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Inequality, Development, and the Stability of Democracy – Lipset and Three Critical Junctures in German History

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Lipset and Three Critical Junctures in German History[1]

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Abstract

This paper studies the endogenous emergence of political regimes, in particular democracy, oligarchy and mass dictatorship, in societies in which productive resources are distributed unequally and institutions do not ensure political commitments. The political regime is shown to depend on resource inequality as well as on economic development, reflected in the production structure. The main results imply that for any level of development there exists a distribution of resources such that democracy is the political outcome. This distribution is even independent of the particular development level if the income share generated by the poor is sufficiently large. On the other hand, there are distributions of resources for which democracy is infeasible in equilibrium irrespective of the level of development. The model also delivers results on the stability of democracy. Variations in inequality across several dimensions due to unbalanced technological change, immigration or changes in the demographic structure affect the scope for democracy or may even lead to its breakdown. The results are consistent with the different political regimes that emerged in Germany after its unification in 1871.

Keywords

Income inequality, development, democracy, coalition formation, factor endowments, demographic structure.

JEL Classification

P16, O10, H10.

1 Introduction

In the history of modern Germany three critical junctures occurred which required the implementation of a new political regime. They led to the proclamation of the German Reich in 1871, the Weimar Republic in 1919, and the Federal Republic of Germany in 1949. However, despite the strong presence of democratic movements since the first half of the 19th century a stable democracy emerged only at the last juncture. This raises the question why a democracy was not implemented earlier successfully. And what were the reasons for the instability and the eventual breakdown of the democratic Weimar Republic which was overthrown by the Nazi regime? Or, more general: Why do democracies emerge, and what makes some of them last while others vanish?

The importance of political institutions, and in particular that of democracy, for economic development has been one of the most intensely researched areas of the recent years. Democracies typically implement many of the institutions and policies that are thought to be beneficial for economic development, like rule of law, social insurance, or wide-spread education, and thereby allow for a comparably efficient resolution of conflicting interests. Yet, relatively little is known about the determinants of democracy and its stability, even beyond the historical example of Germany. Among the first to address these issues was Seymour Martin Lipset, who conjectured in his famous study that higher levels of economic development and a more equal distribution of resources imply a higher probability for a country to become and to *stay* democratic:

> "Democracy is related to the state of economic development. Concretely, this means that the more well-to-do a nation, the greater the chances that it will sustain democracy. (...) A society divided between a large impoverished mass and a small favored elite would result either in oligarchy (dictatorial rule of the small upper stratum) or in tyranny (popularly based dictatorship)."
>
> Lipset (1959, p. 75)

But irrespective of Lipset's seminal impact on the field of democratization theories, most of the subsequent literature that studies the transitions from oligarchy or autocracy to democracy has concentrated attention exclusively on one of the two factors identified

by Lipset, economic development *or* inequality, but not on both. And even more importantly, most of this literature on democratic transitions treats democracy as an absorbing state and thereby assumes that conflicts within such political regimes are solved on the basis of "democratic rules", which obviously implies the existence of some institutionalized environment that ensures these rules to be binding. Assuming democratic rules to be effective seems to be a critical assumption, however, that is unlikely to hold when democracy itself is at stake. Rather, an institutionalized environment cannot be taken for granted when considering the stability of democracy. Or, as Przeworski (2006, p. 312) puts it: "Democracy endures only if it is self-enforcing. It is not a contract because there are no third parties to enforce it." This implies that the stability of democracy needs to be studied in a similar environment as the emergence of democracy from non-democratic rule.

In this paper we consider democracy as an endogenous outcome of a political conflict about the redistribution of incomes within a society in which the income generating factors are distributed unequally. The main novelty of our approach is the consideration of the role of both dimensions, the level of economic development and the distribution of resources, within a heterogeneous society in which no exogenous institutions exist that ensure the possibility to make credible political commitments. Instead, political decisions are made in an environment in which no binding agreements about income redistribution can be made among the different groups of factor owners, and sub-coalitions or single groups can use their de facto power to implement their preferred redistribution scheme against the will of others. In this competition for political power, inequality across several dimensions becomes key for the determination of the politico-economic equilibrium in terms of the political structure and the ex-post allocation of incomes.

The main result of this paper is a novel characterization of the conditions under which democracies emerge or break down in the absence of exogenous institutions that ensure the credibility of political commitments. The equilibrium is characterized by a ruling coalition that is stable and winning against any other challenging coalition. The equilibrium is a democracy if political decisions are not made by a minority within society but by the overall population. Equilibria where a minority dominates political decisions

represent oligarchies.[1] The results provide a characterization of the levels of inequality and development, reflected by the distribution of the different factors in the population and their relative importance in the income generating process, for which democracy or oligarchy emerges in equilibrium. The model also illustrates the consequences of changes in inequality, in terms of population structure and/or factor endowments, or in the economic environment reflected by the economic importance of the different factors, for the stability of democracy. Apart from allowing for a realistic analysis of the stability of political regimes in heterogeneous societies, the approach of considering political regimes as equilibrium in weakly institutionalized environments delivers new insights about the necessary conditions for the emergence and stability of democracy.

The results and implications of the model are consistent with the sequence of political regimes as they emerged in Germany after its unification: the elite-led *German Reich*, the unstable *Weimar Republic* that finally led to the Nazi regime, and the democratic republic after World War II. The three corresponding critical junctures in German history in the years 1871, 1918/19 and 1945 provide an ideal context to illustrate the working of the model. In all three situations, the previous political regime had ceased to exist for exogenous reasons – either due to the unification of previously independent and often competing countries, or due to the loss of one of two immensely costly wars. As a consequence, the shape of the country, the demography and the economic conditions in terms of inequality and economic development had changed dramatically as compared to the respective pre-existing order. This required the emergence of a completely new political regime. The model provides a structural explanation for the very different political regimes that emerged under these conditions: a constitutional monarchy that de facto represented a conservative oligarchy of a landed gentry in the German Reich 1871-1918, a very unstable parliamentary democracy after 1919 that was characterized by several coups and civil conflicts that finally led to the rule of the Nazis 1933-1945, and a stable parliamentary democracy after 1945/48.

This paper contributes to a growing literature on endogenous political institutions. Similar to the seminal work of Acemoglu and Robinson (2000, 2001, 2006), it is the redistributive threat by part of the population that brings about a democratic equilibrium.

[1]The precise definition and classification of equilibria is presented in Section 3.

However, in addition to these repercussions of income inequality, the level of economic development is also relevant in the present paper as it affects the economic importance of certain production factors.[2] The model below also differs from most other frameworks that study the endogenous emergence of democracy like e.g. Acemoglu and Robinson (2000, 2001, 2006), Boix (2003), Lizzeri and Persico (2004), Llavador and Oxoby (2005), Gradstein (2007), Cervellati, Fortunato, and Sunde (2008), in that it is not (implicitly or explicitly) assumed that the population consists of different groups among which coalition formation is not a problem or even an issue at all, and that any conflict of interest in democracies can be resolved by credible commitments concerning the policies or the coalitions that are formed. In this respect, our work also differs from Acemoglu and Robinson (2008) who explicitly address the question of regime persistence. The present paper studies the emergence and breakdown of political regimes in an environment in which such credible commitments are not possible, even in democracy. To this end, our analysis builds on the work by Acemoglu, Egorov, and Sonin (2008) who consider the problem of coalition formation in situations where binding agreements among different groups or parties cannot be made, since no party can commit not to eliminate other parties from the ruling coalition in the future. Our model explicitly deals with the concrete problem of coalition formation among distinct groups that represent differently endowed segments of the population and struggle for the redistribution of factor incomes. Finally, since we consider technological progress to be the key driver of income inequality along the lines of Kuznets (1955) or Acemoglu (2002), the determination of political outcomes corresponds with the ideas of Rogowski and MacRae (2008) who deliver various historical examples that are in line with the functioning of our model and thereby complement our case study on Germany.

The paper is structured as follows. Section 2 lays out the model framework, and section 3 presents the results concerning the political equilibrium. In section 4 the model is nested in a production economy, which allows us to relate the political equilibria to the economic environment in general equilibrium. In section 5 we present the main results concerning the emergence and stability of democracy. Section 6 illustrates the implications of our model in the context of Germany's history after 1871 and points to various other historical

[2]See Cheibub and Vreeland (2010) for a recent survey on the relationship between economic development and democracy.

examples. Section 7 concludes.

2 The Model

2.1 Population Structure and Production

Consider a static economy that is populated by a unit mass of individuals. These individuals live for one period and leave no bequests. Since consumption is the only component of utility, individuals maximize their disposable incomes. While each individual possesses an identical endowment of labor time, $h > 0$, physical strength and intellectual ability are distributed unevenly in the population.[3] For simplicity, we assume the distribution of both of these characteristics to be dichotomic which means that a share $\gamma > 0$ of individuals possesses one unit of physical strength, denoted by $l = 1$, whereas the complement is left with no physical strength at all, $l = 0$. Likewise, a share $\beta > 0$ of the population possesses intellectual ability, $a = 1$, while all others lack this trait, $a = 0$. We assume physical strength and intellectual ability to be mutually exclusive. Thus the population effectively consists of three distinct groups: the able weaklings, denoted by $\mathcal{A}$, the simple-minded strong, $\mathcal{L}$, and those that possess neither strength nor ability, $\mathcal{P}$.[4] Denote the set of groups by $S = \{\mathcal{A}, \mathcal{L}, \mathcal{P}\}$ and the respective size of group $i \in S$ as s_i with

$$s_i = \begin{cases} \beta & \text{if } i = \mathcal{A} \\ \gamma & \text{if } i = \mathcal{L} \\ 1 - \beta - \gamma & \text{if } i = \mathcal{P} \end{cases} \tag{1}$$

where $s_i > 0 \ \forall \ i \in S$. Accordingly, the factor endowments of particular group members are given by

$$l_i = \begin{cases} 0 & \text{if } i \in \{\mathcal{A}, \mathcal{P}\} \\ 1 & \text{if } i \in \{\mathcal{L}\} \end{cases} \quad \text{and} \quad a_i = \begin{cases} 0 & \text{if } i \in \{\mathcal{L}, \mathcal{P}\} \\ 1 & \text{if } i \in \{\mathcal{A}\} \ . \end{cases} \tag{2}$$

[3] The endowment of labor time h can be normalized to 1 without loss of generality.

[4] In principle, our model society could comprise an arbitrary number of groups, and none of our main results depends on the particular population structure we impose. However, the case with three groups is the least complex to deliver our main results. Increasing the number of groups would complicate the analysis without adding new essential insights.

All individuals inelastically supply their endowments on competitive markets to a production sector that uses labor time, strength and ability as separate inputs. Income Y is generated by means of a production function

$$Y \;=\; Y\left(A, H, L, \Lambda\right) \;, \tag{3}$$

where $Y(\cdot)$ exhibits constant returns to scale with respect to the input factors H, L and Λ which represent the aggregate levels of working hours, physical strength and ability, respectively. $A > 0$ represents a productivity parameter or vector, reflecting the level of technology. The marginal product of every input factor q is positive but decreasing, i.e. $\partial Y/\partial q > 0$ and $\partial^2 Y/\partial q^2 < 0$. Factor prices are competitive where $\rho = \partial Y/\partial H$ represents the price paid for one unit labor time, $w = \partial Y/\partial L$ gives the remuneration of physical strength, and $\mu = \partial Y/\partial \Lambda$ is the reward for ability. Consequently, the factor income of an individual belonging to group i is given by

$$y_i \;=\; \rho h + w l_i + \mu a_i \qquad \text{with } i \in S \;. \tag{4}$$

From the unequal endowment of traits and the remuneration of these traits on competitive markets it follows that factor income is distributed unequally within the population, and individuals with higher endowments earn higher factor incomes. This implies that an individual in the $\mathcal{P}$-group always receives the lowest factor income $y_{\mathcal{P}}$ in society and

$$y_{\mathcal{P}} < y_{\mathcal{L}}, y_{\mathcal{A}} \;. \tag{5}$$

always holds. Note that per-capita income y equals aggregate group income, i.e.,

$$y \;=\; \sum_{i \in S} s_i y_i \;=\; \rho h + w\gamma + \mu\beta \;. \tag{6}$$

2.2 Political Power and Utility

The given endowment of production factors implies that factor incomes can vary considerably between different groups which gives rise to redistributive conflicts, since we assume the utility of individuals or of members of a certain group not to be affected by

the well-being of others. In consequence, a latent conflict between the different groups exists and every group tries to maximize its respective income at the expense of others.[5] All political considerations in the model are therefore reduced to the question of how the income generated by the members of society is redistributed amongst them. We assume that in principle *all* income can be expropriated and redistributed between groups, such that the feasible transfer equals per-capita income $y = \sum_{i \in S} s_i y_i$.[6] In combination with the given production structure the possibility to expropriate all factor income has the important implication that it is always beneficial to employ all available workers in the production process and redistribute their incomes afterwards, as $y_i > 0$ follows from equation (4). Since factors are supplied inelastically, there are no hold-up problems or the like through which the political game affects or distorts the production process.

