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Survival of Political Leadership

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Abstract

We focus on political violence as a mechanism that allows the political leader to fight off opposition and increase his chances of re-election. In a *collusive equilibrium*, the leader allocates a bribe to the army, and the latter responds by producing political violence. Such an equilibrium is more likely, the larger are the public resources available to the leader; the lower is army's potential punishment and salary offered by the opposition regime; the more severe is the incumbent's potential punishment; and when the political leader is sufficiently patient, but the army is shortsighted enough.

JEL Classification: D72, D73, D74, H00,O12.

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1 Introduction

The third wave of democratisation swept over Sub-Saharan Africa in the beginning of the 1990s. It was at this time that most of the leaders still holding on to one-party politics finally gave in to the aspirations of active civil groups and demands of international donors to establish multi-party systems. Recurrent elections are now held in all but a few countries.

But regular multi-party elections has not guaranteed fully liberal democratic practices with free and fair competition on access to power. Scholars (e.g. Levitsky and Way 2002; van de Walle 2003; Schedler 2006) generally agree on that many of these countries are lead by authoritarian regimes employing diverse repressive measures, a characteristic arguably exacerbated by the absence of strong politico-legal institutions. An interesting feature in the multi-party Africa is the longevity of regimes and multiple electoral victories of individual leaders. Indeed, currently more than 25 % of Sub-Saharan countries have had the same leader holding on to power for at least 13 years[1].

Yet in terms of economic and social performance, a large part of these countries rank at the bottom of the income and human development charts, while receiving substantial amounts of foreign aid, or possessing significant natural resources, the phenomenon commonly referred to as the 'resource curse'. Furthermore, most of these countries have been reported to be among the most corrupt in the world[2]. In view of these factors, it is puzzling how so many leaders with poor economic, social and administrative performance hold on to power when the citizens have the opportunity to replace them in the elections.

In this paper, we construct a game-theoretical model to answer the question of how corrupt, authoritarian leaders with weak economic and social performance maintain power in countries with recurrent elections. The model has the novel aspect of emphasising the use of political violence as a key mechanism used by political leaders with the objective of undermining the

[1]These are Angola (28 yrs), Burkina Faso (20 yrs), Cameroon (25 yrs) Chad (17 yrs), Equatorial Guinea (28 yrs), Gabon (40 yrs), Gambia (13 yrs), Guinea (23 yrs), Sudan (18 yrs), Uganda (21 yrs) and Zimbabwe (27 yrs), with the years in power of the incumbent in parentheses. Another country would be Togo whose president Gnassingbe Eyadema died while in office in 2005 after 38 years in power.

[2]Governance Matters 2007. Worldwide Governance Indicators, 1996-2006.

efforts of the political opposition and influencing the electoral outcome to guarantee their own, often longstanding survival. As such, the focus of the paper is on a collusive agreement formed between the leader and, arguably, the most powerful group in a society, the military. In a *collusive equilibrium*, a leader offers the army a bribe, and the latter, presumably corruptible, responds by producing politically motivated violence. The equilibrium may exist when the size of the bribe that the army demands is at most as large as the maximum bribe that the leader is prepared to pay. Thus, particular attention is given to the *circumstances* under which an agreement of the sort may arise and is sustained as a subgame perfect equilibrium.

Our comparative static results give foundation to several policy recommendations that may be of interest to policy makers within and outside Africa and other developing countries around the world. Firstly, higher revenues from foreign aid or rents from natural resources, contributing to a larger public budget available to the leader, increase the likelihood of a collusive equilibrium. Similarly, Acemoglu *et al.* (2004) observe that such revenues help a kleptocrat buy off opponents and maintain power, while Robinson *et al.* (2006) conclude that resource booms associate with increased (inefficient) investments into political survival. In addition to explaining the longterm survival of certain leaders and their regimes, we study and analyse the origins and existence of political violence, prevalent in contemporary Africa.

An important question is also whether a third party, within or outside Africa, should provide support to the political opposition in its struggle to replace the authoritarian leader. Our results indicate that a biased financial or military support to the benefit of the opposition could indeed prevent the emergence of political violence, and thus increase opposition's chances of gaining power.

Another dimension to explore is the role of retribution in fighting the longevity of a corrupt leader. We conclude that whereas the prospect of a harsher punishment will make the incumbent less eager to give up power, the effect is opposite when the military is concerned. This suggests that any possibility of transferring power in countries like Robert Mugabe's Zimbabwe may require promises of immunity and peaceful, possibly wealthy retirement. On the other hand, the anticipation by the top military officers of the establishment and existing

rulings of international tribunals may have the effect of restricting their willingness to violently interfere with the free and fair electoral process.

Finally, we find that the collusive equilibrium is more likely the higher is leader's discount factor. For a patient leader, the value of being in power tomorrow is larger, this encouraging him to consume less today. As to the army, the opposite holds, and the collusive equilibrium is more likely the *lower* is army's discount factor. According to our interpretation of this perhaps counterintuitive result, the military, in this case, values the payoff in democracy more, thus demanding a larger bribe for producing political violence.

The present paper was inspired by the work of Acemoglu *et al.* (2004) who formally analyse the mechanisms that enable a kleptocrat to maintain the support of relevant groups. The analysis is based on the ability of the kleptocrat to employ divide-and-rule strategy. More recently, Padró i Miquel (2007) argued that the unpredictability of successional procedures is the key issue in enabling a kleptocrat to steal even from his own supporter group.

The existing literature on dictatorships also includes Grossman (1991), Grossman and Noh (1994), McGuire and Olson (1996), Wintrobe (1998), Acemoglu and Robinson (2000) and Bueno de Mesquita *et al.* (2003), who present models focusing on the equilibrium behaviour of a ruler in setting tax rates, as well as provision of public goods and distribution of income, so as to maximise his utility while satisfying the constraint of staying in power.

Moreover, our model shares features with those constructed to analyse electoral competition in countries with weak democratic institutions. Ellman and Wantchekon (2000) study how the outcome of elections is determined by the ability of the stronger party to cause unrest, and La Ferrera and Bates (2001) show that the optimal combination of public good and security services depends on their marginal costs as well as the personal characteristics of the competing politicians. On the other hand, Robinson and Torvik (2005) argue that inefficient investments are a way for politicians to distinguish themselves from their competitors and collect support. While incorporating the event of elections into the model, our primary interest is in the collusive behaviour of the leader and the military. In a sense, the elections only serve as an explicit motivation for the leader to try collusion with the army.

Finally, we could loosely relate the paper to the theory of political transitions (e.g. Acemoglu and Robinson 2001, 2006).

Zimbabwe is an example of a country with multiparty elections and an authoritarian regime[3]. The particularly curious aspect of the Zimbabwean experience is the longevity of Robert Mugabe's regime coupled with poor economic and social conditions. The economic meltdown has reached record levels, not only in the way some key economic variables have long been uncontrollable, but also in the contrast of how once a promising, industrialised economy with an efficient agricultural sector has suffered substantial loss in productivity during nearly 28 years of independence that Zimbabwe has been under Mugabe's leadership[4].

The economic hardship is more often than not associated with controversial policies implemented during the leadership of Mugabe, such as the land reform program, mainly executed during the 1990s, and the beginning of the current decade[5]. The controversy of Mugabe's rule also lays in his taste for lavish lifestyle, while his fellow citizens suffer under extreme poverty[6].

Contrary to the general experience of African countries, namely, that the opposition groups are dispersed and weak, there has been an organised and active opposition functioning in Zimbabwe since 1999. Although there had previously been a variety of opposition movements, it was the Movement for Democratic Change (MDC) that seriously challenged President Mugabe and his party, Zanu-PF, for the first time. In the 2000 parliamentary elections, Zanu-PF received 48.6 % of the votes, while MDC finished very close with 47 %[7]. It is

[3]Freedom House currently classifies Zimbabwe as 'Not Free', with political rights attributed the score of 7 (lowest), and civil liberties with the score of 6. See also Sachikonye (2002), Bush and Szeftel (2002) and Kagoro (2005) for discussion on the authoritarian features of the Zimbabwean state.

[4]According to the IMF (2007), the inflation rate in 2006 was 1,017 %, and is projected to reach 2,879 % in 2007, while real GDP was reduced by 4.8 % in 2006, and is expected to shrink further in 2007 (-5.7 %) and 2008 (-3.6 %). Upto 80 % of the population is estimated to be unemployed and under the poverty line. In 2005, IMF reported that 40 % of the population was in need of food aid. For an account on the economic and political decline, in particular, the factors that initially launched the downturn in the 1990s, see Sachikonye (2002).

[5]That the agricultural production has decreased substantially following the reform, has had an effect on unemployment as hundreds of thousands of farm workers have become unemployed (IMF 2005). In addition, it has deprived the former farm workers and their families of health services and schools as the new settlers have few resources to maintain these services (Sachikonye 2003).

