \theta^{-2} + \theta^{-1}(\theta^{-2} - 1)^{\frac{1}{2}}].$$

In case of anarchy, $w^a = 1 - \alpha$ and welfare is given by

$$\mathcal{W}^a(\alpha) = \alpha\left(1 - \int_{1-\alpha}^1 w dw\right) = \frac{1}{2}\alpha(1 + (1-\alpha)^2).$$

In case of dictatorship, (θ_D, τ_D) solves the equations

$$\begin{aligned}
(1+\alpha)w^*(\theta)^2 &= \frac{3}{200}\theta^{-\frac{5}{2}}\theta(1 - w^*(\theta)\theta) \\
\tau_D &= 1 - \alpha(1 - w^*(\theta_D)\theta_D)^{-1}
\end{aligned}$$

and welfare is

$$\mathcal{W}^d = (1-\tau_D)[1-\theta_D^{-2} + \theta_D^{-1}(\theta_D^{-2}-1)^{\frac{1}{2}}].$$

Note that, when $\alpha = 1$ (or close enough to 1), the tax has to be a subsidy to ensure participation. Despite not being optimal for a dictator, this case is infeasible.

The political game given w_L and w_H The pooling outcome (θ_p, τ_p) and w_p solves the system of equations

$$\begin{aligned} \Psi_1(\theta) &= \Psi_2(\theta) \\ w_p &= w^*(\theta_p) \\ \tau_p &= \frac{\theta_p \frac{1}{2}(1-w_p^2) + 0.01\left(1+\theta_p^{-\frac{3}{2}}\right)}{(1+\theta_p)\frac{1}{2}(1-w_p^2)} \end{aligned}$$

where

$$\begin{aligned} \Psi_1(\theta) &= \frac{1}{2}(1-w^*(\theta)^2) - 0.01\left(1+\theta^{-\frac{3}{2}}\right) \\ \Psi_2(\theta) &= \frac{\left(\frac{-w^*(\theta)^2}{\theta(1-w^*(\theta)\theta)} + \frac{3}{200}\theta^{-\frac{5}{2}}\right)(1+\theta)\frac{1}{2}(1-w^*(\theta)^2)}{\theta^{-1}w^*(\theta)^2}. \end{aligned}$$

Given any z, the separating outcome (θ_L, τ_L) solves the system

$$\begin{aligned} \psi_1(\theta; z) &= \psi_2(\theta; z) \\ \tau_L &= \frac{(1-w^*(\theta_L)\theta_L)z + 0.01\left(1+\theta_L^{-\frac{3}{2}}\right)}{(1-w^*(\theta_L)\theta_L)z + \frac{1}{2}(1-w^*(\theta_L)^2)} \end{aligned}$$

where

$$\begin{aligned} \psi_1(\theta) &= \Psi_1(\theta) \\ \psi_2(\theta) &= \frac{\left(\frac{-w^*(\theta)^2}{\theta(1-w^*(\theta)\theta)} + \frac{3}{200}\theta^{-\frac{5}{2}}\right)\left(\frac{1}{2}(1-w^*(\theta)^2) + (1-w^*(\theta)\theta)z\right)}{\theta^{-1}w^*(\theta)^2}. \end{aligned}$$

Finally, the enforcement implemented is given by

$$\theta^*(z) = \begin{cases} \theta_p & \text{if } z \le w_p \\ \theta_L(z) & \text{if } z > w_p. \end{cases}$$

E Proofs

In this section, I collect the proofs of the results in the text. It is organized in the same way as the analysis in section 3.

E.1 The underlying economy given a regime

Proposition 1

Proof. In any equilibrium, the marginal agent (who is an appropriator) equalizes payoffs from production and appropriation, i.e.,

$$(1-\theta F(w^*))w^* = \theta \int_{w^*}^{1} wf(w)dw. \tag{22}$$

If $\theta = 0$, then this equation has a unique solution $w^* = 0$. Letting $\theta > 0$, rewriting and integrating by parts yields

$$\theta^{-1}w^* - 1 + \int_{w^*}^{1} F(w)dw = 0. \tag{23}$$

Given F, define $h : [0,1] \times (0,1] \to \mathbb{R}$ where $h(x;\theta) = \theta^{-1}x - 1 + \int_x^1 F(w)dw$. Since F is differentiable and thus continuous, h is continuously differentiable on $(0,1) \times (0,1)$. For $\theta = 1$, we have that $h(0;1) = \int_0^1 F(w)dw - 1 < 0$, $h(1;1) = 0$, and $h_x(x;1) = 1 - F(x) > 0$ for all $x < 1$. Hence, there is a unique root $w^* = 1$. Fix $\theta \in (0,1)$. Then, $h(0;\theta) = \int_0^1 F(w)dw - 1 < 0$ while $h(1;\theta) = \theta^{-1} - 1 > 0$. By the intermediate value theorem, there is a $w^* \in (0,1)$, such that $h(w^*;\theta) = 0$. Since $h_x(x;\theta) = \theta^{-1} - F(x) > 0$, w^* is unique. Let $w^* : [0,1] \to [0,1]$ denote the solution to (22) as a function of θ. It satisfies $w^*(0) = 0$, $w^*(1) = 1$, and for all $\theta \in (0,1)$, there is a unique $w^*(\theta) \in (0,1)$, such that $h(w^*(\theta), \theta) = 0$. Since $h_x > 0$ and $h_\theta < 0$ for all $(x,\theta) \in (0,1)^2$, the assumptions of the implicit function theorem are satisfied at each $(w^*(\theta), \theta)$. Therefore, w^* is continuously differentiable on $(0,1)$ and $w^{*\prime}(\theta) = \frac{\partial w^*}{\partial \theta} = -h_\theta(x;\theta)[h_x(x;\theta)]^{-1}\big|_{x=w^*(\theta)} = -(-\theta^{-2}x)[\theta^{-1} - F(x)]^{-1}\big|_{x=w^*(\theta)} = x[\theta - \theta^2 F(x)]^{-1}\big|_{x=w^*(\theta)} = w^*(\theta)[\theta - \theta^2 F(w^*(\theta))]^{-1} > 0$ for all $\theta \in (0,1)$. Thus, $w^*(\theta)$ is strictly increasing on $(0,1)$. Notice that $w^{*\prime}(\theta)$ is differentiable on $(0,1)$. So, the second derivative exists and can be rewritten as $w^{*\prime\prime}(\theta) = w^*(\theta)[\theta - \theta^2 F(w^*(\theta))]^{-2}[2\theta F(w^*(\theta)) + \theta^2 f(w^*(\theta))w^{*\prime}(\theta)] > 0$ for all $\theta \in (0,1)$. Also, it is continuous on $(0,1)$. Thus, $w^*(\theta)$ is strictly convex on $(0,1)$.

Next, let h_i and w_i^* be the functions h and w^* derived from the underlying cumulative distribution function $F = F_i$. If F_2 is a mean preserving spread of F_1, $\int_0^1 F_1(w)dw = \int_0^1 F_2(w)dw$ and $\int_0^k F_1(w)dw \leq \int_0^k F_2(w)dw$ for all $k \in [0,1]$ which implies $\int_k^1 F_1(w)dw \geq \int_k^1 F_2(w)dw$ for all $k \in [0,1]$. Then, $h_1(x;\theta) - h_2(x;\theta) = \int_x^1 F_1(w)dw - \int_x^1 F_2(w)dw \geq 0$. That is, $w_2^*(\theta) \geq w_1^*(\theta)$.

If F_2 first order stochastically dominates F_1, $F_1(w) \geq F_2(w)$ for all $w \in [0,1]$ which directly implies $h_1(x;\theta) - h_2(x;\theta) = \int_x^1 (F_1(w) - F_2(w))dw \geq 0$. That is, $w_2^*(\theta) \geq w_1^*(\theta)$. This completes the proof. Q.E.D.

E.2 The political game given two candidates

E.2.1 Strategies, payoffs, and equilibrium definition

I first report some intermediate results that are helpful in the proofs below.

Lemma 2. *Problem (P) has a unique solution (θ, τ) that solves the system of two equations in two unknowns given by*

$$(1 - F(w^*(\theta))\theta)(1-\tau) = \bar{\varphi}$$
$$-\tau w^*(\theta) f(w^*(\theta)) w^{*\prime}(\theta) - g'(\theta) = \theta^{-1} w^*(\theta)[F(w^*(\theta)) + \theta f(w^*(\theta)) w^{*\prime}(\theta)](1-\tau).$$

Proof. By assumption, both $\tilde{w}(\theta, \tau)$ and $\varphi(\theta, \tau)$ are continuous and strictly quasiconcave in (θ, τ). The constraint set $\{(\theta, \tau) : \varphi(\theta, \tau) \geq \bar{\varphi}\}$ is a compact and convex subset of $\mathbb{R}^2$. Slater's condition is satisfied whenever $\bar{\varphi} < 1$. Thus, by the Kuhn-Tucker Theorem, the necessary and sufficient conditions for the unique solution are given by

$$\int_{w^*(\theta)}^1 w f(w) dw - \lambda(1 - F(w^*(\theta))\theta) = 0,$$
$$-\tau w^*(\theta) f(w^*(\theta)) w^{*\prime}(\theta) - g'(\theta) - \lambda[F(w^*(\theta)) + \theta f(w^*(\theta)) w^{*\prime}(\theta)](1-\tau) = 0,$$
$$\lambda \geq 0,\ [(1 - F(w^*(\theta))\theta)(1-\tau) - \bar{\varphi}] \geq 0,\ \lambda[(1 - F(w^*(\theta))\theta)(1-\tau) - \bar{\varphi}] = 0,$$

implying that $\lambda = (1 - F(w^*(\theta))\theta)^{-1} \int_{w^*(\theta)}^1 w f(w) dw = \theta^{-1} w^*(\theta) > 0$. Combining gives the system of equations. Q.E.D.

Lemma 3 (Payoffs)**.** *The payoffs in the different occupations satisfy the following.*

1. *Given any tax $\tau \in (0,1)$, there exists a $\hat{\theta}(\tau) \in [0,1]$, such that the office holder's payoff increases in θ whenever $\theta < \hat{\theta}(\tau)$ and decreases in θ whenever $\theta > \hat{\theta}(\tau)$. If $\tilde{w} > 0$, then $\hat{\theta}(\tau) < \bar{\theta}$. Moreover, $\hat{\theta}_\tau(\tau) < 0$.*

2. *Given any $\tau \in (0,1)$, there exists a $\hat{\hat{\theta}} \in [0, \bar{\theta}]$, such that an appropriator's payoff increases in θ whenever $\theta < \hat{\hat{\theta}}$ and decreases in θ whenever $\theta > \hat{\hat{\theta}}$.*

3. *Any producer's payoff is strictly decreasing in both θ and τ.*

Proof. 1. Given any $\tau \in (0,1)$, $\tilde{w}$ as defined by (5) is strictly quasiconcave in θ. Thus, the optimization problem $\max_{\theta \in [0,1]} \tau \int_{w^*(\theta)}^1 w f(w) dw - g(\theta)$ has a unique solution. That is, one can define $\hat{\theta} \equiv \arg\max_{\theta \in [0,1]} \tau \int_{w^*(\theta)}^1 w f(w) dw - g(\theta)$. Then, $\hat{\theta}$ satisfies $\tau w^*(\hat{\theta})^2 f(w^*(\hat{\theta}))[\hat{\theta}(1 - \hat{\theta} F(w^*(\hat{\theta})))]^{-1} = -g'(\hat{\theta})$. In order to show that $\hat{\theta} < \bar{\theta}$, it has to hold that the first order condition evaluated at $\bar{\theta}$ is negative, i.e., $\tau \bar{w}^2 f(\bar{w}) \bar{\theta}^{-1} [1 - \bar{\theta}\frac{1}{2}]^{-1} > -g'(\bar{\theta})$. Since $\tilde{w} > 0$, $\tau > g(\hat{\theta})(\int_{w^*(\hat{\theta})}^1 w f(w) dw)^{-1}$ has to hold. Then, it is sufficient to show that $g(\bar{\theta})(\int_{\bar{w}}^1 w f(w) dw)^{-1} \bar{w}^2 f(\bar{w})[1 - \bar{\theta}\frac{1}{2}]^{-1} \geq -g'(\bar{\theta})\bar{\theta}$. Since $-g'(\bar{\theta})\bar{\theta}/g(\bar{\theta}) \leq 1$, it is sufficient to show that $(\int_{\bar{w}}^1 w f(w) dw)^{-1} \bar{w}^2 f(\bar{w})[1 - \bar{\theta}\frac{1}{2}]^{-1} \geq 1$. That is, $\bar{w}^2 f(\bar{w}) \geq (\int_{\bar{w}}^1 w f(w) dw)[1 - \bar{\theta}\frac{1}{2}]$. Using the definition of $\bar{\theta}$, we have $\bar{w}^2 f(\bar{w}) \geq (\int_{\bar{w}}^1 w f(w) dw)[1 - \frac{1}{2}\bar{w}(1 - \int_{\bar{w}}^1 F(w) dw)^{-1}]$ or $\bar{w}^2 f(\bar{w})(1 - \int_{\bar{w}}^1 F(w) dw) \geq (\int_{\bar{w}}^1 w f(w) dw)[1 - \int_{\bar{w}}^1 F(w) dw - \frac{1}{2}\bar{w}]$. By integration by parts, $\int_{\bar{w}}^1 w f(w) dw = 1 - \frac{1}{2}\bar{w} - \int_{\bar{w}}^1 F(w) dw$. Then, assumption 2 establishes the first part of the result. For the second part, rewrite the first order condition as $\tau w^*(\hat{\theta}) f(w^*(\hat{\theta})) w^{*\prime}(\hat{\theta}) = -g'(\hat{\theta})$. This equation implicitly defines a well-behaved function $\hat{\theta}$ with argument τ. Since $w^{*\prime}(\hat{\theta}) > 0$, $w^{*\prime\prime}(\hat{\theta}) > 0$, the distribution is unimodal, the mode greater than or equal to the median, and as shown, $w^*(\hat{\theta}) \leq \bar{w}$, the left-hand side of this expression (weakly) increases in $\hat{\theta}$. Since $g''(\theta) > 0$, $-g'(\hat{\theta})$ decreases in $\hat{\theta}$. Thus, an increase in τ a decrease in $\hat{\theta}$ for this condition to be satisfied.