Given the possibility to expropriate factor incomes we need to elaborate on the political dimension of our model and, in particular, consider the question which group or coalition of groups actually makes political decisions and effectively imposes its preferred redistribution scheme on the entire population. As already mentioned before, we consider an environment where no institutions exist that would allow for binding commitments between groups. Thus, no group can make binding offers of how to redistribute income, and no group that is part of the coalition that redistributes income can commit not to exclude other members of that coalition and make political decisions autocratically later on. Given this environment we assume that it is the political power P_i of group i that describes its potential to redistribute factor incomes. To keep the conflict game simple and concentrate on the issue of coalition formation, we model the redistributive conflict as parsimoniously as possible and assume that any group or coalition Q can seize the income of group or coalition $S \backslash Q$ if $P_Q > P_{S \backslash Q}$ holds where $P_Q = \sum_{j \in Q} P_j$ denotes the aggregate power of group or coalition Q. To link the economic and political environment we assume

[5] For simplicity, and contrary to Olson (1965), we assume that no commitment problems exist within groups, i.e., single group members do not free-ride on other members of their group. This implies that our analysis is equivalent to one of a society that consists of three different agents, each representing one income group. Thus, individual members of a group and the group itself can be interchangeably denoted by i. A justification for this assumption is that the collective action required in the case of intra-group conflict is transitory, and hence much easier to sustain, see, e.g., Acemoglu and Robinson (2006).

[6] One could alternatively assume that some subsistence income, for example the factor income from time endowment, can be retained by each individual to ensure that production takes place without changing the main results.

that this political power of a group or coalition is given by its aggregate income, i.e.,

$$P_Q \equiv \sum_{i \in Q} s_i y_i \ . \tag{7}$$

This assumption could be motivated by means of a sequential conflict game with perfect information and certain outcome where richer groups can afford more weapons, soldiers, etc., and hence overcome poorer groups in open conflict. Additionally, we assume the power mapping described by equation (7) to be bijective such that no two groups can be equal in power, $P_i \neq P_j \ \forall \ i, j \in S$ for $i \neq j$.[7] For notational convenience, we define the most powerful group i_{MAX} to have power P_{MAX} and size s_{MAX}. From this, it follows that the most powerful group is able to make all political decisions alone if, and only if, $2\,P_{MAX} > P_S$ holds where $P_S = \sum_{i \in S} P_i$.

If no group has the power to rule alone, i.e., $2\,P_{MAX} \leq P_S$ the possibility to form a coalition becomes relevant. On the one hand, coalition formation is associated with making concessions to the other members of the coalition with regard to the desired redistribution scheme. Hence, forming part of a coalition is costly in terms of foregone redistribution to the other members of the coalition. On the other hand, being part of a coalition increases political power by pooling resources for a potential conflict with other groups or coalitions. A last aspect of the political environment concerns the question of how the income seized by a particular coalition is redistributed among its members. Since we do not focus on the redistributive implications of our model we assume disposable income $\widetilde{y}_i$ of group i to be determined by

$$\widetilde{y}_i = \widetilde{p}_i y \ , \tag{8}$$

with $\widetilde{p}_i$ being the effective relative power of group i given by

$$\widetilde{p}_i = \begin{cases} \frac{P_i}{\sum_{j \in RC} P_j} & \text{if } i \in RC \\ 0 & \text{otherwise} \end{cases} \tag{9}$$

[7] As will turn out later this assumption is not only convenient but also plausible, since group income and – due to fixed relative group sizes – political power is affected by technological progress and other exogenous factors.

where $RC \subseteq S$ denotes the coalition that ultimately redistributes income which we call the ruling coalition.[8] The setting implies that the utility of an individual depends on the disposable income $\widetilde{y}_i$ and therewith on the effective relative power $\widetilde{p}_i$ of the group it belongs to. In its general form the indirect utility function of a member of group $i \in S$ reads

$$u_i = u\left(\frac{\widetilde{y}_i(\widetilde{p}_i)}{s_i}\right) \tag{10}$$

with $\dfrac{\partial u_i}{\partial \widetilde{y}_i} > 0$. Since factor income y_i and group size s_i cannot be changed by individuals, the optimization problem amounts to maximizing $\widetilde{p}_i$ in order to maximize lifetime utility, subject to the constraints imposed by the production structure and the political environment, i.e.,

$$\max_{\widetilde{p}_i} u_i\left(\widetilde{y}_i(\widetilde{p}_i)\right) \quad \text{subject to (4), (6), (8) and (9).} \tag{11}$$

Thus every individual always prefers the coalition in which the relative power of the group $i \in S$ he belongs to is greatest.[9]

2.3 Timing of Events

The following description of the non-cooperative ruling coalition formation and redistribution game that is played by every generation completes the timing of events. The sequence of events that a particular generation experiences throughout its lifetime is given by

A. Birth, realization of endowments and factor incomes.

B. Ruling coalition formation and redistribution game Γ:

[8] In this respect, we simply follow Acemoglu, Egorov, and Sonin (2008) by employing a sharing rule that was first used by Gamson (1961) to characterize the sharing of resources amongst coalition members. As several empirical studies suggest, see e.g. Warwick and Druckman (2001) or Ansolabehere et al. (2005), this seems to be a fairly good description of redistribution within coalitions. Given its strong empirical regularity it is often even referred to as Gamson's *law*, see Frechette, Kagel, and Morelli (2005). However, we only adopt this rule for analytic simplicity. Note that for $RC = S$ from equations (6) and (7) it follows that $\widetilde{y}_i = s_i y_i$. In general, any rule can be applied without qualitatively affecting our results as long as it satisfies that (a) every member of a coalition that seizes income of others gets a positive share of redistributed income; but (b) this share does not grant any member more power than the sum of all others; and (c) it does not perfectly equalize the power of any two members.

[9] Since the utility of an individual is determined by the structure of the RC, our game is *hedonic* in the sense of Dreze and Greenberg (1980).

B.1 At the initial stage of the game $k = 0$ an agenda setter is randomly determined from all groups and proposes a sub-coalition (that includes herself).

B.2 The members of this sub-coalition vote sequentially in random order over the proposal (and all non-members automatically vote against it):

B.2.1. If the proposal is not supported by a winning coalition, the game proceeds to step B.3.

B.2.2. If the proposal is supported by a winning coalition and consists of

a) all voting groups, then they all form the *RC* and the game proceeds to step C.

b) a proper subset, then all groups that are not part of this proposal are excluded from participation in the game by redistributing their factor incomes toward the members of the winning subset. Now a new stage $k + 1$ begins and the game proceeds to step B.3.

B.3 From all (remaining) groups a new agenda setter is randomly determined among all groups that have not yet acted as agenda setter at the current stage of the game k; she proposes a sub-coalition (including herself), and the game proceeds to step B.2. If all remaining groups have been agenda setters at the current stage k, then they all form the *RC* and the game proceeds to step C.

C. Consumption of disposable income and death.

3 The Political Equilibrium

We start our analysis of political equilibria with a central Lemma on the equilibrium outcome of the game described above.

Lemma 1. *In game* Γ *there exist subgame perfect Nash equilibria (SPNEs) in pure strategies which all lead to the same RC.*

Proof. See Appendix. □

The intuition for the equilibrium characterization of the ruling coalition *RC* is as follows. First, a *RC* must – by the nature of the game – be winning in the sense that

it is powerful enough to outgun any alternative coalition that may challenge it at the current stage k of the game. And second, every RC must be stable such that none of its proper subcoalitions will be winning and become the new RC at a subsequent stage of the game $\hat{k} > k$.[10] Apart from that, we can also characterize the RC in terms of its size.

Lemma 2. *The RC consists of all groups if and only if the most powerful group is dominated by the rest of society, i.e.* $P_S \geq 2\,P_{MAX} \iff s_{RC} = 1$.

Proof. This proof is straightforward since we know from the proof of Lemma 1 that the RC must be a subset of all winning and stable coalitions. Due to the bijective power mapping, a coalition of two groups cannot be stable, since one group always dominates the other, and therefore could always successfully propose an even smaller coalition that only contains itself at a subsequent stage of the game. Hence, $|RC| \neq 2$ always holds where $|RC|$ denotes the cardinality of set RC. Thus, it immediately follows $P_S \geq 2\,P_{MAX} \iff s_{RC} = 1$. □

Before we proceed, it is worth commenting briefly on the underlying concept of society, in particular concerning the ability and the incentive for certain income groups to secede in order to escape taxation. In our model, it is the exploitation of political power rents that constitutes a centripetal force and prevents society from falling apart.[11] Secessions are ruled out endogenously in equilibrium, since the groups who would be better off on their own, the net tax payers, are not powerful enough to split from the RC, whereas the RC, who would be powerful to split from the rest of society has no incentive to do so, because this would make its members worse off.[12]

Note that so far, the political equilibrium was characterized without any reference to political concepts. But the equilibrium itself can be interpreted as reflecting a particular

[10] This second equilibrium property goes back to Bernheim, Peleg, and Whinston (1987) and their concept of a Perfectly Coalition-Proof Nash Equilibrium which was already studied in several other contexts, see for example Moreno and Wooders (1996) or Einy and Peleg (1995). See also Acemoglu, Egorov, and Sonin (2008) for a modification in the context of political games. Note that this reasoning corresponds to the conceptualization in terms of the set Ω in the proof of Lemma 1, which gives a formal definition of the RC.

[11] Even though this result might contradict the empirical observation of an increasing number of sovereign states over the last century, it should be kept in mind that this model exclusively focuses on economic mechanisms and thereby ignores other factors like ethnic, religious or cultural identity, which play a prominent role in separation processes of political entities in reality. In our model, we take the size of the polity as exogenously given, for instance due to geographical or historical reasons. For a model where state size is determined endogenously, see, e.g., Alesina and Spolaore (1997, 2003).

[12] In this respect our model very much differs from Boix (2003) whose results depend on the assumption of asset specific factor mobility and the existence of some outside option for the owners of mobile assets.

political regime. To simplify the terminology, we first introduce a simple classification of equilibria that follows directly the conceptual distinction of political regimes made by Lipset (1959) in the introductory quote.

Definition 1. *In equilibrium the political regime is ...*

1. *... a democracy if* $s_{RC} = 1$ *;*

2. *... a mass dictatorship if* $0.5 \leq s_{RC} < 1$ *;*

3. *... an oligarchy if* $s_{RC} < 0.5$ *.*

In the context of our model we define an oligarchy as a RC that represents the minority of the population and imposes policies on the rest of society.[13] On the opposite, we call every political system a democracy when the RC embraces the entire population and hence all income groups. In this case, all groups of society are bound together by the fact that no smaller coalition is winning and stable. Then even the small minorities play an active role in policy determination and are actively integrated by all others. From this definition of a democracy, one must distinguish a popularly based or mass dictatorship in which the ruling coalition represents only one single group that constitutes the majority of the population. In such a political regime a minority of the people is expropriated and not involved in political decision-making.[14]

This distinction between a democracy and a mass dictatorship is not obvious from a normative perspective, since in both cases the majority of the population is involved in the redistribution decision.[15] However, in a mass dictatorship, the largest group has the power to dominate all other groups of society that are minorities and extract redistribution from them. It is this monopoly of political power within a mass dictatorship that contradicts

[13]Naturally, one might give an even more detailed definition of oligarchies, depending on which group rules. For example, an oligarchy of group $\mathcal{P}$ could be denoted as an ochlocracy (the rule of the mob), whereas an oligarchy of group $\mathcal{A}$ or $\mathcal{L}$ represents a plutocracy (the rule of the rich in the respective situation).

[14]Note that our notion of a mass dictatorship fundamentally differs from the concepts of partial democracies or restricted franchise as in Acemoglu and Robinson (2006) or Lizzeri and Persico (2004) respectively which both rest on the implicit assumption that binding commitments between different groups can be made.