[6]In February 2007, Mugabe celebrated his 83rd birthday with 20,000 guests. "Mugabe party mocks the starving nation", *The Sunday Times*, 25 February 2007.

[7]African Elections Database (2007).

against the background of the constantly worsening economic and social conditions, on one hand, and the existence of an alternative government in the form of the MDC, on the other, that it is puzzling as to how president Mugabe and his regime succeed in maintaining the power in a country with *recurrent elections*.

A prominent feature in the Zimbabwean society today is violence. There are numerous reports that state the high incidence of politically motivated violence, directed at the opposition's leadership as well as its supporters, not only during pre-electoral period but also on the actual election days as well as after[8]. The remarkable feature of the emergence of the violence is that it coincides with the formation of MDC in 1999. The run-up to the 2000 Parliamentary elections was marked with unprecedented levels of intimidation and abuse, and ever since violence has been an integral part of Mugabe's and his party's campaigning[9]. The number of individuals attacked after 2000 has been reported to exceed 30,000[10]. The figure is short of the massive scale destruction operation, Operation Murambatsvina in 2005, in which businesses and residences of over 700,000 people were torn down[11].

The army have repeatedly been assigned as the main body in organisation and production of this violence[12]. It is also a commonly known fact that the top officers of the military enjoy generous privileges granted by president Mugabe. One form of the privileged treatment is nomination of former military officers in civilian posts as heads of companies or state organisations, or in influential positions in Zanu-PF. Some have taken up posts as ambassadors. The top brass of the military has not been sided in accumulation of commercial connections. Several current or retired top rank officials have stakes in private enterprises[13]. Moreover, these

[8]See reports by the European Union (2000), International Crisis Group (2002) and Kagwanja (2005).

[9]Ibid.

[10]Zimbabwe Human Rights NGO Forum (2007).

[11]United Nations (2005).

[12]Strictly speaking, the army is not the only instance responsible for political violence. In fact, what is generally considered as the security forces include the military, the Central Intelligence Office (CIO), police and youth militia, each one having been associated with violent activities, such as harassing and detaining opposition leadership and other supporters, invading white owned farms during the peak of the land reform, and so forth. However, army's participation in political violence is fundamental. Not only have several CIO officers a military past, but the army is also responsible for the training of the youth militia. Moreover, the structure, discipline and the machinery that the military possess guarantee that it can be mobilised to rapidly access any part of the country. As such, we refer to the security forces simply as the army.

[13]The Kingdom of the Officers. *Indian Ocean Newsletter,* No. 1148, 17/09/2005; Stalinists Turn to Busi-

individuals have benefited from lucrative deals within the diamond industry struck between the DRC and Zimbabwe in the end of the 1990s, coinciding with Zimbabwe's involvement in the Congo war[14].

Political involvement of the security forces is blatant; even active officers are members of Zanu-PF. While such involvement has allowed the state to claim monopoly over the use of violence, it has possibly also protected the regime from a military coup[15]. What this implies for the opposition is lack of any control over the army, and thus incapability to resort to violence in a large scale, organised manner. The MDC has not either been reported to maintain any sort of paramilitary force. Its efforts to switch the regime have mainly consisted of variably active rallying over the years of its existence. In the recent years there have been a few protests including a successful general strike in 2003.

The remainder of the paper is organised as follows. In the next section we present the model, and in section 3 we discuss its unique stationary subgame perfect equilibrium, in which the actions of each player are independent of the history of play. Section 4 extends the model to account for history dependent actions. We construct and analyse the incentive compatibility conditions, which, if satisfied, characterise the circumstances under which a collusive equilibrium may exist. We also study the comparative statics and discuss the policy implications that rise from the results of the model. Examination of the efficient collusion gives us more detailed information about how levels of political violence and bribery evolve with changes in parameter values. In section 5 we present an example where the model is solved using specific functional forms. In section 6 we introduce an application of the model, and conclude in section 7. All proofs are located in the appendix, section 8.

nessmen. *Indian Ocean Newsletter*, No. 1140, 25/06/2005.

[14]United Nations (2004).

[15]Kagwanja (2005).

2 A Model

We consider an infinite-horizon, dynamic political game with three players: Leader (L), Opposition (D), and the Army (A). Leader is corrupt, authoritarian and aims to maximise his own personal utility. The objective of the opposition leader is to replace the leader and establish a properly functioning democracy in the country.

The army, represented by few top rank officers, is assumed to be corruptible. The significance of the army in the model originates from its preparedness to intimidate, abuse or even torture opposition party members and supporters; that is, to produce organised political violence with the intention to interfere with the free and fair electoral process[16]. Production of political violence is not the primary function of the military, and the senior officers must be sufficiently compensated so as to give them an incentive to mobilise their troops to undertake this costly activity. We should stress that, while the army's objective is to maximise its utility (i.e. the payoffs of the few top rank officers), it has no specific preference about the leader *per se*.

In each period t ($t = 1, 2...$), the country can be in one of the two political states, $S_t \in \{L, D\}$, designating which politician assumes power. Note that $S_0 = L$, and that D is an absorbing state. The politician in power has exclusive access to $K \gg 0$, the total resources, available each period. K is considered as a proxy for the public budget that correlates with the size of the economy, and is assumed to be exogenously given, fixed and constant[17].

A key element of the game is the electoral competition between the incumbent and the opposition leader. The competition culminates to the elections that take place every period, and the outcome is contingent on two main factors. The first is opposition's electoral cam-

[16] In Zimbabwe, for example, the security forces are involved in other tasks that restrict opposition's activities, such as physically preventing party meetings or rallies, or work in favour of Mugabe's support, an example of which is provision of food aid primarily to areas and people regarded as loyal to the regime (Human Rights Watch, 2003). Because of the prevalence of the actual physical violence in the contemporary Zimbabwe, on one hand, and the obvious human right violating nature of these other activities, on the other, we refer to all of these activities of the military as *political violence*.

[17] Alternatively, K could be endogenised. For instance, an increase in violence would reduce the total resources of the economy. This could reflect the extent of damage to the agricultural production and thus total output, caused by the violent farm invasions. Here, in order to focus attention to other key strategic forces at play, K is fixed. In an extension that we are currently working on, K is endogenised.

paigning, and its intensity is captured by the effort level, $e_D \geq 0$. Secondly, we argue that political violence has an effect on the election results. Army's choice of effort, $e_A \geq 0$, measures the extent of this violence. The leader, L, can try to indirectly influence both e_A and e_D by allocating shares of K to the army and opposition. His decision variables, $B_A \geq 0$ and $B_D \geq 0$, designate these shares[18].

Importantly, army's share, B_A, of the total resources will be privately consumed by the top brass of the military, while the non-corrupt opposition will distribute its share, B_D, for public consumption. In other words, allocating part of K to the opposition represents sharing the public resources with the citizens, who are the main concern of the opposition.

The probability of the incumbent (i.e. the leader, L) staying in power is captured by an exogenous re-election probability function: $\pi(e_A, e_D)$, which is twice differentiable, concave and increasing in e_A, but decreasing in e_D[19]. Army's effort increases the value of the probability function, as more voters are intimidated from voting the opposition. Opposition's efforts affect the value of $\pi(e_A, e_D)$ negatively as its campaigning attracts more votes for itself. By assumption, these efforts are substitutes[20]. Also, we postulate that $\pi(0,0) > 0$, reflecting the incumbency advantage of the longterm leader. In general, $\pi(e_A, e_D) \in (0,1)$ for all $e_A, e_D \in [0, \infty)$; There is always some uncertainty as to the outcome of the elections.

The costs of exerting effort, or of political action, come in the form of punishments. Opposition's punishment, $P_D(e_D)$, will be overseen by the incumbent leader, but only when he is in power. If opposition wins, it will not be punished. Army's punishment, $L_A(e_A)$, will be executed by the opposition, but only in the case that the latter assumes power. But if the

[18]Since in part because such allocations involve illegal bribery, the leader is unable to commit ex ante (contractually) on allocating certain shares in return for certain effort levels. Hence, he cannot directly influence effort levels.

[19]The main focus of the model is how to influence the electoral outcome through the incentives of the three players of the model, not the citizenry, to take certain actions. In particular, we are interested in the possible collusive arrangement between the leader and the army, and only *indirectly* how this affects the voting behaviour. Hence, we content with an exogenous probability of re-election function and do not aim to model the voting process explicitly.

[20]Consider opposition's effort, e_D. It seems plausible that the productivity of this effort, at the margin, is lowered by increasing army's effort by a unit. For instance, opposition's supporters may be prevented by the security forces to attend a rally.

leader is re-elected, army will go unpunished[21]. Both $P_D(e_D)$ and $L_A(e_A)$ are increasing and concave in the respective efforts, and assumed exogenous, one-shot punishments so that, once undergone, the offenses do not carry on to the successive periods[22].

