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Abstract

In this paper we develop a model of patronage where the king's subjects exert a decentralized social sanction on the dissidents. We are able to show that depending on the succession rule in case of a revolution, the optimal co-optation strategy of the king differs. When the succeding king is the strongest revolutionary, the actual king co-opts the weakest among the potential opponents. When any member of the clientele has a claim on the throne, however, the actual king has two distinct co-optation strategies. He either approaches his most powerful subjects, in which case the size of the clientele is relatively modest but the clients' individual price is relatively high, or else he randomly co-opts subjects to contain the bargaining power of his clients. The ambiguity as to the optimal strategy rests in that in this latter scenario the size of the clientele is larger.

Key words: Threshold Model, Preference Falsification, Rent Seeking, Clientelism.

JEL: D72, H10, P14, P16

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1 Introduction

Rare are the instances in human history where people have been able to choose their leaders by means of genunily direct and fair elections. Certainly, the number of democratic states has reached unprecedented levels, but several countries keep on being ruled by powerful oligarchs who often seem to benefit from their people's support. No single formula can be used to explain the survival of non-democratic regimes, but they do usually have as a common deminator the control of brute force *and* a grip on the country's wealth. And while some of these states - such as North Korea or Zimbabwe - rely essentially on the former tool to maintain the population disciplined, a vast majority of non-democratic leaders give more emphasis to the peaceful co-optation strategy backed by some military might. Buying support through material transfers constitutes current currency in many sub-saharan countries (Azam, 1995) as well as in clan-led places like Afghanistan (Giustozzi and Ullah, 2006) or the Palestinian territories (Livingstone and Halevy, 1990). Despite the abundance of the literature on patronage (e.g. Sahlins, 1963; Platteau, 1995a; 1995b, Gandhi and Przeworski, 2006; North et al., 2007) , few efforts have been made to understand the *identity* of the favours beneficiaries. The core objective of the present paper is to shed some light this question.

To tackle this issue, the starting point is probably the observation that 'dictators are dictators because they cannot win elections' (Gandhi and Przeworski, 2006) given the clientelistic policies they pursue. Indeed, the elites aim at preserving the rents they enjoy in non-democratic settings (North et al., 2007), and have therefore no incentive to permit the median voter to decide the society's wealth partition. A by-product of this observation is that in a context of non-perfectly functioning democratic institutions, if the central power fails to comply with the opposition's demands, the latter will use violent actions to change the leader's mind, or his head (Roemer, 1985; De Nardo, 1985; Ginkel and Smith, 1999; Perez, 2004; Gandhi and Przeworski, 2006), instead of expressing its disagreement through the ballot box. To remain in power in such a context, the central regime may develop a strong repressive apparatus, it may co-opt key players in the opposition movement, or combine both instruments. Much attention has been given to those various strategies, as well as to the relative efficiency of each tool, with some authors putting more emphasis on the stick (Roemer, 1985; Wintrobe, 1998; Bhavnani and Ross, 2003, Ginkel and Smith, 1999, or Bates et al., 2002), others on the carrot (Olson, 1993; Bueno De Mesquita et al., 2003 and Padro I Miquel, 2006), and still others on a mixture of the two devices (De Nardo, 1985; Treisman, 1999; Acemoglu and

Robinson, 2000; Acemoglu et al., 2004; Acemoglu and Robinson, 2006; Fjelde and Hegre, 2006, as well as the vast litterature on rent seeking and the resource curse). In this paper we fix the repressive capacity of the central power and focus on the patronage strategy that, as we show, is not uniquely defined.

Patron-client relationships can be understood as an asymmetric exchange where-by the recipient of a gift vows allegiance to the patron by rewarding the latter with his support and thus increasing the transferers' power (Homans 1961; Blau 1964; Wintrobe 1998; Platteau and Sekeris, 2007, Konrad, 2007). Indeed, material goods may be traded against allegiance since the payback may take a form different from the medium of the original favour (Ekeh 2004: 35). Commodities may thus be exchanged against symbolic attributes such as social prestige and political power: a material gift, which never goes un-repaid, can thus be reciprocated, say, by a demonstration of loyalty, allegiance, homage, respect, subordination, devotion, etc...

A careful look at places structured along patron-client relashionships captures our attention for the following three reasons. The first and most striking observation regards the disproportionately small number of agents the ruler patronizes as compared to the size of the community (Bueno de Mesquita et al., 2003; North et al., 2007). A second calling point regards the non-uniqueness of the optimal co-optation strategies since the strongest subjects may or may not be systematically granted favours by the king. We may nevertheless identify a recurrent characteristic of patron-client relationships: the general populace is typically excluded from the pool of privileges' beneficiaries.

This last observation is perhaps less perplexing than the two previous ones. To the extent that a patron seeks to increase his power through co-optation, it is obvious that the weakest elements of a society are unlikely to be granted any favour. Indeed, several authors have underlined the lower strata's (peasants, workers, migrants) inability to coordinate their actions, hence resulting in their subordination to and exploitation by elites (De Nardo, 1985; Bendix, 1980; Collier, 2008). Regarding the rest of the community, however, alternative strategies have historically been used to fuel patronage networks. The most intuitive pattern is perhaps the one where autocratic rulers have recursively relied on local strong men to dominate their people (Bueno de Mesquita et al., 2003; North et al., 2007). A diametrically opposed strategy consists in purposefuly sidelining the most dangerous opponents rather than having them gathered in the king's court. Such a pattern has been observed in environments where the ruling's individual power was essential in making him the head of the group. Examples of this strategy may be found in environments dominated by power politics (see for instance Reno, 2004 for examples of African weak states), and Lake's (2006) analysis provides us with interesting applications to international politics. A still different bribing strategy consists in dividing and ruling by dispatching favours in a volatile manner (Acemoglu et al., 2004).

The divide and rule strategy consiste in reducing the clients' importance by making their position insecure through the threat of replacement. Mobutu in Zaire (Reno, 2004), Trujillo in the Dominican Republic (Acemoglu et al., 2004), or Stalin in the USSR (Solzhenitsyn, 1973) were able to diminish the individual weight of any single regime supporter by applying such co-optation techniques. Similar strategies of patronage politics have been used by Castro in Cuba, Chavez in Venezuela, or Ahmadinejad in Iran[1]. These populist strong men have departed from their predecesors' policies of co-opting the country's strongmen by precisely sidelining part of the influential people's body and relying on a wider group of individuals.

Alternatively, a much more hierarchized co-optation strategy may be applied. Jackson and Rosberg (1984) use the notion of 'personal rule' to characterize the behaviour of patrons whose support lies in the hands of a few powerful clients: 'personal rule is an elitist political system composed of the privileged and powerful few in which the many are usually unmobilized, unorganized, and therefore relatively powerless to command the attention and action of government' (Jackson and Rosberg, 1984: 423). This strategy which consists in co-opting the strongest local Big Men (Polanyi, 1944; Breman, 1974; Platteau, 1995a) confers, however, significant bargaining power to the clients. Indeed, when allowing for a particular subject to be a basic ingredient of the regime's stability, the ruler improves his clients' exit opportunities and therefore reduces his own bargaining power. Hence, while non-democratic rulers may have an incentive to secure the support of a limited number of powerful subjects, the individual cost of such clients may create incentives to seek alternative co-optation strategies.

Underlying the two above mentioned strategies, namely the strategic selection of the most powerful subjects, and the populist approach of co-opting weaker agents as well, is the fact that the clients have a claim on the ruler's wealth in case the latter fails to satisfy them. The clients prospects, however, need not necessarily be so. Indeed, the benefits from successfully opposing the king may in fact be enjoyed by a very limited number of relatively strong subjects.

