Institutions and Growth in Limited Access Societies

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Abstract

We build a dynamic political economy model with a two-class society: workers and the elite. In the model, the formation of the elite, the rate of innovation and fiscal policy are endogenous. We focus on the conflict within the elite over two fundamental engines of economic growth: innovation and public investment. The model creates a mapping between institutions and economic outcomes which is consistent with the observed patterns of growth. The model also shows that separation of control over various policies maybe optimal for the elite and that, forced to meet the demands of the working class, the elite may delegate policy control to some of its members, even though such delegation exacerbates the conflict within the elite and leads to policy failures. The elite commits to institutions that allow for such failures in order to prevent more harmful outcomes, such as rapid entry and subsequent deterioration of its economic and political power.

Keywords: class interests, endogenous growth, entry barriers, elite, growth, institutions, limited access, optimal institutions.

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1 Introduction

In this paper, we take the stand that institutions are persistent and study their impact on long run political and economic outcomes in limited access societies. We build a dynamic political economy model with a two-class society, workers and the elite, in which the elite has all economic and political power. In the model, the formation of the elite, the innovation rate, and fiscal policy are endogenous. Differently from most of the literature on institutions and growth, which emphasizes the conflict between different classes, we focus on the conflict within the elite over two fundamental engines of economic growth: innovation and public investment. We consider a variety of institutional arrangements. In particular, we investigate those cases in which the control over industrial and fiscal policies is concentrated in the hands of different sub-groups within the elite.

The main features of our model are motivated by historical facts summarized in, e.g., North, Wallis and Weingast (2006). In limited access societies, which have remained the prevalent form of social order, property rights are concentrated exclusively in the hands of the elite. There are entry barriers into all aspects of economic and political life, which leads to a fundamental conflict inherent to these societies: while some elite members prefer increasing access, so that they can benefit from new economic opportunities, the rest of the elite sees increased access as undermining their economic and political power. The elite's ability to restrain its self-interested members from increasing entry determines the innovation rate. Another major conflict in these economies concerns provision of public investment. Fiscal interests of the elite, in general, are different from those of the rest of the society, but they are also different within the elite. The elite faces the classic problem of public goods provision: the elite members in charge of taxes and public investment act in self-interest at the expense of their class (and the society) as a whole. The elite's ability to control fiscal policy determines the amount of public investment.

The elite's ability to control innovation and fiscal policy also has important implications for the welfare of the whole society: while prudent fiscal policies are growth-enhancing, and, therefore, broadly beneficial for the whole society, the elite's ability to suppress innovation protects the power of the elite, but inhibits growth and lowers wages, thus decreasing the workers' life-time utility.

Methodologically, our point of departure is the dynamic legislative bargaining model of Battaglini and Coate (2007, 2008). Although their model (the BC model thereafter) is designed for representative democracies, we argue that it captures well the key forces determining the evolution of limited access societies. Moreover, it is directly applicable to cases in which policy is an outcome of a bargaining process between a narrow group of the elite or their representatives. A prominent feature of the BC model is the dependence of policy outcomes on the size of the winning coalition - the fraction of the society that contemporaneously controls the political process. When the coalition consists of one member, the model effectively becomes a variant of the Olson's (2000) model of a roving bandit, and when the coalition is all inclusive, the model is equivalent to one of a benevolent planner. The intermediate case implies partial consolidation: the self-interested policy maker takes into account the interests of only a fraction of society whose approval is sufficient for a successful implementation of the desired policy.

In our model the elite is "a group of individuals pursuing a mix of common and individual goals through partially coordinated action" (North, Wallis and Weingast, 2006), and the conflict within the elite is over innovation and fiscal policy. Innovation allows some elite members to extract a fraction of the new firms' profits, but the workers creating these firms retain property rights over them, gain political power and become elite members. Thus, innovation undermines the economic and political power of the elite, since it increases competition for labor and diminishes the political influence of each elite member. The conflict over fiscal policy is similar to that studied by Battaglini and Coate (2007). Higher taxes and lower public investment allow for larger lump-sum transfers to some elite members, but suppress labor supply and diminish future productivity.

To analyze these conflicts we modify the BC framework in two dimensions. First, only the elite has an influence over the political process. Second, to capture possible heterogeneity within the elite and the resulting conflicts of interest, we allow for policy separation: industrialists - the winning coalition in charge of industrial policy (E-WC) - control innovation, politicians - the winning coalition in charge of fiscal policy (G-WC) - control taxes and public spending. The proposing industrialist – the elite member engaged in creation of new firms – shares the resulting profits only with the industrialists. The proposing politician – the elite member collecting taxes and administering public spending – shares the tax revenue only with the politicians. Neither the proposing industrialist nor the proposing politician fully internalize the effects of their policy choices on the welfare of the elite as a class. We study two cases. In the benchmark case the bargaining protocol is identical to that of the BC model: both policies are controlled by a single winning coalition (i.e., E-WC and G-WC coincide). In the second case – the case of policy separation – the winning coalitions are distinct, each controlling a single policy.

Institutions are defined as the sizes of the winning coalitions and the degree of their overlap. The size of E-WC captures institutional constraints faced by the proposing industrialists and represents the degree of elite's economic consolidation. Similarly, the constraints imposed on the proposing politicians, or the degree of the elite's fiscal consolidation, are captured by the size of G-WC. The overlap between the winning coalitions determines the degree of conflict between the industrialists and the politicians. This definition parsimoniously maps the complex institutional fabric of rules, regulations and informal arrangements into the key determinants of the economic and political evolution of the society: essentially, what those in power can and cannot do and how they interact between each other.

We show that a unique Markov equilibrium of our model exists for any institutional design. Our first set of results concerns the relation between the consolidation of the elite and sources of economic growth for the benchmark case. When the size of the winning coalition is small, the incentives to innovate are high, and growth occurs mainly through high rates of innovation. However, the incentives to misappropriate fiscal revenues are also high, leading to high taxes and low public spending. To the contrary, a consolidated elite blocks innovation, but at the same time it can enforce prudent fiscal policies, which yield high levels of public investment.

The second set of results concerns the case of policy separation. This scenario features a conflict between the industrialists and the politicians, which is absent in the benchmark case. First, consider fiscal consolidation. As the size of G-WC increases, the tax rate declines, causing labor supply to increase. A higher labor supply and a lower expected tax revenue increase the marginal benefit of innovation. Thus, a higher degree of fiscal consolidation leads to a higher innovation rate. Second, consider a reduction in the degree of economic consolidation. A decrease in the size of E-WC spurs innovation and increases the size of the elite. The politicians' net marginal benefits from taxation fall, leading to less fiscal distortions. Importantly for the welfare analysis, these equilibrium cross-effects are opposite to the direct effects of the changes in the sizes of E-WC and G-WC on policy outcomes.

The patterns of growth generated by the model are consistent with empirical evidence documented in the paper. The lowest growth rates occur when fiscally unconsolidated (or highly corrupt) elite can fully suppress entry, while the highest growth rates occur when fiscally consolidated elite allows for liberal economic policies. Moreover, in the model, as in the data, there is a distinction between state-led and innovation-led growth and between institutions which cause them.

The third set of results concerns the optimal institutional design for the elite. The first-best solution for the elite is full consolidation. Then decisions are made unanimously, which maximizes the ex ante payoff of each elite member. When full consolidation with respect to either policy is not achievable, the elite may optimally reduce consolidation with respect to the other policy. Consider the case in which the elite cannot fully suppress innovation. By delegating policy control to some of its members, the elite commits to fiscal policies that lower the incentives to innovate. That is, low fiscal consolidation forces the industrialists to behave more in accord with the interests of the elite as a class. Thus, some policy failures per se are not inevitable - the elite commits to institutions that lead to such failures in order to prevent more harmful outcomes, such as rapid entry and subsequent deterioration of its economic and political power. We extend our analysis to encompass the workers' interests: institutions chosen by the elite must yield a minimum life-time utility to the working class. Since workers benefit both from high rates of innovation and prudent fiscal policies, to satisfy their demands the elite should either allow for economic freedom or impose fiscal consolidation. When the required life-time utility for workers is sufficiently high, it can be delivered only via economic freedom. Then, it is optimal for the elite to separate policy control, diminish the degree of economic consolidation, thus reducing entry barriers and, possibly, allow some fiscal distortions to partially curb innovation.

The rest of the paper is organized as follows. In Section 2 we discuss the related literature. Section 3 presents our benchmark model, and Section 4 - the model with policy separation. In Section 5, we collect historical facts to support our modelling choices and provide parallels between the model's predictions and historical patterns of economic growth. Section 6 discusses optimal institutions for the elite. We comment on the robustness of our results in Section 7 and conclude in Section 8. All proofs are collected in the Appendix.

2 Literature Review

Our main findings contribute to the growing literature on institutions and growth. This literature has shown how limited access societies can emerge and persist over time, and how the resulting institutions cause economic distortions (e.g., Acemoglu, 2006a, 2006b). Acemoglu and Robinson (2008) compare economic growth in democracies and oligarchies, while several papers study limited access societies with specific political regimes (e.g., Acemoglu, Robinson and Santos-Villagran, 2009, Acemoglu, Ticchi and Vindigni, 2009, and Acemoglu, Egorov and Sonin, 2009a). We complement this literature by explicitly modelling the conflict of interests within the elite as a class and by isolating and analyzing the key determinants of economic and political outcomes in a wide range of limited access societies. In this sense, our paper is also related to the work of Azzimonti (2009), which illustrates how divergence of interests leads to inefficient fiscal policy in democratic societies.

As noted earlier, we build our framework upon the work of Battaglini and Coate (2007). We adapt their dynamic version of Baron and Ferejohn's (1989) legislative bargaining model to study bargaining over multiple policies within an endogenously changing subset of the society – the elite. In doing so, we complement the existing literature on the role and importance of different political decision rules in representative democracies (e.g., Persson, Roland and Tabellini, 2000).

Our model features endogenous political participation, as do the models in, e.g., Ades (1996), Gradstein and Justmann (1995), and Bourguignon and Verdier (2000). While the latter assume that voting rights can be obtained at an exogenously given cost, in Acemoglu and Robinson (2000a, 2000b, 2000c, 2001) the elite may choose to extend the franchise. The elite as a class balances preservation of political power versus superior economic outcomes which could be obtained by extending the franchise. Doepke and Eisfeldt (2009) study colonization. In their model, the gun owners may collectively decide to allow emancipation, which may increase the gun owners' rents through capital-labor complementarity. In contrast to these works, in our model, subgroups within the elite can grant access to non-members and various elite groups have particular interests over policy outcomes. Institutions erected by the elite to control these groups determine the evolution of the elite and the rate and the patterns of economic growth.

Our study of the elite's optimal choice of institutions is related to the literature on voting mechanisms. Acemoglu, Egorov and Sonin (2009b) analyze how different voting mechanisms, i.e. different combinations of majority voting and veto-rules, influence the competence of a government. While their primary emphasis is on the structure of stable governments under various political regimes, our main point of interest in the impact of different voting rules on policy choices and growth. Furthermore, we study optimality of voting rules (i.e., institutions) for the elite. Similarly to the results of Aghion, Alesina and Trebbi (2004), we show that the optimal institutional design may not require unanimous decision making. Furthermore, as in Gersbach (2005), the optimal majority rule varies across different policies. In our model, the derived optimal institutional design (or optimal voting rule in the language of Barbera and Jackson, 2000) is self-stable, because the elite's preferences over institutions do not change over time. Equilibrium policy choices remain constant, and at the beginning of each period (before the bargaining starts) all members of the elite are identical. Hence, as long as the constraints faced by the elite remain, they have no incentive to change the institutional design determined in the first period and institutional arrangements will persist.

3 The Benchmark Model

There are two classes — workers and the elite. Workers populate the unit square in $\mathbb{R}^2$. They supply labor and consume. In period t, the elite populates the interval $[0, E_t)$ in $\mathbb{R}$. Thus, the size of the elite is measure zero with respect to the mass of the workers.[1] Each elite member owns one firm. The elite controls fiscal policy and the creation of new firms. The size of the elite, E_t, and labor productivity, A_t, defined below, constitute the state of the economy in period t.

At the beginning of each period, the elite determines: (i) the innovation rate, e_t, measured as the rate of increase in the number of operating firms, (ii) the amount of labor dedicated to public investment, G_t, (iii) the labor tax rate, τ_t, and (iv) a transfer scheme, which determines the share of tax revenues and profits from the new firms that each elite member receives. After these variables are determined, workers decide on labor supply and firms make production decisions.

First, consider the innovation rate, e_t. Establishing a firm requires a new idea that a random fraction of workers, the inventors, possess. The elite allows some of them to create new firms. These inventors pay a one-time entry fee and join the elite: each inventor acquires property rights over her firm and its profits, as well as the same rights to receive transfers as any other elite member. We assume that future profits are non-contractible and that borrowing is impossible. Hence, the entry fee paid by an inventor cannot exceed her profits in the current period. Because in equilibrium of

[1] Alternatively, we could assume that workers populate the unit interval in $\mathbb{R}$, and in each period there is a finite number of elite members. However, this would introduce a discontinuity in the elite's optimal choice with respect to the innovation rate and significantly complicate the analysis.

our model the inventor's discounted payoff as an elite member exceeds her discounted payoff as a worker even when the elite extracts all of the new firms' initial profits, the elite always sets the entry fee to its highest value. The entry fees collected from the inventors are distributed among the elite according to the specified transfer scheme.[2]

The second policy decision concerns the amount of labor dedicated to public investment, G_t. This investment leads to a change in labor productivity in the next period by a factor of $a(G_t)$. The third decision concerns the labor income tax, τ_t, which is distortionary. Tax revenues are used to finance public investment and make transfers to the elite members. The distribution of transfers between the elite does not affect market outcomes. We specify it below, when describing political institutions.

After the triplet (e_t, G_t, τ_t) is determined, the economic agents take these variables as given and choose their consumption and production plans. The wage clears the labor market. The decisions made in period t determine the state of the economy in the next period: the size of the elite, $E_{t+1} = e_t E_t$, $e_t \geq 1$, $E_0 > 0$, and the level of labor productivity, $A_{t+1} = a(G_t)A_t$, $A_0 > 0$. The elite and the workers discount future at a rate $\beta \in (0, 1)$.

We first discuss the decisions of the firms and the workers, as well as the market equilibrium, taking e_t, G_t and τ_t as given. Then, we describe the political decision-making process and solve for the political equilibrium.

3.1 The Firms

The number of firms, old and new, active in the market at time t is given by $e_t E_t$. The representative firm has diminishing returns to labor input:

$$y_t = A_t \left(x_t\right)^{\frac{1}{2}},$$

[2] An alternative formulation of the innovation process, which yields identical results in our model is as follows. The inventors retain the ownership of the newly created firms and join the elite. However, the existing elite extracts a fraction α_t of the new firms' period t profits, which is distributed among the existing elite members according to the specified transfer scheme. The share of profits retained by the inventors depends on their economic power relative to that of the existing elite. The larger is the number of the inventors, the harder it is for the elite to expropriate the new firms' profits: $\frac{1-\alpha_t}{\alpha_t} \equiv \frac{e_t E_t - E_t}{E_t}$, or $\alpha_t = \frac{1}{e_t}$. In other words, the new firms' period t profits are divided between the inventors and the elite proportionally to their respective sizes.

where x_t is the amount of labor employed. The firm's maximization problem is:

$$\pi_t = \max_{x_t} \left\{ A_t \left(x_t\right)^{\frac{1}{2}} - x_t w_t \right\},$$

where w_t is the wage. In the optimum, the amount of labor employed by the firms and their profits are inversely related to the wage:

$$x_t = \frac{A_t^2}{\left(2w_t\right)^2} \text{ and } \pi_t = \frac{1}{2} A_t \left(x_t\right)^{\frac{1}{2}}.$$

Note, that since the diminishing returns to scale in variable inputs at the firm level imply increasing returns to scale at the aggregate level, our model imbeds Romer's (1986) growth mechanism.

3.2 Workers

The representative worker has a linear-quadratic utility over consumption, C_t, and labor, l_t:

$$U_t(C_t, l_t) = C_t - \frac{\psi_t}{4} l_t^2.$$

To ensure that for a given tax rate the households' labor supply does not unboundedly grow over time with the wage, the time-dependent coefficient ψ_t is assumed to grow at the rate of $A_t E_t^{\frac{1}{2}}$.[3] The worker faces the following budget constraint:

$$C_t = (1 - \tau_t) w_t l_t,$$

where w_t is the wage and τ_t is the labor tax. The worker's maximization problem implies that her labor supply is given by

$$l_t = 2 \frac{1 - \tau_t}{\psi_t} w_t.$$

3.3 Public Investment

We assume that labor supply is voluntary, so that the workers are paid identical wages both in the public and in the private sectors. The total public expenditure is given by $G_t w_t$. The function $a(\cdot)$ is increasing and concave, and it exhibits the same returns to scale as the firms' production function: $a(G_t) = G_t^{\frac{1}{2}}$.

[3] As we show later, the economy's output per worker is proportional to $A_t E_t^{\frac{1}{2}}$. Alternatively, we could use Keeping-up-with-the-Joneses preferences: $\frac{C_t}{C_t^*} - \frac{1}{4} l_t^2$, where C_t^* represents aggregate consumption in the economy.

3.4 Market Equilibrium

It is convenient to denote by g_t the fraction of labor used to produce public investment: $g_t = G_t/l_t$. Since only the fraction $(1 - g_t)$ of the labor force is employed in the production of the consumption good, market clearing implies that

$$e_t E_t x_t = (1 - g_t)\, l_t.$$

It follows, that in equilibrium labor supply, wages and firms' profits can be written, respectively, as:

$$\begin{aligned} l_t &= (1-\tau_t)^{\frac{2}{3}} \left[\frac{e_t}{1-g_t}\right]^{\frac{1}{3}}; \\ w_t &= \frac{1}{2}\left[\frac{e_t}{(1-\tau_t)(1-g_t)}\right]^{\frac{1}{3}} A_t E_t^{\frac{1}{2}}; \\ \pi_t &= \frac{1}{2}\left[\frac{1-g_t}{e_t}\right]^{\frac{1}{3}} (1-\tau_t)^{\frac{1}{3}} A_t E_t^{-\frac{1}{2}}. \end{aligned}$$

Note, that for determining market outcomes it does not matter whether the elite chooses the triplet (e_t, G_t, τ_t) or the triplet (e_t, g_t, τ_t): for given e_t and τ_t, there exists a one to one correspondence between g_t and G_t that leads to identical market outcomes (l_t, w_t, π_t). Thus, we can assume without loss of generality that the elite chooses g_t rather than G_t. This reduces significantly the notational burden in the rest of the paper. Also, the variable g is easier to interpret, because $\frac{g}{2}$ represents public investment as a share of aggregate output.