[15]One could argue that it effectively makes no difference for the political outcome whether a homogeneous majority directly dictates the public actions (redistribution in the concrete case), or whether the same majority competes in a democratic ballot with opposing groups who *de jure* have the right to vote, but will *de facto* fail in achieving their political goals. This would be in line with the famous reasoning of Aristotle (1943) who defined democracy as an inferior form of government where the state is ruled by the many who only pursue their private interests.

the typical connotation of a democracy in which different groups of society can express their will and influence public decisions.[16] With this terminology in mind, we state the following proposition regarding the different types of political regimes.

Proposition 1. *In equilibrium, the political regime is ...*

1. *... a democracy if and only if the most powerful group is dominated by the rest of society,* $2\,P_{MAX} \leq P_S \iff s_{RC} = 1$ *;*

2. *... a mass dictatorship if and only if society is strictly dominated by a single group that represents the majority of the population,* $2P_{MAX} > P_S \wedge s_{MAX} \geq 0.5 \iff 0.5 \leq s_{RC} < 1$ *;*

3. *... an oligarchy if and only if society is strictly dominated by a single group that represents a minority of the population,* $2P_{MAX} > P_S \wedge s_{MAX} < 0.5 \iff s_{RC} < 0.5$ *.*

Proof. This Proposition follows directly from Lemmata 1 and 2 and the application of Definition 1. □

The necessary and sufficient conditions contained in Proposition 1 map any distribution of factor endowments to a unique political regime in equilibrium.

4 The Politico-Economic Equilibrium

4.1 Production Environment and Factor Incomes

This section extends the previous analysis by endogenizing factor incomes with respect to the distribution of strength and ability. To illustrate the main points, we adopt a *CRS* specification of the production function

$$Y = \left(A_a \Lambda + A_l L\right)^{\sigma} H^{1-\sigma}\,, \tag{12}$$

with $0 < \sigma < 1$ and normalize the individual time endowment h to 1. Without being essential for the results, this specification provides a simple way to model redistributive conflicts along the development path by differentiating between ability-augmenting and

[16] This distinction between democracies and mass dictatorships not only links to the introductory quote of Lipset (1959) but is also related to de Tocquevilles (1864) famous thoughts on the *tyranny of the majority*.

strength-augmenting productivity parameters A_a and A_l with $A_a, A_l > 0$.[17] Assuming perfectly competitive markets, the reward for every production factor equals its marginal product. Given expressions (4) and (12), individual factor income of a member of group i therefore becomes

$$y_i \;=\; (A_a\Lambda + A_l L)^{\sigma}\, H^{1-\sigma}\left[\frac{(1-\sigma)}{H} + \sigma\frac{(A_a a_i + A_l l_i)}{(A_a\Lambda + A_l L)}\right] \quad \text{with } i \in S\ . \tag{13}$$

For the following analysis, let us define $\lambda_i = s_i y_i / y$ as the share of total income that is produced by group i. Note that this expression also reflects the relative power of group i, i.e., $\lambda_i = P_i / P_S$. With the distribution of resources as in (2) and using the information contained in equation (6), equation (13) can be rewritten as

$$\lambda_{\mathcal{P}} \;=\; (1-\beta-\gamma)\,(1-\sigma) \tag{14}$$

for the $\mathcal{P}$-group,

$$\lambda_{\mathcal{L}} \;=\; \gamma\,(1-\sigma) + \gamma\sigma\frac{A_l}{(A_a\beta + A_l\gamma)} \tag{15}$$

for the $\mathcal{L}$-group, and

$$\lambda_{\mathcal{A}} \;=\; \beta\,(1-\sigma) + \beta\sigma\frac{A_a}{(A_a\beta + A_l\gamma)} \tag{16}$$

for the $\mathcal{A}$-group, respectively. As can easily be seen from equation (15) given a certain value of β the relative power of the $\mathcal{L}$-group increases in the importance of strength in the production process reflected by A_l or in the size of the group γ, i.e., $\partial\lambda_{\mathcal{L}}/\partial A_l$, $\partial\lambda_{\mathcal{L}}/\partial\gamma > 0$. This reasoning analogously holds for the other groups. And of course, any change that makes one group relatively more powerful makes the others relatively weaker and vice versa.

On the basis of these expressions, we can now characterize a unique politico-economic equilibrium for any given distribution of production factors in the population.

[17] This specification of the production function is formally equivalent to the production of a homogeneous commodity in two distinct sectors, one employing exclusively ability together with time, and the other exclusively physical strength together with time. Variations in productivity parameters affect income levels as well as the shares of total income generated by an exclusive production factor while the income share devoted to labor time remains constant. Note that our results are qualitatively unaffected when using a *CES* production function instead.

4.2 Endogenous Democracy

Every such politico-economic equilibrium reflects the subgame perfect equilibrium of the game described in section 2.3 including income production, formation of the *RC* and redistribution. From Proposition 1 it can be seen that the particular political regime emerging in equilibrium depends on the power and on the size of the most powerful group. Since in general any of the three groups can be the most powerful we have to consider both criteria for every group in society. Setting the relative power equations (14), (15) and (16) equal to one half and solving for β yields

$$\beta_{\lambda_{\mathcal{P}}=0.5} = \frac{0.5-\sigma}{1-\sigma} - \gamma \tag{17}$$

$$\beta_{\lambda_{\mathcal{L}}=0.5} = \frac{\sigma - 0.5 + \gamma(1-\sigma)}{0.5 - \gamma(1-\sigma)} \frac{A_l}{A_a} \gamma \tag{18}$$

$$\beta_{\lambda_{\mathcal{A}}=0.5} = \frac{0.5-\sigma}{2(1-\sigma)} + \frac{\sqrt{f(\gamma) + A_a^2(\sigma-0.5)^2}}{2A_a(1-\sigma)} + \frac{A_l}{2A_a}\gamma \tag{19}$$

with $f(\gamma) = A_l\gamma\left[A_l\gamma(\sigma-1)^2 + A_a(1+\sigma(1-2\sigma))\right] > 0 \,\forall\, \sigma \in (0,1)$. These conditions represent the combinations of parameters for which the relative power of a particular group is just equal to the power of all other groups together. Applying the same reasoning with regard to group size delivers the parametric conditions for the size of a particular group to represent exactly half of total population. The respective loci read

$$\beta_{s_{\mathcal{P}}=0.5} = 0.5 - \gamma, \quad \gamma_{s_{\mathcal{L}}=0.5} = 0.5 \quad \text{and} \quad \beta_{s_{\mathcal{A}}=0.5} = 0.5\ . \tag{20}$$

While all equilibria can be solved analytically, and the characterization of equilibria presented in Section 3 generally applies, we illustrate the results by ways of parametric examples but to highlight the main results as well as their intuition. To illustrate our analytical results we set $A_l = A_a = 1$ and $\sigma = 0.5$ as a benchmark example. In this case, the income share of mere labor time which is distributed equally across all individuals equals 0.5.

Figure 1 presents the corresponding allocation of politico-economic equilibria.[18] The γ-β space is decomposed into different areas of γ-β combinations that imply particular

[18]Note that the three-group version of our model is the simplest structure that allows to derive all types of equilibria, including the grand coalition, and to analyze the results in a two-dimensional space.

equilibrium constellations. From Lemma 1 it follows that there exists a unique equilibrium, in terms of RC and the corresponding redistribution scheme, for each single γ-β combination, i.e., everywhere in the admissible γ-β space. The corresponding characterization of the respective political regime follows from Proposition 1.

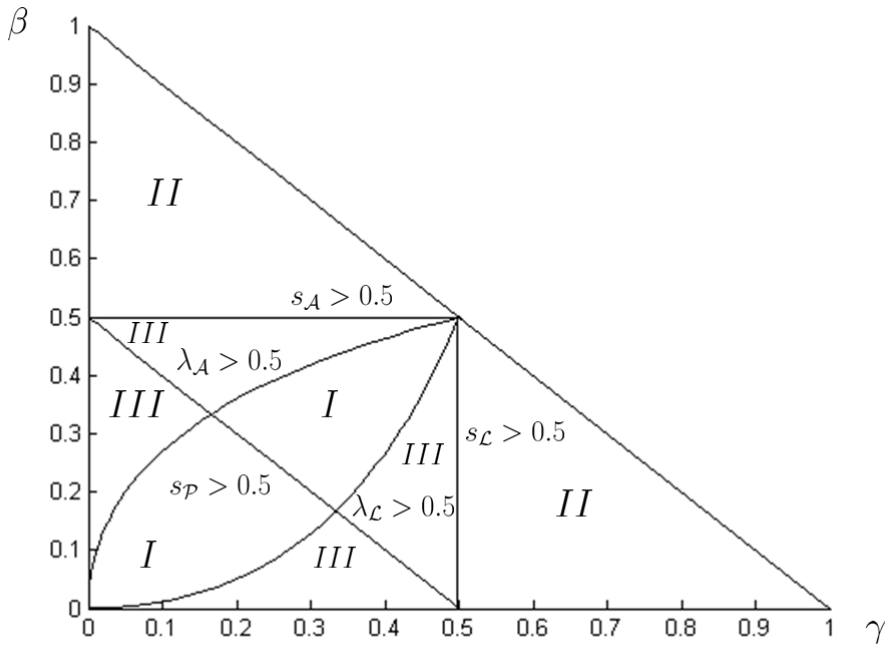


Figure 1: Political equilibria with balanced productivity levels ($A_l = A_a = 1, \sigma = 0.5$).

Given the population structure in our model the admissible γ-β space is restricted by the $\gamma-\beta$ axes for $0 < \gamma, \beta < 1$ and the straight line $\beta = 1-\gamma$ and thus constitutes a triangular space.[19] Within this admissible γ-β space there is another triangular area of interest. It is defined by the relative size loci given in equations (20). All γ-β combinations outside this triangular denote situations where one group represents the majority of the population. For example, South-West of the straight line $\beta = 0.5 - \gamma$ the relative size of the $\mathcal{P}$-group is greater than one half. Similarly, for combinations of γ and β above the the horizontal line at $\beta = 0.5$ group $\mathcal{A}$ constitutes the absolute majority whereas for combinations of γ and β to the right of the vertical line at $\gamma = 0.5$ group $\mathcal{L}$ represents more than half of all people in society.

Since the political regime in equilibrium depends not only on the size but also on the

[19]Note that all points lying on one of the three boundaries are not considered in the following since they represent societies with less than three groups, i.e., γ-β combinations for which the size of (at least) one group is zero.

relative power of the most powerful group in society we must also consider the latter criterion. Figure 1 shows the relative power loci that correspond to equations (18) and (19). The concave, upward-sloping locus represents all γ-β combinations for which $\lambda_{\mathcal{A}} = 0.5$ holds. Above this line, the members of group $\mathcal{A}$ generate more than half of total income, $\lambda_{\mathcal{A}} > 0.5$, and therefore constitute the single most powerful group that can dominate in open conflict against any other group or coalition of groups. A larger endowment of ability than given by this condition – in terms of a higher value of β or combinations of γ and β above this threshold – makes the group $\mathcal{A}$ even more dominant. In this case the political equilibrium is either a mass dictatorship (depicted by areas II) or an oligarchy (areas III) depending on the respective $\gamma - \beta$ combination. The corresponding condition for group $\mathcal{L}$ to be more powerful than the sum of all others is represented by the convex, upward-sloping locus. To the right of this line described by equation (18), i.e., for higher values of γ, group $\mathcal{L}$ is strictly dominating and constitutes the ruling elite. Finally, note that Figure 1 does not contain a graphical representation of equation (17). Since the $\mathcal{P}$-group is disadvantaged in both relevant dimensions it can only rule the state on its own if the income share devoted to the common production factor, $1 - \sigma$, become sufficiently large. Then, the size effect can compensate for disadvantages in factor endowments and a dictatorship of the poor mass can be an equilibrium outcome.[20]

The first main result that emerges from this discussion is the characterization of the conditions, in particular of the distribution of resources in the economy, under which democracy can emerge. These conditions are summarized in terms of areas I in Figure 1 which represent all combinations of γ and β for which a democracy arises as an equilibrium. As the figure illustrates, democracy is an equilibrium only when inequality is moderate along the two dimensions γ and β, i.e., for intermediate values. The higher the fraction of individuals with strength or ability within society, the more likely becomes a mass dictatorship in which the respective largest group rules the state on its own. For example, in the northern area II in Figure 1 the members of the $\mathcal{A}$-group dominate the political decisions and in the East it is the $\mathcal{L}$-group that dominates all others. Note that in principle a democracy could emerge everywhere in the $\gamma - \beta$ space whereas mass dictator-

[20]More precisely, $s_{\mathcal{P}}(1-\sigma) > 0.5$ must hold for this to be the case which can only be satisfied for $\sigma < 0.5$ and $s_{\mathcal{P}} > 0.5$. Thus the $\lambda_{\mathcal{P}} = 0.5$ locus can only emerge in the south-western corner of Figure 1 for $\sigma < 0.5$. A graphical representation of this case is provided in the Appendix.

ships can by definition only occur outside the inner triangular area. Thus the admissible $\gamma - \beta$ space for democracies is larger than the one for mass dictatorships. All remaining areas III denote oligarchies where the state is ruled by a single group that represents a minority of the population.