We point out an important distinction between the punishments and political violence. Political violence (i.e. the effort of the army) targets the whole entity of people associated with the opposition movement, whereas punishments apply only to the elite of each group, namely, the top brass of the military or the leadership of the opposition[23].

The per period game structure can be described as follows. Depending on the election results of the last period, say $t-1$, the economy starts the next period in one of the two states, $S_t = L$, or $S_t = D$. Note that if $S_{t-1} = L$, we may have that $S_t = L$ or a regime switch to $S_t = D$. But if $S_{t-1} = D$, it follows that $S_t = D$. Democracy is an absorbing state, so that if the regime, in any period $t-1$, has been switched to $S_t = D$, it stays as such forever and the payoffs of each player are determined as will be described below[24]. Essentially, no more actions will be taken.

But if the leader, in $t-1$, wins and stays in power, we begin the next period with the political state as $S_t = L$, and have the four stage game, $\Gamma_t(L)$, played in that period, of which the timing is as follows:

1. Army and opposition choose their efforts (e_A, e_D) simultaneously.
2. The leader chooses B_A and B_D (allocates K).
3. Opposition's punishment, $P_D(e_D)$, implemented.

[21]The punishment of the army would comprise long prison sentences or significant fines. The punishment of the opposition's leadership may be considered relatively more severe, such as being imprisoned without charges and fair trial, or even being persecuted by the secret services, tortured and killed.

[22]The history independence of the punishment implies that, since we regard a single period as the time between two elections, the offenses committed during this time, which is several years, will contribute to the punishment. But offenses from the preceding electoral periods will be forgone. We are currently working on an extension where we relax this assumption.

[23]The fact that punishments are directed only at a restricted group implies that the costs of executing them is insignificant. But from the point of view of the army or opposition incurring a punishment, the cost is substantial. Hence, they are included in each of these players' respective payoff functions as shown below.

[24]The rational behind this simplifying assumption is that we assume that once the leader is out of power, he will not be able to run for elections again, as he may be brought to justice, be forced to leave the country and so on. Essentially, there will be no more elections where the particular incumbent is one of the major players.

4. Elections take place. At the outcome of the elections, time elapses and the game moves to the next period.

That the leader makes his decision only after the choices of the army and opposition emphasises the fact, which is common knowledge, that the former cannot credibly commit to any particular allocations of K. This is due to the lack of political and legal accountability, prevalent in weak states, which ensures that the leader will not face serious consequences when failing to comply with an agreement. Thus, the army and opposition choose first, and base their decisions on the anticipation that, at his turn, the leader will choose what is best for him.

Supposing that the leader, in any period t, wins the elections, the payoffs in that period are $K - B_A - B_D$ for himself, $B_A + b'$ for the army, and $B_D - P_D(e_D)$ for the opposition. The game then continues, like before, in the next period. If opposition wins the elections, the next period starts with $S_{t+1} = D$, and the game ends. The payoffs the players then receive *each period* thereafter are u for the leader, a fixed salary, b, for the army paid by the opposition regime and $K - b$ for the opposition. Further, in the first of such period only, the army is punished by opposition for political violence, e_A, by a punishment of $L_A(e_A)$.

We define b' as the salary that the army receives in the incumbent regime, and B_A as an additional monetary incentive, or a bribe, granted to the top military officers in exchange for political violence. For simplicity, b' is normalised to zero, and b actually denotes the difference between army's salaries in the two regimes. We postulate that $K \gg b$.

Note that u may be positive or negative and can be broadly defined as a proxy for the institutional quality and general willingness to punish the leader once he is out of power. Whether $u \geq 0$ or $u < 0$, it will be assumed that $K \gg u$. This should be plausible since K represents the size of the public budget, available to the leader, every period, whereas u is the per period flow of utility to a single agent, in this case the leader.

The respective discount factors of each player are β for the leader, δ for the army, and γ for the opposition, and $\beta, \delta, \gamma \in [0, 1)$.

3 Stationary Subgame Perfect Equilibrium

To start with, we describe the stationary subgame perfect equilibrium (SSPE), in which the equilibrium actions in each period are independent of the history of play.

At the third stage of the game, before the elections, the leader observes the efforts chosen by the army and the opposition, and then chooses the distribution of the public resources. It follows from the nature of a stationary equilibrium, that the leader, in such an equilibrium, sets $B_A^S = 0$ and $B_D^S = 0$, keeping all the resources himself.

Finding the Nash equilibrium in efforts, we move backwards to the first stage of the game. Both the army and opposition anticipate there will be no benefits from the leader and take this into account as they decide their effort levels. Given $B_A^S = 0$, it turns out that $e_A^S = 0$ is the subgame perfect choice for the army in the stationary equilibrium.

Opposition has different objectives than the army, this affecting its choice of effort level. The goal is to establish democracy in the country, which can be done by winning the elections and obtaining access to K. The probability of the leader's re-election is not increased by army's effort, so the opposition expects a relatively better chance of winning than if the army was to choose to exert effort. Given $e_A^S = 0$ and $B_D^S = 0$, we find a unique solution for the opposition, $e_D^S > 0$. In choosing the effort level, opposition trades off the benefit from winning, $(K - b)$, against the cost of punishment, $P_D(e_D)$, from action. Given these informal arguments, proposition 1 describes the unique SSPE, which is formally proven in the appendix.

Proposition 1. *In the unique stationary subgame perfect equilibrium, the leader keeps all of the resources to himself, there will be no political violence produced by the army, and the opposition will choose some positive amount of effort for its electoral campaign.*

That there is complete absence of political violence against the people is appealing in this equilibrium. In addition, there is some chance to moving to democracy as the opposition runs its electoral campaigns actively. But the outcome is not entirely ideal. The government is corrupt, consuming the whole of the public budget by itself. This means that the people

suffer under poverty. Since $e_D^S > 0$, opposition will be punished.

Thus, the model predicts that, despite of the punishment, $P_D(e_D)$, opposition participates in electoral campaigns. It also accounts for the fact that the citizens are subjected to poverty, i.e., $B_D^S = 0$. In contrast, the model fails to replicate the occurrence of political violence, a fact impossible to ignore with countries like Zimbabwe in question. To address this shortcoming, we will in section 4 construct another type of equilibrium. But before proceeding, let us complete the analysis with some discussion on the comparative statics of the SSPE.

In the unique SSPE with $B_A^S = B_D^S = 0$, $e_A^S = 0$ and $e_D^S > 0$, the expected payoffs to players (leader, army and opposition, respectively), in state $S = L$, just after the leader has distributed the public resources are as follows:

$$V_L^S = \frac{K}{1-\beta\pi^s} + \frac{\beta(1-\pi^s)}{1-\beta\pi^s}\left(\frac{u}{1-\beta}\right), \tag{1}$$

$$V_A^S = \frac{\delta(1-\pi^s)}{1-\delta\pi^s}\left(\frac{b}{1-\delta}\right), \tag{2}$$

and

$$V_D^S = -\frac{P_D\left(e_D^S\right)}{1-\gamma\pi^s} + \frac{\gamma(1-\pi^s)}{1-\gamma\pi^s}\left(\frac{K-b}{1-\gamma}\right), \tag{3}$$

where $\pi^s = \pi\left(0, e_D^S\right)$.

First note that an increase in b increases V_A^S and decreases V_D^S, but does not affect V_L^S. The effect of a change in b on V_A^S is independent of army's effort. Since $b' = 0$, an increase in b would make opposition regime even more attractive for the army, as the difference between army's salaries in the two regimes would become larger. As for the punishment, in the equilibrium $e_A^S = 0$, so that $L_A(e_A)$ has no effect on V_A^S. Since $B_A^S = 0$, the army has no incentive to exert any effort in this equilibrium, regardless of the values that the other parameters may take.

More interestingly, a change in b does have an effect on opposition's incentive to exert effort. An increase in b would weaken opposition's incentives to establish democracy, leading to a decrease in e_D^S. By a similar argument, an increase in K would lead to an increase in

opposition's effort. A change in the punishment, $P_D(e_D)$, also influences opposition's choice. A harder punishment decreases e_D^S.

That a change in either K, b or $P_D(e_D)$ has an effect on e_D^S implies that it unambiguosly affects π^s. In the equlibrium, $e_A^S = 0$, so that the only choice affecting the value of π^s is opposition's effort. Given that $K - b$ is sufficiently large, in particular, to outweigh the punishment, $P_D(e_D)$, opposition has an incentive to fight for democracy and induce a relatively high level of effort in order to switch the regime.

This suggests that democracy is most likely to be achieved when either the public budget is sufficiently high or army's salary and opposition's punishment sufficiently small.

These results can be reconciled with countries employing a multi-party system, that are suffering from corruption, but not organised and countrywide state sponsored repression. As argued above, this is not the case in Zimbabwe, and, we should add, a number of other Sub-Saharan African countries. We will in the following study a potential collusion between the leader and the army, to determine the conditions under which both political violence and bribery emerge. We will also see if such an arrangement, should it exist, reduces the possibility of switching the regime into democracy, or, in other words, whether the maximum probability to switching into democracy prevails in the stationary equilibrium.