3.5 Political Institutions

In the spirit of North, Wallis and Weingast (2006), we view the elite as consisting of I powerful subgroups of equal size.[4] We model political decisions as an outcome of a bargaining process between representatives of these sub-groups. In each period, a randomly chosen representative makes a proposal. It consists of a triplet (e_t, g_t, τ_t) and a transfer scheme, which specifies the fraction of the transfers received by each elite member (if any). In order for a proposal to be implemented, the representative must acquire the support of $qI - 1$ representatives. In other words, the parameters q determines the majority necessary to implement a policy decision.

[4] It is important for our purposes that each of the subgroups includes a "specialist in violence," which ensures that the group can issue credible threats in case its rights are violated. However, we abstract away from the question of how the political mechanism, which we introduce below is implemented, implicitly assuming that it is self-enforcing.

We call a subset of representatives of size qI whose votes are decisive for the acceptance of the proposal a minimum winning coalition and denote it by WC. The proposing representative is always a member of WC. A proposal is implemented only if all members of WC vote in its favor. Otherwise, it is rejected and the bargaining goes to the next round. The bargaining lasts for $M \geq 2$ rounds and it is costless. If at the end of round M no agreement is reached, then a randomly chosen representative makes a default proposal, which is implemented without voting. The default proposal can specify arbitrary values of e_t, g_t and τ_t, but it is constrained to offer equal transfers to all elite members.

A political equilibrium has to specify for each period t and for each round of bargaining: (1) the policies and the transfer schemes; and (2) the voting strategies of the members of WC. We consider only Markov perfect equilibria in which the equilibrium proposals are accepted in the first round of bargaining. In the Appendix, we explicitly derive the voting strategies as well as the transfer schemes proposed and implemented in equilibrium. Since we focus only on macroeconomic outcomes, in the main text we discuss only the equilibrium policy choices, (e_t, g_t, τ_t).

3.6 The Payoff Function of the Proposing Representative

For given values of e_t, g_t and τ_t, the total amount of profits extracted from the new firms is given by:

$$\text{Profits from New Firms } = (E_{t+1} - E_t)\,\pi_t, \tag{3.1}$$

and the tax revenue by:

$$\text{Tax Revenue} = (\tau_t - g_t)\,l_t w_t. \tag{3.2}$$

The proposer will distribute transfers so that the other members of WC are just indifferent between voting in favor of the proposal and receiving their outside option. She will keep the remainder. As in Battaglini and Coate (2007), this implies that the proposing representative maximizes the total surplus accruing to the members of WC, or, equivalently, the average expected payoff per each elite member represented in WC (see Appendix).

Each individual elite member receives the profit from her own firm, π_t. Since no transfers are made outside of WC, on average, each elite sub-group represented in WC receives a fraction $\frac{1}{q}$

of the new firms' profits extracted by the elite. Since the elite consists of $e_t E_t$ members, each (individual) elite member represented in WC receives, on average, $\frac{1}{qe_tE_t}$-fraction of the new firms' period t profits. Similarly, an (individual) elite member represented in WC receives a share $\frac{1}{qe_tE_t}$ of the total tax revenue given by (3.2).

Note that in period $t+1$, each representative has equal probability of being part of WC or of making a proposal, independently of her role at time t. Hence, the expected payoff functions of all elite members are identical from period $t+1$ on. Let $v_0(E_t, A_t)$ denote the value function of an elite member at the beginning of period t. Then, the average expected payoff of an elite member in WC can be written as:

$$V(e_t, g_t, \tau_t, E_t, A_t) = \underbrace{\pi_t}_{\substack{\text{individual}\\ \text{profits}}} + \underbrace{\frac{1}{q}\frac{e_tE_t - E_t}{e_tE_t}\pi_t}_{\substack{\text{profits from}\\ \text{new firms}}} + \underbrace{\frac{1}{q}\frac{(\tau_t - g_t)\, l_t w_t}{e_tE_t}}_{\text{tax revenue}} + \underbrace{\beta v_0(E_{t+1}, A_{t+1})}_{\text{continuation value}}. \tag{3.3}$$

Lemma 1 *In equilibrium, the policies of the proposing representative at time t satisfy:*

$$(e_t^*, g_t^*, \tau_t^*) = \arg\max_{e_t, g_t, \tau_t} V(e_t, g_t, \tau_t, E_t, A_t). \tag{3.4}$$

The continuation value $v_0(E_{t+1}, A_{t+1})$ is the average sum of future discounted payoffs of the elite members. Since in period $t+1$ the size of the elite will grow by e_{t+1}^*, each elite member, in expectations, will receive a share $\frac{1}{e_{t+1}^*E_{t+1}}$ of the transfers allocated in period $t+1$: with probability q she will be represented in WC, receiving an average fraction $\frac{1}{qe_{t+1}^*E_{t+1}}$ of transfers, and with probability $(1-q)$ she will not be represented in WC, receiving no transfers.

Lemma 2 $v_0(E_{t+1}, A_{t+1})$ *can be written recursively as:*

$$v_0(E_{t+1}, A_{t+1}) = \pi_{t+1} + \frac{e_{t+1}^*E_{t+1} - E_{t+1}}{e_{t+1}^*E_{t+1}}\pi_{t+1} + \frac{(\tau_{t+1}^* - g_{t+1}^*)l_{t+1}w_{t+1}}{e_{t+1}^*E_{t+1}} + \beta v_0(E_{t+2}, A_{t+2}), \tag{3.5}$$

where $\pi_{t+1}, w_{t+1},$ *and* l_{t+1} *denote quantities resulting from equilibrium policies* $\left(e_{t+1}^*, g_{t+1}^*, \tau_{t+1}^*\right)$.

Note that the problem in (3.4) does not have a standard recursive structure because the value function of the proposing representative does not coincide with the function v_0 (i.e., $V(e_t^*, g_t^*, \tau_t^*, E_t, A_t) \neq v_0(E_t, A_t)$). Indeed, contemporaneous profits from new firms and tax revenue (the second and the third term in these functions, respectively) have a higher weight for the proposing representative maximizing the welfare of the WC members than for an average elite member.

3.7 Political Equilibrium

It can be shown that all contemporaneous terms, which enter the payoff function of the proposing representative in (3.3), are proportional to $A_t E_t^{-\frac{1}{2}}$. This implies that our model admits an AK representation (Rebelo, 1991):

Lemma 3 *For any $\beta \in (0,1)$ and for any $q \in [.5, 1]$, if v_0 exists, then it is given by $v_0(E_t, A_t) = c_0 A_t E_t^{-\frac{1}{2}}$, where c_0 is a constant.*

In standard growth models, an analytical advantage of the AK structure is that the optimality conditions of the underlying maximization problems are independent of the economy's state variables. In our framework, the AK structure also plays a key role in establishing the existence and uniqueness of equilibrium.

Proposition 1 *(Existence and Uniqueness) For any value of the discount factor $\beta \in (0,1)$ and for any degree of elite's consolidation $q \in [.5, 1]$, there exists a unique Markov perfect equilibrium with the following properties:*

- *the innovation rate, e^*, public investment, g^*, and the tax rate, τ^*, which solve the maximization problem (3.4), are constant over time;*
- *the constant c_0 in the continuation value function is given by*

$$c_0 = \frac{1}{2} \frac{\left[1 + \frac{e^*-1}{e^*} + \frac{\tau^*-g^*}{1-g^*}\right] (1-\tau^*)^{\frac{1}{3}} \left[\frac{1-g^*}{e^*}\right]^{\frac{1}{3}}}{1 - \beta \left[\frac{1-\tau^*}{1-g^*} \frac{1}{e^*}\right]^{\frac{1}{3}} \left(g^* (1-g^*)^{\frac{1}{3}}\right)^{\frac{1}{2}}};$$

- *aggregate output grows at a constant rate of $y^* = e^* \left[\frac{1-\tau^*}{1-g^*} \frac{1}{e^*}\right]^{\frac{1}{3}} \left(g^* (1-g^*)^{\frac{1}{3}}\right)^{\frac{1}{2}}$.*

Thus, in equilibrium, the innovation rate and public investment are positive. Aggregate output grows at a constant rate, which depends positively on the innovation rate, and negatively on the tax rate. Since the wage and the after tax labor income are proportional to output, these variables grow at the same rate as output. Finally, the expression for y^* highlights a fundamental difference in the elites' and workers preferences over the innovation rate: the workers welfare is strictly increasing in the innovation rate.

3.8 Institutions and the Conflicts of Interests

In the context of our benchmark model, the effect of institutions on economic outcomes is fully captured by how the changes in the size of WC alter the incentives of the proposing representative, i.e., how the parameter q affects the payoff function V_t and the resulting equilibrium outcomes.

As the size of WC declines, the benefits from innovation are shared among fewer elite members, which implies that a decrease in q should lead to an increase in the innovation rate, e^*. Whereas the cost of a higher e^* – an increase in the competition for labor and a decline in the elite's political power – are borne by each elite member, the benefits accrue only to those represented in WC. This difference is captured by the factor $\frac{1}{q}$ in front of the second term in the value function of the proposing representative in (3.3). It vanishes when q becomes one. In other words, the parameter q captures the degree of conflict over the innovation rate between the elite members standing to gain from it and the elite as a whole. Similarly, the tax revenues (net of public spending) are shared between the members of WC. This means that a decrease in q should lead to a decline in the share of labor allocated to public spending, g^*, and to a lower fiscal efficiency, as measured by the fraction of tax revenues allocated to investment, g^*/τ^*. Whereas the cost of a higher tax rate (a lower labor supply) and the cost of lower public spending (a lower future labor productivity) are borne by each elite member, the benefits are distributed only to those represented in WC. That is, the parameter q captures also the degree of conflict over fiscal policy between those who control it and the rest of the elite. We remark that with a single WC, the equilibrium policy choices are coordinated: the proposing representative chooses the innovation rate and fiscal policy simultaneously.

Finally, a decrease in q also increases all future innovation rates and tax rates and reduces public investment, which, ceteris paribus, reduces the continuation value of the current WC, and, therefore, their marginal cost of rent seeking. That is, dynamic linkages amplify the effects of reducing the elite's consolidation:

Proposition 2 *For any value of the discount factor $\beta \in (0,1)$ and for any degree of elite's consolidation $q \in [.5, 1]$, the equilibrium policies (e^*, g^*, τ^*) are interior: $e^* > 1$, $0 < g^* < 1$, $0 < \tau^* < 1$, and they are differentiable w.r.t. q. Furthermore, the innovation rate, e^*, is decreasing in elite's consolidation, q, while public investment, g^*, and fiscal efficiency, g^*/τ^*, are increasing in elite's consolidation, q.*

Proposition 2 implies that growth in limited access societies with a highly consolidated elite relies mostly on public investment and not on private innovation, while in those with an unconsolidated elite it is driven by high innovation rates but not by public investment. High elite consolidation also implies less diversion of public resources for private transfers to the elite (e.g., less corruption).

4 Separation of Policy Control

In this section, we extend the benchmark BC bargaining protocol to a case in which different elite groups control different policies. This extension features a novel conflict between two powerful subsets of the elite: those in charge of innovation and those in charge of fiscal policy. While the latter stand to gain disproportionately from higher labor taxation, a higher tax reduces labor supply and, therefore, diminishes the gains from innovation for the former. Vice-versa, an increase in the innovation rate increases the elite's size, and, hence, dilutes the benefits from higher taxation.

Below we extend the model to incorporate separation of policy control and study its equilibrium properties. Since, given policy outcomes, the market outcomes remain identical to those described in Section 3, we do not repeat their description here.

4.1 Political Institutions

The interests of each sub-group are represented by an industrialist and a politician. In each period a randomly chosen industrialist, makes an E-proposal which consists of the innovation rate, e_t, and a transfer scheme, specifying the share of the revenues from innovation that each elite member receives. Similarly, a randomly chosen politician, makes a G-proposal which consists of the labor tax rate, τ_t, public spending, g_t, and a transfer scheme, specifying the share of the fiscal revenues that each elite member receives.

In order for a proposal to be implemented, the proposing industrialist must acquire the support of $q^E I - 1$ industrialists, and the proposing politician – of $q^G I - 1$ politicians. That is, the parameters q^E and q^G determine the sizes of the respective minimum winning coalitions, E-WC and G-WC. We assume that the decisions on the two policies are made simultaneously. When an industrialist makes a proposal or votes for it, she does not observe whether the politician representing her group is chosen to make a proposal or is chosen to be in G-WC, and vice versa. We also assume that the probabilities of being represented in E-WC (G-WC) and of being the proposing representative deciding on E-policy (G-policy) are the same across all groups and that they do not depend on whether the group is represented in G-WC (E-WC) or makes the proposal regarding G-policy (E-policy).

The bargaining lasts for $M \geq 2$ rounds and it is costless. If at the end of round M no agreement is reached on either of the policy issues, then a default proposal regarding that policy is made by a randomly chosen representative. The default proposals are implemented without voting. They can specify arbitrary policies, but are constrained to offer equal transfers to all elite members.

A political equilibrium has to specify for each period t and for each round of bargaining: (1) the policies and the transfer schemes announced by the proposing industrialist and the proposing politician; and (2) the voting strategies of the members of each winning coalition. In the Appendix, we explicitly derive the voting strategies and the beliefs of the members of the two winning coalitions as well as the transfer schemes proposed and implemented in equilibrium. As in Section 3, we consider only Markov perfect equilibria in which the equilibrium proposals are accepted in the first round of bargaining.

4.2 The Payoff Functions

The proposing representative in charge of each policy will distribute transfers so that the other members of her WC are just indifferent between voting in favor of the proposal and receiving their outside option. She will keep the remainder. This implies that each proposing representative maximizes the average expected payoff per elite member in her WC, taking into account that the other proposing representative does the same.

The average expected payoff of an elite member in E-WC is given by

$$\max_{e_t} V_t^E = \max_{e_t} \left\{ \underbrace{\pi_t}_{\substack{\text{individual}\\ \text{profits}}} + \underbrace{\frac{1}{q^E} \frac{e_t E_t - E_t}{e_t E_t} \pi_t}_{\substack{\text{profits from}\\ \text{new firms}}} + \underbrace{\frac{(\tau_t^* - g_t^*)\, l_t w_t}{e_t E_t}}_{\text{expected tax revenue}} + \underbrace{\beta v_0 \left(E_{t+1}, A_{t+1}\right)}_{\text{continuation value}} \right\}, \tag{4.1}$$

and in G-WC by

$$\max_{\tau_t, g_t} V_t^{\tau} = \max_{\tau_t, g_t} \left\{ \underbrace{\pi_t}_{\substack{\text{individual} \\ \text{profits}}} + \underbrace{\frac{e_t^* E_t - E_t}{e_t^* E_t} \pi_t}_{\substack{\text{expected profits} \\ \text{from new firms}}} + \underbrace{\frac{1}{q^G} \frac{(\tau_t - g_t) l_t w_t}{e_t^* E_t}}_{\text{tax revenue}} + \underbrace{\beta v_0 (E_{t+1}, A_{t+1})}_{\text{continuation value}} \right\}, \tag{4.2}$$

where v_0 denotes the value function of an elite member at the beginning of period t. Since at time t each elite member has equal probability of being represented in either of the winning coalitions in period $t+1$, each member will receive, in expectations, a share $\frac{1}{e_{t+1}^* E_{t+1}}$ of the transfers allocated in period $t+1$. Hence, the continuation value $v_0 (E_{t+1}, A_{t+1})$ is the same for all elite members:

Lemma 4 *In equilibrium, the policy choices of the proposing industrialist and the proposing politician at time t satisfy, respectively:*

$$e_t^* = \arg\max_{e_t} V_t^E (e_t, g_t^*, \tau_t^*, E_t, A_t); \text{ and} \tag{4.3}$$

$$(\tau_t^*, g_t^*) = \arg\max_{g_t, \tau_t} V_t^{\tau} (e_t^*, g_t, \tau_t, E_t, A_t). \tag{4.4}$$

Lemma 5 $v_0 (E_{t+1}, A_{t+1})$ *can be written recursively as:*

$$v_0 (E_{t+1}, A_{t+1}) = \pi_{t+1} + \frac{e_{t+1}^* E_{t+1} - E_{t+1}}{e_{t+1}^* E_{t+1}} \pi_{t+1} + \frac{\tau_{t+1}^* - g_{t+1}^*}{e_{t+1}^* E_{t+1}} l_{t+1} w_{t+1} + \beta v_0 (E_{t+2}, A_{t+2}).$$

Differently from the benchmark case, the subset of the elite benefiting from innovation, E-WC, has no control over fiscal policy: they rationally anticipate that an equilibrium policy (τ_t^*, g_t^*) will be implemented by G-WC and that only a fraction q^G of their members will be represented by that coalition. The average share of the net fiscal revenues received by the members of E-WC is equal to $1/q^G \cdot q^G / (e_t^* E_t) = 1/(e_t^* E_t)$. Since this share does not depend on q^G, the size of G-WC is irrelevant for the industrialists. In equilibrium, the parameter q^G influences the innovation rate only through changes in fiscal policy. Similarly, the politicians have no control over the innovation rate: they anticipate that an equilibrium policy e_t^* will be implemented and that, on average, they will receive a share $1/q^E \cdot q^E / (e_t^* E_t) = 1/(e_t^* E_t)$ of the revenues from innovation. In equilibrium, the size of E-WC affects fiscal policy only through the innovation rate.

