

DEMOCRATIZATION AND THE RULE OF LAW*

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Abstract

This paper investigates the endogenous emergence of democracy and property rights in an economy where heterogeneous individuals can invest in arms and protect themselves against expropriation by others or the state. Public protection of property rights creates an efficient environment, but depends on the extent of private protection in the population. We characterize the dynamic evolution of the economy in which both the political regime and property rights are endogenously determined. The theory delivers several novel results. Multiple politico-economic equilibria can be sustained conditional on beliefs about property rights enforcement. Democratization is endogenous and democracies can differ with respect to the quality of their property rights protection. The features of democracies are shown to be crucially related to the conditions under which democratization initially takes place. Democratic transitions supported by a large consensus serve as coordination device and lead to better protection of property and more stable political systems than democratic transitions imposed under conflict, which lead to failed democracies with potentially worse property rights protection than in oligarchies.

JEL-classification: H10, O10, N10 ???

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1 Introduction

Democracy and the protection of property rights are widely regarded as crucial for economic development. Some autocracies succeed in protecting property rights and experience rapid income growth despite limited constraints on the action of political rulers, but, on average, democracies tend to have better rule of law than autocracies. However, while some democratic transitions led to improvements in rule of law and the stability of states, others have failed to provide better rule of law and even led to widespread rent seeking, slow growth and lack of social cohesion. This suggests non trivial interactions between political and economic institutions and that other dimensions than democratization itself, such as the conditions under which the democratic transition takes place, might be important for the features of the emerging democracy.¹

This paper is motivated by some important questions that are still largely unsettled. What are the determinants of democracy and property rights protection? Why do some democracies fail in implementing a good rule of law? Does the democratization scenario matter for the establishment of rule of law? To address these questions (i) we propose a theory on the endogenous emergence of property rights protection and democratization, and on their interactions; (ii) we study two possible scenarios in a unified framework: democratization under the pressure of conflict and democratization supported by a broad consensus; (iii) we characterize the structural conditions under which each transition scenario is expected to take place; (iv) we investigate the possibility that consensual democratization may serve as coordination device in the presence of multiple equilibria; and, (v) we analyze the implications of different transition scenarios for the enforcement of property rights in the new democracy, and for the existence of path dependence and historical contingencies in the process of development.

Technically, we consider an economy with a continuum of agents belonging to two groups: the People and the Elite (which is smaller and richer). Individuals face the risk of being expropriated either by part of other individuals (“horizontal” expropriation) or by part of the political rulers through public policies (“vertical” expropriation). Each agent decides whether to undertake an investment to protect his income from expropriation and to predate resources from other, unprotected, individuals. After this investment choice, individuals are randomly matched and the realization of their disposable income depends on the vector of private protection choices as well as on the public enforcement of property rights against horizontal and vertical expropriation.

¹This is also suggested by the literature on the determinants and consequences of democracy and rule of law that is surveyed below.

The cost of the public protection of horizontal property rights, in turn, depends on the aggregate extent of predation and on the efficiency of the available technology for rule of law.

There are two political regimes: oligarchy and democracy. In democracies, the political franchise is universal, while in oligarchies it is restricted to the members of the elite. In each regime decisions about public policies, in particular about the public protection of property rights, are taken by majority voting among the enfranchised population. Besides the degree of political franchise, oligarchy and democracy differ in terms of the constraints on the rulers. As a benchmark, we assume that democracies have stricter limits on vertical expropriation. This reflects the idea that minorities are better protected in democracies since, for example, they are better suited to provide possibilities for citizens to appeal to (independent and fair) courts against expropriation by part of the state. However, both oligarchies and democracies have access to the same technology for the protection of horizontal property rights. This allows us to study the interaction between horizontal and vertical property rights protection, which is usually not made explicit in the existing literature. The political regime is chosen by the strongest group in terms of fighting power in the shadow of conflict. We study the perfect Bayesian equilibria of a game where first the strongest group chooses the political regime, and then each individual decides about private investments in protection, and public policies are implemented by the political rulers.

The theory delivers a set of novel predictions on both structural determinants and consequences of democratization. The maximum efficiency in terms of rule of law depends on structural features of the economy, like inequality, and is higher in democracies. Poor protection of horizontal property rights can emerge under both oligarchy and democracy, however. In each political regime, multiple equilibria can arise because of the strategic complementarity between individual predation behavior and public protection of horizontal property rights. The equilibrium selection depends on individuals' beliefs about whether property rights will be effectively implemented. The expectation of a poor rule of law can be self-fulfilling unless the technology for the protection of property rights is so efficient to make rule of law the unique equilibrium possible.

We find that democratic transitions can take place under two different scenarios. Under the pressure of conflict and against the will of the ruling elite or with the support and participation of all social groups. The theory predicts that a democratic transition under conflict does not necessarily lead to improvements in the rule of law and, given the possible multiplicity of equilibria, may lead to a deterioration as compared to the previous regime. This is more likely to be

the case when inequality is large and when agents expect a poorer rule of law in the emerging democracy. On the contrary, the support for democracy by the entire population, including the oligarchic elites that voluntarily forego political power in the democratization process, serves as a coordination device and makes the implementation of a good rule of law after the transition possible. In this case, in fact, democratization emerges primarily to reduce the extent of wasteful investments in private protection, which is particularly costly for the oligarchic rulers. As result, democracies arising under a broad consensus entail a more favorable environment for economic development.

Finally, we nest the model into a simple dynamic production framework. Along the process of development the relative importance of the factors of production, most notably human capital and natural resources, changes. This alters the conflict of interests in the society, the individual incentives to predate as well as the preferences and ability to choose the political regime. We find that an endogenous transition to democracy takes place only when human capital is sufficiently important as factor of production and income inequality is sufficiently small. Consensual transitions are more likely to occur when natural resources are not abundant and their distribution is relatively equal. On the contrary, a large concentration and abundance of natural resources is likely to lead to democratization under conflict. For intermediate levels of inequality and concentration of natural resources, however, there is even scope for multiplicity of equilibria concerning the transition scenario, which depends on the ability of the elite to enforce a good rule of law in oligarchies, since the incentives for the elites to support a transition to democracy are lower if property rights protection is enforced in oligarchy.

Related Literature. The theoretical model contributes to the literature studying the determinants and consequences of democratization, and to the the literature studying the emergence of property rights and rule of law.

The literature in political science and political economy has identified different paths to democracy. According to Dahl (1972, p. 40f), democratic transitions arose either as a transformation where democracy was accepted or even actively promoted by the ruling elite, or by revolution.² Typical examples of democratization that were accepted or even actively promoted by the elite include Belgium and the Scandinavian countries. Theoretical investigations of the mechanisms behind democratization in the absence of any pressure by part of the disenfranchised include Bourguignon and Verdier (2000), Lizzeri and Persico (2004), Llavador and Oxoby

²See also Lynn (1990), Munck and Leff (1997), Remmer (1990), Shin (1994), Sorensen (1993), as well as McFaul (2002) for reviews of the political science literature on different transition scenarios.

(2005), Jack and Lagunoff (2006a, 2006b), Gradstein (2007) and Cervellati et. al (2008). In contrast, many regime changes resulted from the uprising of the politically (and economically) deprived classes, and hence by force against a relatively weak elite. Many European democracies emerged through collapse or revolutionary displacement (like France in 1870 or Germany in 1919), and open social conflict has played a crucial role in the establishment of voting rights in many Latin American countries.³ Theories that focus on democratization under a shadow of conflict include Acemoglu and Robinson (2000, 2001 and 2006), Conley and Temimi (2001), and Bertocchi and Spagat (2001). In this paper, democratization can emerge under both scenarios, under the pressure of conflict and against the will of the autocratic elites, or by a consensus among all social groups. The main result is that the scenario is crucial, in that transitions to democracy fostered by a consensus among all social groups serve as a coordination device for individual behavior, rather being a commitment device or the result of a conflict within the elite.

This paper also contributes to the literature on the endogenous emergence of rule of law and property rights. On this dimension, we distinguish between horizontal and vertical property rights.⁴ In the model, in equilibrium, poor rule of law leads to, and is the result of, widespread predation behavior, in the presence of the lack of either vertical or horizontal property rights.⁵ These outcomes resemble the failure of implementing good rule of law that Besley and Ghatak (2009) attribute to “predatory” or “ineffective” states, respectively, in their recent review article. The focus on the existence of coordination failures in individual behavior as a source of poor rule of law is shared with Weingast (1997). In contrast to the contributions in this literature, however, we are interested in exploring the role of democratization for the emergence of rule of law. Our theory contributes an investigation of the implications of different democratization scenarios for the emergence of the rule of law within a single framework.

The paper also relates to the literature on the determinants and consequences of democratization. Starting with Lipset’s (1959, 1960) modernization hypothesis, numerous papers have investigated the “structural” economic forces behind democratization. In the model, democratization as well as the timing and the scenario under which it takes place, crucially depends on the level of inequality.⁶ Importantly, besides these structural elements, the democratization scenario

³Examples of conflictual transitions are Uruguay (1919), Colombia (1936), Venezuela (1945) and Nicaragua (1979). See also, Acemoglu and Robinson (2006, ch. 2).

⁴These concepts are similar to the categories of “contractual institutions” and “property rights institutions” studied empirically by Acemoglu and Johnson (2005).

⁵Investments in predation as a strategic choice is similar to that in the models of Grossman and Kim (1995, 1996), see also Garfinkel and Skaperdas (2007) for a recent survey.

⁶For empirical studies that document the role of development, and in particular inequality, for democratization

may also be affected by path dependence. This feature of the model is close to the view initially proposed by Moore (1966) on the long lasting consequences of crucial historical junctures for the emergence and types of political regimes.⁷ The democratization scenario itself may have long lasting effects on the ability of economy to implement sound economic policies and a good rule of law. The model therefore implies that democracy by itself is not a sufficient condition for the implementation of good rule of law, although democratization *can* be causal for policies promoting property rights protection. This allows for a new interpretation of the contradictory empirical findings concerning the economic consequences of democracy.⁸ The prediction that consensual transitions are more likely to occur when inequality is low and tend to lead to better rule of law is consistent with the recent empirical findings of Chong and Gradstein (2007) and Sunde et al. (2008). In this respect, the theory also provides a first attempt to reconcile the the predictions of the economic approach that relates the political equilibrium to the structural features of the economy with the political science literature that emphasizes the fundamental role of historical contingencies of the democratization scenario.⁹

The paper is organized as follows. Section 2 introduces the model while Section 3 and Section 4 characterize the equilibrium and the dynamic evolution of the economy. Section 5 provides a taxonomy of the different transition scenarios and provides a brief discussion. Section 6 concludes.

2 The Model

Set up. Consider an economy populated by subsequent generations of individuals. There is no population growth, and each generation t consists of a continuum of individuals i of measure

see, among others Barro (2000), Boix and Stokes (2003), Epstein et al. (2006).

⁷Acemoglu et al. (2008, 2009) provide evidence in support of the critical juncture hypothesis.

⁸The empirical debate on the consequences of democracy is still ongoing. While Barro (2000) and Glaeser et al. (2004) find no evidence for a significant effect of democracy on development, the findings by Rodrik and Wacziarg (2005) and Papaioannou and Siourounis (2008) suggest that transitions to democracy have a positive effect on growth, and the results of Acemoglu et al. (2001), Rigobon and Rodrik (2005), and Rodrik et al. (2004) suggest that the effect of democratization on development might be indirect through better policies. Also in the political science literature, the consequences of democratization are still poorly understood, as recently noted by Carbone (2009).

⁹The “transitologist” or “*contingency*” literature is concerned with the emergence of different democratization scenarios and the role of the conditions during the transition for the consolidation and stability of new-born democracies as well as general economic consequences, rather than for emergence of rule of law, see, e.g., Dahl (1971), O’Donnell and Schmitter (1986), Karl (1990), Przeworski (1991), Shin (1994), Linz and Stepan (1996) Tilly (2000, 2004), McFaul (2002), and Field (2004).

$L_t = L$. There are two different groups. The elite, denoted by E with size $0 < \gamma < 1/2$, and the People denoted by P . For the moment being we take the level of individual incomes as given and we assume that each member of the elite is endowed with a per capita income given by y_t^E , while y_t^P is the endowment of each member of the people, with $y_t^E > y_t^P$. All vectors are denoted by bold letters, e.g. $\mathbf{y}_t \equiv \{y_t^E, y_t^P\}$. In Section 5 we consider a simple growth model in which incomes and income inequality are the result of an unequal distribution of factors of production, e.g. natural resources (like e.g. land), and change overtime depending on the productivity of human capital and labor.

