On De Facto Political Power, Rent Extraction, and Tenure*

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Abstract

A political leader redistributes income between herself and society in a deterministic endowment economy. Higher rent extraction leads to higher odds of deposition. To overcome the trade-off between rent extraction and survival in power, the leader deviates resources from her consumption into de facto political power. Society can depose the leader if it is able to buy back the de facto power investments, and face other deposition costs. In equilibrium, the leader will be able to last longer in office than in the case when investment in de facto power would not be possible. The model differences between democracy and non-democracy are kept to a minimum, and leaders are assumed to behave in the same way regardless of political regime. In democracy, leaders stay in power much shorter periods, do not invest in de facto power, and in most cases appropriate less resources. The model thus accounts for important aspects of the data on durability in power and government effectiveness in both democracies and non-democratic regimes. It prescribes a high degree of independence of the economy from government for the purpose of achieving potential GDP; short-term limits and regular checks on the executive power; and great scrutiny of public procurement and spending on security and defense.

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1 Introduction

> "Good policy is bad politics, good politics is bad policy. *Bueno de Mesquita et al. (2003): "The Logic of Political Survival".*

Studies about the survival of leaders have shown that the ones who hold onto power best are far from being the most civic-minded, democratic, and benevolent (cfr. Bueno de Mesquita et al., 2003, hereafter BM). Moreover, democratic leaders seem to stay in power for much shorter periods than their counterparts in non-democratic regimes. Using the Archigos (2009) database on political leaders, and the Worldwide Governance Indicators (2009) I show in Table 1 below that the countries where leaders, on average, stayed the longest in power register relatively low levels of "government effectiveness".

In this paper, I model the conflicts of self-interest that world leaders typically face. In a deterministic endowment economy, a political leader has the power to decide redistribution of income among herself and society. I assume such redistribution policies have no distortion effects (*no redistribution vs. efficiency trade-off* assumption) and that full income confiscation is possible.

The leader extracts rents for her own sake, but the more she extracts, the greater the likelihood of her deposition. This is the *survival in power vs. rent extraction trade-off.*

For a given fraction of income to be left for society, the leader chooses how to use her own share. She can spend it in consumption, and in investment in *de facto political power:* this is the *consumption vs. de facto power trade-off.*

De facto political power corresponds to the stock of any type of resources that make it more difficult for society to depose the incumbent leader. For example, in the real world leaders may allocate resources to repression mechanisms, such as a secret police, and they may try to gain control over the mass media, or the higher echelons of the judiciary.

For a given redistribution of income, the exact balance between leader consumption and investment in de facto political power has consequences for the odds of leader deposition.

The model in this paper is thus intended to explain the mechanism that allows leaders to break the trade-off between rent-extracting activities and survival in power. The crucial element of that mechanism is de facto political power.

Table 1 - Ten highest average tenures (1975-2004)

	average tenure *1975-2004*	government effectiveness *2004*
Cuba	46	−0.69
Togo	38	−1.44
Gabon	37	−0.74
Brunei	37	0.06
Libya	35	−0.69
Oman	34	0.41
UAE	33	0.69
Jordan	26	0.15
Maldives	24	0.15
Tunisia	24	0.44

"Government effectiveness 2004" takes values in the interval [-2.5;2.5], with mean 0, unit standard deviation, and with higher values meaning better governance. Source: Kaufmann et alea (2009a), *Worldwide Governance Indicators*. "Average tenure 1975-2004" computed by myself using the *Archigos* database (Goemans et alea, 2009a). For the detailed explanation of both variables cfr. Appendix A.

Investment in de facto political power can take many forms. Examples of these include: control over the mass media and trade unions, getting the support from the military either by corrupting it, directing more resources to that sector, or increasing conscription intensity, buying support from specific interest groups or economic sectors, such as landowners, the use of political repression (e.g., censorship, secret services and police, imprisonment and killing of political opponents, use of death penalty). All of the above are costly and largely wasteful.

Certainly, the composition and intensity of de facto power investment is correlated with the presence or absence of democracy (Acemoglu and Robinson, 2006, Mulligan et

al., 2004)[1]. However, it should be noted that at least some of the possible forms of de facto power can also be observed in democracies. In this paper, I do not make a distinction among the different forms that de facto power can take. Instead, I model the investment in de facto political power as the total sum over those possible forms, and I represent it as one of the leader's control variables.

In the model, a society, whether democratic or not, has the possibility of deposing its leader. That possibility is costly, though, and one of the components of the total cost is the amount of resources invested by the leader in de facto power. Thus, one possible interpretation of the model is that the leader buys political support through investment in de facto political power; and the society, in order to depose the leader, ought to buy back those supporting the leader.

In the real world, deposition occurs in different ways: an election where the incumbent is voted out, a vote of no confidence, a coup, or a revolution, etc.. I assume away the types and specificities of the deposition process, say, whether it is initiated by a specific group or by the population in general, whether its origin is civil or military, etc.. I also assume away a specification of the identity of those supporting the incumbent leader[2].

1.1 Democracy and non-democracy

The distinction between democracy and non-democracy is kept at a minimum in my model - up to a few parameters. There are four reasons for that modeling choice.

The first reason is the axiomatic stance that leaders have the same objectives independently of the regime in which they act. It is institutions that constrain their behavior in ways that either lead to socially beneficial or socially harmful policies and outcomes (BM). Thus, the only regime features that I explicitly model, as parameters, are those which constrain a leader's behavior, and which are exogenous to her actions.

Second, I take as fact that deposition and investment in de facto power are possible and take place in all kinds of political regimes. Surely, removal of incumbent politicians is much more difficult in consolidated autocratic regimes, but that is in part the effect of

[1] The "selectorate theory" presented in BM does not "preclude corruption in *large-W systems*; rather, history suggests such systems are relatively less corrupt than their small-coalition contemporaries". Large-W systems are mostly associated with democratic regimes in the sense of serving the interests of the majority (Acemoglu and Robinson, 2006).

[2] A possible extension of the model can explicitly include a "bureaucracy" sector.

their own de facto power investments. Hence, the level of difficulty in deposing a leader is (at least to a certain extent) endogenous. For this reason, I only minimally impose the type of political regime in the model.

Democracy and non-democracy seen as an outcome, that is, whether policies favor the majority or the ruler (Acemoglu and Robinson, 2006) will be mostly an endogenous result in my analysis. Specifically, low-rent extraction, and relatively short duration in power will be deemed as democratic outcomes, and the opposite will qualify as "non-democracy".

Third, Mulligan et al. (2004) have supported empirically that

> "economic and social policies in all kinds of countries are to a first approximation the outcome of tradeoffs (...) not specific to particular political institutions"

and that

> "The main empirical differences [between democracies and non-democracies] - both in the cross-country regressions and in the time series of countries with dramatic regime changes - are for policies relating to the process of winning and maintaining public office, rather than the social and economic policies featured in so many positive theories of the public sector".

Hence, I disregard all specific economic and social policies except redistribution and total investment in de facto power, which is approximately the same as "policies relating to the process of winning and maintaining the public office". These policies are the main focus of the model and will be endogenously determined through it. Also, I do not need to exogenously incorporate a specific political regime into the model, as the model is not designed to make any predictions on other "economic and social policies", and because, as implied above, those policies are not strongly associated with any particular regime type.

A fourth and final reason that applies mainly to democracies: Persson and Tabellini (2003) show that electoral rules (majoritarian versus proportional rule) and forms of

government (presidentialism versus parlamentarism) have little explanatory value for corruption and government effectiveness in the provision of public services (they use the same government effectiveness variable as I do plus two others, all of which are highly correlated). Hence, it is legitimate that my analysis of the duration in power vs. rent extraction trade-off ignores those political features should it be applied only to the study of democracies[3].

The next section presents a literature review with a focus on the papers most closely related to this one. Section three describes the model in detail. Section four presents and discusses the main results, and makes policy recommendations. Finally, section five concludes.

2 Literature review

In order to investigate why autocratic leaders last in office so much longer than democratic leaders, BM built a model where the type of institutions has an effect on the quality and democratic benevolence of policies chosen by political leaders. These, in turn, might be successful in shaping institutions in order to stay longer in power. The fundamental axiom of the analysis is that any leader, regardless of political regime (democracy or some specific type of non-democracy), desires to keep her power above anything else, and that objective has consequences for most policies. Self-evident as it may seem, such a hypothesis has not always been the basis of economic analysis.

Indeed, the political economy literature has increasingly shifted focus from the *benevolent social planner* approach to the *self-interested ruler assumption.* The first perspective was seminally undertaken by Tinbergen (1952), and Theil (1956), and continued by the rational-expectations pioneers (Kydland and Prescott, 1977, and Barro and Gordon, 1983). Virtually all papers on optimal policy embrace the assumption of the benevolent social planner.

In the optimal policy literature, a government sets some policy instruments that will

[3] The same authors have found that low barriers to entry into politics (large number of legislators elected per district) and whether citizens directly choose their representatives or vote in party lists (bloc voting) are significant in explaining corruption and government effectiveness. Such level of institutional detail, however, is beyond the scope of this paper.

impact on economic targets (say, inflation and unemployment) in order to achieve a social welfare maximum subject to some resource, structural, and time-consistency constraints. The benevolent social planner assumption is meant mainly to describe the most relevant benchmark of first-best policy (maximization of social welfare), that is, what economic authorities *should* do. This benchmark is also used to assess the impact of many possible distortions (first-best versus decentralized economy with market imperfections, etc.).

Government appears as an exogenous entity, whose preferences are implicitly described as identical to those of society, and whose role is to engineer some socially optimal outcome. Society is modeled as an absolutely homogenous entity where any agent is representative of the whole.

This approach fails to explain why governments so routinely and intensely deviate from the prescribed optimal policies, and why countries with similar resources and aims perform so differently (Alesina, 1994). The reasons for that failure are mainly the omission of government's own selfish preferences and a polity's institutions, and the assumption of no conflict of interests within society.

The self-interested ruler assumption was used when the link between political institutions and economic consequences became the major topic of analysis. This perspective was pioneered by Nordhaus (1975), Lindbeck (1976), and MacRae (1977), who assume political leaders only care for re-elections, and by Hibbs (1977), for whom leaders represent the interests of different platforms who favor either unemployment reduction over inflation reduction or vice versa[4]. These studies rely on the assumptions of backward-looking citizens, and the existence of an exploitable Phillips curve.

Those assumptions were later relaxed by the rational-expectations school. Major contributions are those of Cukierman and Meltzer (1986), Persson and Tabellini (1990), Rogoff (1990), Rogoff and Sibert (1988), all of which have developed models of opportunistic leaders, and Alesina (1987), Chappell and Keech (1986, 1988), who proposed models of partisan politics.

Typically in this literature, rulers, who may or may not have ideological preferences, are interested both in *rent extraction,* and in staying in office as long as possible; and there

[4]Frey and Schneider (1978) present a trade-off between ideology and opportunism in which concerns for the first are honored as long as keeping incumbency is highly probable.

may be different ideologies and preferences within society. Thus, in this type of analysis, not only the typical economic trade-offs exist (say, inflation versus unemployment) but there may also be conflict on *which outcome* should be considered superior.

The ruler may have conflicting objectives as well (especially but not only in democracies): staying longer in power may require introducing new forms of economic distortion which, in turn, reduce the size of the economy and the disposable income of the ruler.

2.1 Related approaches

This paper draws most of its inspiration from Bueno de Mesquita et al. (2003, BM), Acemoglu, Golosov and Tsyvinski (2008, hereafter, AGT), and Acemoglu and Robinson (2008, hereafter, AR)[5]. A comparison between my analysis and theirs follows.

I agree with the axioms put forth in BM that all leaders have exactly the same goals independently of the specific regime in which they act, and that it is the "Selection institutions[6] (...) [that] explain the differences in policy choices across all regime types". Without exception, all leaders attempt to stay in power for as long as possible and to personally benefit from that power as much as possible. Hence, I do not assume anything about a leader's adherence to principles of good governance, nor do I distinguish between democratic and non-democratic leaders. Rather, it is institutions that matter. Institutions lead politicians either to civic-minded or to socially undesirable behavior, irrespective of their personal beliefs and idiosyncrasies.

