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ABSTRACT

Hobbes to Rousseau: Inequality, Institutions, and Development*

We analyze the endogenous evolution of economic and political institutions and the interdependencies with the process of economic development. Favorable economic institutions ensure the appropriability of rents in form of a state of law. We study the conditions under which a state of law can be implemented under oligarchy, and when democratization is necessary. Inequality in endowments and incomes prolongs the absence of good institutions and delays democratization. Conversely, institutions shape the income distribution. Simulations illustrate how inequality affects the development process and may lead to overtaking and divergence. The implications are in line with historical and empirical evidence.

JEL Classification: H10, O20, N10

Keywords: inequality, democratization, institutions, state of law, long-term development

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1 Introduction

The importance of economic and political institutions for the development possibilities of an economy is well recognized among economists. A substantial literature studies the economic consequences of different political institutions and different democratic regimes regulating the limits of political power and the aggregation of individual preferences.[1] An important conclusion one can draw from this literature is that political institutions affect social interactions, the resolution of conflicts of interests, and play an important role in shaping economic outcomes. There is an increasing awareness, however, that economic and political institutions themselves evolve endogenously and are affected by economic forces and long term development. In particular, in several contributions on the economic forces behind the process of democratization, Acemoglu and Robinson (Acemoglu and Robinson, 2000, 2001, 2003, 2004) put forward the argument that, facing an increasing threat of conflict, the elites initiate a democratic transition as a commitment device against regressive redistribution.[2] Other authors such as Lizzeri and Persico (2004), Gradstein (2004) and Bourguignon and Verdier (2000) propose efficiency arguments for democratic transitions. The endogenous emergence of democratic systems in these contributions arises from the 'intrinsically good' economic characteristics of the democratic regime which lead the elite to release power in their own interest.[3] These characteristics, in turn, causally spur economic development. In some sense, political institutions and economic institutions coincide in these models, implying that democracy is a necessary and sufficient condition to insure appropriability of economic efforts. In contrast to this focus on political institutions, some authors such as Glaeser and Shleifer (2002) emphasize the role of economic, particularly legal, institutions for economic well-being, and stress the role of the social environment. On grounds of empirical evidence, Glaeser et al. (2004) propose the view that good economic and political in-

[1] This includes, among others, investigations of the effects of the political system (democracy or not), the role of voting systems, of the form of government, or of the form of state to name a few, on various governmental activities and economic performance in general. See e.g. Persson, Roland, and Tabellini (2000) as well as two recent books by Persson and Tabellini (2003) and Alesina and Glaeser (2004) for surveys of theories and empirical evidence.

[2] Acemoglu and Robinson view social conflict as main force leading to democratic transitions: oligarchic elites facing substantial opposition and a threat of revolution and subsequent expropriation release political power to broader masses involving larger and larger groups of the population in the political process. See also the discussion in Acemoglu, Johnson and Robinson (2004).

[3] In these contributions, democratic regimes allow to increase efficiency by facilitating the provision of public goods as compared to oligarchies, by setting limits to rent-seeking and corruption by the elite, by granting universal property rights or by giving higher incentives to accumulate growth-enhancing human capital.

stitutions, although causally affecting each other, can, but do not have to, go hand in hand. In fact, historical and empirical evidence supports the observation that relatively efficient economic institutions can be implemented under non-democratic political regimes.

The aim of this paper is to provide a unified dynamic theory, which models the feedbacks between the endogenous evolution of economic and political institutions and the process of economic development. Our contention is that the different arguments discussed above are not mutually exclusive but rather complement one another. We provide a model of the dynamic forces leading to institutional changes and, in turn, the effects of these changes for economic growth. In particular, we stress the role of changing economic inequality and long term development as both a determinant and a result of institutional and political change. We address the issue by modelling economic and political institutions as intrinsically different but interacting domains. Formally, we provide a stylized model which operationalizes the politico-economic metaphors proposed by Thomas Hobbes (1651) and Jean Jacques Rousseau (1762). A favorable environment of economic institutions is interpreted as a social contract or state of law, and represents the absence of a state of nature. The state of nature, on the other hand, is the default condition in any human community. When it is in place, resources are wasted in rent-seeking and expropriating activities. In line with the definition of North (1990), the existence of a state of law represents institutions, as it prescribes the rules for how members of society have to deal with each other in the widest sense. Concerning the political dimension, we consider the two extreme cases of perfect democracy with universal franchise as opposed to limited franchise under an elitist oligarchy. Different regimes of political and economic institutions can emerge as equilibria. At a given moment in time each regime represents a subgame perfect Nash equilibrium of a game played among the members of different groups in society. Good economic institutions, i.e. a social contract, can be sustained only if no individuals have incentives to deviate from it. The credibility of announcements to stick to a state of law depends on the political environment. Which regime is implemented in equilibrium depends crucially on both the level of development and the inequality in the distribution of factor incomes.

We incorporate this politico-economic game in a standard growth model, in which the economic environment evolves dynamically due to the process of endogenous, human capital-driven, technical change. The process of human capital formation has a non-neutral dynamic external-

ity on future productivity of human capital. The level of development and the changes in the distribution of income associated to the development process represent the main driving forces behind the evolution in the institutional and political environment.

The analysis of our model delivers the following predictions for long-term development. The income share accruing to the oligarchic elite decreases when human capital gains importance as source of income compared to natural resource ownership. We find that in primitive economies, where natural resources represent the main factor of production, and the role played by other factors like human capital is close to nil, a rich oligarchic elite in command over these resources can credibly offer and implement a state of law.[4] Higher levels of development, and consequently lower inequality due to the lower importance of natural resource ownership in the production process, in contrast, are likely to induce an inefficient state of nature in the absence of a social contract: the elite's promise to implement a social contract without expropriation looses credibility. The elite can always decide to extend the franchise to make their intention to adopt a social contract credible, but they only do so if this implies a net gain. Otherwise, they simply leave the economy in a state of nature. Eventually, once the opportunity costs of democracies in terms of redistribution are sufficiently low and the benefits of the social contract are sufficiently large, the economy is likely to adopt a state of law under a democratic regime. Together, these different possibilities imply a potential for non-monotonic development paths for countries: early agrarian oligarchies with an intact state of law can dissolve in the process of development, giving rise to an inefficient state of nature, from which the state of law can only be achieved through a democratic transition. An initially unequal economy may experience a long period of stagnancy in economic conditions due to the existence of an oligarchic political system in association a state of nature. The evolution of the system endogenously leads to a situation in which the elite finds it profitable to extend the franchise. Nevertheless, democratization takes place only when the social contract under democracy is sustainable. Such a change in the political system and the associated economic institutions favors the exit from the stagnant environment and the economic take-off. Sustainability implies that, contrary to oligarchies, democracies are in equilibrium always associated with efficient economic institutions. Inequality in the distribution

[4] As clarified below, the particular social contract implemented in oligarchies differs substantially from the one implemented in democracies, especially in terms of income redistribution.

of natural resources and income crucially affect the dynamic path experienced by a country and its institutional evolution, higher inequality delays the democratic transition. The model can rationalize occurrences of overtaking and divergence.[5]

This paper touches upon several strings of the literature. We contribute to the literature on democratization mentioned above. In our model, democratization arises endogenously during the process of long term development. While rooting democratization in a commitment problem on the side of the ruling elite, the paper allows to put the different views of democratic transitions under immanent social conflict, and of efficient democratization in the elite's own interest into perspective. This is done by disentangling the determinants and the consequences of the political system on the one hand, and institutions on the other. The paper contributes also to the recent literature of unified growth theories initiated by Galor and Weil (2000).[6] In this respect, our paper is closest to the paper by Galor *et al.* (2004) , who provide a unified theory of the transition from a phase in which mainly geographic factors determine productivity and production, to a phase in which institutional factors, in their case public education, are the crucial determinants. The results in their and in our paper suggest that inequality in resource ownership and factor incomes is a primary determinant of the development path of an economy. This is in line with the argument of Engerman and Sokoloff (2004) that societies characterized by large and unequally distributed natural resource endowments have experienced delays in the process of political and institutional change. They suggest that this may explain episodes of income overtaking and divergence. In the model by Galor *et al.* (2004) overtaking is the result of a mechanism in which inequality in land ownership crucially affects the ruling elite's attitude towards adopting institutions such as public education that promote the accumulation of growth enhancing human capital. Education policies harm landowners who derive little income from capital and rely heavily on land as source of income. Only once sufficiently rich and capitalistic, will landowners actually benefit from public education, and are therefore willing to implement the taxation system needed to provide it. In contrast, our model concentrates on the conditions for the

[5] See Section 4.2.

[6] The endogenous take-off in our model is based on the implementation of appropriate economic and political institutions, and therefore differs from the mechanisms studied earlier, which are based on fertility as in Galor and Weil (2000), selection as in Galor and Moav (2002), or improvements in life expectancy as in Cervellati and Sunde (2005). See Galor (2004) for an extensive discussion of the literature of unified theories on the transition from stagnation to modern growth.

implementation of economic institutions in terms of a state of law, which requires credibility on the side of the agents with political power. Moreover, in our framework, good economic institutions always benefit all members of the society. Under certain conditions, however, their implementation requires a change in the political system, i.e. a process of democratization, to solve the credibility problem.

The results and predictions of our model are in line with the results of recent empirical studies that suggest that the effects of political institutions on economic outcomes may only be indirect. Glaeser *et al.* (2004) present evidence for their claim that the fundamental force driving growth is the accumulation of human capital, and that this fact and the related economic development facilitated, or even led to, the adoption of favorable institutions and political regimes. An important implication of this evidence is that institutions and policies, e.g. ensuring property rights protection, that are favorable for economic development can arise and be implemented even in the absence of democracy. In line with our predictions they also argue that democratic political systems, which are recognized to be usually associated with relatively efficient institutions, can arise due to the process of human capital formation and development which takes place in oligarchies. Likewise, the paper can be interpreted in the light of the findings of Rodrik *et al.* (2004) that geographic environment affects economic development primarily through institutions. The recent study by Rigobon and Rodrik (2004) on the relationships between economic institutions, political institutions, and income levels across countries suggests, in line with the view proposed in this paper, that both democracy and rule of law are beneficial for economic performance, but that rule of law is quantitatively and statistically more important. Finally our prediction that a higher level of economic development leads to a more democratic political system and better economic institutions in the sense of rule of law, while good economic and political institutions mutually reinforce each other, are also reflected in their empirical findings.[7]

The following section introduces a simple model to study the endogenous determination of institutions and political regimes. This model is embedded in the context of a dynamic economy in section 3. Section 4 derives the dynamic paths that result from the interplay of economic environment, political regimes and institutions, and presents some illustrative simulations of

[7] A more detailed discussion of the empirical and historical implications of the model can be found in section 4.4.

the model, before offering a brief discussion of the theoretical results and their empirical and historical relevance. Section 5 concludes. All proofs are relegated to the appendix.