5 The Stability of Democracy

Having identified the conditions for the emergence of democracy, the model also delivers results on its stability with respect to two dimensions: first, it allows for an analysis of secular changes in the distribution of production factors via variations of β and γ, and second, it can be used to trace the consequences of economic development in terms of secular changes in the relative importance of production factors in the income generating process, i.e., variations in A_l and A_a.[21]

The effects of changing the distribution of production factors for a given level of economic development, i.e., for a given combination of A_l and A_a, can already be inferred from the previous discussion of Figure 1. In particular, one can directly derive the consequences of *ceteris paribus* changes in the population structure for the politico-economic equilibrium. Applications for such an analysis are numerous. With regards to changes in β one could think for example of massive schooling programs that change the distribution of ability whereas epidemics or improvements in health provision can affect the distribution of strength γ within society. There might also be changes in the population structure that affect both dimensions simultaneously, like asymmetric population growth due to war casualties, ethnic cleansing, displacements, group specific birth rates caused by a quality-quantity trade-off or immigration of individuals with particular endowments of ability and strength. It is obvious that the results will depend on the status quo before the change in population structure, as well as on the distribution of the other factor. Massive increases in β will lead to an equalization of power and make democracy more likely if applied to an economy with relatively few able individuals, and hence increase the likelihood of democracy. Whereas in a situation in which only a few individuals do not

[21]Note that the model framework does not account for other non-economic factors that have been considered as being important for the stability of democracy by political scientists, like e.g. civic culture or democratic values, see Almond and Verba (1963) or Putnam (1993).

have ability, i.e., β is high, such a policy might induce a concentration of political power, and make democracy less likely. In the benchmark case given above, it is a fairly balanced distribution of production factors that provides the optimal environment for democracy to emerge in equilibrium.[22]

A different picture arises when the effects of changes in the relative productivity of the different factors, reflected by A_l and A_a, on the politico-economic equilibrium are taken into account. Such changes might for example be caused by unbalanced technological progress like skill-biased technological change, by natural disasters or by war. Before going to the characterization of the implications for the politico-economic equilibrium, it is worth noting that for any productivity environment there is always a scope for democracy. This is summarized in the following proposition.

Proposition 2. *There always exist admissible $\gamma - \beta$ combinations for which a democracy emerges in equilibrium ...*

1. *... irrespective of the productivity environment A_a and A_l for $0 < \sigma < 0.5$.*

2. *... given a particular productivity environment A_a and A_l for $0.5 \leq \sigma < 1$.*

Proof. See Appendix. □

The results of this Proposition are particularly noteworthy from a policy perspective. They essentially state that the structure of the population, in terms of inequality in factor endowments, rather than the level of development, is the central determinant for democracy if a sufficiently large income share goes to the factors that are distributed equally (i.e., for σ being sufficiently small). In this case democracy can be established for any productivity environment by ensuring a suitable distribution of factors or factor incomes. In other words, democracy is feasible regardless the level of economic development. This implication modifies the introductory statement by Lipset, suggesting that the level of development or income is of secondary importance for the emergence and the stability of democracy compared to the distribution of factors. A similar but less pronounced result holds if the income share going to unequally distributed factors (σ) is relatively high. According to the proposition, democracy is also always a possible equilibrium outcome,

[22] Since the relative importance of both exclusive production factors is equal in this case, i.e., $A_l = A_a$, the bisectrix constitutes a symmetry axis of the political landscape.

but the necessary factor distribution depends on the level of development in terms of the particular productivity environment.

The reverse statement is not true, however, as there exist certain factor distributions for which the equilibrium outcome is never a democracy, irrespective of how the productivity environment looks like.

Proposition 3. *For any* $0 < \sigma < 1$*, and irrespective of the productivity environment* A_a *and* A_l*, there exist admissible* $\gamma - \beta$ *combinations for which ...*

1. *... a mass dictatorship emerges in equilibrium.*

2. *... an oligarchy emerges in equilibrium.*

Proof. See Appendix. □

Hence, the model suggests that there are limits for the possibility to implement democracies by mere technology or income transfers. To illustrate the implications of variations in the relative importance of factors in the income generating process, we change the baseline scenario and consider two stylized cases. The first one refers to a society in which physical strength is much more important than ability in the production process. This we take into account by setting $A_l = 20$ and $A_a = 1$.

The politico-economic equilibria for a society with strength as the dominant factor of production are depicted in Figure 2. Again, as in Figure 1, area I represents democracies whereas in all areas II a mass dictatorship occurs for sure. Finally, all areas III represent oligarchies of the respective minority that is most powerful. The most immediate result of this case is that there is much more scope for oligarchies. Additionally, democracy only emerges as outcome in societies in which strength is a relatively scarce resource, i.e., γ has a low value, whereas it can emerge for a large range of values of β. If γ is too high, a change in β has virtually no effect on the politico-economic equilibrium.

A different, yet somewhat symmetric picture emerges in the second stylized case when considering a developed society. This case represents a society in which physical strength has lost its relative importance and ability has become the predominant factor in the income generating process. In our static model we replicate this kind of skill-biased technological change in a very simplified manner by assuming A_l to stay constant and increasing A_a to 400. This scenario is depicted in Figure 3. The figure suggests that

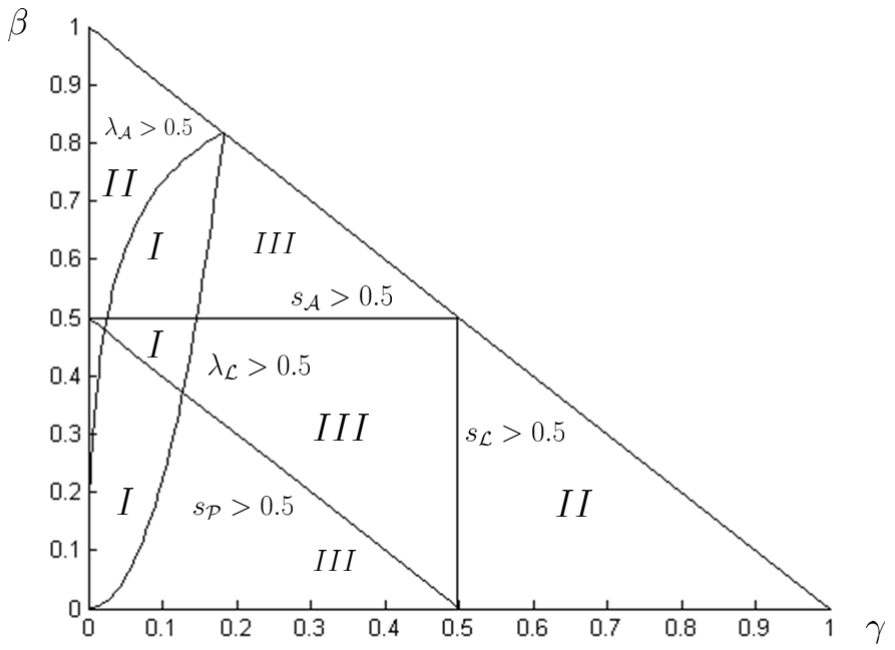


Figure 2: Political equilibria in a strength-dominated society ($A_l = 20, A_a = 1, \sigma = 0.5$).

changes in γ only affect the equilibrium outcome if the distribution of β is not too high, similar to the previous case. In an economy of this type, in which ability is by far the most important factor for production, even small variations in β, for example due to immigration of high-skilled workers or some other asymmetric change in the demographic structure, can have far-reaching implications for the politico-economic equilibrium, up to the point that democracy becomes infeasible in equilibrium. In this respect, the model can rationalize to what extent demographic change, in particular with respect to the distribution of low-skilled and high-skilled labor, may provide a challenge for existing democracies. This way, the model can also give some guidance as to what are the likely consequences of drastic demographic changes or policies.[23]

6 Empirical Implications and Historical Evidence

To illustrate the model's implications, we begin by discussing evidence from three critical junctures in Germany's recent history, each of which was breaking grounds for the emer-

[23] An example would be the one-child policy conducted by the Chinese government which might not be sufficient as a regime-stabilizing measure in the long run since – despite its potentially preserving effects on the population structure – changes in the technological environment are not taken into account.

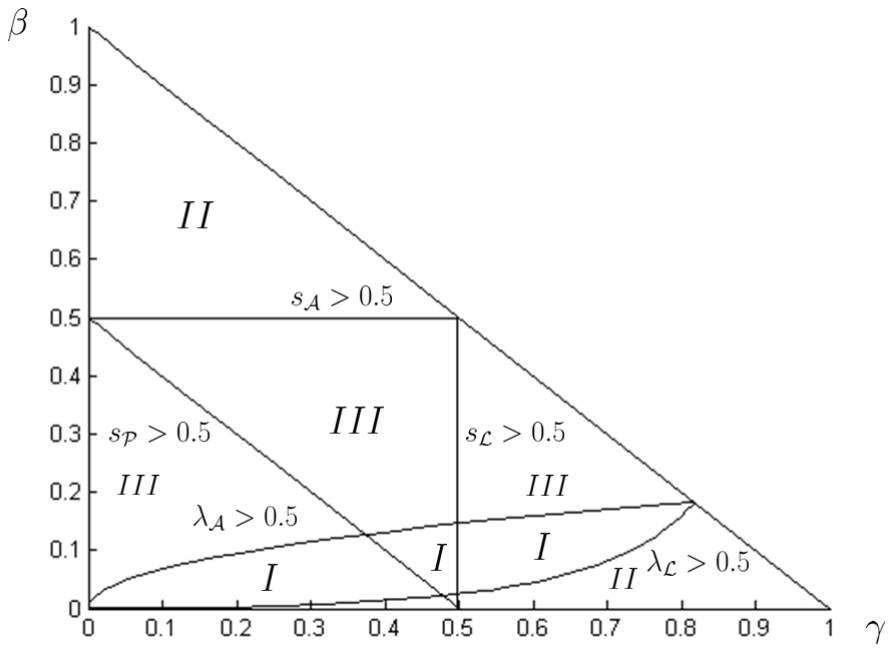


Figure 3: Political equilibria in an ability-dominated society ($A_l = 20, A_a = 400, \sigma = 0.5$).

gence of a completely new political regime: the period following its unification in 1871, the aftermath of World War I, and the period after Germany's capitulation in World War II in 1945. These three dates mark crucial turning points in German history which were preceded by substantial changes in territory, population, and the economic environment in terms of inequality and the corresponding production structure. In all three cases the previous regime had ceased to exist and a completely new political regime had to emerge while the process leading to these breaks was not related to the domestic struggle for political power in any respect. These exogenous breaks from the past were the consequences of a unification process and of the unforeseen outcome of two self-inflicted major wars. In this regard, the three critical junctures in German history provide a perfect setting to illustrate the working of our model. In all three situations different groups of society were confronted with the possibility, or even need, to implement a new political regime that served their purpose. As stipulated by the model, the emerging regime had to be stable and self-enforcing against the background of imminent civil war and open conflict. We conclude our empirical discussion by providing further historical examples from different countries and epochs where wars or exogenous shocks in technology changed the distribution or importance of production factors and subsequently triggered institutional change.