4 Collusion between the Leader and the Army

A collusive outcome between the leader and the army is characterised as the army choosing a positive amount of violence, and the leader allocating a positive share of public resources to the army, this pair of actions taking place in each period. Such collusive behaviour is consistent with Zimbabwean reality. As discussed above, the Zimbabwean army is effectively producing politically motivated violence, while Mugabe guarantees that its top brass receive privileged treatment. The opposition has no control over the army and is an outsider to the collusive agreement between the two other players. Nevertheless, it still maintains its efforts to win enough support to replace Mugabe, despite of the consequent punishment.

4.1 Collusive Equilibrium as a Subgame Perfect Equilibrium

We already mentioned that the leader cannot credibly commit to a contract of allocating $B_A > 0$ to the army. In the stationary equilibrium, this resulted in no political violence or bribery. Here we examine whether in a non-stationary equilibrium, with actions dependent on history, there is a possibility for an intertemporal, collusive agreement to be sustained in a self-enforcing manner between the leader and the army.

The collusive equilibrium path is to be sustained as a subgame perfect equilibrium path, by standard kinds of "trigger" strategies where a unilateral deviation by either the army or the leader from the collusive path moves play to the unique SSPE. To conveniently describe this non-stationary SPE, we will use the concepts of two paths of play and a transition rule. The two paths of play refer to those of the collusive path and the stationary (punishment) path. In essence, the collusive path of play consists of such actions, within each period, that the army chooses to produce some violence ($e_A^* > 0$), and the leader allocates a positive share of the public resources to the army ($B_A^* > 0$). We focus on collusive paths in which $B_D^* = 0$.

The transition rule states that in the event of the army choosing a different level of effort ($e'_A \neq e_A^*$), and/or the leader failing to allocate the agreed part of K to the army ($B'_A \neq B_A^*$), the play immediately switches to the stationary equilibrium path. For the army, the costs of deviating from the collusive path are incurred within the same period, as the leader withholds the distribution of K as of his turn to act, the second stage of the stage game. The army can punish the leader only as of the beginning of the next period.

In its position as an outsider to the agreement, opposition's strategy is to choose its best response to the collusive choices of $B_A^* > 0$ by the leader and $e_A^* > 0$ by the army. The incumbent's re-election probability in the collusive equilibrium is $\pi^c = \pi\left(e_A^*, e_D^*\right)$. But as a result of deviation, it becomes $\pi^d = \pi\left(0, e_D^*\right)$.

Let us now derive the conditions, if any, under which the proposed collusive path of play is a subgame perfect equilibrium. Before turning to the derivation and analysis of the incentive compatibility conditions, we first establish:

Lemma 1. *Fix an arbitrary collusive equilibrium* $(B_A^* \geq 0, e_A^* \geq 0, B_D^* = 0)$. *Opposition's effort,* e_D^**, in this equilibrium is such that* $\pi^c > \pi^d > \pi^s$.

Proof. See the appendix.

4.2 Incentive Compatibility Conditions

Along the proposed collusive equilibrium path with $B_A^* > 0, e_A^* > 0$ and $B_D^* = 0$, and with e_D^* as the best response of the opposition, leader's equilibrium payoff, in any subgame, as he is about to choose the distribution of the public resources is

$$V_L^C = (K - B_A^*) + \beta \left[(1 - \pi^c) \frac{u}{1 - \beta} + \pi^c V_L^C \right]. \tag{4}$$

Deviation from the collusive path of play and the subsequent switch to the stationary path of play results in

$$V_L^D = K + \beta \left[(1 - \pi^c) \frac{u}{1 - \beta} + \pi^c V_L^S \right], \tag{5}$$

where

$$V_L^S = K + \beta \left[(1 - \pi^s) \frac{u}{1 - \beta} + \pi^s V_L^S \right]. \tag{6}$$

Incentive compatibility requires that $V_L^C \geq V_L^D$. Solving for V_L^C in (4) and substituting (6) into (5) to solve for V_L^D, we obtain, after rearranging, the maximum amount of the bribe that the leader is willing to give away in exchange for army's effort:

$$B_A^* \leq \bar{B}_A \equiv \frac{\beta^2 \pi^c (\pi^c - \pi^s)(K - u)}{1 - \beta \pi^s}. \tag{7}$$

From (7), the collusive re-election probability, π^c, must be strictly higher than the stationary re-election probability, π^s, for it to be worth the leader's while to propose collusion to the army and be willing to reward it in the first place. Lemma 1 shows that this is indeed the case.

Similarly for the army, the proposed collusive equilibrium path of play $(B_A^* > 0, e_A^* >$

$0, B_D^* = 0, e_D^* > 0$) brings the equilibrium payoff of

$$V_A^C = B_A^* + \delta \left[(1 - \pi^c) \left(\frac{b}{1-\delta} - L_A \left(e_A^* \right) \right) + \pi^c V_A^C \right], \tag{8}$$

while deviating from the collusive path of play and the subsequent switch to the stationary path of play results in

$$V_A^D = \delta \left[\left(1 - \pi^d \right) \left(\frac{b}{1-\delta} \right) + \pi^d V_A^S \right], \tag{9}$$

where[25]

$$V_A^S = \delta \left[(1 - \pi^s) \left(\frac{b}{1-\delta} \right) + \pi^s V_A^S \right]. \tag{10}$$

Incentive compatibility requires that $V_A^C \geq V_A^D$. Again, solving for V_A^C and V_A^D and rearranging produces the minimum share of the public resources that is compatible with army's incentives to collude:

$$B_A^* \geq \underline{B}_A \equiv \delta \left(\frac{\pi^c - \pi^d - \delta \pi^c \left(\pi^s - \pi^d \right)}{1 - \delta \pi^s} \right) b + \delta \left(1 - \pi^c \right) L_A \left(e_A^* \right). \tag{11}$$

Army's share of K must outweigh the expected punishment, $L_A \left(e_A^* \right)$, as well as the discounted salary multiplied by the expression in parantheses. This expression is positive[26].

4.3 Existence of the Collusive Equilibrium

In the previous section, we derived the individual incentive compatibility conditions for the two parties of the potential collusive agreement. From (7) and (11), this implies that the size of the bribe acceptable to the leader is the upper bound $\left(\bar{B}_A \right)$ of possible values that B_A^* can take, while the lower bound $(\underline{B}_A)$ is given by army's minimum requirement.

Proposition 2. *The collusive path of play, characterised by* $B_A^* > 0, e_A^* > 0, B_D^* = 0$ *and* $e_D^* > 0$ *as the solution to opposition's maximisation problem, is sustainable as a subgame perfect equilibrium, if and only if (7) and (11) are satisfied.*

[25] Note that $L_A \left(e_A^D \right) = 0$ and $L_A \left(e_A^S \right) = 0$.

[26] Recall that $\left(\pi^c - \pi^d \right) > 0$, and $\pi^s - \pi^d < 0$.

In the following we discuss the conditions on the primitives of the model under which both (7) and (11) are satisfied, as well as when they fail to hold. The analysis will be complemented with policy implications that may be relevant to decision makers within and outside countries with repressive regimes.

4.4 Comparative Statics

It is straightforward to verify that (7) and (11) hold if and only if $\bar{B}_A \geq \underline{B}_A$, i.e.,

$$\delta \left(\frac{\pi^c - \pi^d - \delta\pi^c \left(\pi^s - \pi^d\right)}{1 - \delta\pi^s} \right) b + \delta \left(1 - \pi^c\right) L_A \left(e_A^*\right) \leq \frac{\beta^2 \pi^c \left(\pi^c - \pi^s\right) (K - u)}{1 - \beta\pi^s}. \tag{12}$$

Examination of (12) shows that the collusive equilibrium is more likely, when[27]:

1. The public budget is sufficiently large. Increasing K increases V_L^C relatively more than V_L^D, improving leader's incentives to play collusion. Alternatively, an increase in K increases the maximum bribe the leader is willing to give away.

The public budget, K, only enters to the right hand side of (12), since the army does not have direct access to it[28]. Since K is directly available to the leader, it could include foreign aid donated by the international community, as well as rents from natural resources. We base this claim on the common wisdom about a core problematic feature of weak institutions; corrupt leaders may expropriate the foreign aid and/or natural resource rents and use it controversially to their own benefit.

Empirical studies have established that foreign aid and resource booms fail to promote growth or even worsen the economic and political conditions in a country with weak democratic institutions (See Burnside and Dollar 2000, Easterly and Levine 2003 and Knack 2000 for studies on foreign aid, and Mehlum *et al.* 2006, and Sachs and Warner 1995, 1999 and

[27] As is commonly done, we say that the collusive equilibrium is "more likely" to exist the greater is the range of the discount factors for which the IC conditions are satisfied (i.e. the larger the difference $\bar{B}_A - \underline{B}_A$).