2 A Model of State of Nature and State of Law

This section introduces the institutional environment under which the members of a society live and make their decisions, and which they endogenously determine by their actions. The first component is the political system. We discriminate between two political systems, oligarchy and democracy characterized by the formal allocation of political power.[8] In other words, the difference between the two systems is given by the degree of enfranchisement: in democracy, all members of society have the right to vote, while in oligarchy some people are excluded and the constituency is restricted to a leading class of oligarchs, the elite. This implies that the decisive agent for political decisions (the pivotal agent or median voter) in the two systems differs as well. Consequently, if the interests of the decisive agents in oligarchy and democracy do not coincide, then different actual policies will be implemented in the two systems, reflecting the conflict of interests between the different groups of society - the elite and the people.

The second component of the institutional environment are the rules governing all economic and social interactions. In this respect, we discriminate between *state of nature* and *state of law* established under a social contract, reflecting the views of Thomas Hobbes and Jean-Jacques Rousseau. A universally accepted social contract, or a *state of law,* is characterized by the existence of universally known, accepted, and enforced rules that govern all social interactions. Alternatively, the absence of a social contract reflects the *state of nature.* In particular, the state of law is more efficient than the state of nature, because individuals face no uncertainty concerning the appropriability of their investments or permanent threat of being expropriated.

We next present a model that operationalizes this institutional environment, in particular the concepts of state of nature and state of law, in a parsimonious way. Consider a society, which is populated by two groups of individuals. The first group constitutes the minority, making up for a fraction $\gamma < 1/2$ of the population. This group is called the elite, and denoted by E.[9] The

[8] In this paper, there is no need to distinguish between *de jure* and *de facto* political power, since both always coincide, as will become clear below.

[9] For later use we assume that members of this group possess some innate political power, enabling it to constitute an oligarchic regime. For example, this power derives from the possession of particular resources, such as land,

remaining fraction $(1-\gamma)$ of the population is called the people P. All members of a particular group are identical, they face the same decision problems, and so we can interchangeably speak about a (representative) member of the group or the entire group. Members of the elite and the people decide about the use of their individual incomes y^E and y^P, respectively.[10] We assume the members of the elite are richer than members of the people, $y^E > y^P$, and denote the average income of a member of society by y.

Following the views of Thomas Hobbes, under the state of nature...

> "every man will and may lawfully rely on his own strength and art, for caution against all other men. (...) For being distracted in opinions concerning the best use and application of their strength, they [i.e. all men] do not help, but hinder one another, and reduce their strength by mutuall opposition to nothing: whereby they are easily, not onely subdued by a very few that agree together; but also, when there is no common enemy, they make warre upon each other, for their particular interests."
>
> (T. Hobbes, 1651, Leviathan, Part 2 Ch. XVII, pp.128-129)

We model the political environment, and in particular the state of nature, following closely this view. Individuals face an allocative problem on how to use their "strength" (i.e. income in our model), in the most beneficial way. In particular, they can spend some of their income to "caution" or protect themselves against expropriation or "oppose" fellow individuals trying to rent-seek and appropriate part of others' incomes. These activities arise between the different groups in society. We consider well defined social groups, elite and people, and both, conflict between and within groups. If both groups engage in rent-seeking, neither one will be successful: their attempts cancel each other leading to a mere destruction of income, they "reduce their strength by mutuall opposition to nothing": this is the source of inefficiency associated with the state of nature. The within group conflict has to do with the distributional struggle arising if one group successfully rent-seeks on the other, as individuals "make warre upon each other, for their particular interests". We also take on board the idea that this internal conflict is more

or other peculiar attributes, like nobility.

[10] At this point, the source of this income is irrelevant. A full economic model specifying the income-generating process is developed in the next session.

easily resolved the smaller the group size: "very few that agree together". This is in line with the argument put forward by Olson (1965).[11]

All these elements are formalized in a game played between the elite and the people. Figure 1 presents the strategic form of this game. Each group can choose either to distract part of their income for offensive or defensive purposes or not. For simplicity, we say that they have the possibility to "arm" or "not to arm" themselves.[12] If both groups decide to arm the result is that both burn income without gaining anything. This situation is depicted in the top-left panel, and essentially constitutes a society living under the state of nature with everybody struggling against everybody while foregoing a fraction $f(\gamma)$ of income, with $0 < f(\cdot) < 1$.[13]

Insert Figure 1 about here!

If one group does decide not to caution itself, while the other group decides to arm, a net transfer from the former to the latter takes place. We assume that all income of the society is appropriated by the arming group and the receipts are distributed equally among all its members. Part of these receipts are lost due to the inside group struggle, and we assume that each group can appropriate only a fraction g of all income in the society. Furthermore, following the previous argument the net receipts are a decreasing function of group size: $0 < g(\cdot) < 1$ and $g'(\cdot) < 0$.[14] This situation is illustrated in the off-diagonal panels.

Only in the case in which both groups decide not to arm, no income is burned. This is the case of a commonly agreed social contract with a state of law governing social interactions. Members of the two groups obtain the income that the social contract stipulates in that case, denoted by y^E_{SC} and y^P_{SC}, respectively. This case is reflected in the lower right panel of the figure.

The level of income received by each group crucially depends on the *type* of social contract

[11] Alternative, but equivalent, interpretations for the inefficiency of the state of nature are imperfect property rights enforcement, inefficient provision of public goods and infrastructure, imperfect protection from expropriation, or inefficiently low labor supply, entrepreneurship etc. due to hold-up problems. See also e.g. Grossman (2004b) for a model of a model of individual investment decisions concerning the use of time and effort for productive and rent-seeking activities in an institutional environment in which property rights are not granted (anarchy).

[12] This can be interpreted as literal investment in arms, but also more broadly in engaging in some kind of rent-seeking activity or social conflict and unrest.

[13] This view is reflected in the literature on rent-seeking and social conflict, e.g. see Esteban and Ray (2001), which provides formal arguments why the relative sizes of the groups may affect the intensity, and thus the wastefulness, of conflict.

[14] The precise specification of the inefficiency loss is without consequence for the main result. Any formulation preserving the asymmetry in the efficiency of rent-seeking between differently sized groups would lead to equivalent results.

implemented. As argued by Jean-Jacques Rousseau, a social contract can arise under very different political systems. For Rousseau the crucial attribute of a society is whether a state of law, exists, or whether the state of nature rules:

> "I therefore give the name "Republic" to every State that is governed by laws, no matter what the form of its administration may be. (...) I understand by this word [Republic] not merely an aristocracy or a democracy, but generally any government directed by the general will, which is the law."
>
> (J.J. Rousseau, 1762, The Social Contract, Book 2 Ch. 6, pp.39-40)

Consequently, one can think of two possible types of social contract: one that arises under oligarchy, and another one arising under democracy. However, while both political systems may implement an efficient state of law, the social contracts actually implemented are inherently different. In particular, as we discuss next, the fact whether a republic is democratic or oligarchic crucially affects the distribution of incomes.

2.1 Taxonomy of Political Equilibria

A political equilibrium is characterized by the particular political system adopted by a society and the social contract (or absence of social contract) associated with it. The members of the different groups determine by their own arming decisions whether they live under a state of nature, or adopt a state of law. In this sense, a social contract implying a state of law can only arise with mutual consent of all members of society, which justifies the term.[15]

In oligarchies, the political power is in the hand of the elite which has the possibility to offer its preferred social contract but cannot commit on its decisions. This has important implications, as it gives the elite the advantage to e.g. announce 'not to arm' and eventually rent-seek on the people. Hence, in terms of the game introduced before, this implies an extensive form in which the elite always decides about arming after the people. In turn, the defining characteristic of a democracy is that that everybody participates in the process of political decision making. In

[15] Also here, the definition follows Rousseau's description: " 'To find a form of association which defends and protects the person and property of each member with the whole force of the community, and where each, while joining with all the rest, still obeys no one but himself, and remains free as before.' This is the fundamental problem to which the social contract provides the answer." (Rousseau, 1762, part 1 ch. 6, pp.14-15).

the current setting, the people represent the majority in the society. Following the conventional view in political economy, this implies that the pivotal agent is a member of the people. In terms of the extensive form of the game, this implies that the people move last. The political system is therefore represented by the sequence of decisions, and political institutions essentially serve as coordination device for society, which is in line with Rousseau's view.[16]

The actually implemented social contract mirrors the preferences of the group which has political power. Following the standard literature, if taxation is non-distortionary, the equilibrium outcome of a democratic voting over taxation implies full redistribution. This means that a democratic republic would adopt a social contract where all members of society receive the same income: $y_{SC}^E = y_{SC}^P = y$. Under oligarchy, on the other hand, the elite has no incentive to implement a social contract involving progressive redistribution. Therefore, we consider the case in which the social contract in an oligarchic republic implies no redistribution $y_{SC}^E = y^E$ and $y_{SC}^P = y^P$. This is in line with the conventional view that the social contract exhibits more progressive redistribution in democracies that in oligarchies, which goes back to De Tocqueville (1835) and has been formalized by Meltzer and Richard (1981).[17] This view is also in line with empirical and historical evidence.[18]

As anticipated above, a social contract can therefore only emerge if it is credible, that is, if it represents a subgame perfect Nash-equilibrium of the extensive form of the game depicted in Figure 2 for the case of oligarchy and in Figure 3 for the case of democracy.

Insert Figure 2 about here!

Insert Figure 3 about here!

[16] Our model essentially builds on the well-known Stag Hunt game, with which Rousseau (1755, pp. 111-112) exemplified the need for a social contract and institutions that can solve the coordination problem among citizens and implement the social contract.

[17] Voting over linear-progressive tax schedules with distortions could be introduced without changing the main results. This would lead to the 'median voter hypothesis', under which taxation increases with inequality. A similar argument is made in the model by Bourguignon and Verdier (2000), where the poor people cannot commit not to expropriate the rich elite once democracy is established. Also, allowing for regressive redistribution in oligarchies would not change the result. What is crucial for our argument is merely the higher progressivity of the redistribution scheme under the democratic social contract.