4.3 Political Equilibrium

Proposition 3 *(Existence and Uniqueness) For any value of the discount factor $\beta \in (0,1)$, for any degree of economic consolidation $q^E \in [.5,1]$ and for any degree of fiscal consolidation $q^G \in [.5,1]$, there exists a unique Markov perfect equilibrium with the following properties:*

- *the innovation rate, e^*, which solves the maximization problem in (4.3), as well as public investment, g^*, and the tax rate, τ^*, which solve the maximization problem (4.4), are constant over time;*
- *the continuation value function is given by $v_0(E_t, A_t) = c_0 A_t E_t^{-\frac{1}{2}}$, where*

$$c_0 = \frac{1}{2}\frac{\left[1+\frac{e^*-1}{e^*}+\frac{\tau^*-g^*}{1-g^*}\right](1-\tau^*)^{\frac{1}{3}}\left[\frac{1-g^*}{e^*}\right]^{\frac{1}{3}}}{1-\beta\left[\frac{1-\tau^*}{1-g^*}\frac{1}{e^*}\right]^{\frac{1}{3}}\left(g^*(1-g^*)^{\frac{1}{3}}\right)^{\frac{1}{2}}},$$

- *aggregate output grows at a constant rate of $y^* = e^*\left[\frac{1-\tau^*}{1-g^*}\frac{1}{e^*}\right]^{\frac{1}{3}}\left(g^*(1-g^*)^{\frac{1}{3}}\right)^{\frac{1}{2}}$.*

4.4 Institutions and Conflicts of Interests

As in the benchmark model, the size of a winning coalition determines the degree of conflict between those in charge of the policy and the elite as a whole. However, since the innovation rate and fiscal policy are chosen independently of each other, the model with policy separation also features a conflict within the elite stemming from the differences in the objectives of the proposing industrialist and the proposing politician.

Static Case. To illustrate this conflict we first consider the case in which the discount rate is zero and, therefore, the elite is concerned only about current outcomes. In this case, there is no public investment and all fiscal revenues are expropriated by the members of G-WC. The best response functions of the proposing industrialist and of the proposing politician are, respectively:

$$\begin{aligned} e(\tau^*) &= \frac{1}{\frac{q^E}{4}\left[1+\frac{1}{q^E}+\tau^*\right]}, \text{ and} \\ \tau(e^*) &= 1-\frac{q^G}{4}\left[1+\frac{e^*-1}{e^*}+\frac{1}{q^G}\right], \end{aligned}$$

which allows us to characterize the equilibrium policies:

Proposition 4 *In the static case, the innovation rate, e^*, is decreasing in the degree of economic consolidation, q^E, and the tax rate, τ^*, is decreasing in the degree of fiscal consolidation, q^G.*

Proposition 5 *In the static case, the innovation rate, e^*, is increasing in the degree of fiscal consolidation, q^G, and the tax rate, τ^*, is increasing in the degree of economic consolidation, q^E.*

The intuition behind Proposition 4 is identical to that of Proposition 2 in Section 3: a smaller size of E-WC implies a higher marginal benefit from innovation, while a lower degree of fiscal consolidation encourages higher taxation. However, with policy separation there are important cross-effects, as stated in Proposition 5. First, consider fiscal consolidation. As the size of G-WC increases, the tax rate declines, causing labor supply to increase. A higher labor supply and a lower expected tax revenue increase the marginal benefit from innovation for the members of E-WC. Thus, a higher degree of fiscal consolidation leads to a higher innovation rate. Second, consider reducing the degree of economic consolidation, i.e., lowering q^E. Since the innovation rate increases, the politicians' marginal benefits from taxation fall. That is, economic freedom, by diluting the gains from misappropriation of the tax revenue, leads to a higher fiscal efficiency.

Importantly for the welfare analysis which we conduct in Section 6, these equilibrium cross-effects are opposite to the direct effects of the changes in the sizes of E-WC and G-WC on policy outcomes. Thus, smaller sizes of the winning coalitions per se are not unambiguously worse for the elite as a whole.

General Case. The effects of institutions in the dynamic case are qualitatively the same as in the static case, with one exception: the relation between the innovation rate and the degree of fiscal consolidation is not necessarily monotone.

Figure 1 illustrates the relation between the equilibrium tax rate and the sizes of the winning coalitions when the discount factor β is set to 0.75.[5] As in the static case, a higher degree of fiscal consolidation implies less taxation. A larger size of E-WC lowers the innovation rate and encourages higher taxation. Dynamic linkages, discussed in Section 3, reinforce these effects.

Figure 2 depicts public investment as a function of institutional design. As expected, fiscal consolidation yields higher public investment. The relation between the size of E-WC and public investment is also positive: since a lower q^E implies higher innovation rates (both in the present

[5] Note that some of the subsequent figures have different orientation to achieve the best viewing angle.

and in the future), it reduces the elite's future individual profits from firm ownership and future expected individual fiscal transfers. Both of these effects reduce the net marginal gains from public investment, leading to the positive relation between q^E and g.

Figure 3 presents the relation between the innovation rate and the sizes of the winning coalitions. As in the static case, the size of E-WC and the innovation rate are negatively related. The relation between the degree of fiscal consolidation and the innovation rate is more nuanced. As we discussed in Section 3, reducing the size of the winning coalition in charge of fiscal policy leads not only to a higher tax rate but also to lower public investment. The former effect increases the marginal cost of innovation. The latter, however, by lowering future productivity and the growth rate of the economy, reduces the marginal cost of innovation. It follows that when the conflict between the proposing politicians and industrialists is substantial (and, in particular, the size of E-WC is sufficiently small) and the discount factor β is high, the second effect may dominate, which is what we find in our analysis.

Finally, Figure 4 shows the dependence of the growth rate of the economy on the underlying institutional design. It is increasing in q^G and decreasing in q^E: a first-order effect of higher fiscal consolidation is an increase in public investment, and a first-order effect of enlarging the size of the elite in charge of new entrepreneurial activity is the decline in the innovation rate.

We note that, due to a highly non-linear nature of the equilibrium of our model, the results for this case are established numerically. We confirm that, for every value of the discount factor β on a hundred point uniform grid, the patterns illustrated in Figures 1, 2 and 4 hold qualitatively. The negative relation between the innovation rate and the size of E-WC holds also, while the non-monotone relation between the innovation rate and the size of the G-WC becomes entirely negative for low values of the discount factor, as it is in the static case.

In sum, the model predicts that an economy with a high q^E and a high q^G grows via public investment; an economy with a low q^E and low q^G – via innovation. An economy with a low q^E and high q^G enjoys both high innovation and high public investment. An economy with a high q^E and q^G has neither (high) innovation nor (high) public investment. Finally, the model also captures the effects of institutional change on economic and political outcomes: a decrease in q^E causes a rise in the innovation rate, and an increase in q^G leads to higher levels of public investment and more responsible fiscal policy, which, in turn, may result in a higher industrialization pace. We next show that these transitions are consistent with empirical evidence.

5 Model's Predictions and Empirical Facts

Our framework features six prominent cases, two in the benchmark model and four in the model of policy separation: (*A-1*) a consolidated elite with concentration of policy control; (*A-2*) an unconsolidated elite with concentration of policy control; (*B-1*) a consolidated elite with separation of policy control; (*B-2*) an unconsolidated elite with separation of policy control; (*B-3*) a fiscally consolidated elite with low degree of economic consolidation; and (*B-4*) a fiscally unconsolidated elite with high degree of economic consolidation. In each case the model generates a qualitative prediction about the sources of economic growth (see Table 1). In addition, in the case of policy separation, the model unambiguously assigns the highest growth rate to Case *B-3,* and the lowest – to Case *B-4*:

Table 1

Case	Institutions			Outcomes		
	q	q^E	q^G	e^*	g^*	y^*
A-1	high			low	high	
A-2	low			high	low	
B-1		high	high	low	high	moderate
B-2		low	low	high	low	moderate
B-3		low	high	high	high	high
B-4		high	low	low	low	low

Below, we illustrate these cases using historical examples. In each example, we highlight the elite structure, the political decision mechanism, the implemented policies, and the resulting macroeconomic outcomes. Overall, these examples offer the following broad picture. De facto and de jure institutional arrangements vary significantly in limited access societies. The elite is composed of members who may represent diverse geographic regions, different ethnic groups, and which may have different political or professional affiliation. What brings the elite together as a class is the necessity to protect the current social order both against the rest of the society and against the self-interested actions of its own members. The elite's ability to consolidate power and reign over its individual members or sub-groups shapes the evolution of the economy. This ability has seldom been absolute and has varied across countries and through time. Moreover, even within a limited access society the elite has had various degrees of control over different aspects of economic and political life, such as innovation and fiscal policy.

5.1 Mexico in the 19th and the early 20th century

Case *B-4*. In **19th century Mexico, prior to 1872,** the elite consisted primarily of large landowners, who had low fiscal consolidation. The regions enjoyed fiscal autonomy. The federal government was weak and constantly changing. Consequently, there were no investments in inter-regional infrastructure. At the same time, special permits and licences were needed in order to establish a new enterprise: "without access to those who wielded political power and influence, it was virtually impossible to conduct business of any kind," Haber (1992, pp. 6-7). The economy remained predominantly agricultural, the industrial production was rudimentary and most industries were highly monopolized.

Case *A-1*. **During 1872-1910** the power within the elite shifted towards powerful politicians and large industrialists. The decisions about the industrial and fiscal policies were concentrated in the hands of President Porfirio Diaz. His strategy consisted in cooperating with the members of the industrial elite, who enjoyed protection of their property rights and large political influence. This was achieved by appointing political figures as directors of some major companies and vice versa (Haber, Razo and Maurer, 2003, pp. 44-45, 48). At the same time, the president was careful not to create conflicts within the elite and refused to grant preferential rights to some of the elite members at the expense of the others (Haber, Razo and Maurer, 2003, p. 50). That is, the elite was highly consolidated. The period was marked by large investments in infrastructure. Although industrialization was taking place, market entry was severely restricted by the elite in several ways. First, a monopolized banking sector was providing credit exclusively to elite members. Second, the entry into the banking sector required a charter, which could only be obtained with the collective efforts of the elite members. Third, the patent law gave almost unlimited monopoly rights to the patentee. The resulting industrial development was modest, the markets were highly monopolized (Haber, 2005, pp. 8-9), and the labor productivity was lower than in England and in Germany at that time (Haber, 1992, p. 21).

Case *B-1***.** During the presidency of Obregon, **1920-1924,** the elite remained highly consolidated, but there was a separation of policy control. Obregon ruled by decree, deciding on budget and public spending without consulting the Congress (Haber, Razo and Maurer, 2003, pp. 63-64). A small number of financiers (no more than 25) controlled the access to large markets via credit rationing (Haber, 1992, p. 23). The financing of large enterprises typically required the participation of all financiers. Thus, decision making with respect to both industrial and fiscal policies was unanimous, albeit by different authorities. Similarly to the times of president Diaz, Mexico experienced modest industrial growth, high rates of public investment, market monopolization and restricted entry.

Case *B-3***. In the 1930's,** the President remained in full control of fiscal policy, and large investments into public infrastructure (e.g. transportation and irrigation) continued. Yet, because of the banking reform of 1925 (Haber, Razo and Maurer, 2003, p. 113), market entry had become free, and, consequently, the power of the industrialists diminished dramatically. Without the need of powerful political backing the number of new enterprises increased dramatically, and new industries rose in sectors which were previously controlled by importers (Haber, 1992, p. 30).

In sum, Mexico's historical experience illustrates not only the differences in institutional arrangements but also the effects of institutional change on economic outcomes. Much of the political development and institutional change which occurred in Mexico could be found also in many other Latin American countries (e.g., Brazil – see Haber, 2000, and Summerhill, 2000; Argentina – see Conde, 2009, Peralta-Ramos, 1992; Peru – see Hughes and Mijeski, 1984, p. 59, Bulmer-Thomas, 2003, p. 36).[6] As we showed earlier, similar patterns arise in our model.

Nowadays, high entry barriers remain a major obstacle to economic development, as detailed in Section 7. They are present in many societies, in which the power to promote entrepreneurship essentially rests with the bureaucratic establishment. De Soto (1989) provides a canonical example of de facto limited access to markets. In Peru in the early 1980's the elites were represented by an army of bureaucrats, whose consent was needed to establish a new firm. The large number

[6] For example, Argentina in 1880 underwent a transition from a decentralized, highly conflicted and inefficient fiscal system to a consolidated fiscal authority, Conde (2009, pp. 15-16). The increase in the degree of fiscal consolidation allowed for a social agreement on the level of taxation and spurred investment into railroads and public education. Similarly to the case of Mexico, industrialization was taking off, but the industries remained highly monopolized with big factories dominating the landscape and small businesses having no political power, Peralta-Ramos (1992, p. 21).

of required entry procedures and associated costs made entry prohibitively expensive, unless a potential entrepreneur could establish informal and costly connections with officials who had enough power to lobby for new business creation.

5.2 England during the Industrial Revolution

Case *B-2.* **England at the end of the 18th century** represents the case in which both interest groups had a low degree of consolidation. The elite consisted of old landed aristocracy and the new aristocracy comprising of big merchants and manufacturers. The Parliament decided on fiscal policy with a simple majority. While market entry was controlled by big merchants, a small manufacturer could easily access the market by establishing connections with one of the big merchants, and later could trade independently (Bowden, 1925, pp. 142-144). Guild regulations existed but were not enforced by the courts and were eventually abolished (More, 1989, p. 59). After the Glorious Revolution, the King had lost his power to grant monopolies and did not discriminate between landlords and industrialists in granting nobility titles (North and Weingast, 1989, and Bowden, 1925, p. 153). As a result, England experienced very high innovation rates. Government spending constituted a negligible fraction of national income up to the 1820s (More, 1989, p. 62), and was mostly driven by military needs and the servicing of public debt.

5.3 The Soviet Union

In the Soviet Union, the elite comprised of highly ranked party officials, most of whom de facto governed over various geographic regions, industries or large enterprises. Though all means of production were nationalized, the party officials had complete control over their use, labor compensation, resource allocation and investment. The larger the plant or the industry was, the higher was the party rank of the official controlling it. The decision authority over all issues was concentrated in formal governing bodies of the Communist Party: the Central Committees of the Republican Communist Parties, the Central Committee of the Communist Party of the Soviet Union, and, above all, the Politburo.

Case *A-1.* **During the 1920s - early 1950s,** under the iron rule of Stalin, both the Politburo and, subsequently, the Central Committee of the Communist Party acted essentially unanimously. The initial industrialization stage was marked by gigantic investments into infrastructure, electrification of the European part of the country, eradication of illiteracy, large irrigation systems and by the establishment of large public enterprises. Afterwards, the creation of new enterprises slowed dramatically. Most enterprises wielded monopoly power over the goods they produced, since competition was deemed as an unnecessary duplication of existing forms of production. Production efficiency and innovation rates were low, despite continuos attempts by the party bosses to inspire workers to create for the common good of Soviet people (e.g., Stakhanov movement). The inventors were not necessarily welcome. Though in few cases they could earn a promotion, often they were regarded by the bureaucrats in charge as a threat to their authority. Moreover, the scale of the Soviet enterprises implied a tremendous amount of inertia in the development, implementation and the use of new technologies.[7]

Case *A-2*. **After Stalin's death in 1953**, the Soviet system started to slowly unfold. First, at the higher levels of governance, individual elite members gained more power over policy decisions. Second, the enforcement mechanisms, without Stalin's terror apparatus, began to deteriorate, which lead to a dramatic increase in corruption and diversion of public resources for private consumption by the party officials and other bureaucrats. By the late 1970s - 1980s, while the shadow economy grew, the Soviet political and economic system came essentially to a halt. At the time of Gorbachev's election unanimous decision making in the Politburo was neither expected, nor feasible anymore (Bunce 1999, p. 63). Importantly, among the first changes introduced by Gorbachev in the desperate attempt to save the system was the reduction of entry barriers: citizens were allowed to operate small private enterprises.

Similar developments occurred in most socialist countries, with eventual transition to private ownership and destruction of de jure entry barriers. In the 1990s, the entry rate drastically increased, exceeding 60% in the Czech republic, Slovakia and the Russian Federation (Kontorovich, 1999), while the share of public spending in GDP declined precipitously (Barbon and Polackova, 1996).

[7]A canonical manifestation of this pattern is related to AutoVaz, though it comes from a slightly later time period. Built in the 1960s with the help of Italian FIAT to produce relatively inexpensive cars, this giant auto-maker continued to produce essentially the same car models for nearly thirty years. The technological pace of the rest of the Soviet car industry was not very different from that of AutoVaz.

6 Optimal Institutions for The Elite

Until now we treated institutions as given. In this section, we analyze why the elite may choose different institutional arrangements. Since the elite's welfare is maximized when full consensus is required to enact either policy, the first best institutional choice is $q^E = q^G = 1$. However, the optimal institutional choice is not trivial when full consolidation is not possible or when the elite must meet the demands of the working class.

Static Case. We define the ex-ante welfare of the elite, as

$$W(q^E, q^G, E_0) = \pi + \frac{e^* - 1}{e^*}\pi + \frac{\tau^* l w}{e^* E_0}.$$

Since different institutions, i.e., various combinations of q^E and q^G, imply different equilibrium policies, they yield different levels of welfare. First, suppose that the elite cannot fully consolidate control over innovation: $q^E \leq \bar{q}^E < 1$. Then the elite may choose less than full fiscal consolidation:

Proposition 6 *There exists $\bar{q}^E \in (.5, 1)$, such that for any $q^E \leq \bar{q}^E$ the welfare of the elite is maximized at an interior q^G:*

$$q^G_{optimal}(q^E) = \arg\max_{q^G} W(q^E, q^G, E_0) < 1.$$

If $q^E < 1$, then E-WC prefers a higher innovation rate than the elite as a whole. Propositions 4 and 5 show that even though a lower degree of fiscal consolidation decreases the labor supply via a higher tax rate, it also deters the proposing industrialist from choosing an excessively high innovation rate. In other words, by allowing some of its members to engage (ex-post) in an irresponsible fiscal policy, the elite curbs the benefits from creating new firms and, thus, forces the industrialists to act more in the interests of the elite as a class. This finding offers an interesting explanation to policy failures that are detrimental not only to the society as a whole, but also to the elite. The elite commits to institutions that lead to such failures in order to prevent more harmful outcomes, such as rapid entry and subsequent deterioration of its economic and political power.