[28] We point out that here the army is simply a utility maximiser, and therefore not interested in assuming power itself to obtain direct access to K. In future research, the aim is to extend the model to allow for the possibility that the army may actually try to replace the ruler.

Ross 1999 for diverse mechanisms through which the resource curse may take effect)[29].

Acemoglu *et al.* (2004) formally show that foreign aid and natural resource rents provide resources for a kleptocratic leader to buy off opponents. Robinson *et al.* (2006) conclude that since resource booms increase the value of being in power, higher rents associate with more resources invested, inefficiently, into guaranteeing the political survival. Our result is closest in spirit to these two studies linking foreign aid or resource booms inversely to political outcomes. However, by incorporating political violence into the model, we consider another adverse consequence that can be caused by such resources in a country with weak democratic institutions.

From (12), it is clear that the collusive equilibrium is more likely to be sustained, when:

2. Army's salary in opposition regime is sufficiently small. The impact of an increase in b is strictly larger in V_A^C *than in* V_A^D*, and the lower bound of the bribe has to increase to account for such a change*[30].

A positive change in army's salary, b, implies that the prospect of democracy becomes more attractive for the army, as it will have more resources under the opposition regime. Again, there is scope for a third party to interfere with the collusive equilibrium. An international actor could provide military or economic support to the opposition force in order to prevent complete chaos or civil war from breaking out in the event of a regime switch. This could be some amount, $s > 0$, so that the army's one shot payoff in opposition regime would become $b + s - L_A(e_A)$, and army's incentives to collude with the leader become lower.

Somewhat relatedly, Collier *et al.* (2004) argue that a biased military intervention, to the side of the rebels, has a positive impact on shortening the length of the the civil war, as it equalises the capabilities of defence. In our framework, the support to the side of the opposition would be to reduce the gap between the military capacities in the two alternative regimes.

[29]Mehlum *et al.* (2006) conclude that the quality of institution determines the impact on the economy of the natural resource, while Sachs and Warner (1995, 1999) attribute the effect to trade related issues, such as the movements in the real exchange rates.

[30]For this to be true we need $\delta\frac{\pi^d(1-\pi^s)}{(1-\delta\pi^s)} + \left(1-\pi^d\right) > \frac{(1-\pi^c)}{(1-\delta\pi^c)}$, which simplifies to $\pi^c - \pi^d + \delta\pi^c\left(\pi^d - \pi^s\right) > 0$.

These two comparative statics results reveal a contradictory nature of external financial and/or military support to be considered by policy makers and aid donors: Such support, in the hands of an abusive leader, tends to increase the likelihood of a repressive regime. In contrast, it could positively contribute to the replacement of such a regime, when offered to an opposition movement.

Furthermore, the collusive equilibrium is more likely, when:

3. Leader's payoff in the opposition regime is sufficiently small. An increase in the value of u will increase V_L^D at a higher rate, reducing the leader's incentives to participate in the collusion[31]*. Moreover, from (7) it is clear that an increase in u reduces the size of $\bar{B}_A$.*

We first note that a very small or negative u could represent a situation in which there is a harsh punishment awaiting the retired or ousted leader to be executed by strong democratic institutions. Vice versa for a large u. The model predicts that a decrease in u improves leader's incentives to collude, which, in turn, implies that there is a higher chance of political violence against the opposition supporters.

A third party, could, through its influence on the institutional settings (e.g. independent judiciary), or a domestic player, through its willingness to seek retribution, affect the value of u, and thereby the leader's decision to propose and maintain collusion with the army. In light of our model, a milder punishment would increase the chances of replacing an unpopular leader. Interestingly, the leader of the political opposition in Zimbabwe has publicly discussed the possibility of granting immunity to President Mugabe in order to encourage his voluntary departure from office[32].

We also find that, the collusive equilibrium is more likely to hold, when:

4. Army's punishment is mild enough. The punishment only occurs in the collusive equilibrium path of play, reducing the equilibrium payoff. An increase in $L_A(e_A)$ leads to an increase in $\underline{B}_A$, i.e., army's minimum requirement for the bribe becomes larger.

A prominent institutional player, such as an international tribunal, could interfere with the

[31] This is true when $\frac{1-\pi^c}{1-\beta\pi^c} < (1-\pi^c) + \frac{\beta\pi^c(1-\pi^s)}{1-\beta\pi^s}$, or $\beta(\pi^c - \pi^s) - \pi^c + \pi^s < 0$. The latter inequality holds since $\beta < 1$.

[32] "Tsvangirai sees Mugabe's end", BBC, 2 April 2007.

collusive equilibrium by announcing its aim to hold the army generals accountable for their crimes against humanity. The precedents created by the International Criminal Tribunals for Rwanda and the former Yugoslavia, as well as persecution of people responsible for Darfur's massacres, represent such interference. In our interpretation, since this would increase the expected punishment, it would, consequently, mitigate army's willingness to produce political violence.

Finally, the collusive equilibrium is more likely, when:

5. The leader is sufficiently patient, while army is impatient enough. For the leader, a higher β corresponds to a relatively larger public budget in the future. A more patient army values democracy more, and demands a larger bribe.

A leader with a higher discount factor has more optimistic prospects about the future, hence, he is prepared to consume less today, as the value of K is even higher tomorrow. In contrast, an increase in δ increases the bribe that the army requires for its efforts, since the salary and the potential punishment in opposition regime are both relatively larger.

Having established and analysed the conditions under which political violence may emerge and is sustained, we now turn to briefly discussing, in the context of efficient collusion, how the level of violence varies when the values of the parameters change.

4.5 Efficient Collusion

The set up of the model implies that the leader makes a take–it–or–leave–it offer. As such, given the existence of a collusive equilibrium, it is the leader's optimal choice that determines the level of political violence and bribery. In essence, the parameter changes affect the level of political violence through the (direct or indirect) connection they have with B_A^*, the bribe. The optimal size of the bribe for the leader is the lower bound, i.e.:

$$B_A^* = \delta \left(\frac{\pi^c - \pi^d - \delta\pi^c \left(\pi^s - \pi^d\right)}{1 - \delta\pi^s} \right) b + \delta \left(1 - \pi^c\right) L_A \left(e_A^*\right). \tag{13}$$

Intuitively, if the equality was not strict, the leader could increase his payoff by undercutting B_A^* by a small amount and still satisfy the constraint. We learn that the bribe that maximises leader's utility in collusion is an increasing function of e_A^*. This is established in Proposition 3 and formally shown in the appendix.

Proposition 3. *The optimal size of the bribe for the leader is the lower bound of the bribe. The bribe is an increasing function of political violence.*

From (13), we also see that the optimal bribe is an increasing function of army's salary, b and punishment, L_A, in the opposition regime as well as its discount factor, δ. The implication is that a change in the level of violence are caused by the changes in these parameters. The intuition follows by noting that an increase in b, L_A, or δ must be compensated by a decrease in e_A^* so as to keep the bribe unchanged.

Less straightforward is how "leader's parameters", K, u, and β, affect the levels political violence. To that end we totally differentiate the leader's best response function. The results are summarised in the corollary, and their mathematical derivation is located in the appendix.

Corollary 1. *An increase in K or β leads to higher levels of political violence and bribery, whereas an increase in u implies lower levels of political violence and bribery.*

For the same level of utility, an increase in K compensates for the increase in the bribe, resulting from the increase in army's effort. Intuitively, larger resources increase the value of being in power. The leader is prepared to give away a larger share to stay in office[33].

The point made about the controversy of foreign aid becomes even more pressing. A similar prediction was obtained by Olsson and Fors (2004), who study the motivations of two distinct players, the state (that controls the rents from natural resources) and insurgents, to engage in a conflict. They find that the optimal level of ruling party's defence efforts increases with rents from natural resources.

[33]It is worth noting that this result could be in the other direction, namely, lower K would lead to an increase in political violence. Such an argument would be based on the assumption that lower public resources – in the sense of the GDP per capita – and, hence, lower standard of living of the citizens in general, would imply less support for the incumbent, and, therefore, higher need for political violence in order to silence any opposition. While plausible mechanism, we stress that our focus is not in the voting behaviour itself. The public resources are to be shared between the leader and the army.

Higher u implies that the leader is relatively better off in the stationary (punishment) path of play. Losing power means losing relatively less utility. This change is reflected in a smaller effort demanded from the army, and corresponds to a smaller bribe. In terms of policy implications, this is in line with what we found previously.

As far as the leader's discount factor, β, is concerned, the direct implication is that as β increases, staying in office becomes relatively more valuable in the future. Thus, even a smaller part of K will bring the same utility in the future, so the leader is willing to give a larger bribe to the army.

In the following section, we conduct a similar exercise, but with specific functional forms for π, P_D and L_A.