With these postulates in mind, both BM and this paper aim at encompassing all forms of political regimes within a single theory. Both works use data from most countries of the world.

Both BM and I seek to answer the same question: Why do leaders who implement "bad policies" last longer than those who implement "good policies"? The focus of the two works, though, is different. BM zeros in on the institutions that select leaders. They create a continuum of those institutions based on two numbers: the relative size of the *winning coalition* (those who directly support the leader) and the *selectorate* (those who have a say in deciding who the leader should be).

[5] Other closely related works are Acemoglu and Robinson (2000, 2001, and 2006a), Ticchi and Vindigni (2005), Jack and Lagunoff (2006), and Lagunof (2006).

[6] Those regulating the selection of leaders.

As against this very general definition of selection institutions, I consider a specific mechanism that enhances a leader's survival in office, namely, de facto power. Whereas BM propose a way to classify all regime types using a single ratio of parameters, and while they demonstrate the relevance of that ratio in predicting many economic and political outcomes, my research examines a particular mechanism to enhance survivability in power.

From the perspective of BM's theory, de facto power can be seen as the total sum of resources that have been spent by the leader in order to retain the support of the winning coalition. Then, citizens can counteract a leader's de facto power by buying back the individuals who support the leader. Citizens' spending in de facto power, which I do not model, can thus be interpreted along BM's theory too, specifically, as a challenger (or some citizens supporting him) buying the support of some members of the current winning coalition.

Whereas in BM's book good policies are peace and prosperity, my paper does not consider war/peace issues, economic growth and tax distortions. I investigate a purely redistributional issue, that is, how much of a fixed income goes to citizens, and how much goes to the leader.

For these objectives, I need only model a minimum of institutional and economic detail, which is also the methodology adopted by BM. This parsimony in institutional specification enlarges the scope of application of both models.

Finally, both BM and I treat leaders as individuals, which differs from the analysis of elite members versus citizens developed in Acemoglu and Robinson (2006) and (2008).

AGT present the rent-extraction/survival in power conflict in an extreme way: a leader is able to confiscate all the economy's wealth, but the immediate consequence of that policy is deposition; also, the time-consistent renegotiation-proof equilibrium features a leader surviving in office forever and receiving a minimum of utility. Hence, their paper cannot account for leader turnover, which is one of my aims.

While the leader in their paper is self-interested, the regime is democratic in the sense that deposition can take place at any time. Further, under the assumption of the leader being sufficiently patient, aggregate distortions (in labor supply and investment) stemming

from political economy disappear (there are still transfers from society to the leader)[7].

Thus, AGT's model predicts that a self-interested leader in a democratic regime will keep office eternally (no political turnover and no deposition) and, as long as she is patient enough, no efficiency distortions will exist in the long run.

This is at odds with the findings in BM and in my empirical exercise above. In BM, civic-minded politicians (in democratic regimes) who pursue socially desirable policies are shown to hold onto power for shorter periods than self-interested leaders, who last longer in power at the expense of the general welfare. Furthermore, in most contemporary democracies, spells in power are much shorter than infinity, and cases of pork-barrel spending, patronage, illegal party and campaign funding, corruption, etc. are not uncommon.

Even if AGT's politician is interpreted, instead, as a political party, a democracy where the same party always stays in power is an exceptional case (should there actually be any such case).

AGT's model is, thus, not adequate to match some important facts concerning duration in power of leaders, namely, that most leaders exit office for reasons other than natural death, and that turnover is higher in those countries where government effectiveness is high, and, hence, where economic distortions are relatively smaller.

My model is aimed at analyzing the survival in power/rent extraction conflict in both democracies and non-democratic regimes and matching the basic empirical facts of power turnover, and of democracies displaying higher government effectiveness, than non-democracies.

Acemoglu and Robinson (2008, AR) model investment in de facto power. In their model, "economic institutions" (wage-rent pairs favoring either workers or the elite) and "political institutions" (whether workers have some de jure political power or not, and whether it is workers or the elite who benefit from public goods) are chosen by who has more overall political power. This is the sum of de jure and de facto powers. Both the elite and the workers can invest in the latter.

Labor is inelastically supplied and public goods are provided at no cost. There are two different public goods, and each enters the utility function of either citizens, or elite

[7] This differs somewhat from the mechanism implied in the "encompassing interest" theory (Olson, 2000).

members.

Income is fixed but subject to a distortion in the case of economic institutions favoring the elite. Thus, AR's model is one of a redistributional issue, but where a distortion in total output is created when redistribution favors the elite.

Whether the political regime is democratic or not has many direct consequences. First, the marginal power of resources invested in de facto power depends on it (for both groups in society). Hence, there is a "technology" which transforms resources into de facto power, and this "technology" depends on the regime itself. Second, if there is democracy (non-democracy), citizens (the elite) can choose which type of public goods to provide. Finally, only if there is democracy will the citizens benefit from a fixed amount of power.

My paper centers on investment in de facto power, for which there is also a technology, but it ignores de jure political power. More importantly, while the deposition of the leader may be thought of as the citizens buying back those who support the leader, I do not model investment in de facto power by the citizens.

Democracy is an essentially nominal concept in AR's model. What matters therein is who (citizens or the elite) has more *overall* political power (de jure plus de facto). The "group in power" may be the elite even though the nominal political state is democracy. The group in power determines economic institutions in the current period (i.e., GDP redistribution) and sets political institutions in the next period.

Differently from AGT, in AR there can be turnover of regimes (democracy and non-democracy)[8]. There is also turnover of the group with the highest overall political power.

Under assumptions, the equilibrium features a regime-switching structure: "society fluctuates between democracy and associated competitive economic institutions and non-democracy with associated labor repressive economic institutions". While AGT featured no depositions and no turnover, AR seems to predict too-extreme institutional variability: are there any examples of full institutional fluctuation, that is, simultaneous change of political and economic institutions in a cyclical way?

The same equilibrium, however, also features *persistence* in the sense that the equilibrium probability that the elite will keep having more overall political power than the

[8] The identity of players is always the same: elite members and citizens keep their status independently of the regime.

citizens is strictly bigger in the case of non-democracy. This means that non-democracy is more likely to be followed by non-democracy than by democracy, and analogously for democracy. This, however, seems only to guarantee that the predicted fluctuation, on average, will not display very short cycles; but when change happens, it is likely to be of both political and economic institutions.

Under more severe assumptions (namely, that it takes more overall power to change regime type than to change economic institutions), *captured democracy* becomes an equilibrium. This is the case in which a country remains nominally democratic while economic institutions favoring the elite persist.

A corollary of the above-noted results is the phenomenon of *invariance*. Under the assumption that the marginal effect of the elite's de facto power is the same under democracy and non-democracy, the probability that the elite will have more overall power and, thus, decide redistribution, is the same in both political regimes. This is the same as saying that the likelihood of repressive economic institutions does not depend on the nominal political regime but only on the amounts of de facto power.

My model is in line with this prediction: since what matters for economic outcomes is investment in de facto power and not which nominal regime type is in place, I model the regime type only minimally.

The distribution of de jure power established by the political state can, thus, be partially or fully offset by investment in de facto power. De jure power is not absolutely determinant of anything. For example, the overall effect of economic regulation in democracies in the real world is sometimes less competition, an outcome that tends to favor some economic elites at the expense of the general welfare.

This result is somewhat similar to the above-presented conclusion found in Mulligan et al. (2004): democracies' and non-democracies' policies differ mainly with respect to those policies directly related to maintaining power; institutions may equally protect an economic elite in both a democracy and a non-democracy. In AR's model, the elites may be at an advantage in both democracies and non-democracies. For these reasons too, I do not impose a political regime into my model, which, thus, will be silent about the precise nature of the de jure political setting.

AR's model presumes that a representative of each group (i.e., elites and the citizenry) takes the decisions in the name of her group, and that all group members share the same preferences. Hence, the players in AR are not individuals but two groups, each of which can be seen as an individual player. Thus, the AR model explains turnover of regimes in a model of the interaction between two groups[9].

My approach differs from the one taken by AR in that I am not interested in the turnover of the relative power of different groups, or in regime changes. Rather, I am concerned with the turnover of the individual in power (the leader), for which I have data. It is not important to me whether this individual originally belonged to the citizenry or to some elite, nor is it of interest what her faith after stepping out of power will be[10]. Furthermore, in my model leaders are not concerned with maintaining institutions; their only goals are to obtain resources for themselves, and to stay in power for as long as possible. My model has very few institutional details when compared with AR, and it is appropriate to match data concerning the duration of individuals in power.

A controversial result in AR is that in equilibrium citizens do not invest in de facto power (regardless of whether it is a democracy or a non-democracy). This result seems very odd: in both democratic and non-democratic regimes there are always some forms of organized opposition. In all regime types, non-politicians spend resources aimed at changing political leadership. These activities should be positive in equilibrium[11].

3 The model

3.1 Environment, timing, and information

Society is composed of a continuous of identical individuals forming a unity[12], and of a large group of fungible potential leaders. The economy is of the deterministic constant endowment type, and time is discrete.

[9] What matters in both my work and that of AR is the sum of individual investments in power: de facto power is by nature a public good.

[10] As a matter of fact, there are data for that too.

[11] My model ignores the "who" and "how" questions concerning citizens' de facto power investment: how society or a subgroup of it solves the collective action problem and inherent free-rider issues, how it comes together to invest in de facto power, how it takes decisions, etc..

[12] The "selectorate" in BM's terminology.

An incumbent leader has the power to redistribute total income between herself and the citizenry. Furthermore, the leader allocates her income share between consumption, and investment in de facto power.

In each period, the citizenry may decide to depose the leader. Deposition leads citizens to incur a utility cost, which is formed by two components: the amount of extant de facto power, and a random component. Citizens observe the value the random component takes before they decide whether or not to depose the leader. The leader knows the distribution of the random part of the deposition costs but she doesn't observe its value. The random cost of deposition is identically and independently distributed.

Each time period is divided into three moments:

1. a quantity y of pure manna is delivered to the economy; there is a leader who has either just been assigned to power (randomly from their large group) or was already assigned in some previous period; in the first case, the stock of de facto power is nil ($\phi^0 = 0$), and the leader is supposed to guarantee an exogenously determined minimum life-time utility level of ω^0 to the citizens; in the second case, there may be some level ϕ of de facto power from previous periods, and the leader is supposed to honor her previous lifetime utility promise ω; the random component d of the deposition technology is exogenously determined, and it is revealed to the citizens (but not to the leader);

2. the leader announces to the citizenry her proposed policies $\{\lambda, \omega', \phi'\}$: λ is the share of income the leader will retain for herself, with $0 \leq \lambda \leq 1$; the leader commits herself to a new (or the same) life-time utility promise ω' before the citizens; and ϕ' is the new level of de facto power;

3. given the announced policies, and the knowledge of the shock d, the citizens decide to keep the leader in power or to depose her:

   (a) in the case the leader is kept in power, the proposed policies are implemented; depreciation of the existing stock of de facto power takes place at a period rate δ; the leader spends some part (or none) of her share of income in investment in political de facto power so that, at the beginning of the next period, the

total stock of power will be ϕ'; this investment is observed by the citizens; they consume their $1-\lambda$ share of GDP, and the leader consumes her share minus the resources allocated to de facto power investment (if any)[13];

(b) in case of leader deposition, the citizens suffer a utility cost $d+\phi$, with ϕ being the stock of de facto power at the beginning of the period; this stock collapses to zero after deposition; citizens face also a GDP loss corresponding to the upheaval caused by having to endure one period with no leader in power; consumption takes place, with the citizens getting only ξy, with $\xi \in (0,1)$ being the "initial cost of anarchy"; the deposed leader enjoys her exogenously determined outside option Ψ; a new leader is assigned to power.

3.2 Deposition technology

Deposition leads the citizenry into incurring in one utility cost, and one income cost. The utility cost has two components: the random component d; and the existing stock of de facto power, ϕ. Deposition costs are incurred only if deposition takes place.

In order for society to depose the leader, it must spend resources and time corresponding to an utility loss of $d+\phi$.