The former assumption of all clients benefiting from a successfull uprising is an underlying assumption in North

[1] In these latter examples the people's material conditions have been much more humane. The reason may lie in the rulers' smaller coercive capacity.

et al.'s (2007) understanding of the way non-democratic states (*natural states* in their terminology) are organized. According to their theory, the elites collude in a *dominant coalition* that 'manipulates the rest of society to create incentives for powerful members of the coalition to limit their use of violence' (North et al., 2007: 20). The elites are therefore assumed to maximize the coalition's payoff by acting cooperatively 'under the aegis of the state [which] enhances the elite return from society's productive resources - land, labor, capital, and organizations (North et al., 2007: 23-24). In this paper we explore both hypotheses and analyze the respective implications in terms of clients selection by the 'King'.

When the successor of a deposed king is knwon ex-ante, however, the subjects' motivations are radically modified since the only benefit from opposing the ruler rests in the *expressive*utility of making know one's own disagreement with the king. Categorizing the international system along these ligns seems to be a fair assumption since whenever the regional or world domination has been successfully contested, the successor has proved to be the strongest survivor in the system. After the First Sino-Japanese war (1894-95), Japan emerged as the sole regional power, while in the aftermath of Napoleon' humuliating defeat in Waterloo, the English empire established itself as the uncontestable superpower. Similarly, among the consequences of the elimination of the Nazi threat in 1945 we account the establishment of the United States, and of the Soviet Union as the unique patrons in their (well delimited) respective spheres of influence. When considering the players' relationships in the international arena, alliances of the strongest players can be deemed more an oddity than a regularity. Washington's policy nowadays, to cite one example, has consisted in co-opting middle influence countries around the globe rather than securing the (costly) allegiance of China, Russia, or Iran. The succession rule should therefore be deterministic in the way a patron selects his clients.

While our main objective is to better understand the various co-optation strategies, we are equally concerned with the perplexing observation that the ruling elites often represent a disproportionately small share of the population (Bueno De Mesquita et al, 2003; North et al., 2007), both in terms of numbers, and of aggregate power. The Febuary 1917 Bolshevik Revolution, for instance, revealed the incapacity of the Czar to discipline his subjects in times of massive uproar. In the same vein, Louis XVI would not have been overthrown (and later beheaded), nor would the Shah of Iran have been forced to exile, or Ceausescu been killed, if their respective regimes possessed a military power strong enough to overwhelm a large scale insurrection. Nevertheless, the coercive power of these regimes was sufficient to have secured long periods of political stability despite the capacity of the mob to overthrow their respective ruler. The litterature on patronage and clientelism (Bueno de Mesquita et al., 2003; Gaspart and Platteau, 2003; Platteau, 2004; Acemoglu et al., 2004; Gandhi and Przeworski, 2006; Padro I Miquel, 2006) partly explains these regimes' survival ability. A complementary explanation can contribute to understand the modest size of the ruling coalitions.

The preferred argument in the litterature is that the masses are profoundly exposed to the collective action problem of free ridding (Olson, 1965). The subjects' incentives not to contribute to the costly rebellion allows the kleptocrat to exploit the masses. In such contexts, Olson (1993) observed that "it is a logical mistake to suppose that because the subjects of an autocrat suffer from his exactions, they will overthrow him. The same logic of collective action that ensures the absence of social contracts in the historical record whereby large groups agreed to obtain advantages of government also implies that the masses will not overthrow an autocrat simply because they would be better off if they did so."

Rather than referring to the free riding problem, in the present model we consider situations where subjects refrain from opposing the regime out of fear of beeing sidelined by their pairs. We build on Timur Kuran's (1989; 1995) theory of preference falsification[2] where the agents' utility is composed of three components: the intrinsic, the reputational, and the expressive utility. In short Kuran's argument goes as follows: an agent publicly expresses a view at odds with his personal beliefs, because of the social pressures he anticipates were he to act otherwise. The reason is to be sought in the components of the net utility an agent derives from the public expression of a viewpoint. Kuran distinguishes between the *intrinsic utility* of one's public choice, that is the direct utility he would receive if his personal choice turned out to be the society's choice, the *expressive utility* of it, i.e. the personal gratification one experiences from making public his opinion, and the *reputational utility*, that measures the effect the other agents' viewpoint on one's expressed opinion has on one's own well being. I may for instance publicly

[2]Kuran's idea can be traced back to Granovetter (1978) who develops a *threshold model* that sheds light on the observation that 'collective outcomes can seem paradoxical, i.e. intuitively inconsistent with the intentions of the individuals who generate them'. More precisely, in a situation of strategic interaction featuring many agents, provided a certain threshold concerning some action(s) is not reached, we may observe individuals picking an action opposed to their genuine preferences regarding the act itself because of the costs imposed by other individuals when acting in a different way. Lohmann (1994) also follows a similar path to the one of Granovetter. She integrates the informational cascades theory (Bikhchandani et al., 1992) in her model, thus departing from the pure idea of preference *falsification*.

state that my preferred colour is pink, even though I abhor it (*intrinsic utility*), simply because, if I disclose in 'pinkland' my distaste for their cherished colour, I would be regarded as extremely odd (*reputational utility*), while, on the other hand, I feel no particular urge to make known my preference for blue (*expressive utility*).

In this paper we assume the agents' utility to possess the three components identified by Kuran. The subjects are asymmetrically endowed with some power/force that can be used to overthrow the ruler. By introducing the players' force in an exogenous manner we forego the conflict side of the coin in order to understand more in depth the patron-client relationships. Protesting against the central regime enhances one's reputation, which in turn affects positively the players' utility. The resulting expressive utility of demonstrating is assumed to be a positive function of one's power since stronger individuals' actions are likely to be more visible than the opposition exerted by weaker agents (Emiliano Zapata in Mexico, James Connolly in Ireland, or Martin Luther King in the United States have all managed to obtain such respect and esteem through their actions that their names remain carved in History). On the other hand, demonstrating entails reputational costs. This 'reputational utility' is a 'second order punishment scheme' (Bowles, 2002) stressing that if some agent does not openly criticize the regime he must denounce those who do for, should he not, he is assimilated to the authority's challengers and treated as such (Kuran, 1995). Such decentralized collective punishments need not necessarily be formal sanctions. This brings to mind Frank's (1996) remark that there is a 'universal desire for human approval' that will make one avoid voicing against the prevalent opinion[3]. The king decides whether and how to grant favours to his subjects in the knowledge that if the agents protesting manage to reach some critical revolutionary mass he will be toppled.

In order to gauge the implications of the alternative succession schemes exposed earlier, the analysis is partitioned in two sections. In a first part we assume that when a revolution succeeds, the strongest rebelling individual becomes the new king. The inability of the king to commit on future gifts implies that the subjects have no incentive in coordinating their actions to topple the ruler. We are able to show that the optimal co-optation strategy for the king then consists in delivering personalized gifts to the weakest potential opponents. In the second section we allow for any client of the king to have a likelihood of replacing the latter in case of a revolution. This creates

[3]Referring again to the social psychology literature, note that Deutsch and Gerard (1955, cited in Leyens and Yserbyt, 1997) point at the social pressure one is exposed to when deviating from the group's viewpoint, while Kelman (1958, cited in Leyens and Yserbyt, 1997) considers that the individuals obey a source of influence that masters rewards and punishments, hence their willingness to convey 'complaisance'.

scope for the subjects to coordinate their actions. In this latter scenario the bargaining power of the clients is thus enhanced, and we are able to distinguish two distinct equilibrium strategies from the king's viewpoint. The ruler may develop a 'personal rule' and exclusively bribe the Big Men of his polity, in which case few subjects need to be co-opted at a high individual price. The king may alternatively decide to cut the clients' bargaining power by randomly selecting them. This 'divide-and-rule' strategy is quite different from the one proposed by Acemoglu et al. (2004) since the opposition's power is diminished by effective random bribes to some clients rather than by the threat of destroying any collective action among the potential rebels. Lastly, in a concluding section we discuss the results of the model.