Utility maximization involves maximizing consumption. Factor income y_t^i is not automatically disposable for consumption purposes, however. All individuals face the risk of having their income expropriated by other individuals (*horizontal* expropriation), or the state on behalf of the political rulers (*vertical* expropriation). Individual factor income is disposable if in the economy private claims to factor income are protected against horizontal and vertical expropriation by the existence of property rights. We say that *Horizontal Property Rights* (HPR) are in place if agents' income is protected against predation by part of other individuals. The existence of this form of property rights protection, which is modeled below, depends on the existence of appropriate institutions and public policies, as well as on the extent of predation activities in the economy. *Vertical Property Rights* (VPR) are in place to the extent that individual factor income is protected against expropriation by part of the state, or equivalently, the politically decisive group, i.e. the rulers.¹⁰ Vertical property rights involve the existence of institutions that limit the ability of the rulers to divert revenues through expropriation of factors of production (like land) or other means (like the imposition of state monopolies and controlled prices on natural resources), or the existence of limits to fiscal taxation and redistribution. In the literature, the enforcement of what we denote as (horizontal) property rights is also sometimes referred to as “contracting institutions”, since it refers to the ability of each individual to insure economic claims against other individuals, while the existence of limits to the power of the rulers are referred to as “property rights institutions” (see Acemoglu and Johnson, 2005, for this terminology and for an empirical investigation of the role of property rights and contracting institutions for long-run growth).

Independently from the property rights in place, individuals may decide to protect privately

¹⁰For the main results it is of no consequence whether the politically stronger group expropriates the weaker group directly (by taxation and redistribution of revenues to themselves), or indirectly (by using the revenues to set up an infrastructure, or a system of state monopolies, that exclusively benefits the members of the politically stronger group).

their claims to factor income. This protection is costly and requires an investment of a share φ of the income to be protected. To fix ideas, we refer to this investment as “arming”. The choices *no arms* or *arms* are denoted $p_t = \{0, 1\}$, where $p_t = 1$ means undertaking the investment in property rights. For simplicity, we assume that this investment insures full protection against any attempt of expropriation. The investment in arms also allows to predate other individuals, but only if they are not protected by horizontal public property rights and they did not invest in arming. As a consequence, the minimal disposable income available to an individual that decides to arm is given by $y_t^i(1 - \varphi)$.¹¹ Denote by π_t^E and π_t^P , with $\boldsymbol{\pi}_t \equiv \{\pi_t^E, \pi_t^P\}$, the fractions of armed individuals (or predators) in each group so that the total number of predator is given by $\pi_t = \pi_t^E \gamma + \pi_t^P (1 - \gamma)$.

To study the optimal choices we consider a simple game in which individuals are randomly matched in pairs: after arming decisions have been taken, every individual $i \in \{E, P\}$ meets another individual $j \in \{E, P\}$. The payoffs of the match depend on individual arming decisions and the protection of property rights. If two armed individuals meet, no transfer of income takes place and they are both left with a disposable income given by $c_t^i = (1 - \varphi)y_t^i$. The payoffs of an armed/non-armed match directly depends on the protection of horizontal property rights; if they are not in place, armed individuals can successfully expropriate non-armed ones. In this case, one observes a transfer of income (net of costs for arming) between agents. This scenario is depicted in Figure 1.

Figure 1: Game without Enforcement of Horizontal Property Rights

$i \quad j$	Arms ($p_t = 1$)	No Arms ($p_t = 0$)
Arms ($p_t = 1$)	$y_t^i(1 - \varphi)$ $y_t^j(1 - \varphi)$	$y_t^i(1 - \varphi) + y_t^j$ 0
No Arms ($p_t = 0$)	0 $y_t^j(1 - \varphi) + y_t^i$	$\tilde{y}_t^i(\boldsymbol{\pi}_t)$ $\tilde{y}_t^j(\boldsymbol{\pi}_t)$

If horizontal property rights are publicly enforced, however, no transfer of income takes can

¹¹This defensive role investments φ can be interpreted as a private substitute for property rights and contracting institutions in the sense of Acemoglu and Johnson (2005). We discuss the implications of allowing for the possibility that investing in arms only allows partial protection against other individuals and the state in Section 5.4.

take place between agents and private income is protected against horizontal expropriation. This scenario is depicted in Figure 2.

Figure 2: Game with Enforcement of Horizontal Property Rights

		j	
		Arms ($p_t = 1$)	No Arms ($p_t = 0$)
i	Arms ($p_t = 1$)	$y_t^i(1 - \varphi)$ $y_t^j(1 - \varphi)$	$y_t^i(1 - \varphi)$ $\tilde{y}_t^j(\boldsymbol{\pi}_t)$
	No Arms ($p_t = 0$)	$\tilde{y}_t^i(\boldsymbol{\pi}_t)$ $y_t^j(1 - \varphi)$	$\tilde{y}_t^i(\boldsymbol{\pi}_t)$ $\tilde{y}_t^j(\boldsymbol{\pi}_t)$

Finally, the payoffs of a match between two agents with no arms, denoted by $c_t^i = \tilde{y}_t^i(\boldsymbol{\pi}_t)$, depend on the extent of vertical expropriation by part of the state. This in turn is endogenously related to the group to which each agent belongs and the political regime in place, as studied below. This feature of the model implies that, differently from a partial equilibrium setting like a standard prisoners' dilemma, the payoffs in the strategic form of the game, and hence the equilibrium, fundamentally depend on macroeconomic conditions in terms of horizontal and vertical property rights protection and the political regime. As studied below, this implies, in particular, that the payoff associated with not investing in arms depends on the overall extent of arming in the economy and the individual beliefs about the feasibility of horizontal property rights protection. This creates a strategic complementarity between individual arming choices and policy choices, and opens up the possibility of multiple equilibria.

Political Regimes, Horizontal and Vertical Property Rights. Public enforcement of horizontal property rights is denoted by $I_t = \{0, 1\}$ where $I_t = 0$ means absence of enforcement. We assume that the cost of enforcement of horizontal property rights depends on the individual investments in arms,¹² and the quality of institutions. In particular, the cost increases in the share of armed individuals, π_t , but decreases with z , which reflects the quality of existing (formal and informal) institutions in terms of legal systems, efficiency of bureaucracy, but also broader aspects like culture, customs, traditions, and the like.¹³

¹²See also Andvig and Moene (1990) for a model in which the cost of rule of law depends on the extent of predation.

¹³Essentially, z captures institutions that tend to change only in the long run, reflecting the definition of level 1

The cost of implementing property rights is represented by the share of income to be protected (or equivalently the per capita cost faced by all individuals that do not invest in arms), and is given by,

$$G_t = G(\pi_t, z) \quad \text{with} \quad G(0, z) = 0, \quad G_\pi(\pi_t, z) > 0, \quad G_z(\pi_t, z) < 0, \quad (1)$$

This formulation implies that protecting individual property is always affordable when the extent of arming in the economy is low enough. In the limit, if no individuals invest in arms, property claims to factor income are ex-post ensured at zero cost.¹⁴

There are two possible political regimes: oligarchy and democracy, denoted by $r_t = \{o, d\}$. Under oligarchy only the elite is enfranchised, and makes decisions about public policies, while under democracy the franchise is universal and decisions are taken by the majority inside the whole population. As a benchmark we assume that both oligarchies and democracies have the same technology G for implementing horizontal property rights protection as described in (1). The only difference between oligarchies and democracies is about the limits to the ability of the political rulers to divert resources or incomes to themselves. This reflects the view that in principle both oligarchies and democracies may have the sufficient coercive power to provide an efficient protection of horizontal property rights. The main difference between oligarchies and democracies lies, rather, in the extent of constraints on the executive in terms of expropriating the groups that are not in power, or the minorities.¹⁵ This relates to the bounds on vertical expropriation. As a benchmark, we assume that in oligarchies the rulers face no constraints on their ability to expropriate resources from the people, but that there are bounds on the ability of the majority to expropriate minorities in democracies. We set these bounds in democracies in terms of the maximum level of expropriation of income that the majority of poor can realize to full equality. This implies that in a democracy $c_t^i = y_t$ for all i , where y_t is the average income in the economy.¹⁶ The actual (quantitative) extent of these differential constraints on vertical institutions by Williamson (2000). These are the institutions which are exogenous in the short run to individual or political choices.

¹⁴In Section 5 we also restrict attention to the case in which

$$\varepsilon_{G,\pi} = \frac{G_\pi(\pi_t, z)\pi}{G(\pi_t, z)} > 1 \quad (2)$$

which implies that the elasticity of the cost of enforcing property with respect to the share of armed individuals is sufficiently large. This assumption is without loss of generality and is made to simplify the illustration.

¹⁵This could be seen to reflect the relative advantage of democracies in providing possibilities for citizens, in particular members of minorities, to appeal to (independent and fair) courts against expropriation by part of the state.

¹⁶Since the people constitute the majority in a democracy with universal franchise this assumption is equivalent to assuming that the maximum degree of progressive redistribution, involving a marginal tax rate of 100%. This

expropriation are irrelevant for the qualitative results (see also the discussion in section 5.4).

The political regime, and therefore also the degree of vertical property rights protection, is determined endogenously. The choice about the political regime is made by the group of individuals with the largest strength in case of open conflict. The elite can decide about the political regime if

$$y_t^E \gamma > y_t^P (1 - \gamma) / k, \quad (3)$$

otherwise this decision is taken by the people.¹⁷ Equation (3) can be interpreted as the conflict potential. This means that the Elite has the power to choose the political regime only as long as it is able to mobilize more economic resources in terms of total income.¹⁸ Condition (3) essentially reflects, in a reduced form, the idea that a group's ability to control the allocation of political power is related to its relative economic power, similar to Acemoglu and Robinson (2006). The parameter k captures non-economic dimensions which might affect the conflict potential.¹⁹

Timing. The political regime is inherited by the previous generation. For a given generation t , the sequence of events and decisions is as follows:

1. If (3) holds, then the elite has the possibility to change the *political regime* r_t , or alternatively the regime choice is made by the people;
2. Each individual i decides about *arming* p_t^i ;
3. Public policies concerning horizontal property rights are chosen and implemented by majority voting inside the enfranchised population;

would emerge in equilibrium, for example, also in voting model a la Meltzer and Richard (1981) if taxation does not involve distortions.

¹⁷As shown later, individuals belonging to the same group share the same preferences about political regimes and policies. Hence there is no need to model explicitly the aggregation of individual preferences leading to the choice of regimes and policies by part of the different groups. As far as political choices are concerned, in the following we therefore interchangeably refer to the group or individual preferences.

¹⁸The choice of regime in the shadow of conflict essentially follows Acemoglu and Robinson (2006). Condition (3) can also be interpreted as a reduced form for the equilibrium condition identifying the winner of the conflict in a micro-founded game like a war of attrition game, in which the group with larger conflict potential wins the conflict, see, e.g., Shen (2007) for an explicit modeling of this type of conflict game.

¹⁹For example, if the People are split into $k > 1$ ethnic groups, i.e. differ with respect to some non-economic dimension, this might reduce their effective ability to challenge the current oligarchic ruler, see also Hirshleifer (2001) and Garfinkel and Skaperdas (2007). It could also be the case that Elite is split along economic or non economic dimensions which can reduce their ability to retain power (i.e. $k < 1$), see Llavador and Oxoby (2005) and Jack and Lagunoff (2006a).

4. Individuals are randomly matched in pairs and the *disposable incomes* c_t^i are realized, according to the games illustrated in Figures 1 or 2.

This timing implies that under no political regime there is a possibility to commit to public policies before arming choices are made. Studying the emergence of equilibria in the absence of commitment allows to restrict attention to the endogenous emergence of politico-economic outcomes that are self-sustaining, i.e., compatible with all individuals' incentives to arm and the conflict potential of the different groups, and feasible in the sense that horizontal property right protection and arming behavior are mutually compatible.²⁰

3 Investments in Arms and Property Rights

Solving the model backward, we first characterize the political decisions about horizontal property rights protection and individual choices about arming conditional on the type of regime. In the following section we extend the analysis to investigate the endogenous emergence of the political regime and its implications for predation and protection of property rights.

Investment in Arms and Public Policies. Public policies in terms of horizontal property rights protection is determined by majority voting among the politically enfranchised population, where m denotes the respective pivotal voter. Enfranchised individuals vote in order to maximize their individual disposable income. Individual preferences over public policies therefore depend on the cost of property rights enforcement $G_t = G(\pi_t, z)$, which is a function of the share of the share of armed, π_t ,

$$I_t^m = \arg \max_{I \in \{0,1\}} c_t^m(p^i, \pi_t, I) \quad (4)$$

subject to $r_t \in \{o, d\}$, \mathbf{y}_t , and given $G_t = G(\pi_t, z)$.

When the arming choice is made, an individual does not yet know if property rights are protected, i.e. whether $I_t = 0$ or $I_t = 1$, and consequently which of the games depicted in Figures 1 and 2 is played. This, in turn, depends on the arming choices adopted by all other individuals in society \mathbf{p}_t^{-i} , and the resulting total number of predators, π_t which, according to (1), influences the ex-post cost of property rights protection. Optimal arms decisions are therefore made conditional on individuals' beliefs concerning the aggregate level of arms and

²⁰For the results of the paper it is only important that public policies I_t are not determined before individual choices about arms are made. None of the results would change if the timing implied that public policies were determined contemporaneously with choices about arms, instead of sequentially.

the corresponding protection of horizontal property rights which are denoted by $\mu_r^i(\pi_t, I_t)$ for $r \in \{o, d\}$ and $i \in \{E, P\}$.