It is interesting to contrast the welfare of the elite with that of the workers:

$$W_{workers}(q^E, q^G, E_0) = \left((1 - \tau^*)w\right)^2.$$

The welfare of the workers is increasing in q^G (since the workers prefer lower taxes), but it is decreasing in q^E (since the workers prefer higher innovation rates). Therefore, while the ex ante interests of the workers and the elite vis-a-vis fiscal consolidation coincide, they have opposite interests in allowing the elite to consolidate control over innovation and entry. Suppose the workers had some bargaining power. In particular, suppose that any institutional choice by the elite should deliver a guaranteed level of welfare to the workers. If this utility level is sufficiently high, then the only way for the elite to deliver it is to choose a low q^E. As we showed above, this, in turn, might force the elite to choose less than full fiscal consolidation. In sum, the elite, faced with the demands of the workers, may find interior institutional choices to be optimal.

Second, suppose that the elite is unable to keep the proposing politicians in check: $q^G \leq \bar{q}^G < 1$. That is, some misappropriation of fiscal revenues (corruption, pork spending, etc.) is inevitable. Then, the elite may allow for some economic freedom as an indirect way of lowering fiscal distortions:

Proposition 7 *There exists $\bar{q}^G \in (.5, 1)$, such that for any $q^G \leq \bar{q}^G$ the welfare of the elite is maximized at an interior q^E:*

$$q^E_{optimal}(q^G) = \arg\max_{q^E} W(q^E, q^G, E_0) < 1.$$

General Case. When the discount factor β is strictly positive, the welfare analysis is similar to the previous case, except the changes in institutional design affect the elite's welfare also via changes in public investment. Figure 5 illustrates the welfare of the elite as function of institutional design.

As in the static case, for low values of q^E the welfare of the elite is maximized at an interior q^G. The intuition behind this result is similar to that behind Proposition 4. Lowering q^G increases taxes which diminish the industrialists' gains from innovation. It also lowers public investment, which reduces future marginal cost of innovation. The former effect dominates, and, as in the static case, for sufficiently low values of q^E it is optimal for the elite to choose less than full fiscal consolidation. We also find that if the elite cannot fiscally consolidate, it may choose an interior q^E to indirectly reduce fiscal distortions via a higher innovation rate. These results are numerical. We confirm that they hold for every value of the discount factor β on a hundred point uniform grid.

Finally, the workers' welfare is increasing in q^G and decreasing in q^E, which implies that, ex ante, the workers' demands may force the elite to choose an interior q^E and, possibly, an interior q^G.

7 Robustness and Other Discussions

Parameter Values. In our model the production side of the economy is described by a single parameter, the elasticity of individual firms' output with respect to the variable labor input. The benchmark value of this parameter, 0.5, is consistent with the estimates of the returns to scale on individual plant level (e.g., Basu, 1996, Atkeson and Kehoe, 2005, Guner, Ventura and Xu 2008). More importantly, this parameter also determines the labor share of output, and its value of 0.5 is well within the range considered in the growth literature (e.g., Parente and Prescott, 2005).

Our proofs of Propositions 1- 2 and 4-7 are constructed for any value of the labor elasticity of output, which yields a labor share of output between 0.4 and 0.6. The proof of Proposition 3 can be extended analytically to the values of this parameter in the neighborhood of its benchmark value and can be constructed numerically for other values. When it is higher than its benchmark value, some of these proofs require an upper bound on the discount factor β, which is not very restrictive. For example, for the value of 0.6, the highest labor share considered by Parente and Prescott (2005), the upper bound on β is equal to 0.727.[8]

Finally, the discount factor β in our model can be interpreted as a product of the elites' discount factor and the probability that the elite retains power in the next period, as long as the elite has zero continuation value after a loss of power.

Long Run Dynamics. In our model, countries with institutions that are more favorable to growth achieve permanently superior economic outcomes. Furthermore, as in most models with the AK structure, these countries enjoy permanently higher growth rates. Thus, the model can generate "reversals of fortune": countries with good institutions, which are initially poor, eventually outgrow rich countries with inferior institutions. This property of the model offers an interesting avenue for future research: the link between initial conditions faced by colonizing powers, their institutional choice and subsequent economic and political development of these colonies. Within our current framework, the elite's optimal institutional choice can be constrained by the workers demands, and, if these demands are high, the elite may choose institutions that foster economic development. Then, the elites' ability to suppress workers demands or rely on existing oppressive mechanisms emerges as an important determinant of institutional choice by the colonizing powers,

[8] If we interpret one period in our model as 6.25 years, then this discount factor would correspond to a yearly discount factor of 5%.

which is consistent with the evidence presented in Engermann and Sokoloff (2000) and Acemoglu, Johnson and Robinson (2001, 2002).

Future Steps: Escaping Inequality. Another interesting question, which we leave for future research, is the transition from limited to open access societies. In our model, the elite is small compared to the labor force and transition from labor to the elite leaves the size of the work force unchanged. We plan to relax this assumption. We conjecture that in this case economies with good institutions will optimally choose policies that lead to outcomes that are preferred by both workers and the elite. Though the political structure of these economies would remain unchanged, the economic outcomes would converge to those chosen in countries with democratic representation, making the eventual transition from limited to open access societies costless to the elite.

Future Steps: The Model and The Data. One interpretation of the degree of economic consolidation, q^E, is that the elite exerts over innovation is the size of the entry costs and the number of bureaucratic procedures that an entrepreneur must complete to operate legally. These variables, originally constructed by Djankov, La Porta, Lopez de Silanes and Shleifer (2002) and later expanded by the World Bank (2007), are strongly negatively correlated with various measures of economic activity, just as our model predicts. Barseghyan (2008) identifies a causal effect of entry barriers on productivity and output in a large sample of countries as well as in a sub-sample of colonies, while controlling for the quality of property rights protection and a number of other relevant variables. Entry barriers are negatively correlated with the number of operating enterprises and the entry rates (Barseghyan and DiCecio, 2009). Furthermore, in countries with high entry costs the variance of the firms size distribution is higher, suggesting a larger concentration both of very big and of very small firms. Finally, Barseghyan and DiCecio (2008) show that countries with higher entry barriers experience higher macroeconomic volatility, perhaps because the firms in these countries have higher markups (i.e., higher market power) that vary considerably over the business cycle. These facts suggest that future work, which would classify countries based on their economic outcomes, policies and observable institutional characteristics (such as political participation, openness of the political process, and constraint on executive power, available from Gurr, 1990, and Jaggers and Mashall, 2000), might create a mapping between the model and the data that can be used to further study the role of various institutions in limited access societies.

8 Conclusion

In this paper, we build a dynamic political economy model with endogenous elite formation, innovation and fiscal policy to study the effect of institutions on economic and political outcomes in limited access societies. In our model, the elite controls the political process and the means of production. We focus on disagreements within the elite and analyze several conflicts of interest which affect the dynamics of these societies: those between (i) the elite and the working class; (ii) the industrialists and the elite; (iii) the politicians and the elite; and (iv) the industrialists and the politicians. We derive a mapping from institutional design to economic outcomes, which is consistent with empirical evidence documented in the paper. In particular, our model identifies the impact of institutions on the rate and sources of economic growth, thus allowing a distinction between state-led and innovation-led growth. When decisions over both industrial and fiscal policies are concentrated in the hands of a single subgroup of the elite, an increase in the degree of elite's consolidation leads to lower innovation, higher public investment and more responsible fiscal policy. When there is separation of policy control, changes in the degree of economic and fiscal consolidation have different effects on policy choices. An increase in economic consolidation implies lower innovation and higher public investment, combined with more prudent fiscal policy. In contrast, an increase in fiscal consolidation leads to higher public investment and may also lead to higher innovation. The growth rate of the economy depends positively on the degree of elite's fiscal consolidation and negatively on the degree of elite's economic consolidation. In particular, the highest growth rates are achieved by societies, whose institutions allow both for high innovation and prudent fiscal policies.

Finally, we analyze the optimal institutional design for the elite. Though the first best institutional choice for the elite is full fiscal and economic consolidation, when full consolidation vis-a-vis either policy is not achievable, the elite may choose to reduce control over the other policy. Doing so introduces a conflict of interest between two powerful subgroups, industrialists and politicians, which results in a higher welfare of the elite as a whole. This analysis may explain the variation of institutional arrangements in limited access societies and their dependence on underlying socioeconomic fundamentals.

9 Appendix

For expositional convenience, in what follows we denote the elasticity of output with respect to labor as $1/\lambda$. Our benchmark parameterization corresponds to the case of $\lambda = 2$.

Proof of Lemma 1

We denote by $\tilde{S}_t$ the sum of all distributed transfers in period t, and by $\tilde{s}_{tn}$ - the transfer to each non-proposing member of the WC. The transfer to the proposing representative is $\tilde{s}_{tp} = \tilde{S}_t - (Iq-1)\,\tilde{s}_{tn}$. Then the transfers per elite member are, respectively:

$$S_t =: \frac{\tilde{S}_t}{e_t E_t} I,\ s_{tn} =: \frac{\tilde{s}_{tn}}{e_t E_t} I,\ s^i_{tp} =: S_t - (Iq-1)\,s_{tn}.$$

We index these variables by m when we want to refer to a specific round $m \in \{1...M\}$ of the bargaining game. The transfer schemes must satisfy the following feasibility constraint:

$$S_t \leq I\frac{(e_t-1)}{e_t}\pi_t\,(e_t; g_t; \tau_t) + \frac{I}{e_t E_t}\,(\tau_t - g_t)\,w_t\,(e_t; g_t; \tau_t)\,l_t\,(e_t; g_t; \tau_t)\,.$$

In equilibrium the condition above holds with equality, because the proposing representative's utility is strictly increasing in the size of the transfer. For a given policy triplet e_t, g_t and τ_t, denote

$$S_t\,(e_t, g_t, \tau_t, E_t, A_t) =: I\frac{(e_t-1)}{e_t}\pi_t\,(e_t, g_t, \tau_t, E_t, A_t) + \frac{I}{e_t E_t}\,(\tau_t - g_t)\,w_t\,(e_t, g_t, \tau_t, E_t, A_t)\,l_t\,(e_t, g_t, \tau_t, E_t, A_t)\,.$$

The strategy of the proposing representative specifies the share of the transfers allocated to each member of the WC. We denote these shares by:

$$\left(\sigma_t =: \frac{s_{tn}}{S_t}; \sigma_{tp} =: \frac{s_{tp}}{S_t} = 1 - (Iq-1)\,\sigma_{tn}\right).$$

In what follows, we simplify exposition by omitting the dependence of the endogenous variables on the state variables E and A. If the proposal is accepted, the expected payoff of an elite member represented by a non-proposing WC member is given by:

$$V_{tn}\,(e_t, g_t, \tau_t; \sigma_t) \;=\; \pi_t\,(e_t, g_t, \tau_t) + \sigma_t S_t\,(e_t, g_t, \tau_t) + \beta v_0\,(E_{t+1}; A_{t+1})\,,$$

and by the proposing WC member - by:

$$V_{tp}\,(e_t, g_t, \tau_t; \sigma_t) \;=\; \pi_t\,(e_t, g_t, \tau_t) + S_t\,(e_t, g_t, \tau_t)\,(1 - (qI-1)\,\sigma_t) + \beta v_0\,(E_{t+1}; A_{t+1})\,.$$

We show below that in equilibrium all proposals are accepted. Hence, in round $m \in \{1...M\}$, the proposing representative solves the following problem:

$$\begin{aligned} (9.1) \qquad & \max_{\{e_{tm};g_{tm};\tau_{tm};\sigma_{tm}\}} \pi_t\left(e_{tm};g_{tm};\tau_{tm}\right) + S_{tm}\left(e_{tm};g_{tm};\tau_{tm}\right)\left(1-\left(qI-1\right)\sigma_{tm}\right) + \\ & +\beta v_0\left(E_{t+1}\left(e_{tm}\right);A_{t+1}\left(e_{tm};g_{tm};\tau_{tm}\right)\right) \end{aligned}$$

s.t.

$$\begin{aligned} (9.2) \qquad & \pi_t\left(e_{tm};g_{tm};\tau_{tm}\right) + \sigma_{tm}S_{tm}\left(e_{tm};g_{tm};\tau_{tm}\right) + \beta v_0\left(E_{t+1}\left(\cdot\right);A_{t+1}\left(\cdot\right)\right) \\ \geq \; & v_{t(m+1)}\left(E_t;A_t\right) \end{aligned}$$

$$\left(Iq-1\right)\sigma_{tm} \leq 1,\; \sigma_{tm} \geq 0,\; e_{tm} \in [1;\infty)\,,\; g_{tm} \in [0;1]\,,\; \tau_{tm} \in [0;1]\,,$$

where $v_{t(m+1)}$ denotes the continuation value of a member of the WC in case the proposal in round m is rejected, but the proposal made in the next round $(m+1)$ is accepted. The continuation value is given by:

$$v_{t(m+1)}\left(E_t;A_t\right) = \pi_t\left(\cdot\right) + \frac{S_{t(m+1)}\left(\cdot\right)}{I} + \beta v_0\left(E_{t+1};A_{t+1}\right).$$

It follows immediately from Lemma A.1 in Battaglini and Coate (2007), that in an equilibrium of the bargaining game in which all proposals are accepted, the constraint (9.2) in problem (9.1) is binding. Hence, the optimal σ_{tm} must satisfy:

$$\begin{aligned} (9.3) \qquad \sigma_{tm}S_{tm}\left(e_{tm};g_{tm};\tau_{tm}\right) &= v_{t(m+1)}\left(E_t;A_t\right) - \pi_t\left(e_{tm};g_{tm};\tau_{tm}\right) \\ &\quad -\beta v_0\left(E_{t+1}\left(e_{tm}\right);A_{t+1}\left(e_{tm};g_{tm};\tau_{tm}\right)\right) \end{aligned}$$

As in Battaglini and Coate (2007), condition (9.3) together with the definition of the continuation value v_{tm} implies that the problem of the proposing representative can be reduced to:

$$(9.4) \qquad \max_{\{e_{tm};g_{tm};\tau_{tm}\}} \pi_t\left(e_{tm};g_{tm};\tau_{tm}\right) + \frac{S_{tm}\left(e_{tm};g_{tm};\tau_{tm}\right)}{q^E I} + \beta v_0\left(E_{t+1}\left(e_{tm}\right);A_{t+1}\left(e_{tm};g_{tm};\tau_{tm}\right)\right)$$

$$\text{s.t. } S_{tm}\left(e_{tm};g_{tm};\tau_{tm}\right) \geq 0,\; e_{tm} \in [1;\infty)\,,\; g_{tm} \in [0;1]\,,\; \tau_{tm} \in [0;1]$$

completing the proof.■

Proof of Lemma 2

Note that in period $t+1$, each member of the elite faces two possibilities:

- Her representative is a member of the WC. This happens with probability q. In this case, her expected transfer is:

$$\frac{1}{q}\left[\frac{e_{t+1}-1}{e_{t+1}}\pi_{t+1}+\frac{1}{\lambda-1}\frac{\left(\tau_{t+1}-g_{t+1}\right)w_{t+1}l_{t+1}}{e_{t+1}E_{t+1}}\right]$$

- Her representative is not a member of the WC. This happens with probability $(1-q)$. In this case, her expected transfer is 0.

Since at time t, the constitution of the WC in period $t+1$ is not known, the expected transfer to each elite member is given by

$$\frac{e_{t+1}-1}{e_{t+1}}\pi_{t+1}+\frac{1}{\lambda-1}\frac{\left(\tau_{t+1}-g_{t+1}\right)w_{t+1}l_{t+1}}{e_{t+1}E_{t+1}},$$

implying that v_0 has the stated form.■

Proof of Lemma 3

Suppose that v_0 exists. Consider two values of E_1: E_1' and E_1'', and a given value of A_1. If $(e_t,g_t,\tau_t)_{t=1}^{\infty}$ and transfer schemes $(\sigma_t)_{t=1}^{\infty}$ are a solution for (E_1',A_1), then they are also a solution for (E_1'',A_1), because the multiplication of all profits, wages and transfers by $(E''/E')^{\frac{1}{\lambda}}$ leaves the problem of the proposing representative and the strategies of the WC members in all periods unchanged. In other words, $(e_t,g_t,\tau_t)_{t=1}^{\infty}$ are independent of the initial condition in E, and the transfers are proportional to $E^{-\frac{1}{\lambda}}$. Similarly, the equilibrium sequence $(e_t,g_t,\tau_t)_{t=1}^{\infty}$ is independent of the initial condition in A, while the transfers are proportional to A.■

Proof of Proposition 1

Fix an equilibrium continuation strategy, e^*,g^*,τ^* (and transfers), from period $t+1$ on and consider the period t optimization problem of the proposing representative. The continuation value satisfies: $v_0\left(E,A\right)=c_0AE^{-\frac{1}{\lambda}}$, where c_0 is given by:

$$c_0=\frac{\left[1+\frac{e^*-1}{e^*}+\frac{1}{\lambda-1}\left(1-\frac{1-\tau^*}{1-g^*}\right)\right]\left[\frac{(1-\tau^*)[1-g^*]}{e^*}\right]^{\frac{1}{2\lambda-1}}}{1-\beta\left[\frac{1-\tau^*}{1-g^*}\frac{1}{e^*}\right]^{\frac{1}{2\lambda-1}}\left(g^*\left(1-g^*\right)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}}}.$$

We consider period t and demonstrate that a unique optimal strategy of the proposing representative $e_t^*=e^*$, $g_t^*=g^*$ and $\tau_t^*=\tau^*$, exists. This optimal strategy, together with the optimal transfer scheme and the optimal voting strategies for the non-proposing WC members forms an equilibrium in the stage game given the continuation strategies. Define the voting strategy of the non-proposing representatives by $\omega_{tm}(e_{tm}; g_{tm}; \tau_{tm}; \sigma_{tm}) \in \{0; 1\}$, where 1 denotes a vote in favor of a proposal and 0 stands for a vote against a proposal.