2 The domination of the fiercest.

2.1 The Setting

We consider an infinitely repeated game with one Leader, L, and n subjects, where N denotes the set of subjects ($N = \{1, 2, \ldots, n\}$). Each agent is endowed with one unit of time that he inelastically allocates at each time period to the productive activity, or to protesting/rebelling. At every time period the king decides the vector of productive resources to transfer to his subjects, $\vec{x} = (x_1, x_2 \ldots x_n)$. Recipient i is thus in possession of $r_i^{t-1} + x_i^t$ resources in time t, where $\sum_{i \in L \cup N} r_i^t = r$. These transfers are irrevocable by the leader; only a revolution can modify the distribution of productive resources, in which case all the community's resources end up in the hands of the new ruler. After the privileges have been distributed, the subjects decide whether to transform their resources in consummables using a one-to-one production technology, or to join the rebellion, in which case they forego production. When subjects decide to join the protest, their individual contribution to the general outcome is heterogenous. Subject i's power/force equals p_i, and the total force of the protesters equals $F_P = \sum_{i \in P} p_i$, where P designates the subset of subjects protesting. The players' power is independently and uniformly distributed accross the population over the interval $[0, \bar{p}]$. If the movement's power exceeds some revolutionary critical force Π, the regime collapses and the strongest revolutionary replaces the actual king. Otherwise the leader stays in power with unit probability. Whenever the opposition movement is contained at the level of a protest (i.e. $F_P < \Pi$), the opponents to the central regime derive an expressive utility by making public their opposition to the leader. This utility component the protesters enjoy is assumed to equal the pressure they exert on the central power, p_i. If, however, the protest mutates in a revolution, the revolutionaries' expressive utility drops to zero since the ruler being immediately ousted, the very act of protesting is less visible. The third component of the subjects' utility is given by their reputational utility. When a proportion π of the community takes the streets, and $F_P < \Pi$, the remaining $(1-\pi)n$ agents apply a social sanction on the protesters in order to avoid any potential confusion regarding their support to the central government. The protesters' utility is thereby reduced in time t by an amount $z(\pi^t)$, where $\frac{\partial z(\pi^t)}{\partial \pi^t} < 0$. If the protest mutates in a revolution, the social pressure against the protesters disappears and the deposed leader's faithful supporters are the ones who experience a dis-utility loss of $-z(1-\pi)$, with $\frac{\partial z(1-\pi^t)}{\partial \pi^t} > 0$.

In a last stage of the current time period, the agents consume their production and we next move on to period $t+1$. In case no revolution occured, period t's leader remains in power and $r_i^{t+1} = r_i^t - \sum x_i^t$, $\forall i$, while in the converse situation a new leader is picked out of the revolutionary movement's members.

Subject i's instantaneous utility can thus be written as:

$$u_i^t = x_i^t - z(1-\pi^t) \qquad \text{if } i \text{ does not rebel} \tag{1}$$

$$u_i^t = (1-R)\left(f(p_i) - z(\pi^t)\right) \qquad \text{otherwise} \tag{2}$$

A graphical support may help fix the ideas at this stage. On Figure (1) we show how a revolution occurs when the ruler takes no action to prevent it (i.e. if the leader co-opts no subject). The graph features a discontinuous concave curve that stands for the reputational (dis)utility, which reaches its maximum when the subjects all conform to either supporting the king, or opposing him. The negatively sloped line depicts the power of each subject, ranked from the strongest to the weakest. The shaded area Π/n represents the revolutionary critical force that the protesters must exceed for a revolution to occur. Bearing in mind that all information is common knowledge, the π_a strongest subjects are expected to rebel, irrespectively of the other subjects' decision. Indeed, since the king is assumed not to have co-opted anyone, all the individuals whose expressive utility from rebelling (p_i) is higher to the expected social pressure ($z(0)$) become dissidents. This in turn implies that the expected social sanction is no more equal to $z(0)$, but rather adjusted to $z(\pi_a)$. Hence, the next $(\pi_b - \pi_a)\%$ more powerful subjects are also expected to join the opposition's ranks. Since, however, the $\pi_b n$ strongest agents' strength (area $0\bar{p}b\pi_b$) exceeds the critical revolutionary mass (area $0\bar{p}AB$), the leader is thrown out of office.

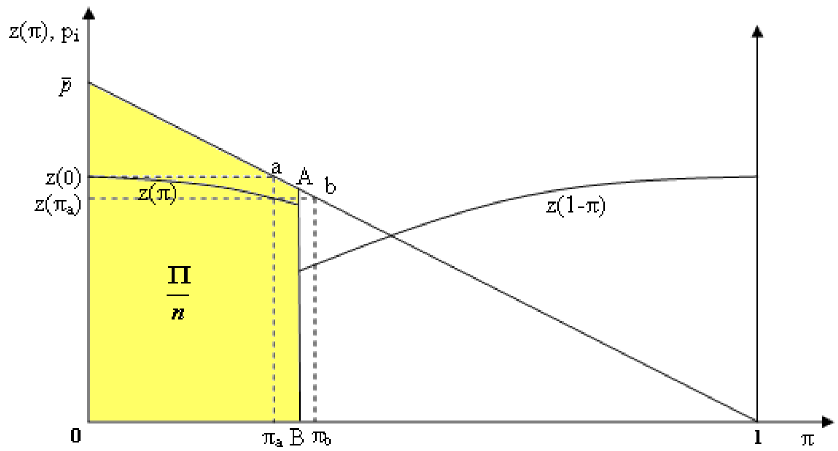

Figure 1: Mutation of a protest in a revolution in the absence of co-optation.

Summing up, if we neglect for notational convenience the time superscripts, the timing of the period-model is the following:

1. The leader chooses a vector of resources gifts, $\vec{x} = (x_1, x_2 \dots x_n)$.

2. The subjects simultaneously decide whether to join the protest and forego the productive activity or not.

3. The players obtain their period utilities. If $F_P > \Pi$, a revolution occurs, the ruler loses his a authority and a new leader selected among the pool of revolutionaries becomes the new king in the subsequent time period. Otherwise, the same ruler remains in place.

Bear in mind that in this section the new ruler, in case of revolution, is the strongest revolutionary, an assumption that we later lift.

2.2 Analysis

The natural equilibrium candidate for a repeated game is the Subgame Perfect Equilibrium (SPE). Because of the complexities this equilibrium notion involves when dealing with infinitely repeated games, we choose to focus on the Markov Perfect Equilibrium (MPE) that constitutes a subset of the SPE set. While the latter only requires that the players' strategies are Nash in every proper subgame, the MPE possesses the additional feature that at any time period only the payoff-relevant history should matter. And since all the payoff-relevant history in time t is captured by a state variable S^t, the MPE is a SPE conditioned on the state variable. More formally,

Definition: A Markov Perfect Equilibrium (MPE) is a profile of strategies σ that are perfect equilibrium and are measurable with respect to the payoff-relevant history ($H^t(h^t) = H^t(\bar{h}^t) \Rightarrow \forall i, \sigma_i^t(h^t) = \sigma_i^t(\bar{h}^t)$) (Fudenberg and Tirole, 1991: 515).