5 A Worked Example

Adapting from Skaperdas (1996), the probability of re-election function will be attained the form of a contest success function, $\pi = \left(\frac{e_A}{e_A+e_D}\right)$. For computational simplicity, army's punishment function is $L_A(e_A) = e_A^2$, while opposition's punishment takes a linear form, i.e., $P_D(e_D) = e_D$. The results from the calculations using these functional forms are in line with the results from the general form functions as will be shown below[34].

We focus essentially on the collusive equilibrium but point out that in the stationary equilibrium, leader's choice is $B_A^S = B_D^S = 0$, while the efforts of the army and opposition are $e_A^S = 0$ and $e_D^S = 0$, respectively. It follows from these choices that the probability of the incumbent's re-election, $\pi^s = \left(\frac{e_A^S}{e_A^S+e_D^S}\right) = 0$. There will always be a regime switch in the stationary equilibrium. That the opposition now chooses $e_D^S = 0$ is due to the fact that since the regime switch is certain, there is no need for the costly effort.

[34]Since the results in this section are derived in a significantly similar way to that in previous parts, their proofs are omitted.

5.1 Existence of collusive equilibrium

Since $\pi^s = 0$, the incentive compatibility conditions are slightly simpler. Recalling from section (4.2), V_L^C remains intact, but since $\pi^s = \pi^d = 0$, we have that[35]

$$V_L^D = K + \beta \left[(1 - \pi^c) \frac{u}{1-\beta} + \pi^c \left(K + \beta \frac{u}{1-\beta} \right) \right]. \tag{14}$$

Similarly for the army, V_A^D becomes

$$V_A^D = \delta \frac{b}{1-\delta}. \tag{15}$$

We set $V_L^C \geq V_L^D$ and $V_A^C \geq V_A^D$, and rearrange. The condition for the existence of the collusive equilibrium is now:

$$\delta \pi^c b + \delta \left(1 - \pi^c\right) L_A \left(e_A^*\right) \leq \beta^2 \left(\pi^c\right)^2 (K - u). \tag{16}$$

Importantly, the comparative static results from section (4.4) still apply.

5.2 Characteristics of the collusive equilibrium

Let us now study the leader's re-election probability in collusion. By definition of the collusive equilibrium, $e_A^* > 0$. Hence, $\pi^c = \left(\frac{e_A^*}{e_A^* + e_D^*} \right) > 0$. Opposition's best response in collusion

$$e_D = -e_A^* + \sqrt{\gamma e_A^* \left(\frac{K-b}{1-\gamma\pi^c} \right) + \gamma e_A^* \left(\frac{P_D\left(e_D^*\right)}{1-\gamma\pi^c} \right)}, \tag{17}$$

depends negatively on the salary, b, offered to the army, but positively on the public resources, K, and the punishment. For any values of $e_A^* \geq 0$ and the parameters, we have $e_D > 0$. It follows that $\pi^c < 1$. In the collusive equilibrium, the probability of the leader's re-election is strictly higher than in the stationary equilibrium (in which the probability is zero). There is

[35] It is straightforward to show that the army chooses $e_A^D = 0$ when it deviates. It follows that $\pi^d = 0$.

always a chance for the democracy to be established.

Finally, we briefly discuss the responses of political violence to changes in the values of the relevant parameters. Maximising V_L^C w.r.t. e_A and B_A, again treating as binding constraint army's IC condition, we obtain the leader's best response in collusion:

$$e_A = \frac{-\delta e_D^* + \sqrt{\left(\delta e_D^*\right)^2 + \delta\beta\left(1-\beta\right)\left(K-u\right) - \delta^2\left(1-\beta\right)b}}{\delta\left(1-\beta\right)}. \tag{18}$$

As before, and for the same reason, e_A is increasing in K and β. Furthermore, we find that political violence is reduced when b and u, or e_D^* are increased. A higher e_D^* results in a lower value of the leader's re-election in collusion, which, in turn, increases the expected punishment of the army. Finally, the intensity of political violence is negatively related to army's discount factor, δ.

6 Venezuela and the leadership of Hugo Chávez

Though the model was originally motivated by the particular experience of Sub-Saharan Africa, it is applicable to other developing countries with similar distinctive characteristics. Venezuela, currently headed by president Hugo Chávez, has a multiparty system and a prominent military increasingly involved with activities of the civil society.

A former Spanish colony, Venezuela gained independence in 1830. This is a country with vast natural and mineral resources including huge reserves of oil, natural gas, coal, bauxite, iron ore and 12 % of world's known gold reserves. The principal source of revenue is oil, generating about one-half of central government revenue, more than 80 % of export revenue and approximately 25 % of the total GDP[36]. Due to the high dependence on oil revenue, the performance of the Venezuelan economy reflects developments in the world oil prices.

Hugo Chávez rose to power in the 1998 presidential elections with 56% of the votes. His victory was a result of several factors including rising discontent with the economic decline,

[36]Economist Intelligence Unit (2007).

weakening of traditional partisan identities, and the general perception of widespread corruption in the nation's major political parties. Nevertheless, his victory was remarkable in that only seven years earlier he had been the leader of an unsuccessful coup against a democratically elected government (Canache 2002).

Venezuela has experienced a huge transformation in its civil-military relations under Chávez's leadership. Upon assuming the presidency, Chávez began what has turned out to be an extensive politicisation of the armed force and a deterioriation of civilian control over the military. The various measures taken by the president range from appointment of active and retired military officers to perform civilian political and administrative functions to his direct intervention in officer promotions and assignments. Additionally, the roles and missions of the armed force have been concentrated on internal security, instead of giving priority to national defense (Trinkunas 2005).

A concrete example of the importance of the military in fortifying the popularity of president Chávez was Plan Bolivar, a social program launched in 2000. As Trinkunas notes, Plan Bolivar constituted a broad incorporation of the armed forces into domestical political and economic affaires. The program was aimed to readdress a wide range of defects in social issues, such as in infrastructure, health care, education, unemployment and food distribution.

In December 2006, Chávez was re-elected with a comfortable 63 % of the votes. A marginalised opposition failed to put up serious challenge for the incumbent[37]. The share of the votes received by Chávez should be an indicator of his popularity among the electorate. At the same time, it is true that despite the looming economic decline, the citizens are still enjoying various benefits of the social program, such as the distribution of food aid.

Thus, what we currently observe in Venezuela is a high value of the re-election probability function ($\pi(e_A, e_D)$), low efforts of both the military (e_A) and the opposition (e_D), but a positive share of public resources given to the opposition, i.e., $B_D > 0$. Since opposition's effort is low, a high value of the probability function is consistent with our theory. The fact that opposition's low effort level coincides with a positive B_D is not explicitly considered in

[37]Economist Intelligence Unit 2007.

our framework, since we assume that $B_D = 0$. But endogenising B_D is something that future research should take into account as it could provide interesting additional information about opposition's behaviour.

There are increasing concerns that the country is moving towards a restricted degree of democracy. Widespread violence has not been reported. But the state has extended its control of press, and exercised some threat and intimidation on voters (such as taking finger prints on voting ballots) as well as opposition supporters in general[38]. In addition, coinciding with high oil prices of recent years, there has been an increase in military spending since 2005. Furthermore, the state has continued to broaden its control of the economy. In January 2007, the government announced the nationalisation of Venezuela's largest private company, the dominant telecommunications company, CANTV[39].

These observations reconcile with our predictions. A higher K associated with an increase in B_A is what we found earlier. That the state control of the economy has widened can be interpreted as the state assuring itself more sources of revenues (increase the base for K) in the event that the oil revenues would be reduced. Judging from the recent election results, the popularity of Chávez is still sufficiently high for him to get re-elected without widespread concern about the legitimacy of the electoral process. Nevertheless, his support could be tested by the eventual economic decline, due to, if no other reason, but a global recession. It is arguably in that sense that Chávez has built a state machinery that can be called upon to produce extensive political violence in order to influence the electoral outcome. Indeed, observers believe that if needed, Chávez will not hesitate to use brute force[40].

7 Concluding remarks

Democracy is a relative concept. Post-colonial history of Zimbabwe and a number of other African and developing countries has shown that introduction of multiparty system with

[38]International Crisis Group (2007).
[39]Economist Intelligence Unit (2007).
[40]International Crisis Group (2007).

regular elections sometimes fails to guarantee circumstances in which the citizens freely choose their representatives and the elected ones are held accontable for their actions. Authoritarian regimes around the world resort to various methods in an often successful attempt to prolonge their existence.

This paper contributes to the yet scarce game-theoretical literature on the political survival of non-democratic leaders and their regimes. We have developed a dynamic model which emphasises the role of military involvement and use of violence as the mechanism through which the electoral outcome may be influenced.

We derived and analysed the conditions for the existence of a collusive equilibrium. In such an equilibrium, the agreement concealed by the political leader and the military contributes to the emergence of politically motivated violence. This produced a set of predictions that might be insightful in thinking about prevention of political violence.