[18] In a historical discussion of economic and political development in Britain, Justman and Gradstein (1999) argue that democratization was the prime factor that led to declining inequality in the aftermath of the Industrial Revolution beginning in the second third of the 19th Century. In particular, the extension of the franchise led, according to their discussion, to the replacement of regressive indirect taxes by progressive taxes on incomes, land and inherited wealth following. Analyzing historical episodes and cross-country data, Gradstein and Milanovic (2000) and Gradstein, Milanovic, and Ying (2001) find a robust positive correlation between democratization and income equality.

The main objective of this paper is the analysis of how different political systems and associated social contracts arise endogenously in a society. To study this process, consider the case in which the elite has political power. Before the groups of society play the arming game, the elite can choose to retain exclusive political power or to release political power to the people by offering a democratic regime. This amounts to play either the game in Figure 2 or in Figure 3. This choice is made rationally, anticipating the outcome of the respective games. In the following, we characterize the political environment that arises endogenously as equilibrium. Three different types of equilibria can arise: Oligarchic Republic, Democratic Republic and the State of Nature. The presentation of a dynamic model, which allows to study jointly the dynamic evolution of the economy and the endogenous emergence of different equilibria is postponed to the next section.

Oligarchic Republic. For the elite, an oligarchic republic represents the best regime. It is feasible if the elite can credibly announce not to arm, that is, when the elite has no incentive to deviate to arming if the people do not arm. The second condition needed is that the people find it not profitable to deviate and arm themselves. Since, under an oligarchic regime, the people move first, they anticipate that if they would arm, the elite would do the same, leading to a state of nature. Hence, it is in the people's best interest to leave the power in the hand of the oligarchy without opposing and arming.[19] Formally, the necessary and sufficient condition for this equilibrium is given by,

$$yg(\gamma)/\gamma < y^E \,. \tag{1}$$

This condition is more likely to be satisfied, *ceteris paribus*, the richer the elite is compared to the people, and the less efficient is the rent-seeking process. Rearranging condition (1) using the fact that average income in the society is given by $y = \gamma y^E + (1-\gamma)y^P$, one obtains $\frac{y^E}{y^P} > \frac{(1-\gamma)}{\gamma}\frac{g(\gamma)}{1-g(\gamma)}$. The larger inequality y^E/y^P, and the smaller the benefits from rent-seeking

[19] This regime is reflected in Hobbes' idea of a Leviathan, when he argues that everybody would gain by giving all power in the hands of a small elite, or one person: "The only way to erect such a Common Power, as may be able to defend them (...) from the injuries of one another, and thereby to secure them in such sort as by their owne industrie, and by the fruites of the Earth they may nourish themselves, and live contendedly; is to conferre all their power and strength upon one Man, or upon one Assembly of men (...) and therein to submit their Wills, everyone to his Will and their Judgements to his Judgement." (T. Hobbes, 1651, Leviathan, Part 2 Ch. XVII, p. 131).

$g(\gamma)$, the more easily this condition is satisfied as the elite has less to gain from rent-seeking.[20]

Democratic Republic. While being less attractive than an oligarchic republic, from the elite's point of view offering a democratic regime can nevertheless be the best available option. This is the case whenever offering democracy is the only way to credibly implement a social contract.[21] The elite will only release power if the people have no incentive to deviate and arm once observing the elite's decision. Formally, the necessary and sufficient conditions for a democratic republic are therefore,

$$yg(\gamma)/\gamma > y^E\,, \tag{2}$$

$$y^E f(\gamma) < y\,, \tag{3}$$

$$yg(1-\gamma)/(1-\gamma) < y\,. \tag{4}$$

Rearranging condition (2) gives $\frac{1-\gamma}{\gamma}\frac{g(\gamma)}{1-g(\gamma)} > \frac{y^E}{y^P}$, which requires that the efficiency of the elite in rent-seeking must be reasonably large while inequality sufficiently small. Analogously, rearranging condition (4) one obtains $g(1-\gamma) < (1-\gamma)$, which implies that for a democratic republic to arise, the rent-seeking effectiveness of the people must be sufficiently low; lower than their group size.[22] Finally, rearranging (3) yields $\frac{y^P}{y^E} > \frac{f(\gamma)-\gamma}{(1-\gamma)}$. This is true whenever $f(\gamma) < \gamma$, i.e. when inefficiencies in the state of nature are sufficiently large. Also, inequality must be sufficiently small to make the opportunity cost of redistribution bearable for the elite.

State of Nature. Without a social contract the society is characterized by the state of nature. If, for the elite, the opportunity cost of redistribution in democracy is too high, but at the same time it cannot credibly commit to a social contract under oligarchy, then the state of nature is the only viable option. This is true even if the implied inefficiency makes this

[20] Similar to our idea that a social contract can emerge only if it is credible, constitutions provide an alternative to social conflict only if they are self-enforcable, that is, when no party has a big advantage in social conflict, as in the paper by Grossman (2004a). In an earlier paper, Grossman (2001) finds that under certain circumstances, leaving the power in the hands of a restricted elite may be preferable for the people, similar to the case of an oligarchic republic equilibrium. Nonetheless, the concept of state we consider is inherently different, since under an oligarchic republic the elite abstains from rent-seeking out of own interests, while in Grossman's paper the intervention of a state is needed to guard the group of potential predators. This difference explains why larger efficiency of predation makes a state more useful and likely in his set up, while it makes the elite less credible in our model.

[21] This crucial role of commitment in the process of democratization is in line with the arguments put forward in earlier contributions, e.g. by Acemoglu and Robinson (2000, 2001).

[22] While not essential for the formal arguments, the specification for rent-seeking effectiveness being decreasing with group size adopted later in the paper ensures that this condition is always satisfied.

regime always inferior for both groups as compared to an oligarchic republic. The necessary and sufficient conditions for this regime are,

$$y^E f(\gamma) > y\,, \tag{5}$$

$$yg(\gamma)/\gamma > y^E\,. \tag{6}$$

Rearranging condition (5) one obtains $\frac{y^P}{y^E} < \frac{f(\gamma)-\gamma}{(1-\gamma)}$, and condition (6) gives $\frac{y^E}{y^P} < \frac{(1-\gamma)}{\gamma}\frac{g(\gamma)}{1-g(\gamma)}$. Note that the former condition can hold only if the state of nature is not too inefficient, i.e. $f(\gamma) > \gamma$. In this case, both conditions can be combined to $\frac{(1-\gamma)}{\gamma}\frac{g(\gamma)}{1-g(\gamma)} > \frac{y^E}{y^P} > \frac{(1-\gamma)}{f(\gamma)-\gamma}$, which is satisfied for intermediate levels of inequality. The occurrence of a state of nature where 'homo homini lupus' is more likely to arise with intermediate levels of inequality, and when the elite is reasonably efficient in rent-seeking activities, while the inefficiencies related to the state of nature are not too high.[23]

3 The Politico-Economic Model

This section lays down an economic framework that allows to study the political game between elite and people, and the endogenous emergence of the political equilibria in a dynamic context.

Individuals. Consider an economy, which is populated by an infinite sequence of subsequent generations of individuals. A given generation t consists of a continuum of individuals i of measure one. Each individual has a single parent and a single offspring, so the size of the population is constant across generations. We use i to interchangeably denote an individual and the family or dynasty to which he belongs. For simplicity, individuals' utility is logarithmic in the consumption c of a unique good and bequests b,

$$u_t^i = u(c_t^i, b_t^i) = (1-\beta)\log c_t^i + \beta \log b_t^i\,. \tag{7}$$

[23] Intuitively, very low levels of inequality imply low opportunity costs for going to a democratic state of law. Very high levels of inequality, on the other hand render the elite less willing to implement a democratic republic, and more credible to adopt a state of law under oligarchy.

Consumption and bequest are financed from the income individuals derive from supplying manual labor and human capital to the labor market. We abstract from modelling labor-leisure choices. Rather, we assume that every individual is endowed with one unit of labor, which he inelastically supplies during his life. Aggregate labor input in production therefore equals the total population size: $L \equiv 1$. Moreover, individuals can acquire human capital by using the bequests received from their parents, and transforming them in a costly human capital production process into human capital. For simplicity, we assume that this process is linear in bequests, so an individual acquires $h_t^i = b_{t-1}^i$.[24] Aggregate human capital is then given by $H_t = \int_0^1 h_t^i di$. The human capital of a generation fully depreciates when the generation dies. Apart from labor and bequests, some individuals, the elite, are endowed with land. Land is equally distributed among the members of the elite, each one owning $n^E = N/\gamma$. Land is passed-on from generation to generation, and there is no market for land.[25] Like labor, land is ready to use for its owners, and does not depreciate, hence $N_t = N$. We denote per capita variables by lower case letters, and aggregate variables by upper case letters, i.e. $y_t = Y_t/L$, $h_t = H_t/L$, and $n = N/L$.

Production. The economy is fully competitive, and all resources are employed in the production of a single final commodity Y, which is used both for consumption and investment in human capital capital in the form of received bequests. The production technology exhibits constant returns to scale and is of the form

$$Y_t = [A_t H_t + N]^{\alpha} L^{(1-\alpha)} . \tag{8}$$

Besides the resource inputs, production is affected by a relative productivity index A_t, which reflects the technological state of the art of production and augments human capital.[26] The technological environment evolves endogenously depending on the stock of human capital available in the economy. Technological progress favors human capital in the sense that technological change is faster in affecting human capital than land. For simplicity we adopt the following

[24] These assumptions are not crucial for the main argument or the main results. Any production technology that is increasing in the received bequests would be equivalent.

[25] This assumption is without loss of generality. In fact, as will become clear below, even allowing for land markets does not change the results, because selling or buying land using e.g. bequests is always a (weakly) dominated strategy.

[26] This specification of the production function, which is also used by Acemoglu and Robinson (2003), is formally equivalent to the production of a homogeneous commodity in two distinct sectors, one employing exclusively land resources together with labor, and the other exclusively human capital together with labor.

formulation,[27]

$$\frac{A_t - A_{t-1}}{A_{t-1}} = \mu H_{t-1}^{\eta} \quad \forall \quad t\,. \tag{9}$$

This formulation combines two central features. Following the endogenous growth literature along Lucas (1988) and Romer (1990), human capital acquired by one generation exerts an externality on productivity of the next generation, and is therefore the engine of growth, while technical progress is biased in favor of augmenting the productivity of human capital.[28] These two features imply that the available stock of human capital in a given generation indirectly makes human capital a more important source of income for future generations.