An individual's optimal arming choice, p_t^i , maximizes expected consumption conditional on the political regime in place, the distribution of factor income in the economy and the individual beliefs about public policies.²¹ This optimal choice is given by,

$$p_t^i = \arg \max_{p \in \{0,1\}} c_t^i(p, \pi_t, I_t) \quad (5)$$

subject to $r_t \in \{o, d\}$, \mathbf{y}_t and beliefs $\mu_r^i(\pi_t, I_t)$.

Public Policy Equilibria. A public policy equilibrium is a fix point in which the public policies selected by the decisive voter and the optimal arming choices of all individuals are mutually compatible and consistent with the respective beliefs.²²

Definition 1 (Public Policy Equilibria). *For any $r \in \{o, d\}$ and \mathbf{y}_t , $\{p_t^i(r), I_t(r), \mu_r^i(\pi_t, I_t)\}$ for all i , represents a public policy equilibrium if and only if*

- i) investments in arms p_t^i are made optimally as defined in (5), given $\mu_r^i(\pi_t, I_t)$ for all i ;*
- ii) public policies are chosen optimally by the median voter as in (4).*
- iii) and beliefs about arming and public policy are consistent with equilibrium choices: $\mu_r^i(\pi_t, I_t) = (\pi_t, I_t)$ for all i*

The maximization of disposable income of the median voter in the enfranchised population implies that the extent of vertical expropriation will always be at the maximum that is feasible. In an oligarchy, the maximization of consumption involves full expropriation of the disenfranchised people and redistribution of the total income, net of the costs of horizontal property rights protection, to the members of the elite. Given the timing of events, any other announcement about vertical expropriation is not credible. On the contrary, inside a democracy the optimal expropriation implies the highest progressive redistribution possible, i.e., full equalization of incomes. These are the only optimal and credible levels of expropriation.

The other component of public policy equilibria concerns the horizontal public protection of property rights. Consider first the individual choice about arming. When contemplating about

²¹Since individuals are small with respect to the total population, the aggregate outcomes do not depend on a particular individual's arming choices. The best strategy at the individual level therefore depends on public policies and income inequality. This is the case since both the after tax income \tilde{y}_t^i and the returns from arming are related to π . We rule out any possibility of coordination between agents in the choice of arming strategies. This reflects the view of choices about arming being truly individualistic and not organized at the group level.

²²Technically, a public policy equilibrium is given by a Perfect Bayesian Equilibrium of the game described above when restricting to the stages 2., 3., and 4 of the timing.

investing a share of their income φ in arms, agents need to anticipate the expected costs and benefits of the two strategies. These depend on the level of horizontal and vertical property rights as well as the extent of arming by part of others. Consider first the case in which agents believe that horizontal property rights will not be enforced. As a preliminary result we note that, given the structure of the game, arming is a dominant strategy for all individuals in the absence of horizontal property rights protection,

Lemma 1 (Failure of Property Rights Implementation). *In any political regime $r \in \{o, d\}$, if agents expect horizontal property rights not to be protected, $\mu^r(\pi_t, I_t) = (\pi_t, 0)$ for any π_t , then the optimal individual strategy is to invest in arms, $p_t^i = 1$ for all i , so that $\pi_t = 1$.*

The intuition for the Lemma follows from Figure 1: arming is a dominant strategy for all $i \in P$ irrespective of the political regime. This, in turn, makes arming a dominant strategy also for each member of the elite. As a result, $\pi_t = 1$. This Lemma clarifies that the beliefs about the existence of horizontal protection of property rights constitute a necessary condition to induce the agents to choose not to arm. The existence of horizontal property rights does not represent, however, a sufficient condition to induce the agents to abstain from arming; also the level of vertical property rights protection matters for individual choices, as shown below.

Public policy equilibria are fix points between optimal arming choices and horizontal property rights protection. To move a step forward in their characterization, notice that the public enforcement of horizontal property rights is individually costly and therefore may be optimal only for those agents that have not invested in arming. To see this, recall that, from Lemma 1, in the absence of property rights investing in arms is a strictly dominant strategy for all agents. Notice that in equilibrium the disposable income of an individual i that has decided to arm is given by $y^i(1 - \varphi)$ irrespective of the enforcement of horizontal property rights.²³ Therefore, an agent that invests in arms is indifferent with respect to the enforcement of horizontal property rights.²⁴ On the other hand, in equilibrium individuals that do not invest in arms can be observed if and only if horizontal property rights are in place and if the median voter among non-armed individuals, m , benefits from implementing horizontal property rights.

Lemma 2 (Conditions for Property Rights). *A public policy equilibrium with a share of armed*

²³This is the case since, from Lemma 1, in the absence of horizontal property rights all individuals will be armed so that no transfer of income between them can take place. On the other hand, arming is not effective as a predation instrument in the presence of horizontal property rights.

²⁴Introducing an arbitrarily small cost ϵ for political participation would induce all predators to abstain from voting even when they are enfranchised.

π is characterized by horizontal protection of property rights $I_t = 1$ if and only if

$$\tilde{y}_t^m (1 - G(\pi, z)) \geq y_t^m (1 - \varphi) \quad (6)$$

where m is the median voter among non-armed individuals.

In order to characterize the set of equilibria, the identity of the decisive voter has to be clarified. In an oligarchy the median voter is a member of the Elite since the rights to choose the policies is restricted this group of agents. In democracies there is universal franchise. Since we restrict attention to a pure direct democracy (i.e., we do not consider the role of political parties) the equilibrium policy must represent a Condorcet winner, that is, it must prevail against any other policy vector in pair-wise majority voting. The preferred policies of each individual are those that maximize his disposable income and, therefore, depend on individual pre-tax income as well as the individual arming choice. Under democracy, the median voter m among the individuals that do not arm belongs to the people, $m \in P$, if and only if $(1 - \pi_t^P)(1 - \gamma) \geq (1 - \pi_t^E)\gamma$.

Let us restrict attention to public policy equilibria with decisions about arming in pure strategies. This implies that all agents of the same group make the same arming choices, and leaves us with four possible equilibrium configurations: 1) all agents arm; 2) all agents do not arm; 3) only the members of the people arm; 4) only the members of the elite arm.²⁵

Consider first the case of an oligarchy where all the people invest in arms, $\pi_t^P = 1$. The elite may still decide to protect property rights by themselves. In this case, the disposable income of each member of the elite that decides not to arm is a strictly decreasing function of π_t^E and a strictly increasing function of z . The maximum payoff from not arming in an oligarchy with property rights protection in place is therefore given by $y_t^E (1 - G(1 - \gamma, z))$. In this case the elite finds it profitable to protect horizontal property rights if $y_t^E (1 - G(1 - \gamma, z)) \geq y_t^E (1 - \varphi)$ or equivalently if $G(1 - \gamma, z) \leq \varphi$. This implicitly defines a lower bound on the level of efficiency of $G(\cdot)$ given by $z = \underline{z}^E(\varphi, \gamma)$ which is the level for which equation (6) holds with equality when $\pi_t = 1 - \gamma$. Similarly, in a democracy where all members of the elite arm, the people find it profitable to protect property rights publicly if $G(\gamma, z) \leq \varphi$, which implicitly defines a lower bound on the level of efficiency, $z = \underline{z}^P(\varphi, \gamma)$ for which equation (6) holds with equality when $\pi_t = \gamma$. Finally, notice that there is a level of efficiency, $z = \bar{z}(\varphi)$, such that for any $z > \bar{z}(\varphi)$ protection of property rights would be profitable even if all agents were to arm, so that (6)

²⁵This is done to facilitate illustration. In the Appendix it is shown that the consideration of equilibria in mixed strategies leaves all predictions unchanged.

holds even at $\pi = 1$.²⁶ Given the features of $G(\cdot)$, the minimum quality of institutions z that is required for the people to implement horizontal property rights despite the elite investing in arms, \underline{z}^P , is lower than what is required for implementation by the elite with the people arming, \underline{z}^E , which, in turn, is lower than the minimum efficiency of institutions that is needed in the case in which everybody invests in arms, \bar{z} ,

$$\bar{z}(\varphi) > \underline{z}^E(\varphi, \gamma) > \underline{z}^P(\varphi, \gamma).$$

We can now characterize public policy equilibria in which horizontal property rights emerge in oligarchies and democracies. In oligarchies, the optimal strategy for the people is to arm to protect against vertical expropriation by the ruling elite. This implies that horizontal property rights can be implemented by part of the elite only if condition (6) holds, that is, only if $z \geq \underline{z}^E(\varphi, \gamma)$. This condition is not sufficient, however. From Lemma 1 it is also required that the beliefs are consistent, that is $\mu_o^i(\pi_t, I_t) = (\pi_t, 1)$ for $i \in E$. Under these conditions horizontal property rights can be implemented in oligarchies (by the Elite for the Elite). If the efficiency of the institutions is too low, however, the unique equilibrium involves wide spread arming in the absence of horizontal property rights. This is the case if $z < \underline{z}^E(\varphi, \gamma)$, in which case the unique public policy equilibrium is characterized by $I_t = 0$, $p_t^i = 1$ and $c_t^i = y_t^i(1 - \varphi)$ for all $i \in \{E, P\}$. In this case, as a consequence of the interaction between horizontal and vertical property rights protection, the oligarchy is not characterized by horizontal property rights since the people arm in response to the lack of vertical property rights. We have the following proposition concerning the conditions under which horizontal property rights emerge in oligarchy,

Proposition 1 (Property Rights in Oligarchies). *Under oligarchy, $r = o$, for any y_t and γ , the equilibrium involves property rights protection, $I_t = 1$, if and only if $z \geq \underline{z}^E(\varphi, \gamma)$ and $\mu_o^i(\pi_t, I_t) = (1 - \gamma, 1)$ for all $i \in E$. In this equilibrium $p_t^E = 0$, $p_t^P = 1$ with $c_t^E = y_t^E(1 - G(\gamma, z))$ and $c_t^P = y_t^P(1 - \varphi)$.*

Next, consider under which conditions an efficient equilibrium with no investments in arms and with protection of horizontal property rights can arise under democracy. Notice that the maximal income that individuals can get in a democracy in which horizontal property rights are protected is given by y_t . Therefore, a necessary condition for a member of the elite to prefer a democracy to an oligarchy without horizontal property rights protection is given by

$$y_t^E(1 - \varphi) \leq y_t. \tag{7}$$

²⁶Note that $\partial \underline{z}^j(\varphi, \gamma) / \partial \varphi < 0$ for $j = E, P$, which implies that the larger the cost of predation the less efficient can be the institutions to still ensure that protecting property rights is profitable, while $\partial \underline{z}^E(\varphi, \gamma) / \partial \gamma < 0$ and $\partial \underline{z}^P(\varphi, \gamma) / \partial \gamma > 0$ since the cost G is increasing in the share of predators. Finally $\partial \bar{z}(\varphi) / \partial \varphi < 0$.

In all equilibria in democracy the median voter turns out to belong to the group of people.

Proposition 2 (Property Rights in Democracies). *Under democracy, $r = d$, for any \mathbf{y}_t and γ , there exist two possible public policy equilibria with horizontal property rights protection, $I_t = 1$:*

i) $p_t^E = 1, p_t^P = 0$ with $c_t^P = y_t^P (1 - G(1 - \gamma, z))$ and $c_t^E = y_t^E (1 - \varphi)$ is a public policy equilibrium if and only if $\mu_d^i(\pi_t, I_t) = (\gamma, 1)$ for all $i \in \{E, P\}$, $z \geq \underline{z}^P(\varphi, \gamma)$ and condition (7) does not hold;

ii) $p_t^i = 0$ and $c_t^i = y_t$ for all $i \in E, P$ if and only if $\mu_d^i(\pi_t, I_t) = (0, 1)$ for all $i \in E, P$ and condition (7) holds.

The intuition for the result is as follows. If condition (7) does not hold, then, despite the limits on vertical expropriation, the best option for the Elite is to arm. This is more likely to be the case the larger is inequality. In this case, for horizontal property rights to emerge in equilibrium, condition (6) is required to hold and the people must expect property rights to be in place. Notice that, despite the fact that democracies are not intrinsically superior in terms of the possibilities to commit to horizontal property rights, a democracy can, unlike an oligarchy, exhibit a public policy equilibrium with horizontal property rights protection in the absence of any investment in arms in society. This is possible as consequence of the stricter limits to vertical expropriation, but only if individuals expect horizontal property rights to be in place and condition (7) holds.

The previous propositions reveal that democracies may be characterized by different degrees of efficiency, however, even when $I_t = 1$. Under condition (7), a democratic regime represents a strict Pareto improvement as compared to an oligarchy. In contrast, arming still represents the best available option for the members of the elite if condition (7) does not hold, even under democracy. In this case, the restrictions on vertical expropriation under democracy are insufficient to encourage participation by the elite. Notice also that, under the conditions implied by Proposition 2, effective enforcement of horizontal property rights can emerge in equilibrium only if they are compatible with arming choices in the population at large.

These are not the only equilibria, however. We next show that an equilibrium with widespread investment in arms and no property rights protection may always emerge irrespective of the political regime and economic conditions, namely whenever the beliefs are such that no property rights are expected to be implemented *ex post*.