The component ϕ corresponds to the resources the leader has paid to some bureaucrats or key figures in society so that these individuals will support her[14]. It may also be interpreted as a stock of capital whose output is a stream of services aimed at preserving political leadership.

Therefore, the deposition of a leader requires that society must *buy back* those influential people or bureaucrats, or capture the capital that helps the leader stay in power. The citizens are, thus, forced to engage in some utility-diminishing activities aimed at counterbalancing the effects of the accumulated de facto power[15].

[13] As it will be shown below, I assume that some part of the resources invested in de facto power may also be consumed by the leader. For example, an investment in personal security forces not only makes deposition more difficult, but it is also directly beneficial to the leader.

[14] The "winning coalition".

[15] The rate at which an existing stock of de facto power translates into an utility loss may be more generally modelled as $\gamma\phi$, where γ takes values on $(0;+\infty)$. A very high γ may be thought of as implying that the price bureaucrats ask from society to betray the leader is higher than the price the leader had previously paid them when buying their support.

Citizens cannot themselves create their own secret services, buy big broadcasters, or raise an army. Thus, their political efforts leading to deposition are best described by a utility loss rather than by the accumulation of physical resources.

The component d represents all the random forces, in favor or against, that relate to the deposition of a leader. It encompasses the costs of organization and coordination of society so that it decides for deposition, but it also includes the pure benefits accruing from a change in leadership[16]. Thus, this cost component is in general positive, but it may also take negative values. Furthermore, it comprises any external factors with impact on a leader's survivability, such as pressure from the international community for leadership change.

Also, the difficulty of the collective-action problem at a given period is captured by d. It is likely to be easier to gather efforts to depose a ruler when she enjoys low levels of popularity. In such cases, deposition per se may have a positive impact on the well-being of the citizens. Hence, d may be interpreted as well as a measure of a leader's popularity.

The balance at a given time between the coordination costs (pressure for higher d) and the pure benefits from the removal of an unpopular leader (pressure for lower d) determines the sign of d.

When it takes negative values, d favors society. A negative value of d also corresponds to any fortuitous circumstances that make it especially beneficial for (some) citizens to self-organize and depose the leader.

Many factors may converge in helping or preventing society (or a part of it) from coordinating towards a specific political decision. They range from the difficulties associated with collective action to the asymmetrical personal benefits accruing from political change. We assume those factors are exogenous to the model, have a random nature, and also that they are not, as a whole, serially correlated: that is, they are highly unpredictable.

It is assumed, thus, that d is an i.i.d. random variable.

With the leader deposed, society must endure one period of "anarchy", in the sense of absence of government. Without leadership, many functions of government cannot be

[16] These pure benefits should not be confused with those arising from a possibly different redistribution of income due to leadership change.

accomplished, and the consequence is a loss of GDP, denoted by ξ. This is the "initial cost of anarchy"; it is an income cost.

3.3 Incumbent leader's objective function

A political leader can find herself in two possible situations: she has been newly assigned or she is already incumbent. The main difference is that the incumbent leader is supposed to honor the utility promise ω she made in the previous period to society, whereas the newly assigned leader brings no commitment from the past and is, thus, subject to an hypothetical promise ω^0, which may be constitutionally defined.

I commence by presenting the incumbent leader's problem and, in the next section, I state the two specificities of the newly assigned leader's problem.

The objective function of the incumbent leader is the following:

$$V(\omega, \phi) = \max_{\{\omega', i, \lambda\}} \left[1 - P^d(.)\right] \left\{U^L(\lambda y - \alpha i) + \beta^L E\left[V\left(\omega', \phi'\right)\right]\right\} + P^d(.)\Psi \tag{1}$$

where i stands for investment in de facto power. De facto power accumulates according to:

$$\phi' = (1 - \delta)\phi + i \tag{2}$$

The objective function is thus rewritten as the following Bellman equation:

$$V(\omega, \phi) = \max_{\{\omega', \phi', \lambda\}} \left[1 - P^d(.)\right] \left\{U^L\left[\lambda y - \alpha\left(\phi' - (1 - \delta)\phi\right)\right] + \beta^L E\left[V\left(\omega', \phi'\right)\right]\right\} + P^d(.)\Psi \tag{3}$$

Bellman equation: $V(\omega, \phi)$ is the value function of the incumbent leader; it depends on the utility she has promised (ω) to the citizenry in the previous period, and on the stock of de facto power from previous periods (ϕ). $U^L(.)$ is the instantaneous utility function of the leader; I assume it to be of the CRRA type, with parameter ρ^L. β^L is the time-discount factor of the leader, with $\beta^L \in [0, 1]$. E is the expectations operator.

The leader's choice variables are ω', λ, and ϕ': ω' is the utility value promised in this

period (which will be carried on to the next period should the leader remain in power); λ is the share of national income the leader takes for herself. She divides her income share between her own consumption and investment in de facto political power. The total stock of power at the end of the period is given by ϕ'.

These choice variables are announced by the leader, and are only made effective should the leader survive in power.

The stock of de facto power evolves according to (2). It is subject to depreciation, the rate of which is $\delta \in [0, 1]$. Whether de facto power is physical in nature or intangible it depreciates: while buildings and weapons wear out, loyalties and trust may dissolve with time. Also, de facto power depreciates as a fraction of people, government agencies, and institutions who previously supported the leader defect.

De facto power takes time to be built: the announced level ϕ' is reached at the beginning of the following period (should the leader be kept in office).

Leaders enjoy direct benefits from spending in de facto power (other than increasing their survivability chances). For example, a leader who buys control over a mass media group not only increases her odds of staying in power but also earns profits from that investment. To account for those benefits, I model the fraction of de facto power investment that does not yield direct benefits for the leader as $\alpha \in (0, 1]$.

Should α take the value 1, all de facto power spending corresponds to private goods granted to the leader's supporters, such as gifts, which cannot be enjoyed by the donor; lower values of α mean a bigger share of "public goods" in the de facto power bundle. These "public goods" are consumed both by those supporting the leader, and the leader herself (but not by the representative citizen).

Alternatively, the parameter α is the marginal cost of producing one unit of de facto power.

$P^d(.)$ is the probability of deposition; it is derived from the survival condition (see below). Ψ is the exogenous outside option of the leader; that is, it is her life-time utility in the event that she is removed from power. While in the real world former leaders may enjoy generous pensions after they retire from politics, others may be removed from power by death. The variation of post-politics outcomes is great (but the removal by death is probably more likely in non-democracies); a database on those outcomes exists.

3.4 Survival in power, and the probability of deposition

The leader is subject to a set of constraints. A leader is deposed if the following *survival condition* is not honored:

Survival condition [SC]*:*

$$U\left(\left(1-\lambda\right)y\right)+\beta\omega'\geq U\left(\xi y\right)-d-\phi+\beta\omega^{0} \tag{4}$$

The leader survives in power if the option of deposing the leader today is less valued by the citizens than the present expected utility they have just been offered. It depends on the contemporary realization of the random variable d. Should deposition and keeping the same leader yield the same value, it is assumed that citizens keep the leader.

The LHS of (4) is the value for the citizenry from keeping the leader; it depends on the announced policies λ, and ω'; it consists of the utility from current period consumption when the announced share λ is applied, plus discounted promised utility; $U(.)$ is the utility function of the representative citizen; it is assumed to be of the CRRA type, with parameter ρ; β is the citizens' time-discount parameter.

The RHS of (4) is the value associated with deposition; in such case, the citizens do not have to share the GDP (y) between them and the leader, but total income suffers a loss of ξ; the value of deposition is thus composed of the utility from consuming ξy, minus the deposition utility costs d and ϕ, plus the discounted value of the citizens outside option, ω^0. This is the value for citizens when a new leader has just been assigned; it is the (possibly constitutionally inscribed) hypothetical utility promise new leaders should honor.

From (4), the leader remains in power when

$$d\geq U\left(\xi y\right)-U\left(\left(1-\lambda\right)y\right)-\phi+\left(\omega^{0}-\omega'\right)\beta\equiv d^{*} \tag{5}$$

With CRRA utility:

$$d \geq \frac{(\xi y)^{1-\rho}-1}{1-\rho} - \frac{((1-\lambda)\,y)^{1-\rho}-1}{1-\rho} - \phi + \left(\omega^0 - \omega'\right)\beta$$

$$d \geq \frac{\left[\xi^{1-\rho} - (1-\lambda)^{1-\rho}\right] y^{1-\rho}}{1-\rho} - \phi + \left(\omega^0 - \omega'\right)\beta \equiv d^* \tag{6}$$

Assuming d follows a continuous uniform distribution with support $[d^{min}, d^{max}]$, deposition takes place when the shock d is strictly smaller than d^*. Then, the probability of deposition is:

$$P^D = P^D\left(\omega', \lambda; \phi; \beta, \omega^0, \xi, \rho, d^{max}, d^{min}\right) = \frac{d^* - d^{min}}{d^{max} - d^{min}} \tag{7}$$

The probability of deposition depends on two choice variables: the promise ω', and the redistribution rule λ. Moreover, it is affected by the past choice ϕ. Hence, investment in de facto power matters for leader survival only one period after it was carried through. The probability of deposition also depends on the citizens' outside option ω^0. Clearly, the higher this option, the more likely it is that the citizens will remove the incumbent leader. The bigger the stock of power (ϕ), and the greater the income loss (ξ), the less likely deposition will be.

The leader increases her chances of survival by being generous with citizens in the present period (low λ), and by making big utility promises (ω'). Setting a high or low ϕ' has no effect on survival in the present period, but a higher one enhances survival in the following period.

The policies λ and ω' are *substitutes* in the context of survivability: for the same probability of deposition, the leader may promise less by giving a bigger share of GDP to the citizens in the present period. Some combinations of policies may lead to higher probabilities of deposition, unless the inherited stock of power is sufficiently high.

Through $P^D(.)$, the survival condition is implicitly included in the leader's objective function (3).

It is useful to define as well the probability of survival in power:

$$P^s(.) \equiv 1 - P^d(.) \tag{8}$$

The leader knows the distribution of d but does not observe its value when she announces her policies. Low values of d increase the likelihood of failure to honor the SC and, thus, of being deposed. Hence, deposition and, thus, *leader turnover* occur because d is unobserved by the leader when she makes her choices: ω' and λ may be set too low, for a given unobserved value of d, such that it becomes optimal for citizens to depose their leader.

The leader cannot infer anything about the present period d from the fact that he survived in the previous period because d is an independently distributed shock.

3.5 Promise keeping

A *promise keeping constraint* is also imposed upon the leader. If there would never be deposition, the promise keeping constraint would be

$$U\left(\left(1-\lambda\right)y\right) + \beta\omega' \geq \omega \tag{9}$$

where ω is the previous life-time utility promise. However, deposition is possible and, hence, the leader must not only honor the past promise, but also take into account the possibility of deposition. The life-time utility promise must cover all possible contingencies, and that includes both the cases of the leader remaining in power, and of the leader being removed from it. In honoring the past promise, the announced policies must, then, compensate society for the possibility of deposition.

Promise keeping constraint [PKC]*:*

$$P^s(.)\left[U\left(\left(1-\lambda\right)y\right) + \beta\omega'\right] + P^d(.)E_{dep}\left[U\left(\xi y\right) - d - \phi + \beta\omega^0\right] \geq \omega \tag{10}$$

It guarantees past life-time utility promises are honored. It states that the weighted average of life-time utility over the possibilities that the leader stays in power, or that she is deposed is at least as high as the previous life-time utility promised.

The weights are the probabilities associated with the two possible events, deposition and leader's survival in power. If the leader is kept, citizens get $U\left(\left(1-\lambda'\right)y\right)+\beta\omega'$. Otherwise, they get $U\left(\xi y\right)-d-\phi+\beta\omega^0$.

E_{dep} is the expectations operator conditional on the occurrence of deposition. Formally,

$$E_{dep}[.] \equiv E[.|d<d^*] \tag{11}$$

Given that $d \sim U[d^{min}, d^{max}]$, the PKC can be rewritten as:

$$\left[1-P^D(.)\right]\left[U\left(\left(1-\lambda\right)y\right)+\beta\omega'\right]+P^D(.)\left[U\left(\xi y\right)-\frac{d^*+d^{min}}{2}-\phi+\beta\omega^0\right]\geq\omega \tag{12}$$

where d^* is given by the expression in (6), and $P^D(.)$ is taken from (7).