Price Equilibrium and Individual Income. Since the economy is competitive, all factors are remunerated according to their marginal products.[29] Hence, equilibrium factor prices in terms of labor wages, wages for human capital and land rents, in the economy are given by

$$w_t = (1-\alpha)\left[A_t h_t + n\right]^{\alpha}\,; \tag{10}$$

$$r_t = \alpha\left[A_t h_t + n\right]^{\alpha-1} A_t\,; \tag{11}$$

$$\text{and} \quad \rho_t = \alpha\left[A_t h_t + n\right]^{\alpha-1}\,, \tag{12}$$

respectively. While the implied income share of labor is stable over generations, as was the case in history, the incomes generated by human capital grow at the expense of the incomes generated by land over the course of development, see also Acemoglu and Robinson (2003). Individuals derive their incomes, which they can then either consume or bequeath, from supplying their endowments in terms of labor, human capital, and land, hence

$$y_t^i = w_t + r_t h_t^i + \rho_t n_t^i \quad \text{with} \quad i \in \{E, P\}\,. \tag{13}$$

Individual incomes are determined by the individual resources employed in the production process and the respective rents accruing to them. Hence, all individuals earn a labor income plus

[27] Any formulation implying a positive relationship between human capital and technological progress is equivalent for the results. This specification is adapted from Jones (2001) and reflects the idea that the stock of ideas transfers into the productivity of future generations.

[28] Since only the relative strength of productivity growth in both sectors is relevant for the argument of the paper, there is no loss in normalizing the productivity of land to one and assuming that it stays constant over the course of generations. This view is consistent with historical evidence from England that suggests that productivity growth in agriculture was modest if existent at all before and during the Industrial Revolution, see Clark (2001, 2002).

[29] Evidence supports this assumption: different sectors were competing for factors and factor prices reflected productivities, even before or at early stages of the industrial revolution, see e.g. Magnac and Postel-Vinay (1997).

an income from supplying their human capital. Those individuals i belonging to the landlord elite, $i \in E$, additionally earn income from renting out their land to the production process, while the landless people, $i \in P$, have no land, so $n^P = 0$, and hence also enjoy no incomes from land resources. For notational convenience, denote the effective stock of human capital available per member of generation t in the economy as $\tilde{h}_t$, with

$$\tilde{h}_t \equiv A_t^{\frac{1-\alpha}{\alpha}} \frac{H_t}{L_t} \,. \tag{14}$$

Also, denote individual income relative to average per capita income by, $\lambda_t^i \equiv \frac{y_t^i}{y_t}$ with $i \in \{E, P\}$ where incomes of members of the elite and the people differ due to different land endowments, and denote the income of members of the elite relative to that of people simply as $\lambda_t \equiv \frac{y_t^E}{y_t^E}$. Using this notation, and substituting with the expressions for equilibrium factor prices given by conditions (10), (11) and (12), income of individual i, $i \in \{E, P\}$, can be expressed as

$$y_t^i = \left(\tilde{h}_t + n\right)^\alpha \left[(1-\alpha) + \frac{\alpha \tilde{h}_t}{\tilde{h}_t + n} \lambda_{t-1}^i + \frac{\alpha}{\tilde{h}_t + n} n^i\right] \,. \tag{15}$$

Consequently, average per capita income is given by $y_t = \left(\tilde{h}_t + n\right)^\alpha$.

Institutional Environment. In order to obtain analytical results, we introduce a parametric specification of the political environment introduced in the previous section. In particular, we assume that under the state of nature, that is in the absence of a social contract, only a fraction $f(\gamma) = \phi\gamma$ of incomes can be appropriated by any member of the society, where ϕ is a parameter satisfying $1/\gamma > \phi > 1$.[30] In other words, the inefficiency under the state of nature, $(1 - \phi\gamma)$, is larger the smaller the elite, since, for example, the higher inequality in the distribution of resources implies higher social unrest.[31] Moreover, we model the notion that within-group conflict about the appropriated rents is increasingly costly the larger the group as follows: the elite can only retain a fraction $g(\gamma) = (1 - \gamma)$ of appropriated rents, while the people are left with $g(1 - \gamma) = \gamma$.

[30] These technical restrictions on ϕ have a natural interpretation. If $\phi > 1/\gamma$ were to hold, this would imply that the state of nature were actually *productive*, leading to higher incomes than the state of law, which does not make sense in the current context. Alternatively, if $\phi < 1$ the state of nature would be too wasteful, so the elite would always strictly prefer to implement a democratic republic with full redistribution as compared to a regime under the state of nature. This would rule out any interesting analysis.

[31] Recall that the smaller the elite, the more concentrated is the distribution of natural resources, as each member of the elite owns $n^E = N/\gamma$.

Timing of Events. The final element of the model to be specified is the timing of events within a generation's lifetime. Every generation t of individuals $i \in \{E, P\}$ faces the following timing of events and decisions:

1. Birth, inheritance of bequests b_{t-1}^i, human capital acquisition h_t^i, and production: w_t, r_t, ρ_t, y_t^i;
2. Elite: decision about keeping or releasing political power;
3. All Individuals: realization of arming decisions and equilibrium institutional environment;
4. All Individuals: consumption and bequest decision, c_t^i, b_t^i, death.

This completes the framework, whose dynamic properties are analyzed in the following section.

4 The process of Long Term Politico-Economic Development

We are now in a position to derive a characterization of the dynamics of economic and political development, and to discuss the conditions under which the political equilibria derived in section 2 arise endogenously.

We start by studying the evolution of the key state variables, effective human capital $\tilde{h}_t$, and relative inequality $\lambda_t = \lambda_t^E/\lambda_t^P = y_t^E/y_t^P$. The key parameters are the initial inequality in terms of land resources expressed by γ, the inefficiency of the state of nature, ϕ, the coefficients characterizing the rate technological progress, μ and η, and the total size of the land resources of the economy, n. Since we are interested in a characterization of development from a dynamic perspective, and since the dynamics are measured in terms of generations rather than time, all arguments will be made in terms of generations.

Next, consider the initial conditions determining the dynamic process of development. At the beginning of time, the endowments of the members of the economy are as follows: there is no human capital in the economy, so $h_0^E = h_0^P = 0$.[32] Moreover, initially the elite represents the oligarchy. As becomes clear from the structure of individual incomes as displayed in equation (15), already in the initial period the elite has higher income than the people, simply by the

[32] This assumption is made for simplicity and does not affect the main argument.

fact that they own the same labor and capital endowments, but additionally land, that is $\lambda_1^P \leq 1 \leq \lambda_1^E$.[33]

Concerning the technological environment we consider a specification in which innovations build on the available stock of human capital. As a result, we observe steady technological innovations which improve the production possibilities of the economy and lead, as generations pass, to larger production and larger stocks of human capital. This implies that the effective human capital stock grows monotonically and unboundedly over the course of generations. This observation is recorded in

Lemma 1. *The level of effective human capital, $\tilde{h}$ grows unboundedly over the course of generations:* $\lim_{t\to\infty} \widetilde{h}_t = \lim_{t\to\infty} A_t^{\frac{1-\alpha}{\alpha}} \frac{H_t}{L_t} = \infty$.

The joint processes of technological progress and human capital accumulation favor the acquisition of human capital of future generations. As a result, land becomes less and less important in the production process and its role as a source of individual income declines. In the limit human capital is the only relevant factor of production. This observation, together with the assumed process of dynamic evolution of costly human capital acquisition based on bequests, implies that income inequality between the groups tend to decrease monotonically overtime and vanishes in the limit.[34] We can therefore state

Proposition 1. *The relative income of the landed elite decreases monotonically over the course of generations, and inequality vanishes in the limit as* $\lim_{t\to\infty} \lambda_t = 1$.

We are now in a position to study the possible dynamic paths followed by an economy and the role of inequality for the process of politico-economic development.

4.1 Dynamic Development Paths and Inequality

The fact that the relative income of the landlord elite declines over the course of generations has important implications for the outcome of the political game between elite and people. The goal of this section is the characterization of the full dynamic evolution of the system. For

[33] Note that this is true regardless of which political environment individuals face.

[34] This asymptotic result concerning the relative incomes of landed elite and landless people does not hinge on the assumption of two groups. In a setting with more than two groups, it cannot be excluded that income inequality behaves non-monotonically over the course of generations, e.g. if some landlords turn into capitalists.

illustrative convenience we start by considering the politico-economic equilibrium that eventually emerges in the long run and then move backwards in time, that is in the sequence of generations. Following Proposition 1, this is equivalent to make the mental experiment of asking what are the consequences of a progressive increase in relative income of the elite λ. This exercise allows to fully characterize the evolution of the system since the beginning of time.

If income inequality is sufficiently low the only equilibrium is a democratic republic. To see why, consider once more the necessary and sufficient conditions for a democratic republic. With the specification $g(1-\gamma)=\gamma$ adopted in the last section it is clear that condition (4) is always satisfied since the people can always credibly announce to implement a democratic state of law. The remaining conditions (2) and (3) can be rearranged as,[35]

$$y^E/y^P < (1-\gamma)^2/\gamma^2\,, \tag{16}$$

$$y^E/y^P < (1-\gamma)/\gamma(\phi-1)\,. \tag{17}$$

Since in the limit $\lambda \to 1$ democracy eventually emerges as absorbing state.[36] By analyzing how the economy makes the democratic transition we can characterize the sequence of political equilibria endogenously emerging during the process of development. Moving back in the sequence of generations is equivalent to increasing inequality. Once the ratio y^E/y^P is sufficiently large one of the two conditions fails to hold. We can identify the regime which precedes democracy depending on,

$$\frac{(1-\gamma)^2}{\gamma^2} \lessgtr \frac{(1-\gamma)}{\gamma(\phi-1)} \quad \Leftrightarrow \quad \phi \lessgtr \frac{1}{1-\gamma}\,. \tag{18}$$

If $\phi > \frac{1}{1-\gamma}$ then the first condition failing to hold is condition (16), which means that earlier generations of the elite can credibly commit to a social contract under oligarchy. In this case the regime preceding democracy is an oligarchic republic, which the elite always prefers to a democracy with full redistribution of incomes.[37] In this case, the dynamic path of development is characterized by the existence of a state of law throughout history, and a smooth transition from an oligarchic republic to a democratic republic. Alternatively, if $\phi < \frac{1}{1-\gamma}$, the first condition

[35] For notational simplicity, we omit generation indices "$_t$" as long as there is no danger of confusion.