The model has produced a set of results that include the prediction that larger public resources, which, within the framework of the model, account for foreign aid, and/or rents from natural resources, increase the likelihood of the collusive equilibrium. Furthermore, the model delivers insight into how a potential punishment of the abusive leader, to be realised in the eventuality of a regime switch, actually encourages collusive behaviour. In contrast, the punishment directed at the military is predicted to render the existence of the collusive equilibrium less likely, as is an increase in the salary that the opposition party offers to the army.

Another set of results was obtained from the examination of what, from the leader's point of view, could be considered as the optimal level of the existing violence and bribery. Larger resources in hands of an abusive leader, tend to lead to higher levels of violence together with increased bribery provided to the military. But prospects of wealthier and punishment-free retirement encourages the leader to reduce the amount of bribery to the military, with the consequence of inducing less political violence into the country.

On the other hand, stricter punishments to the army associate with lower levels of violence. Finally, financial and military support to the opposition forces is predicted to appease the

violence.

Possible extensions to the present model include relaxing the assumption that the violence produced by the army in the previous electoral periods has no impact on the current punishment. In the future, we will also aim to consider the possibility that the army have the option of taking power establishing a military regime. Furthermore, future research should take into account the volatile nature of democracy. Examples of countries where the characteristics of regimes has shifted between various degrees of democracy and dictatorship are abundant.

8 Appendix

8.1 Proof for Proposition 1

Let $\left(B_A^S, B_D^S, e_A^S, e_D^S\right)$ be an arbitrary SSPE strategy profile and let V_i^S $(i = L, A, D)$ denote the equilibrium PDV of player i. It follows from the 'one-shot deviation principle' (henceforth OSDP) that the leader's equilibrium PDV, V_L^S, satisfies:

$$V_L^S = \max V_L = \max_{\substack{\{B_A, B_D \geq 0\} \\ \{K - B_A - B_D \geq 0\}}} (K - B_A - B_D) + \beta \left[(1 - \pi(e_A, e_D)) \frac{u}{1-\beta} + \pi(e_A, e_D) V_L^S \right], \tag{19}$$

where

$$V_L^S = \left(K - B_A^S - B_D^S\right) + \beta \left[(1 - \pi^s) \frac{u}{1-\beta} + \pi^s V_L^S \right], \tag{20}$$

with $\pi^s = \pi\left(e_A^S, e_D^S\right)$. Differentiating w.r.t. B_A and B_D:

$$\frac{\partial V_L}{\partial B_A} = \frac{\partial V_L}{\partial B_D} = -1 \tag{21}$$

which implies: $B_A = B_D = 0$. By the OSDP: $B_A^S = B_D^S = 0$. Given $B_A^S = B_D^S = 0$, it follows from the OSDP that army's equilibrium PDV, V_A^S, satisfies

$$V_A^S = \max V_A = \max_{\{e_A \geq 0\}} \delta \left[(1 - \pi(e_A, e_D)) \left(\frac{b}{1-\delta} - L_A(e_A) \right) + \pi(e_A, e_D) V_A^S \right], \tag{22}$$

where[41]

$$V_A^S = \delta \left[(1 - \pi^s) \left(\frac{b}{1-\delta} - L_A\left(e_A^S\right) \right) + \pi^s V_A^S \right]. \tag{23}$$

Differentiating w.r.t. e_A :

$$\frac{\partial V_A}{\partial e_A} = -\delta (1 - \pi(e_A, e_D)) L_A'(e_A) - \delta \pi_1 \left(\frac{b}{1-\delta} - L_A(e_A) \right) + \delta \pi_1 V_A^S \tag{24}$$

[41] Since $B_A = B_A^S = 0$.

We prove that $e_A^S = 0$, by contradiction. Suppose that $e_A^S > 0$. This implies that (24) equals zero, i.e.:

$$-\delta\left(1-\pi^s\right)L_A'\left(e_A^S\right)+\delta\pi_1\left[V_A^S-\left(\frac{b}{1-\delta}-L_A\left(e_A^S\right)\right)\right]=0, \tag{25}$$

which cannot hold since $-\delta\left(1-\pi^s\right)L_A'\left(e_A^S\right)<0$ and $V_A^S-\left(\frac{b}{1-\delta}-L_A\left(e_A^S\right)\right)<0$ as $\frac{\delta(1-\pi^s)}{1-\delta\pi^s}<1$. Finally, given $B_A^S=B_D^S=e_A^S=0$, the OSDP implies that opposition's equilibrium PDV, V_D^S, satisfies:

$$V_D^S=\max V_D=\max_{\{e_D\geq 0\}}\left[-P_D\left(e_D\right)+\gamma\left[\left(1-\pi\left(0,e_D\right)\right)\left(\frac{K-b}{1-\gamma}\right)+\pi\left(0,e_D\right)V_D^S\right]\right], \tag{26}$$

where

$$V_D^S=-P_D\left(e_D^S\right)+\gamma\left[\left(1-\pi^s\right)\left(\frac{K-b}{1-\gamma}\right)+\pi^s V_D^S\right]. \tag{27}$$

Differentiating w.r.t. e_D gives:

$$\frac{\partial V_D}{\partial e_D}=-P_D'\left(e_D\right)-\gamma\pi_2\left(\frac{K-b}{1-\gamma}\right)+\gamma\pi_2 V_D^S. \tag{28}$$

After substituting for V_D^S, it follows that

$$\frac{\partial V_D}{\partial e_D}=-P_D'\left(e_D\right)-\gamma\pi_2\left(1-\frac{\gamma\left(1-\pi^s\right)}{1-\gamma\pi^s}\right)\left(\frac{K-b}{1-\gamma}\right)-\gamma\pi_2\frac{P_D\left(e_D^S\right)}{1-\gamma\pi^s}. \tag{29}$$

Given our assumptions ($\pi_2<0, P_D'>0$),

$$\left.\frac{\partial V_D}{\partial e_D}\right|_{e_D=0}>0,\left.\frac{\partial V_D}{\partial e_D}\right|_{e_D=+\infty}<0, \tag{30}$$

which implies that $e_D^S>0$. Furthermore, since V_D is smooth, it follows that $e_D^S>0$ is a solution to

$$\gamma\pi_2\left(\frac{\gamma\left(1-\pi^s\right)}{1-\gamma\pi^s}-1\right)\left(\frac{K-b}{1-\gamma}\right)=P_D'\left(e_D\right)+\gamma\pi_2\frac{P_D\left(e_D^S\right)}{1-\gamma\pi^s}. \tag{31}$$

□

8.2 Proof for Lemma 1

Let $\pi^c \equiv \pi\left(e_A^*, e_D^*\right)$, $\pi^d \equiv \pi\left(0, e_D^*\right)$, and $\pi^s \equiv \pi\left(0, e_D^S\right)$ denote the values of the re-election probability function in the collusive, deviation and stationary path of play, respectively. It is immediately clear that $\pi^c > \pi^d$. It remains to show that $e_D^* < e_D^S$ to guarantee that $\pi^c > \pi^d > \pi^s$.

Opposition's effort, e_D^*, in an arbitrary collusive equilibrium $(B_A^* \geq 0, B_D^* = 0, e_A^* \geq 0)$ is the solution to the first order condition:

$$-P_D'\left(e_D\right) - \gamma\pi_2\left(\frac{K-b}{1-\gamma}\right) + \gamma\pi_2 V_D^C = 0, \tag{32}$$

where $\pi_2 = \pi_2\left(e_A^*, e_D\right)$. Let $e_D\left(e_A^*\right)$ be a solution. Differentiating (32) implicitly w.r.t. e_A^*:

$$e_D'\left(e_A^*\right) = \frac{\gamma\pi_{21}\left(1-\gamma\frac{1-\pi^c}{1-\gamma\pi^c}\right)\left(\frac{K-b}{1-\gamma}\right) + \gamma\pi_{21}\frac{P_D\left(e_D^*\right)}{1-\gamma\pi^c}}{\gamma\pi_{22}\left(\gamma\frac{1-\pi^c}{1-\gamma\pi^c}-1\right)\left(\frac{K-b}{1-\gamma}\right) - \gamma\pi_{22}\frac{P_D\left(e_D^*\right)}{1-\gamma\pi^c} - P_D''\left(e_D\right)} < 0, \tag{33}$$

since $V_D^C = \frac{\gamma(1-\pi^c)}{1-\gamma\pi^c}\frac{K-b}{1-\gamma} - \frac{P_D\left(e_D^*\right)}{1-\gamma\pi^c}$. Note that e_D is a function of e_A^* and all derivations of π are evaluated at $\left(e_A^*, e_D\left(e_A^*\right)\right)$. Since both π and $P_D\left(e_D\right)$ are concave, the denominator is positive. Also $\pi_{21} < 0$, so the nominator is negative.