2. Given any $\tau \in (0,1)$, the function $\nu(\theta,\tau) = (1-\tau)\theta \int_{w^*(\theta)}^{1} wf(w)dw$ is strictly quasiconcave in θ. Thus, the optimization problem $\max_{\theta\in[0,1]}(1-\tau)\theta \int_{w^*(\theta)}^{1} wf(w)dw$ has a unique solution. Define $\hat{\hat{\theta}} = \arg\max_{\theta\in[0,1]}(1-\tau)\theta \int_{w^*(\theta)}^{1} wf(w)dw$. Then, $\hat{\hat{\theta}}$ satisfies $[1-F(w^*(\theta))\theta] \int_{w^*(\theta)}^{1} wf(w)dw = w^*(\theta)^2 f(w^*(\theta))$. Suppose for a contradiction that $\hat{\hat{\theta}} > \bar{\theta}$. Then, the first order condition evaluated at $\bar{\theta}$ satisfies $[1-F(w^*(\bar{\theta}))\bar{\theta}] \int_{w^*(\bar{\theta})}^{1} wf(w)dw > w^*(\bar{\theta})^2 f(w^*(\bar{\theta}))$ or $[1-\frac{1}{2}\bar{\theta}] \int_{\bar{w}}^{1} wf(w)dw > \bar{w}^2 f(\bar{w})$. Plugging in the definition of $\bar{\theta}$, we get $[1-\frac{1}{2}\bar{w}(1-\int_{\bar{w}}^{1} F(w)dw)^{-1}] \int_{\bar{w}}^{1} wf(w)dw > \bar{w}^2 f(\bar{w})$. Using the fact that, by integration by parts, $\int_{\bar{w}}^{1} wf(w)dw = 1-\frac{1}{2}\bar{w} - \int_{\bar{w}}^{1} F(w)dw$, this expresion can be rewritten to yield $\left(\int_{\bar{w}}^{1} wf(w)dw\right)^2 > \bar{w}^2 f(\bar{w})\left(1-\int_{\bar{w}}^{1} F(w)dw\right)$. This contradicts assumption 2 completing the argument.

3. Given any $(\theta,\tau) \in [0,1]^2$, producer i's payoff is given by $(1-F(w^*(\theta))\theta)(1-\tau)w_i$, where both F and w^* are strictly increasing in their arguments.

Q.E.D.

E.2.2 Equilibrium of the political game given two candidates

First, I prove a helpful median voter result. Let $\varphi_i = (1-\tau_{-i})(1-F(w^*(\theta_{-i}))\theta_{-i})$ and let $\tilde{w}^*(\varphi_i)$ denote the value of problem (P) given $\bar{\varphi} = \varphi_i$. If $(\theta_i,\tau_i) = (\theta_{-i},\tau_{-i})$, then the proposals are said to be pooled.

Lemma 4 (The median voter and the winner)**.** *Suppose that voters face any two proposals (θ_i,τ_i) and (θ_{-i},τ_{-i}). If $V(\theta_i,\tau_i;\bar{w}) > V(\theta_{-i},\tau_{-i};\bar{w})$, then (θ_i,τ_i) wins the election with probability* 1. *Suppose $V(\theta_i,\tau_i;\bar{w}) = V(\theta_{-i},\tau_{-i};\bar{w})$. If $\theta_i < \bar{\theta} < \theta_{-i}$, then (θ_i,τ_i) wins the election with probability $\frac{1}{2}$. Furthermore:*

1. *Suppose that either $\varepsilon = 0$ or $\tilde{w}^*(\varphi_i) \geq V(\theta_{-i},\tau_{-i};w_i)$ for all $i \in \{L,H\}$ or $\tilde{w}^*(\varphi_i) < V(\theta_{-i},\tau_{-i};w_i)$ for all $i \in \{L,H\}$. If $\theta_i = \theta_{-i}$, then (θ_i,τ_i) wins the election with probability $\frac{1}{2}$. If $\bar{\theta} \geq \theta_i > \theta_{-i}$ or $\bar{\theta} \leq \theta_i < \theta_{-i}$, then (θ_i,τ_i) wins the election with probability* 1.

2. *Suppose that $\varepsilon > 0$ and $\tilde{w}^*(\varphi_i) < V(\theta_{-i},\tau_{-i};w_i)$ and $\tilde{w}^*(\varphi_{-i}) \geq V(\theta_i,\tau_i;w_{-i})$. If $\theta_i = \theta_{-i}$, then (θ_i,τ_i) wins the election with probability $\frac{1}{2}(1+\varepsilon)$. If $\bar{\theta} \geq \theta_i > \theta_{-i}$ or $\bar{\theta} \leq \theta_i < \theta_{-i}$, then (θ_i,τ_i) wins the election with probability* 1.

3. *Suppose that $\varepsilon > 0$ and $\tilde{w}^*(\varphi_i) \geq V(\theta_{-i},\tau_{-i};w_i)$ and $\tilde{w}^*(\varphi_{-i}) < V(\theta_i,\tau_i;w_{-i})$. If $\theta_i = \theta_{-i}$, then (θ_i,τ_i) wins the election with probability $\frac{1}{2}(1-\varepsilon)$. If $\bar{\theta} > \theta_i > \theta_{-i}$ or $\bar{\theta} < \theta_i < \theta_{-i}$, then (θ_i,τ_i) wins the election with probability $(1-\varepsilon)$. If $\bar{\theta} = \theta_i > \theta_{-i}$ or $\bar{\theta} = \theta_i < \theta_{-i}$, then (θ_i,τ_i) wins the election with probability $1-\frac{1}{2}\varepsilon$.*

Proof. First, notice that the preference shock can only matter when there is a postive measure of voters that is indifferent between the regimes proposed. This is due to the facts that it only affects voting decisions when agents are indifferent and a set of agents with measure zero does not affect the measure of the set of agents that vote for a particular regime.

First, suppose that $V(\theta_i,\tau_i;\bar{w}) = V(\theta_{-i},\tau_{-i};\bar{w})$ and either $\varepsilon = 0$ or $\tilde{w}^*(\varphi_i) \geq V(\theta_{-i},\tau_{-i};w_i)$ for all $i \in \{L,H\}$

or $\tilde{w}^*(\varphi_i) < V(\theta_{-i}, \tau_{-i}; w_i)$ for all $i \in \{L, H\}$. That is, the preference shock is either impossible or does not matter.

Suppose that $V(\theta_i, \tau_i; \bar{w}) > V(\theta_{-i}, \tau_{-i}; \bar{w})$. If $\theta_i = \theta_{-i}$, then all agents choose the same occupations under either regime and $\tau_i < \tau_{-i}$. All agents prefer the lower tax, so that all agents vote for (θ_i, τ_i) which thus wins. If $\theta_i > \theta_{-i}$, then there are three cases. Either $\theta_{-i} < \theta_i < \bar{\theta}$, or $\theta_{-i} < \bar{\theta} \leq \theta_i$, or $\bar{\theta} \leq \theta_{-i} < \theta_i$. In the first case, the median agent would be a producer under either regime. Thus, $V(\theta_i, \tau_i; \bar{w}) > V(\theta_{-i}, \tau_{-i}; \bar{w})$ implies that the payoff from being a producer is higher under (θ_i, τ_i) than under (θ_{-i}, τ_{-i}). This implies that all agents that would be producers under either schedule vote for (θ_i, τ_i). Since $\theta_{-i} < \theta_i < \bar{\theta}$, it holds that all agents with productivity greater than $w^*(\theta_i) < \bar{w}$ and thus a measure $1 - F(w^*(\theta_i)) > 1 - F(\bar{w}) = \frac{1}{2}$ vote for (θ_i, τ_i) which thus wins. In the second case, the median voter prefers to appropriate under (θ_i, τ_i) (if $\bar{\theta} \leq \theta_i$, then, still, the median voter is indifferent between occupations under that schedule) over producing under (θ_{-i}, τ_{-i}) which he prefers to appropriating under (θ_{-i}, τ_{-i}). Thus, the appropriation payoff under (θ_i, τ_i) is greater than under (θ_{-i}, τ_{-i}). This implies that all agents with $w \leq \bar{w}$ prefer schedule 1. If $\theta_i = \bar{\theta}$, then also producing under (θ_i, τ_i) yields higher payoff than under (θ_{-i}, τ_{-i}) implying that all agents prefer and vote for schedule 1 which thus wins. If $\theta_i > \bar{\theta}$, then since $V(\theta_i, \tau_i; \bar{w}) > V(\theta_{-i}, \tau_{-i}; \bar{w})$, there is an $\epsilon > 0$ such that, for the agent with productivity $\bar{w} + \epsilon$, appropriating under 1 is still prefered to producing under 2 and $V(\theta_i, \tau_i; \bar{w} + \epsilon) > V(\theta_{-i}, \tau_{-i}; \bar{w} + \epsilon)$. Then, the mesure of agents voting for (θ_i, τ_i) equals $F(\bar{w} + \epsilon) > \frac{1}{2}$ and 1 wins. In the third case, the median voter prefers appropriation under (θ_i, τ_i) over appropriation under (θ_{-i}, τ_{-i}) implying the payoffs from the former are greater than payoff from the latter. If $\theta_{-i} > \bar{\theta}$, then all agents with $w \leq w^*(\theta_{-i})$ prefer (θ_i, τ_i) since they would be appropriators under either schedule. Then, $F(w^*(\theta_{-i})) > F(\bar{w}) = \frac{1}{2}$ vote for (θ_i, τ_i) which thus wins. If $\theta_{-i} = \bar{\theta}$, then since $V(\theta_i, \tau_i; \bar{w}) > V(\theta_{-i}, \tau_{-i}; \bar{w})$, there is an $\epsilon > 0$ such that, for the agent with productivity $\bar{w} + \epsilon$, appropriating under 1 is still prefered to producing under 2 and $V(\theta_i, \tau_i; \bar{w} + \epsilon) > V(\theta_{-i}, \tau_{-i}; \bar{w} + \epsilon)$ so that a measure $F(\bar{w} + \epsilon) > \frac{1}{2}$ of agents votes for (θ_i, τ_i) which thus wins. If $\theta_i < \theta_{-i}$, then there are three cases, $\theta_i < \theta_{-i} \leq \bar{\theta}$, $\theta_i \leq \bar{\theta} < \theta_{-i}$, or $\bar{\theta} < \theta_i < \theta_{-i}$. In the first case, the median voter prefers to produce under (θ_i, τ_i) over producing under (θ_{-i}, τ_{-i}). All agent with $w > \bar{w}$ thus prefer (θ_i, τ_i), too, since they would be producers under either regime. If $\theta_{-i} < \bar{\theta}$, then all agents with $w \geq w^*(\theta_{-i})$ prefer (θ_i, τ_i) so that a measure $1 - F(w^*(\theta_{-i})) > 1 - F(\bar{w}) = \frac{1}{2}$ of agents vote for it and it wins. If $\theta_{-i} = \bar{\theta}$, then, since $V(\theta_i, \tau_i; \bar{w}) > V(\theta_{-i}, \tau_{-i}; \bar{w})$, there is an $\epsilon > 0$ such that $V(\theta_i, \tau_i; \bar{w} - \epsilon) > V(\theta_{-i}, \tau_{-i}; \bar{w} - \epsilon) = V(\theta_{-i}, \tau_{-i}; \bar{w})$. Thus a measure $1 - F(\bar{w} - \epsilon) > 1 - F(\bar{w}) = \frac{1}{2}$ vote for (θ_i, τ_i) which thus wins. In the second case, the median voter prefers to produce under (θ_i, τ_i) over appropriating under (θ_{-i}, τ_{-i}) which he prefers over producing under (θ_{-i}, τ_{-i}). This implies that, for any w, producing under (θ_i, τ_i) yields a higher payoff than producing under (θ_{-i}, τ_{-i}). So, all agents with productivity $w > \bar{w}$ prefer (θ_i, τ_i) independent of their occupations under either regime. If $\theta_i = \bar{\theta}$, then appropriation yields higher payoff under (θ_i, τ_i) than it does under (θ_{-i}, τ_{-i}). Thus, all agents vote for (θ_i, τ_i) which thus wins. if $\theta_i < \bar{\theta}$, then, since $V(\theta_i, \tau_i; \bar{w}) > V(\theta_{-i}, \tau_{-i}; \bar{w})$, there is an $\epsilon > 0$ such that $V(\theta_i, \tau_i; \bar{w} - \epsilon) > V(\theta_{-i}, \tau_{-i}; \bar{w} - \epsilon) = V(\theta_{-i}, \tau_{-i}; \bar{w})$. Thus a measure $1 - F(\bar{w} - \epsilon) > 1 - F(\bar{w}) = \frac{1}{2}$ vote for (θ_i, τ_i) which thus wins. In the third case, the median voter prefers appropriation under (θ_i, τ_i) over appropriation under (θ_{-i}, τ_{-i}). For all agents with productivity $w \in (w^*(\theta_i), w^*(\theta_{-i}))$ the payoff from production under (θ_i, τ_i) is greater than the payoff from appropriation under (θ_i, τ_i) which is greater than the payoff from appropriation under (θ_{-i}, τ_{-i}) which is greater than the payoff from production under (θ_{-i}, τ_{-i}). This implies that for any w, the payoff from producing under (θ_i, τ_i) is greater than the payoff from producing under (θ_{-i}, τ_{-i}). Thus, all agents vote for (θ_i, τ_i) which thus wins.