[36] The RHS of both conditions is larger than one given that $1 < \phi < 1/\gamma$. A more general specification of technological progress in which the elite can affect which technologies are adopted would not necessarily lead to income convergence and ultimately this result of democracy as absorbing state, see also discussion below.

[37] This can be verified by checking the necessary and sufficient condition for an oligarchic republic given by (1), which is precisely the condition arising under this case.

failing to hold when inequality is increased is condition (17). That is, earlier generations of the elite cannot commit to a state of law under oligarchy, and at the same time prefer to face the inefficiency of the state of nature to the redistribution they would have to concede to the people under democracy. In this case the democratic social contract is preceded by a state of nature.[38] When inequality is increased further, however, the necessary and sufficient conditions for the state of nature also eventually fail to hold. Yet earlier generations with higher levels of inequality can therefore be characterized by an oligarchic republic, as indicated by the respective condition (1), since for sufficiently high inequality the elite is credible and willing to adopt a republican oligarchy, which therefore arises as equilibrium political regime. In this case the dynamic path of development is characterized by the following sequence: a social contract under an oligarchic regime, which is implementable for very high levels of inequality early in history, but followed by a transition to a wasteful state of nature under oligarchy. Nevertheless, eventually, as inequality declines sufficiently, the social contract can be re-gained through a process of democratization. From the inspection of (18) it emerges that the observation of a phase of state of nature is more likely when the elite is more effective in rent seeking (which depends on γ) and when the efficiency cost of this regime are not too large (i.e. ϕ is not too small).[39] The two possible development regimes that can characterize the development process of an economy are illustrated in Figure 4.

Insert Figure 4 about here!

While this taxonomy allows to characterize the political regimes through which a society can pass, the actual realization of particular institutional equilibria, as well as the precise timing of transitions between them, crucially depend on inequality. For example, whether a society actually adopts an oligarchic republic, or immediately starts off under a state of nature essentially depends on the initial level of income inequality, and therefore also inequality in resource endowments. Likewise, in the limit case of initially full equality, democracy would characterize the economy throughout all its history. Hence, larger initial income inequality implies that the

[38] This can be easily verified by observing the necessary and sufficient conditions for oligarchy, (5) and (6) and comparing them to the conditions for democracy.

[39] Also, in the simple formulation adopted, the smaller the elite the larger the inequality in the distribution of land. In this interpretation, initially larger land inequality makes the emergence of the state of nature more likely.

threshold conditions for change of regimes bind at different points in time. Consequently, otherwise identical economies characterized by different inequalities experience different dynamic development experiences. In particular, *ceteris paribus* for given γ and ϕ, larger initial income inequality, for the same level of total income, leads to larger income inequality throughout all generations.[40] An important consequence of this observation is that larger initial inequality increases the opportunity cost of democratization for the elite and, therefore, delays the democratic transition. This is summarized in

Proposition 2. *For any given parametric configuration* $\langle \gamma, \phi, \mu, \eta, \alpha \rangle$*, a larger initial income inequality* y_0^E/y_0^P *delays the transition to democracy.*

To demonstrate the implications of these results, we next present a simulation of the model.

4.2 An Illustrative Simulation

A simulation of the model is helpful to illustrate the theoretical predictions described in the previous section and to highlight the ability of the model in reproducing historical episodes of take-off and overtaking. Consider first an economy characterized by a relatively low level of initial inequality in land possessions, and a relatively large elite. In particular, let us assume that the total amount of land available in the economy, N, is equal 5 and that the group of landlord represents the 40% of the population (i.e. $\gamma = 0.4$).[41]

Insert Table 1 about here!

Insert Figure 5 about here!

Figure 5 shows the evolution of income in this economy and compares the income that is actually realized generation by generation with the potential one that could be realized if an efficient state of law were implemented. As shown in the figure, this economy (let us call it *Economy 1*) is characterized initially, that is during the early generations, by an oligarchy which is able to implement an efficient state of law. This is possible since inequality is sufficiently high

[40] This is true since the process of technological change depends on the level of average human capital which is linked, in turn, to the average income. Nonetheless the technological path may be different if the economies experience different political regimes with different efficiencies. This role of inequality is illustrated in the simulations presented in the next section in more detail.

[41] The full parametrization used for the simulation is displayed in Table 1.

during the early stages of development in order to make expropriation not attractive for the elite. The elite is therefore credible in offering and respecting the rule of law. As generations pass and income inequality shrinks, the rent-seeking on the landless people becomes more and more attractive for the ruling elite. This eventually leads to a situation in which they are not credible to respect the rule of law anymore. *Economy 1* therefore enters a phase in which the state of nature characterizes the interactions between the two social groups. In particular, the transition to a state of nature and an abandonment of state of law is characterized by substantial instability. For a few generations, the institutional environment in the economy alternates between state of nature and state of law. During this transition and the phase in which the state of nature characterizes the society, actual income falls below the potential that could be used for consumptive or investive purposes, since, as described in the previous sections, the absence of a social contract leads the social classes to distract resources towards unproductive activities. Finally, after a substantial number of generations has lived in this dismal state, the society eventually returns to efficiency. The reason for this transition is that the progressive reduction of inequality makes the democracy the most attractive solution also for the elite: they are willing to trade-off redistribution against the efficiency gains associated with the state of law. Note that this transition towards a democratic regime coincides with the decisive take off of the economy towards a path of more rapid and sustained growth.

Now, compare the development process of this economy with that of another economy, called *Economy 2*, which is identical in terms of parameters and initial conditions except for the abundance of land and its distribution. In particular, consider a very rich country with a total amount of land, N_2, equal to 400 which is very unequally distributed with only the 5% of the population actually owning land ($\gamma_2 = 0.05$).

Insert Figure 6 about here!

As shown in Figure 6, again this economy is characterized by an inefficient state of nature for numerous generations. As a consequence, for a long period of time the actual income realized will remain below the potential one. The reason is that, given the large proportion of landless people, rent-seeking is very attractive for the elite since the early stages of development. Moreover, given the initial disparity in land distribution, the process of income equalization is delayed, which

affects the final transition towards democracy.

Insert Figure 7 about here!

The consequences of these different development patterns, and this delay in the transition to democracy is illustrated in Figure 7, which displays the dynamic paths of income in the two economies. *Economy 2* initially exhibits higher incomes, because it is richer in terms of natural resources, the total land endowment is 80 times larger than in *Economy 1*. Nevertheless, as generations pass, the poorer society catches up and eventually overtakes the richer one. The reason is that the initially poorer and more equal economy is sooner prepared to reap the benefits of an efficient state of law as a consequence of a democratic transition. Moreover, after the overtaking, the development paths of the two economies diverge, since the spill-overs of human capital accumulation on future productivity implied by technological progress reinforce the initial take off of the initially poorer country. These dynamics exemplify the mechanism proposed by Engerman and Sokoloff (2002, 2004), who provide extensive evidence on the role played by natural resource abundance and institutional development in the process of economic development. Focussing on the divergent development patterns of the Americas, they show how the originally richer and more unequal Central and South American countries were unable to implement an efficient institutional system. This eventually led to the overtaking by North American countries, which were able to implement efficient institutions and reaped their benefits.

4.3 Discussion

Before concluding with a discussion of the empirical relevance of our model, we briefly discuss the robustness of our results and the role played by our simplifying assumptions. First, consider the modelling of the political game. Since the focus of the paper is on the dynamic implications of politico-economic interactions for long term development, we consider a reduced form for the payoffs received by the different groups. The main assumptions driving the result on the evolution of the political regimes are that the state of nature implies a net loss for all individuals and that democracies are relatively more appealing for the people than for the elite. These ideas are reflected in the assumptions that rent-seeking effectiveness is larger for smaller (and implicitly more cohesive) groups and that democracies are more progressively redistributive and

oligarchies. Alternatively, payoffs under the social contract and in the state of nature with these features could be micro-founded considering, respectively, a conflict game e.g. along the lines of Esteban and Ray (1999) and a voting model with distortions following Meltzer and Richard (1981). The assumption that income is wasted under the state of nature is also made for simplicity. In an earlier version of the model, members of society invested resources in wasteful arming activities that they then had not at disposal for productive purposes. A microfoundation of the inefficiency could be considered, as well as potentially asymmetric payoffs under the state of nature. All these extensions would leave the main arguments unchanged.

The assumption of a subsequent generation structure with a joy-of-giving element in individual utility is more crucial. This formulation implies myopia as individuals do not internalize the effects of the change of political and institutional regimes on the well-being of their offspring. The solution of a repeated strategic game with fully altruistic agents certainly involves more technical difficulties and makes it more difficult to come up with clear predictions. Nonetheless, as long as endogenous technological change represents a main force driving structural change, we believe that the main trade-off faced by the different social groups at different points in time is similar to the one in our model as long as some discounting is considered.[42]

The dynamics of the model, in particular the sequence of the appearance of regimes and the result that democracy emerges as absorbing state, are mainly driven by the assumption that technological process is incremental and unbounded. Alternative views of technological change and knowledge accumulation involving forgetting or destruction might change the predictions about the democratic transition and the take-off.[43] The result that inequality vanishes in the limit is also important. It is driven by the process of technological change, which makes rents accruing on natural resources less and less important over the course of generations, while, in addition, the logarithmic specification of the utility function implies that both groups bequeath

[42] Without discounting, one cannot rule out a quicker, or even instantaneous, switch to democracy. This is not the case with discounting since the short-term advantage of staying in power (even in a state of nature) may more than compensate the discounted benefits of democracy. Hence democracy would be chosen by later generations when the opportunity cost of redistribution is sufficiently small. In any case, in our view the assumption of some intergenerational myopia concerning the evolution of the political system in the future is more realistic than a fully rational set up with dynasties making their choice while anticipating the evolution of institutions for several generations ahead.

[43] See Mokyr (2002, 2004) for a detailed discussion on the evolution of technology and knowledge in a historical perspective. Our assumption of homothetic preferences also rules out any demand driven structural change that leads to a declining importance of agricultural products and land as production factor. Such elements could be adopted without changing the main insights of the model.

the same constant fraction of their income. If the people bequeath a larger fraction of their income than the elite, the result is even stronger. This would be the case if the bequest of land would enter the utility function.[44] In this case the landlord dynasties would bequeath relatively less 'capital' income than the people.[45] Different assumptions implying non-monotonic technological progress and non-monotonic development of inequality would qualify the results concerning the development path and the order of transitions, without altering the main results concerning the taxonomy of equilibria.[46]

Finally, we consider a very simple production function for human capital implying that human capital formation takes place by means of a private production function (the linearity of which is without loss of generality). Human capital is assumed to substitute natural resources and complement labor. This implies that the rent on land decreases while labor wages increase with the amount of 'effective human capital'. The possibility of public education represents a natural generalization of the model proposed here, which would extend the trade-off for the elite who would resist to democratization and public schooling in the early stages of development. Considering public education in our model would reinforce the findings that democratization is endogenous and delayed by larger inequality in natural resource ownership.