Note that $e_D\left(0\right) \equiv e_D^S$. Since $e_D'\left(e_A^*\right) < 0$, an increase in army's effort reduces e_D. For any $e_A > 0$, opposition's effort $e_D^* < e_D^S$. We conclude that $\pi^c > \pi^d > \pi^s$. □

8.3 Proof for Proposition 3

Consider an arbitrary collusive equilibrium $(B_A^* \geq 0, e_A^* \geq 0, e_D^* \geq 0, B_D^* = 0)$. The leader chooses, in the beginning of any subgame, both e_A and B_A such that his equilibrium PDV payoff, V_L^C is maximised:

$$\max V_L^C = \max_{\{B_A, e_A \geq 0\}} \frac{K - B_A}{1-\beta\pi} + \beta\frac{(1-\pi)}{1-\beta\pi}\frac{u}{1-\beta}, \tag{34}$$

$$s.t. V_L^C \geq V_L^D \tag{35}$$

$$V_A^C \geq V_A^D \tag{36}$$

$$K - B_A \geq 0, \tag{37}$$

where $\pi = \pi\left(e_A, e_D^*\right)$. The first order conditions are:

$$\frac{\partial V_L^C}{\partial B_A} = -\frac{1}{1-\beta\pi} - \lambda_1 + \lambda_2 - \lambda_3 = 0 \tag{38}$$

$$\frac{\partial V_L^C}{\partial e_A} = \frac{\beta\pi_1\left(K - B_A - u\right)}{\left(1-\beta\pi\right)^2} + \lambda_1\left[\frac{\beta^2\left(K-u\right)}{1-\beta\pi^s}\left(\pi_1\left(2\pi - \pi^s\right)\right)\right] - \lambda_2\left(\frac{\partial \underline{B}_A}{\partial e_A}\right) = 0 \tag{39}$$

$$\lambda_1\left[\frac{\beta^2\pi\left(\pi - \pi^s\right)\left(K-u\right)}{1-\beta\pi^s} - B_A\right] = 0, \tag{40}$$

$$\lambda_2\left[B_A - \frac{\delta\left(\pi - \pi^d - \delta\pi\left(\pi^s - \pi^d\right)\right)}{1-\delta\pi^s}b - \delta\left(1-\pi\right)L_A\left(e_A\right)\right] = 0, \tag{41}$$

$$\lambda_3\left[K - B_A\right] = 0, \tag{42}$$

with complementary slackness for (40)-(42), and with $\pi_1 = \pi_1\left(e_A, e_D^*\right)$.

First note that $\lambda_3 = 0$, since otherwise from (42), $K = B_A$ and substituting this into (40) yields $\frac{\beta^2\pi(\pi-\pi^s)(K-u)}{1-\beta\pi^s} - K < 0$, since $\frac{\beta^2\pi(\pi-\pi^s)K}{1-\beta\pi^s} - K < 0$. We also rule out $\lambda_1 = \lambda_2 = \lambda_3 = 0$, since from (38) this would imply $-\frac{1}{1-\beta\pi} \neq 0$.

Given $\lambda_3 = 0$, it remains to consider (1) $\lambda_1 > 0, \lambda_2 = 0$, (2) $\lambda_1 > 0, \lambda_2 > 0$ and (3) $\lambda_1 = 0, \lambda_2 > 0$. From (38), $\lambda_1 > 0, \lambda_2 = 0$ cannot hold, since this would imply $\lambda_1 = -\frac{1}{1-\beta\pi}$.

If $\lambda_1 > 0, \lambda_2 > 0$, then solving for λ_1 from (38) and substituting this into (39), we obtain

$$\lambda_1 = \frac{\left(1-\beta\pi\right)\left(\frac{\delta b\left(\pi_1\left(1-\delta\left(\pi^s-\pi^d\right)\right)\right)}{1-\delta\pi^s} + \delta\left(1-\pi\right)L_A' - \delta\pi_1 L_A\right) - \beta\pi_1\left(K - B_A - u\right)}{\left(1-\beta\pi\right)^2\left[\frac{\beta^2(K-u)}{1-\beta\pi^s}\left(\pi_1\left(2\pi-\pi^s\right)\right) - \left(\frac{\delta b\left(\pi_1\left(1-\delta\left(\pi^s-\pi^d\right)\right)\right)}{1-\delta\pi^s} + \delta\left(1-\pi\right)L_A' - \delta\pi_1 L_A\right)\right]} < 0, \tag{43}$$

since $K \gg 0$. We conclude that $\lambda_1 = 0, \lambda_2 > 0$ and $\lambda_3 = 0$, and the binding constraint is (36). The optimal bribe is given by

$$B_A^* = \frac{\delta\left(\pi^c - \pi^d - \delta\pi^c\left(\pi^s - \pi^d\right)\right)}{1-\delta\pi^s}b + \delta\left(1-\pi^c\right)L_A\left(e_A^*\right). \tag{44}$$

It is increasing in e_A^*:

$$\frac{\partial B_A^*}{\partial e_A^*} = \frac{\delta\left(\pi_1\left(1-\delta\left(\pi^s-\pi^d\right)\right)\right)}{1-\delta\pi^s} b + \delta\left(1-\pi^c\right) L_A' - \delta\pi_1 L_A > 0, \tag{45}$$

□

8.4 Proof for Corollary 1

Army's effort, e_A^*, is the solution to the leader's FOC:

$$\frac{\beta\pi_1\left(K-u-\frac{\delta\left(\pi^c\left(1-\delta\left(\pi^s-\pi^d\right)-\pi^d\right)\right)}{1-\delta\pi^s} b-\delta\left(1-\pi^c\right)L_A\right)}{\left(1-\beta\pi^c\right)^2} - \frac{\frac{\delta\left(\pi_1\left(1-\delta\left(\pi^s-\pi^d\right)\right)\right)}{1-\delta\pi^s} b+\delta\left(1-\pi^c\right)L_A'-\delta\pi_1 L_A}{1-\beta\pi^c}, \tag{46}$$

where army's IC condition (36) is directly substituted into the leader's objective function (34). By total differentiation, we obtain, since $\frac{\pi_{11}}{(\pi_1)^2} > \frac{2\beta}{1-\beta\pi^c}$, $K > u + B_A^* + \frac{1}{1-\beta\pi^c}\frac{\partial^2 B_A^*}{\partial\left(e_A^*\right)^2}$, and $\frac{\partial^2 B_A^*}{\partial\left(e_A^*\right)^2} = \frac{\delta\left(\pi_{11}\left(1-\delta\left(\pi^s-\pi^d\right)\right)\right)}{1-\delta\pi^s} b + \delta\left(1-\pi^c\right)L_A'' - 2\delta\pi_1 L_A' - \delta\pi_{11} L_A < 0$:

$$\frac{de_A^*}{dK} = \frac{-\frac{\beta\pi_1}{\left(1-\beta\pi^c\right)^2}}{\left[\frac{\beta\pi_{11}}{\left(1-\beta\pi^c\right)^2}+\frac{2(\beta\pi_1)^2}{\left(1-\beta\pi^c\right)^3}\right]\left(K-u-B_A^*\right)-\frac{2\beta\pi_1}{\left(1-\beta\pi^c\right)^2}\frac{\partial B_A^*}{\partial e_A^*}-\frac{1}{1-\beta\pi^c}\frac{\partial^2 B_A^*}{\partial\left(e_A^*\right)^2}} > 0, \tag{47}$$

$$\frac{de_A^*}{du} = \frac{\frac{\beta\pi_1}{\left(1-\beta\pi^c\right)^2}}{\left[\frac{\beta\pi_{11}}{\left(1-\beta\pi^c\right)^2}+\frac{2(\beta\pi_1)^2}{\left(1-\beta\pi^c\right)^3}\right]\left(K-u-B_A^*\right)-\frac{2\beta\pi_1}{\left(1-\beta\pi^c\right)^2}\frac{\partial B_A^*}{\partial e_A^*}-\frac{1}{1-\beta\pi^c}\frac{\partial^2 B_A^*}{\partial\left(e_A^*\right)^2}} < 0, \tag{48}$$

$$\frac{de_A^*}{d\beta} = \frac{-\left[\frac{\pi_1}{\left(1-\beta\pi^c\right)^2}+\frac{2\beta\pi_1\pi^c}{\left(1-\beta\pi^c\right)^3}\right]\left(K-u-B_A^*\right)-\frac{\pi^c}{\left(1-\beta\pi^c\right)^2}\frac{\partial B_A^*}{\partial\left(e_A^*\right)^2}}{\left[\frac{\beta\pi_{11}}{\left(1-\beta\pi^c\right)^2}+\frac{2(\beta\pi_1)^2}{\left(1-\beta\pi^c\right)^3}\right]\left(K-u-B_A^*\right)-\frac{2\beta\pi_1}{\left(1-\beta\pi^c\right)^2}\frac{\partial B_A^*}{\partial e_A^*}-\frac{1}{1-\beta\pi^c}\frac{\partial^2 B_A^*}{\partial\left(e_A^*\right)^2}} > 0. \tag{49}$$

□

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