Suppose $V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w})$. If $\theta_i < \bar{\theta} < \theta_{-i}$, then the median voter is indifferent between producing under (θ_i, τ_i) and appropriating under (θ_{-i}, τ_{-i}). This implies that, for any w, the payoff from production under (θ_i, τ_i) is greater than under (θ_{-i}, τ_{-i}) while the payoff from appropriation under (θ_i, τ_i) is smaller than under (θ_{-i}, τ_{-i}). This implies that all agents with $w > \bar{w}$ prefer (θ_i, τ_i) while all agents with $w < \bar{w}$ prefer

(θ_{-i},τ_{-i}). Thus, a measure $\frac{1}{2}$ of agents vote for either schedule so that (θ_i,τ_i) wins with probability $\frac{1}{2}$.
If $\theta_i=\theta_{-i}$, then, since $V(\theta,\tau;w)=(1-\tau)V(\theta,0;w)$ for all θ, τ, and w, $\tau_i=\tau_{-i}$. Thus, $(\theta_i,\tau_i)=(\theta_{-i},\tau_{-i})$ and both proposals have equal and thus $\frac{1}{2}$ probability of winning.
Suppose that $\bar{\theta}\geq\theta_i>\theta_{-i}$. Then, the median voter is indifferent between being a producer under either regime, so that it can be concluded that, for any w, the payoff from producing is the same under both regimes. So all agents with $w\geq w^*(\theta_i)$ are indifferent. The agent with $w=w^*(\theta_{-i})$ is indifferent between production and appropriation under (θ_{-i},τ_{-i}) while he prefers to appropriate under (θ_i,τ_i). Since he is indifferent between producing under each regime, this implies that the payoff from appropriation under (θ_i,τ_i) is greater than the under (θ_{-i},τ_{-i}). The agent with $w=w^*(\theta_i)$ is indifferent between appropriation and production under (θ_i,τ_i) where the latter is the same as under (θ_{-i},τ_{-i}). This implies that all agents with $w<w^*(\theta_i)$ prefer (θ_i,τ_i) over (θ_{-i},τ_{-i}). So, a measure $F(w^*(\theta_i))+\frac{1}{2}(1-F(w^*(\theta_i)))=\frac{1}{2}+\frac{1}{2}F(w^*(\theta_i))>\frac{1}{2}$ of agents vote for (θ_i,τ_i) which thus wins.
Suppose that $\bar{\theta}\leq\theta_i<\theta_{-i}$. The median voter is indifferent between appropriation under either regime. Thus all agents with $w\leq w^*(\theta_i)$ are indifferent, as they would be appropriators under either regime. For all agents with $w\in(w^*(\theta_i),w^*(\theta_{-i}))$, agents prefer producing over appropriating under (θ_i,τ_i) while they would be indifferent between appropriating under either regime which they prefer to producing under (θ_{-i},τ_{-i}). This implies that, for any w, the payoff from producing under (θ_i,τ_i) is greater than the payoff from producing under (θ_{-i},τ_{-i}). Hence, all agents with $w>w^*(\theta_i)$ prefer (θ_i,τ_i) so that a measure $\frac{1}{2}F(w^*(\theta_i))+(1-F(w^*(\theta_i)))=1-\frac{1}{2}F(w^*(\theta_i))>\frac{1}{2}$ of agents vote for (θ_i,τ_i) which thus wins.
Now, notice that there is a nontrivial set of agents that is indifferent between the regimes proposed only when either $\theta_i=\theta_{-i}$ (all agents are indifferent), $\bar{\theta}\geq\theta_i>\theta_{-i}$ (all agents with $w\geq w^*(\theta_i)$ are indifferent), or $\bar{\theta}\leq\theta_i<\theta_{-i}$ (all agents with $w\leq w^*(\theta_i)$ are indifferent). in fact, in all these cases, the measures of these sets are greater than or equal to $\frac{1}{2}$.
Suppose that $\varepsilon>0$ and $\tilde{w}^*(\varphi_i)<V(\theta_{-i},\tau_{-i};w_i)$ and $\tilde{w}^*(\varphi_{-i})\geq V(\theta_i,\tau_i;w_{-i})$. That is, the preference shock has positive probability and favors proposal (θ_i,τ_i). If $\theta_i=\theta_{-i}$, then (θ_i,τ_i) wins the election with probability $\varepsilon+(1-\varepsilon)\frac{1}{2}=\frac{1}{2}(1+\varepsilon)$. If $\bar{\theta}\geq\theta_i>\theta_{-i}$ or $\bar{\theta}\leq\theta_i<\theta_{-i}$, then (θ_i,τ_i) wins the election with probability 1 even when the preference shock is not at work. Since it favors this schedule, the probability is unchanged.
Suppose that $\varepsilon>0$ and $\tilde{w}^*(\varphi_i)\geq V(\theta_{-i},\tau_{-i};w_i)$ and $\tilde{w}^*(\varphi_{-i})<V(\theta_i,\tau_i;w_{-i})$. That is, the preference shock has positive probability and favors proposal (θ_{-i},τ_{-i}). If $\theta_i=\theta_{-i}$, then (θ_i,τ_i) wins the election with probability $\frac{1}{2}(1-\varepsilon)$. If $\bar{\theta}>\theta_i>\theta_{-i}$ or $\bar{\theta}<\theta_i<\theta_{-i}$, then (θ_i,τ_i) wins if the shock does not realize but loses if it does since a measure of agents greater than $\frac{1}{2}$ is indifferent. Thus, the probability of (θ_i,τ_i) to win is $(1-\varepsilon)$. If $\bar{\theta}=\theta_i>\theta_{-i}$ or $\bar{\theta}=\theta_i<\theta_{-i}$, then exactly a measure of agents of $\frac{1}{2}$ is indifferent. That is, if the shock realizes, (θ_i,τ_i) wins the election with probability $\frac{1}{2}$ due to randomization on the aggregate level. Thus, (θ_i,τ_i) wins the election with probability $(1-\varepsilon)+\frac{1}{2}\varepsilon=1-\frac{1}{2}\varepsilon$. Q.E.D.

Proposition 2

I describe equilibrium requirements and then show that there is one and characterize it. I use lemma 4 in terms of the function mapping proposals and candidate productivities in probabilities of winning as reported in appendix B.2.

Lemma 5. *Suppose the set of proposals* $\{(\theta_i,\tau_i),(\theta_{-i},\tau_{-i})\}$, $i,-i\in\{L,H\}$, $-i\neq i$, *constitute an equilibrium of the political game. Then, the following has to hold.*

1. *If the regime* (θ_i,τ_i) *has positive probability of winning the election over* (θ_{-i},τ_{-i}), *then it has to satisfy* $\tilde{w}(\theta_i,\tau_i)\geq V(\theta_{-i},\tau_{-i};w_i)$, $\tilde{w}(\theta_i,\tau_i)\geq\tilde{w}(\theta_{-i},\tau_{-i})$, *and* $V(\theta_i,\tau_i;w_{-i})\geq$

$\tilde{w}(\theta_i, \tau_i)$.

2. *Suppose that* (θ_i, τ_i) *wins the election over* (θ_{-i}, τ_{-i})*, with positive probability. Then,* (θ_i, τ_i) *satisfies* $\theta_i \leq \hat{\theta}(\tau_i) < \bar{\theta}$ *and* $V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w})$*. Moreover, any equilibrium is either pooling or separating with only one proposal having positive probability of winning.*

3. *If proposal* i *has positive probability of winning, then it has to solve problem* (P) *given* $\bar{\varphi} = \varphi_i = (1 - \tau_{-i})(1 - F(w^*(\theta_{-i}))\theta_{-i})$*, i.e.,* $\tilde{w}(\theta_i, \tau_i) = \tilde{w}^*(\varphi_i)$*.*

4. *Any equilibrium is either pooling or separating in which one agent wins for sure and the institutions satisfy* $\theta < \bar{\theta}$*.*

Proof. Consider each point in turn.

1. Suppose for a contraposition that $\tilde{w}(\theta_i, \tau_i) < V(\theta_{-i}, \tau_{-i}; w_i)$. Agent i could offer a schedule that loses against (θ_{-i}, τ_{-i}), say $(\theta_i', \tau_i') = (1, 1)$. Then, his payoff is higher implying that he did not play a best response before which contradicts the assumption that $\{(\theta_i, \tau_i), (\theta_{-i}, \tau_{-i})\}$ constitutes an equilibrium of the political game. Similarly, suppose for a contraposition that $\tilde{w}(\theta_i, \tau_i) < \tilde{w}(\theta_{-i}, \tau_{-i})$. Then, agent i could have offered $(\theta_i, \tau_i) = (\theta_{-i}, \tau_{-i} - \epsilon)$ for some small $\epsilon > 0$, win the election for sure and receive $\tilde{w}(\theta_{-i}, \tau_{-i} - \epsilon) > \tilde{w}(\theta_i, \tau_i) \geq V(\theta_{-i}, \tau_{-i}; w_i)$. Thus, he did not play a best response and the set of proposals is not an equilibrium. Also, suppose for a contraposition that $\tilde{w}(\theta_i, \tau_i) > V(\theta_i, \tau_i; w_{-i})$. One feasible response of agent j is $(\theta_{-i}, \tau_{-i}) = (\theta_i, \tau_i - \epsilon)$ for some small $\epsilon > 0$ such that $\tilde{w}(\theta_{-i}, \tau_{-i}) > V(\theta_i, \tau_i; w_{-i})$. All voters prefer this schedule, so j wins the election and is strictly better off than before (even if he had $\frac{1}{2}$ probability of winning) since $\tilde{w}(\theta_i, \tau_i) \geq \tilde{w}(\theta_{-i}, \tau_{-i})$. Thus, he did not play a best response contradicting the assumption that $\{(\theta_i, \tau_i), (\theta_{-i}, \tau_{-i})\}$ constitutes an equilibrium of the political game.

2. Fix τ_i. First, suppose $\theta_i \geq \bar{\theta}$. Since $\hat{\theta}(\tau_i) < \bar{\theta}$ and $\hat{\hat{\theta}}(\tau_i) \leq \bar{\theta}$ and producers always prefer a smaller θ_i, the winner does not maximize payoffs since decreasing θ_i wins him the election at a higher in-office payoff. (In the limiting case where $\theta_i = \bar{\theta} = \hat{\hat{\theta}}(\tau_i)$, the median agent is just indifferent between being a producer or an appropriator. Thus, decreasing θ_i slightly increases his payoff so that he votes for the lower θ_i which then wins the election.) This violates equilibrium conditions. Second, suppose that $\theta_i > \hat{\theta}(\tau_i)$. Since $w^*(\theta_i) < \bar{w}$, the measure of producers is greater than $\frac{1}{2}$. Therefore, leaving τ_i unchanged, a lower θ_i would win him the election with higher in-office payoffs. This violates equilibrium conditions.
   Suppose that $V(\theta_i, \tau_i; \bar{w}) - V(\theta_{-i}, \tau_{-i}; \bar{w}) = \epsilon$ for some $\epsilon > 0$. Then, leaving θ_i unchanged, increasing τ_i slightly increases $\tilde{w}(\theta_i, \tau_i)$ while still winninig the election. This violates equilibrium conditions.
   From (16)-(18) it follows directly that any equilibrium with positive probability of winning for both proposals has to be pooling.