4.4 Empirical and Historical Relevance

In this section we briefly discuss the empirical and historical relevance of the main implications and results of our theory. The intermediate result that the share of income generated by land resources and appropriated by the elite declined in the process of economic development, which is the underlying dynamic force in our framework, is in line with empirical findings and historical evidence. Lindert (1994) emphasizes the declining importance of unequally distributed land due

[44] Note incidentally that we do not consider any market for land. The assumptions of constant returns to scale in aggregate production and perfect factor markets would result in equilibrium factor prices, which make any generation weakly indifferent about buying or selling land even with a full specified land market. Nonetheless if land has a 'political' value in terms of political power like in the present model, no landlord would be willing to sell it. This is equivalent to assuming away land market in the first place.

[45] Historically, the fact that the transmission of wealth by landlords was more concentrated on land than on capital led to the emergence of a capitalist class which was not linked to land ownership. See also Bertocchi (2003) for a model investigating the role of primogeniture laws. If the landlords bequeath a larger fraction of their income, the convergence of income may not converge to full equality. Nonetheless, the income share generated from land ownership decreases over the course of generations, which is sufficient for our argument.

[46] Such alternative frameworks could allow for stochastic elements leading to set-backs in the level of development, such as wars or natural disasters, or could allow for forces tending to increase inequality, such as differential fertility.

to the decreasing importance of agricultural production in Britain. The historically declining economic importance associated to land and resource ownership, and the associated shift in economic power and political determination, is also documented by Huber *et al.* (1993) for several countries all over the world. A more in-depth model for the declining importance of land in production and respective evidence is presented by Hansen and Prescott (2002). O'Rourke and Williamson (2002) present additional historical evidence suggesting that the ratio of land rents to wages increased in late medieval Europe, but started falling from the early 19th Century onwards, that is, before democratization took place in most countries.[47]

The result that higher income levels and lower inequality make a democratic transition more likely is a well documented feature in the empirical literature. In particular, the model is in line with the findings of Barro (1999) that the propensity of democracy increases with per capita income and the share of middle class income in an economy. Moreover, he finds that, conditional on the standard of living, a greater dependence of the economy on natural resources implies a lower propensity of democracy, which is precisely what our model implies. Similar results for the causal effect of economic development and inequality on the probability of democratization have been found by Boix and Stokes (2003). Their evidence suggests that the effect of the level of development on democratization works through the extent of inequality as reflected in the literacy rate. In our model, a similar effect arises through the dependency of human capital accumulation on parental bequests. In an attempt to test whether a more equal distribution of incomes reduces the likely losses for the elite from redistribution under democracy, Boix (2003) and Boix and Garicano (2001) find evidence that higher inequality implies a lower propensity of democracy and a lower probability of democratization. Moreover, Boix finds that the more important the agricultural sector in an economy is, the less stable is the associated democracy. Additionally, higher specificity of assets, which reflects the degree to which the asset-owning elite relies on their immobile endowments such as land, tends to increase the social tensions.

In the model, the initial distribution of land, or equivalently any other crucial natural re-

[47] The monotonic decline in land importance and relative income of the elite in our model is due to the simplifying assumptions. The transition to a democratic regime in the long run arises also when monotonicity does not hold, i.e. even with intermediate increases in inequality. Such experiences would qualify the sequence of transitions between equilibria along the development path, but would leave the set of possible equilibria unaffected. Moreover, extensions with mechanisms based on population growth, or trade, which was the causal factor for the reversal in the trend of the wage-land rent ratio according to O'Rourke and Williamson (2002), could be implemented in our model and would lead to similar results without altering the main argument.

source, which can result from a particular geographic environment, shapes the political environment in a society. We find that these initial conditions crucially determine the dynamic development path of the economy through the implied evolution of institutions. This view is consistent with the findings of Rodrik *et al.* (2004), that suggest that institutions are more important for growth and economic well-being than geography or trade, but that, at the same time, institutions are strongly influenced by geographical factors. Our findings are also in line with the view proposed by Engerman and Sokoloff (2002, 2004) who argue that the geographic and climatic environment is a crucial determinant of the economic structure of a country. This economic structure, and the distribution of income and political influence it implies, gives rise to the adoption of certain political institutions, which in turn shape economic development, as is the case in our model. As illustrated in the simulations above, this implies the potential for overtaking of initially rich countries with abundant natural resources by initially poorer but more equal countries, and subsequent divergence, which is consistent with Engerman and Sokoloff's interpretation of the experience of the Americas. Moreover the model can replicate and rationalize an increase in inequality in incomes across countries, which is accompanied with a simultaneous drop in income inequality within countries, as found by Bourguignon and Morrisson (2002).

The result that relatively efficient economic institutions can be implemented and sustained in non-democratic regimes is consistent with recent empirical results published by Glaeser *et al.* (2004) . These results cast doubt on the view that political institutions and constraints on the government are a prerequisite for growth, but rather suggest that democracy and economic development permanently affect each other. This implies that economic factors may actually be crucial for the adoption of certain political institutions, which is the case in model presented above, where the political regime is an instrument to implement and sustain economic institutions that are favorable for economic development, in particular a state of law. The empirical findings of Rigobon and Rodrik (2004) on the interrelation between economic development and the quality of economic institutions (in the sense of rule of law) and political institutions (in the sense of democratic structures) do indeed suggest that economic development positively affects the quality of both economic and political institutions. Moreover, their findings support the result that, in turn, rule of law is more important for economic performance than democracy. Both types of institutions have a positive effect on economic development and tend to mutually

reinforce each other. In terms of our model, these results are not surprising, as democracy is instrumental in implementing a rule of law, while rule of law speeds up development, and therefore eventually also the democratization process. The empirical results seem to reflect this more direct impact of democracy on rule of law in form of larger feedback effects in this direction than in the other direction, from rule of law to democracy.

5 Conclusion

This paper provides a dynamic model to study the joint endogenous evolution of economic variables, political regimes and economic institutions. We model the choice of both the institutional environment (the existence of a state of law) and the political system (the extension of the franchise) as emerging from a game played rationally by the members of society. Different politico-economic equilibria can emerge. An Oligarchic Republic is characterized by a well defined social contract under which economic interactions are efficient and no rent seeking activities take place. This regime is sustainable for low levels of development and when the elite is sufficiently richer than the people so that the commitment to a state of law is credible because rent-seeking activities are not profitable. Intermediate levels of development and inequality may lead to societies with inefficient economic institutions. This regime is the 'state of nature' reflecting the absence of well defined institutional arrangements that regulate economic interactions. Widespread inefficiencies characterize this outcome as the appropriability of economic efforts is uncertain and agents prefer to get involved in rent seeking activities. Higher levels of development and a more equal distribution of incomes facilitate the emergence of a Democratic Republic characterized by a redistributive social contract and efficient economic institutions. This regime arises only when the opportunity cost of redistribution is not too large for the elite, and when at the same time the inefficiencies of the state of nature are sufficiently high to bring all groups in society to refrain from rent-seeking activity.

We further characterize the dynamic evolution of the system and the endogenous emergence of the sequence of politico-economic institutions. Inequality in natural resource ownership and income distribution is crucial in determining both the type of institutions emerging and the timing of the changes. This, in turn, affects the development possibilities of the society. In

particular, the transition to democracy is delayed, *ceteris paribus*, by larger initial income inequality. Simulations of the model illustrate that more unequal economies tend to experience longer periods of economic stagnation in inefficient systems. The model is able to rationalize episodes of overtaking and divergence in which richly endowed but unequal countries display inferior development experiences than initially poorer but more equal countries. Historical and empirical evidence is overall in line with the theoretical predictions.

A Appendix: Proofs

Lemma 1:

Proof. Rearranging condition (9), technological progress is of the form $A_t = \left(1 + \mu H_{t-1}^{\eta}\right) A_{t-1} = d_{t-1}(H_{t-1})A_{t-1}$ with $d_{t-1}(\cdot) > 1 \; \forall t > 1$ due to the human capital accumulation process. For any $A_0 > 0$, we can rewrite $A_t = \left(\prod_{i=1}^{t} d_{i-1}\right) A_0$, where $\left(\prod_{i=1}^{t} d_{i-1}\right) > 1$ and $\lim_{t \longrightarrow \infty} \left(\prod_{i=1}^{t} d_{i-1}\right) = \infty$. This means that the process is autoregressive, positive monotonous and non stationary. Hence, A_t is strictly increasing generation after generation, with $lim_{t \longrightarrow \infty} A_t = \infty$. □

Proposition 1:

Proof. The relative income of individual i to the average per capita income is denoted by $\lambda_t^i \equiv \frac{y_t^i}{y_t} \in [0, \infty)$. From maximization of (7), each individual devotes a constant fraction of his individual income y_t^i to consumption and bequest, respectively, with $c_t^i = (1-\beta)y_t^i$ and $b_t^i = \beta y_t^i$ which implies $h_{t+1}^i = \beta y_t^i$ and,

$$\lambda_t^i = \frac{y_t^i}{y_t} = \frac{w_t + \lambda_{t-1}^i h_t r_t + n^i \rho_t}{w_t + h_t r_t + n\rho_t} \tag{19}$$

Using $y_t = \frac{w_t}{1-\alpha}$ and $r_t = \frac{w_t A_t^{\frac{1-\alpha}{\alpha}}}{n+\widetilde{h}} \frac{\alpha}{1-\alpha}$ we can express the dynamic evolution of relative human capital as,

$$\lambda_t^i = (1-\alpha)\frac{w_t + n^i \rho_t}{w_t} + \lambda_{t-1}^i \frac{\alpha \widetilde{h}}{n + \widetilde{h}} \tag{20}$$

Contingent on a given level of effective human capital $\widetilde{h}$, the dynamic equation (20) is characterized by a unique (conditional) steady state

$$\lambda_*^i(\widetilde{h}) = \frac{(1-\alpha)}{w}\left[\frac{w + n^i \rho}{n + (1-\alpha)\widetilde{h}}\right](n + \widetilde{h}) \, . \tag{21}$$