The leader will no longer be accountable if she is removed from power. In that case, society gets $U\left(\xi y\right)-d-\phi+\beta\omega^0$. The leader considers this when making and honoring new promises.

However, the leader does not observe d and, thus, *ex ante*, the leader does not know what the realization of $U\left(\xi y\right)-d-\phi+\beta\omega^0$ would be (given that deposition occurs). This explains the expectations operator in the second term of the LHS of (10).

The leader is committed to society getting ω "on average", and this promise already considers the possibility society will depose her. Isn't the leader promising too much? No: by considering that society will get something even after deposition, the leader can actually promise *less*. The second term on the LHS of the PKC allows the leader to set a smaller ω' while still fulfilling the past promise ω.

The policies ω' and λ enter (12) directly, and indirectly through d^*, and $P^D(.)$. Are those policies substitutes in the context of keeping a given promise? Increasing λ decreases the LHS of (12) keeping everything else the same; increasing ω' increases the same LHS. Hence, the two policies are once more *substitutes*: while keeping the same promise ω, it is possible to promise a smaller ω' by extracting a little bit less income (smaller λ).

Then, starting with $\omega'=\omega$, and λ equal to the maximum λ that still satisfies (12) given ϕ and given parameters (I call this $\lambda^{max}(\phi,\omega)$), it is possible to decrease the promised life-time utility, that is, to promise ω' below ω, by setting λ below $\lambda^{max}(\phi,\omega)$. The leader

is able to honor the past promise and, at the same time, to promise less than that by being "generous", that is, by giving a higher share of income to the citizens than was strictly necessary in order to honor the PKC, that is, by setting $\lambda < \lambda^{max}(\phi, \omega)$. Then, in the following period, since the initial promise is now lower, the leader may extract higher rents: with a lower ω, the new $\lambda^{max}(\phi, \omega)$ will be higher.

I refer to this strategy of decreasing the promised level of utility in one period in order to be able to extract more rents later as the *fork strategy*.

The optimality of setting a new promise at a lower level than the previous one, while honoring the latter, depends crucially on the possibility of accumulating de facto power (as will be seen in the results section). While trying simultaneously to extract more resources and to decrease the promised level of utility, the chances of being deposed may get dangerously high; to mitigate such risk it is necessary that the leader has the option of making deposition artificially costly by building up de facto power.

3.6 New leader's problem

The newly assigned leader's problem is identical to that of the incumbent leader, with two exceptions. The first of these is that the new leader is subject to a hypothetical life-time utility promise, ω^0, and the second is that he cannot benefit from the investments in de facto power of his predecessor (if any exist).

I assume, thus, that given a change of leadership, the stock of de facto power is either destroyed or changes into civil hands ($\phi^0 = 0$).

The hypothetical promise is assumed to be equal to ω^0, which is the outside option of the citizens. Clearly, a new leader cannot be selected without committing to providing society with at least the minimum they can get in a state of endless no-leadership ("anarchy")[17].

The new leader's value function is similar to that of the incumbent leader, with the exceptions being its arguments: $V\left(\omega^0, 0\right)$. And the RHS of the promise keeping constraint is ω^0.

[17] It is thus assumed that the minimum initial promise to society new leaders are willing to make is at least as high as the value of endless anarchy; otherwise, new leaders would never be selected.

3.6.1 A note on the "value of anarchy"

"Anarchy" appears in two different yet related contexts in this paper. First, when the leader is deposed, the society suffers *during one period* from disruption of governmental functions; this is represented by the parameter ξ. In this context, the "value of anarchy" is $U(\xi y)$. Second, if society was to remain leaderless *forever*, eventually some or all of the governmental functions would be resumed. In this longer situation, the "value of anarchy" is given by ω^0.

It is not necessary that $\omega^0 = U(\xi y) / (1-\beta)$. This equation means that the value of endless anarchy would be equal to the value of "anarchy in each and every period". This would imply that society would never be able to mitigate the upheaval experienced in the first period without a leader.

3.7 Possibility of resignation

The probability of deposition increases with the proportion of income the leader takes for herself, λ. Could the leader, then, set a sufficiently high λ such that she would guarantee her own deposition, in the sense that, whatever the realization of d, the citizenry would always depose her?

The highest possible d the leader can face is d^{max} (making it the most difficult for the leader to be deposed); and in order to get deposed, the leader can at most announce $\lambda = 1$. Then, from (4), and assuming utility is of the CRRA type with relative risk aversion parameter greater than 1[18]:

$$\begin{aligned} U((1-1)y) + \beta\omega' &\geq U(\xi y) - d^{max} - \phi + \beta\omega^0 \\ -\infty + \beta\omega' &\geq U(\xi y) - d^{max} - \phi + \beta\omega^0 \end{aligned} \tag{13}$$

For whatever combinations of ϕ and ω', condition (13) never holds (unless $d^{max} = +\infty$); hence, the leader can always force her deposition by announcing full income confis-

[18] I assume the relative risk aversion parameter of citizens and of the leader is 2 (cfr. section Main Results).

cation: $\lambda = 1$.

For each pair $\{\omega', \phi\}$, there may be or there may be not a λ strictly lower than 1 that also implies certain deposition.

Assuming the leader chooses to stay in power when she is indifferent to whether she stays or leaves, and assuming the value of her outside option is $\Psi = -\infty$, then it is never optimal to resign.

If $\Psi > -\infty$, it may be optimal for the leader to resign. I impose that the leader must always satisfy the promise keeping constraint even when resignation is optimal. This means that it might happen that resignation is optimal but, nevertheless, the leader opts for staying in power because otherwise the PKC would not be satisfied.

3.8 Limits to promises, and to de facto power investment

The leader's control variables are subject to other constraints:

Limit to rent extraction:

$$0 \leq \lambda \leq 1 \tag{14}$$

Clearly, the endowment share the leader takes to herself cannot be negative and it cannot be bigger than 1. Full confiscation is possible.

De facto power investment constraint (i):

$$\lambda y \geq i \geq 0 \tag{15}$$

Investment in de facto political power in one period cannot be bigger than the leader's share of income, and it cannot be negative. Note also that the leader cannot save resources (this is valid for citizens too, as manna is non-storable).

De facto power investment constraint (ii):

$$\phi' - \phi \leq \phi^{dif} \tag{16}$$

Net investment cannot be bigger than $\phi^{dif} > 0$. This is a *time-to-build* parameter: it takes time to build-up de facto power, hence, its stock cannot be increased immensely

overnight. Also, the accumulation of repressive means, and the gathering of loyalties are activities that require a certain level of secrecy: a great deal in a short time might just not be possible. It is likely easier to increase the stock of power in societies with fewer limits on a leader's activities; hence, a higher ϕ^{dif} is associated with less democratic regimes.

De facto power stock constraint:

$$0 \leq \phi \leq \phi^{max} \tag{17}$$

The total amount of available de facto power, $\phi^{\max}$, cannot be bigger than a given value. It is plausible that even in the most repressive regimes, stocks of de facto power are bounded from above. For practical purposes, ϕ^{max} will be measured as a share of GDP.

While necessary for solving the model numerically, this parameter has also a political interpretation: in a society with a weak system of checks-and-balances, the leader will be able to accumulate more de facto power. In democracies, a too-large stock of de facto power might trigger condemnation from the public, any opposition forces, and perhaps the international community. Hence, a lower ϕ^{max} is associated with more democratic regimes.

The parameters ϕ^{dif} and ϕ^{max} together provide a way to approximate convex investment costs. If the cost of investment in de facto power is convex, then it increases with the size of the invesment at an increasing rate, rendering large investments prohibitive. Then, it also becomes difficult to achieve very large stocks of de facto power.

Feasibility of promised utility constraint:

$$\omega' \leq \omega^{max}(\phi) \tag{18}$$

Lifetime utility promises are restricted to be feasible; the maximum feasible promise depends on the state variable ϕ.

The announced policies that are consistent with the maximum feasible promise are $\omega' = \omega^{max}(\phi)$ (the leader promises the feasible maximum), $\lambda = 0$, which means that the leader gives the whole GDP to the citizens, and $\phi' = (1 - \delta)\phi$: since the leader does not

appropriate any resources today, she cannot make any investment in power, and thus she is forced to let the existing stock of power depreciate. Then, $\omega^{max}(\phi)$ is:

$$\begin{aligned}
\omega^{max}(\phi) &= \left[1 - P^D(max)\right]\left[U(y) + \beta\omega^{max}\right] + P^D(max)E_{dep}\left[U(\xi y) - d - \phi + \beta\omega^0\right] \\
&= \left[1 - P^D(max)\right]\left[U(y) + \beta\omega^{max}\right] + ... \\
&\quad ... + P^D(max)E\left[U(\xi y) - d - \phi + \beta\omega^0 | d < d^*(max)\right] \\
&= \left[1 - P^D(max)\right]\left[U(y) + \beta\omega^{max}\right] + ... \\
&\quad ... + P^D(max)\left\{U(\xi y) - \phi + \beta\omega^0 - E\left[d | d < d^*(max)\right]\right\} \\
&= \left[1 - P^D(max)\right]\left[U(y) + \beta\omega^{max}\right] + ... \\
&\quad ... + P^D(max)\left[U(\xi y) - \phi + \beta\omega^0 - \frac{d^*(max) + d^{min}}{2}\right]
\end{aligned} \tag{19}$$

where $d^*(max)$ is the d^* from choosing $\{\omega' = \omega^{max}(\phi), \lambda = 0, \phi' = (1-\delta)\phi\}$, and $P^D(max)$ is the corresponding probability of deposition. With CRRA utility, $d^*(max)$is

$$\begin{aligned}
d^*(max) &= \frac{\left[\xi^{1-\rho} - (1-0)^{1-\rho}\right] y^{1-\rho}}{1-\rho} - \phi + \left(\omega^0 - \omega^{max}\right)\beta \\
&= \frac{\left[\xi^{1-\rho} - 1\right] y^{1-\rho}}{1-\rho} + \left(\omega^0 - \omega^{max}\right)\beta - \phi
\end{aligned} \tag{20}$$

and the probability of deposition in the feasible maximum becomes

$$
\begin{aligned}
P^D(max) &= P^D\left(\omega' = \omega^{max}, \lambda' = 0; \phi; \beta, \omega^0, \xi, \rho, d^{max}, d^{min}\right) \\
&= \frac{d^*(max) - d^{min}}{d^{max} - d^{min}} \\
&= \frac{\frac{[\xi^{1-\rho}-1]y^{1-\rho}}{1-\rho} + \left(\omega^0 - \omega^{max}\right)\beta - \phi - d^{min}}{d^{max} - d^{min}} \qquad (21)
\end{aligned}
$$

Plugging (20) and (21) into (19), and after some simplification, $\omega^{max}(\phi)$ is given by the following expression:

$$
\omega^{max}(\phi) = \frac{y^{1-\rho} - 1}{1-\rho} + \beta\omega^{max} + \frac{\left\{\frac{[\xi^{1-\rho}-1]y^{1-\rho}}{1-\rho} + \left(\omega^0 - \omega^{max}\right)\beta - \phi - d^{min}\right\}^2}{d^{max} - d^{min}} \qquad (22)
$$

The maximum feasible promise is thus dependent on the state variable ϕ.

3.9 On the minimum feasible promise

Promises are constrained by the PKC: for a given pair of states $\{\omega, \phi\}$, and a given announced λ, ω' cannot be so low that (10) fails. However, as seen in the section on the PKC above, it is possible to decrease the level of promised life-time utility by giving to the citizens a share of GDP that is bigger than that which is strictly necessary to honor the PKC, while setting $\omega' < \omega$. Hence, promises can be decreased. The corresponding levels of a leader's share that just satisfy the PKC ($\lambda^{max}(.,.)$) will, thus, be increasing: in one period, in order to decrease the promise, it is necessary to set λ below $\lambda^{max}(\phi, \omega)$; but since in the following period ω will be smaller than before, λ^{max} will be bigger in the following period, allowing for the leader's share to be larger. As λ^{max} goes up, the leader is allowed to extract more rents, while the citizens will consume less and less. Since with CRRA utility (with relative risk aversion parameter greater than 1)

$$
\lim_{c \to 0} U(c) = -\infty \qquad (23)
$$

and since there is a correspondence between citizens' share, and ω (the lower the promise, the lower the citizens' share needs to be), there isn't *seemingly* a lower bound for ω.