6.1 Germany 1871: The Emergence of the German Reich

Prior to 1871, there was a large number of independent German regional kingdoms and principalities. The largest and most dominant of these kingdoms were Prussia and Austria, which formed the so-called *pentarchy* together with England, France and Russia during the 18th and early 19th century. What later was to become Germany therefore essentially consisted of largely independent feudal states, each with a monarch or sovereign that controlled political power. In many of the German states, there were some liberal and democratic movements in the first half of the 19th century that were combined with some tendencies towards a German nation state, and which culminated in the revolution of 1848 and the famous constitution of the Frankfurt assembly. These tendencies were successfully repressed by the leading elites in the years after 1849, however. Eventually, a German nation state emerged under the primacy of Prussia, the so-called "Lesser German solution". At the same time Austria formed a multi-ethnic state with Hungary in 1867. After three unification wars in 1864 against Denmark, in 1866 against Austria and in 1870/71 against France, the German Reich was founded in 1871 in the Hall of Mirrors of the Palace of Versailles near Paris with the proclamation of the Prussian king Wilhelm I. as the first German emperor. As head of the state he appointed Otto von Bismarck first Chancellor (*Reichskanzler*) of the German Reich who at that time also served as head of the executive of the kingdom of Prussia.

The unification of then 17 more or less independent states within one German Reich raised the question about the appropriate political regime.[24] Different interest groups tried to shape the Reich according to their ideas. There was a strong landed gentry and nobility, which had dominated the small states, but there were also tendencies trying to establish a parliamentary democracy following the ideals of the revolution of 1848. However, the democratic movement was split into different factions. Liberal forces were seeking to establish a moderate democracy with monarchistic elements and restricted franchise, while left-wing social democrats wished to establish a democracy with universal franchise and a radical reform of the economic system. Bismarck proposed electoral rules along the lines of the Frankfurt assembly, but he also deeply despised a truly democratic regime. In fact, to maintain the aristocratic order he repeatedly threatened to prohibit social-democratic

[24]For a detailed description of the different political tendencies see Botzenhart (1993), chapters 8 and 9.

and catholic-centrist parties. Bismarck's government was "... in principle hostile towards parties and constitution" (Botzenhart, 1993, p. 119). At several occasions he made clear that he would rather destroy all democratic elements and mount a coup to re-establish a corporatist state under the leadership of the nobility than to concede minimal democratic reforms. And until World War I, the nobility and the conservatives successfully prevented any attempt to implement democratic reforms that would grant the parliament effective influence over the executive or the military whose leaders largely belonged to the nobility.[25]

The success of the conservative nobility can be understood in light of the geographic, economic and demographic structure of the Reich at the time of its foundation. By the 1870s, industrialization had just began in Germany and was mainly concentrated in the Western part of the Reich around Rhine and Ruhr whereas huge areas ranging from the east of the Rhine all the way up to the Baltic Sea beyond *Königsberg* (today's Kaliningrad) and including large states like Bavaria, Wuerttemberg, or Saxonia, were still agrarian. During the 1870s, almost two thirds of the population still lived in the countryside and about half of the active population worked in agriculture while the primary sector contributed a little less than 40% of total net domestic product.[26] These patterns of the economic structure of the German Reich are illustrated in Figure 4. At the same time, a huge fraction of Germany was still in the hand of the landed gentry. In 1879 about 40% of all manors in Prussia and Pomerania belonged to them.[27]

In light of Proposition 1, this made an oligarchy under the landed gentry the natural candidate for a politico-economic equilibrium in the German Reich. Considering the rural society in Germany around 1871 as one in which physical strength was the dominant factor of production and given the relatively large and strong landed elite, one can infer the high likelihood that the political regime would be characterized by an oligarchy, as illustrated by the areas III in Figure 2. Despite the progressing industrialization, the changes in the demographic structure due to differential fertility, and the corresponding evolution in inequality, this political regime remained stable until World War I.

[25]See also Winkler (1993), p. 610.

[26]Urbanization data is from Bähr (2004). Data on the economic structure is taken from Hoffmann (1965), Tables 1.6 and 2.20, where agriculture includes agriculture, forestry and fishing.

[27]The data for landownership reflect the social structure of ownership of manors, in terms of nobility, middle class and corporate owners; source is Buchsteiner (1993).

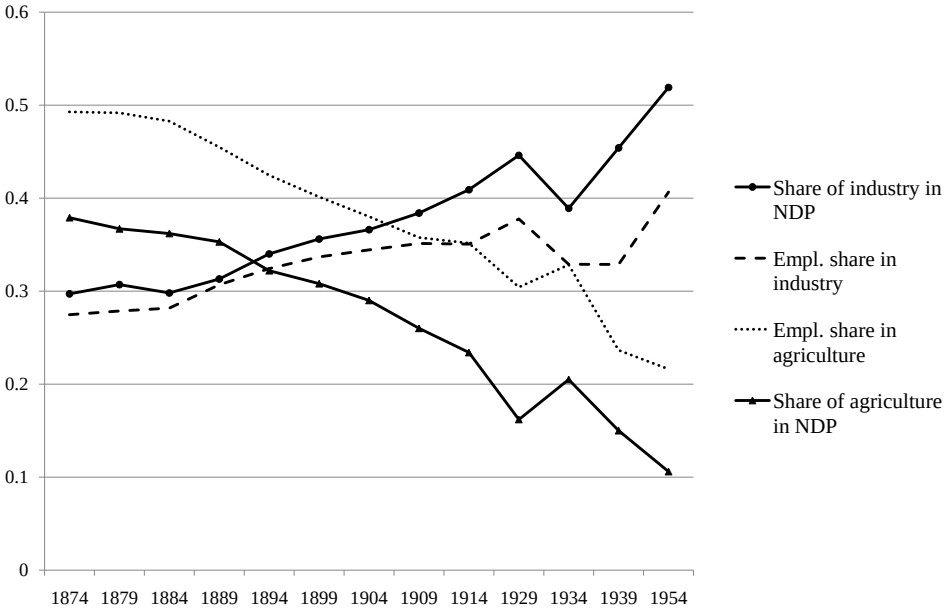


Figure 4: Economic Development and Structural Change in Germany.
Five-year averages calculated from Hoffmann (1965), Tables 1.6, 2.20.

6.2 Germany 1919: From Weimar Republic to Nazi Germany

Germany's entry into World War I was largely independent from domestic politics, and in particular, it was not driven by a democratic movement. In fact, political forces from the entire spectrum agreed in a "class truce" (*Burgfrieden*) to postpone major domestic political reforms to the time after the war. Also the outcome of this war, the defeat of Germany and Austria-Hungary in 1918, came unexpected for the German political leaders and ended with the abdication and exile of the German Kaiser. Hence, the monarchy ceased to exist and an intense political struggle arose about the most appropriate political regime to be implemented. The consequences of the self-inflicted war for Germany were disastrous in terms of national debt, geographic losses and war casualties. More than two million people died on the battlefields, compared to around 14 million soldiers and a total population of around 67 million in 1914, Eastern Prussia and Alsace-Lorraine were lost and the victorious powers imposed massive reparation obligations on post-war Germany. Moreover, many of the soldiers had been traumatized by their experiences in the trenches

and had become callous in the face of the tremendous violence they had seen. In the riots that broke out at the end of the war, many therefore did not shy away from using violence against fellow citizens whom they accused of recklessly forcing them to sacrifice their lives on the battlefield. According to the *Dochstoßlegende* put forward by the military elite the war was not ended on the battle field by foreign military but by domestic socialist forces who were accused of having stabbed in the back of the German army. Despite riots with numerous casualties, an outright civil war could just be avoided. All these factors brought about a fundamental change in the political and economic environment.

Given these circumstances, a coalition of moderate conservatives, liberals and social democrats managed to implement a parliamentary democracy, known as the Weimar Republic.[28] The constitution of Weimar stipulated universal suffrage and control of the parliament over the executive but also contained elements of a strong sovereign in the person of the president who had the power to suspend the parliament and to install a strong executive which could act independently of the legislative in times of crises. In the 1920s, starting with the immense economic burden imposed by the reparation payments and culminating in the Great Depression Germany suffered a permanent instability of its political regime.

In this period, the Weimar Republic saw an ongoing polarization at both ends of the political spectrum given by communists and social democrats on the left, and ultra-conservatives and national socialists on the right. Supported by the ultra-conservative president and former general von Hindenburg, conservative politicians with an inherently anti-democratic attitude implemented deflationary policies and countered the parliament's protests by weakening the parliament more and more.[29] In a series of emergency decrees, the parliament was eventually suspended by Brüning in 1930 despite the obvious strengthening of the Nazi-movement. Brüning was followed by von Papen, formally a conservative from the center, but with an ultra-conservative attitude who intended the establishment of a corporate state under the leadership of the landed aristocracy, and his "cabinet of barons".[30] Despite the widespread belief that the biggest threat to the republic came from the right-wing Nazi-movement, many conservative politicians including von Papen

[28]The following description mainly draws on Botzenhart (1993) chapters 13 and 14.
[29]See Schulz (1992), in particular chapters 2 and 10.
[30]See Dederke (1996), p. 247-250.

still believed they could contain the Nazis once in power. Von Papen, in a sort of coup, also dismissed the Prussian state government and became acting commissioner of Prussia in addition to being German chancellor. This virtually meant the elimination of the fundamentals of a federal state since police, judiciary and administration of the largest German state were now directly controlled by the chancellor. These newly created structures substantially facilitated the implementation of a dictatorship by the Nazis after the January elections of 1933 that brought Hitler into power.[31] In these elections, the Nazis only collected somewhat less than 44 % of the votes despite the fact that the election campaign and the elections were accompanied by substantial violent repressions of left-wing parties and voters by Nazi paramilitary gangs.[32] The Nazis had to form a coalition with an ultra-conservative party to get to power, but once Hitler was installed as chancellor, it took the Nazis only a bit more than one year to turn Germany into a dictatorship using the loopholes in the Weimar constitution. Power was granted by the fact that Hitler had control over the largest paramilitary army that he used openly to threaten with civil war in the early 1930s.[33] What followed was a political regime that executed unparalleled atrocities in the holocaust and various waves of ethnic cleansing, that started a war which was without comparison in history, and that ultimately led to the destruction of Germany and its political system.

Again, the model presented in this paper can shed light on the mechanisms that led to the emergence of a weak and unstable democracy that eventually gave way to the Nazi regime. Despite the war and the associated losses of territory and population, the population structure in 1919 had remained largely unchanged compared to 1871. Yet, compared to 1871, the economic environment had changed substantially by the end of World War I, as is illustrated in Figure 4. By the early 1920s, the employment share in agriculture had fallen by roughly 20 percentage points compared to the time after German unification and only about 20% of the net domestic product was produced in the primary sector between 1925 and 1935. At the same time, industrial production had become more important than agriculture and had received a further push by managed efforts to make war production more efficient.[34] Correspondingly, the population in the

[31] See Dederke (1996), p. 249.
[32] See Botzenhart (1993), p. 171 and Dederke (1996).
[33] See Winkler (1993), p. 613.
[34] See Schulz (1987), chapters 4 and 5 for details.

cities and industrial centers had grown more than twofold leading to a significant increase in the urbanization rate with roughly two thirds of the population now living in urban areas.[35] Nevertheless, there possibly exists no parallel of another industrialized society in which a pre-industrial elite could retain as much political power as the landed gentry in the Weimar Republic, see Winkler (1993). The ongoing economic development caused a structural change in the economic environment. Assuming in the absence of reliable data that working hours and capital intensities per person were roughly equal and constant in both sectors, Figure 4 implies that the relative productivity A_a/A_l between the two sectors was much larger in the Weimar Republic than in times of the German Reich.

In terms of the stylized model, this substantially higher relative productivity results in a smaller income gap between the two high-income groups, $\mathcal{L}$ and $\mathcal{A}$ as compared to the agricultural society of 1871.[36] In fact, the available data on pre-tax income inequality as measured by the the Pareto coefficient α seems not to contradict this interpretation.[37] Figure 5 below shows Pareto's α over the period 1871 to 1938 for three of the major states of the German Reich, Baden, Prussia, and Saxony, as well as for the Weimar Republic as a whole.[38] The figure suggests that equality of incomes was on average lower in the times of the German Reich than in the times of the Weimar Republic, as reflected by the lower values of Pareto's α in the period before World War I.

The data also show that equality increased during the first years after the foundation of the Reich in 1871, but then slowly decreased over time until World War I.[39] Considering

[35] See Bähr (2004).

[36] Note that this does not imply a monotonous relation between an increase in the relative productivity and income inequality in our model.

[37] The Pareto-coefficient used to be a common measure of inequality. When observing the distribution of incomes Pareto (1896) assumed the number N of people earning at least income x to be best described by some function $N = Ax^{-\alpha}$ with A and α being constants. According to this reasoning, in a society with a high α a smaller fraction of individuals earns an income equal or above x than compared to a society with a lower α. Despite all obvious shortcomings of this measure, see e.g. Lorenz (1905) or Bresciani-Turroni (1939), in this respect higher values of α are considered to represent more equal income distributions ceteris paribus. To the best of our knowledge, there are no other data on income inequality available for the time period under consideration.