Proposition 3 (Failure of Property Rights Protection). *If $z \leq \bar{z}(\varphi)$ then, for any political regime $r \in \{0, d\}$ and any \mathbf{y}_t and γ , the belief $\mu_r^i(\pi_t, I_t) = (1, 0)$ leads to a unique public policy*

equilibrium with $p_t^i(r) = 1$ and $\pi_t = 1$, no horizontal property rights protection, $I_t = 0$, and $c_t^i = y_t^i(1 - \varphi)$ for all $i \in \{E, P\}$.

The proof follows directly from Lemma 1 since if individuals expect no horizontal property rights then all individuals would invest in arms so that $\pi_t = 1$ and $I_t = 0$ in equilibrium. Beliefs are therefore correct in equilibrium whenever $z \leq \bar{z}(\varphi)$. This is the case unless $z > \bar{z}(\varphi)$, in which case the group in power always finds it optimal to protect property rights. In this case, the only consistent equilibrium belief involves expecting the protection of property rights, and the equilibria are characterized as in Propositions 1 and 2 when $I_t = 1$.

The previous propositions characterize the full set of public policy equilibria in pure arming strategies.²⁷ Notice that multiple public policy equilibria may exist under both political regimes. These equilibria are supported by different beliefs about the arming strategies adopted by the other individuals in society, and thus about the aggregate investment in arms. For example, if condition (7) holds, two equilibria are possible. If all individuals expect property rights, the public policy equilibrium characterized in Proposition 2 *ii*) emerges. On the other hand, if all individuals expect no property rights, the resulting public policy equilibrium involves widespread investment in arms as characterized in Proposition 3. As consequence of strategic complementarities under both oligarchies and democracies expectations of a poor protection of property rights are self-fulfilling.²⁸ This implies that equilibria with poor rule of law can emerge in any political regime, unless its institutions are so efficient to the point that $z > \bar{z}(\varphi)$.

4 Politico-Economic Equilibria

Endogenous Political Regimes. The political regime implemented during a given generation t depends on the relative political power of the two groups according to condition (3), and on their respective preferences about policies. In particular, the choice of the political regime is made conditional on the belief concerning the emerging public policy equilibrium. The optimal strategy concerning the political regime is therefore given by,

$$r_t^j = \arg \max_{r \in \{o, d\}} c_t^j(r, p_t^j, \pi_t, I_t) \text{ given } \mu_r^j(\pi_t, I_t) \text{ where } j = E \text{ if (3) holds, and } P \text{ otherwise.} \quad (8)$$

²⁷Equivalently, the propositions characterize all symmetric equilibria.

²⁸This feature is similar to the situation studied by Hassler, Storesletten, and Zilibotti (2007) where multiplicity is driven by forward looking strategic voting rather than by forward looking arming choices as in our model.

We also assume that each group prefers to be pivotal whenever both regimes deliver the same expected income. This natural tie-breaking assumption ensures a unique equilibrium.²⁹

Politico-Economic Equilibria. For each generation t , the economy is in a Politico-Economic equilibrium if the optimal choices of regime, public policies and arms investments are mutually compatible.

Definition 2 (Politico-Economic Equilibrium). *For any \mathbf{y}_t , the vector $\{\mathbf{p}_t^*, I_t^*, r_t^*\}$ represents a Politico-Economic Equilibrium if and only if*

- i) The political regime is chosen optimally by the most powerful group j : $r_t^* = r_t^j$ as in (8) given $\mu_{\mathbf{r}}^i(\pi_t, I_t)$;*
- ii) Given the regime, public policies and individual arming choices represent a public policy equilibrium as in Definition 1;*
- iii) Beliefs are correct ex post, $\mu_{\mathbf{r}^*}^i(\pi_t, I_t) = (\pi_t, I_t) \quad \forall i$.*

In order to characterize the Politico-Economic equilibria, first consider the optimal strategy of the people in the case in which they have the possibility to chose the political regime. Denote by $\{(p_t^P, r_t^P) | \mu_{\mathbf{d}}^P(\pi_t, I_t)\}$ the optimal choices of a member of the people regarding investment in arms and regime choice conditional on the individual's beliefs about aggregate arming and property rights enforcement under democracy. Notice, however, that the people are always better off in a democracy compared to an oligarchy irrespective of the actual degree of protection of property rights. This directly implies,

Lemma 3 (Optimal Strategy of the People). *If the people can choose the political regime, i.e. if (3) does not hold, then*

$$\{(p_t^P, r_t^P) | \mu_{\mathbf{d}}^P(\pi_t, I_t) = (\pi_t, 1)\} = \{0, \mathbf{d}\} \quad \text{and} \quad \{(p_t^P, r_t^P) | \mu_{\mathbf{d}}^P(\pi_t, I_t) = (\pi_t, 0)\} = \{1, \mathbf{d}\}$$

constitute the optimal strategies for each member of the people.

According to Lemma 3, the optimal arming choice depends on beliefs. But having the power to do so, the people would always choose a democracy regardless of their beliefs concerning the future enforcement of horizontal property rights. Under this condition, from Proposition 3, the Politico-Economic equilibrium is then characterized by,

²⁹Recall that for simplicity we assumed that arming insures full protection against all attempts of expropriation. This is without loss of the generality for the qualitative results. If arming does not fully protect against predation, however, it would be always strictly better to be the ruler even in the absence of horizontal property rights, because being in power allows to extract at least some resources through vertical expropriation.

Proposition 4 (Conflictual Democracy). *If the people can choose the political regime, i.e. condition (3) does not hold then the PE Equilibrium is a democracy, $r_t^* = d$. The corresponding public policy equilibrium exhibits horizontal property rights protection under the conditions characterized by Proposition 2, whereas if $\mu_d^P(\pi_t, I_t) = (\pi_t, 0)$ horizontal property rights protection are not enforced as in Proposition 3.*

The proposition implies that transiting from oligarchy to democracy does not solve the multiplicity of public policy equilibria. Under this scenario, democratization does not necessarily lead to an improvement in horizontal property rights compared to an oligarchy.

There exists also a different scenario, however, in which democracy also represents the preferred option for the elite compared to retaining power in an oligarchy. From Proposition 2 a democratic transition may imply a strict Pareto improvement. For this to be the case two conditions must hold. First, horizontal property rights must be protected in the emerging democracy. Second, the limits to vertical expropriation must be sufficient to guarantee a large enough income to the elite to induce them not to protect themselves by investing in arms. Under these conditions, the elite supports democratization whenever their expected income is larger under democracy than retaining oligarchic power. Therefore, not only the elite's beliefs about the property rights protection emerging in equilibrium under democracy are important when contemplating the possibility of a transition, but also their beliefs about the equilibrium that emerges in oligarchy. Recall that $\mu_o^i(\cdot)$ and $\mu_d^i(\cdot)$ denote the beliefs regarding investments in arms and property rights protection in oligarchies and democracies, respectively. From Proposition 1 horizontal property rights emerge in equilibrium under oligarchy if and only if

$$z \geq \underline{z}^E(\varphi, \gamma) \quad \wedge \quad \mu_o^i(\pi_t, I_t) = (1 - \gamma, 1) \quad \forall i \in E. \quad (9)$$

On the contrary, if $z < \underline{z}^E(\varphi, \gamma)$ private protection at a cost φ is cheaper for the elite than public protection at the cost $G(1 - \gamma, z)$ and therefore horizontal property rights will not be enforced under oligarchy. The condition $z \geq \underline{z}^E(\varphi, \gamma)$ is not sufficient, however, since the belief that $\pi_t = 0$ prevents enforcement of horizontal property rights unless $z > \bar{z}(\varphi)$ as shown in Proposition 3. Therefore, oligarchies are characterized by no horizontal property rights protection if

$$z < \underline{z}^E(\varphi, \gamma) \quad \vee \quad \mu_o^i(\pi_t, I_t) = (\pi_t, 0). \quad (10)$$

In other words, whether the members of the elite hold the belief that property rights are successfully implemented under oligarchy or not, affects their incentives to offer democratization. The elite is better off in a democracy where property rights are protected only if,

$$\{(9) \wedge y_t^E(1 - G(1 - \gamma), z) < y\} \vee \{(10) \wedge y_t^E(1 - \varphi) < y\}. \quad (11)$$

Consider now the optimal regime and arming choice of members of the elite.

Lemma 4 (Optimal Strategy of the Elite). *If condition (3) holds and the elite can choose the political regime, and if (11) holds, then*

$$\{(p_t^E, r_t^E) | \mu_d^E(\pi_t, I_t) = (0, 1)\} = \{0, d\} \text{ and } \{(p_t^E, r_t^E) | \mu_d^E(\pi_t, I_t) = (\pi_t, 0)\} = \{1, o\}$$

constitute the optimal strategies for each member of the elite.

Depending on their beliefs about property rights enforcement, the optimal strategy for members of the elite is either to support democracy or to implement an oligarchy. Following Lemma 4, the elite can find it optimal to offer a democratization even when they are sufficiently entrenched to retain political power. This is the case only if they expect property rights to be enforced and a larger income than under oligarchy.

We now show that a change in political institutions may constitute a device that allows to credibly coordinate individuals' behavior and establish a democracy with property rights protection. Recall the different stages of the politico-economic game. In the first stage, the group with larger power chooses the political regime, then all individuals make decisions about arms and vote on public policies. This implies that all individuals observe the regime implementation *before* making the arming choices in the second stage. The process of democratization can therefore serve the role of a coordination device for individual behavior. This is the case since the observation of a democratic transition supported by an unchallenged elite reveals that they must prefer a democracy with public property rights protection, hold a belief that $I_t = 1$, and that they do not intend to invest in arms. Otherwise, the elite would have implemented an oligarchy instead of a democracy. Recognizing this, the optimal strategy for the people involves no investment in arms, as well. Therefore, applying a forward induction argument delivers a unique Politico-Economic equilibrium. The elite, by accommodating democracy, credibly signals their beliefs of $\mu_d^E(\pi_t, I_t) = (0, 1)$.³⁰

Proposition 5 (Consensual Democracy). *The Politico-Economic Equilibrium is unique and is characterized by a democracy, horizontal property rights enforcement $I_t^* = 1$ and no arming, $p_t^{i*} = 0$ for all i , if and only if the elite can choose the political regime as in (3) and condition (11) holds.*

³⁰The equilibrium satisfies forward induction as proposed by Kohlberg and Mertens (1986) and Kohlberg (1989), and recently formalized by Govindan and Wilson (2009). Also notice that in the coordination game of the present context, the elite has nothing to gain from inducing the wrong beliefs.

Condition (11) requires that democratization allow the elite to increase their expected income when passing from an oligarchic equilibrium to a democracy with horizontal property rights protection. The arising democracy is labeled *consensual* because it implies a Pareto improvement and is therefore supported by a consensus of all groups of society, including the unchallenged elite. In this scenario the emerging equilibrium is such that the entire population is willing to participate to the social contract.³¹ Finally, if condition (11) does not hold then the preferred regime for each member of the elite is an oligarchy. In this case if the elite is sufficiently entrenched to impose their will, i.e. if (3) holds.

Proposition 6 (Oligarchy). *The Politico-Economic Equilibrium is unique and characterized by an Oligarchy if and only if the elite can choose the political regime as in (3) and condition (11) does not hold. The equilibrium level of arming and property rights is as characterized in Propositions 1 and 3 depending on conditions (9) and (10).*

It is worth noting that it is not possible to rank oligarchies and conflictual democracies in terms of relative efficiency when both regimes implement property rights protection.³² This implies that conflictual transitions may lead to failed democracies where the degree of property rights protection is lower than the one in oligarchies. Consensual democratization, however, leads to the most efficient outcome by coordinating individual beliefs and by leading to an equilibrium that represents a Pareto improvement.

5 The Dynamics of Economic and Political Development

We now nest the model into a simple dynamic production framework to demonstrate the dynamics of economic and political development, and in particular the consequences of different democratization scenarios.

5.1 Production and Inequality Dynamics

Production Structure and Technological Change. All individuals are born with h_t units of human capital and one unit of labor, which they inelastically supply to the market. The

³¹Notice that if $y_t^E(1 - \varphi) < y_t$ then the Politico-Economic Equilibrium features $I_t^* = 1$ and $p_t^{i*} = 0$ for all i if and only if $\mu_d^i(I_t) = 1$ for all i , and $I_t^* = 0$ otherwise. This case is not discussed in the Proposition since, as will be shown below, it does not emerge along the dynamic evolution of the economy.

³²The empirical evidence documents that democracies seem to fare better than oligarchies on average. However, there exists several examples of oligarchic governments that created environments in which property rights are better protected than in democracies, see e.g. Glaeser et al. (2004).

economy is also endowed with a stock of natural resources (or land), N . Hence, the aggregate stocks of productive factors are given by the stock of human capital H_t , the labor supply L , and natural resources N . Natural resources do not depreciate while human capital fully depreciates when the generation dies. We denote per capita variables by lower case letters, e.g. $n = N/L$.