In the present framework, the state variable is the amount of resources belonging to each agent, $\vec{r^t} = (r_1^t, r_2^t \dots r_n^t, r_L^t)$. Agent i's objective is to choose a strategy $\Sigma_i = (\sigma_i^0, \sigma_i^1 \dots \sigma_i^\infty)$ that maximizes his inter-temporal utility for any given strategy of the n remaining agents. For a constant (and identical accross agents) discount rate of δ, the discounted flow of expected payoffs can be written as:

$$U_i(\Sigma_i, \Sigma_{-i}, \{S\}_0^\infty) = \sum_{t=0}^{\infty} \delta^t u_i^t(\sigma_i^t, \sigma_{-i}^t, S^t)$$

Under state S, the maximal utility any agent i can obtain is given by the following Bellman equation:

$$V_i(S) = max_{\sigma_i}\{u_i(\sigma_i, \sigma_{-i}, S) + \delta \sum_{S'} V_i(S^{'})T(S^{'}|\sigma_i, \sigma_{-i}, S)\} \tag{3}$$

where $V_i(S)$ is the value for function for i under state S, while $T(.)$ gives the probability that some particular state is realised in the next time period. Following our hypotheses the transition process possesses a deterministic characteristic that significantly easens the analysis. Whenever a revolution fails, $S^{t+1} = S^t$ with unit probability.

An interesting feature of the MPE is that we solve the game by proceeding backwardsly inside any time period. We thus start by determining whether a revolution occurs or not in the last stage. When $F_P < \Pi$, the only subjects that do join the protest are the ones whose expressive utility of protesting is higher to the associated reputational utility. If, however, $F_P \geq \Pi$, all resourceless subjects join the rebellion since failing to do so would only burden these 'faithfull' individuals with the social sanction. Regarding the demised leader's clients, they join the rebellion if:

$$\delta \sum_{S'} V_i(S^{'})T(S^{'}|r_1^t, r_2^t, \dots r_n^t, \sigma_i^{'}, \sigma_{-i}, S)\} > x_i - z(1-\pi) + \delta \sum_{S'} V_i(S^{'})T(S^{'}|r_1^t, r_2^t, \dots r_n^t, \sigma_i^{''}, \sigma_{-i}, S)\} \tag{4}$$

Having fully described the subjects' equilibrium strategy in time t we can climb up the decision tree and elucidate stage (1) which consists in the leader selecting the vector of personal gifts $(r_1, r_2 \dots r_n)$ to provide. The problem of the leader is the following:

$$max_{x^L, r_1^t, r_2^t, \dots r_n^t} \Big\{ \big[x_L^t - \sum_{j \in N} r_j^t \big] + \delta \sum_{S'} V_L(S') T(S' | r_1^t, r_2^t, \dots r_n^t, \sigma_{-i}, S) \big\} \Big\} \tag{5}$$

If the ruler fails to discipline his subjects, $V_L(S') = 0$, the ruler takes his exit option forever after with unit probability, exit option assumed to be nil. In that case, the leader's problem is to maximize his instantaneous utility, and this is achieved by setting $r_1^t = r_2^t \dots = r_n^t = 0$, hence $U_i = r^t$.

If, however, the ruler succeeds in averting the revolution from taking place, $V_L(S') = V_L(S)$. For this scenario to arise the ruler must make sure that $F_P \leq \Pi$.

Consider the following obvious result:

Result 1. *If $F_{P|\vec{x}=\{0,0,\dots 0\}} \leq \Pi$, the leader rules without transfers.*

If (i) the ruler distributes no private benefits, (ii) $p_i < z(0)$, and (iii) $F_P \leq \Pi$, the ruler needs not take any action to avert a revolution. In this situation the leader's life time utility is given by:

$$U_i = \frac{r}{1-\delta} \tag{6}$$

The subjects receive no productive resources, while the most powerful individuals obtain a positive (expressive) utility from exerting some resistance. This result is due to a combination of weak, comparatively to the central power, subjects, and/or an efficient decentralized punishment.

Result 2. *If $F_{P|\vec{x}=\{0,0,\dots 0\}} > \Pi$ and $\nexists \vec{x}'$ such that $F_{P|\vec{x}'} < \Pi$ and $\sum_i r'_{i \neq L} \leq \delta r$, then a revolution occurs at each time period.*

This 2^{nd} result, the proof of which is in the Appendix, states that if a vector of gifts that succeds in both (i) making a revolution impossible, and (ii) making the leader better off as compared to the no transfer option, does not exists, then a revolution recursively occurs at each time period.

There must therefore also exist an intermediate outcome where the ruler finds it optimal to co-opt subjects in order that the revolution is not carried. In this situation, the ruler needs to dispatch gifts to some potential protesters so that the pool of opponents falls short of reaching the revolutionary critical force. Given that the leader co-opts enough subjects to avert a revolution, any individual i in the community will refrain from joining the uprising if the expected utility of participating to a failed rebellion is less than the expected utility of not rebelling.

In case no revolution occurs, since the distribution of resources remains unaltered from one period to the other, the same decisions must be adopted at both time periods. The stationarity that follows from the markov hypothesis implies that individual i will therefore decide to join the rebellion if the next condition is fulfilled:

$$\frac{p_i - z(\pi^\tau)}{1-\delta} > \frac{x_i}{1-\delta} \Leftrightarrow p_i - z(\pi^\tau) > x_i \tag{7}$$

Provided the ruler wants to remain in power, he still has to decide whom to co-opt given that this last inequality gives the individual cooptation price of subject i. If the leader bribes rather weak subjects, the individual transfer that keeps them silent is small compared to the equivalent amount the ruler should transfer to powerful individuals. The trade-off, however, rests in that the *number* of weaker individuals that must be co-opted for the critical revolutionary mass not to be reached is bigger to the analogous number of powerful individuals.

Optimal co-optation strategy

The aim of the ruler is to make sure that after buying-off some subjects, the remaining protesters are just not enough to perform a revolution, meaning that their aggregate power is smaller than the critical revolutionary force, Π. In order to keep track of the analysis, we have represented on Figure (2) one such possible co-optation strategy. In this scenario, the ruler co-opts all the subjects whose power is comprised between $\bar{p}_c$ and $\bar{p}_b$. These individuals represent a share $(\pi_C - \pi_B)$ of the total population. This implies that after the $\pi_B n$ more powerful subjects have protested, then next most powerful non co-opted individuals have a power slightly smaller than $\bar{p}_C$. As one can see on Figure (2), the move of the 'power line', $f(\pi)$, towards the origin $(g(\pi))$ implies that after applying this specific co-optation strategy, π_E percent of the community eventually takes the streets. We can therefore deduce that when applying this particular bribing strategy, the ruler still faces a total opposition equal to the sum of the two shaded areas, $0\bar{p}B\pi_B$ and $\pi_B bE\pi_E$. If we impose that the shaded area equals Π so as to prevent a revolution, the ruler's problem is then a cost minimization one consisting in deciding which individuals to bribe given this constraint. Since the minimal amount that deters individual i from protesting is equal to $\bar{p}_i - z(\pi_E)$, the total cost of bribing the individuals whose power lies between $\bar{p}_B$ and $\bar{p}_C$ equals to the area $ABCD$.