However, the LHS of the PKC is likely not a continuous function: when the probability of deposition moves from extremely high to 1, the first term of the LHS of the PKC collapses, and the PKC might suddenly fail. This suggests that there should be a lower bound for ω'.

Nevertheless, with ever-lower ω', and ever-higher λ, the probability of deposition increases, and this might not be in the interest of the leader: trying to reap a very big share of income at a very great risk of being deposed might not be optimal (and it should be noted also that the stock of de facto power is capped at ϕ^{max}).

3.10 Summary of Assumptions

Here I collect all previous assumptions, and introduce a few (minor) ones.

A.0: *Environment:* time is infinite and discrete; the economy is of the deterministic endowment type; total income in each period is $y \in \mathbb{R}^{++}$; income is non-storable; there is a mass 1 of identical citizens; there is some set of potential identical leaders; timing of events and information flow is as established in Section 3.1.

A.1: *Preferences:* time discount factors are such that $\beta, \beta^L \in (0,1)$ for citizens, and for the leader; the representative citizen's period utility is $U(a) - b$, where $U(.)$ is the instantaneous utility of consumption, a is consumption, and b are utility costs of deposition; it is thus assumed that deposition leads to incursion in a utility loss; $U(.)$ is of the CRRA type with parameter ρ; leader's preferences are also of the CRRA type, with parameter ρ^L.

A.2: *Outside options:* a leader's outside option is $\Psi > -\infty$; citizen's outside option is $-\infty < \omega^0 < \frac{U(y)}{1-\beta}$, which means that in case there will never be any leader ("anarchy forever"), the life-time utility is smaller than consuming the whole GDP in each and every period forever; hence, it is assumed that having the worst leader possible is still preferable to "endless anarchy"[19].

[19] The thesis that having a bad regime is better than having no regime at all because this situation opens the door to the worst atrocities has been recently presented in Snyder (2015).

A.3: *Rent extraction technology:* the share of income appropriated by the leader is $\lambda \in [0,1]$; full confiscation is, thus, possible;

A.4: *De facto power technology:* the total cost of producing i new units of de facto power is αi, with $\alpha \in (0,1]$; the stock of de facto power (ϕ') accumulates in accordance to $\phi' = (1-\delta)\phi + i$, with depreciation rate $\delta \in [0,1]$; the stock of de facto is limited to a maximum of $\phi^{max} > 0$; and net investment takes time to build: $\phi' - \phi \leq \phi^{dif}$.

A.5: *Newly assigned leader:* he accepts the value ω^0 as his hypothetical past promise; the previous stock of de facto power becomes useless to the new leader, so that he faces $\phi^0 = 0$.

A.6: *Deposition costs:* the deposition technology is additive and it includes a random part, d, and one of the leader's choice variables: ϕ; the random part is such that $d \sim iid$ $U[d^{\min}, d^{\max}]$ with $d^{\min} \in \mathbb{R}$, and $d^{\max} \in \mathbb{R}^{++}$, which means that this cost can be negative; should deposition happen, GDP is restricted to ξy in one period, with $\xi \in (0,1)$.

A7: *Promises:* $\omega' \leq \omega^{max}(\phi)$, which was determined above; ω' has a lower bound determined by the PKC.

3.11 Political Regime Parameters

The model is aimed at matching leader turnover with government effectiveness. The fundamental postulate is that what matters most for political-economic outcomes is neither de jure regime characteristics, nor any supposed leader idiosyncrasies, but rather de facto power and the way a polity works in practice, which means its de facto institutions.

With that postulate in mind, and intending to model both democracy and non-democratic regimes, I choose to keep any exogenous specifications of political regime and de jure power at a minimum: there are a total of eight political parameters

$$\left\{\alpha, d^{min}, d^{max}, \phi^{max}, \phi^{dif}, \phi^0, \omega^0, \Psi\right\} \tag{24}$$

and of these at most three may differ between the democratic parameterizations, and the

non-democratic ones:

$$\left\{\alpha, d^{max}, \omega^0\right\} \tag{25}$$

I discuss now the three allowed regime differences.

The distribution of d is an element of the model structure of power. As discussed above, it encompasses many different forces that help or hinder leadership change. Some of these forces are de facto in nature while others are de jure institutions.

A distribution taking on mostly negative values would imply the easy deposition of a leader: such would be a distribution of deposition *benefits*, not costs. This is suggestive of a democratic environment, with free elections, free press, and possibly low levels of ideological fractionalization within society[20]. A mostly positive distribution of d is symptomatic of permanent barriers to leader deposition. In two of the parameterizations presented in the next section, d^{max} will have a lower value; those parameterizations are thus referred to as democratic.

The de facto power technology parameter is α; should it take on a low value, it will be cheaper to produce de facto power, or a big part of the investment in power is actually directly enjoyed by the leader. Hence, relatively low values are associated with lower democracy levels in practice, in which case counteracting formal democracy is relatively easy. Furthermore, low levels of α imply that the leader easily obtains high levels of private benefits from investments funded by public resources. Such scenario corresponds to a low respect for the general good on the part of the leader. Moreover, a low α may mean that the stock of de facto power is mainly composed of goods and services with no rivalry in consumption: one and the same unit of those goods and services may be consumed both by the leader and his supporters.

As aforementioned, the citizens' outside option, ω^0, is the minimum hypothetical promise a potential leader must commit to in order to be selected. Hence, ω^0 represents the bargaining power of citizens *vis-à-vis* potential leaders. Clearly, if citizens would enjoy the same level of consumption in anarchy as they would when ruled by a leader they would refuse any candidate to the leadership. That bargaining power can be either constitution-

[20] A high level of fractionalization might make the coordination necessary to depose a leader too difficult.

ally defined (de jure), or determined by "the street" (de facto). Also, this power depends on some existing conditions, such as the general level of development of the country, social capital, human capital, etc.. Hence, while it precedes the announcement and implementation of any policies, it may be determined by the specific past history of a given place. Countries that enjoyed democracy and a market economy for a long time are likely to have developed an environment such that its citizens can endure a relatively long stretch without any leadership. The opposite is likely to be true for countries with an extended experience of repression. Then, the value of "endless anarchy" should be higher in those polities with a democratic past, and lower for the non-democracies, or young democracies.

The outside option of any leader is Ψ. It is unclear whether dictators have better or worse outside options than democrats: a fallen dictator might be killed, but she can also escape with a fortune secretly hoarded somewhere abroad. Hence, this parameter takes the same value for all model parameterizations.

4 Main results

The model is solved by value function iteration. The following parameter values are used:

Table 2: Parameter Values

		Non-democ.		Democracy		
	Parameter	(1)	(2)	(1)	(2)	(3)
y	total income	10				
β	citizens' time discount factor	0.95				
β^L	leader's time discount factor	0.99				
ρ	citizens' relative risk aversion	2				
ρ^L	leader's relative risk aversion	2				
ω^0	citizens' outside option	16		17.3		17.3
Ψ	leader's outside option	80				
d^{min}	unif. dist. minimum	-2				
d^{max}	unif. dist. maximum	4			3.5	3.5
ξ	GDP loss	0.05				
α	d.f.p. marginal cost	0.5			0.6	0.6
δ	d.f.p. depreciation rate	0.25				
ϕ^0	initial d.f.p. stock	0				
ϕ^{max}	maximum d.f.p. stock (% of GDP)	2.5%	0%			
ϕ^{dif}	maximum d.f.p. increase (% of GDP)	0.1%				

The reference parameterization is Non-democracy (1); the parameters for the other non-democracy case, and for the three democracy parameterizations are the

same as the reference parameters except for those values in columns N-d (2), D (1), D (2), and D (3).

Non-democracy's column (1) is the reference parameterization. I refer to it as the ND (1) parameterization. The other parameterizations are Non-democracy (2), and Democracy (1), (2), and (3). I refer to them as ND (2), D (1), D (2), and D(3) respectively. These parameterizations share the same parameter values with the reference parameterization except for those figures presented in columns ND (2), D (1), D (2), and D (3). I briefly comment on the reference parameters below.

The size of the economy (y) is purely conventional; most other level parameters are meaningful in relation to that size. The value of β is standard in the macroeconomics literature. The leader's time-discount factor differs from that of citizens': the assumption that the leader is more patient than society is necessary for matching average tenures. The leader and society have the same relative risk aversion parameter, which is standard in the macroeconomics literature.

Citizens and the leader have the same constant relative risk aversion parameter value.

As for α, it is assumed that half of the investment in de facto power generates direct benefits to the leader (other and beyond the increase in the probability of survival in power).

If a new leader comes to power, it is assumed he cannot use any fraction of the previously built up stock of de facto power ($\phi^0 = 0$). Citizens's outside option (ω^0), and the leader's outside option (Ψ) are both equivalent to receiving 50% of the endowment in each and every period forever; their values are different because I assume citizens and leader have different time-discount factors. In the analysis below, I present the life-time utility promises not in terms of utility levels but as the equivalent share of the fixed GDP that would be awarded in each and every period forever in order to honor the promise; I call this the *equivalent perpetual GDP share*.

The parameters d^{min} and d^{max} have been set such that the model approaches the mean duration in power of leaders in democracies and non-democracies. Those means and other statistics are shown in Table 3, where countries were defined as *democratic* when their POLITY 2004 scores lay between 6 and 10, and as *non-democratic* otherwise[21]. In all

[21] This criterion is standard in the literature.

specifications, d takes mostly positive values. The minimum value that d can take is the same in all five parameterizations, whereas d^{max} is lower on D (2), and D (3). The narrower positive scope of d implies that there are no major barriers in deposing a leader (other than buying back those who support her).

The parameters δ, and ϕ^{max} were not calibrated, as I am not aware of any literature on measuring the size of the de facto power sector in different countries. Such measuring may be approached, for example, as the sum of wages and rents accruing to public officials in propaganda offices, in the political police, secret services, and related offices. Measuring how many of those officials defect, and how much their facilities, and "means of production" wear out is not a trivial task either, but by setting δ at a seemingly high level I am assuming that the elite which supports the leader must be rewarded very regularly, and displays a relatively low level of loyalty.

Also, ϕ^{max} is motivated by a technical limitation: as the model solution method involves discretizing the state variable spaces, a large ϕ^{max} (relative to the permissible maximum de facto power net investment, ϕ^{dif}) would require a large grid for de facto power, and this would translate into much more computation time.

The parameter ϕ^{dif} is set with two ideas in mind, one empirical, the other technical. On the empirical side, it does not seem likely that in the real world any non-democratic (or democratic) leader would be able to divert a very large share of GDP into de facto power investment in one single period (quarter), no matter how powerful he may be. Hence, ϕ^{dif} shouldn't be very big. On the technical side, the stock of power can only be increased in one-period steps corresponding to ϕ^{dif}, and a large ϕ^{dif} may prevent any de facto power from being accumulated, even though it is an effective means of extending duration in power (see below). This is because the preferences of the leader are concave, and hence the leader desires to smooth his consumption. An implication of this is that it is not optimal to divert a very large amount of resources from consumption to de facto power in one single period, and to invest only a little while consuming much more in the following period. For this reason, ϕ^{dif} should also be a low value.

Finally, the parameter ξ was set also such that the model matches the empirical leader durations in power.