3. Suppose for a contradiction that this does not hold. Let the solution to (P) given $\bar{\varphi} = \varphi_i$ be (θ_i^*, τ_i^*). Then, it has to be true that $\tilde{w}^*(\varphi_i) = \tilde{w}(\theta_i^*, \tau_i^*) > \tilde{w}(\theta_i, \tau_i) \geq V(\theta_{-i}, \tau_{-i}; w_i)$ and $V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w})$. Thus, i could propose $(\theta_i^*, \tau_i^* - \epsilon)$, $\epsilon > 0$ and small, so that both i's in-office payoff and the median voter's payoff strictly increase. Agent i would win for sure and get $\tilde{w}(\theta_i^*, \tau_i^* - \epsilon) > \tilde{w}(\theta_i, \tau_i) \geq V(\theta_{-i}, \tau_{-i}; w_i)$ which contradicts the assumption of an equilibrium set of proposals.

4. Result 2 of this very lemma implies both that the median voter's payoffs under either regime are equal in equilibrium and that any schedule (θ, τ) that wins with positive probability satisfies $\theta < \bar{\theta}$.

This completes the proof. Q.E.D.

Thus, necessary conditions for the policy (θ_i, τ_i) to win are $V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w})$ and $\theta_{-i} < \theta_i \leq \hat{\theta}(\tau_i) < \bar{\theta}$ in a separating equilibrium and $(1-\tau)V(\theta, 0; w_{-i}) = \tilde{w}(\theta, \tau)$ and $(1-\tau)V(\theta, 0; w_i) = \tilde{w}(\theta, \tau)$ in a pooling equilibrium.

Lemma 6 (Pooling equilibrium)**.** *If a pooling equilibrium (θ_p, τ_p) exists, then it is unique and the quality of the institutions implemented is independent of both w_L and w_H. If $w_H > w^*(\theta_p)$, then a pooling equilibrium does not exist.*

Proof. Suppose $(\theta_L, \tau_L) = (\theta_H, \tau_H) = (\theta_p, \tau_p)$ constitutes a pooling equilibrium. Then both agents have probability $\frac{1}{2} > 0$ of winning. That is, by the first part of lemma 5, $V(\theta_p, \tau_p; w_L) \geq \tilde{w}(\theta_p, \tau_p) \geq V(\theta_p, \tau_p; w_H) \geq \tilde{w}(\theta_p, \tau_p) \geq V(\theta_p, \tau_p; w_L)$, so that $V(\theta_p, \tau_p; w_L) = \tilde{w}(\theta_p, \tau_p) = V(\theta_p, \tau_p; w_H)$. Since $V(\theta, \tau; w)$ is monotonic in w, this implies that $w^*(\theta_p) \geq w_H$ has to hold. Suppose a pooling equilibrium (θ_p, τ_p) exists and $w^*(\theta_p) \geq w_H$. It has to be the case that

$$\tilde{w}(\theta_p, \tau_p) = \tau_p \int_{w^*(\theta_p)}^{1} wf(w)dw - g(\theta_p) = (1-\tau_p)\theta_p \int_{w^*(\theta_p)}^{1} wf(w)dw. \tag{24}$$

Additionally, by lemma 5, the proposal (θ_p, τ_p) solves problem (P) for some $\bar{\varphi} = \varphi_p = (1 - F(w^*(\theta_p))\theta_p)(1 - \tau_p)$. (The in-office payoff given a regime is independent of the office holder's productivity.) That is, it solves (P) given the opponent's proposal is the pooling proposal. The equality (24) gives

$$\tau_p(\theta_p) = \frac{\theta_p \int_{w^*(\theta_p)}^{1} wf(w)dw + g(\theta_p)}{(1+\theta_p)\int_{w^*(\theta_p)}^{1} wf(w)dw} \quad \text{and} \quad 1 - \tau_p(\theta_p) = \frac{\int_{w^*(\theta_p)}^{1} wf(w)dw - g(\theta_p)}{(1+\theta_p)\int_{w^*(\theta_p)}^{1} wf(w)dw}. \tag{25}$$

Then, by lemma 2, $(\theta_p, \tau_p, \varphi_p)$ solves the following system of three equations in three unknowns:

$$(1 - F(w^*(\theta_p))\theta_p)(1-\tau_p) = \varphi_p, \tag{26}$$

$$\tau_p(\theta_p) = \frac{\theta_p \int_{w^*(\theta_p)}^{1} wf(w)dw + g(\theta_p)}{(1+\theta_p)\int_{w^*(\theta_p)}^{1} wf(w)dw} \tag{27}$$

$$-\tau_p w^*(\theta_p) f(w^*(\theta_p)) w^{*\prime}(\theta_p) - g'(\theta_p) = \theta_p^{-1} w^*(\theta_p)[F(w^*(\theta_p)) + \theta_p f(w^*(\theta_p)) w^{*\prime}(\theta_p)](1-\tau_p). \tag{28}$$

Combining the second and the third equation, θ_p solves

$$\begin{aligned} &-\frac{\theta_p \int_{w^*(\theta_p)}^{1} wf(w)dw + g(\theta_p)}{(1+\theta_p)\int_{w^*(\theta_p)}^{1} wf(w)dw} w^*(\theta_p) f(w^*(\theta_p)) w^{*\prime}(\theta_p) - g'(\theta_p) \\ &= \theta_p^{-1} w^*(\theta_p)[F(w^*(\theta_p)) + \theta_p f(w^*(\theta_p)) w^{*\prime}(\theta_p)] \frac{\int_{w^*(\theta_p)}^{1} wf(w)dw - g(\theta_p)}{(1+\theta_p)\int_{w^*(\theta_p)}^{1} wf(w)dw}. \end{aligned}$$

Rewriting yields

$$\frac{\left[-w^*(\theta_p) f(w^*(\theta_p)) w^{*\prime}(\theta_p) - g'(\theta_p)\right](1+\theta_p)\int_{w^*(\theta_p)}^{1} wf(w)dw}{\theta_p^{-1} w^*(\theta_p) F(w^*(\theta_p))} = \int_{w^*(\theta_p)}^{1} wf(w)dw - g(\theta_p). \tag{29}$$

To simplify notation, define

$$\Psi_1(\theta) = \int_{w^*(\theta)}^{1} wf(w)dw - g(\theta)$$

$$\Psi_2(\theta) = \frac{\left[-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)\right](1+\theta)\int_{w^*(\theta)}^{1} wf(w)dw}{\theta^{-1}w^*(\theta)F(w^*(\theta))}.$$

Ψ_1 is quasi-concave and has its unique maximium at $\theta = \hat{\theta}(1)$. $\Psi_1(0) = \mu - g(0) < 0$, $\Psi_1(\theta)$ is strictly increasing for all $\theta < \hat{\theta}(1)$ and strictly decreasing for all $\theta > \hat{\theta}(1)$. Assume that $\Psi_1(\hat{\theta}(1)) > 0$ as otherwise $\tilde{w}(\theta,\tau) \le 0$ for all $(\theta,\tau) \in [0,1]^2$. $\Psi_1(\theta) < 0$ cannot be an equilibrium since it implies that $\tilde{w}(\theta,\tau) < 0$ which contradicts individual rationality as $V(\theta,\tau;w) \ge 0$ for all (θ,τ) and w. Since $\Psi_2(\theta) < 0$ for all $\theta > \hat{\theta}(1)$, the relevant area is $\theta \le \hat{\theta}(1)$. On this subset of the domain, Ψ_1 is strictly increasing. As to Ψ_2, rewriting it to $\Psi_2(\theta) = \frac{[-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)]\int_{w^*(\theta)}^{1} wf(w)dw}{(\theta+\theta^2)^{-1}w^*(\theta)F(w^*(\theta))}$, the nominator is strictly decreasing in θ. The denominator weakly increases in θ if and only if $\frac{w^*(\theta)f(w^*(\theta))}{F(w^*(\theta))} \ge \frac{\theta}{1+\theta}[1-(1+2\theta)F(w^*(\theta))]$. That is, it is sufficient if $\frac{w^*(\theta)f(w^*(\theta))}{F(w^*(\theta))} \ge \frac{1}{2}$. On the relevant subset of the domain, $\theta \le \hat{\theta}(1) \le \bar{\theta} \le \theta_{mod}$, where $w_{mod} = w^*(\theta_{mod}) = mod(F)$, so that $f'(w^*(\theta)) \ge 0$ for all $\theta \in [0,\hat{\theta}(1)]$. Since, $w^*(0)f(w^*(0)) = 0f(0) = F(w^*(0)) = F(0) = 0$ and $f(w) + wf'(w) \ge f(w)$ for all $w \le w_{mod}$, it holds that $w^*(\theta)f(w^*(\theta)) \ge F(w^*(\theta)) > \frac{1}{2}F(w^*(\theta))$. That is, the denominator of Ψ_2 is weakly increasing in θ and, thus, Ψ_2 is strictly decreasing in θ on $(0,\hat{\theta}(1))$. Now, $\Psi_1(0) < 0 < \Psi_2(0)$ and $\Psi_1(\hat{\theta}(1)) > 0 = \Psi_2(\hat{\theta}(1))$. Thus, by continuity and strict monotonicity of both Ψ_1 and Ψ_2 on $(0,\hat{\theta}(1))$, there exists a unique $\theta_p \in (0,\hat{\theta}(1))$ such that $\Psi_1(\theta_p) = \Psi_2(\theta_p)$. Then, given θ_p, (25) gives a unique $\tau_p(\theta_p)$, and the constraint yields φ_p.
Obviously, neither w_L nor w_H matter since they don't appear in the equations that determine the unique solution (θ_p,τ_p). Finally, since any pooling equilibrium is given by (θ_p,τ_p), if $w_H > w_p \equiv w^*(\theta_p)$, then the above argument shows that a pooling equilibrium does not exist. Q.E.D.

Lemma 7 (Separating equilibrium)**.** *In any separating equilibrium, if w_H wins the election with probability one, then $w_H \le w^*(\theta_H)$.*

Proof. Suppose for a contradiction that there is a separating equilibrium where H wins and $w_H > w^*(\theta_H)$. By lemma 5, the equilibrium set of proposals $\{(\theta_L,\tau_L),(\theta_H,\tau_H)\}$ has to satisfy $V(\theta_H,\tau_H;w_L) \ge \tilde{w}(\theta_H,\tau_H) \ge V(\theta_L,\tau_L;w_H)$, $V(\theta_H,\tau_H;\bar{w}) = V(\theta_L,\tau_L;\bar{w})$, and $\theta_L < \theta_H < \bar{\theta}$. Since $w_H > w^*(\theta_H)$, $(1-F(w^*(\theta_H))\theta_H)(1-\tau_H)w_H = V(\theta_H,\tau_H;w_H) > V(\theta_H,\tau_H;w_L) \ge \tilde{w}(\theta_H,\tau_H) \ge V(\theta_L,\tau_L;w_H) \ge (1-F(w^*(\theta_L))\theta_L)(1-\tau_L)w_H$ implying that $(1-F(w^*(\theta_H))\theta_H)(1-\tau_H) > (1-F(w^*(\theta_L))\theta_L)(1-\tau_L)$ and thus $V(\theta_H,\tau_H;\bar{w}) > V(\theta_L,\tau_L;\bar{w})$, a contradiction. This completes the proof. Q.E.D.