For the equilibrium transfers determined by condition (9.3), define the voting strategies of the non-proposing representatives supporting these equilibrium proposals as follows:

$$\omega_{tm}(e_{tm}; g_{tm}; \tau_{tm}; \sigma_{tm}) = 1 \text{ iff}$$

$$\pi_t(e_{tm}; g_{tm}; \tau_{tm}) + \sigma_{tm} S_{tm}(e_{tm}; g_{tm}; \tau_{tm}) + \beta v_0(E_{t+1}(\cdot); A_{t+1}(\cdot)) \geq v_{t(m+1)}.$$

It is obvious that these voting strategies are optimal as long as in equilibrium all proposals are accepted. Conversely, condition (9.3) imposed on the optimal transfer scheme implies that with these voting strategies, all equilibrium proposals are accepted. Also, given the voting strategies, the proposal determined by (9.4) is optimal for the proposing representative. Hence, it remains to show that the problem in (9.4) has a unique solution.

Denote by $\tilde{V}(\cdot) =: \frac{(E_t)^{\frac{1}{\lambda}}}{A_t} V(\cdot)$, recall that $\lambda = 2$ and write the problem in (9.4) as:

$$\begin{aligned}\max_{e,g,\tau} \tilde{V}(e, g, \tau) &= \max_{e,g,\tau} \left[1 + \frac{1}{q}\frac{(e-1)}{e} + \frac{1}{q}\frac{1-\tau}{1-g}\right]\left[\frac{1-\tau}{e}\right]^{\frac{1}{2\lambda-1}}(1-g)^{\frac{1}{2\lambda-1}} \\ &\quad + \beta c_0 \left[\frac{1-\tau}{(1-g)e}\right]^{\frac{1}{2\lambda-1}}\left(g(1-g)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}}.\end{aligned}$$

We introduce the following change of variables: $x =: \frac{1}{e}$, $z =: \frac{1-\tau}{1-g}$ and rewrite the optimization problem as:

$$\max_{x,z,g} \tilde{V}(x, g, z) = \max_{x,z,g}\left[1 + 2\frac{1}{q} - \frac{1}{q}(x+z)\right][z \cdot x]^{\frac{1}{2\lambda-1}}(1-g)^{\frac{2}{2\lambda-1}} + \hat{\beta} c_0 [z \cdot x]^{\frac{1}{2\lambda-1}}\left(g(1-g)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}},$$

where

$$c_0 = \frac{[3 - x^* - z^*][z^* x^*]^{\frac{1}{2\lambda-1}}[1-g^*]^{\frac{2}{2\lambda-1}}}{1 - \beta [z^* x^*]^{\frac{1}{2\lambda-1}}\left(g^*(1-g^*)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}}}.$$

The first-order conditions w.r.t. x, z, and g are given by:

(9.5)

$$\begin{aligned}\frac{\partial \tilde{V}(x, g, z)}{\partial x} &= -\frac{1}{q}[x^* z^*]^{\frac{1}{2\lambda-1}}(1-g^*)^{\frac{2}{2\lambda-1}} + \frac{1}{2\lambda-1}\left[1 + 2\frac{1}{q} - \frac{1}{q}(x^* + z^*)\right]\frac{[x^* z^*]^{\frac{1}{2\lambda-1}}}{x^*}(1-g^*)^{\frac{2}{2\lambda-1}} \\ &\quad + \frac{1}{2\lambda-1}\hat{\beta} c_0 \left(g^*(1-g^*)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}}\frac{[x^* z^*]^{\frac{1}{2\lambda-1}}}{x^*} = 0.\end{aligned}$$

(9.6)

$$\frac{\partial\tilde{V}(x,g,z)}{\partial z} = -\frac{1}{q}[x^*z^*]^{\frac{1}{2\lambda-1}}(1-g^*)^{\frac{2}{2\lambda-1}} + \frac{1}{2\lambda-1}\left[1+2\frac{1}{q}-\frac{1}{q}(x^*+z^*)\right]\frac{[x^*z^*]^{\frac{1}{2\lambda-1}}}{z^*}(1-g^*)^{\frac{2}{2\lambda-1}}$$
$$+\frac{1}{2\lambda-1}\hat{\beta}c_0\left(g^*(1-g^*)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}}\frac{[x^*z^*]^{\frac{1}{2\lambda-1}}}{z^*} = 0.$$

$$\frac{\partial\tilde{V}(x,g,z)}{\partial g} = -\frac{2}{2\lambda-1}\left[1+2\frac{1}{q}-\frac{1}{q}(x^*+z^*)\right][1-g^*]^{\frac{2}{2\lambda-1}-1} \tag{9.7}$$
$$+\hat{\beta}c_0\left(\frac{1}{\lambda}(g^*)^{\frac{1}{\lambda}-1}(1-g^*)^{\frac{1}{\lambda(2\lambda-1)}} - \frac{1}{2\lambda-1}\frac{1}{\lambda}(g^*)^{\frac{1}{\lambda}}(1-g^*)^{\frac{1}{\lambda(2\lambda-1)}-1}\right) = 0$$

Rearranging (9.5) and (9.7), we obtain:

$$-\frac{2\lambda-1}{q}x^* + \left[1+2\frac{1}{q}-\frac{1}{q}(x^*+z^*)\right] + \hat{\beta}c_0\left[\frac{g^*}{1-g^*}\right]^{\frac{1}{\lambda}} = 0 \tag{9.8}$$

$$\left[1+2\frac{1}{q}-\frac{1}{q}(x^*+z^*)\right]\left[\frac{1-g^*}{g^*}\right]^{\frac{1}{\lambda}} = \hat{\beta}c_0\left(\frac{2\lambda-1}{2\lambda}\frac{1}{g^*}-1\right). \tag{9.9}$$

Combining (9.8) and (9.9) implies

$$\frac{1}{q}x^* = \frac{1}{2\lambda}\hat{\beta}c_0\frac{1}{g^*}\left[\frac{g^*}{1-g^*}\right]^{\frac{1}{\lambda}} \tag{9.10}$$

Substituting back into (9.8) we obtain

$$\left[1+2\frac{1}{q}-\frac{1}{q}(x^*+z^*)\right] = \frac{1}{q}\left(\frac{2\lambda-1}{2\lambda}-g^*\right)2\lambda x^*.$$

Redoing the same computations, but this time using (9.6) and (9.7) gives:

$$\left[1+2\frac{1}{q}-\frac{1}{q}(x^*+z^*)\right] = \frac{1}{q}\left(\frac{2\lambda-1}{2\lambda}-g^*\right)2\lambda z^*.$$

Hence, $x^* = z^*$ and

$$g^* = \frac{(2\lambda+1)x^*-(q+2)}{2\lambda}. \tag{9.11}$$

Note that $g^* \in [0;1]$ obtains whenever $x^* \in \left[\frac{q+2}{2\lambda+1};1\right]$. Using the fact that $z^* = x^*$, as well as expressions in (9.10) and (9.11) and the definition of c_0 we derive the equation which determines x^*:

$$\beta = \frac{(2\lambda)^{\frac{2}{2\lambda-1}}\left[(2\lambda+1)x^*-(2+q)\right]^{1-\frac{1}{\lambda}}}{((2\lambda+1-2q)x^*-2(1-q))(q+2-x^*)^{\frac{1}{\lambda}\frac{1}{2\lambda-1}}} \tag{9.12}$$

To prove that a solution to this equation exists, we use the intermediate value theorem. When $x^* = \frac{q+2}{2\lambda+1}$, the r.h.s. of this equation is $0 < \beta$. If $x^* = 1$, the r.h.s. becomes:

$$\frac{(2\lambda)^{\frac{2}{2\lambda-1}}\left[(2\lambda+1)-(2+q)\right]^{1-\frac{1}{\lambda}}}{\left((2\lambda+1-2q)-2\left(1-q\right)\right)(q+1)^{\frac{1}{\lambda}\frac{1}{2\lambda-1}}}. \tag{9.13}$$

Note that (9.13) is decreasing in q and is minimized at $q = 1$ at a value of 1.058. Hence, a solution exists for every $\beta \in (0;1)$.

We now show that the solution of (9.12) is unique. We define $Z(x^*, q)$, as

$$Z(x^*, q) =: \frac{\left[(2\lambda+1)\,x^* - (2+q)\right]^{1-\frac{1}{\lambda}}}{(2+q-x^*)^{\frac{1}{\lambda}\frac{1}{2\lambda-1}}\left[(2\lambda+1-2q)\,x^* - 2(1-q)\right]}$$

and show below that $\frac{d}{dx^*}Z(x^*, q)$ can change sign only once.

$$\frac{1}{Z(x^*,q)}\frac{dZ(x^*,q)}{dx^*} = \left(\left(1-\frac{1}{\lambda}\right)\frac{2\lambda+1}{(2\lambda+1)\,x^*-(2+q)} + \frac{1}{\lambda}\frac{1}{2\lambda-1}\frac{1}{2+q-x^*} - \frac{(2\lambda+1-2q)}{(2\lambda+1-2q)\,x^*-2(1-q)}\right).$$

$$sign\frac{d}{dx^*}Z(x^*,q) = sign\left(\begin{array}{c}\frac{\left(1-\frac{1}{\lambda}\right)(2\lambda+1)}{(2\lambda+1)x^*-(2+q)} + \frac{1}{\lambda}\frac{1}{2\lambda-1}\frac{1}{2+q-x^*} \\ -\frac{(2\lambda+1-2q)}{(2\lambda+1-2q)x^*-2(1-q)}\end{array}\right) =$$

$$= sign\left(\frac{\frac{2+q}{2\lambda+1}-\frac{2(1-q)}{2\lambda+1-2q}}{x^*-\frac{2(1-q)}{2\lambda+1-2q}} + \frac{2}{4\lambda^2-1}\left(\frac{x^*}{(2+q)-x^*}-2\lambda\right)\right)$$

When $x^* = \frac{2+q}{2\lambda+1}$,

$$sign\frac{d}{dx^*}Z(x^*,q) = sign\left(1+\frac{2}{4\lambda^2-1}\left(\frac{1}{2\lambda}-2\lambda\right)\right) = sign(1-\frac{1}{\lambda}) = +1.$$

Note that,

$$\frac{d}{dx^*}\left(\frac{\frac{2+q}{2\lambda+1}-\frac{2(1-q)}{2\lambda+1-2q}}{x^*-\frac{2(1-q)}{2\lambda+1-2q}} + \frac{2}{4\lambda^2-1}\left(\frac{x^*}{(2+q)-x^*}-2\lambda\right)\right) =$$

$$= \left(-\frac{\frac{2+q}{2\lambda+1}-\frac{2(1-q)}{2\lambda+1-2q}}{\left(x^*-\frac{2(1-q)}{2\lambda+1-2q}\right)^2} + \frac{2}{4\lambda^2-1}\frac{2+q}{((2+q)-x^*)^2}\right)$$

which can be zero for at most one admissible $x^* \in \left[\frac{2(1-q)}{2\lambda+1-2q};1\right]$. Thus, if $sign\frac{d}{dx^*}Z(x^*,q)$ changes, it goes from "+1" to "–1." In other words, $Z(x^*,\cdot)$ first increases and then decreases, or always increases. This, in turn implies that (9.12) has a unique solution, and at the solution, $Z(x^*;\cdot)$ is increasing in x^*. It remains to show that the triplet (x^*, z^*, g^*), which solves the system of the first-order conditions in (9.5), (9.6) and (9.7), is the global maximum. Note that for any constant c_0, the function V is continuos and bounded from above. Therefore, it has a maximum. For any values of any two of the endogenous variables, the maximum of the function V with respect to the third variable is interior. Hence, V attains its maximum in an interior and the only candidate for an interior maximum is (x^*, z^*, g^*).$\blacksquare$

Proof of Proposition 2:

The optimal equilibrium value of g^* is given by (9.11), see the proof of Proposition 1. Hence,

$$\frac{dg^*}{dq} = \frac{1}{2\lambda}\left(-\frac{1}{x^*} + \frac{q+2}{(x^*)^2}\frac{dx^*}{dq}\right)$$

and the condition $\frac{dg^*}{dq} > 0$ is equivalent to

$$\frac{q+2}{x^*}\frac{dx^*}{dq} - 1 > 0.$$

Recall that

$$\frac{1}{Z(x^*, q)}\frac{d}{dx^*}Z(x^*, q) = \left(1 - \frac{1}{\lambda}\right)\frac{2\lambda+1}{(2\lambda+1)\,x^* - (2+q)} + \frac{1}{\lambda}\frac{1}{2\lambda-1}\frac{1}{2+q-x^*} - \frac{(2\lambda+1-2q)}{(2\lambda+1-2q)\,x^* - 2(1-q)}$$

and $\frac{d}{dx^*}Z(x^*, q) > 0$ at the optimal value of x^* and that

$$\frac{1}{Z(x^*, q)}\frac{d}{dq}Z(x^*, q) = -\left(1 - \frac{1}{\lambda}\right)\frac{1}{(2\lambda+1)\,x^* - (2+q)} - \frac{1}{\lambda}\frac{1}{2\lambda-1}\frac{1}{2+q-x^*} - \frac{2-2x^*}{(2\lambda+1-2q)\,x^* - 2(1-q)}.$$

Hence,

$$\frac{dg^*}{dq} = \frac{2+q}{x^*}\frac{dx^*}{dq} - 1 =$$

$$\frac{2+q}{x^*}\frac{\left(1-\frac{1}{\lambda}\right)\frac{1}{(2\lambda+1)x^*-(2+q)} + \frac{1}{\lambda}\frac{1}{2\lambda-1}\frac{1}{2+q-x^*} + \frac{2-2x^*}{(2\lambda+1-2q)x^*-2(1-q)}}{\left(1-\frac{1}{\lambda}\right)\frac{2\lambda+1}{(2\lambda+1)x^*-(2+q)} + \frac{1}{\lambda}\frac{1}{2\lambda-1}\frac{1}{2+q-x^*} - \frac{(2\lambda+1-2q)}{(2\lambda+1-2q)x^*-2(1-q)}} - 1$$

and we obtain:

$$\frac{x^*}{Z(x^*, q)}\frac{d}{dx^*}Z(x^*, q)\frac{dg^*}{dq} =$$

$$= \frac{2}{2\lambda-1} + \frac{1}{(2\lambda+1-2q)\,x^* - 2(1-q)}\left[(2\lambda+1-2q)\,x^* + (2+q)\,(2-2x^*)\right]$$

The expression in the brackets above is decreasing in x^* for all values of q and λ. For $\lambda = 2$ the expression above is decreasing in q, implying that it obtains a minimal value at $x^* = 1$, $q = 1$:

$$\frac{x^*}{Z(x^*,q)} \frac{d}{dx} Z(x,q) \frac{dg^*}{dq} |_{x=1,q=1} = \frac{2}{2\lambda - 1} > 0.$$

Hence, at the optimum,

$$\frac{dg^*}{dq} = \frac{2+q}{x^*} \frac{dx^*}{dq} - 1 > 0 \text{ and, therefore, } \frac{dx^*}{dq} > 0. \blacksquare$$

Proof of Lemma 4

We use the notation from the proof of Proposition 1, but use an index $i \in \{E, G\}$ to distinguish between the two winning coalitions. The transfer schemes must satisfy the following feasibility constraints:

$$\begin{aligned} S_t^E &\leq I \frac{(e_t - 1)}{e_t} \pi_t (e_t; g_t; \tau_t) \\ S_t^G &\leq \frac{I}{e_t E_t} (\tau_t - g_t) w_t (e_t; g_t; \tau_t) l_t (e_t; g_t; \tau_t) \end{aligned}$$

In equilibrium, the conditions above hold with equality, because the proposing representatives' utilities are strictly increasing in the size of the transfer. For a given policy triple e_t, g_t and τ_t, we denote:

$$\begin{aligned} S_t^E (e_t; g_t; \tau_t) &=: I \frac{(e_t - 1)}{e_t} \pi_t (e_t; g_t; \tau_t) \\ S_t^G (e_t; g_t; \tau_t) &=: \frac{I}{e_t E_t} (\tau_t - g_t) w_t (e_t; g_t; \tau_t) l_t (e_t; g_t; \tau_t) \end{aligned}$$

Since the total amount of transfers depends on the proposals made in both WC, the strategy of the proposing representatives can only specify the *shares* of the total transfers allocated to each member of i-WC. We denote these shares by:

$$\left(\sigma_t^i =: \frac{s_{tn}^i}{S_t^i}; \sigma_{tp}^i =: \frac{s_{tp}^i}{S_t^i} = 1 - \left(I q^i - 1 \right) \sigma_{tn}^i \right).$$

If both proposals are accepted, the expected payoff of an elite member represented in by non-proposing i-WC member is given by

$$\begin{aligned} V_{tn}^i \left(e_t, g_t, \tau_t; \sigma_t^E; \sigma_t^G \right) &= \pi_t (e_t, g_t, \tau_t) + \sigma_t^i S_t^i (e_t, g_t, \tau_t) + \frac{S_t^j}{I} (e_t, g_t, \tau_t) + \beta v_0 (E_{t+1}; A_{t+1}), \\ &\quad \text{and by the proposing } i\text{-}WC \text{ member - by:} \\ V_{tp}^i \left(e_t, g_t, \tau_t; \sigma_t^E; \sigma_t^G \right) &= \pi_t (e_t, g_t, \tau_t) + S_t^i (e_t, g_t, \tau_t) \left(1 - \left(q^i I - 1 \right) \sigma_t^i \right) + \frac{S_t^j (e_t, g_t, \tau_t)}{I} \\ &\quad + \beta v_0 (E_{t+1}; A_{t+1}) \end{aligned}$$