Table 3: Duration in Power (in Years)

Democracies: POLITY 2004 $\in [+6; +10]$				
obs.	mean	std. dev.	min.	max.
86	5.3	3.3	1	14.8

Non-democracies: POLITY 2004 $\in [-10; +5]$				
obs.	mean	std. dev.	min.	max.
65	13	9.8	1.9	46

Value function iteration is the method used to approximate the policy functions for ω', ϕ', and λ (cfr. equation 3); optimization is done over a discretized state variable space for $\{\omega, \phi\}$. With those policy functions, 10000 simulations are performed; each simulation is composed of 1600 periods. The maximum duration in power is capped to 300 quarters (75 years). Each and every simulation begins with a new leader and with no stock of de facto power. Statistics are computed first for each simulation, and then means are taken across simulations; the latter are shown below:

Table 4: Simulation Results

	Non-democracy		Democracy		
	(1)	(2)	(1)	(2)	(3)
Mean n. of leaders per 100 years	7.5	15.1	19.4	19.0	20.5
Mean effective final power stock	1.19%	0	0	0	0
Mode effective final power stock	2.5%	0	0	0	0
Mean leader's share	51.1%	51.06%	28.32%	51.44%	28.23%
Maximum leader's share	52.69%	51.26%	50.91%	52.26%	50.73%
Initial effective leader's share	48.44%	48.44%	21.29%	48.53%	21.38%
Final effective leader's share	50.86%	51.07%	30.95%	51.52%	30.78%
Final announced leader's share	50.9%	51.08%	31.22%	51.55%	31.05%
Average duration in power	13.8	6.5	5.0	5.1	4.7
Std. deviation of duration	19.5	6.4	3.4	5.0	3.2
Maximum duration	70.3	30.4	15.2	24.7	14.5
Minimum duration	0.16	0.04	0.05	0.02	0.04

Non-democracy (1) is the reference parameterization; ND (2) is the same as the reference, but de facto power is not allowed; in D (1) the citizens' outside option is higher; in D (2) the cost of de facto power is higher, and the maximum deposition shock is lower; D (3) combines D (1) and D (2). All the statistics are means taken across 10000 simulations. Percentages refer to GDP. Duration statistics are in years.

4.1 Non-democracy

Non-democracy parameterizations (1) and (2) differ only in that investment in de facto power is not allowed in the latter.

In both cases, forced deposition is never optimal for any combination of state variable

values.

The most striking difference between the simulation results for the two non-democracy cases is that average duration in power is much shorter when investing in de facto power is not possible (Column 2 of Table 1). Keeping everything else the same, such possibility more than doubles the average duration in office. This average duration is very close to the empirical figure, which is 13 years, when de facto power may be accumulated.

De facto power is, thus, an effective means for significantly extending survival in power. It is used in equilibrium when it is possible to use it and even though it represents a cost for the leader, and it is continuously accumulated until it reaches the maximum allowed as long as the leader remains in power: the mode stock of power the leader inherits in his last period in power is 2.5% of GDP, which corresponds to the maximum permissible.

The pattern of optimal accumulation of de facto power can be seen in the figure below. There, I form a *no-deposition sequence*, that is, a sequence of policies that would take place if there was never deposition (but the leader didn't know deposition was never to take place). After an initial period with no investment, the stock of de facto power increases continuously up to the maximum allowed.

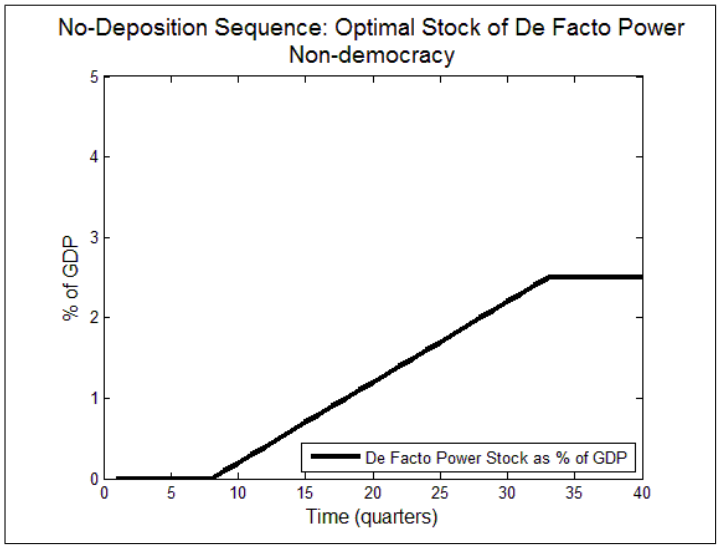

Figure 1: No-Deposition Sequence: Optimal Stock of De Facto Power, N-d (1)

It takes 32 quarters for power to reach its maximum, and while the average duration in power is almost 14 years, time in power registers a very big variation in the first non-

democratic parameterization (the standard deviation is higher than 19 years). Hence, not all leaders survive for long enough to let power reach the maximum of 2.5% of GDP: the average effective stock of power at the last period in power is just 1.19% of GDP[22].

The maximum duration in power is limited to 75 years; the average across simulations of the maximum duration gets close to that limit when power can be accumulated: 70.3 years.

The mean leader's share of GDP in the two non-democracy cases is almost identical, and it is very close to the mean of the second democratic parameterization. Hence, de facto power, while enhancing survival in power, does not directly lead to higher rent extraction for the leader. It may only help extract rents in an indirect way: when the optimal pattern of rent extraction is increasing along time, by increasing survival in office de facto power helps a leader achieve higher levels of rents. However, that pattern is not always increasing, as the figure below shows.

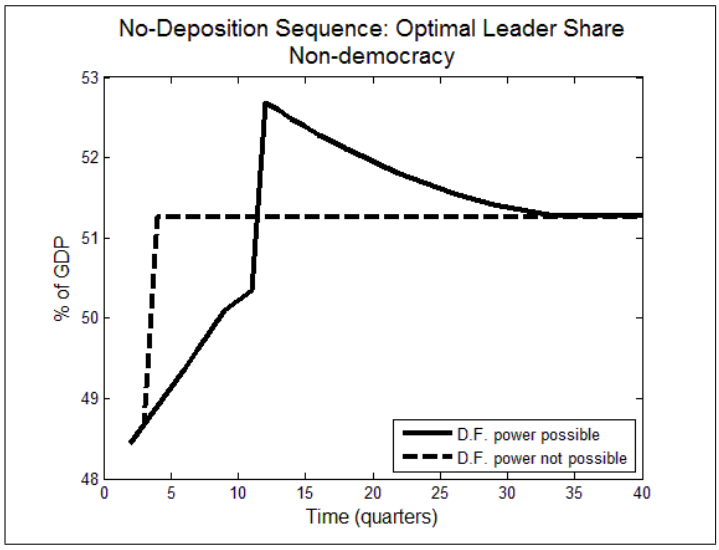

Figure 2: No-Deposition Sequence: Optimal Leader Share in Non-democracy

Figure 2 makes it clear why the mean leader's share is almost as big when de facto power investment is not possible: predicting a relatively short stay in power, the leader is much more eager to appropriate resources. In such case, the pattern of rent extraction is

[22] The final effective stock of power is the amount of de facto power at the beginning of the period in which the leader is deposed. In that period, the leader is still able to announce a new level of power, but this level ends up not becoming effective.

faster: even though she is in power for less time (on average), after the first two quarters and until the eleventh quarter, the leader with no de facto power extracts larger rents than the leader with power.

This greater eagerness for rent extraction does not, however, imply higher chances of removal from office for the leader without de facto power (cfr. figure 3 below). In fact, after the first three quarters, the probability of deposition is higher for the leader with the option to invest in power. The two probabilities will be exactly the same in the 17th quarter, after which the leader with de facto power will become more secure than the leader without power.

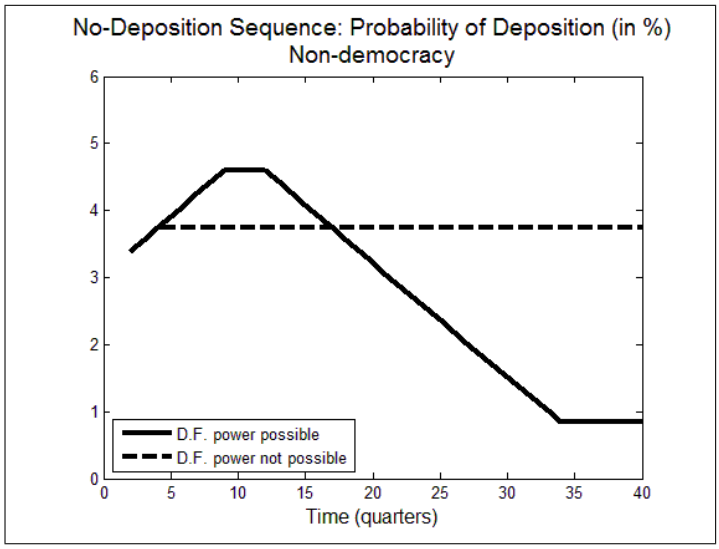

Figure 3: No-Deposition Sequence: Probability of Deposition in Non-democracy (in %)

That is because the circumstance of having or not having access to de facto power changes radically the policy on promised utility (see figure 4); in fact, it changes the whole optimal-policy mix.

As discussed in Section 2.3.5 "Promise Keeping", a leader who wants to follow the strategy of simultaneously increasing rent extraction and decreasing the promised level of utility, which I call *fork strategy*, in order to be able to extract even larger rents in the future, will face fairly high probabilities of deposition. This risk is, however, worthwhile precisely because there will be higher rents to benefit from: exposure to higher risk is compensated by the expectation of higher consumption. Why then shouldn't the leader without power follow the same strategy?

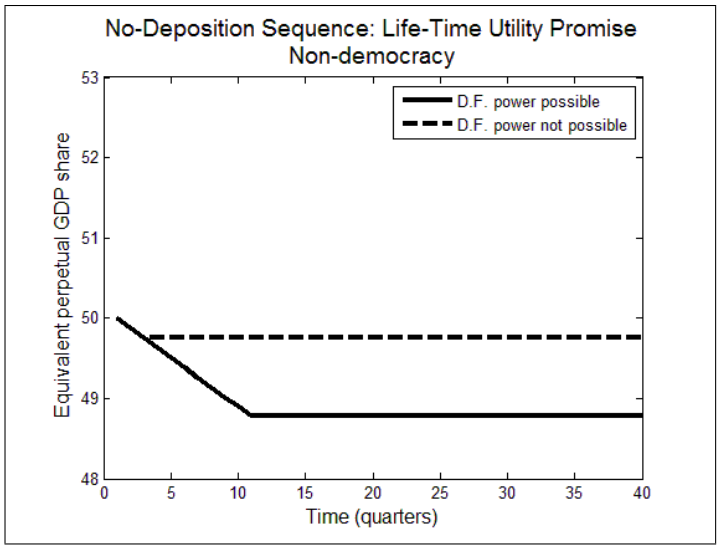

Figure 4: No-Deposition Sequence: Life-Time Utility Promise in Non-democracy

The reason is that, without power, the probability of deposition under the aforementioned strategy would just be too high to be worthwhile. This can be seen in the plot (5) which compares the probability of deposition for the leader with de facto power (as in figure 3) with the probability of deposition for the same leader "inflated" by removing the effect of the accumulated power, this is, by dropping the ϕ from equation (6). Unsurprisingly, the probability is higher with the effect of power removed.

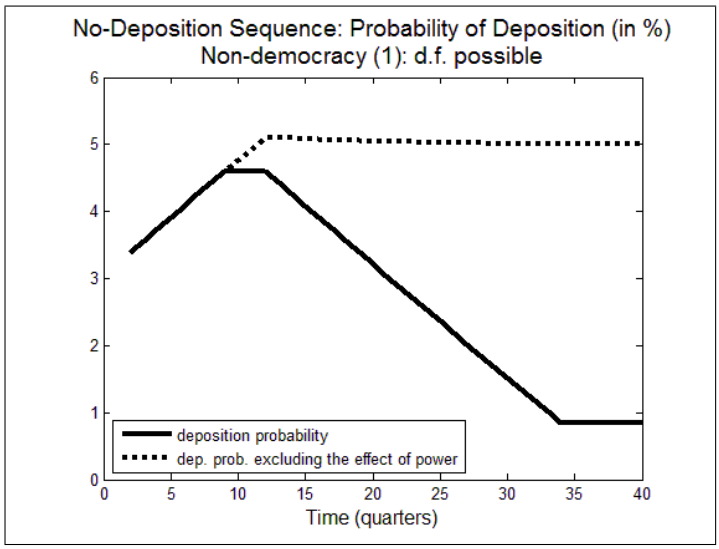

Figure 5: No-Deposition Sequence: Prob. of Deposition in Non-dem. (%) when d.f. power is possible including and excluding the effect of power on the probability

The leader with no de facto power could, however, initiate the fork strategy and follow it up to the 8th quarter: however, up to that quarter, he actually consumes more than the leader with de facto power, as the latter keeps decreasing the promised level of utility from quarter 3 [Q3] to Q11 (cfr. figure 4) and, hence, cannot increase his share as fast as the leader without de facto power can (otherwise, he would violate the promise keeping constraint). Furthermore, the leader with no de facto power would be stuck in a probability of deposition of about 4.61%, while if he just follows his own strategy, the probability of deposition will remain at 3.74%[23].