Lemma 8. *In equilibrium, if regime (θ_i,τ_i), $i \in \{L,H\}$ wins over regime (θ_{-i},τ_{-i}), $-i \in \{L,H\}\backslash\{i\}$, then $\tilde{w}(\theta_i,\tau_i) = V(\theta_i,\tau_i;w_{-i})$. Moreover, if in a separating equilibrium (θ^*,τ^*) wins the election and $w_L < w_H \le w^*(\theta^*)$, then the winning policy satisfies $(\theta^*,\tau^*) = (\theta_p,\tau_p)$, irrespectively of the winner's identity.*

Proof. Consider any equilibrium and let (θ_i^*,τ_i^*) satisfy $\tilde{w}(\theta_i,\tau_i) = \tilde{w}^*(\varphi_i)$ for any $i \in \{L,H\}$. There are two claims. First, $\tilde{w}(\theta_{-i}^*,\tau_{-i}^*) \ge V(\theta_i,\tau_i;w_{-i})$. Suppose for a contradiction that $V(\theta_i,\tau_i;w_{-i}) > \tilde{w}(\theta_{-i}^*,\tau_{-i}^*) \ge \tilde{w}(\theta_{-i},\tau_{-i})$. Since $V(\theta_i,\tau_i;\bar{w}) = V(\theta_{-i},\tau_{-i};\bar{w})$, agent $-i$ wins with probability $\varepsilon > 0$. If he offered any $(\theta_{-i}',\tau_{-i}')$ such that $V(\theta_i,\tau_i;\bar{w}) > V(\theta_{-i}',\tau_{-i}';\bar{w})$, he would lose with probability one receiving a payoff $V(\theta_i,\tau_i;w_{-i}) > (1-\varepsilon)V(\theta_i,\tau_i;w_{-i}) + \varepsilon\tilde{w}(\theta_{-i},\tau_{-i})$. Thus, this contradicts the assumption of an equilibrium to start with. Second, $\tilde{w}(\theta_i,\tau_i) \ge \tilde{w}(\theta_{-i}^*,\tau_{-i}^*)$. Suppose for a contradiction that

$\tilde{w}(\theta_i, \tau_i) < \tilde{w}(\theta^*_{-i}, \tau^*_{-i})$. Agent i could propose $(\theta'_i, \tau'_i) = (\theta^*_{-i}, \tau^*_{-i} - \epsilon)$ for some small $\epsilon > 0$. He would win for sure since $V(\theta^*_{-i}, \tau^*_{-i} - \epsilon; \bar{w}) > V(\theta^*_{-i}, \tau^*_{-i}; \bar{w}) \geq V(\theta_i, \tau_i; \bar{w})$ by the constraint in (P) and get $\tilde{w}(\theta^*_{-i}, \tau^*_{-i} - \epsilon) > \tilde{w}(\theta_i, \tau_i) \geq V(\theta_{-i}, \tau_{-i}; w_i)$. Thus, this contradicts the assumption of an equilibrium to start with. Together these two facts imply that $\tilde{w}(\theta^*_{-i}, \tau^*_{-i}) \geq V(\theta_i, \tau_i; w_{-i}) \geq \tilde{w}(\theta_i, \tau_i) \geq \tilde{w}(\theta^*_{-i}, \tau^*_{-i})$ establishing the result.

Suppose there exists a separating equilibrium in which (θ^*, τ^*) wins the election and $w_L < w_H \leq w^*(\theta^*)$. Let $w_{-i} \in \{w_L, w_H\}$ be the loser. Since $\tilde{w}(\theta^*, \tau^*) = V(\theta^*, \tau^*; w_{-i})$, it holds that

$$\tau^* \int_{w^*(\theta^*)}^1 wf(w)dw - g(\theta^*) = (1 - \tau^*)\theta^* \int_{w^*(\theta^*)}^1 wf(w)dw. \tag{30}$$

Furthermore, (θ^*, τ^*) has to solve (P) given $\bar{\varphi} = \varphi_i = (1 - F(w^*(\theta_{-i}))\theta_{-i})(1 - \tau_{-i})$. This implies that the (sub)system of two equations in two unknowns that solve for (θ^*, τ^*) conincides with (25) and (29). Thus, since (θ_p, τ_p) is the unique solution to that system, $(\theta^*, \tau^*) = (\theta_p, \tau_p)$, as was to be shown. Q.E.D.

An additional argument with respect to the cutoff w_p is required.

Lemma 9. *If $w_H > w^*(\theta^*)$, then $\theta^* > \theta_p$. If $w_H \leq w_p$, then $(\theta^*, \tau^*) = (\theta_p, \tau_p)$. If $w_H > w_p$, then w_L wins.*

Proof. Notice first that $\Psi_1(\theta) = \psi_1(\theta; w_H)$ for all θ and w_H. In equilibrium, since $w_H > w^*(\theta^*)$, $\Psi_1(\theta^*) = \psi_1(\theta^*; w_H) = \psi_2(\theta^*; w_H) > \Psi_2(\theta^*)$, while θ_p satisfies $\Psi_1(\theta_p) = \Psi_2(\theta_p)$. Since $\Psi_1(\theta)$ is strictly increasing on $(0, \hat{\theta}(1))$ and $\Psi_2(\theta)$ is strictly decreasing on $(0, \hat{\theta}(1))$, $\theta^* > \theta_p$.

Assume that $w_H \leq w_p$. Suppose for a contradiction that $\theta^* \neq \theta_p$. If $\theta^* > \theta_p$, then $w^*(\theta^*) > w_p \geq w_H$ and the equilibrium is separating. Thus, by lemma 8, $\theta^* = \theta_p$, a contradiction. If $\theta^* < \theta_p$, then the equilibrium is separating and either $w_H \leq w^*(\theta^*)$ or $w_H > w^*(\theta^*)$. If $w_H \leq w^*(\theta^*)$, then by lemma 8, $\theta^* = \theta_p$, a contradiction. If $w_H > w^*(\theta^*)$, then by the first part, $\theta^* > \theta_p$, a contradiction. Thus, $w_H \leq w_p = w^*(\theta^*)$ and by lemma 8, $(\theta^*, \tau^*) = (\theta_p, \tau_p)$.

Suppose for a contradiction that $w_H > w_p$ and w_H wins. Since $w_H > w_p$, the equilibrium is separating and, by lemma 7, $w_H \leq w^*(\theta^*)$. By lemma 8, this implies that $\theta^* = \theta_p$ and $w^*(\theta^*) = w_p$. Thus, $w_H \leq w_p$ which is a contradiction. Q.E.D.

Now, these lemmas can be used to prove **proposition 2**.

Proof. Lemma 5 directly implies that in any equilibrium $V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w})$ and $\theta^* < \bar{\theta}$, i.e., the median voter is indifferent between regimes and chooses to produce. Lemma 6 proves all the statements for pooling equilibria and defines $w_p = w^*(\theta_p)$. That is, all equilibria with $\theta^* > \theta_p$ are separating. Lemma 7 states that there is no separating equilibrium in which w_H wins with a regime (θ_H, τ_H) in which he would be a producer if not in office. Lemma 8 shows that any separating equilibrium that satisfies $w_H \leq w^*(\theta^*)$ looks like a pooling equilibrium. By lemma 9, if $w_H \leq w_p$, then the pooling equilibrium outcome prevails and if $w_H > w_p$, then the equilibrium is separating and w_L wins with probability 1. Moreover, lemma 8 says that, in a separating equilibrium, i.e., when $w_H > w_p$, the winning regime satisfies $\tilde{w}(\theta_i, \tau_i) = V(\theta_i, \tau_i; w_H)$. Then, w_L wins the election by lemma 7 and agent w_H is (or would choose to be) a producer in equilibrium. Thus, collecting equations, in any equilibrium, (θ_L, τ_L) has to solve (P) and $\{(\theta_L, \tau_L), (\theta_H, \tau_H)\}$ has to satisfy

$$V(\theta_L, \tau_L; \bar{w}) = V(\theta_H, \tau_H; \bar{w})$$
$$\tilde{w}(\theta_L, \tau_L) = V(\theta_L, \tau_L; w_H).$$

The latter implies that

$$\tau_L \int_{w^*(\theta_L)}^{1} wf(w)dw - g(\theta_L) = (1 - F(w^*(\theta_L))\theta_L)(1-\tau_L)w_H. \tag{31}$$

This equation can be rewritten to yield the tax τ_L as a function of θ_L, $\tau_L(\theta_L)$.

$$\tau_L(\theta_L) = \frac{(1 - F(w^*(\theta_L))\theta_L)w_H + g(\theta_L)}{(1 - F(w^*(\theta_L))\theta_L)w_H + \int_{w^*(\theta_L)}^{1} wf(w)dw} \tag{32}$$

$$1 - \tau_L(\theta_L) = \frac{\int_{w^*(\theta_L)}^{1} wf(w)dw - g(\theta_L)}{\int_{w^*(\theta_L)}^{1} wf(w)dw + (1 - F(w^*(\theta_L))\theta_L)w_H}. \tag{33}$$

Moreover, in equilibrium, w_H is making an offer that equalizes the median voter's payoff from both proposals and, since $\theta_H < \theta_L < \bar{\theta}$, the median voter's occupation under either regime would be producer. Thus, let the equilibrium expected payoff of the median voter be $V(\theta_i, \tau_i; \bar{w}) = V(\theta_{-i}, \tau_{-i}; \bar{w}) = \varphi_H \bar{w}$ so that $\varphi_H = (1 - F(w^*(\theta_L))\theta_L)(1-\tau_L) = (1 - F(w^*(\theta_H))\theta_H)(1-\tau_H)$. Let $T_H(\theta_L, \varphi_H) \equiv \{(\theta, \tau) \in [0,1]^2 : (1 - F(w^*(\theta))\theta)(1-\tau) = \varphi_H \text{ and } \theta < \theta_L\}$. Notice that $T_H(\theta_L, \varphi_H) \neq \emptyset$ whenever $(\theta_L, \varphi_H) > 0$. Then it is required that, in equilibrium, $(\theta_H, \tau_H) \in T_H(\theta_L, \varphi_H)$. On the other hand, by lemma 5, agent L's proposal has to solve (P). Thus, using lemma 2, dropping subscripts for the moment, $(\theta_L, \tau_L, \varphi_H)$ solve

$$\begin{aligned}
(1 - F(w^*(\theta))\theta)(1-\tau) &= \varphi \\
\tau_L &= \frac{(1 - F(w^*(\theta))\theta)w_H + g(\theta)}{(1 - F(w^*(\theta))\theta)w_H + \int_{w^*(\theta)}^{1} wf(w)dw} \\
-\tau w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta) &= \theta^{-1}w^*(\theta)[F(w^*(\theta)) + \theta f(w^*(\theta))w^{*\prime}(\theta)](1-\tau).
\end{aligned}$$

Combining the second and the third equation, this can be rewritten to

$$\begin{aligned}
&-\frac{(1 - F(w^*(\theta))\theta)w_H + g(\theta)}{\int_{w^*(\theta)}^{1} wf(w)dw + (1 - F(w^*(\theta))\theta)w_H} w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta) \\
&= \theta^{-1}w^*(\theta)[F(w^*(\theta)) + \theta f(w^*(\theta))w^{*\prime}(\theta)] \frac{\int_{w^*(\theta)}^{1} wf(w)dw - g(\theta)}{\int_{w^*(\theta)}^{1} wf(w)dw + (1 - F(w^*(\theta))\theta)w_H}.
\end{aligned}$$

Rewriting yields

$$\begin{aligned}
&\frac{\left(-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)\right)\left(\int_{w^*(\theta)}^{1} wf(w)dw + (1 - F(w^*(\theta))\theta)w_H\right)}{\theta^{-1}w^*(\theta)F(w^*(\theta))} \\
&\qquad = \int_{w^*(\theta)}^{1} wf(w)dw - g(\theta).
\end{aligned} \tag{34}$$

To simplify notation, define

$$\begin{aligned}
\psi_1(\theta; w_H) &= \int_{w^*(\theta)}^{1} wf(w)dw - g(\theta) \\
\psi_2(\theta; w_H) &= \frac{\left(-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)\right)\left(\int_{w^*(\theta)}^{1} wf(w)dw + (1 - F(w^*(\theta))\theta)w_H\right)}{\theta^{-1}w^*(\theta)F(w^*(\theta))}.
\end{aligned}$$

ψ_1 is quasi-concave and has its unique maximium at $\theta = \hat{\theta}(1)$. It is strictly increasing for all $\theta < \hat{\theta}(1)$ and strictly dcreasing for all $\theta > \hat{\theta}(1)$. $\psi_1(0; w_H) = \mu - g(0) < 0$ and if $\psi_1(\theta'; w_H) > 0$, then $\psi_1(\theta; w_H) \geq 0$ for all $\theta > \theta'$. As to ψ_2, given w_H, the denominator is increasing in θ, while each term in the product constituting the nominator is decreasing in θ in the relevant area. The relevant area is $\theta \leq \hat{\theta}(1)$ since for all $\theta > \hat{\theta}(1)$, $\psi_1(\theta; w_H) \geq 0$ while $\psi_2(\theta; w_H) < 0$. Then, $\hat{\theta}(1) \leq \bar{\theta} \leq \theta_{mod}$, where $w^*(\theta_{mod}) = mod(F)$, so that $f'(\theta) \geq 0$ for all $\theta \leq \hat{\theta}(1)$. Thus, ψ_2 is strictly decreasing in θ on the relevant subset of the domain. Now, by continuity, there is $\theta' > 0$, $\theta' < \hat{\theta}(1)$, such that $\psi_1(\theta'; w_H) < 0$ and $\psi_2(\theta'; w_H) > 0$. Furthermore, $\psi_1(\hat{\theta}(1); w_H) > 0$ and $\psi_2(\hat{\theta}(1); w_H) = 0$. Thus, by the intermediate value theorem and the strict monotonicity of both functions on $(0, \hat{\theta}(1))$, there exists a unique θ^* such $\psi_1(\theta^*; w_H) = \psi_2(\theta^*; w_H)$. Then, given $\theta_L = \theta^*$, (32) give a unique $\tau_L(\theta^*)$, and from the constraint φ^*. Any $(\theta_H, \tau_H) \in T_H(\theta^*, \varphi^*)$ establishes both existence of equilibrium of the political game and uniqueness of the winning regime.