We show below that in equilibrium, all proposals are accepted. Hence, in round $m \in \{1...M\}$, the proposing industrialist takes the equilibrium proposal of the proposing politician $(g_t^*; \tau_t^*)$ as given and solves the following problem:

$$\begin{aligned} (9.14) \qquad & \max_{\left\{e_{tm};\sigma_{tm}^E\right\}} \pi_t\left(e_{tm}; g_t^*; \tau_t^*\right) + S_{tm}^E\left(e_{tm}; g_t^*; \tau_t^*\right)\left(1 - \left(q^E I - 1\right)\sigma_{tm}^E\right) + \frac{S_{tm}^G\left(e_{tm}; g_t^*; \tau_t^*\right)}{I} \\ & +\beta v_0\left(E_{t+1}\left(e_{tm}\right); A_{t+1}\left(e_{tm}; g_t^*; \tau_t^*\right)\right) \end{aligned}$$

s.t.

$$\begin{aligned} (9.15) \qquad & \pi_t\left(e_{tm}; g_t^*; \tau_t^*\right) + \sigma_{tm}^E S_{tm}^E\left(e_{tm}; g_t^*; \tau_t^*\right) + \frac{S_{tm}^G\left(e_{tm}; g_t^*; \tau_t^*\right)}{I} + \beta v_0\left(E_{t+1}\left(\cdot\right); A_{t+1}\left(\cdot\right)\right) \\ \geq \; & v_{t(m+1)}^E\left(E_t; A_t\right) \end{aligned}$$

$$\left(Iq^E - 1\right)\sigma_{tm}^E \leq 1,\ \sigma_{tm}^E \geq 0,\ e_{tm} \in [1; \infty)\,,$$

where $v_{t(m+1)}^E$ denotes the continuation value of a member of E-WC in case the proposal in round m is rejected, but the proposal made in the next round $(m+1)$ is accepted. Similarly, the proposing politician solves:

$$\begin{aligned} (9.16) \qquad & \max_{\left\{g_{tm};\tau_{tm};\sigma_{tm}^G\right\}} \pi_t\left(e_t^*; g_{tm}; \tau_{tm}\right) + S_{tm}^G\left(e_t^*; g_{tm}; \tau_{tm}\right)\left(1 - \left(q^G I - 1\right)\sigma_{tm}^G\right) \\ & + \frac{S_{tm}^E\left(e_t^*; g_{tm}; \tau_{tm}\right)}{I} + \beta v_0\left(E_{t+1}\left(e_t^*\right); A_{t+1}\left(e_t^*; g_{tm}; \tau_{tm}\right)\right) \end{aligned}$$

s.t.

$$\begin{aligned} (9.17) \qquad & \pi_t\left(e_t^*; g_{tm}; \tau_{tm}\right) + \sigma_{tm}^G S_{tm}^G\left(e_t^*; g_{tm}; \tau_{tm}\right) + \frac{S_{tm}^E\left(e_t^*; g_{tm}; \tau_{tm}\right)}{I} + \beta v_0\left(E_{t+1}\left(\cdot\right); A_{t+1}\left(\cdot\right)\right) \\ \geq \; & v_{t(m+1)}^G\left(E_t; A_t\right) \end{aligned}$$

$$\left(q^G I - 1\right)\sigma_{tm}^G \leq 1,\ \sigma_{tm}^G \geq 0,\ \tau_{tm} \geq g_{tm},\ \tau_{tm} \in [0; 1]\,,\ g_{tm} \in [0; 1]\,.$$

The continuation value is given by:

$$v_{t(m+1)}^i\left(E_t; A_t\right) = \pi_t\left(\cdot\right) + \frac{S_{t(m+1)}^G\left(\cdot\right)}{I} + \frac{S_{t(m+1)}^E\left(\cdot\right)}{I} + \beta v_0\left(E_{t+1}; A_{t+1}\right)$$

for $i \in \{E; G\}$. It follows from Lemma A.1 in Battaglini and Coate (2007), that in an equilibrium of the bargaining game, in which all proposals are accepted, the constraints (9.15) and (9.17) in problems (9.14) and (9.16) are binding. Hence, the optimal σ^E_{tm} and σ^G_{tm} must satisfy:

$$\begin{aligned}
\sigma^E_{tm} S^E_{tm}\left(e_{tm};g^*_t;\tau^*_t\right) &= v^E_{t(m+1)}\left(E_t;A_t\right) - \pi_t\left(e_{tm};g^*_t;\tau^*_t\right) - \frac{S^G_{tm}\left(e_{tm};g^*_t;\tau^*_t\right)}{I} \\
&\quad -\beta v_0\left(E_{t+1}\left(e_{tm}\right);A_{t+1}\left(e_{tm};g^*_t;\tau^*_t\right)\right) \\
\sigma^G_{tm} S^G_{tm}\left(e^*_t;g_{tm};\tau_{tm}\right) &= v^G_{t(m+1)}\left(E_t;A_t\right) - \pi_t\left(e^*_t;g_{tm};\tau_{tm}\right) - \frac{S^E_t\left(e^*_t;g_{tm};\tau_{tm}\right)}{I} \\
&\quad -\beta v_0\left(E_{t+1}\left(e^*_t\right);A_{t+1}\left(e^*_t;g_{tm};\tau_t\right)\right)
\end{aligned} \tag{9.18}$$

As in Battaglini and Coate (2007), condition (9.18) together with the definition of the continuation value v^i_{tm} for $i \in \{E;G\}$ implies that the problems of the proposing industrialist and of the proposing politician can be reduced to:

$$\begin{aligned}
&\max_{\{e_{tm}\}} \pi_t\left(e_{tm};g^*_t;\tau^*_t\right) + \frac{S^E_{tm}\left(e_{tm};g^*_t;\tau^*_t\right)}{q^E I} + \frac{S^G_{tm}\left(e_{tm};g^*_t;\tau^*_t\right)}{I} \\
&+\beta v_0\left(E_{t+1}\left(e_{tm}\right);A_{t+1}\left(e_{tm};g^*_t;\tau^*_t\right)\right) \\
&\qquad \text{s.t. } S^E_{tm}\left(e_{tm};g^*_t;\tau^*_t\right) \geq 0,\ e_m \in [1;\infty)\,.
\end{aligned} \tag{9.19}$$

$$\begin{aligned}
&\max_{\{g_{tm};\tau_{tm}\}} \pi_t\left(e^*_t;g_{tm};\tau_{tm}\right) + \frac{S^G_{tm}\left(e^*_t;g_{tm};\tau_{tm}\right)}{q^G I} + \frac{S^E_{tm}\left(e^*_t;g_{tm};\tau_{tm}\right)}{I} \\
&+\beta v_0\left(E_{t+1}\left(e^*_t\right);A_{t+1}\left(e^*_t;g_{tm};\tau_{tm}\right)\right) \\
&\qquad \text{s.t. } S^G_{tm}\left(e^*_t;g_{tm};\tau_{tm}\right) \geq 0,\ g_{tm} \in [0;1]\,,\ \tau_{tm} \in [0;1]\,,
\end{aligned}$$

completing the proof.■

Proof of Lemma 5

Note that in period $t+1$, each member of the elite faces the following possibilities:

- Her representative industrialist is a member of E-WC, but her representative politician is not a member of G-WC. This happens with probability $q^E\left(1-q^G\right)$. In this case, her expected transfer is:

$$\frac{1}{q^E}\frac{e_{t+1}-1}{e_{t+1}}\pi_{t+1}$$

- Her representative politician is a member of G-WC, but her representative industrialist is not a member of E-WC. This happens with probability $q^G\left(1-q^E\right)$. In this case, her expected transfer is:

$$\frac{1}{\lambda-1}\frac{1}{q^G}\cdot\frac{\left(\tau_{t+1}-g_{t+1}\right)w_{t+1}l_{t+1}}{e_{t+1}E_{t+1}}$$

- Both of her representatives are members of the respective winning coalitions. This happens with probability $q^E q^G$. In this case, her expected transfer is:

$$\frac{1}{q^E}\frac{e_{t+1}-1}{e_{t+1}}\pi_{t+1}+\frac{1}{\lambda-1}\frac{1}{q^G}\cdot\frac{(\tau_{t+1}-g_{t+1})\,w_{t+1}l_{t+1}}{e_{t+1}E_{t+1}}$$

- Neither of her representatives is a member of the winning coalitions. This happens with probability $\left(1-q^E\right)\left(1-q^G\right)$. In this case, her expected transfer is 0.

Since at time t, the constitution of the WC's in period $t+1$ is not known, the expected transfer to each elite member is given by

$$\begin{aligned}
& q^E\left(1-q^G\right)\frac{1}{q^E}\frac{e_{t+1}-1}{e_{t+1}}\pi_{t+1}+q^G\left(1-q^E\right)\frac{1}{\lambda-1}\frac{1}{q^G}\cdot\frac{(\tau_{t+1}-g_{t+1})\,w_{t+1}l_{t+1}}{e_{t+1}E_{t+1}} \\
& +q^E q^G\left[\frac{(e_{t+1}-1)}{e_{t+1}q^E}\pi_{t+1}+\frac{1}{\lambda-1}\frac{1}{q^G}\cdot\frac{(\tau_{t+1}-g_{t+1})\,w_{t+1}l_{t+1}}{e_{t+1}E_{t+1}}\right] \\
= \quad & \frac{e_{t+1}-1}{e_{t+1}}\pi_{t+1}+\frac{1}{\lambda-1}\cdot\frac{(\tau_{t+1}-g_{t+1})\,w_{t+1}l_{t+1}}{e_{t+1}E_{t+1}}
\end{aligned}$$

implying that v_0 has the stated form.■

Proof of Proposition 3

We first note that Lemma 3 extends also to the case of policy separation.

Fix an equilibrium continuation strategies, e^* and g^*,τ^* (and the transfers), from period $t+1$ on and consider the period t optimization problem of the proposing industrialist and the proposing politician. Given the continuation strategies, the optimal strategies, together with the optimal transfer schemes, the beliefs supporting these strategies and the optimal voting strategies for the non-proposing WC members form an equilibrium in the stage game. Define the voting strategy of the non-proposing representatives by $\omega^E_{tm}\left(e_{tm};\sigma^E_{tm}\right)\in\{0;1\}$ and $\omega^G_{tm}\left(g_{tm};\tau_{tm};\sigma^G_{tm}\right)\in\{0;1\}$, where 1 denotes a vote in favor of a proposal and 0 stands for a vote against a proposal. We denote the beliefs of the members of each of the winning coalitions i-WC about the identities of the members of j-WC and the proposals made there as $\mu^E_{tm}\left(\cdot\mid e_{tm};\sigma^E_{tm}\right)$ and $\mu^G_{tm}\left(\cdot\mid g_{tm};\tau_{tm};\sigma^G_{tm}\right)$.

First, consider the beliefs of the members of the winning coalitions. Note that the proposal made in j-WC does not give its members any additional information about the identities of the members of i-WC, or of the proposal made in i-WC Hence, the equilibrium beliefs of each member of j-WC assign a probability of 1 to the equilibrium proposal being made and accepted in i-WC, $i\neq j$. The representatives' beliefs about the identities of the members of i-WC have to be consistent with the way in which the two WC's are drawn. Let n be any member of a winning coalition i-WC in period m and let p_m^E and p_m^G stand for the identities of the proposing industrialist and the proposing politician in round m. Then, for each $m \in \{1...M\}$,

$$\mu_{tm}^{*E}\left(n \in G\text{-}WC_m,\, n \neq p_m^G;\ \left(g_t^*;\tau_t^*;\sigma_t^{*G}\right) \mid \left(e_{tm};\sigma_{tm}^E\right), n \in E\text{-}WC_m\right) = \frac{Iq^G-1}{I}$$

$$\mu_{tm}^{*E}\left(n \in G\text{-}WC_m,\, n = p_m^G;\ \left(g_t^*;\tau_t^*;\sigma_t^{*G}\right) \mid \left(e_{tm};\sigma_{tm}^E\right), n \in E\text{-}WC_m\right) = \frac{1}{I}$$

$$\mu_{tm}^{*E}\left(n \notin G\text{-}WC_m;\ \left(g_t^*;\tau_t^*;\sigma_t^{*G}\right) \mid \left(e_{tm};\sigma_{tm}^E\right), n \in E\text{-}WC_m\right) = 1-q^G$$

$$\mu_{tm}^{*G}\left(n \in E\text{-}WC_m,\, n \neq p_m^E;\ \left(e_t^*;\sigma_t^{*E}\right) \mid \left(g_{tm};\tau_{tm};\sigma_{tm}^G\right), n \in G\text{-}WC_m\right) = \frac{Iq^E-1}{I}$$

$$\mu_{tm}^{*G}\left(n \in E\text{-}WC_m,\, n = p_m^E;\ \left(e_t^*;\sigma_t^{*E}\right) \mid \left(g_{tm};\tau_{tm};\sigma_{tm}^G\right), n \in G\text{-}WC_m\right) = \frac{1}{I}$$

$$\mu_{tm}^{*G}\left(n \notin E\text{-}WC_m,\ \left(e_t^*;\sigma_t^{*E}\right) \mid \left(g_{tm};\tau_{tm};\sigma_{tm}^G\right), n \in G\text{-}WC_m\right) = 1-q^E$$

Given these beliefs, the voting strategies of the members of the winning coalitions are given by:

$$\omega_{tm}^E\left(e_{tm};\sigma_{tm}^E\right) = 1 \text{ iff}$$

$$\pi_t\left(e_{tm};g_t^*;\tau_t^*\right) + \sigma_{tm}^E S_{tm}^E\left(e_{tm};g_t^*;\tau_t^*\right) + \frac{S_{tm}^G\left(e_{tm};g_t^*;\tau_t^*\right)}{I} + \beta v_0\left(E_{t+1}(\cdot);A_{t+1}(\cdot)\right) \geq v_{t(m+1)}^E$$

and

$$\omega_{tm}^G\left(g_t;\tau_t;\sigma_{tm}^G\right) = 1 \text{ iff}$$

$$\pi_t\left(e_t^*;g_{tm};\tau_{tm}\right) + \sigma_{tm}^G S_{tm}^G\left(e_t^*;g_{tm};\tau_{tm}\right) + \frac{S_{tm}^E\left(e_t^*;g_{tm};\tau_{tm}\right)}{I} + \beta v_0\left(E_{t+1}(\cdot);A_{t+1}(\cdot)\right) \geq v_{t(m+1)}^G.$$

It is obvious that these voting strategies are optimal as long as in equilibrium all proposals are accepted. Conversely, condition (9.18) imposed on the optimal transfer schemes implies that with these voting strategies, all equilibrium proposals are accepted. Also, given the voting strategies, the proposals determined by (9.19) are optimal for the proposing representative. Hence, it remains to show that the problems in (9.19) have a unique solution which is independent of t and the state variables E and A.

Denote by $\tilde{V}_E(\cdot) =: \frac{(E_t)^{\frac{1}{\lambda}}}{A_t} V_E(\cdot)$ and $\tilde{V}_G(\cdot) =: \frac{(E_t)^{\frac{1}{\lambda}}}{A_t} V_G(\cdot)$. Using the definitions of $x = \frac{1}{e}$ and $z = \frac{1}{\lambda-1}\frac{1-\tau}{1-g}$ and noting that $\lambda = 2$, we can write down the optimization problems of the proposing industrialist and the proposing politician as:

$$\max_x \tilde{V}_E\left(x,g^*,z^*\right) = \max_x \left[1+\frac{1}{q^E}(1-x)+(1-z^*)\right]\left[z^*x\right]^{\frac{1}{2\lambda-1}}\left[1-g^*\right]^{\frac{2}{2\lambda-1}} + \beta c_0\left[z^*x\right]^{\frac{1}{2\lambda-1}}\left(g^*\left(1-g^*\right)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}},$$

$$\max_{g,z} \tilde{V}_G\left(x^*, g, z\right) = \max_{g,z} \left[1 + (1 - x^*) + \frac{1}{q^G}(1 - z)\right] [zx^*]^{\frac{1}{2\lambda-1}} [1 - g]^{\frac{2}{2\lambda-1}} + \beta c_0 [zx^*]^{\frac{1}{2\lambda-1}} \left(g (1 - g)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}},$$

where

$$c_0 = \frac{[3 - x^* - z^*] [z^* x^*]^{\frac{1}{2\lambda-1}} [1 - g^*]^{\frac{2}{2\lambda-1}}}{1 - \beta [z^* x^*]^{\frac{1}{2\lambda-1}} \left(g^* (1 - g^*)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}}}.$$

The first-order conditions of these problems are given by:

(9.20)

$$\frac{\partial \tilde{V}_E\left(x; g; z\right)}{\partial x} = -\frac{1}{q^E} [z^* x]^{\frac{1}{2\lambda-1}} [1 - g^*]^{\frac{2}{2\lambda-1}} + \frac{1}{2\lambda - 1}\left[1 + \frac{1}{q^E}(1 - x) + \frac{1}{\lambda - 1}(1 - z^*)\right] \frac{[z^* x]^{\frac{1}{2\lambda-1}}}{x} (1 - g^*)^{\frac{2}{2\lambda-1}}$$
$$+ \frac{1}{2\lambda - 1} \beta c_0 \left(g^* (1 - g^*)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}} \frac{[z^* x]^{\frac{1}{2\lambda-1}}}{x} = 0,$$

(9.21)

$$\frac{\partial \tilde{V}_G\left(x; g; z\right)}{\partial z} = -\frac{1}{q^G} [zx^*]^{\frac{1}{2\lambda-1}} [1 - g]^{\frac{2}{2\lambda-1}} + \frac{1}{2\lambda - 1}\left[1 + (1 - x^*) + \frac{1}{\lambda - 1}\frac{1}{q^G}(1 - z)\right] \frac{[zx^*]^{\frac{1}{2\lambda-1}}}{z} (1 - g)^{\frac{2}{2\lambda-1}}$$
$$+ \frac{1}{2\lambda - 1} \beta c_0 \left(g (1 - g)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}} \frac{[zx^*]^{\frac{1}{2\lambda-1}}}{z} = 0,$$

.

$$\frac{\partial \tilde{V}_G\left(x; g; z\right)}{\partial g} = -\frac{2}{2\lambda - 1}\left[1 + (1 - x^*) + \frac{1}{\lambda - 1}\frac{1}{q^G}(1 - z)\right] [1 - g]^{\frac{2}{2\lambda-1} - 1}$$
$$+ \beta c_0 \left(\frac{1}{\lambda} (g)^{\frac{1}{\lambda} - 1} (1 - g)^{\frac{1}{\lambda(2\lambda-1)}} - \frac{1}{2\lambda - 1}\frac{1}{\lambda} (g)^{\frac{1}{\lambda}} (1 - g)^{\frac{1}{\lambda(2\lambda-1)} - 1}\right) = 0. \tag{9.22}$$