Having explained the problem in a detailed manner, let us minimize the leader's expenses. The total co-optation cost, C, in the case under consideration is equal to:

$$C = \int_{\pi_B}^{\pi_C} \Big(f(\pi) - z(\pi_E)\Big) n d\pi \tag{8}$$

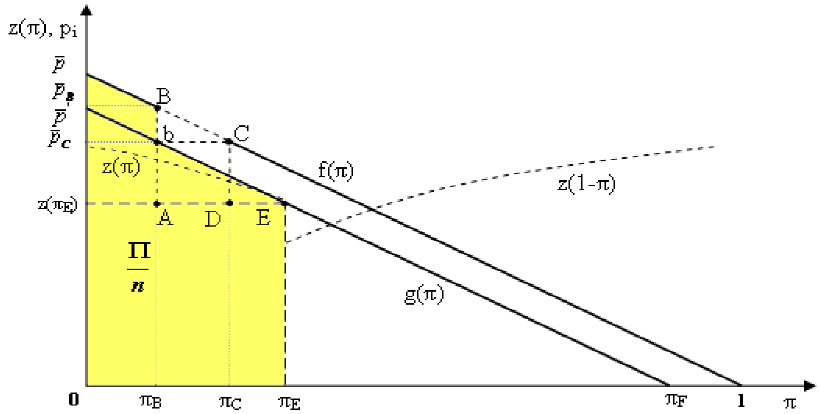

Figure 2: Some co-coptation strategy

And since $f(\pi) = \bar{p}(1-\pi)$, we have that

$$C = \big(\bar{p}z(\pi_E)\big)\big(\pi_C - \pi_B\big)n - \frac{\bar{p}}{2}\big(\pi_C^2 - \pi_B^2\big)n \tag{9}$$

We thus need to compute the values of π_B and π_C so as to have the cost as a function of a single choice variable, π_E.

Notice first that since we have not altered the distribution of the individuals' power on the $[0, \bar{p}_B]$ interval, $f(\pi)$ and $g(\pi)$ respectively describe the power distribution on the $[0, \pi_B]$ and $[0, \pi_F]$ domains. It follows that those two lines must have the same slope, $\bar{p}$, but a different intercept. If we denote the intercept of $g(\pi)$ by $\bar{p}'$, given that $g(\pi)$, is such that $g(\pi_E) = z(\pi_E)$ by construction (since we do not want any subject after the $\pi_E n^{th}$ individual to protest), we can deduce that:

$$\bar{p}' = z(\pi_E) + \pi_E\bar{p} \tag{10}$$

We equally know that $\pi_C - \pi_B$, the total percentage of co-opted subjects, is equal to $1 - \pi_F$ because of the parallel move of the power line. This means that:

$$\pi_C - \pi_B = 1 - \frac{\bar{p}'}{\bar{p}} \tag{11}$$

Combining this last equation with (10), we deduce that:

$$\pi_C - \pi_B = 1 - \pi_E - \frac{z(\pi_E)}{\bar{p}} \tag{12}$$

If we want to depict the revolutionary critical mass Π in this graph, we need to divide it by n since the x-axis is expressed in percentages. It thus follows that Π/n is equal to the shaded area, which means that:

$$\frac{\Pi}{n} = \int_0^{\pi_B} \big(\bar{p}(1-\pi)\big)nd\pi + \int_{\pi_B}^{\pi_E} \big(\bar{p}' - \pi\bar{p}\big)nd\pi \tag{13}$$

And after computing this expression and replacing for the value of $\bar{p}'$ as given by equation (10), we can isolate π_B to obtain:

$$\pi_B = \frac{\frac{\Pi}{n} - \pi_E z(\pi_E) - \frac{\pi_E^2\bar{p}}{2}}{\bar{p}\Big(1 - \pi_E - \frac{z(\pi_E)}{\bar{p}}\Big)} \tag{14}$$

Combining results (12) and (14) in the cost computation derived in (9), and simplyfing, we obtain:

$$C(\pi_E) = \Big[\frac{\bar{p}}{2} - (1-\pi_E)z(\pi_E) + \frac{z(\pi_E)^2}{2\bar{p}}\Big]n - \frac{\Pi}{n} \tag{15}$$

Since this equation gives us the cost of preventing a revolution as a function of the percentage of the community eventually joining the protest (π_E), the ruler will select π_E such that this cost is minimized. We thus derive (15) which gives us:

$$\frac{\partial C(\pi_E)}{\partial \pi_E} = z(\pi_E)n + z(\pi_E)^{'} n\Big[\frac{z(\pi_E)}{\bar{p}} - (1-\pi_E)\Big] \tag{16}$$

The reputation function being decreasing in π_E, $C(\pi_E)$ is increasing in π_E if the square-bracketed term is negative as well. For this to be the case, we need that $z(\pi_E) \leq (1-\pi_E)\bar{p}$. We know by construction that $(1-\pi_E)\bar{p}^{'} = z(\pi_E)$. Since the co-optation strategy shifts the power line towards the origin (from π_B on), we have that $z(\pi_E) = \bar{p}' - \pi_E\bar{p} < \bar{p} - \pi_E\bar{p}$. We conclude that $\frac{\partial C(\pi_E)}{\partial \pi_E} \geq 0$, with strict equality if $z(\pi_E) \neq 0$.

Having showed that the cost of co-optation is increasing in π_E, the ruler selects the smallest π_E compatible with $\pi_E \geq 0$, $\pi_B \geq 0$, and $\pi_C < 1$. Deriving both π_B as given in equation (14), and π_C as given in equation (12) with respect to π_E, we show in the Appendix that $\frac{\partial \pi_B}{\partial \pi_E} < 0$, and $\frac{\partial \pi_C}{\partial \pi_E} < 0$. Moreover, by using those same results we obtain that $\frac{\partial(\pi_C - \pi_B)}{\partial \pi_E} < 0$. This implies that since it is optimal for the ruler to select the smallest possible value of π_E, and that the smaller is π_E, the bigger are π_B and π_C (with the gap separating them reducing), it must be that $\pi_E = \pi_B$ since taking $\pi_E < \pi_B$ implies the co-optation of individuals that would not protest given the equilibrium social sanction of protesting $z(\pi_E)$.

Proposition 1. *When the strongest rebel replaces the king in case of a revolution, the latter co-opts the weakest opponents among the subset of subjects powerful enough to publicly oppose the regime.*

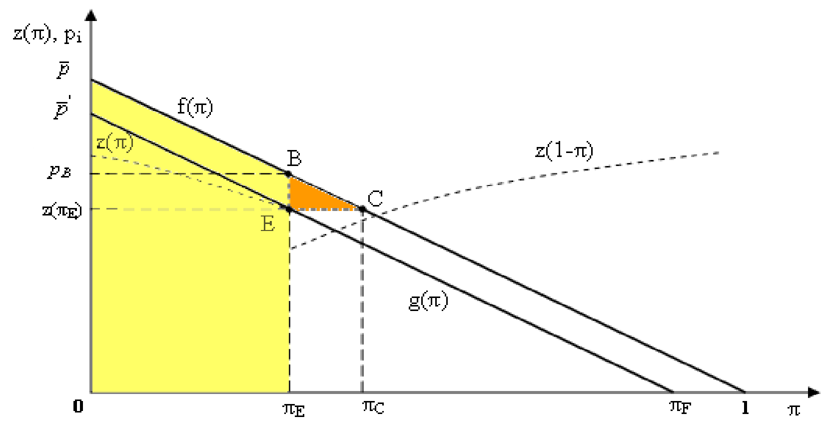

Figure 3: Equilibrium co-optation strategy

On Figure (3) we have graphically represented the equilibrium strategy of the ruler when he dispatches personalized gifts to a share $(\pi_C - \pi_E)$ of the community. The total cost of this operation equals to the triangle EBC, and we now derive the exact value of this cost.