[38] Baden, Prussia and Saxony represent about 70% of total population living in the German Reich, see Hohorst, Kocka, and Ritter (1975), and almost 75% of that in the Weimar Republic, see Petzina, Abelshauser, and Faust (1978). Population data is available only for 1871, 1890, 1910, 1925, 1933, and 1939. The remaining data are calculated by assuming exponential population growth between these dates.

[39] In 1891 a major tax reform was implemented in Prussia in order to collect more reliable income data. Thus, the true value of the Pareto coefficient might have already been lower in the years before. With Prussia representing around 90% of the population in our sample this could explain the pronounced drop of the Pareto coefficient in 1891.

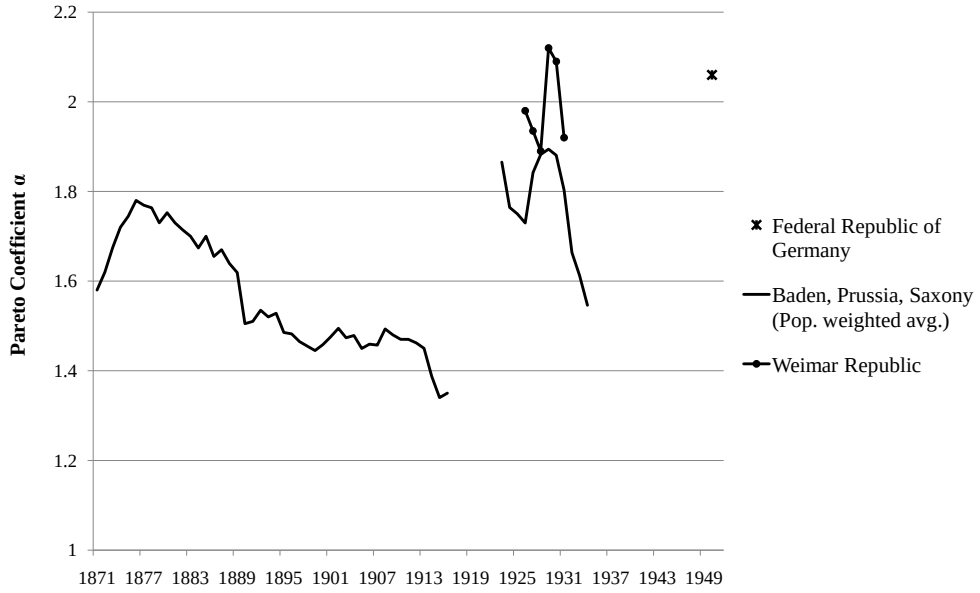


Figure 5: Income Distributions in Germany.
Data from Hoffmann (1965), Table 2.123, Hohorst, Kocka, and Ritter (1975), and Petzina, Abelshauser, and Faust (1978).

this measure of income distribution, it therefore appears as if incomes in the Weimar Republic were more equally distributed than in the German Reich.[40] And as Dumke (1991) points out, this difference mainly stems from changes in the composition of the high-income groups. Given the evidence presented in Figures 4 and 5, it therefore appears as if in the Weimar Republic the economic environment is best described by the one depicted in Figure 1. With moderate levels of β and slightly higher values of γ, the equilibrium emerged in an area of Figure 1 where all three regimes had some relevance, somewhere in the central lower part. This explains the inherent instability of the Weimar Republic despite its even by modern standards progressive democratic design.

The dynamics during the Weimar Republic that eventually led to the collapse of democracy and the emergence of the Nazi regime can also be rationalized in light of the model. Despite their political influence at the beginning of the Weimar Republic, the

[40]This conclusion is also in line with the assessment of Kuznets (1955) regarding the evolution of income inequality in Germany in the 18th and 19th century, as well as with the evidence cited by Acemoglu and Robinson (2000).

landed aristocracy lost influence slowly but significantly during the 1920s as a consequence of the ongoing structural changes shown in Figure 4, see also Zollitsch (1999).[41] This creeping descent of the political power of the nobility together with the presence of a structural indeterminacy in the Weimar Republic, in terms of different feasible equilibria, might have provided the scope for a single, unscrupulous man with extraordinary political talents to ultimately implement and stabilize an oligarchy of the "strong", the Nazis, as reflected by area III.[42] By repression, expropriation and terror, the Nazis formed the economy in terms of population composition and inequality in a way to stabilize their regime and rule out any political change until their ultimate defeat in 1945. In fact, Figure 5 suggests that inequality increased substantially during the first years of the Nazi regime, reflected in a pronounced drop of Pareto's α.[43]

6.3 1945: Towards a Federal Republic of Germany

The war and the terror caused by the Nazis devastated large parts of the world, and also Germany. Until 1945, acts of war and inhumanity like the holocaust and different measures of ethnic cleansing had cost the lives of more than 10 million Germans. Huge territorial losses like almost the entire Prussia and a virtually complete destruction of infrastructure and production facilities marked a deep caesura (the so-called "hour zero", *Stunde Null*) in German history. The landed elite had lost most of their estates, and had been decimated substantially by war and repression.[44] As a result, Germany 1945 looked entirely different from what it used to be in the early days of the Weimar Republic, or even at the beginning of the Nazi dictatorship. The political regime had to be completely

[41] This is reflected in political reforms at the expense of the aristocracy that were implemented in this period. For example, from 1928 on, manor districts were legally no longer considered as political entities on a communal level in Prussia which effectively ended the political dominance of land owners in such communities.

[42] Such an interpretation taking into account the interplay between the structural setting and individual talent would be in line with the famous study of Bullock (1964) on the reasons for the rise of Hitler. One could also argue that given the directed changes in the economic structure and its high popularity, Nazism eventually turned out being a mass dictatorship during the late 1930s and is therefore better represented by area II.

[43] See also Jeck (1968) and Morrisson (2000).

[44] As in World War I, large parts of the officer corps consisted of men of the nobility but the Nazis became increasingly distrustful about the support of the nobility during the war, which is why the nobles lost influence in the military. As a reaction to several attempts to assassinate Hitler, culminating in the attempt of July 20, 1944, by von Stauffenberg and his group, the Nazi regime killed many officers they accused of conspiracy, a large fraction being of noble decent, see e.g. Reif (1999).

re-established under the occupation by the four allied forces, the USA, England, France and the Soviet Republic. In the so-called "Bizone", the territory occupied by the USA and England, the Germans were given the freedom to develop a federal structure and a constitution that would enable the formation of a democratic political system. The drafts of the new constitutions for federal states (*Länder*) and for communities had to be authorized by the respective occupying powers. This happened fairly quickly in the years after the war without a significant exertion of influence on the constitutional details by the allies. The construction of a national state was impeded by the diverging interests of the allied forces with the Soviets trying to expand their direct influence in Germany. Struggles between the Western allies and the Soviets culminated in different policies of containment that led to the Cold War, and eventually to the establishment of two German states in 1948.[45] The Federal Republic of Germany (FRG) as a parliamentary democracy was established in the Western part of Germany comprising the American, English and French occupation zones. In their zone, the Soviets installed the so-called German Democratic Republic (GDR) as a socialist state which was essentially undemocratic and heavily controlled by the Soviets. Since the possibility of external influence is beyond the consideration of our model we focus on the FRG in the following.[46]

The constitution of the federal republic stipulated a modern parliamentary democracy with universal and equal franchise. After the demise of the old elite, the defeat of the Nazis, and under the impression of the Soviet influence in the GDR, the political climate in Germany was very moderate and pragmatic. There was a consensus among the three leading political movements, the social democrats, the conservatives and the liberals, to establish a political regime that would avoid the loopholes and problems of the Weimar Republic while keeping some of its progressive features.[47] Social democrats and conservatives had their own proposals, but in a famous "constitutional convent", the draft of a

[45] See Eschenburg (1983), p. 375.

[46] Historically, this procedure appears to be justified also on grounds of the fact that the GDR collapsed in 1989 and joined the FRG in the process of German re-unification in 1990. The political system of the FRG was sustained in re-unified Germany.

[47] Scholars like Dahrendorff (1965) went as far as to argue that the destruction of the traditional social structures by the Nazis, and the ultimate defeat of Nazi Germany constituted a prerequisite for the emergence of the liberal and modern democracy after 1945. According to Dahrendorff (1965, p.155), it was the social inequality and the persistence of traditional corporative structures that had impeded any progress towards a modern democracy in the *German Reich* and in the *Weimar Republic*. In his view, this was mainly because it was in the interest of the politically dominant groups of society, consistent with the discussion above.

new constitution (*Grundgesetz*) was finished in just two weeks. The constitution emerged from this draft after it was ratified by the constitutional assembly and authorized by the allied forces without serious objections, is – with minor modifications – still in effect today.

In the light of the model presented in this paper, the emergence of a stable democracy that encompasses all parts of society and that in many ways still represents a model democracy for large parts of the world today can be rationalized by the very equilibrated economic and political interests after the devastation and the defeat in the self-inflicted Second World War. Abstracting from the immense war-related destruction of production facilities, the industrial structure was very similar to that in the Weimar times, as exemplified by the virtually identical employment shares in agriculture over the period from the 1920s to the late 1940s.[48] From Figure 4 one can also see that the primary sector had lost further economic importance during the Weimar Republic and the Nazi period. However, when again assuming constant working hours and capital intensities per person the relative productivity between both sectors seems to not have changed dramatically indicating a fairly similar economic environment to that in 1919. Thus, the German economy at that time might still be best described by a level of development as depicted in Figure 1 – with the most salient difference being the much lower inequality after World War II due to a more equal demographic structure.

According to the study of Morrisson (2000) who analyzes the income distribution within Germany from 1870 to 1990 inequality had decreased after World War II compared to the pre-war era, and then remained almost stable at historically low levels. With all groups of society being of similar importance, and the need to focus attention on reconstruction and development, the politico-economic equilibrium in this situation is likely to be one of democracy, as represented by areas I. To complement this picture, Figure 6 displays the development of income levels in Germany using the data from Maddison (2003). With income levels after World War II being even lower than after World War I or at the end of the Weimar Republic, the data seems to lend further support to the model prediction that inequality and the distribution of resources, rather

[48] Mitchell (2003, Table B1) provides data for the first year directly after the war. According to his numbers, the shares of economically active men working in agriculture evolved from 23.3 % in 1925 to 22.5 % in 1933 when Hitler came to power, to 22.6 % in 1946. For women, the respective numbers are 43.3 %, 40.7 % and 40.6 %.

than the level of income, crucially affect the institutional equilibrium.

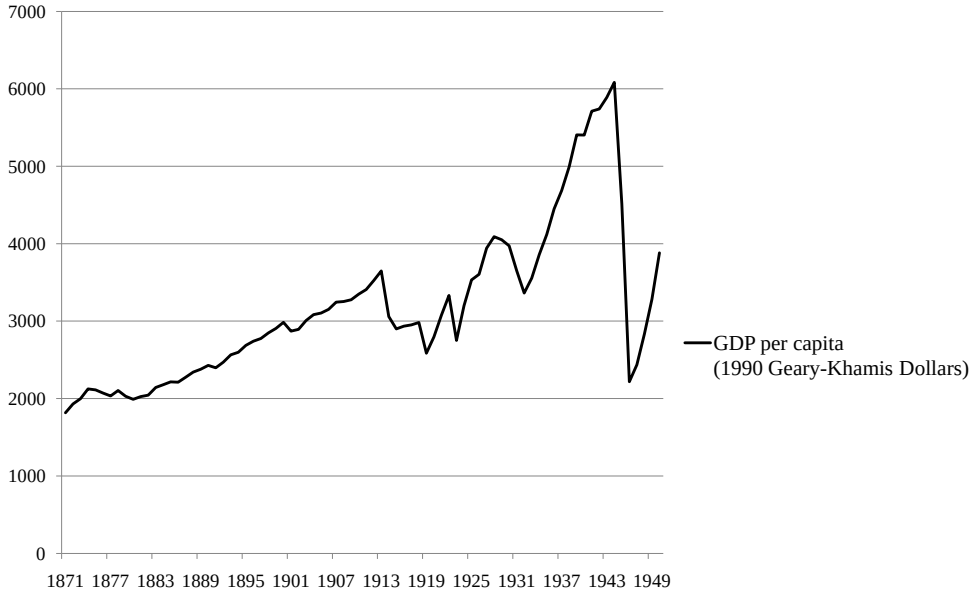


Figure 6: Income Development in Germany.
Data from Maddison (2003), Table 1c.