Consider the dynamics of income for a dynasty belonging to the group of people. In this case the equation for the conditional steady state reads as,

$$\lambda_*^P(\widetilde{h}) = \frac{(1-\alpha)(n+\widetilde{h})}{n + (1-\alpha)\widetilde{h}} \tag{22}$$

Consider the state of the economy at time zero. Since $\widetilde{h}_0^P = 0$ and $n^P = 0$ then from equation (20) we have that the initial level of inequality is given by $\lambda_1^P = (1-\alpha)$ while the conditional steady state is given by $\lambda_*^P(\widetilde{h}_0 = 0) = (1-\alpha)$, hence $\lambda_0^P = \lambda_*^P(\widetilde{h}_0) = (1-\alpha)$. We then analyze the level of inequality in the limit. From Lemma 1, we have $lim_{t \to \infty} \widetilde{h}_t = \infty$ and $lim_{t \to \infty} \rho_t = 0$ which implies that in the limit: $lim_{t \to \infty} \lambda_t = 1$. From condition (21) and l'Hopital's rule it follows

$$\lambda_{*LR}^i = \frac{(1-\alpha)(n+\widetilde{h})}{n + (1-\alpha)\widetilde{h}} = \frac{(1-\alpha)}{(1-\alpha)} = 1 \, . \tag{23}$$

This implies that income inequality disappears in the limit. To show monotonicity of λ_t^P over the course of generations note that the conditional steady state (22) is strictly increasing with $\widetilde{h}$. Hence from period 1 onwards $\lambda_t^P < \lambda_t^{*P}$ and since the dynamic system (20) is stable, λ_t^P increases monotonically over the course of generations following the increase of the conditional steady state λ_t^{*P}. Also $\lambda_*^E(\widetilde{h}_\infty) = 1$ while $\lambda_0^E > 1$. From $y = \gamma y^E + (1-\gamma)y^P$ and $y^i = \lambda^i y$ $\forall i$, we have $1 = \gamma\lambda^E + (1-\gamma)\lambda^P$. Hence, because λ^P is monotonically increasing, λ_t^E must be monotonically decreasing. □

References

Acemoglu, D., S. Johnson, and J. Robinson (2004): "Institutions as the Fundamental Cause of Long-Run Growth," in *Handbook of Economic Growth*, ed. by P. Aghion, and S. Durlauf, chap. 20. Elsevier, Amsterdam.

Acemoglu, D., and J. Robinson (2000): "Why Did the West Extend the Franchise? Democracy, Inequality, and Growth in Historical Perspective," *Quarterly Journal of Economics*, (4), 1167–99.

——— (2001): "A Theory of Political Transitions," *American Economic Review*, 91(4), 938–63.

——— (2003): "A Theory of Political Development," *mimeo, MIT*.

——— (2004): *Economic Origins of Dictatorship and Democracy*. unpublished book manuscript, available at http://web.mit.edu/daron/www.

Alesina, A., and E. L. Glaeser (2004): *Fighting Poverty in the U.S. and Europe: A World of Difference*. to appear in: Oxford University Press, Oxford.

Barro, R. J. (1999): "Determinants of Democracy," *Journal of Political Economy*, 107(6), S158–S183.

Bertocchi, G. (2003): "The Law of Primogeniture and the Transition from Landed Aristocracy to Industrial Democracy," *CEPR Discussion Paper*, 3723.

Boix, C. (2003): *Democracy and Redistribution*. Cambridge University Press, Cambridge.

Boix, C., and L. Garicano (2001): "Democracy, Inequality, and Country-Specific Wealth," *mimeo, University of Chicago*.

Boix, C., and S. C. Stokes (2003): "Endogenous Democratization," *mimeo, University of Chicago*.

Bourguignon, F., and C. Morrisson (2002): "Inequality Among World Citizens: 1820-1992," *American Economic Review*, 92(4), 727–744.

Bourguignon, F., and T. Verdier (2000): "Oligarchy, Democracy, Inequality and Growth," *Journal of Development Economics*, 62(2), 285–313.

Cervellati, M., and U. Sunde (2005): "Human Capital Formation, Life Expectancy and the Process of Development," *American Economic Review, forthcoming*.

Clark, G. (2001): "Farm Wages and Living Standards in the Industrial Revolution: England, 1670-1850," *Economic History Review*, 54(3), 477–505.

——— (2002): "Land Rental Values and the Agrarian Economy: England and Wales 1500-1914," *European Journal of Economic History*, 6(3), 281–308.

De Tocqueville, A. (1835): *Democracy in America*. Gosselin, Paris.

Engerman, S. L., and K. L. Sokoloff (2002): "Factor Endowments, Inequality, and Paths of Development Among New World Economies," *Economia*, 3(1), 41–88.

——— (2004): "The Evolution of Suffrage Institutions in the New World," *mimeo, updated version of NBER Working Paper*, 8512.

Esteban, J., and D. Ray (1999): "Conflict and Distribution," *Journal of Economic Theory*, 87, 379–415.

——— (2001): "Collective Action and the Group Size Paradox," *American Political Science Review*, 95(3).

Galor, O. (2004): "From Stagnation to Growth: Unified Growth Theory," in *Handbook of Economic Growth*, ed. by P. Aghion, and S. Durlauf, chap. 3. Elsevier, Amsterdam.

Galor, O., and O. Moav (2002): "Natural Selection and the Origin of Economic Growth," *Quarterly Journal of Economics*, 117(4), 1133–92.

Galor, O., O. Moav, and D. Vollrath (2004): "Land Inequality and the Origin of Divergence and Overtaking in the Growth Process: Theory and Evidence," *mimeo, Brown University*.

Galor, O., and D. N. Weil (2000): "Population, Technology, and Growth: From Malthusian Stagnation to the Demographic Transition and Beyond," *American Economic Review*, 90(4), 807–828.

Glaeser, E., R. LaPorta, F. Lopez-De-Silanes, and A. Shleifer (2004): "Do Institutions Cause Growth," *Journal of Economic Growth*, 9, 271–303.

Glaeser, E., and A. Shleifer (2002): "Legal Origins," *Quarterly Journal of Economics*, 117(4), 1193–1229.

Gradstein, M. (2004): "Inequality, Democracy, and the Emergence of Institutions," *CEPR Discussion Paper*, 4187.

Gradstein, M., and B. Milanovic (2000): "Does Liberte = Egalite? A Survey of the Empirical Evidence on the Links Between Political Democracy and Income Inequality," *CESifo Working Paper*, 261.

Gradstein, M., B. Milanovic, and Y. Ying (2001): "Democracy and Income Inequality: An Empirical Analysis," *mimeo, World Bank*.

Grossman, H. (2001): "Make Us A King: Anarchy, Predation, and the State," *European Journal of Political Economy*, 18, 31–46.

——— (2004a): "Constitutions or Conflict," *Conflict Management and Peace Science*, 21, 29–42.

——— (2004b): "Property Rights Under Anarchy," *mimeo, Brown University*.

Hansen, G. D., and E. C. Prescott (2002): "Malthus to Solow," *American Economic Review*, 92(4), 1205–1217.

Hobbes, T. (1651): *Leviathan. Or: The Matter, Forme, & Power of a Common-Wealth*. Andrew Crooke, London, reprinted by Oxford University Press, Oxford, 1965.

Huber, E., D. Rueschemeyer, and J. Stephens (1993): "The Impact of Economic Development on Democracy," *Journal of Economic Perspectives*, 7, 71–85.

Jones, C. I. (2001): "Was an Industrial Revolution Inevitable? Economic Growth Over the Very Long Run," *Advances in Macroeconomics*, 1(2).

Justman, M., and M. Gradstein (1999): "The Industrial Revolution, Political Transition, and the Subsequent Decline in Inequality in 19th-Century Britain," *Explorations in Economic History*, 36, 109–127.

Lindert, P. H. (1994): "Unequal Living Standards," in *The Economic History of Britain Since 1700*, ed. by R. Floud, and D. McCloskey. Cambridge University Press, 2 edn.

Lizzeri, A., and N. Persico (2004): "Why did the Elites Extend the Suffrage? Democracy and the Scope of Government, with an Application to Britain's 'Age of Reform'," *Quarterly Journal of Economics*, 119(2), 707–765.

Lucas, R. E. (1988): "On the Mechanism of Economic Development," *Journal of Monetary Economics*, 22, 3–42.

Magnac, T., and G. Postel-Vinay (1997): "Wage Competition Between Agriculture and Industry in Mid-Nineteenth Century France," *Explorations in Economic History*, 34(1), 1–26.

Meltzer, A. H., and S. F. Richard (1981): "A Rational Theory of the Size of Government," *Journal of Political Economy*, 89(5), 914–927.

Mokyr, J. (2002): *The Gifts of Athena: Historical Origins of the Knowledge Economy*. Princeton University Press, Princeton.

——— (2004): "Long-Term Economic Growth and the History of Technology," in *Handbook of Economic Growth, forthcoming*, ed. by P. Aghion, and S. Durlauf. Elsevier Science B.V., Amsterdam.

North, D. C. (1990): *Institutions, Institutional Change, and Economic Performance*. Cambridge University Press, Cambridge.

Olson, M. (1965): *The Logic of Collective Action*. Harvard University Press, Cambridge, Massachusetts.

O'Rourke, K. H., and J. G. Williamson (2002): "From Malthus to Ohlin: Trade, Growth, and Distribution Since 1500," *NBER Working Paper*, 8955.

Persson, T., G. Roland, and G. Tabellini (2000): "Comparative Politics and Public Finance," *Journal of Political Economy*, 108(6), 1121–1161.

Persson, T., and G. Tabellini (2003): *The Economic Effect of Constitutions*. MIT Press, Cambridge, Massachusetts.

Rigobon, R., and D. Rodrik (2004): "Rule of Law, Democracy, Openness and Income: Estimating the Interrelationships," *NBER Working Paper*, 10750.

Rodrik, D., A. Subramanian, and F. Trebbi (2004): "Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development," *Journal of Economic Growth*, 9.

Romer, P. M. (1990): "Endogenous Technological Change," *Journal of Political Economy*, 98(5), S71–S102.

Rousseau, J. J. (1755): *Discours Sur L'Origine et les Fondements de L'Inégalité Parmi Les Hommes*. reprinted by Èditions Sociales, Paris, 1971.

——— (1762): "The Social Contract. Or: Principles of Political Right," in *Rousseau: Political Writings*, ed. by and translated by Frederick Watkins. Nelson and Sons, Edinburgh and London, 1953.