Individuals belonging to different groups differ with respect to their ownership of natural resources. For simplicity, we assume that all available natural resources N are equally distributed among the elite, E . Hence, the resource endowment of a member of the elite is given by $n_t^E = N/\gamma$. The People P possess no natural resources, $n_t^P \equiv 0$.³³

A unique commodity is produced with an aggregate production function $Y_t = Y(A_t H_t, N, L)$ that exhibits positive but decreasing marginal productivity of all inputs, Inada conditions and constant returns to scale. Productivity A_t is human capital augmenting and H_t and N are substitutes.³⁴ Individual factor income is given by $y_t^i = r_t h_t^i + \rho_t n^i + w_t$, for all $i \in \{E, P\}$ where prices (r_t, ρ_t, w_t) are determined on the competitive market and equal marginal productivity.³⁵

Technological Progress and Inequality. The emergence of the different equilibria described in the previous subsection crucially depends on inequality and on the costs associated with the implementation of contractual property rights. Denote the relative (per capita) income of the elite and the people as

$$\lambda_t \equiv \frac{y_t^E}{y_t^P}. \quad (12)$$

For any λ_t , and thus for any generation t , only one of the *PE Equilibria* characterized in Propositions 4, 5 and 6 can emerge.

The productivity of human capital A_t grows at an exogenous rate $a > 0$.³⁶ As a consequence of the technological progress a and the substitutability between factors H_t and N in the production process, and Inada conditions, it follows that the rents on natural resources decrease

³³The assumption that the people own no land is without loss of generality. All that is required for the analysis is inequality in terms of resource endowments between elite and people.

³⁴An example of a neoclassical production function satisfying these assumptions is $Y_t = (A_t H_t + N)^\alpha (L)^{1-\alpha}$, with $0 < \alpha < 1$, where L denotes raw labor that is distributed equally among all members of society. Equivalently one could adopt a technology with one commodity being produced in two sectors, with labor being optimally allocated across sectors like, e.g. $Y_t = Y_t^T + Y_t^M = N^\alpha L^{T1-\alpha} + H_t^\alpha (A_t L^M)^{1-\alpha}$, where sector T is natural resource intensive while sector M is human capital intensive.

³⁵This implies $r_t = \partial Y_t / \partial H_t$ and $\rho_t = \partial Y_t / \partial N$, and $w_t = \partial Y_t / \partial L$. The assumption that prices are competitive even if property rights are potentially not ensured is for simplicity in order to model the conflict of interest in terms of incomes. The main results would remain unchanged if the conflict of interest would be directly modeled in terms of resources.

³⁶Equivalently, one could introduce endogenous technological progress. Any formulation implying a positive relationship between human capital and technological progress would deliver qualitatively equivalent results.

during the process of development, so that $\partial\rho_t/\partial A_t < 0$ and $\lim_{A_t \rightarrow \infty} \rho_t = 0$.³⁷ This implies that, in the limit, the share of income produced by, and distributed to, the owners of natural resources converges to zero, while the income share produced by labor and human capital tends to one. As a result, income inequality decreases over time and vanishes in the limit.³⁸

Lemma 5 (Change in Inequality). *Income inequality λ_t decreases monotonically overtime with $\lim_{t \rightarrow \infty} \lambda_t = 1$.*

5.2 Towards a Taxonomy of Democratization

In this Section we investigate the conditions in terms on income inequality and control of natural resources which are likely to lead to consensual or conflictual democratization. We also investigate the possibility of path dependence both in terms of type of democratization scenario and in terms of emergence of property rights and arming. We begin the analysis of the model dynamics by considering a situation in which the rents to natural resources, and therefore income inequality, are sufficiently large so that the elite dominates in terms of political power.³⁹ Under these initial conditions, (3) holds, but (7) is not satisfied, such that from Proposition 6 the economy is characterized by a politico-economic equilibrium with oligarchy. The reduction of the importance of natural resources in the income generating process as consequence of Lemma 5 eventually leads to a democratic transition of one of the two types discussed before. The reason is that the condition (3), under which the elite is sufficiently entrenched to impose its will eventually ceases to hold, while condition (11), under which the elite is willing to support democratization, eventually begins to hold. The type of democratization scenario essentially depends on which of these conditions changes sign earlier.

The economic and political equilibrium during the life of any generation t is fully characterized by the pair γ and λ_t . We develop the analysis by looking at the dynamics of the economy in the $\{\gamma, \lambda\}$ -space. The relevant range of values is given by $\gamma \in [0, 1/2)$ and $\lambda \geq 1$, because the elite is smaller and initially richer than the people. The locus of combinations (γ, λ) for which

³⁷For example, in the case of the production function $Y_t = (A_t H_t + N)^\alpha (L)^{1-\alpha}$, with $0 < \alpha < 1$, given in footnote 34, the rents on natural resources, are given by $\rho_t = \alpha (A_t H_t + N)^{\alpha-1} L^{1-\alpha}$.

³⁸As will become clear below, the main results of the model do not depend on the monotonous decline in inequality that is driven by the assumptions on the evolution of technology. These assumptions are merely made for illustrative reasons.

³⁹These initial conditions require a sufficiently underdeveloped economy with the initial level of productivity A_0 being sufficiently small.

the two groups have the same strength in case of open conflict, i.e. condition (3) holds with equality, is given by

$$\lambda = \Gamma(\gamma, k) = \frac{1 - \gamma}{\gamma k}, \quad (13)$$

which is a continuous, strictly decreasing, convex function in γ that takes values $\Gamma(0, k) = +\infty$ and $\Gamma(\gamma = 1/2, k) = 1/k$. The locus is downward sloping since an increase in the size of the elite γ must be compensated by a reduction of its per capita income, and thus λ , to keep the strength of the elite unchanged. From Section 4, we know that this is the relevant locus for the determination of a conflictual democratization scenario.

Next, consider the combinations of (γ, λ) for which condition (11) holds with equality. This is the relevant locus for the emergence of a consensual democratization. Condition (11) can hold under two scenarios, depending on the implementation of horizontal property rights under oligarchy. Let us for a moment restrict attention to the case in which horizontal property rights are not implemented under oligarchy. The locus of combinations of (γ, λ) for which (7) holds with equality, that is when elite receives the same income under oligarchy and a consensual democracy, $y_t^E(1 - \varphi) = y_t$, is given by

$$\lambda = \Upsilon_\varphi(\gamma, \varphi) = \frac{1 - \gamma}{1 - \gamma - \varphi} \quad (14)$$

which is a continuous, strictly increasing, convex function in γ .⁴⁰ A larger γ implies that democratization is less costly in terms of redistribution so that the level of income inequality λ for which the elite receives the same income under the two regimes is larger.

From Proposition 5, a consensual democratization can take place also when the elite does protect horizontal property rights in oligarchies. The locus of combinations of (γ, λ) for which the elite receive the same income under an oligarchy with horizontal property rights in place and a consensual democracy, that is for which $y_t^E(1 - G(1 - \gamma, z)) = y_t$ is given by

$$\lambda = \Upsilon_G(\gamma, G(\cdot)) = \frac{1 - \gamma}{1 - \gamma - G(1 - \gamma, z)}, \quad (15)$$

which is a continuous function that takes positive values in $\gamma \in [0, 1]$ since from the definition in (1), $1 - \gamma > G(1 - \gamma, z)$. Under the restriction of a sufficiently large elasticity of the cost G with respect to arming π , (2) this locus is strictly monotonically decreasing in γ .⁴¹

⁴⁰The function (14) takes values $\Upsilon_\varphi(\gamma = 0, \varphi) = 1/(1 - \varphi) > 1$ and exhibits a vertical asymptote at $\gamma = 1 - \varphi$: $\Upsilon_\varphi(\gamma = 1, \varphi) = +\infty$ (and with negative values of $\Upsilon_\varphi(\cdot)$ for $\gamma > 1 - \varphi$).

⁴¹Also $\Upsilon_G(\gamma = 0, G(\cdot)) = +\infty$ and $\Upsilon_G(\gamma = 1, G(\cdot)) = 0$. Alternatively the locus is independent of π if $\varepsilon_{G,\pi} = 1$ or increasing γ if $\varepsilon_{G,\pi} < 1$. Also in these cases the qualitative taxonomy would be unchanged as clarified by the discussion below.

To understand under which conditions the locus (14) or (15) is the relevant locus for consensual democratization, recall that from Lemma 2 and Proposition 1, the necessary condition to observe horizontal property rights in oligarchies is $y^E(1 - G(\pi, z)) \geq y^E(1 - \varphi)$. Notice that this condition holds whenever the locus Υ_G lies below the locus Υ_φ . Given the features of (14) and (15), by intermediate value theorem, we have for any z ,

Lemma 6 (Threshold for Horizontal Property Rights in Oligarchies). *For any z , there exists a unique*

$$\gamma \equiv \gamma_o \in [0, 1]$$

such that $\Upsilon_\varphi(\gamma_p, \varphi) = \Upsilon_G(\gamma_o, G(1 - \gamma_o, z))$, with $\partial\gamma_p/\partial z < 0$.

This Lemma states that, for any level of institutional quality, horizontal property rights can be enforced in oligarchy only if γ is large enough, $\gamma > \gamma_o$. The larger z , the lower the minimum γ required to enforce horizontal property rights.⁴² From Lemma 6 for all $\gamma \geq \gamma_p$, property rights can be implemented by the elite under oligarchy and that the locus $\Upsilon_\varphi(\gamma, \varphi)$ lies below $\Upsilon_G(\gamma, G(\cdot))$, that is, for all $\gamma < \gamma_o$, while the opposite is true for any $\gamma > \gamma_o$. It follows that the locus of (γ, λ) -combinations for which the elite is indifferent between *the best* oligarchy and a consensual democracy is given by the continuous function that corresponds to the lower envelope of the two previous functions,

$$\Upsilon(\gamma, \varphi, z) = \begin{cases} \Upsilon_\varphi(\gamma, \varphi) & \text{for all } \gamma < \gamma_o, \\ \Upsilon_G(\gamma, G(\cdot), z) & \text{for all } \gamma \geq \gamma_o. \end{cases} \quad (16)$$

This function is continuous and differentiable for all $\gamma \neq \gamma_p$, and has a kink at $\gamma = \gamma_o$. Along the locus $\Upsilon(\gamma, \varphi, z)$ the elite is indifferent between the best oligarchy (which may or not involve property rights protection depending on $\gamma \gtrless \gamma_o$).

Lemma 7 (Thresholds for Democratization). *For any z , there exist*

- 1) a unique $\underline{\gamma}$ such that $\Upsilon_\varphi(\underline{\gamma}, \varphi) = \Gamma(\underline{\gamma}, k)$ with $\partial\underline{\gamma}/\partial\varphi < 0$ and $\partial\underline{\gamma}/\partial k < 0$;
- 2) a unique γ_g such $\Upsilon_G(\gamma_g, G), z) = \Gamma(\gamma_g, k)$ with $\partial\gamma_g/\partial k < 0$ and $\partial\gamma_g/\partial z > 0$.

Denote by

$$\bar{\gamma} = \max\{\underline{\gamma}, \gamma_g\} \quad (17)$$

We are finally in the position of studying the taxonomy of endogenous democratization.

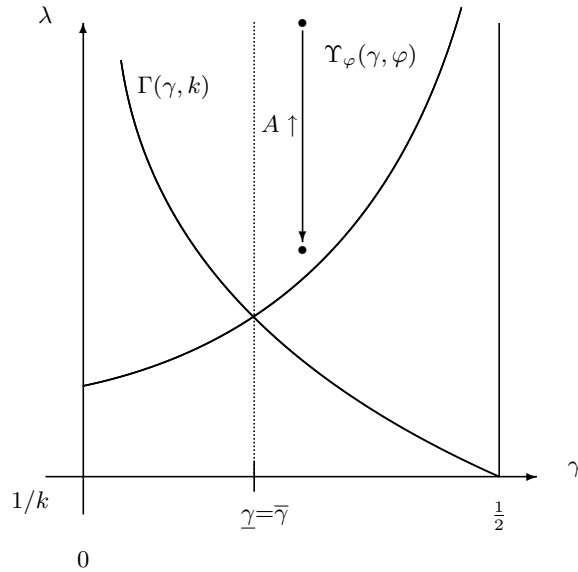
⁴²An increase in z leads to a downward shift of the Υ_G -locus (15), which implies that it becomes easier for the elite to protect horizontal property rights in oligarchy, which reduces their incentive to democratize.

5.3 Democratization Scenario, Rule of Law and Path Dependence

We now investigate the taxonomy concerning the democratization scenario and its implications for the timing of the emergence of endogenous democratization and for the subsequent development path. The elite's incentives to support democratization crucially depend on income inequality, the concentration of natural resources (and group size), and the ability of the elite to enforce horizontal property rights in oligarchies, which, among other things, is related to the parameter z .

Consider first the case in which $\gamma_o > 1/2$, which essentially means that the level of efficiency z is too low to fulfil the necessary condition (6) to observe horizontal property rights protection in an oligarchic equilibrium.⁴³ In this case the relevant loci to study democratization are $\Gamma(\gamma, k)$ as defined in (13), and $\Upsilon_\varphi(\gamma, \varphi)$ as defined in (14). Figure 3 illustrates the dynamic taxonomy for this case.