It remains to verify that any such set of schedules is an equilibrium. By construction, given the (θ_H, τ_H), agent w_L cannot increase expected payoffs by deviating. He could increase in-office payoff only by offering something that would make the median voter strictly worse off than with his opponent's proposal and would thus lose falling back to his strictly smaller outside option. Any other proposal that would win gives a worse in-office payoff. Similarly, given (θ_L, τ_L), agent w_H cannot increase expected payoffs by deviating. Any deviation that still loses the election does not change payoffs. The relevant deviations are the ones he gets into office with. The best he can propose to make the median voter at least as well off as with L's proposal is (θ_L, τ_L). He weakly (strictly when w_H is the leader) prefers no to deviate to pooling. Any other potentially winning proposal yields an in-office payoff strictly less than his outside option payoff from losing.

As to the comparative statics, let θ^* and τ^* denote the equilibrium institutions and tax that imply the equilibrium payoff factor φ^* for producers. First notice that φ, ν, $\tilde{w}$, y, and $\mathcal{W}$ are differentiable in both their arguments. Also, $w^*(\theta)$ is differentiable in θ and the expression for $1 - \tau$ in equation (33) is differentiable in both θ and w_H.

If $w_H < w_p$, then $(\theta^*, \tau^*) = (\theta_p, \tau_p)$ and there is an $\epsilon > 0$ such that for all $w'_H \in (w_H - \epsilon, w_H + \epsilon)$, $w'_H < w_p$ and the corresponding equilibrium satisfies $(\theta^*, \tau^*) = (\theta_p, \tau_p)$. That is, all the functions are differentiable with respect w_H for all $w_H < w_p$ but don't change in w_H.

Assume that $w_H > w_p$. Recall that the equilibrium tax τ and the expression $1 - \tau$ are given by equations (32) and (33). For notational simplicity, let (θ, τ) refer to the equilibrium regime (θ^*, τ^*). The relevant equilibrium expressions are $\varphi(\theta, \tau)$, $\nu(\theta, \tau) = \varphi(\theta, \tau) w^*(\theta)$, and $\tilde{w}(\theta, \tau) = \varphi(\theta, \tau) w_H$. Using (33), these can be rewritten as

$$
\begin{aligned}
\varphi(\theta, \tau) &= (1 - F(w^*(\theta))\theta)(1 - \tau) = (1 - F(w^*(\theta))\theta) \frac{\int_{w^*(\theta)}^1 w f(w) dw - g(\theta)}{\int_{w^*(\theta)}^1 w f(w) dw + (1 - F(w^*(\theta))\theta) w_H} \\
&= \frac{\int_{w^*(\theta)}^1 w f(w) dw - g(\theta)}{\theta^{-1} w^*(\theta) + w_H} \\
\nu(\theta, \tau) &= \varphi(\theta, \tau) w^*(\theta) = \frac{\int_{w^*(\theta)}^1 w f(w) dw - g(\theta)}{\theta^{-1} w^*(\theta) + w_H} w^*(\theta) \\
\tilde{w}(\theta, \tau) &= \varphi(\theta, \tau) w_H = \frac{\int_{w^*(\theta)}^1 w f(w) dw - g(\theta)}{\theta^{-1} w^*(\theta) + w_H} w_H.
\end{aligned}
$$

All of them are differentiable with respect to both w_H and θ. Notice first that

$$\begin{aligned}
\frac{\partial\varphi(\theta,\tau)}{\partial w_H} &= -\frac{\int_{w^*(\theta)}^1 wf(w)dw - g(\theta)}{\left(\theta^{-1}w^*(\theta)+w_H\right)^2} = -\left(\theta^{-1}w^*(\theta)+w_H\right)^{-1}\varphi(\theta,\tau) \\
\frac{\partial\varphi(\theta,\tau)}{\partial\theta} &= \left(\theta^{-1}w^*(\theta)+w_H\right)^{-2}\Big[(-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta)-g'(\theta))\left(\theta^{-1}w^*(\theta)+w_H\right) \\
&\quad -\left(\int_{w^*(\theta)}^1 wf(w)dw - g(\theta)\right)\left(\theta^{-1}w^{*\prime}(\theta)-\theta^{-2}w^*(\theta)\right)\Big] \\
&= \frac{\left(\theta^{-1}w^*(\theta)+w_H\right)^{-2}}{(1-F(w^*(\theta))\theta)}\Big[(-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta)-g'(\theta))(1-F(w^*(\theta))\theta)\left(\theta^{-1}w^*(\theta)+w_H\right) \\
&\quad -\left(\int_{w^*(\theta)}^1 wf(w)dw - g(\theta)\right)\theta^{-2}w^*(\theta)\left(1-(1-F(w^*(\theta))\theta)\right)\Big] \\
&= \frac{\left(\theta^{-1}w^*(\theta)+w_H\right)^{-2}}{(1-F(w^*(\theta))\theta)}\Big[(-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta)-g'(\theta))\Big(\int_{w^*(\theta)}^1 wf(w)dw \\
&\quad +(1-F(w^*(\theta))\theta)w_H\Big)-\left(\int_{w^*(\theta)}^1 wf(w)dw - g(\theta)\right)\theta^{-1}w^*(\theta)F(w^*(\theta))\Big] = 0
\end{aligned}$$

since, in equilibrium, $\psi_1(\theta;w_H)=\psi_2(\theta;w_H)$. Therefore,

$$\frac{d\varphi(\theta,\tau)}{dw_H} = \frac{\partial\varphi(\theta,\tau)}{\partial w_H}+\frac{\partial\varphi(\theta,\tau)}{\partial\theta}\cdot\frac{\partial\theta}{\partial w_H} = \frac{\partial\varphi(\theta,\tau)}{\partial w_H} = -\left(\theta^{-1}w^*(\theta)+w_H\right)^{-1}\varphi(\theta,\tau)<0,$$

i.e., the taxpayers' payoffs decreases in w_H. Similarly,

$$\begin{aligned}
\frac{d\tilde{w}(\theta,\tau)}{dw_H} &= \frac{\partial\tilde{w}(\theta,\tau)}{\partial w_H}+\frac{\partial\tilde{w}(\theta,\tau)}{\partial\theta}\cdot\frac{\partial\theta}{\partial w_H} = \frac{\partial\varphi(\theta,\tau)}{\partial w_H}w_H+\varphi(\theta,\tau)+w_H\frac{\partial\varphi(\theta,\tau)}{\partial\theta}\cdot\frac{\partial\theta}{\partial w_H} \\
&= \frac{\partial\varphi(\theta,\tau)}{\partial w_H}w_H+\varphi(\theta,\tau) = \left(1-\left(\theta^{-1}w^*(\theta)+w_H\right)^{-1}w_H\right)\varphi(\theta,\tau)>0,
\end{aligned}$$

since $\varphi(\theta,\tau)>0$ and $1-\left(\theta^{-1}w^*(\theta)+w_H\right)^{-1}w_H>0$ iff $\theta^{-1}w^*(\theta)>0$ which holds. Thus, the office holder's payoff increases in w_H. With respect to $\nu(\theta,\tau)$, we have that

$$\begin{aligned}
\frac{\partial\nu(\theta,\tau)}{\partial w_H} &= \frac{\partial\varphi(\theta,\tau)}{\partial w_H}w^*(\theta)+\varphi(\theta,\tau)\frac{\partial w^*(\theta)}{\partial w_H} = \frac{\partial\varphi(\theta,\tau)}{\partial w_H}w^*(\theta) = -\left(\theta^{-1}w^*(\theta)+w_H\right)^{-1}\nu(\theta,\tau)<0 \\
\frac{\partial\nu(\theta,\tau)}{\partial\theta} &= \frac{\partial\varphi(\theta,\tau)}{\partial\theta}w^*(\theta)+\varphi(\theta,\tau)w^{*\prime}(\theta) = \varphi(\theta,\tau)w^{*\prime}(\theta) = \theta^{-1}(1-F(w^*(\theta))\theta)^{-1}\nu(\theta,\tau)>0
\end{aligned}$$

As to $\frac{\partial\theta}{\partial w_H}$, consider the equation $\hat{\psi}(\theta;w_H)=\psi_1(\theta;w_H)-\psi_2(\theta;w_H)=0$ with both ψ_1 and ψ_2 as defined above. The conditions of the Implicit Function Theorem are satisfied at all $(\theta(w_H),w_H)$ so that $\frac{\partial\theta}{\partial w_H}=$

$-\frac{\hat{\psi}_{w_H}(\theta;w_H)}{\hat{\psi}_\theta(\theta;w_H)}$ on $(0,\hat{\theta}(1))$, or

$$\begin{aligned}\frac{\partial\theta}{\partial w_H} = (1-F(w^*(\theta))\theta)\Bigg[&\theta^{-1}w^*(\theta)F(w^*(\theta)) + w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) + F(w^*(\theta))w_H + \theta f(w^*(\theta))w^{*\prime}(\theta)w_H \\ &+ \left(\int_{w^*(\theta)}^1 wf(w)dw + (1-F(w^*(\theta))\theta)w_H\right)\Big(-\theta^{-1} + \theta^{-1}(1-F(w^*(\theta))\theta)^{-1} + F(w^*(\theta))^{-1}f(w^*(\theta))w^{*\prime}(\theta) \\ &+ \frac{f(w^*(\theta))w^{*\prime}(\theta)^2 + w^*(\theta)f'(w^*(\theta))w^{*\prime}(\theta)^2 + w^*(\theta)f(w^*(\theta))w^{*\prime\prime}(\theta) + g''(\theta)}{-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)}\Big)\Bigg]^{-1} > 0,\end{aligned}$$

since $f'(w^*(\theta)) > 0$ as $w^*(\theta) < \bar{w} \le w_{mod}$. That is, enforcement θ is differentiable in w_H and worsens with it for all $w_H > w_p$. This implies that all equilibrium payoffs, output, and welfare are differentiable with respect to w_H for all $w_H > w_p$. Thus, $\frac{\partial\nu(\theta,\tau)}{\partial\theta}\cdot\frac{\partial\theta}{\partial w_H}$

$$\begin{aligned}= \nu(\theta,\tau)\Bigg[&w^*(\theta)F(w^*(\theta)) + \theta w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) + \theta F(w^*(\theta))w_H + \theta^2 f(w^*(\theta))w^{*\prime}(\theta)w_H \\ &+ \left(\int_{w^*(\theta)}^1 wf(w)dw + (1-F(w^*(\theta))\theta)w_H\right)\Big((1-F(w^*(\theta))\theta)^{-1} - 1 + \theta F(w^*(\theta))^{-1}f(w^*(\theta))w^{*\prime}(\theta) \\ &+ \frac{\theta f(w^*(\theta))w^{*\prime}(\theta)^2 + \theta w^*(\theta)f'(w^*(\theta))w^{*\prime}(\theta)^2 + \theta w^*(\theta)f(w^*(\theta))w^{*\prime\prime}(\theta) + \theta g''(\theta)}{-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)}\Big)\Bigg]^{-1}.\end{aligned}$$

Now, $\frac{d\nu(\theta,\tau)}{dw_H} = \frac{\partial\nu(\theta,\tau)}{\partial w_H} + \frac{\partial\nu(\theta,\tau)}{\partial\theta}\cdot\frac{\partial\theta}{\partial w_H} < 0$ iff $-\frac{\partial\nu(\theta,\tau)}{\partial w_H} > \frac{\partial\nu(\theta,\tau)}{\partial\theta}\cdot\frac{\partial\theta}{\partial w_H}$ iff