In the aftermath of World War II, the reconstruction and development in Germany was fairly balanced, the recovery was fast and accompanied by policies intended to stabilize the political and social situation. Led by later chancellor Ludwig Erhard, the currency and the welfare system were reformed in order to flatten out wealth inequality and to level economic conditions, at least to a certain extent. The goal was to implement a so-called "social market economy" which would mitigate social conflicts, ensure a moderate political climate and thereby stabilize the economy by maintaining the conditions necessary for a democratic politico-economic equilibrium. The recovery was complemented by international support through the Marshall plan, which was intended as a measure of policy of containment against the Soviets.[49]

[49]See also Eschenburg (1983), p. 432-445.

6.4 More Historical Examples

The theoretical result that economic inequality, reflected by the distribution of resources, might be the crucial factor for institutional stability as well as for institutional change appears to be consistent with many other observations in history. In fact, Rogowski and MacRae (2008) argue that the majority of historians, including economic historians, agree that exogenous changes in inequality due to warfare or shocks in technology or demographics have been the major determinant for institutional change in human history.[50]

The different historical events consistent with this line of causality include the emergence and collapse of the democracy in Ancient Greece, the collapse of the Roman Republic into a de-facto dictatorship, the rise of feudalism under the Merovingians, the tendencies towards liberation of tenants in response to the Black Death in the 14th century, the reformation movement in the 15th and 16th century, the rise of absolutism in the 17th century, as well as the first and second waves of democratization in the early 19th and in the 20th century, respectively. Rogowski and MacRae (2008) make the convincing case that all these events were triggered by an initial exogenous shock that changed inequality and subsequently led to a change in political institutions. In line with the theoretical predictions of the model above, changes in inequality and institutions appear to occur in both directions, indicating that the stability of institutions in general, and of democracy in particular, might crucially depend on inequality. For instance, democratic reforms in ancient Greece were induced by a drop in inequality which was caused by changes in military technology that made a lightly armored infantry, the *hoplites*, favorable over the former dominant knights. Conversely, the increasing professionalisation of the army in the Roman Empire, or the adoption of the stirrup in the middle ages, gave more economic and political power to smaller elites. This led to transitions towards more oligarchic structures, reflected in the breakdown of the Roman Republic and the rise of Caesarism, or the rise of feudalism in medieval Europe. Likewise did demographic or technological shocks, such as the Black Death or the movable type, which led to a reduction in inequality, eventually

[50]Rogowski and MacRae suggest that these exogenous shocks are likely to have changed both inequality and institutions, and propose an explanation that is based on standard political economy arguments regarding the link between inequality and public goods provision. Although this explanation is consistent with different degrees of franchise that are optimal from the perspective of the rich political entrepreneurs, it also rests on the implicit assumption of an institutionalized environment unlike the theory presented above.

give rise to a more equal distribution of political power. The wars of the Napoleonic times as well as the World Wars required huge armies and workforces, thereby also causing a reduction in political and economic inequality.

In summary, the historical evidence collected by Rogowski and MacRae (2008) suggests that exogenous changes in inequality were the major driver behind major institutional changes in history. One aspect that appears noteworthy in this context is the fact that most of the historical examples of changes in inequality were also associated with an increase in economic living standards. In some cases, however, inequality increased, whereas in others it decreased, pointing towards the importance of inequality, rather than income levels, for the emergence and stability of political institutions.

7 Concluding Remarks

This paper has developed a model of political institutions in which democratic or oligarchic rule emerges as equilibrium outcome of a political struggle for redistribution in a weakly institutionalized environment where no binding agreements between different groups of society can be made. The results show that factual inequality along several dimensions, in terms of the distribution of factors in the economy as well as of their importance in the income generating process, is key for the resulting political institutions. Democracies can emerge only in fairly balanced economic environments whereas alternative conditions give rise to various forms of oligarchies or mass dictatorships. The main results are robust to several extensions of the model, including the consideration of more income groups or the implementation of other production technologies, and are in line with historical evidence on changes in political regimes. In particular, the model can rationalize the emergence of different political regimes in Germany after its unification in 1871. Apart from that, our results suggest that the advent of democracy neither is an indispensable event in the process of development nor necessarily marks the beginning of an era of eternal stability of democracy.

The results have several relevant implications. First, democracy might not be the automatic outcome of economic development, consistent with the evidence produced by Acemoglu et al. (2008, 2009). The fact that different political regimes can emerge for

comparable levels of income and economic development is also suggested by the historical data for Germany as provided by Figure 6. Second, the model shows that the distribution of factors or incomes, rather than the level of economic development, very often is key for democracy to emerge. Again, this result is supported by the observations from Germany's history. Facing fairly equal levels of income at three critical junctures, a stable democracy in Germany emerged only after the third juncture in 1945, when the distribution of factors and incomes was more balanced than at the previous junctures, see also Figure 5. Our results suggest that democratization is possible at every level of economic development if the distribution of production factors lies within a certain range. Third, the model also implies a note of caution in that the situation of a stable democracy does not necessarily constitute an absorbing state. Even if democracy eventually emerges, it might not be stable in the long run but only be a temporary phenomenon. Hence, democracy might fail if income discrepancies and redistributive tensions between the different social groups become too large. The model characterizes the conditions under which this is the case. In particular, ongoing technical change and economic development that affects different groups of society in different ways, as well as increases inequality and polarization may potentially lead to a breakdown of the democratic equilibrium and to the (re)emergence of an oligarchy or a mass dictatorship.

The model presented in this paper suggests various directions for future research. Several implications of the model can be tested empirically, including the prediction that democracies are more likely to emerge in balanced economic environments with fairly equal factor incomes. In this context, it would also be interesting to investigate the structure of democracy, in terms of the emerging ruling coalitions, under different scenarios of economic development and resource distribution, as well as the corresponding patterns of income redistribution. Another interesting avenue for future research would be to link the model closer to the empirical and theoretical concepts of polarization and fractionalization, as developed by Esteban and Ray (1994, 2008) and Alesina et al. (2003). Finally, a dynamic version of the model could be used to investigate the interdependencies of the political regime and the corresponding policies on the one hand, and endogenous factor accumulation and technological change, as well as the associated changes in the income distribution on the other.

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Appendix

Proof of Lemma 1

We first show that for any group there exists a pure strategy profile σ^* that is a $SPNE$ and leads to a unique RC.

Part I. Existence. This part of the proof follows the structure of the proof of *Lemma 1* in Acemoglu, Egorov, and Sonin (2008). First consider the preferred coalition of agenda setter $i \in S_k$ at stage $k \in \{k \in \mathbb{N}_0 : k \leq 2\}$ of game Γ where S_k is the set of all (remaining) groups whose income has not been redistributed away up to the current stage of the game, i.e., $S_0 = S$, $S_k \subset S \; \forall \, k > 0$ and $S_k \neq \varnothing \; \forall \, k$. Let $\mathscr{P}(S_k)$ denote the power set of S_k and let $\mathcal{I}_i = \{\mathcal{I} \in \mathscr{P}(S_k) : i \in \mathcal{I}\}$ be the set of all coalitions that include group i whereas $F_i = \{F \in \mathcal{I}_i \backslash S_k : 2P_i > P_F\}$ represents the set of all coalitions in which group i is more powerful than the other coalition members at the current stage of the game excluding the set of all (remaining) groups. For notational convenience we set $P(\varnothing) = \infty$. Let $W_k = \{W \in \mathscr{P}(S_k) : P_W > 0.5 P_{S_k}\}$ be the generic set of winning coalitions and denote the set of stable coalitions as $E_k = \{E \in \mathscr{P}(S_k) : [\nexists \, Q \subset E : 2P_Q > P_E \wedge |Q| = 1]\}$. Additionally, let us define the union of the set of coalitions that are both winning and stable and the set of all (remaining) groups at the current stage of the game which is given by $R_k = [W_k \cap E_k] \cup S_k$ where the coalition that exhibits the lowest aggregate power in this set is given by

$$\Omega_k = \underset{X \in R_k}{\operatorname{argmin}} \, P(X) \; .$$

Then, the preferred proposal of an agenda setting group i at stage k of the game is given by

$$\Pi_{i,k} = \underset{X \in \mathcal{I}_i \cap R_k}{\operatorname{argmin}} \, P(X)$$

and the pure strategy profile for group i reads

$$\sigma^*_{i,k} = \begin{cases} \text{agenda-setting stage: } i \text{ proposes } \Pi_{i,k} \\ \text{voting stage: } i \text{ votes} \begin{cases} yes & \text{if } \; \Pi_{j,k} = \Pi_{i,k} \vee \Pi_{j,k} \in F_i \\ no & \text{otherwise .} \end{cases} \end{cases}$$

where $\Pi_{j,k}$ denotes the proposal made by group $j \in S_k$ on which groups currently vote.

Now we need to prove that the pure strategy profile σ^* which is a vector of $\sigma^*_{i,k} \forall\, i,k$ constitutes a $SPNE$. Since we consider a finite game it is sufficient to show that there exists no one-shot deviation from $\sigma^*_{i,k}$ which is profitable for group i at any given history $\mathbb{h}$ of the game. In order to do this we need to distinguish two cases each one itself containing two subcases, since in this sequential game any group i is either an agenda setter (*case A*) or a voter (*case B*) at a given history of the game, and any proposed redistribution policy can either be rejected (*subcase 1*) or accepted (*subcase 2*).

Case A

In this case we show that group i cannot benefit from making a proposal $\pi_{i,k} \in \mathcal{I}_i$ that differs from that stipulated by $\sigma^*_{i,k}$. We need to distinguish two subcases.

Subcase A.1. Let us assume that there exists such an alternative proposal $\pi_{i,k} \neq \Pi_{i,k}$ and that $\Pi_{i,k}$ is rejected if proposed. Then, obviously $\pi_{i,k}$ must be accepted if proposed as otherwise group i would not benefit from making this proposal. By definition we know that $\Pi_{i,k} \in \mathcal{I}_i \cap R_k$ holds. Suppose first that $\Pi_{i,k} = \Omega_k$. In this case, $\Pi_{i,k}$ is only rejected by others if $\{i\} = \Omega_k$ holds. But then making a proposal $\pi_{i,k} \neq \Pi_{i,k}$ cannot be beneficial for group i. Now assume $\Pi_{i,k} \neq \Omega_k$. This implies $\{j\} = \Omega_k$ with $j \neq i$. Obviously, since $\Pi_{i,k}$ is not accepted in this case there can exist no $\pi_{i,k} \in \mathcal{I}_i$ which would not also be rejected. For this reason no deviation from $\sigma^*_{i,k}$ can be beneficial in the given subcase.

Subcase A.2. Let us now suppose that there exists an alternative proposal $\pi_{i,k} \neq \Pi_{i,k}$ and that $\Pi_{i,k}$ is accepted if proposed. Note that by the nature of the game $\pi_{i,k} \in R_k$ holds as no proposal $\pi_{i,k} \notin W_k$ can be accepted and no proposal $\pi_{i,k} \notin E_k$ will be accepted. Furthermore, no proposal $\pi_{i,k} \notin \mathcal{I}_i$ can be made by group i. Hence $\pi_{i,k} \in \mathcal{I}_i \cap R_k$ needs to hold. Given our assumption of a bijective power mapping $\pi_{i,k} \neq \Pi_{i,k}$ then implies $P_{\Pi_{i,k}} < P_{\pi_{i,k}}$ since $\Pi_{i,k} = \operatorname{argmin}_{X \in \mathcal{I}_i \cap R_k} P(X)$. With regards to the optimization problem (11) we can therefore conclude that it is not beneficial for group i to propose $\pi_{i,k}$ instead of $\Pi_{i,k}$ in the given subcase.