Figure 3: Democratization with $\gamma_o > 1/2$



Recall that the locus $\Gamma(\gamma, k)$ reflects the combinations of $\{\gamma, \lambda\}$ for which the two groups are equally powerful, where for any combination above this locus the elite is stronger. The locus $\Upsilon_\varphi(\gamma, \varphi)$, in turn, identifies the combinations of $\{\gamma, \lambda\}$ for which the elite is indifferent between an oligarchy without horizontal property rights protection, and a consensual democracy. For levels of λ above the two loci, the elite therefore prefers an oligarchy and is also sufficiently

⁴³Notice that there is a one-to-one mapping between $z^E(\varphi, \gamma)$ and γ_o since by definition of z^E , $G(1 - \gamma, z^E(\varphi, \gamma)) = \varphi$ for any γ while by definition of γ_o , $G(1 - \gamma_o, z) = \varphi$ for any z .

powerful to enforce its preference. Hence, this area reflects the combinations of γ and λ for which the economy is in the oligarchic politico-economic equilibrium characterized in Proposition 6.

Note that since γ is unchanged over the course of generations, it follows from Lemma 5 that development occurs on a vertical trajectory in the $\{\gamma, \lambda\}$ -space from top to bottom. Already from graphical inspection it is clear that this implies that for any $\gamma < \underline{\gamma}$ the process will eventually lead to a conflictual democratization. The reason is that the elite is not willing to voluntarily support democratization when the people gain power, that is, condition (3) holds earlier than condition (7), and hence locus $\Gamma(\gamma, k)$ is crossed earlier than locus $\Upsilon_\varphi(\gamma, \varphi)$. On the contrary, for any $\gamma \geq \underline{\gamma}$ the process eventually leads to a consensual democratization, that is condition (3) ceases to hold earlier than (7) holds. Intuitively, if the resource ownership is too concentrated, i.e. if γ is too small, then the importance of natural resources for the elite is very large and the opportunity cost of democratization (in terms of implicit redistribution to the poor) is too large to induce them to support democratization.

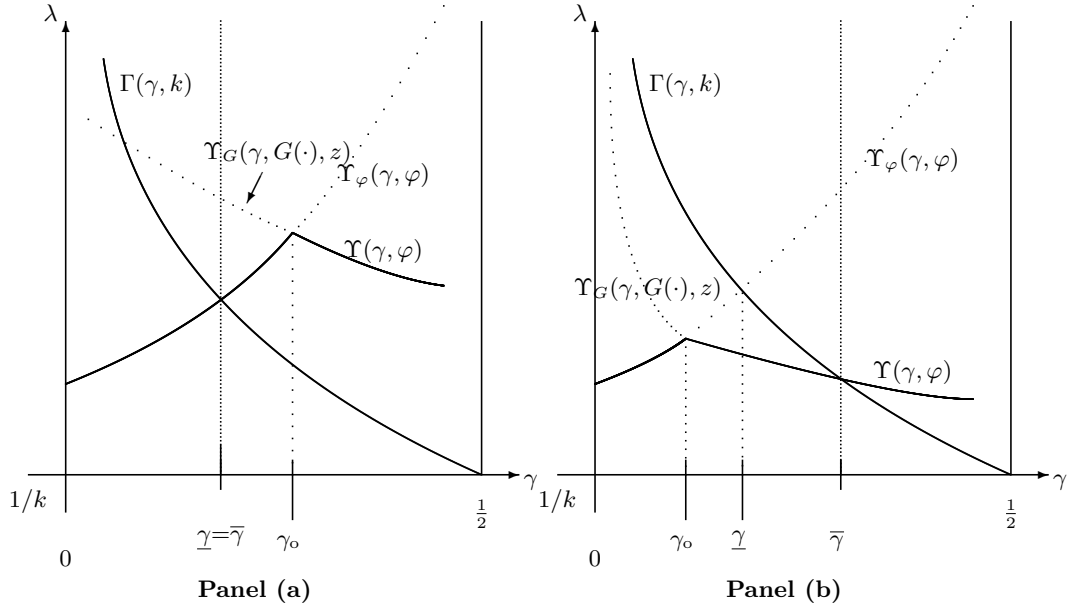
An analogous threshold to $\underline{\gamma}$ can be derived for the people's incentives to implement property rights in democracy at their own expense (i.e., when the elite arm) vs. investing in arms. In this case, the people compare $y_t^P(1 - G(\gamma, z))$ to $y_t^P(1 - \varphi)$. Hence, there exists a unique γ_d above which the people prefer investing in arms to implementing property rights by themselves. In the area below $\Gamma(\gamma, k)$ and for $\gamma < \gamma_d$ there is a multiplicity of equilibria in terms of property rights protection inside conflictual democracies, depending on the ability of the members of the elite to coordinate their beliefs because of Lemma 1 and Proposition 3.⁴⁴

Consider next the alternative case in which z is sufficiently large so that $\gamma_o < 1/2$, that is, there are situations in which the elite can enforce horizontal property rights in equilibrium. While leaving the main predictions unchanged, the possibility that the elite may succeed in protecting horizontal property rights in oligarchies has implications for the timing and contingencies of democratization as well as for the occurrence of path dependence along the process of development.

Panel (a) of Figure 4, reports the dynamic taxonomy of democratization for the case $\underline{\gamma} = \bar{\gamma}$. From Lemma 6 this configuration emerges, ceteris paribus, for intermediate levels of z since from (17) this implies that $\gamma_g > \underline{\gamma}$. The taxonomy of democratization is qualitatively identical the taxonomy illustrated in Figure 3. For any $\gamma < \underline{\gamma}$ the democratization is conflictual while it is consensual for any $\gamma > \underline{\gamma}$. The main difference is that for intermediate $\gamma \in (\underline{\gamma}, \gamma_o)$ the economy

⁴⁴Obviously, depending on φ and the properties of $G(\cdot, \cdot)$ the level of γ_d might lie outside the admissible or relevant range, i.e., $\gamma_d > 1/2$ or $\gamma_d > \underline{\gamma}$, in which case no multiplicity arises and conflictual democratization unambiguously implies population-wide arming, $\pi_t = 1$, and no property rights protection, $I_t = 0$.

Figure 4: Democratization with $\gamma_0 < 1/2$



makes a transition from an oligarchy in the absence of horizontal property rights to a consensual democracy. The other relevant difference compared to the case depicted in Figure 3 concerns the dynamics in terms of the timing of democratization. Specifically, in the area $\gamma > \gamma_0$ consensual democratization will take place as soon as $\lambda < \Upsilon_\varphi(\gamma, \varphi)$ if horizontal property rights are not enforced in oligarchies, but only once $\lambda < \Upsilon_G(\gamma, G(\cdot))$ if horizontal property rights are enforced. This implies that the elite tends to hold on to oligarchies in which horizontal property rights are successfully enforced for longer, which implies a delay in democratization. Notice that from Proposition 3 this also implies that the *onset* of consensual democratization may depend on the beliefs of the elite concerning the protection of property rights under oligarchy.

Finally, Panel (b) of Figure 4 depicts the case in which z is even larger to the point that $\underline{\gamma} < \bar{\gamma}$. It is still the case that democratization is conflictual if $\gamma < \underline{\gamma}$ and consensual if $\gamma > \bar{\gamma}$. An interesting case arises now for intermediate levels of γ , however: In the range $\gamma \in (\underline{\gamma}, \bar{\gamma})$ there is path dependence in terms of the democratization scenario. In particular, the scenario crucially depends on the actual enforcement of horizontal property rights in oligarchies. Inside this range the elite can effectively implement horizontal property rights but, again, from Proposition 3 only if the members of the elite are successful in coordinating their arming choices. If the elite does not enforce horizontal property rights in oligarchy a consensual democratization emerges as soon as λ is below the locus $\Upsilon_\varphi(\gamma, \varphi)$. If, on the other hand, the elite does enforce horizontal property rights, it will persist in an oligarchy as long as it is sufficiently powerful. In this case,

the oligarchy ends with a conflictual democratization as soon as λ intersects the locus $\Gamma(\gamma, k)$, since at this point in time the elite is still not willing to democratize (i.e., λ is still above $\Upsilon_G(\gamma, G(\cdot))$).

In summary, from Lemma 5 the process of technological change eventually leads to a democratization which is conflictual if γ is sufficiently low, consensual if γ is sufficiently large, and which can be of either type for intermediate levels of γ if the elite can successfully implement horizontal property rights in oligarchy. In the latter case the process of development can therefore be subject to history dependence. This discussion is summarized in,

Proposition 7 (Democratization Scenario). *For any $\{\varphi, k, z\}$ the economy experience a democratic transition which is:*

1. Conflictual if $\gamma < \underline{\gamma}$;
2. Consensual or Conflictual depending on the enforcement of horizontal property rights in oligarchies for intermediate levels of γ : for all $\gamma \in (\underline{\gamma}, \bar{\gamma})$.⁴⁵
3. Consensual if γ is large enough: for all $\gamma > \bar{\gamma}$.

In the model, the contingencies of the democratization scenario lead to path dependence for two different reasons. In the first place, from Proposition 4 conflictual democracies may be characterized by different degrees of horizontal property rights enforcement. This implies that for $\gamma < \underline{\gamma}$ democratization may lead to improvements in the level of property rights protection compared to oligarchies, but it may also be the case that democracies do not improve property rights protection or even lead to worse property rights protection than oligarchies. The equilibrium crucially depends on the beliefs about the property rights protection that can be implemented in the emerging democracy. Second, from Proposition 7, there is an intermediate range of $\gamma \in (\underline{\gamma}, \bar{\gamma})$ where the democratization scenario crucially depends on the elite's ability to coordinate beliefs and implement property rights protection in oligarchy. If property rights can be implemented in oligarchy in this range, the transition is likely to be conflictual, and in this case democratization in fact implies a deterioration of the quality of economic institutions. If, on the other hand, the elite is unable to coordinate and implement property rights by themselves, then the transition to democracy is likely to happen earlier and within a consensus of all groups. Hence, the "better" an oligarchy is in implementing property rights, the later democratization will take place and the more likely is a conflictual transition. This is crucially affected by the environment in terms of inherited institutions (or culture), reflected by z .

⁴⁵Where this range is an empty set whenever $\underline{\gamma} = \bar{\gamma}$ like in Figure 3 and Panel (a) of Figure 4.

In terms of inequality, the model implies that democratization takes place once the dependence of the economy on natural resources is sufficiently low, implying sufficiently low inequality in incomes. At the same time, if natural resources are very concentrated in the hands of a small elite, the transition is more likely to be conflictual. Noting that conflictual transitions imply bad institutions and therefore little redistribution in equilibrium, the model has also implications for persistence in inequality: Countries that democratize under conflict exhibit a high concentration of natural resources and income inequality is not reduced by redistribution even after the transition if the elite avoid expropriation by making private provisions to protect their property. This implies that the redistributive conflict remains high. On the other hand, countries that democratize under consensus have more equally distributed resources to begin with, and allow for substantial redistribution after the transition. These results also have implications for the stability and efficiency of democracies, in particular once one allows for stochastic variation in A or λ rather than assuming a monotonous process. Whenever democracy does not represent a Pareto improvement a change in the allocation of political power leads to a change of regime, making conflictual democracies intrinsically more unstable.

The demographic environment, in terms of k , also affects the democratization scenario. A less effective coordination of the people in terms of conflict potential, for example because of higher ethnic fragmentation, reflected by a higher k , the later democracy will take place in time. On the other hand, a higher k makes consensual democratization more likely as it weakens the people's ability to overthrow an oligarchy and enforce democratization.

5.4 Discussion

In this paper we propose a theoretical framework to study the joint interactions between the process of democratization and the establishment of the rule of law. In the development of the analysis we rely on set of assumptions which despite not being crucial for the main results matter some side predictions.

Investments allows full protection from predation. Investments in arms are assumed to be fully effective as a private protection against both horizontal and vertical property rights. There are two main implications of considering partial effectiveness of private investments in protection. In the first place, horizontal property rights are less likely to be implemented since the individual incentives to predate on others are larger (which increase the cost of enforcement of HPR). In the second place the ruler can realize more vertical expropriation. The main implication is that being a ruler in each regime is more convenient thereby reducing the scope of consensual

democratization. Another side implication is that for each group being in power would always be strictly better than being ruled so it cannot be possible that a group is strictly indifferent between the two regimes.

Investments are both defensive and offensive. The assumption of investments in arms serving offensive and defensive purposes at the same time does not affect the main results but simplifies the presentation by having only one choice variable to keep track of. Notice that investment in private defense is not optimal if both horizontal and vertical property rights are implemented. In turn, investment in offensive arming, which are aimed at preying other individuals, are profitable only in the absence of horizontal property rights. This implies that whenever HPR are implemented no investment in offensive predation are undertaken. This would therefore reduce the cost of public protection of horizontal property rights if it depends on the population share of offensively armed individuals. The main direct implication of considering two separate choices in defensive and offensive arming investments is therefore to increase the ability of the ruler to protect horizontal property rights. This also indirectly implies that for the elite is easier to discourage predation in oligarchies to the effect that the taxonomy for democratization is similar to the one reported in Figure 3.