All this being said, the possibility of investing in de facto power changes the optimal-policy mix in a qualitative way; with de facto power, the optimal policy is the fork strategy. Without it, such strategy is not only too risky, but it is also not worthy in terms of rent extraction, because decreasing the promised utility continuously in the first periods requires extracting rents at a slower pace.

Finally, I present the no-deposition sequence for a non-democratic leader's consumption in Figure 6.

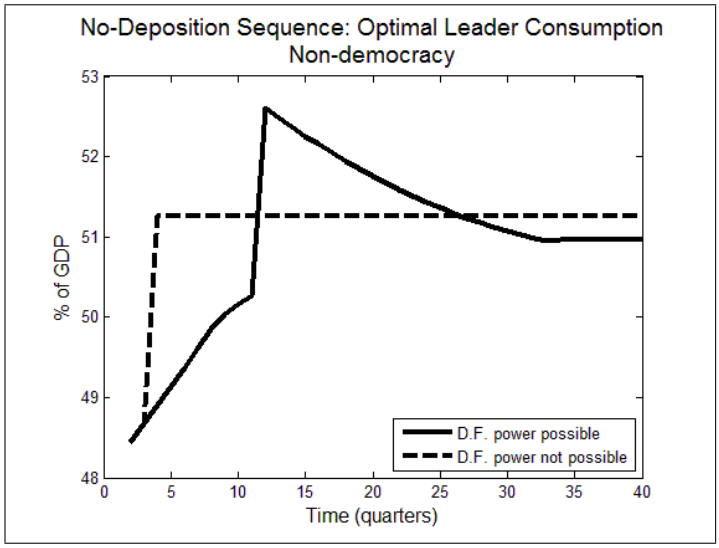

Figure 6: No-Deposition Sequence: Optimal Leader Consumption in Non-democracy

I define the *long run* as the time it takes until all the optimal policies become constant in a no-deposition sequence. In the long run, the non-democrat without the option of

[23] As these probabilities of deposition are quarterly, a 1% difference implies a significant difference in expected durations.

investing in his own power actually consumes more than the non-democrat with power. However, the combination of consumption and chances of survival is more favorable to the latter: a difference of 2.9% in the quarterly probability of deposition is extremely significant (cfr. figure 3). Furthermore, the average expected duration in power of the leader without power almost coincides with the point at which the two lines cross for the last time in the graph above: on average, the leader with no power is unlikely to remain in power for much time beyond the point at which his consumption his superior to the consumption of the leader with power.

It is worth noting that in both specifications the patterns of rent extraction and consumption increase in the first periods and eventually stabilize: up to a point, the longer a leader stays in power, the more he gets for himself; in a sense, duration causes extraction, as time in power enables more rent extraction.

4.2 Democracy

I present simulation results for three different democracy parameterizations: D (1), D (2), and D (3). The first one is identical to ND (1) except for the citizens' outside option, which I set as equivalent to a 74.1% share of GDP forever. This outside option implies that life without a government leads to a loss in production, but not as big a loss as that which occurs in the case of non-democracy. The implied assumption is that a democratic country has a set of structures and institutions that will work and allow a high level of production, with respect to potential GDP, even in the absence of any government.

In the second parameterization, I keep the same citizens' outside option as in the non-democratic benchmark, but now the barriers to deposition are lower (d^{max} is lower), and, possibly due to checks and balances and the role of the media, the share of the investment in de facto power that is directly consumed by the leader falls to 40% $(1-\alpha)$. A common ω^0 for ND (1) and D (2) implies the alternative assumption that whether society begins in democracy or dictatorship, the value of "anarchy" (as absence of government) will be the same for citizens: they will be able to produce and consume the same share of potential GDP, and this share will be low.

The third democracy parameterization combines the changes in D (1) and D (2) *vis-*

à-vis ND (1).

In all cases, resignation is never optimal for any point in the state space. The mean leader's share is significantly reduced only in D (1), and D (3), but not in D (2): while a bigger value of anarchy implies that the leader will have to grant a very big part of the GDP to the citizens, otherwise they will be better off by themselves, a smaller barrier to depose has almost no effect on leader's rent extraction, and less direct consumption out of investment in power does not significantly decrease the incentive to extract rents.

In D (1), the average duration in power is decreased to less than half that in ND (1), and it matches the empirical duration in power of leaders in democracy: 5 years. Duration in power is also lower in D (2) than in ND (1). Putting all the democratic parameters together does not decrease the average duration in power by much more: the leader stays in power on average 4.7 years in D (3).

Whether the outside option of citizens is higher, or the barriers to deposition are lower together with higher cost of investment in power - it is not optimal to invest in de facto power. As the leader expects to stay in power for a relatively short period, the optimal strategy is to consume as much as possible as early as possible, without applying any appropriated resources to de facto power investment, and even though the leader is very patient ($\beta^L = 0.99$). It is just not worthwhile to be patient for quite a number of quarters before being able to enjoy a pattern of high consumption and low probability of deposition as in figures 6 and 3 (d.f. power possible), because the chances the leader survives up to that point are low.

Turning to the no-deposition sequences, I begin by presenting the leader's share under the three different democratic regimes. As there is no investment in the de facto power in any of the specifications, a leader's share coincides with his consumption (see figure 7).

While both the pattern and the level of rent extraction in D (2) is not that different from ND (2)'s, in D (1) and D (3) the leader's share at the beginning of a spell in office is much lower than in the case of non-democracy.

In the long run, even democratic regimes 1 and 3 will register leader's shares at very similar levels to those in non-democracy. However, the leader in D (1) or D (3) is not likely to remain in power long enough to enjoy such levels. This means that while even

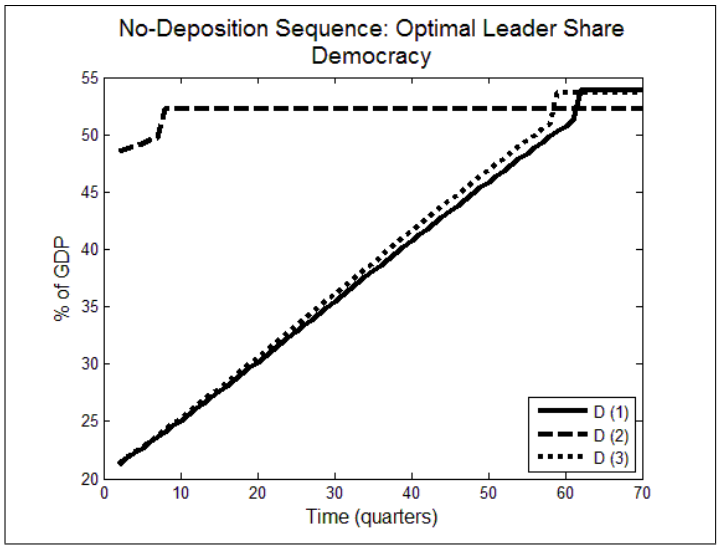

Figure 7: No-Deposition Sequence: Optimal Leader Share in Democracy

democrats will try to extract as much to themselves as they can by manipulation of the promised utility level downwards, they just don't manage to achieve dictatorial levels of appropriation because institutions will remove them much too early for that.

The model, thus, is consistent with the hypothesis that leaders are prone to behave in the very same way in both democracy and dictatorship, the main difference in regimes being how easy it is for society to depose them.

Ease of deposition can be checked in figure 8 for democracy, and in figure 9, where all the five regimes are represented.

In the two democratic specifications with initial lower rent extraction, the probabilities of deposition are the lowest of all the five regimes in the first periods in power (figure 9). But these probabilities increase continuously over time, becoming by far the highest of all regimes in the long run.

This is in line with the democratic experience in general, and with what is expected from democratic regimes: recently elected leaders should be secure in power, as they enjoy political legitimacy, at least for a modicum of time; however, as time passes change of leadership should not only be possible, but it may also become desirable, as the leaders implement their policies, and, thus, their legitimacy is hollowed out, and as they appropriate an increasing share of income.

The only democratic regime where the leader benefits from rent extraction as high as

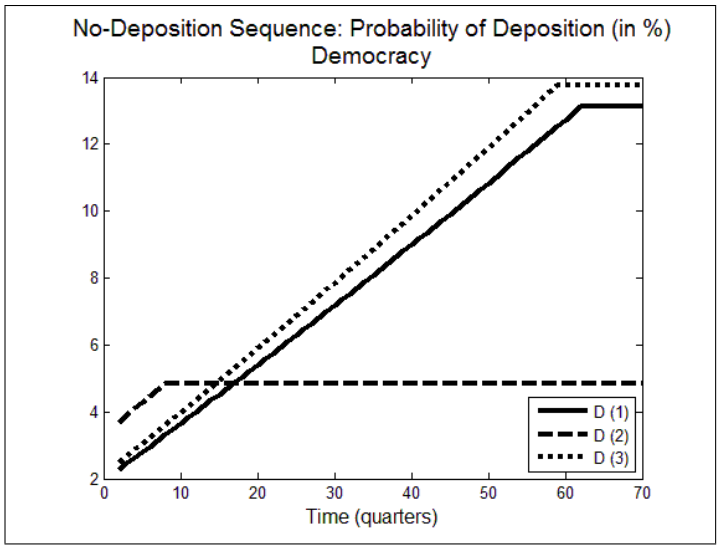

Figure 8: No-Deposition Sequence: Probability of Deposition in Democracy (in %)

in dictatorship is also the one where the probability of deposition is the highest of all the three democracy specifications. The time pattern of the probability of deposition in D (2) is also very similar to that of the non-democracy without access to power (ND 2).

Of the five regimes, the only one where the probability of deposition is ever decreased in the optimum is the non-democracy with power (ND 1). Clearly, without de facto power, it is not optimal to decrease that probability, by either increasing the promised utility or by decreasing the leader's share or both: as the leader expects a short spell in power, it is better to extract as much as possible as soon as possible. Then, the patterns displayed in figure 10 are as just the expected ones: in all democracy cases, it is never optimal to promise more than in the previous period.

It is interesting to note that D (1) and D (3), while displaying the highest long-run levels of promised utility, are also the ones where those levels fall the most from the initial period onwards.

Just as in the case of non-democracy, the patterns of rent extraction are all strictly increasing for, at least, the first periods: the longer a leader stays in power, the bigger the share he collects from the economy's product.

The absence of investment in de facto power under democracy matches the empirical fact of greater government effectiveness in democratic countries, as investments in de facto

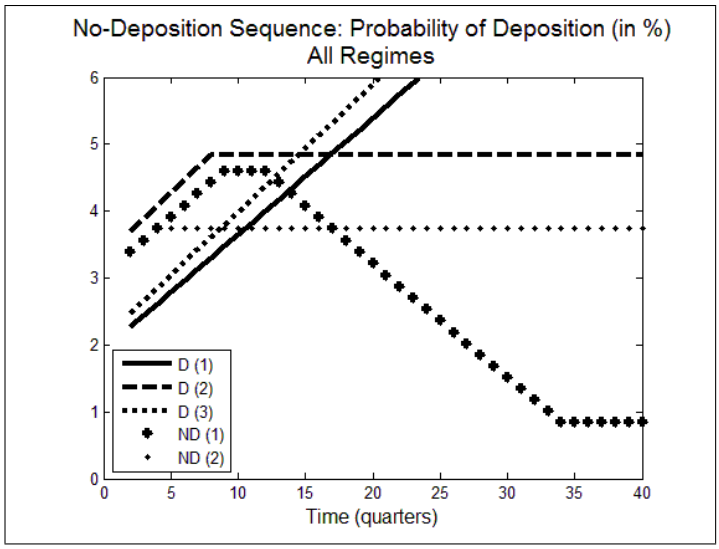

Figure 9: No-Deposition Sequence: Probability of Deposition (in %), All Regimes

power are purely wasteful.