$$\begin{aligned}&\theta^{-1}w^*(\theta) + w_H < w^*(\theta)F(w^*(\theta)) + \theta w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) + \theta F(w^*(\theta))w_H + \theta^2 f(w^*(\theta))w^{*\prime}(\theta)w_H \\ &\quad + \left(\int_{w^*(\theta)}^1 wf(w)dw + (1-F(w^*(\theta))\theta)w_H\right)\Big(\frac{F(w^*(\theta))\theta}{(1-F(w^*(\theta))\theta)} + \theta F(w^*(\theta))^{-1}f(w^*(\theta))w^{*\prime}(\theta) \\ &\quad + \frac{\theta f(w^*(\theta))w^{*\prime}(\theta)^2 + \theta w^*(\theta)f'(w^*(\theta))w^{*\prime}(\theta)^2 + \theta w^*(\theta)f(w^*(\theta))w^{*\prime\prime}(\theta) + \theta g''(\theta)}{-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)}\Big) \\ &\Leftrightarrow (1-F(w^*(\theta))\theta)\theta^{-1}w^*(\theta) + (1-F(w^*(\theta))\theta)w_H < \theta^2 f(w^*(\theta))w^{*\prime}(\theta)[\theta^{-1}w^*(\theta) + w_H] \\ &\quad + \left(\int_{w^*(\theta)}^1 wf(w)dw + (1-F(w^*(\theta))\theta)w_H\right)\Big(\frac{F(w^*(\theta))\theta}{(1-F(w^*(\theta))\theta)} + \theta F(w^*(\theta))^{-1}f(w^*(\theta))w^{*\prime}(\theta) \\ &\quad + \frac{\theta f(w^*(\theta))w^{*\prime}(\theta)^2 + \theta w^*(\theta)f'(w^*(\theta))w^{*\prime}(\theta)^2 + \theta w^*(\theta)f(w^*(\theta))w^{*\prime\prime}(\theta) + \theta g''(\theta)}{-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)}\Big) \\ &\Leftrightarrow (1-F(w^*(\theta))\theta)\left(\int_{w^*(\theta)}^1 wf(w)dw + (1-F(w^*(\theta))\theta)w_H\right) < \left(\int_{w^*(\theta)}^1 wf(w)dw + (1-F(w^*(\theta))\theta)w_H\right) \\ &\quad \times\Big(\theta^2 f(w^*(\theta))w^{*\prime}(\theta) + F(w^*(\theta))\theta + (1-F(w^*(\theta))\theta)\theta F(w^*(\theta))^{-1}f(w^*(\theta))w^{*\prime}(\theta) \\ &\quad + (1-F(w^*(\theta))\theta)\frac{\theta f(w^*(\theta))w^{*\prime}(\theta)^2 + \theta w^*(\theta)f'(w^*(\theta))w^{*\prime}(\theta)^2 + \theta w^*(\theta)f(w^*(\theta))w^{*\prime\prime}(\theta) + \theta g''(\theta)}{-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)}\Big) \\ &\Leftrightarrow 1 < 2F(w^*(\theta))\theta + \theta F(w^*(\theta))^{-1}f(w^*(\theta))w^{*\prime}(\theta) \\ &\quad + (1-F(w^*(\theta))\theta)\frac{\theta f(w^*(\theta))w^{*\prime}(\theta)^2 + \theta w^*(\theta)f'(w^*(\theta))w^{*\prime}(\theta)^2 + \theta w^*(\theta)f(w^*(\theta))w^{*\prime\prime}(\theta) + \theta g''(\theta)}{-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) - g'(\theta)}.\end{aligned}$$

Since $\theta < \bar{\theta} \le \theta_{mod}$, the $f'(w^*(\theta)) > 0$ so that the fraction on the right hand side is strictly positive. Thus, it is sufficient to show that $1 \le 2F(w^*(\theta))\theta + \theta F(w^*(\theta))^{-1}f(w^*(\theta))w^{*\prime}(\theta)$. However, $\theta F(w^*(\theta))^{-1}f(w^*(\theta))w^{*\prime}(\theta) = \frac{f(w^*(\theta))w^*(\theta)}{F(w^*(\theta))(1-F(w^*(\theta))\theta)} > \frac{f(w^*(\theta))w^*(\theta)}{F(w^*(\theta))}$. That is, it is sufficient to show that

$\frac{f(w^*(\theta))w^*(\theta)}{F(w^*(\theta))} \geq 1$. Thus, it is sufficient to require $\frac{wf(w)}{F(w)} \geq 1$ or $wf(w) \geq F(w)$ for all $w \leq \bar{w}$. Since $\bar{w} \leq w_{mod}$, we have that $f'(w) \geq 0$ for all $w \leq \bar{w}$ and strictly so if $w < \bar{w}$. At $w = 0$, both sides are equal to zero. For all $w \in (0, \bar{w})$, the derivative of the left hand side is $f(w) + wf'(w) \geq f(w)$ which is the derivative of the right hand side. Hence, $wf(w) \geq F(w)$ holds, which establishes that appropriators' payoffs decrease in w_H.
Consequently, since the welfare functional is the sum of all taxpayers' and appropriators' payoffs, which decrease in w_H, welfare decreases in w_H. As to output, the derivative of $y(\theta)$ with respect to θ is given by $-w^*(\theta)f(w^*(\theta))w^{*\prime}(\theta) < 0$. Thus, since $\frac{\partial\theta}{\partial w_H} > 0$ when $w_H > w_p$, the result obtains. This completes the proof. Q.E.D.

E.3 The selection game given a set of potential candidates

Proposition 3

Proof. By a standard argument, a mixed strategy equilibrium exists under both timing assumptions. I conjecture there is a pure strategy equilibrium and attempt to find it by iterated elimination of (weakly) dominated strategies. Since $V^a(w) \leq \alpha$ for all $w \in [0,1]$ and since $\tilde{w}^d > \alpha$, for any $w_j \in \hat{N}$, if $n_j' = 0$, then w_j chooses to run, that is $\chi_j^s = 1$. Similarly, since $V^d(w) \leq \alpha$ for all $w \in [0,1]$, if $n_j' = 1$, then w_j runs, i.e., $\chi_j^s = 1$, since not running yields the out-of-office payoff associated with some agent's dictatorship while running yields at least $\bar{\bar{\varphi}} w_p > \alpha$. Thus, if $n_j' \leq 1$, then w_j runs.
Assume that $\hat{N} \subset [0, w_p]$. Then, independent of who actually gets to run, the outcome is $(\theta^*, \tau^*) = (\theta_p, \tau_p)$ and all agents would be appropriators getting the best possible outcome they could get in any conceivable regime. Any (random) selection of agents of at least two agents into running is an equilibrium. Assume that $\hat{N} \cap (w_p, 1] \neq \emptyset$.
First, I argue that running is a (weakly) dominant strategy for w_1. Consider any strategy profile of the agents in $\hat{N}_1$. Assume $n_1' > 1$. Since $w' > w_1$ for all $w' \in \hat{N}_1'$, it holds that $V(\theta(w'), \tau(w'); w') \geq V(\theta(w'), \tau(w'); w_1)$ for all $w' \in \hat{N}_1'$ so that expected payoff from running is given by

$$\begin{aligned}
&\sum_{w' \in \hat{N}_1'} \frac{2x_1(w')}{n_1'(n_1'+1)} V(\theta(w'), \tau(w'); w_1) + \sum_{w' \in \hat{N}_1'} \frac{2}{n_1'(n_1'+1)} V(\theta(w'), \tau(w'); w') \\
&= \frac{n_1'-1}{n_1'+1} \sum_{w' \in \hat{N}_1'} \frac{2x_1(w')}{n_1'(n_1'-1)} V(\theta(w'), \tau(w'); w_1) + \frac{2}{n_1'+1} \sum_{w' \in \hat{N}_1'} \frac{1}{n_1'} V(\theta(w'), \tau(w'); w') \\
&= \frac{n_1'-1}{n_1'+1} \sum_{w' \in \hat{N}_1'} \frac{2x_1(w')}{n_1'(n_1'-1)} V(\theta(w'), \tau(w'); w_1) + \left(1 - \frac{n_1'-1}{n_1'+1}\right) \sum_{w' \in \hat{N}_1'} \frac{1}{n_1'} V(\theta(w'), \tau(w'); w') \\
&\geq \sum_{w' \in \hat{N}_1'} \frac{2x_1(w')}{n_1'(n_1'-1)} V(\theta(w'), \tau(w'); w_1)
\end{aligned}$$

which is the expected payoff from not running. The weak inequality derives from the convex combination since $\sum_{w' \in \hat{N}_1'} \frac{2x_1(w')}{n_1'(n_1'-1)} = 1$ and $\sum_{w' \in \hat{N}_1'} \frac{1}{n_1'} = 1$. It is strict if $\hat{N}_1' \cap (w_p, 1] \neq \emptyset$. Thus, given $\hat{N}_1'$, $n_1' > 1$, w_1 weakly prefers to run. Since this holds for any strategy profile $\hat{N}_1'$, w_1 has a weakly dominant strategy of running.
Consider agent w_2. Consider any strategy profile of the agents in $\hat{N}_2$. If $w_1 \notin \hat{N}_2'$, then the analysis is exactly the same as for agent w_1 above. Thus, w_2 runs. Assume $w_1 \in \hat{N}_2'$ and $n_2' > 1$. Then, since $x_2(w_1) = 0$ and

$V(\theta(w'), \tau(w'); w') \geq V(\theta(w'), \tau(w'); w_2)$ for all $w' \in \hat{N}_2' \backslash \{w_1\}$ his expected payoff from running is given by

$$\sum_{w' \in \hat{N}_2'} \frac{2x_2(w')}{n_2'(n_2'+1)} V(\theta(w'), \tau(w'); w_2) + \sum_{w' \in \hat{N}_2' \backslash \{w_1\}} \frac{2}{n_2'(n_2'+1)} V(\theta(w'), \tau(w'); w')$$
$$+ \frac{2}{n_2'(n_2'+1)} V(\theta(w_2), \tau(w_2); w_2)$$
$$= \frac{n_2'-1}{n_2'+1} \sum_{w' \in \hat{N}_2'} \frac{2x_2(w')}{n_2'(n_2'-1)} V(\theta(w'), \tau(w'); w_2) + \frac{2}{n_2'+1} \left(\sum_{w' \in \hat{N}_2' \backslash \{w_1\}} \frac{1}{n_2'} V(\theta(w'), \tau(w'); w') \right.$$
$$\left. + \frac{1}{n_2'} V(\theta(w_2), \tau(w_2); w_2) \right)$$
$$= \frac{n_2'-1}{n_2'+1} \sum_{w' \in \hat{N}_2'} \frac{2x_2(w')}{n_2'(n_2'-1)} V(\theta(w'), \tau(w'); w_2) + \left(1 - \frac{n_2'-1}{n_2'+1}\right) \left(\sum_{w' \in \hat{N}_2' \backslash \{w_1\}} \frac{1}{n_2'} V(\theta(w'), \tau(w'); w') \right.$$
$$\left. + \frac{1}{n_2'} V(\theta(w_2), \tau(w_2); w_2) \right) \geq \sum_{w' \in \hat{N}_2'} \frac{2x_2(w')}{n_2'(n_2'-1)} V(\theta(w'), \tau(w'); w_2).$$

which is the expected payoff from not running. The weak inequality derives from the convex combination since $\sum_{w' \in \hat{N}_2'} \frac{2x_2(w')}{n_2'(n_2'-1)} = 1$, $\sum_{w' \in \hat{N}_2' \backslash \{w_1\}} \frac{1}{n_2'} + \frac{1}{n_2'} = 1$, and, by proposition 2, $V(\theta(w_2), \tau(w_2); w_2) \geq V(\theta(w'), \tau(w'); w_2)$ for all $w' \in \hat{N}_2' \backslash \{w_1\}$. It is strict if $\hat{N}_2' \cap (w_p, 1] \neq \emptyset$. Therefore, w_2 weakly prefers selecting to run, independent of whether or not w_1's weakly dominated strategy is eliminated.

Assume that $|\hat{N} \cap [0, w_p]| \leq 2$. Then, all the above inequalities that are potentially strict are actually strict so that the dominance is strict. Next, consider agent w_n. Consider any strategy profile of the agents in $\hat{N}_n$ with $w_1, w_2 \in \hat{N}_n'$. Note that $w_n = \arg\max N$ and the important aspect is that $n_n' \geq 2$ rather than w_1 and w_2 selected to run. Since, by proposition 2, $V(\theta(w_n), \tau(w_n); w_n) \leq V(\theta(w'), \tau(w'); w_n)$ for all $w' \in \hat{N}_n'$, his expected payoff from running is

$$\sum_{w' \in \hat{N}_n'} \frac{2x_n(w')}{n_n'(n_n'+1)} V(\theta(w'), \tau(w'); w_n) + \sum_{w' \in \hat{N}_n'} \frac{2}{n_n'(n_n'+1)} V(\theta(w_n), \tau(w_n); w_n)$$
$$= \sum_{w' \in \hat{N}_n'} \frac{2x_n(w')}{n_n'(n_n'+1)} V(\theta(w'), \tau(w'); w_n) + n_n' \frac{2}{n_n'(n_n'+1)} V(\theta(w_n), \tau(w_n); w_n)$$
$$= \frac{n_n'-1}{n_n'+1} \sum_{w' \in \hat{N}_n'} \frac{2x_n(w')}{n_n'(n_n'-1)} V(\theta(w'), \tau(w'); w_n) + \left(1 - \frac{n_n'-1}{n_n'+1}\right) V(\theta(w_n), \tau(w_n); w_n)$$
$$\leq \sum_{w' \in \hat{N}_n'} \frac{2x_n(w')}{n_n'(n_n'-1)} V(\theta(w'), \tau(w'); w_n),$$

which is his expected payoff from not running. The weak inequality derives from the convex combination since $\sum_{w' \in \hat{N}_n'} \frac{2x_n(w')}{n_n'(n_n'-1)} = 1$, so that $\sum_{w' \in \hat{N}_n'} \frac{2x_n(w')}{n_n'(n_n'-1)} V(\theta(w'), \tau(w'); w_n) \geq V(\theta(w_n), \tau(w_n); w_n)$. It holds strictly if $w_n > w_p$ which is assumed. This implies that w_n prefers not to run. That is, given that w_1 and w_2 run, w_n has a strictly dominant strategy of not running.