Asymmetries in HPR and VPR across political regimes. As a benchmark we have assumed a full symmetry in the technology for protection of HPR while democracies are assumed to have stricter limits on VPR than oligarchies. If, for some reason, there is an asymmetry in horizontal property rights between oligarchies and democracies would imply that horizontal property rights are more likely to be implemented in the regime that is better suited to do so. In turn, the assumed asymmetry in vertical property rights, creates the room for pareto improvements in the transition to democracy and consensual democratization. The actual extent of the limits of vertical expropriation in democracies matters only quantitatively (since in particular it affects the thresholds for the different democratization scenario) but not qualitatively for the predictions. Only in the extreme case in which no constraints on vertical expropriation exist under any regime, consensual democratization does not emerge. The reason is that consensual democratization requires some ability of the majority in democracies to compensate the former elite for their income loss. Hence, as long as democracy does guarantee property of minorities at least to a certain extent, all qualitative predictions remain unchanged.

Demographic Dynamics. We considered a simple stationary population structure where the relative size of the two groups is stable overtime. The consideration of a richer demographic structure or more involved population dynamics than a stationary population structure with

two groups would enrich the dynamics and provide additional implications for democratization. For example, if there is differential fertility associated to different income levels, as in e.g., de la Croix and Doepke (2003) or ?) then the relative size of the disenfranchised poor would disproportionately increase overtime. This implies that in countries with large fertility among the poor conflictual transitions are expected to be more likely.⁴⁶ Similarly, changes in concentration or possessions of natural resources over time may affect the type and timing of transition. Resource discoveries or the presence of particular institutions like primogeniture law as studied by Bertocchi (2006) may therefore influence the thresholds and the timing of the transition scenario.

Multiplicity of Groups. The extension of the analysis to more than two groups requires a more extensive discussion since it might yield additional insights into the democratization process related to the possibilities of, e.g. partial extensions of the franchise and coordination in conflict among some of the groups. For example, in the case of three groups (the elite, the middle class and the poor) both democratization scenarios would still exist, but there would be additional scenarios like a consensual democratization with only partial extension of the political franchise. In fact the rich elite may find it profitable to extend the franchise to the middle class but not to the poor people. The trade-off faced by the elite essentially entail the comparison of the gain from reduced predation associated to a consensual extension of the franchise, with the cost of (implicit) redistribution to the poorest segments of newly enfranchised population.⁴⁷ It may therefore be the case that the elite profits from the by extending the franchise only partially to the middle classes (to coordinate their behavior) while a full democratization may involve efficiency gains which are smaller than the implicit cost of redistributing to the very poor.⁴⁸ The existence of different groups (similarly to the role of k in the taxonomy above) may also imply difficulties in coordinating conflict among the disenfranchised. While leaving the main features of the model unchanged, the extension to a multi-group setting may therefore enrich the picture in terms of predictions on role of inequality for the democratization scenario. For example in the presence of a rich middle class and a large share of poor an initial partial/consensual democratization may be followed by a conflictual democratization associated to the shift of

⁴⁶Since the trajectory of development in Figures 3 and 4 would be characterized by a reduction in γ overtime making the locus for conflictual democratization more likely to bind first for any initial condition.

⁴⁷As a benchmark in the model we set the bounds on VPR in democracies to be full equality. In reality, however, the extent of vertical expropriation or the pressure for progressive redistribution may be larger the poorer is the median voter as in e.g. Meltzer and Richard (1981) CITE.

⁴⁸This mechanism is similar to the strategic partial extension of the franchise studied by Jack and Lagunoff (2006???) and Gradstein (2007????).

power to the poor masses. In turns, a diffuse distribution of economic resources across the population may lead to a series of subsequent consensual partial extensions of the franchise.⁴⁹

In summary, the main predictions about the existence of multiplicity of public policy equilibria and the different determinants and consequences of consensual and conflictual democratization do not depend on the simplifying assumptions discussed above. Also the main prediction that consensual democratization are expected to emerge in more equal economic environment appears to be robust. These assumptions, however, appear to matter for the quantitative predictions about the thresholds of the taxonomy of democratization, the likelihood of observing the implementation of horizontal property rights in the different regime and the actual sequence of dynamic path of economic and political development.

6 Concluding Remarks

This paper provides a theory of the endogenous emergence of democracy and rule of law and their interactions. Democracies can emerge under different scenarios, either under conflict or under a consensus of all groups of the population. We study the determinants of the different transitions and their consequences for the emergence of a rule of law in terms of public protection of property rights in democracy. The conflict of interest about the political regime between the groups of society, as well as their relative power in implementing a particular regime, crucially depends on inequality in terms of the concentration of natural resources and their relative importance as production factor. Consequently, democracies that arise under consensus initiated by the elite are able to coordinate the beliefs of all citizens towards abstaining from investments in private protection, leading to a participatory democracy of all groups. Democracies that arise under conflict, on the other hand, are implemented against the will of parts of the population and have no such ability to coordinate. This also implies that parts of the population will invest in private protection and this way make the public protection of property rights more expensive and suboptimal. The model also shows that there is an important feedback effect from rule of law to democracy, since consensual democratization only takes place under the belief that rule of law will be implemented and compensate the groups that lose political power in terms of efficiency gains. The proposed benchmark could be usefully extended in some interesting directions. We mainly concentrated attention to the study of equilibria inside each generation. Beliefs about the arms investments in the population at large, and hence about the possibility to implement

⁴⁹This scenario resemble, for example, the historical experience of some European countries like England, see Dahl (1971).

property rights in equilibrium, are a central element of the model. While the results obtained above show that the democratization scenario is crucial for the possibility to coordinate beliefs, other potentially important determinants and coordination devices have not been studied. For example, beliefs, and hence the possibility to implement rule of law, could be affected by cultural factors or history. Conditioning beliefs on historical events, in particular on the equilibria of previous generations, would require extending the model towards a fully dynamic framework. Another interesting topic for future research would be a closer inspection of the consequences of the different democratization scenarios for growth or the stability of democracies against upheavals. So far, the results suggest that the inefficiencies from private protection are minimized under consensual democratization, but one might think about a more detailed analysis of the consequences of different democratization scenarios for factor accumulation and path dependence in a dynamic context. Instead of looking at a deterministic monotonic decrease in inequality as the source of dynamic variation, which was chosen for the purpose of illustration rather than realism, it might be interesting to allow for a stochastic and endogenous dynamic process. This would allow for a closer investigation of the model implications for the consolidation and stability of democracies, thereby providing a more direct contribution to the literature in political science that has mainly focused on these issues. One implication that also deserves closer inspection in this context is the stability predictions for oligarchies. In the model presented above, the possibility of establishing property rights in equilibrium under oligarchy reduces the incentives to democratize and initiate a consensual transition. If, in addition, an oligarchy could establish credible constraints to vertical expropriation and hence provide vertical property rights, this would add further to the persistence and stability of oligarchies.

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7 Appendix

7.1 Proofs.

Proof of Lemma 1. Regardless of the political regime, if agents expect to play the game depicted by Figure 1 then arming is a strictly dominant strategy for all agents, which implies $\pi = 1$. Consider the belief that $\mu_r^i(\pi_t, I_t) = (1, 0)$ for all i . If two members of the elite $i, j \in E$ are matched, then predateding $p_t^E = 1$ represents a strictly dominant strategy irrespective of the arming decision of the opponent. This is true, a fortiori, for a poor agent that is matched with a rich agent e.g. $i \in E$ and $j \in P$. The richer player $i \in E$ might not have a dominant strategy p_t^E in this case, however, if the gain from expropriating a non armed poor y_t^P is lower than the cost φy_t^E . But since for $j \in P$, $p_t^P = 1$ is a strictly dominant strategy, by iterated deletion of strictly dominated strategies, it follows that $p_t^E = 1$ is optimal.

Proof of Lemma 2. The necessity follows directly from the observation that property rights cannot be implemented if the electorate, in particular the pivotal voter, do not have an incentive to do so. The sufficiency follows from majority voting among the electorate and the fact that the median voter is decisive.

Proof of Proposition 2. i) Consider a democracy in which all members of the elite arm $\{p_t^i(d) = 1\}_{\forall i \in E}$, while the people abstain from arming $\{p_t^i(d) = 0\}_{\forall i \in P}$. Then $\pi = \gamma$, and the median voter belongs to the people. He can contemplate protecting property rights when the people finance them on their own. If $I_t = 1$ under these conditions, then the disposable income earned by each $i \in P$ is $c_t^P = y_t^P(1 - G(\gamma, z))$ by non arming and $y_t^P(1 - \varphi)$ by arming. Therefore if (6) holds, that is if $y_t^P(1 - G(\gamma, z)) \geq y_t^P(1 - \varphi)$, then it is optimal for the people to protect property rights and restrain from arming. In this case, the maximum disposable income that a member of the elite $i \in E$ can earn by not arming is given by $c_t^E = y_t$ which is realized only if $p_t^i = 0$ for all $i \in E$. But, if $y_t^E(1 - \varphi) > y_t$, arming is a strictly dominant strategy, which implies $\{p_t^i(d) = 1\}_{\forall i \in E}$. Consequently, the belief of all members of society that is consistent with this equilibrium is $\mu_d^i(\pi_t, I_t) = (\gamma, 1)$. Violation of one of the conditions does not allow to implement $I_t = 1$ with $\pi_t = \gamma$: from Lemma 1, beliefs of $\mu^i(\pi_t, I_t) = (\pi_t, 0), i \in P$ imply that property rights cannot be implemented in equilibrium; similarly, if $z < \underline{z}^P$; finally, if $y_t^E(1 - \varphi) < y_t$ the elite do not arm and the second part of the proposition is relevant.

ii) If nobody arms, $p_t^i = 0 \forall i$, then a member of the people is the median voter. If the belief is that $\mu_d^i(\pi_t, I_t) = (\pi_t, 1)$ for all i , the expected payoff by not arming depends on arming decisions made by others, \mathbf{p}^{-i} . If no individuals arm then all agents earn a disposable income equal to $c_t = \tilde{y}_t = y_t = \gamma y^E + (1 - \gamma) y^P > y^P$. Under this payoff structure as depicted in Figure 2, each member of the people can ensure himself a disposable income strictly larger than $y_t^P(1 - \varphi)$ by not arming. This implies that $p_t^i = 0 \forall i \in P$ is the optimal strategy. On the other hand, if $y_t^E(1 - \varphi) \leq y_t$ then $p_t^E = 0$ is the optimal strategy for the elite as well, and the consistent belief is $\mu_d^i(\pi_t, I_t) = (0, 1)$ for all i . Violation of beliefs $\mu_d^i(\pi_t, I_t) = (\pi_t, 0)$ or incentives $y_t^E(1 - \varphi) > y_t$ implies that $\pi_t > 0$ in equilibrium.

Proof of Lemma 4. From Proposition 2, whenever condition (11) then, irrespective of the enforcement of horizontal property rights in oligarchy, each member of the elite optimally decides not to arm whenever $\mu_d^E(\pi_t, I_t) = (0, 1)$ since this would give them disposable income equal to y_t . In this case a democratic regime represents the optimal regime choice for the members of the elite: $r_t^E = d$. Consider now the belief $\mu_d^E(\pi_t, I_t) = (1, 0)$. In this case, from Proposition 3, $p_t^E = 1$ represents a strictly dominant strategy independently of the political regime in place. Under these conditions the optimal choice of the elite is to stay in an oligarchy so that $r_t^E = 0$.

Proof of Proposition 5. From Propositions 2 and 3, it follows that the equilibrium crucially depends on the beliefs about predation choices and implementation of horizontal property rights, $\mu_r^i(\pi_t, I_t)$. From Lemma 4, the elite will only offer democracy, $r_t^E = d$, if $\mu_d^E(\pi_t, I_t) = (0, 1)$, in which case their dominant strategy is no predation, $p_t^E = 0$. Retaining oligarchy, $r_t^E = 0$, implies that the elite believes property rights will not be implemented and investment in predation is optimal, in which case also the people invest in predation and the outcome is an inefficient oligarchy with no horizontal property rights. Note, however, that if $y_t^E(1 - \varphi) < y_t$, the latter choice is dominated by offering democracy. By forward induction, for the people observing democracy being offered imply that the only reasonable belief for the elite must be $\mu_d^E(\pi_t, I_t) = (0, 1)$ which from Lemma 4 implies $p_t^E = 0$. But in this case the only reasonable belief for the people is $\mu_d^E(\pi_t, I_t) = (0, 1)$ which from Lemma 3 implies that $p_t^P = 0$ is a strictly dominant strategy. As a result by offering democracy the elite coordinate the beliefs of all individuals that horizontal property rights will be enforced and predation will be low, in particular, $\mu_d^i(\pi_t, I_t) = (0, 1)$ for all i . Hence, the equilibrium is unique, and $I_t^* = 1$ and $y_t^E = y_t^P = y_t$ in equilibrium.

Proof of Proposition 6. The result immediately follows from Lemma 1 and Propositions 1, 2, and 3, and from noting that oligarchy can never be the best choice for the people, i.e., if (3) does not hold.