Case B

Subcase B.1. Suppose that instead of voting *yes* according to $\sigma^*_{i,k}$ voter i would be better off if he voted *no*. Since the votes of the other groups do not depend on the decision of group i such a behavior could only cause a rejection of a proposal that would have been

accepted otherwise if group i is pivotal for the decision outcome. In every other case such a deviation has no effect on equilibrium outcome and therefore cannot be beneficial. For this reason, let us assume that group i is pivotal for the decision outcome and that it votes *no* contrary to $\sigma^*_{i,k}$.[51]

To understand why no such deviation can be beneficial for $\Pi_{j,k} = \Pi_{i,k}$ is trivial since from the perspective of group i there exists no better proposal on which will be voted on at the given stage of the game according to σ^* (see *Case A*). Note that if $\{i\} \neq \Omega_k$ then $\Pi_{i,k} = S_k$. In this case voting *yes* of the pivotal group i would preserve the status quo and prevent the possibility of $\Pi_{j,k} = \Omega_k$ being made afterward. Voting *no* and thereby rejecting a proposal $\Pi_{j,k} = \Pi_{i,k}$ can therefore not be beneficial. Now suppose that $\Pi_{j,k} \in F_i$ holds. Since F_i consists of all coalitions in which group i is more powerful than all other coalition members, it is clear that whenever one of those coalitions is proposed and accepted given $\{i\} \neq \Omega$, then $\widetilde{p}_i$ becomes maximal at the subsequent stage of the game. Thus, in the absence of redistribution costs it cannot be beneficial to vote *no* if $\Pi_{j,k} \in F_i$. Note that $S_k \notin F_i$ such that voting *yes* for $\Pi_{j,k} \in F_i$ always implies group i to become an agenda setter again at the subsequent stage of the game. We can therefore conclude that it is not beneficial to vote *no* contrary to $\sigma^*_{i,k}$ for any group $i \in S$ at any stage of the game.

Subcase B.2. Now suppose that instead of voting *no* according to $\sigma^*_{i,k}$ group i would be better off if it voted *yes*. Again, this could only affect equilibrium outcome if group i's decision is pivotal and leads to the acceptance of a proposal that would have been rejected otherwise. Let us assume it does. Here, we only need to consider the case where $\Pi_{j,k} \neq \Pi_{i,k}$ and $\Pi_{j,k} \notin F_i$ holds. In this case, it is obvious that a deviation from $\sigma^*_{i,k}$ cannot be beneficial for group i since such a decision would lead to an unstable coalition in which group i is not the most powerful group. Given this, income of group i would be redistributed away at the subsequent stage of the game if such a proposal was accepted. We can therefore conclude that it is not beneficial to vote *yes* contrary to $\sigma^*_{i,k}$ for any group $i \in S$ at any stage of the game. □

Part II. Uniqueness. Finally, we need to show that all $SPNEs$ lead to the same RC. Note that the assumption of a bijective power mapping implies that in equilibrium different RCs cannot be equal in aggregate power. To see this suppose, by contradiction, that $P_M =$

[51] For consistency, and without loss of generality, the strategy of non-pivotal or indifferent voters is also assumed to be characterized by σ^* in the following.

P_Q holds for the two equilibrium coalitions $M, Q \in \mathscr{P}(S) \setminus \{\varnothing\}$ which are not identical, $M \neq Q$. Obviously, the bijective power mapping directly rules out $|M| = |Q| = 1$ in the given case. Additionally, a coalition of two groups can never be an equilibrium outcome, because, due to the bijective power mapping, it would not be stable as the stronger group could always propose a winning subcoalition only containing itself at a later stage of the game. And uniqueness in the case of the grand coalition comprising all three groups is trivial. Therefore we can conclude that in equilibrium any two coalitions M and Q can only be equal in power, $P_M = P_Q$, when they are identical, $M = Q$.

Under strategy profile σ^* the resulting RC does not depend on the moves of nature. Therefore the $SPNEs$ in our finite coalition formation and redistribution game with perfect information can only lead to different RCs if a pivotal group i is indifferent about her action at a certain decision node. Suppose first that group j is not part of the equilibrium coalition and is indifferent at a given history of the game $\mathbb{h}$. Then $|\Omega| = 1$ immediately follows and group j cannot be pivotal. Now suppose that the pivotal group i is part of different equilibrium coalitions and is indifferent at a given history of the game $\mathbb{h}$. This can only be the case if (at least) two actions lead to the same equilibrium payoff which requires – given the optimization problem (11) and the political power of group i – the aggregate power of (at least) two different RCs to be the same. With regards to our former reasoning this is impossible. Thus there cannot exist two different equilibrium coalitions between which any pivotal group $i \in S_k$ is indifferent at a given history of the game $\mathbb{h}$. This establishes the proof of Lemma 1. □

Proof of Proposition 2

Proof of Proposition 2.1. The proof shows that for $0 < \sigma < 0.5$ there exist $\gamma - \beta$ combinations for which a democracy emerges in equilibrium irrespective of the productivity environment A_a and A_l.

Note first that from $0 < \sigma < 0.5$ it follows directly that $0 < 1 - \frac{1}{2(1-\sigma)} < 0.5$ which implies with regard to equation (17) that the $\beta_{\lambda_P=0.5}$-locus intersects the β-axis at positive values. Thus, we must consider the relative power loci of all groups for the following analysis. Suppose that $\gamma^* = \beta^* = \frac{0.5-\sigma}{2(1-\sigma)} + \epsilon$ where ϵ is some positive parameter which is infinitely

small such that $0 < \gamma^*, \beta^* < 1$. Using equation (14) we find that

$$\lambda_{\mathcal{P}}(\gamma^*, \beta^*) = 0.5 - 2\epsilon(1-\sigma) \leq 0.5$$

always holds. Applying the same reasoning to equation (15) yields

$$\lambda_{\mathcal{L}}(\gamma^*, \beta^*) = 0.25 + \epsilon(1-\sigma) + \sigma\left(\frac{A_l}{A_a + A_l} - 0.5\right)$$

where obviously $\lim_{\epsilon \to 0} \lambda_{\mathcal{L}}(\gamma^*, \beta^*) \leq 0.5$ for $0 < \sigma < 0.5$. It is straightforward to obtain an analogous result for $\lambda_{\mathcal{A}}(\gamma^*, \beta^*)$ when using equation (16). We can therefore conclude that for $\gamma^* = \beta^* = \frac{0.5-\sigma}{2(1-\sigma)} + \epsilon$ with $0 < \sigma < 0.5$ and small enough values of ϵ no group is powerful enough to rule the state on its own irrespective of the productivity environment A_a and A_l. From Proposition 1 it then follows that a democracy emerges as equilibrium outcome. □

Proof of Proposition 2.2. The proof shows that for $0.5 \leq \sigma < 1$ and a given productivity environment A_a and A_l there exist $\gamma - \beta$ combinations for which a democracy emerges in equilibrium.

Since $0.5 \leq \sigma < 1$ holds we do not need to consider the $\beta_{\lambda_{\mathcal{P}}=0.5}$ locus in the following. From equation (19) it can easily be seen that within the admissible $\gamma - \beta$ space the $\beta_{\lambda_{\mathcal{A}}=0.5}$ locus is a continuously differentiable and monotonically increasing function in γ which passes through the origin. Additionally, we know that for any given value of γ an increase in β increases the relative power of the $\mathcal{A}$-group but decreases the relative power of all others. Thus, for any given γ the value of β which is necessary to reach a certain relative power (like 0.5) must be higher for the $\mathcal{A}$-group than for the $\mathcal{L}$-group. Therefore the $\beta_{\lambda_{\mathcal{A}}=0.5}$ locus always lies above the $\beta_{\lambda_{\mathcal{L}}=0.5}$ locus within the admissible $\gamma - \beta$ space. And since both loci do not intersect and therefore cannot be identical due to $\lambda_{\mathcal{P}} > 0$ we can conclude that, for a given productivity environment A_a and A_l, there must always exist a set of $\gamma - \beta$ combinations such that $\lambda_{\mathcal{L}} \leq 0.5 \wedge \lambda_{\mathcal{A}} \leq 0.5$ holds. This establishes the proof. □

Proof of Proposition 3

Proof of Proposition 3.1. The proof shows that for $0 < \sigma < 1$ there exist $\gamma - \beta$ combinations for which a mass dictatorship emerges in equilibrium irrespective of the productivity

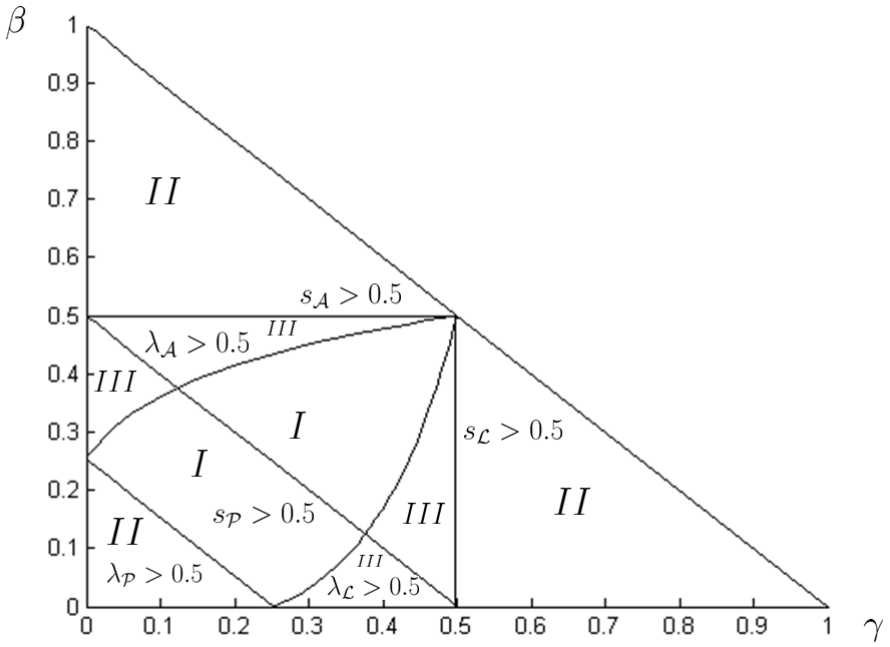
environment A_a and A_l.

With regard to equations (17) and (20) we see that the $\beta_{\lambda_{\mathcal{P}}=0.5}$ locus is a parallel of the $s_{\mathcal{P}}$ locus where the former always lies below the latter. Thus for $\sigma \in (0, 0.5)$ there always exist admissible $\gamma - \beta$ combinations for which $\lambda_{\mathcal{P}} > 0.5 \wedge s_{\mathcal{P}} > 0.5$ holds independent of the productivity environment A_a and A_l. This also is true for $\sigma \in [0.5, 1)$ since we already know from the proof Proposition 2.2 that at least for small enough values of γ there must exist $\gamma - \beta$ combinations directly above the $\beta_{\lambda_{\mathcal{A}}=0.5}$ locus which satisfy these two conditions with regard to group $\mathcal{A}$. □

Proof of Proposition 3.2. The proof shows that for $0 < \sigma < 1$ there exist $\gamma - \beta$ combinations for which an oligarchy emerges in equilibrium irrespective of the productivity environment A_a and A_l.

Let us focus on the $\beta_{\lambda_{\mathcal{L}}=0.5}$ locus and highlight some of its properties. As can easily be seen from equation (18) the $\beta_{\lambda_{\mathcal{L}}=0.5}$ locus has a pole at $\gamma = 0.5/(1-\sigma)$ and intersects the abscissa at most twice for $\gamma_1 = 0$ and $\gamma_2 = (0.5-\sigma)/(1-\sigma)$ with $0 < \gamma_2 < 0.5 \,\forall\, \sigma \in (0, 0.5)$ and $\gamma_2 \leq 0 \,\forall\, \sigma \in [0.5, 1)$. Also $\partial\lambda_{\mathcal{L}}/\partial\gamma > 0 \,\forall\, \gamma \geq \max[\gamma_1, \gamma_2]$ holds. Thus for $\sigma \in [0.5, 1)$ the $\beta_{\lambda_{\mathcal{L}}=0.5}$ locus is a continuously differentiable and monotonously increasing function in the admissible γ set which passes through the origin. This implies that there always exists a set of $\gamma - \beta$ combinations below the $\beta_{\lambda_{\mathcal{L}}=0.5}$ locus for which $\lambda_{\mathcal{L}} > 0.5 \wedge s_{\mathcal{L}} < 0.5$ holds irrespective of the productivity environment A_a and A_l. The same is true for $\sigma \in (0, 0.5)$ since $\gamma_2 = \max[\gamma_1, \gamma_2] < 0.5$ implies that a set of such $\gamma - \beta$ combinations exists to the left of the $s_{\mathcal{L}}$ locus. This establishes the proof. □

Exemplary Figure for $\sigma < 0.5$



Political equilibria for $A_l = A_a = 1, \sigma = 0.33$.