The surface of the EBC area on Figure (3) equals:

$$\sum_{i \in C} x_i = \frac{\big(\bar{p}_B - z(\pi_E)\big)(\pi_C - \pi_E)}{2} n \tag{17}$$

As before, we know that the total mass of protesters should equal the critical revolutionary mass, hence:

$$\int_0^{\pi_E} \big(\bar{p}(1-\pi)\big) n d\pi = \bar{p}\pi_E n \big(1 - \frac{\pi_E}{2}\big) = \frac{\Pi}{n} \tag{18}$$

Solving (18) for π_E yields:

$$\pi_E = 1 - \sqrt{\frac{n\bar{p} - 2\Pi/n}{n\bar{p}}} \tag{19}$$

Having computed π_E, we can deduce the value of p_B:

$$p_B = (1 - \pi_E)\bar{p} \tag{20}$$

We are left with the computation of π_B which is obtained by finding the percentile of the uniformily distributed population such that the $(1 - \pi_C)^{th}$ subject has a power equal to $z(\pi_B)$ (i.e. after π_B% of the population have protested the next most powerful individual is indifferent between joining the revolt or not). Hence,

$$(1 - \pi_C)\bar{p} = z(\pi_E) \Rightarrow \pi_C = 1 - \frac{z(\pi_E)}{\bar{p}} \tag{21}$$

Using (19), (20) and (21) in (17) we obtain:

$$\sum_{i \in C} x_i = \frac{\left[\sqrt{\frac{n\bar{p}-2\Pi/n}{n}} - \frac{z\left(1-\sqrt{\frac{n\bar{p}-2\Pi/n}{n\bar{p}}}\right)}{\sqrt{\bar{p}}}\right]^2}{2} n \tag{22}$$

Lastly, for the cooptation strategy to be the equilibrium one, we need that $\sum_{i \in C} r_i \leq \delta r$ (see Result 2).

3 The Dominant Coalition

In the previous section we assumed that when a revolution succeeds, the strongest rebel becomes the new ruler. We now want to allow the *dominant coalition* members, i.e. the transfer beneficiaries, to all have the same possibility of being the successors in the event of a successful revolution. Moreover, we shall assume that the dominant coalition's members have no problem in coordinating their actions; we adopt a cooperative stance *for these agents*. For a revolution to be averted, therefore, it is necessary that the coalition is stable in the sense that no partition of the dominant coalition can grant the deviating members a higher payoff. We can anticipate the results at this stage and claim that the dominant coalition is such that if *all members* of the dominant coalition refrain from joining the protest, no revolution occurs. The coalition subjects' decision regarding the protest is determined by comparing the expected payoff of a certain revolution with the status quo payoff. If $r_i^t \neq 0$, meaning i belongs to the dominant coalition, the expected utility of rebelling to i equals:

$$V_i^t = \delta\Big((1 - L_i)V_i^{t+1} + L_i V_L^{t+1}\Big) \tag{23}$$

Indeed, in $t+1$ the rebelling agent expects to obtain with probability L_i the expected payoff of being a leader, while with the complementary probability he will be treated as in the previous time period. We assume that all members of the dominant coalition have the same likelihood of assuming the leader's role in the next time period.

The present framework significantly differs from the no-coordination scenario since the identity of the clients affects their payoff expectations, which in turn determine the individual co-optation price. Assume it is optimal for the ruler in time period t to buy-off a particular subset of the community. If this leader is deposed, the same class of individuals will be co-opted by the new leader in $t+1$ because of the assumed stationarity the markov hypothesis imposes in the players' strategies. This means that if the ruler behaves as in the previous section by selectively picking the weakest subjects among the potential protesters, this particular class of individuals (i.e. whose power is comprised between p_B and $z(\pi_E)$ as shown on Figure 3) know that with unit probability they will be given a privileged treatment at any future time period. And since transferring them private favors empowers them to provoke a revolution, those subjects will require a gift whose value lies between their expected payoff as leaders, and their expected payoff as privileged members of the community. An alternative strategy that needs to be considered now consists in reducing the expected payoff of the subjects by initially selecting them on a random basis. The required transfer for those subjects not to revolt is then smaller since their payoff expectation in the event they do not become leader after a successful revolution embeds the likelihood they don't belong to the dominant coalition in $t+1$. Our resolution strategy consists in first determining the superior strategy when selecting the players in a strategic manner, and then comparing this outcome to the alternative strategy of randomly selecting clients.

3.1 Strategic selection of the clients

From the above explanations we deduce that when a strategically selected client decides not to join a failed revolution, $u_i^0 = x_i^0 = \ldots x_i^t = x_i^s$, with the s superscript designating the strategic selection strategy. This same agent, however, has the power to provoke a revolution since all agents in the dominant coalition, except the leader himself, will join the rebellion. We can thus rewrite (23) as:

$$V_i = \frac{\delta}{1-\delta}\Big[(1-L_i^s)x_i^s + L_i^s v_L^s\Big] \tag{24}$$

On the other hand, if this subjects' optimal strategy is not to protest, his life-time utility is given by

$$V_i = \frac{x_i^s}{1-\delta} \tag{25}$$

Agent i will therefore prefer not provoking a revolution if (25) is bigger than (24) which means that the minimal individual co-optation cost equals:

$$x_i^s = \frac{\delta L_i^s v_L^s}{1-\delta(1-L_i^s)} \tag{26}$$

The clients all receive the same gift because their exit option is the same (i.e. whichever member of the dominant coalition provokes a revolution, at equilibrium all dominant coalition members obtain the same expected payoff). We thus have that $v_L^s = r - \sum_{i\in C} x_i^s = r - n_C^s x_i^s$, with n_C^s standing for the number of clients under the strategic selection mechanism. Replacing this value in (26) yields:

$$x_i^s = \frac{\delta L_i^s r}{1-\delta(1-L_i^s) + n_C^s \delta L_i^s} \tag{27}$$

Since we assume each member of the dominant coalition to be equally likely to become the new king after a revolution succeeds, we have that $L_i^s = 1/n_C^s$. Replacing in (27) yields:

$$x_i^s = \frac{\delta r}{\delta + n_C^s} \tag{28}$$

We therefore deduce that when the king decides to co-opt n_C^s subjects, his payoff equals:

$$v_L^s = \frac{r\left(\delta + (1-\delta)n_C^s\right)}{\delta + n_C^s} \tag{29}$$

From (28) we understand that the required amount of the gift for a subject not to join the rebellion is decreasing in the number of clients. This implies that, on the one hand, the king has an incentive to reduce the size of the dominant coalition so as to contain the number of gifts, while, on the other hand, there is an opposing force pushing him to increase the size of the dominant coalition.

We can easily show that $dv_L^s/dn_C^S < 0$, meaning that the above trade-off is lifted and that the king will seek to minimize the size of the dominant coalition. We showed earlier that the *size* of the clan decreases when co-opting stronger individuals. This implies that if the ruler seeks to minimize the clientele's size, he will buy-off the most powerful subjects in his community. On Figure (4) we have graphed this situation when the critical revolutionary mass Π is equal to the shaded area $0\bar{p}'E\pi_E$. As the ruler co-opts the $\pi_C - \pi_E$ most powerful share of the total population (which also equals to $(1-\pi_D)n$), the strength of the most powerful non co-opted individual equals $\bar{p}'$. Indeed, all the subjects whose power lies between $\bar{p}$ and $\bar{p}^{'}$ have been co-opted by the king.