Proof of Lemma 6. Given the features of the functions (14) and (15) the proof follows directly from the intermediate value theorem and the implicit function theorem.

Proof of Lemma 7. The unique level of γ that identifies the unique intersection between loci Γ and Υ_φ is denoted by $\underline{\gamma}$ such that $\Gamma(\underline{\gamma}, k) = \Upsilon_\varphi(\underline{\gamma}, \varphi)$ and is given by,

$$\underline{\gamma} = \frac{1 - \varphi}{1 + k}. \quad (18)$$

Note that $\underline{\gamma}$ is independent of z and G . Given the features of (13) and (14), for any $\gamma < \underline{\gamma}$ the locus $\Gamma(\gamma, k)$ lies above $\Upsilon_\varphi(\gamma, \varphi)$ and vice-versa. Also note that the threshold $\underline{\gamma}$ is decreasing in both φ and k : $\partial \underline{\gamma} / \partial \varphi < 0$ and $\partial \underline{\gamma} / \partial k < 0$. The level of γ at which the loci Γ and Υ_G cross is denoted by γ_g , such that $\Gamma(\gamma_g, k) = \Upsilon_G(\gamma_g, G(\cdot), z)$, and is implicitly characterized by,

$$1 - \gamma_g(k + 1) = G(1 - \gamma_g, z). \quad (19)$$

The left hand side of condition (19), $1 - \gamma(k + 1)$, is linear and strictly decreasing in γ and takes non-positive values at $\gamma \geq 1/2$ for any $k \geq 1$. The right hand side, $G(1 - \gamma, z)$, is strictly decreasing and convex in γ with $G(1/2, z) > 0$. Hence, there exists at most a unique $\gamma_g \in (0, 1/2)$ solving (19) such that for any $\gamma > \gamma_g$ the locus $\Upsilon_G(\gamma_g, G(\cdot))$ lies above the locus $\Gamma(\gamma, k)$ and the opposite is true for any $\gamma < \gamma_g$. Also by implicit function theorem we have $\partial \gamma_g / \partial k < 0$ and $\partial \gamma_g / \partial z > 0$.

7.2 Public Policy Equilibria in Mixed Strategies [Not Intended for Publication]

Consider the possibility of equilibria in mixed strategies concerning the individual arming decisions.⁵⁰ In the following we omit time subscript for notational simplicity. Mixed strategies equilibria can be sustained by members of the elite and the people randomizing optimally between predation and non predation with some probability π^{E*} and π^{P*} , respectively. With a continuum of agents this is equivalent to have fractions π^{E*} and π^{P*} of the elite and the people optimally choosing to arm so that the aggregate a share of predators is

$$\pi^* = \pi^{E*}\gamma + \pi^{P*}(1 - \gamma) \quad (20)$$

Denote the corresponding equilibrium vector by $\pi^* \equiv \{\pi^{E*}, \pi^{P*}\}$.

In order to characterize the set of equilibria with mixed strategies we need to identify the pivotal (median) voter that determines the public policies. As discussed in section 3 in the text, the median voter (whose preferred policy is a Cordocet winner) is identified by the majority inside the set of non-armed individuals. A mixed strategy equilibrium (MSE) is a public policy equilibrium as defined in Definition 1 where individuals can randomize between the strategies arming and non arming. As a preliminary step for the characterization of the set of MSE, we first notice that irrespective of the political regime and income inequality, equilibria in mixed strategies in which both groups split in predators and non predators, i.e. with $\pi^{E*} \in (0, 1)$ and $\pi^{P*} \in (0, 1)$, do not exist. Also, if some members of the people predate in democracies then it must be the case that all members of the elite predate as well.

Lemma 8. *For any $\{\mathbf{y}, A, \varphi, \gamma, G\}$, any $r = \{o, d\}$ and any set of beliefs concerning property rights protection and predation $\mu^i(\pi, I)$:*

- i) No equilibrium in mixed strategies can emerge with $\pi^{E*} \in (0, 1)$ and $\pi^{P*} \in (0, 1)$.*
- ii) In a democracy if $\pi^{P*} > 0$ then it must be that $\pi^{E*} = 1$.*

Proof. i) From Proposition 6, in oligarchies any equilibrium involves arming by part of the people. In democracies, from Lemma 1 we know that if $\mu_d^i(\pi, I) = (\pi, 0)$, $\forall i \in P$ then $p^P = 1$. As in Proposition 3, this makes arms always a strictly dominant strategy also for each member of the elite which implies $\pi^{E*} = \pi^{P*} = 1$. Consider the case $\mu_d^i(\pi, I) = (\pi, 1)$, $\forall i \in \{E, P\}$ and, by contradiction, assume that there exists a mixed strategy equilibrium in which each member of the elite and the people optimally randomizes between arms and no arms with some probability $\pi^{E*} \in (0, 1)$ and $\pi^{P*} \in (0, 1)$, respectively, delivering an aggregate proportion of armed individuals $\pi^* = \pi^{E*}\gamma + \pi^{P*}(1 - \gamma)$. The disposable income earned by agent $i \in \{E, P\}$ by not arming is then given by $\tilde{y}^i(\pi^*)$, while the disposable income associated with arming is $y^i(1 - \varphi)$. The vector $\pi^* \equiv \{\pi^{E*} \in (0, 1), \pi^{P*} \in (0, 1)\}$ is an equilibrium if, given π^* , the strategy π^{i*} is not strictly dominated by any other strategy, which is the case if and only if

$$y^i(1 - \varphi) = \tilde{y}^i(\pi^*) \text{ for all } i \quad (21)$$

which is not possible since $y^E > y^P$.

ii) Consider the case in which $\pi^{P*} > 0$ in a democracy. From point i) we know that it must be the case that either $\pi^{E*} = 1$ or $\pi^{E*} = 0$ which we want to rule out. Notice that if $\pi^{E*} = 0$ then in equilibrium $I = 1$ and $\pi = \pi^{P*}$. This equilibrium holds if and only if:

$$\tilde{y}^E(\pi^*) = \frac{[y^P \pi^{P*}(1 - \gamma) + y^E \gamma]}{\pi^{P*}(1 - \gamma) + \gamma} (1 - G(\pi^{P*}(1 - \gamma) + \gamma)) > y^E(1 - \varphi) \quad (22)$$

⁵⁰This is equivalent to considering asymmetric equilibria in pure strategies.

and

$$\tilde{y}^P(\pi^*) = \frac{[y^P \pi^{P*} (1 - \gamma) + y^E \gamma]}{\pi^{P*} (1 - \gamma) + \gamma} (1 - G(\pi^{P*} (1 - \gamma) + \gamma)) = y^P (1 - \varphi) \quad (23)$$

But these last conditions hold together if and only if :

$$y^P (1 - \varphi) > y^E (1 - \varphi)$$

Which is not possible since $y^E > y^P$. This essentially means that if the elite finds it profitable not to predate in a democracy this must be true, a fortiori, for the people.

We next characterize the set of equilibria in mixed strategies in democracy.

Proposition 8 (Horizontal Property Rights in Democracy (MSE)). *Under democracy, $r = d$, for any \mathbf{y}_t and γ , there exist two possible public policy equilibria with mixed strategy with horizontal property rights protection $I_t = 1$:*

i) $\pi_1^* = \{\pi^{E*} = 1, \pi^{P*} \in (0, 1)\}$ if and only if $\mu_d^i(\pi, I) = (\pi_1^*, 1)$ for all i , $z > \underline{z}^P(\varphi, \gamma)$ and condition (7) does not hold;

ii) $\pi_2^* = \{\pi^{E*} \in (0, 1), \pi^{P*} = 0\}$ if and only if $\mu_d^i(\pi, I_t) = (\pi_2^*, 1)$ for all $i \in E, P$ and condition (7) holds;

Proof. Having ruled out mixed strategies in which both $\pi^{E*} \in (0, 1)$ with $\pi^{P*} \in (0, 1)$ and $\pi^{E*} \in (0, 1)$ with $\pi^{E*} = 0$, the only possible MSE in democracy involve:

i) (Type 1 MSE) $\pi_2^* = \{\pi_2^{E*} = 1, \pi_2^{P*} \in (0, 1)\}$. The total number of predators in this case is given by $\pi_2^* = \gamma + (1 - \gamma)\pi_2^{P*}$. This equilibrium holds if and only if,

$$\tilde{y}^E(\pi_2^*) = y^P [1 - G(\gamma + (1 - \gamma)(\pi_2^{P*}), z)] < y^E (1 - \varphi) \quad (22)$$

and

$$\tilde{y}^P(\pi_2^*) = y^P [1 - G(\gamma + (1 - \gamma)(\pi_2^{P*}), z)] = y^P (1 - \varphi) \quad (23)$$

Note that if (23) holds the also (22) is immediately satisfied and since $\tilde{y}^E(\pi_2^*)$ is strictly decreasing and continuous in π_2^{P*} . Hence if (7) does not hold then $\pi_2^{E*} = 1$ while if $z > \underline{z}^P(\varphi, \gamma)$ then $y^P [1 - G(\gamma, z)] > y^P (1 - \varphi)$. there exists a unique $\pi_2^{P*} \in (0, 1)$ such that 23 holds with equality.

ii) (Type 2 MSE) $\{\pi_1^{E*} \in (0, 1), \pi_1^{P*} = 0\}$. Notice that in this case the total number of predators is $\pi_1^* = \gamma\pi_1^{E*}$ and the people would be pivotal since they constitute the majority among non predators. Repeating the logic of the Proof of Lemma 8, $\pi^{E*} \in (0, 1)$ is an equilibrium strategy if and only if for the elite,

$$\tilde{y}^E(\pi_1^*) = \frac{[y^P (1 - \gamma) + y^E \gamma (1 - \pi_1^{E*})]}{(1 - \gamma) + \gamma (1 - \pi_1^{E*})} (1 - G(\gamma\pi_1^{E*}, z)) = y^E (1 - \varphi) \quad (24)$$

and at the same time $\pi^{P*} = 0$ is an equilibrium strategy for the people if and only if,

$$\tilde{y}^P(\pi_1^*) = \frac{[y^P (1 - \gamma) + y^E \gamma (1 - \pi_1^{E*})]}{(1 - \gamma) + \gamma (1 - \pi_1^{E*})} (1 - G(\gamma\pi_1^{E*}, z)) > y^P (1 - \varphi) \quad (25)$$

Notice that (25) is satisfied whenever (24) holds. Also notice that $\tilde{y}^E(\pi_1^*)$ is a strictly decreasing and continuous function in π_1^{E*} (since the larger the number of predators the lower the taxable income and the larger the cost of property rights enforcement). Hence if condition (7) does not hold with strict inequality, by intermediate value theorem there exists a unique $\pi_1^{E*} \in (0, 1)$ such that (24) holds;

Repeating the reasoning we can prove that whenever the equilibrium with HPR can be sustained in oligarchies there also exists a corresponding MSE where some members of the elite predate in equilibrium. This is stated in,

Proposition 9 (Horizontal Property Rights in Oligarchy (MSE)). *Under oligarchy, $r = o$, for any y_t and γ , the equilibrium in mixed strategy with $I_t = 1$ and $\{\pi^{E*} \in (0, 1), \pi_1^{P*} = 1\}$ with π^{E*} being identified by*

$$y_t^E (1 - G(\gamma\pi^{E*} + (1 - \gamma), z)) = y_t^E (1 - \varphi).$$

if and only if $z > z^E(\varphi, \gamma)$ and $\mu_o^i(\pi_t, I_t) = (\pi_3^, 1)$ for all $i \in E$.*

These Propositions essentially mirror Proposition 2 and 1 in the text. In democracies, whenever the people strictly benefit from enforcing HPR then there also exist a MSE in which a fraction π_2^{P*} of the people predate, too (Type 1 MSE). Similarly, whenever the elite strictly benefits from HPR in democracies then there also exists a MSE where part of the elite predate. When the elite strictly benefits from HPR in oligarchies there also exists a mixed strategy equilibrium in which part of the elite predate. In summary, for any pure strategy equilibrium of the model (holding with strict inequalities) there exists a corresponding mixed strategy equilibrium in which all the members of one of the two groups is indifferent between predation and non predation.

Finally notice that the consideration of MSE does not affect the qualitative predictions concerning the politico-economic equilibria. The main difference is that under the conditions in which conflictual democracies and oligarchies sustain HPR there exists also a corresponding MSE as characterized in Propositions 8 and 9. Still, as in Proposition 5, consensual democracies are characterized by a unique equilibrium with $\pi = 0$. Now, notice that

$$y > \tilde{y}(\pi_1^*) > \tilde{y}(\pi_2^*).$$

Recalling the discussion on the dynamic taxonomy of democratization this implies that at the moment in time in which the conditions for a consensual transition hold, then mixed strategy are strictly dominated. From Proposition 5 we have that the conditions for a consensual democracy, (3) and condition (11), are therefore violated. This means that no mixed strategy equilibria can emerge after a consensual democratic transition. Consequently, mixed strategy equilibria do not emerge along the dynamic equilibrium path leading to consensual democracies. In summary, the consideration of mixed strategy therefore leaves all qualitative predictions unchanged.