4.3 The role of de facto power

In a non-democracy, investment in de facto power is useful for the leader, as it is set optimally at strict positive levels, even though it is costly. De facto power does not directly lead to higher levels of rent extraction, but it allows leaders to stay in power for significantly longer. Since patterns of rent extraction are always increasing in the first periods, de facto power enables higher rent extraction by increasing survivability in power.

By setting a sufficiently high level of de facto power, it is possible to promise a low level of utility while still enjoying a low probability of deposition. Low utility promises for society translate into higher rents extracted for the leader. That, in turn, allows the leader to keep the stock of de facto power at a high level.

4.4 Policy recommendations

A high citizens' outside option is crucial to guarantee that rent extraction is relatively low. In practice, the "value of anarchy" can only be high when society is not much dependent on government for achieving its potential GDP, or when the relative contribution of government to GDP is low. While the second condition is a consequence of fundamental

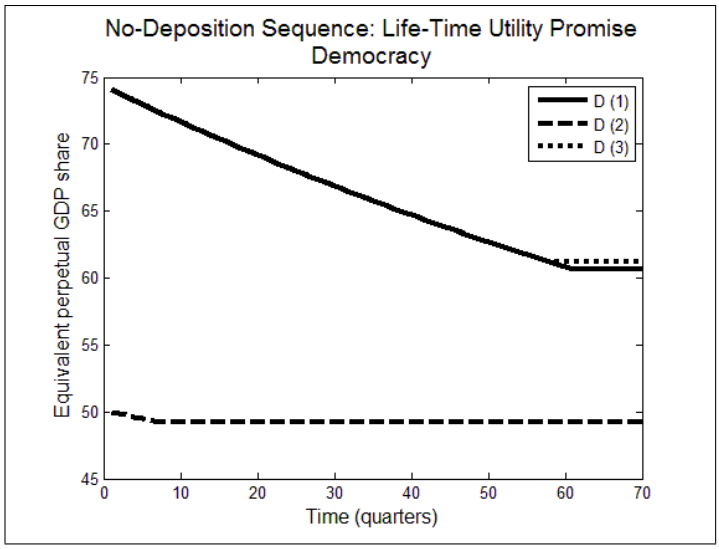

Figure 10: No-Deposition Sequence: Life-Time Utility Promise in Democracy

political choices (how big should government be?), the first condition may be accomplished by removing the impediments and hurdles that are set by the administration and that make it difficult to create enterprises, to exercise a profession, to invest, etc..

When it is not possible to invest in de facto power, and when it is not optimal to do so, leaders try and appropriate as much income as fast as they can. When investment in de facto power takes place, the pattern of appropriation is slower, but it reaches higher levels. In any case, rent extraction always presents a non-decreasing pattern.

It should be noted that investment in de facto power is wasteful: it would be Pareto-improving to keep the probabilities of survival, and the same distribution of GDP, and just let the leader or society or both consume a part or the whole of the resources invested in power.

Then, in order to improve efficiency and the welfare of citizens, investment in de facto power and survival in office should become simultaneously more difficult, as by making de facto power accumulation more difficult alone, there will be a stronger incentive for leaders to behave impatiently and extract more rents in the first periods. A higher citizens outside option, or lower barriers to deposition together with a high cost of investment, or everything together will achieve those objectives.

In practice, a lower range for d can be easily achieved in an already-democratic context

by setting shorter term limits, by restricting re-elections, by determining the executive power to face votes of confidence regularly; these settings are much more difficult to implement in a non-democracy. Furthermore, there is a trade-off in all those constitutional features: while shorter tenures make it difficult for leaders to encroach upon an economy's resources, it may also lead to a government's myopia and "short-termism", in which the optimal policies of an opportunistic government do not coincide with those of society. Also, governments expected to last only a short period may face less favorable external constraints, as for example higher interest rates in international financial markets (cfr. Cuadra Sapriza, 2008).

The cost of investment (or the share of it that is not directly consumed by the leader) may be increased by allowing a mass media that scrutinizes the necessity of each and every item on the spending side of a government's budget, especially those items concerned with internal security and defense. It also helps to have an independent authority that checks all government procurement plans, and these should be made transparent, competitive, and it should be given sufficient time so that public opinion can try to prevent some of those plans from taking effect.

The prescription of a lower proportion of de facto power that directly benefits the leader (beyond increasing his survival) is an argument for separation of powers understood in a broad sense. For instance, a leader should not be allowed to use the military, the secret services, or the judiciary for his own purposes, and this objective can only be attained if there is sufficient separation between the leader that is responsible for income redistribution, and those institutions.

5 Conclusions

This paper presents a model that links rent extraction, investment in de facto power, and tenure of leaders who have the power to redistribute wealth between themselves and society. While the level of institutional detail is kept at a minimum, the model is able to replicate real statistics on leader duration in power for both democracies and non-democracies. It also matches the stylized fact that government effectiveness is higher in democratic countries, as investment in de facto power is inefficient, and it does not take

place in equilibrium in the democratic model parameterizations.

The model sheds light on the way a specific mechanism works to keep a leader in power for a long time while allowing him to extract high rents. By decreasing the probability of deposition, and given that the time pattern of rent extraction never decreases, de facto power indirectly leads to higher resource appropriation by the leadership.

Thus, this paper offers a specific solution to the paradox of "good policy is bad politics, good politics is bad policy". The mechanism is de facto power investment, which is characterized as spending that, on the one hand, generates a utility punishment that society must endure should it decide to depose the leader, and, on the other hand, provides some direct consumption benefits for the leader which are independent of society's decision whether or not to keep her in power. When investment in de facto power is possible, a given low probability of deposition can be achieved with a smaller life-time utility promise; such low promise can then be fulfilled by the leader while extracting a higher level of rents for herself than in the period before.

Some policy suggestions are drawn, namely, that preventing a leader from directly benefiting from spending categories that can be used as de facto power, such as those related to security and intelligence gathering, will reduce the incentives for such spending, as it will become more costly. Also, a society less dependent on the government enjoys stronger bargaining power before the leader, who is then forced to be more benevolent towards the citizens.

The possibility of investing in de facto power changes a leader's optimal behavior. Whether in democracy or not, the patterns of rent extraction never decrease. However, non-democratic leaders without access to de facto power, and democratic leaders facing a society that is highly dependent on the government will both extract as much as possible as fast as possible, while the former enjoying de facto power will appropriate resources at a slower pace. In all regimes, the promised life-time utility will decrease in the initial periods before stabilizing.

In recent times, constraints on re-election in the law and in practice have been eased in some South American countries, but also in Russia, while civil dependence on the administration has not diminished. The model predicts an increase in the expected tenure

of officials, an increase in rent-seeking activities, a reduction of net incomes to citizens, and a recrudescence of public spending on activities whose main effect is the consolidation of the political elites in those countries.

The model is based on recursive contract theory. For its parsimony, it can support plenty of extensions and adaptations aimed at answering a myriad of political-economy questions.

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Appendix: Duration in power, and government effectiveness

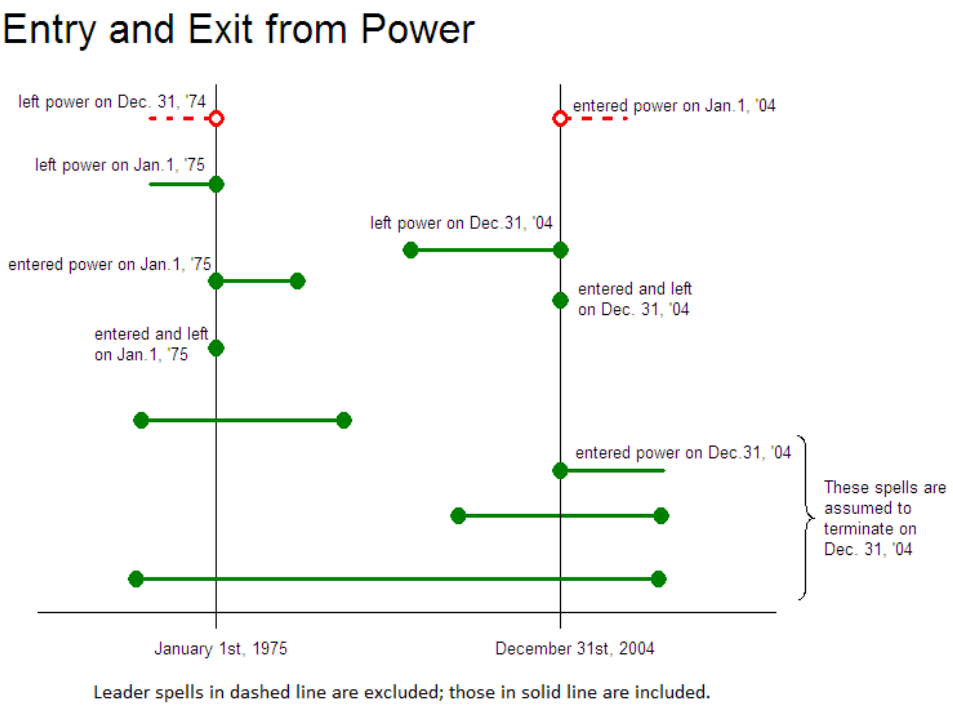
This appendix presents, and discusses the two variables used in the introduction to motivate this paper.

Government effectiveness 2004: taken from Kaufmann et alea (2009a); it captures "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (Kaufmann et al., 2009b); the range is $[-2.5, 2.5]$ with higher values meaning better governance; it is an estimate and I use the one for 2004. Total number of countries: 209. It exhibits a correlation greater than 95% with Kaufmann et alea's indicator on corruption. "Government effectiveness" has been used as a proxy for corruption and rent extraction by Persson and Tabellini (2003).

Average Years in Power: based on data from Archigos (Goemans et al., 2009a), which collects the exact dates of entry to and exit from power for effective primary rulers of independent states from 1875 to 2004. The effective primary ruler is "the person that *de facto* exercised power in a country" (*idem*). In practice, the highest responsible for foreign affairs and war/peace decisions is coded as the leader. I have changed the database to account for the few cases in which the effective primary ruler does not coincide with the economic policy/redistribution policy leader, which is the concept of leader I model in this paper (notes on these cases are available upon request). Total number of countries: 189.

For the reference period **1 January 1975 - 31 December 2004**, I compute the **simple mean of number of consecutive years in power** for all leaders that have exited from power after 31 December 1974 and up to 2004. A leader whose time in power is from 1950 to 1 January 1975 is included but a leader ruling from 1950 to 31 December 1974 is not. A leader that entered power on 31 December 2004 or before and exited on 31 December 2004 or after is included and **assumed** as leaving power on that date. Also, if both entry to and exit from power take place in 1974 then such leader is not included. If entry to power is on 1 January 2005 or after, then, no inclusion. (Country-specific

cases and definitions: available upon request). The following graph depicts the inclusion criteria.



About the assumption above: if one believes government effectiveness 2004 was observed at 31 December 2004, than it is not relevant and it does not make sense to use our knowledge that some leader-spells ended after that exact date. For present purposes, the duration of a given leader-spell up to the date of observation ends on that same date. Thus, the assumption that leaders in power on 31 December 2004 exited from power on that date is better described as assuming government effectiveness was observed on that date. If we assumed the spot of time for making that observation was, say, 30 June 2004, we would truncate leader-spells on that date. Since government effectiveness is an indicator based on many variables drawn from many data sources (cfr. Kaufmann et al., 2009b), it is quite plausible that on average the observation spot date across those sources is closer to 31 December 2004 than to any other specific day of that year.