Table 1: Simulation: Parameter Values Used for Base-line Specification

α	=	0.5;	β	=	0.4;	γ	=	0.4;
η	=	0.75;	A_0	=	1;	N	=	5;
μ	=	0.15;	h_0^E	=	1;	γ_2	=	0.05;
ϕ	=	2;	h_0^P	=	1;	N_2	=	400.

People / *Elite*	Arms	No Arms
Arms	$y^E f(\gamma)$ $y^P f(\gamma)$	$y\frac{g(\gamma)}{\gamma}$ 0
No Arms	0 $y\frac{g(1-\gamma)}{1-\gamma}$	y_{SC}^E y_{SC}^P

Figure 1: The Arming Game

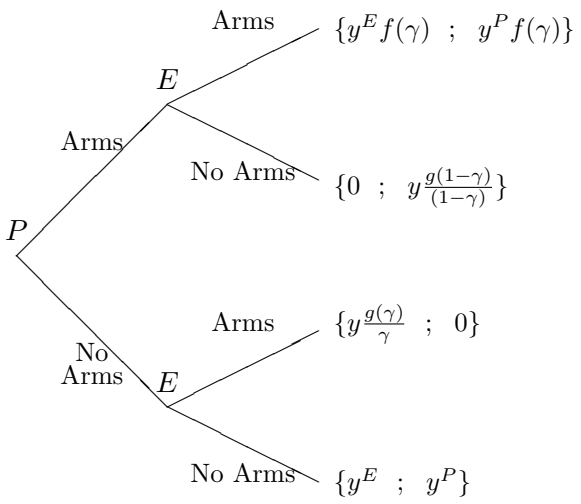

Figure 2: Extensive Form of Arming Game under Oligarchy

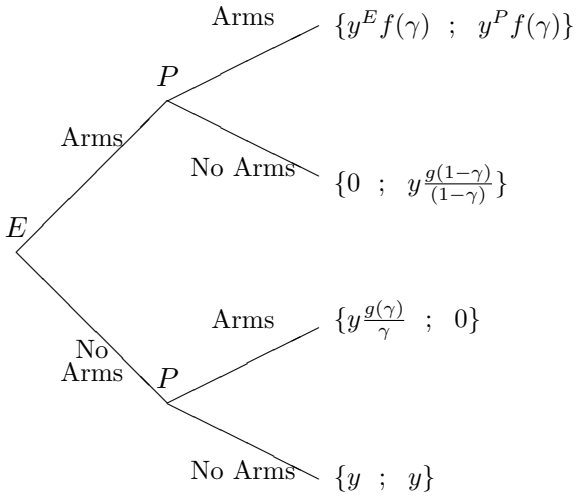

Figure 3: Extensive Form of Arming Game under Democracy

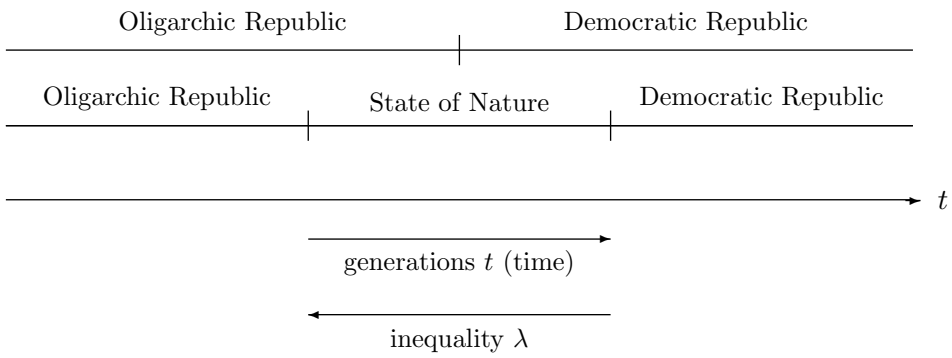

Figure 4: The Two Possible Development Paths

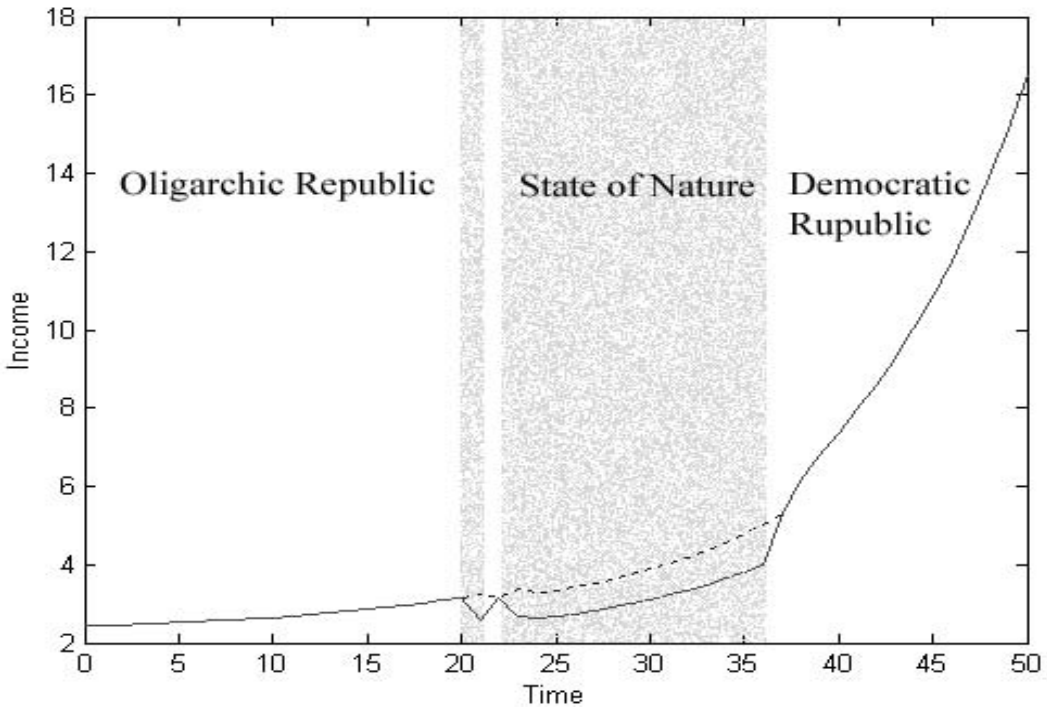

Figure 5: The Development Path With State of Nature

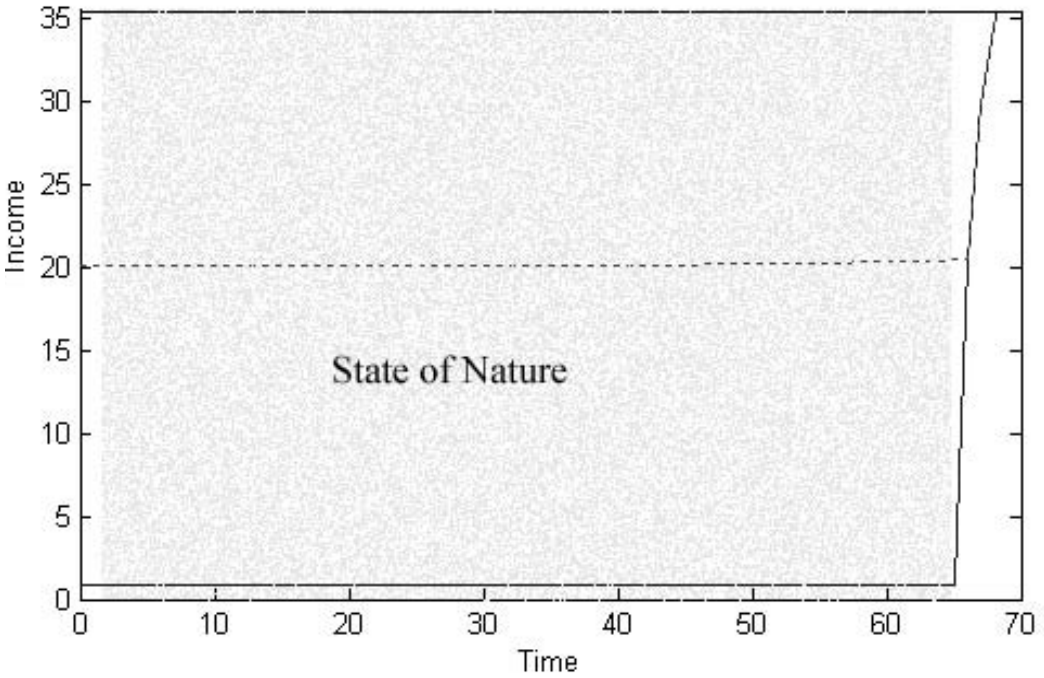

Figure 6: The Development Path with Long Period of State of Nature

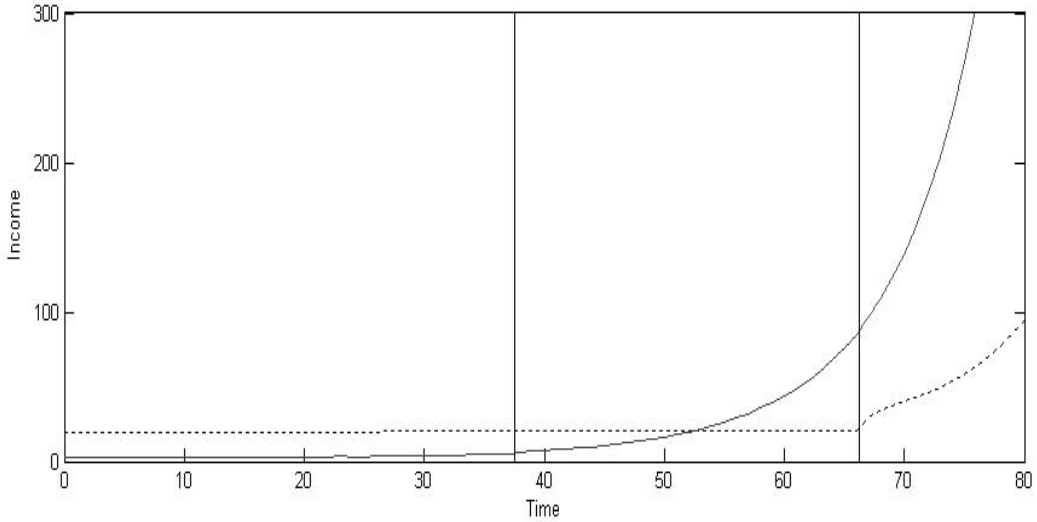

Figure 7: Overtaking and Divergence: The Impact of Institutions and the Political System on Long-Term Development