To evaluate the cost of this strategy, we need to determine the difference between π_C and π_E, $(\pi_C - \pi_E)n$ is equal to the total number of clients. We know that $g(\pi_E) = z(\pi_E)$, since π_E is the percentage of protesters at equilibrium. We thus have:

$$g\left(\pi_E\right) = \bar{p}' - \bar{p}\pi_E = z(\pi_E) \tag{30}$$

And since $\pi_D = \frac{\bar{p}'}{\bar{p}}$, we obtain that:

$$\pi_D = \frac{z(\pi_E)}{\bar{p}} + \pi_E \tag{31}$$

The percentage of agents to be bribed under the strategic selection scenario, π^s, is thus given by the next expression:

$$\pi^s = \pi_C - \pi_E = 1 - \pi_D = 1 - \frac{z(\pi_E)}{\bar{p}} - \pi_E \tag{32}$$

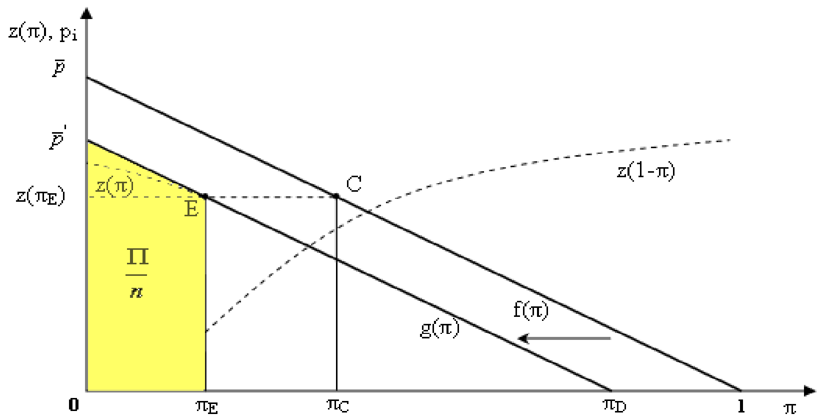

Figure 4: Strategically co-opting the powerful

This equally means that the value of π_E allows us to evaluate the cost of the cooptation strategy.

We find the value of π_E by equating the protesting players' power to the critical revolutionary mass:

$$\frac{\Pi}{n} = \int_0^{\pi_E} g(\pi)d\pi \Rightarrow \frac{\Pi}{n} = z(\pi_E)\pi_E + \frac{\pi_E^2 \bar{p}}{2} \tag{33}$$

Had we an explicit formulation of $z(\pi)$, (33) would give us π_E which would allow us to compute π^s by using (32).

We therefore conclude that the life time utility of the king equals:

$$V_L^s = \frac{v_L^s}{1-\delta} = \frac{r\left(\delta + (1-\delta)n\pi^s\right)}{(1-\delta)\left(\delta + n\pi^s\right)} \tag{34}$$

In Appendix A.3 we conduct some basic comparative statics the results of which are summarized in the following expression:

$$\mathrm{V_L^s} = \mathrm{V_L^s}\Big(\underset{+}{\mathrm{r}}\ ,\ \underset{+}{\delta}\ ,\ \underset{-}{\mathrm{n}}\ ,\ \underset{-}{\bar{\mathrm{p}}}\ ,\ \underset{+}{\Pi}\Big)$$

We can therefore state the following proposition

Proposition 2. *When the clients (together with the king) form a dominant coalition and that the ruler strategically chooses the gifts' beneficiaries, the latter's payoff is increasing in the value of the available pie as well as in the weight assigned to future time periods. A bigger community size decreases the patron's utility as a consequence of the bigger number of clients. The stronger the subjects (or the weaker the ruler), the higher their expected utility from revolution, and the lower the utility of the king.*

While the first two results barely need any comment, the remaining ones deserve some further explanations. Regarding the community size, it's effect seems fairely intuitive since more subjects imply a bigger resistance and, therefore, more individuals to co-opt if a revolution is to be averted. We must not neglect, however, that there is a force pushing in the opposite direction, since, as the dominant coalition grows larger, the individual payoffs to the clients decrease. It is therefore the case that the former effect is stronger to the second one. Not surprisingly, when subjects' strength relative to the central regime's power is higher, the individual claims of the clients are larger, and, therefore, the burden of sustaining a clientele is heavier.

Let us now turn to the king's alternative strategy of randomly selecting his clients.

3.2 Random selection of the clients

The king may instead reduce the claims of his clients by distributing productive resources in a random fashion. A graphical support is provided on Figure (5) where, among the $\pi_C^{'}$% more powerful subjects, the leader randomly co-opts a share $\pi_R = \frac{\pi_C^{'} - \pi_E^{'}}{\pi_C^{'}}$ of them. This implies that $\frac{\pi_E^{'}}{\pi_C^{'}}$% of the $\pi_C^{'}$% more powerful subjects will protest, managing to gather a cumulated force of $F_P = \Pi$, and thus falling short of overthrowing the ruler. To simplify notations, we define the percentage of the total population belonging to the dominant coalition, $\left(\pi_C^{'} - \pi_E^{'}\right)$, as follows:

$$\pi^r = \pi_C^{'} - \pi_E^{'} \tag{35}$$

Before computing the optimal number of such clients, $n_C^r = \pi^r n$, we shall derive the individual payoff those randomly selected clients receive.

If a client chooses to rebel, his utility is no longer given by equation (23). Since the ruler randomly selects his clients when first acceding to power, any newly enthroned leader will adopt the same co-optation strategy given that the state of the world is the same in any time period following a successful revolution. Provided, however, that a revolution occurs in time t, and that a member of the dominant coalition has not become leader in $t+1$, the probability the latter does not belong to the new dominant coalition equals $(1 - \pi_R)$. Therefore, the expected utility of a dominant coalition's member of provoking a revolution equals:

$$V_i^r = \frac{\delta}{1-\delta}\left[L_i^r v_L^r + (1 - L_i^r)\pi^r x_i^r\right] \tag{36}$$

Since the expected utility of supporting the regime is given by (25), the minimal gift that keeps agent i disciplined

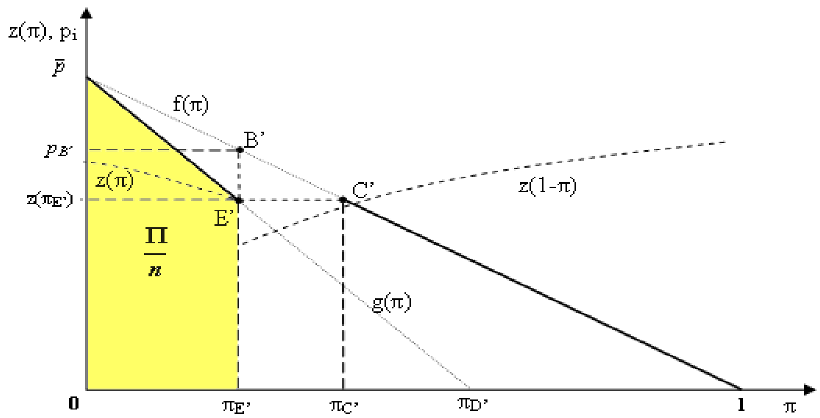

Figure 5: Random co-optation strategy

equals:

$$x_i^r = \frac{\delta r L_i^r}{1 + \delta \pi^r (L_i^r n_C^r - 1 + L_i^r)} \tag{37}$$

In the random selection scenario, the probability that a client becomes the new king after a successful revolution, L_i^r, is equal to $1/n_C^r$, with $n_C^r = \pi^r n$. The above expression can therefore be re-written as:

$$x_i^r = \frac{\delta r}{\pi^r \left[n + \delta(n(1-\pi^r)+1)\right]} \tag{38}$$