Combining (9.20) and (9.21), we obtain:

$$x^* = \frac{z^* q^E \left(2\lambda - q^G\right) + q^G - q^E}{q^G \left(2\lambda - q^E\right)}. \tag{9.23}$$

The constraint that $x^* \in (0; 1]$ implies that $z^* \in \left(\frac{q^E - q^G}{q^E (2\lambda - q^G)}; \frac{q^G (2\lambda - q^E) - q^G + q^E}{q^E (2\lambda - q^G)}\right]$. Note that if $q^E \leq q^G$, neither the upper, nor the lower limit binds. If, however $q^G < q^E$, both are relevant. Combining (9.21) and (9.22), we obtain:

$$z^* \frac{2\lambda}{q^G} g^* = \beta c_0 \left(g^*\right)^{\frac{1}{\lambda}} \left(1 - g^*\right)^{-\frac{1}{\lambda}}. \tag{9.24}$$

Note further that (9.22) implies:

$$\beta c_0 \left(g^*\right)^{\frac{1}{\lambda}} \left(1 - g^*\right)^{-\frac{1}{\lambda}} = \frac{2\lambda - 1}{q^G} z^* - \left[1 + (1 - x^*) + \frac{1}{q^G}(1 - z^*)\right],$$

and substituting into (9.24) gives:

$$z^*\frac{2\lambda}{q^G}g^* = \frac{2\lambda-1}{q^G}z^* - \left[2+\frac{1}{q^G}-x^*-\frac{1}{q^G}z^*\right].$$

Substituting for the value of x^* in (9.23) and rearranging terms, we obtain:

$$g^* = \frac{1}{2\lambda}\left[2\lambda+\frac{q^E\left(2\lambda-q^G\right)}{\left(2\lambda-q^E\right)}-\left[2q^G+\frac{2\lambda-q^G}{2\lambda-q^E}\right]\frac{1}{z^*}\right]. \tag{9.25}$$

The constraint $g^* \in [0;1]$ implies that $z^* \geq \frac{\left[2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right]}{2\lambda(2\lambda-q^E)+q^E(2\lambda-q^G)}$, which is equivalent to $g^* \geq 0$, while the upper constraint, $g^* \leq 1$, is always satisfied. Note that the condition

$$\frac{\left[2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right]}{2\lambda\left(2\lambda-q^E\right)+q^E\left(2\lambda-q^G\right)} \geq \frac{q^E-q^G}{q^E\left(2\lambda-q^G\right)}$$

is always satisfied. Hence, as long as $g \geq 0$, so is x. We conclude that the constraints on the equilibrium value of z^* are given by $z^* \in \left[\frac{\left[2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right]}{2\lambda(2\lambda-q^E)+q^E(2\lambda-q^G)};\frac{q^G\left(2\lambda-q^E\right)-q^G+q^E}{q^E(2\lambda-q^G)}\right]$ if $q^E \leq q^G$, and by $z^* \in \left[\frac{\left[2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right]}{2\lambda(2\lambda-q^E)+q^E(2\lambda-q^G)};1\right]$ if $q^E \geq q^G$. Denote by

$$\hat{g} =: z^*g^* = \frac{1}{2\lambda}\left[2\lambda z^*+\frac{q^E\left(2\lambda-q^G\right)}{\left(2\lambda-q^E\right)}z^*-\left[2q^G+\frac{2\lambda-q^G}{2\lambda-q^E}\right]\right]. \tag{9.26}$$

Combining these with (9.24) and substituting for c_0 we have

$$z^* = \frac{q^G}{2\lambda}\beta\left(g^*\right)^{\frac{1}{\lambda}}\left(1-g^*\right)^{-\frac{1}{\lambda}}\frac{1}{g}\frac{\left[3-x^*-z^*\right]\left[z^*x^*\right]^{\frac{1}{2\lambda-1}}\left[1-g^*\right]^{\frac{2}{2\lambda-1}}}{1-\beta\left[z^*x\right]^{\frac{1}{2\lambda-1}}\left(g^*\left(1-g^*\right)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}}},$$

which, after rearranging terms, implies that

$$\hat{g} = \frac{q^G}{2\lambda}\beta\left(\hat{g}\right)^{\frac{1}{\lambda}}\frac{\left[3-x^*-z^*\right]\left[x^*\right]^{\frac{1}{2\lambda-1}}\left(z^*\right)^{-\frac{1}{2\lambda-1}}\left[z^*-\hat{g}\right]^{\frac{1}{(2\lambda-1)\lambda}}}{1-\beta\left[x^*\right]^{\frac{1}{2\lambda-1}}\left(z^*\right)^{-\frac{1}{2\lambda-1}}\left(\hat{g}\left(z^*-\hat{g}\right)^{\frac{1}{2\lambda-1}}\right)^{\frac{1}{\lambda}}}.$$

Substituting for the values of x^* and $\hat{g}$ in (9.23) and (9.26), we obtain that the equilibrium value of z^* is the solution of the equation:

(9.27)

$$\beta = \frac{(2\lambda)^{\frac{2}{2\lambda-1}}\left[\left(4\lambda^2-q^Eq^G\right)z^*-\left(2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right)\right]^{1-\frac{1}{\lambda}}\left(z^*\right)^{\frac{1}{2\lambda-1}}}{\left[q^G-q^Gz^*+2\lambda z^*-1\right]\left[\frac{z^*q^E(2\lambda-q^G)+q^G-q^E}{q^G}\right]^{\frac{1}{2\lambda-1}}\left[-q^E\left(2\lambda-q^G\right)z^*+2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right]^{\frac{1}{(2\lambda-1)\lambda}}}.$$

We now prove that a solution of this equation exists. Since the function on the r.h.s. of (9.27) is continuous, we can use the intermediate value theorem. The lower bound on z^* is $\frac{\left[2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right]}{2\lambda(2\lambda-q^E)+q^E(2\lambda-q^G)}$ and at that value of z^*, $g^*=0$. Hence, the r.h.s. of (9.27) is 0, which is smaller than β.

The upper bound on z^* depends on whether $q^E \lesseqgtr q^G$. If $q^E \leq q^G$, then the highest attainable value of z is 1. For this case, the r.h.s. of (9.27) reduces to:

$$\frac{(2\lambda)^{\frac{2}{2\lambda-1}}\left[\left(16+q^Eq^G\right)-\left(7q^G+4\right)\right]^{1-\frac{1}{\lambda}}}{[2\lambda-1]\left[\frac{q^E(2\lambda-q^G)+q^G-q^E}{q^G}\right]^{\frac{1}{2\lambda-1}}\left[-2\lambda q^E+q^G\left(4\lambda-q^E\right)+2\lambda-q^G\right]^{\frac{1}{(2\lambda-1)\lambda}}},$$

which, for $\lambda=2$, attains its minimal value of $\frac{1.2599}{1.1905}>1>\beta$ at $q^E=q^G=1$. Hence, for every $\beta\in(0;1)$ and for every combination of q^E and $q^G\in[0.5;1]$, an interior solution for z^* exists.

For the case $q^G\leq q^E$, the upper bound on z^* is given by $\frac{q^G\left(2\lambda-q^E\right)-q^G+q^E}{q^E(2\lambda-q^G)}$. At this value of z^*, $x^*=1$ and for $\lambda=2$ we can write the r.h.s. of (9.27) as:

$$(4)^{\frac{2}{3}}\frac{\left[\left(16-q^Eq^G\right)\frac{q^G\left(4-q^E\right)-q^G+q^E}{q^E(4-q^G)}-\left(2q^G\left(4-q^E\right)+4-q^G\right)\right]^{\frac{1}{2}}\left(\frac{q^G\left(4-q^E\right)-q^G+q^E}{q^E(4-q^G)}\right)^{\frac{1}{3}}}{\left(4-q^E\right)^{\frac{1}{3}}\left[\left(q^G+1\right)\left(4-q^E\right)\right]^{\frac{1}{6}}\left[\frac{3q^G}{q^E}\right]},$$

which attains it minimum value of $\frac{2}{9}\cdot(2)^{\frac{1}{6}}\sqrt{19}>1>\beta$ at $q^E=q^G=1$.

We conclude that for all values of $\beta\in(0;1)$, and all values of q^E and $q^G\in[0.5;1]$, equation (9.27) has a solution in z^*. Furthermore, this value satisfies $z^*\in\left[\frac{\left[2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right]}{2\lambda(2\lambda-q^E)+q^E(2\lambda-q^G)};1\right]$ whenever $q^E\leq q^G$ and $z^*\in\left(\frac{\left[2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right]}{2\lambda(2\lambda-q^E)+q^E(2\lambda-q^G)};\frac{q^G\left(2\lambda-q^E\right)-q^G+q^E}{q^E(2\lambda-q^G)}\right)$ if $q^E>q^G$, therefore precluding the case of corner solutions for all three variables, x, z and g.

We now prove that the solution of equation (9.27) is unique. We define the function $\tilde{Z}$ as

$$\tilde{Z}\left(z^*\right)=:\frac{\left[\left(4\lambda^2-q^Eq^G\right)z^*-\left(2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right)\right]^{1-\frac{1}{\lambda}}\left(z^*\right)^{\frac{1}{2\lambda-1}}}{\left[\frac{z^*q^E(2\lambda-q^G)+q^G-q^E}{q^G}\right]^{\frac{1}{2\lambda-1}}\left[-q^E\left(2\lambda-q^G\right)z^*+2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right]^{\frac{1}{(2\lambda-1)\lambda}}\left[q^G-q^Gz^*+2\lambda z^*-1\right]}.$$

Differentiating w.r.t. z^* and multiplying by $\frac{z^*}{\tilde{Z}}$ gives:

$$\begin{aligned}\frac{d\tilde{Z}}{dz}\frac{z^*}{\tilde{Z}} &= \frac{1}{2\lambda-1}+\left(1-\frac{1}{\lambda}\right)\frac{1}{\left[1-\frac{\left(2q^G(2\lambda-q^E)+2\lambda-q^G\right)}{\left(4\lambda^2-q^Eq^G\right)z^*}\right]}-\frac{1}{2\lambda-1}\left[\frac{1}{1+\frac{q^G-q^E}{q^E(2\lambda-q^G)z^*}}\right]\\ &\quad+\frac{1}{(2\lambda-1)\lambda}\frac{1}{\left[-1+\frac{2q^G(2\lambda-q^E)+2\lambda-q^G}{q^E(2\lambda-q^G)z^*}\right]}-\frac{1}{\left[1+\frac{q^G-1}{(2\lambda-q^G)z^*}\right]}.\end{aligned}$$

For $\lambda=2$, $\frac{d\tilde{Z}}{dz}\frac{z^*}{\tilde{Z}}>0$ for $z^*\in\left(\frac{\left[2q^G\left(2\lambda-q^E\right)+2\lambda-q^G\right]}{2\lambda(2\lambda-q^E)+q^E(2\lambda-q^G)};1\right)$. Hence, $\tilde{Z}\left(z^*\right)$ is monotone and therefore, the solution is unique.

Finally, we show that the three first-order conditions (9.20), (9.21) and (9.22) indeed correspond to maxima of the problems of the proposing industrialist and the proposing politician. The payoff function of the proposing industrialist is strictly concave in x. Hence, the first-order condition with respect to x identifies a maximum. The second derivatives of the payoff function of the proposing politician with respect to g and z are both negative. Furthermore, for any specification of g and x, the optimal value of z is interior, and, similarly, for any values of z and x, the optimal value of g is interior. Hence, if the function V_G has a maximum, it will satisfy the first-order conditions stated above. Since V_G is a continuous function on $[0;1]^2$ it follows that it has a maximum and, by the argument above, this maximum is given by the unique solution to the first-order conditions with respect to g and z. Therefore, the optimal policy triplet is indeed given by $(x^*; g^*; z^*)$ derived above.■

The proofs of Propositions 4, 5, 6 and 7 are straightforward and therefore omitted.

10 References

Acemoglu, D. (2006a). "Modeling Inefficient Economic Institutions," in: Advances in Economic Theory, Proceedings of 2005 World Congress, eds. Blundell, R., Newey, W., Persson, T., Cambridge University Press, Cambridge.

Acemoglu, D. (2006b). "A Simple Model of Inefficient Institutions," Scandinavian Journal of Economics 108(4): 515-546.

Acemoglu, D., Egorov, G., Sonin, K. (2009a). "Do Juntas Lead to Personal Rule?" mimeo, MIT.

Acemoglu, D., Egorov, G., Sonin, K. (2009b). "Political Selection and Persistence of Bad Governments," mimeo, MIT.

Acemoglu, D., Johnson, S., Robinson, J. (2001): "The Colonial Origins of Comparative Development: An Empirical Investigation," American Economic Review, 91(5), 1369-1401.

Acemoglu, D., Johnson, S., Robinson, J. (2002): "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution," Quarterly Journal of Economics, 117, 1231-94.

Acemoglu, D., Johnson, S., Robinson, J. (2006). "Institutions as the Fundamental Cause for

Long-Run Economic Growth," in Handbook of Economic Growth, ed. by P. Aghion, and S. Durlauf. Elsevier Science, North-Holland, Amsterdam, New York and Oxford.

Acemoglu, D., Robinson, J. A. (2000a). "Democratization or Repression?," European Economics Review, Papers and Proceedings 44: 683-693.

Acemoglu, D., Robinson, J. A. (2000b). "Political Losers As a Barrier to Economic Development," American Economic Review, Papers and Proceedings 90: 126-130.

Acemoglu, D., Robinson, J. A. (2000c). "Why did the West extend the franchise? Quarterly Journal of Economics, 115: 1167-1199.

Acemoglu, D., Robinson, J. A. (2001). "A Theory of Political Transitions," American Economic Review 91: 938-963.

Acemoglu, D., Robinson, J. A. (2008). "Persistence of Power, Elites and Institutions," American Economic Review, 98(1): 267-93.

Acemoglu, D., Robinson, J. A., Santos-Villagran, R. J. (2009). "The Monopoly of Violence: Evidence from Colombia," Discussion Paper, MIT.

Acemoglu, D., Ticchi, D., Vindigni, A. (2009). "A Theory of Military Dictatorships," mimeo, MIT.

Ades, A., (1996). "The Rise and Fall of Elites: Economic Development and Social Polarization in Rent-Seeking Societies," CEPR Discussion Paper No. 1495.

Aghion, Ph., Alesina, A., Trebbi, F. (2004). "Endogenous Political Institutions," Quarterly Journal of Economics 69: 565-611.

Atkeson, A., Kehoe, P. J. (2005). "Modeling and measuring organizational capital," Journal of Political Economy, 113(5): 1026–53, October 2005.

Azzimonti, M. (2009). "Barriers to Investment in Polarized Societies", mimeo, University of Texas – Austin.

Baron, D., Ferejohn, J. (1989). "Bargaining in Legislatures," American Political Science Review 83: 1181-1206.

Barbera, S., Jackson, M. (2000). "Choosing How to Choose: Self-Stable Majority Rules," California Institute of Technology, mimeo.

Barbone, L., Polackova, H. (1996). "Public Finances and Economic Transition," MOCT-MOST 6: 35-61.

Barseghyan, L. (2008). “Entry Costs and Cross-Country Differences in Productivity and Output,” Journal of Economic Growth, 13(2): 145–67, June 2008.

Barseghyan, L., DiCecio, R. (2008). “Institutional Causes of Macroeconomic Volatility,” Federal Reserve Bank of St. Louis, Working Paper No. 2008-021A, June 2008.

Barseghyan, L., DiCecio, R. (2009). “Entry Costs, Misallocation, and Cross-Country Income and TFP Differences,” Federal Reserve Bank of St. Louis, Working Paper No. 2009-005A, January 2009.

Basu, S., (1996). “Procyclical productivity: Increasing returns or cyclical utilization?” Quarterly Journal of Economics, 111(3): 719–751, August 1996.

Battaglini, M., Coate, S. (2007). “Inefficiency in Legislative Policy-Making: A Dynamic Analysis,” American Economic Review, 97(1): 118-149.

Battaglini, M., Coate, S. (2008). “A Dynamic Theory of Public Spending, Taxation and Debt,” American Economic Review, 98(1): 201-36.

Bourguignon, F., Verdier, Th. (2000). “Oligarchy, Democracy, Inequality and Growth,” Journal of Development Economics 62: 285-313.

Bowden, W. (1925). Industrial Society in England Towards the End of the Eighteenth Century, The Macmillan Company, New York.

Bulmer-Thomas, V. (2003). The Economic History of Latin America since Independence, Cambridge University Press, Cambridge.

Bunce, V. (1999). Subversive Institutions. The Design and the Destruction of Socialism and the State, Cambridge University Press, Cambridge.

Conde, R. C. (2009). The Political Economy of Argentina in the Twentieth Century, Cambridge University Press, Cambridge.

De Soto, H. (1989). The Other Path. The Economic Answer to Terrorism, Basic Books.

Djankov, S., La Porta, R., Lopez de Silanes, F., Shleifer, A. (2002). “The Regulation of Entry,” Quarterly Journal of Economics, 117, 1—37.

Doepke, M., Eisfeldt, A. (2009). “Colonies,” mimeo, Northwestern University.

Engermann, S., Sokoloff, K. L. (2000). “Institutions, Factor Endowments, and the Path of Development in the New World,” Journal of Economic Perspectives 51: 437-464.

Gersbach, H. (2005). Designing Democracy. Ideas for Better Rules, Springer Verlag, Berlin.

Gradstein M., Justmann, M. (1995). "A Political Interpretation of the Kuznets Curve," mimeo.

Guner, N., Ventura, G.,Xu, Y. (2008). "Macroeconomic implications of size-dependent policies," Review of Economic Dynamics, 11(4):721–44.

Gurr, T. R. (1997): "Polity II: Political Structures and Regime Change, 1800-1986," unpublished manuscript, University of Colorado, Boulder.