Next consider agent w_{n-1}. Consider any strategy profile of the agents in $\hat{N}_{n-1}$ with $w_1, w_2 \in \hat{N}_{n-1}'$ and $w_n \notin \hat{N}_{n-1}'$. The problem for w_{n-1} now looks exactly the same as the one for w_n above. Thus, analysis and result are the same so that not running weakly dominates running for w_{n-1}. The same argument then holds for agents $w_{n-2}, \ldots, w_3$. That is, only w_1 and w_2 select themselves into running and therefore run for office.

It can be verified that all agents other than w_1 and w_2 have no weakly dominated strategy if the ones of w_1

and w_2 are not deleted. They would choose to run if at most one of the agents with a smaller productivity than themselves runs but refrain from doing so if at least two of them do so. By the very nature of the argument, any other strategy profile allows for profitable deviations. Therefore, the equilibrium is unique, w_1 wins the election, w_2 determines the outcome.
Assume that $2 < |\hat{N} \cap [0, w_p]| < n$. For all agents in $\hat{N} \cap [0, w_p] \backslash \{w_1, w_2\}$, the consideration parallels the one worked out for agents w_1 and w_2 above. That is, they also have a weakly dominant strategy of running and any subset of $\hat{N} \cap [0, w_p]$ can be part of the equilibrium selection. Any one of them wants to run if some agent $w' > w_p$ wants to run in order to increase the probability of best possible outcomes. They are indifferent if only agents from that set want to run since they get the best possible appropriation payoff which equals the corresponding in-office payoff as the regime would be (θ_p, τ_p). For all agents in $\hat{N}$ with $w' > w_p$, then the argument parallels the one for agents $w_n, w_{n-1}, \dots, w_3$ in the above case. As a consequence, any subset selected from $\hat{N} \cap [0, w_p]$ is an equilibrium with the associated outcome $(\theta^*, \tau^*) = (\theta_p, \tau_p)$. Any strategy profile involving agents from $(w_p, 1]$ running allows for profitable deviations. Q.E.D.

E.4 Constraints to participation

E.4.1 Access to political competition

Proposition 4

Proof. First, in the selection game, the agent that determines the outcome is the second smallest element of the set N, w_2. By proposition 2, the smaller w_2, the (weakly) better are institutions and the higher is welfare. It follows directly that everything that increases the probability of w_2 being small improves the likelihood of good outcomes. Consider any z such that $\Gamma(z) \in (0, 1)$ and $\gamma(z) > 0$. Let Γ_2 be the cdf of the second smallest element, the second order statistic. Then, $\Gamma_2(z) = 1 - \big((1 - \Gamma(z))^n + \Gamma(z)(1 - \Gamma(z))^{n-1}n\big)$. This can be rewritten to $\Gamma_2(z) = 1 - (1 - \Gamma(z))^{n-1}(1 + (n-1)\Gamma(z))$. Since $\Gamma(z) \in (0, 1)$ and $\gamma(z) > 0$, the derivative with respect to n is given by

$$\frac{\partial \Gamma_2(z)}{\partial n} = -(1 - \Gamma(z))^{n-1}(\Gamma(z) + (1 + (n-1)\Gamma(z)) \log(1 - \Gamma(z))) > 0$$

if and only if $\frac{\Gamma(z)}{(1+(n-1)\Gamma(z))} < -\log(1 - \Gamma(z))$. Fix n. If $\Gamma(z) = 0$, both side of this inequality are equal to zero. The derivative of the left hand side with respect to z is $\frac{\gamma(z)(1+(n-1)\Gamma(z)) - \Gamma(z)(n-1)\gamma(z)}{(1+(n-1)\Gamma(z))^2} = \frac{\gamma(z)}{(1+(n-1)\Gamma(z))^2} < \frac{\gamma(z)}{(1-\Gamma(z))}$ which is the derivative of the right hand side with respect to z. Hence, $\frac{\partial \Gamma_2(z)}{\partial n} > 0$. Therefore, the probability of $w_2 \leq z$ and, thus, the probability of better institutions and higher welfare increases with n.
Second, consider $\underline{w}$ and $\underline{w}'$, $\underline{w} < \underline{w}'$. Since Γ' is a truncation of Γ, $\Gamma'(z) = \frac{\Gamma(z) - \Gamma(\underline{w}')}{1 - \Gamma(\underline{w}')}$ if $z \geq \underline{w}'$ and $\Gamma'(z) = 0$ otherwise. Note that $\Gamma'(z) = \Gamma(z)$ if $\underline{w}' = \underline{w}$. Thus, $\frac{\partial \Gamma'(z)}{\partial \underline{w}'} = -\frac{[1-\Gamma(z)]\gamma(\underline{w}')}{[1-\Gamma(\underline{w}')]^2} \leq 0$ and strictly so if $\Gamma(z) < 1$. Then,

$$\frac{\partial \Gamma_2'(z)}{\partial \underline{w}'} = n(n-1)(1 - \Gamma'(z))^{n-2}\Gamma'(z)\frac{\partial \Gamma'(z)}{\partial \underline{w}'} \leq 0$$

and strictly so if $\Gamma(z) \in (0, 1)$. Therefore, decreasing $\underline{w}$ increases the probability of better institutions and higher welfare.
Finally, the second order statistics $\Gamma_2(z)$ increase with $\Gamma(z)$, since

$$\frac{\partial \Gamma_2(z)}{\partial \Gamma(z)} = n(n-1)\Gamma(z)(1 - \Gamma(z))^{n-2} \geq 0$$

and strictly so if $\Gamma(z) \in (0,1)$. Since Γ' first order stochastically dominates Γ, $\Gamma(z) \geq \Gamma'(z)$ for all z and strictly so for some z. The result follows. Q.E.D.

E.4.2 Qualified electorate or elites

Proposition 5

Proof. Note that the universe the sets $\mathcal{I}$, $\mathcal{I}^+$, and $\mathcal{I}^-$ live in remains unchanged due to the assumption that the elite E has full support. However, the distribution function used in defining $\mathcal{M}_e$, $\mathcal{M}_e^+$, and $\mathcal{M}_e^-$ is F_e. Given the regime (θ, τ) chosen, the competitive equilibrium and, thus, payoffs depend only on the productivity distribution in the population. Thus, lemma 3 holds. Since $\bar{\theta}^e \geq \bar{\theta}$ and $f_{w\chi_e}(z, 1)$ has full support, proposition 4 can be rewritten replacing $\bar{w}$ by $\bar{w}^e$. The proof is exactly the same replacing $\bar{\theta}$ with $\bar{\theta}^e$ and F by F_e. It follows that the probabilities of winning are given by equations (16)-(18) using $\bar{\theta}^e$ and $\bar{w}^e$ instead of $\bar{\theta}$ and $\bar{w}$. For the same reasons, lemma 5 goes through, both as it is and with $\bar{\theta}^e$ replacing $\bar{\theta}$. Then, all other results follow directly from the unaltered payoff structure. Q.E.D.

References

Acemoglu, Daron, "Why not a political Coase theorem? Social conflict, commitment and politics," *Journal of Comparative Economics*, 2003, *31*, 620–652.

_ , "A simple model of inefficient institutions," *Scandinavian Journal of Economics*, 2006, *108*, 515–546.

_ , "Oligarchic versus democratic societies," *Journal of the European Economic Association*, 2008, *6*, 1–44.

_ **and James A. Robinson**, "Inefficient redistribution," *The American Political Science Review*, 2001, *95*, 649–661.

_ **and Simon Johnson**, "Unbundling institutions," *The Journal of Political Economy*, 2005, *113*, 949–995.

_ **and Thierry Verdier**, "The Choice between Market Failures and Corruption," *The American Economic Review*, 2000, *90*, 194–211.

_ **, Simon Johnson, and James Robinson**, "Institutions as the Fundamental Cause of Long-Run Growth," 2005. In Handbook of Economic Growth, eds. Philippe Aghion and Stephen Durlauf, Elsevier Science.

Aidt, Toke S., "Economic Analysis of Corruption: A Survey," *The Economic Journal*, 2003, *113*, F632–F652.

Baron, David P. and John A. Ferejohn, "Bargaining in Legislatures," *The American Political Science Review*, 1989, *83*, 1181–1206.

Barro, Robert J., "The control of politicians: an economic model," *Public Choice*, 1973, *14*, 19–42.

— , "Democracy and Growth," *Journal of Economic Growth*, 1996, *1*, 1–27.

Becker, Gary S., "Crime and Punishment: An Economic Approach," *The Journal of Political Economy*, 1968, *76*, 169–217.

— **and George J. Stigler**, "Law enforcement, malfeasance and compensation of enforcers," *The Journal of Legal Studies*, 1974, *3*, 1–18.

Benhabib, Jess and Aldo Rustichini, "Social Conflict and Growth," *Journal of Economic Growth*, 1996, *1*, 125–142.

Benoît, Jean-Pierre and Martin J. Osborne, "Crime, Punishment and Social Expenditure," *Journal of Institutional and Theoretical Economics*, 1995, *151*, 326–347.

Besley, Timothy, "Political Selection," *The Journal of Economic Perspectives*, 2005, *19*, 43–60.

— **and Maitreesh Ghatak**, "Property Rights and Economic Development," 2010. In Handbook of Development Economics, eds. Mark Rosenzweig and Dani Rodrik, Elsevier Science.

— **and Stephen Coate**, "An Economic Model of Representative Democracy," *The Quarterly Journal of Economics*, 1997, *112*, 85–114.

Easterly, William and Ross Levine, "Tropics, germs, and crops: how endowments influence economic development," *Journal of Monetary Economics*, 2003, *50*, 3–39.

Ferejohn, John, "Incumbent performance and electoral control," *Public Choice*, 1986, *50*, 5–25.

Glaeser, Edward L., Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, "Do institutions cause growth?," *Journal of Economic Growth*, 2004, *9*, 271–303.

Glazer, Amihai and Susanne Lohmann, "Setting the agenda: Electoral competition, commitment of policy and issue salience," *Public Choice*, 1999, *99*, 377–394.

Grossman, Herschel I. and Minseong Kim, "Swords or Plowshares? A Theory of the Security of Claims to Property," *The Journal of Political Economy*, 1995, *103*, 1275–1288.

— **and** — , "Predation and Accumulation," *Journal of Economic Growth*, 1996, *1*, 333–350.

Harrington, Joseph E. Jr, "The power of the proposal maker in a model of endogenous agenda formation," *Public Choice*, 1990, *64*, 1–20.

Hirshleifer, Jack, "The analytics of continuing conflict," *Synthese*, 1988, *76*, 201–233.

Imrohoroglu, Ayse, Antonio Merlo, and Peter Rupert, "On the political economy of income redistribution and crime," *International Economic Review*, 2000, *41*, 1–25.

Knack, Stephen and Philip Keefer, "Institutions and Economic Performance: Cross-Country Tests Using Alternative Institutional Measures," *Economics and Politics*, 1995, *7*, 207–227.

McKelvey, Richard D., "Intransitivities in Multidimensional Voting Models and Some Implications for Agenda Control," *Journal of Economic Theory*, 1976, *12*, 472–482.

_ , "General Conditions for Global Intransitivities in Formal Voting Models," *Econometrica*, 1979, *47*, 1085–1112.

Murphy, Kevin M., Andrei Shleifer, and Robert W. Vishny, "Why Is Rent-Seeking So Costly to Growth?," *The American Economic Review, Papers and Proceedings*, 1993, *83*, 409–414.

North, Douglass C., John Joseph Wallis, and Barry R. Weingast, "A conceptual framework for interpreting recorded human history," 2006. NBER Working Paper 12795.

_ , _ , Steven B. Webb, and Barry R. Weingast, "Limited access orders in the developing world: A new approach to the problems of development," 2007. The World Bank, Policy Research Working Paper 4359.

Osborne, Martin J. and Al Slivinski, "A Model of Political Competition with Citizen-Candidates," *The Quarterly Journal of Economics*, 1996, *111*, 65–96.

Plott, Charles R., "A Notion of Equilibrium and its Possibility Under Majority Rule," *The American Economic Review*, 1967, *57*, 787–806.

Rodrik, Dani, Arvind Subramanian, and Francesco Trebbi, "Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development," *Journal of Economic Growth*, 2004, *9*, 131–165.

Rose-Ackerman, Susan, "The Economics of Corruption," *Journal of Public Economics*, 1975, *4*, 187–203.

Schofield, Norman, "Instability of Simple Dynamic Games," *The Review of Economic Studies*, 1978, *45*, 575–594.

_ , "Generic Instability of Majority Rule," *The Review of Economic Studies*, 1983, *50*, 695–705.

Shepsle, Kenneth A. and Barry R. Weingast, "Structure-induced equilibrium and legislative choice," *Public Choice*, 1981, *37*, 503–519.

Skaperdas, Stergios, "Cooperation, Conflict, and Power in the Absence of Property Rights," *The American Economic Review*, 1992, *82*, 720–739.