Haber, S. (1992). "Assessing the Obstacles to Industrialization: The Mexican Economy, 1830-1940," Journal of Latin American Studies 24: 1-32.

Haber, S. (2000). "The Political Economy of Financial Market Regulation and Industrial Productivity Growth in Brazil, 1866-1934," in: Political Institutions and Economic Growth. Essays in Policy, History and Political Economy, ed. S. Haber, Hoover Institution Press, Stanford.

Haber, S., Razo, A., Maurer, N. (2003). The Politics of Property Rights. Political Instability, Credible Commitments and Economic Growth in Mexico, 1876-1929, Cambridge University Press, Cambridge.

Haber, S. (2005). "Development Strategy or Endogenous Process? The Industrialization of Latin America," Stanford University, mimeo.

Hughes, S. W., Mijeski, K. J. (1984). Politics and Public Policy in Latin America, Westview Press, Boulder and London.

Jaggers, K., Marshall, M. G. (2000): Polity IV Project ,Center for International Development and Conflict Management, University of Maryland.

Kontorovich, V. (1999). "Has New Business Creation in Russia Come to a Halt?", Journal of Business Venturing 14: 451-460.

More, Ch. (1989). The Industrial Age. Economy and Society in Britain 1750 - 1985, Longman, London.

North, D., Wallis, J. J., Weingast, B. R. (2006). "A Conceptual Framework for Interpreting Recorded Human History," NBER Working Paper 12795.

North, D. C., Weingast, B.R. (1989). "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England," Journal of Economic History 49: 803-832.

Olson, M. (2000). Power and Prosperity: Outgrowing Communist and Capitalist Dictatorships, Oxford University Press, Oxford.

Parente, S. L., Prescott E. C. (2005) “A Unified Theory of the Evolution of International Income Levels,” in Handbook of Economic Growth, ed. by P. Aghion, and S. Durlauf. Elsevier Science, North-Holland, Amsterdam, New York and Oxford.

Peralta-Ramos, M. (1992). The Political Economy of Argentina. Power and Class since 1930, Cambridge University Press, Cambridge.

Persson, T., G. Roland, Tabellini, G. (2000). “Comparative Politics and Public Finance.” Journal of Political Economy 108: 1121-1161.

Rebelo, S. (1991). “Long-Run Policy Analysis and Long-Run Growth,” Journal of Political Economy, 99(3): 500-521.

Romer, P. M. (1986). “Increasing Returns and Long-run Growth,” Journal of Political Economy, 94(5): 1002-37.

Summerhill, W. (2000). “Institutional Determinants of Railroad Subsidy and Regulation in Imperial Brazil,” in: Political Institutions and Economic Growth. Essays in Policy, History and Political Economy, ed. S. Haber, Hoover Institution Press, Stanford.

The World Bank (2007) “Doing Business in 2008,” The International Bank for Reconstruction and Development/The World Bank, Washington, D.C.

Figure 1. The Tax Rate, τ^*.

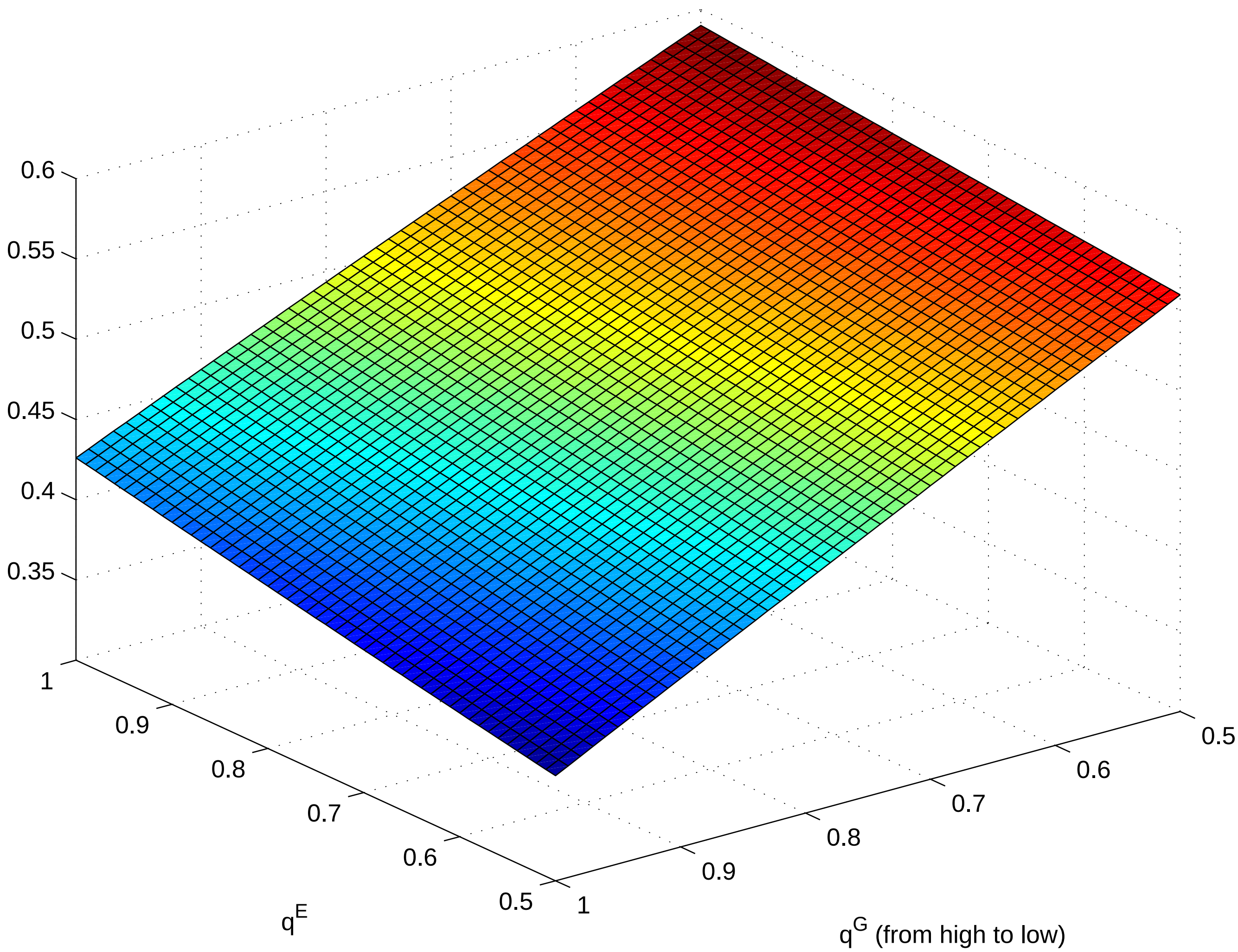

Figure 2. Public Investment as a Share of Output, g*/λ.

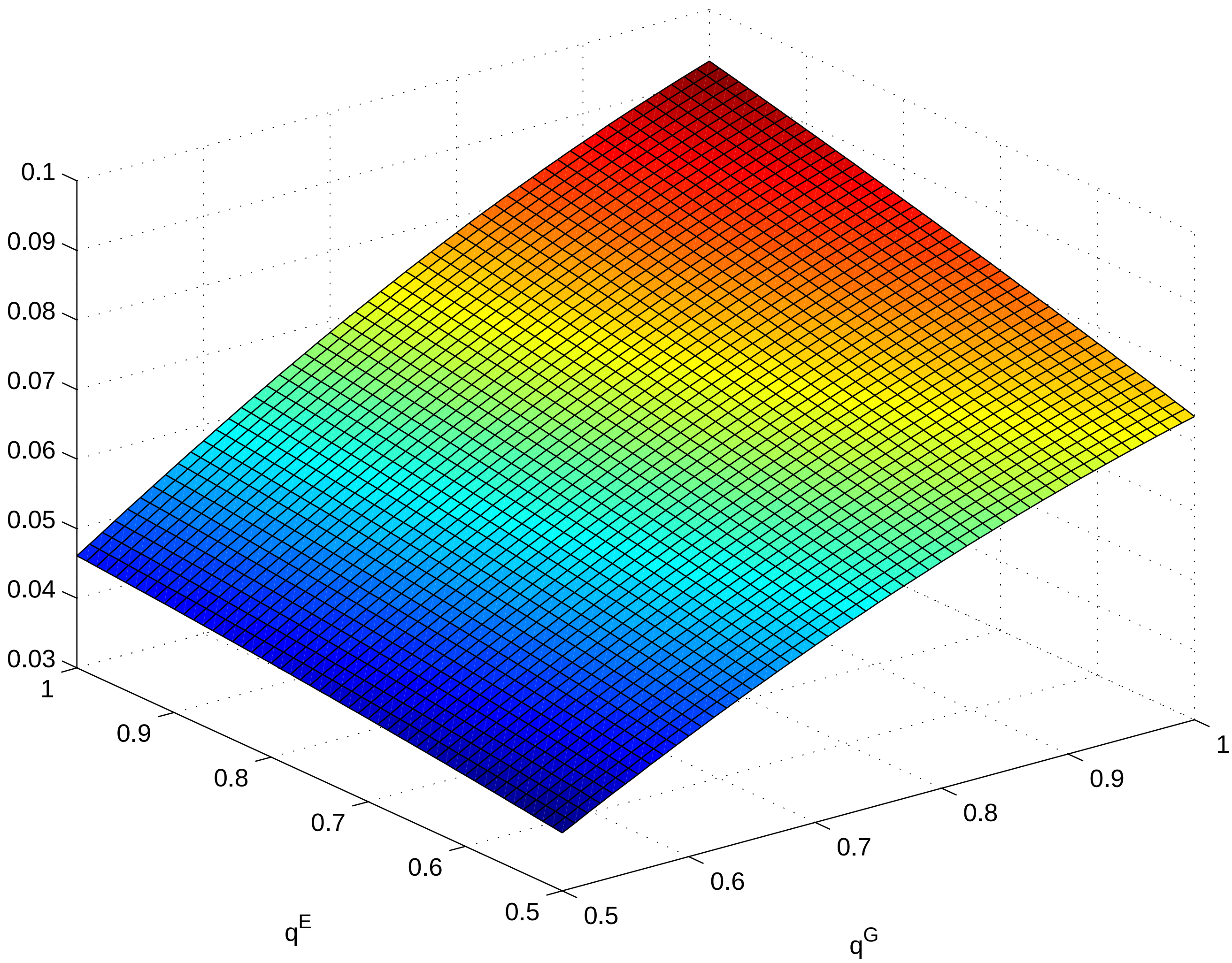

Figure 3. The Innovation Rate, e*−1.

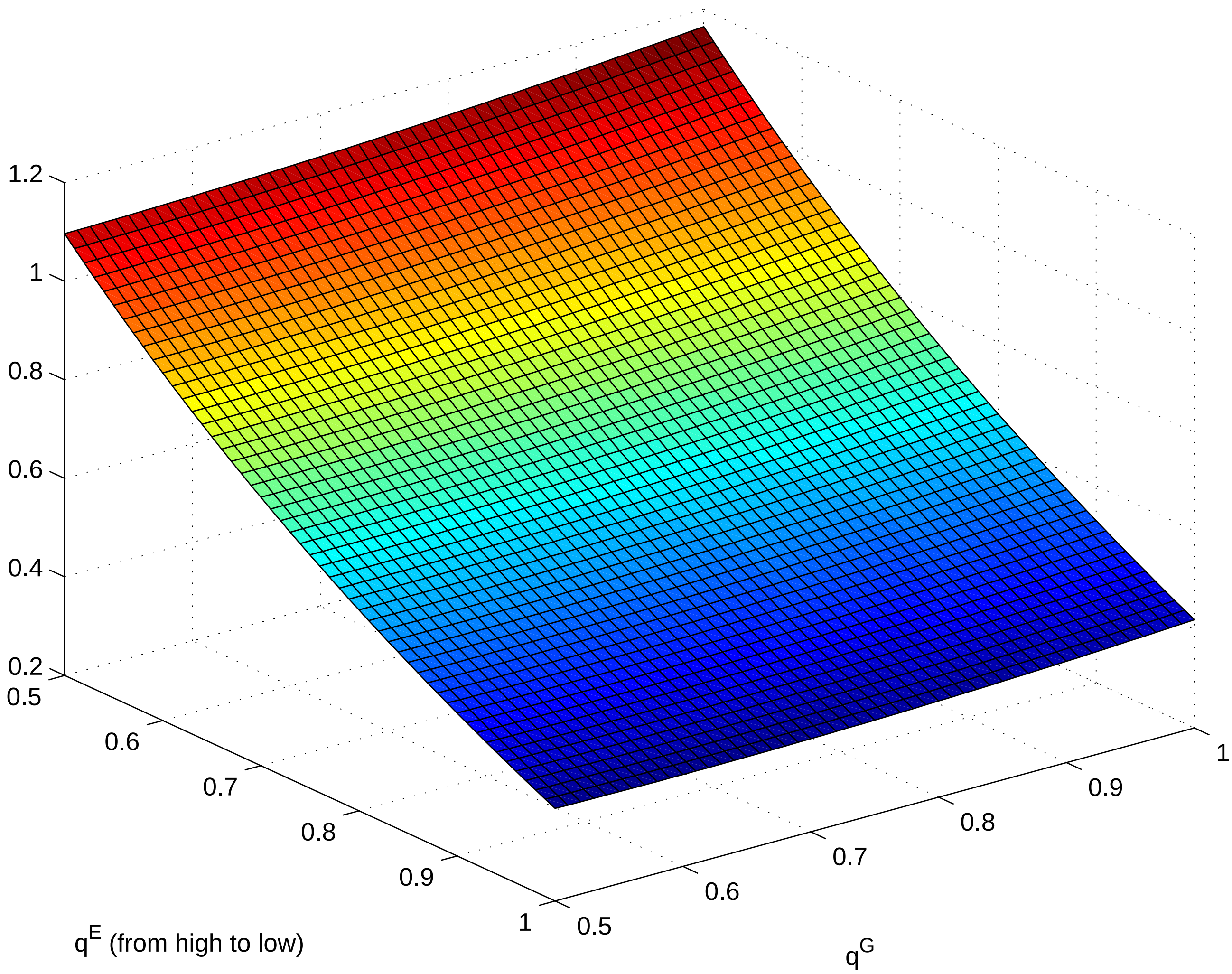

Figure 4. The Growth Rate of the Economy.

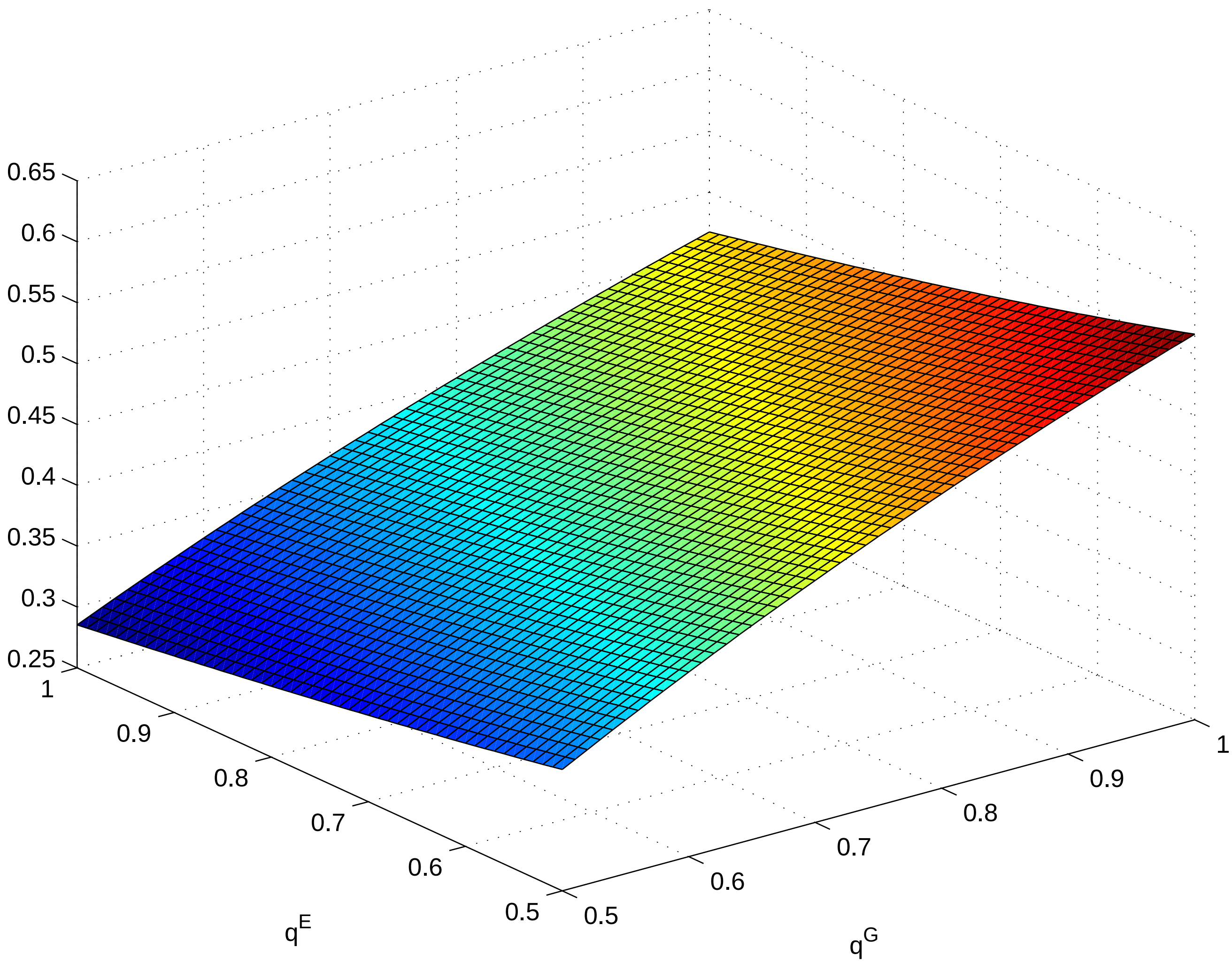

Figure 5. Welfare of the Elite, in % deviations from the first best.