We therefore conclude that when the king randomly co-opts $n\pi^r$ clients, his instantaneous payoff equals:

$$v_L^r = \frac{r\left(n + \delta(1 - n\pi^r\right)}{n + n\delta + \delta - n\delta\pi^r} \tag{39}$$

Let us now turn to the computation of π^r as given by equation (35). We therefore need to compute the $\pi_C^{'}$ and $\pi_E^{'}$ values. As a starting point, we determine the explicit form of $g(\pi)$, whose slope is given by $-\frac{\bar{p}}{\pi_D^{'}}$. Moreover, we know that $\pi_D^{'} = \frac{\pi_E^{'}}{\pi_C^{'}}$, thus allowing us to write the following equation:

$$g(\pi) = \bar{p}\Big(1 - \frac{\pi\pi_C^{'}}{\pi_E^{'}}\Big) \tag{40}$$

And since the protesters' aggregate power, F_P, is equated to Π, the percentage of rebels, $\pi_E^{'}$ is such that:

$$\int_0^{\pi_E^{'}} g(\pi) d\pi = \frac{\Pi}{n} \tag{41}$$

Computing the area $0\bar{p}E^{'}\pi_E^{'}$ as the sum of the areas $z(\pi_E^{'})\bar{p}E^{'}$ and $0z(\pi_E^{'})E^{'}\pi_E^{'}$, we obtain:

$$\pi_E^{'} = \frac{2\Pi}{n(\bar{p} + z(\pi_E^{'}))} \tag{42}$$

Had we an explicit formulation of $z(\pi)$ we could compute the exact value of $\pi_E^{'}$. Regarding $\pi_C^{'}$ we know that the next equation must hold:

$$f(\pi_C^{'}) = z(\pi_E^{'}) \Rightarrow \pi_C^{'} = 1 - \frac{z(\pi_E^{'})}{\bar{p}} \tag{43}$$

Hence, the percentage of subjects to co-opt under the random selection mechanism, π^r, equals:

$$\pi^r = 1 - \frac{z(\pi_E^{'})}{\bar{p}} - \pi_E^{'} \tag{44}$$

The life-time utility of the king when applying the random selection strategy equals:

$$V_L^r = \frac{r\,(n - \delta n \pi^r + \delta)}{(1-\delta)\,(n + n\delta + \delta - n\delta\pi^r)} \tag{45}$$

The comparative statics results that we compute in Appendix A.4 are summarized in the following expression:

$$\mathrm{V_L^r} = \mathrm{V_L^r}\big(\underset{+}{\mathrm{r}}\ ,\ \underset{+}{\delta}\ ,\ \underset{-}{\mathrm{n}}\ ,\ \underset{-}{\bar{\mathrm{p}}}\ ,\ \underset{+}{\Pi} \big)$$

Proposition 3. *When the clients (together with the king) form a dominant coalition and that the ruler randomly chooses the gifts' beneficiaries, the latter's payoff is increasing in the value of the available pie as well as in the weight assigned to future time periods. A bigger community size decreases the patron's utility as a consequence of the bigger number of clients. The stronger the subjects (or the weaker the ruler), the higher their expected utility from revolution, and the lower the utility of the king.*

Whether the ruler selects randomly or selectively his clients, we have shown that the comparative statics results are qualitatively the same. The last task of the analysis, therefore, consists in indentifying how each of the model's parameters push the ruler to opt for either selection mechanism.

3.3 Optimal Co-optation Strategy

Whichever clients' selection mechanism the ruler decides to apply, the cost of co-optation is a function of both the number of clients, and the size of the individual gifts. With respect to the first dimension, we can state the next result:

Result 3. *The number of clients is smaller under a strategic selection than under a random selection of the gift beneficiaries.*

Proof in the Appendix.

While Result 3 highlights the king's incentives to strategically select his clients, the leader faces nevertheless a tradeoff regarding the co-optation strategy:

Result 4. *The size of the individual gifts is smaller under a random selection than under a strategic selection of the clients.*

Proof in the Appendix.

The next expression, that we derive in the Appendix, is helpful to compare the utility of the king under these two alternative strategies:

$$V_L^r \lesseqgtr V_L^s \Leftrightarrow 1 - \pi^s > n\pi^s(1 - \pi^r) \tag{46}$$

While $(1 - \pi^s)$ is larger than $(1 - \pi^r)$, $n\pi^s$ is necessarily bigger than unity, thus implying that this inequality could hold either way. This expression allows us to state the last proposition of this paper:

Proposition 4. *The king is more likely to selectively co-opt his clients, rather than randomly, if the required proportion of the community to be co-opted is significantly smaller under the former mechanism than under the latter, and if the number of subjects is small.*

4 Discussion

In this paper we have developed a model of patronage where the king of a community averts being deposed by co-opting subjects. Each subject is endowed with some power/strength, and if the dissident's aggregate strength is bigger to some critical revolutionary mass, the king is ousted. We assume that expressing one's opposition to the regime is gratifying and that the utility derived by the dissidents is proportional to their individual strength. The subjects not joining the protest, however, ostracize the dissidents thus decreasing the latters' well-being.

Two scenarios have been considered. In the first one we suppose the fiercest dissident replaces the king if a revolution succeeds. We have shown that the king's optimal co-optation scheme consists in buying-off the weakest subjects that would otherwise oppose the regime. The strongest subjects' co-optation price is too high, while the weakest subjects do not pose any threat. In a second scenario we assume that any dissident may replace the king if a revolution succeeds. The king's optimal strategy consists in either co-opting the strongest potential dissidents, or else in randomly choosing clients. While the former strategy requires a smaller clientele, the latter involves smaller individual transfers because of the lower payoff expectations if a revolution succeeds. Indeed, when the clientele is chosen selectively, clients know that irrespectively of a protest's outcome, their belonging to the dominant coalition is not jeopardized. The randomly co-opted subjects, however, may not enjoy the on-going privileges if a new king is enthroned.

The patron-client relationships modelled in this paper have long shaped social order in the West. As emphasized by Tilly (1990), to maintain control over widely dispersed populations, rulers "co-opted landlords and clergy, subordinated the peasantry, built extensive bureaucracies, and stifled their bourgeoisie" (Tilly 1990). As a matter of fact, failing to possess a monopoly of power, rulers needed to open their fiefdoms' resources to a strong enough dominant coalition "to put down possible combinations of non-elites or external groups" (North et al. 2007).

When considering societies that are organized around a powerful individual, we have in mind "primitive societies" where brute physical force is necessary to counter individual agressions. Thus our predictions are that tribal societal organizations are more likely to feature coalitions of the head and of mild subjects, the most powerful opponents being purposefully kept aside. This reasoning can bring answers at higher levels of societal organization: how are clans' coalitions formed in tribal led societies?

The model we have developed considers a ruler whose repressive apparatus is taken as given, and who can fine-tune the second tool at his disposal for preventing revolutions, namely the size of the gifts he makes. We first showed that when agents completely fail to coordinate their actions, the ruler exploits this coordination failure and selectively rewards the weaker individuals of his community that would have taken part in the protests in the absence of the leader's intervention. When assuming, however, that the members of the dominant coalition, defined as the group of individuals receiving the king's favours, can perfectly coordinate their actions, we reach different conclusions. We are able to show that the strategic co-optation of the most powerful elements of the community may be optimal for the ruler, provided that the most powerful individuals in the community are not too strong. Alternatively, the leader finds it optimal to randomly select his clients. By acting in the latter fashion the ruler effectively reduces the bargaining power of the strongest elements that are being co-opted. The trade off the ruler then faces is wheter to strategically select his client and then offer big gifts to few clients, or to randomly construct the dominant coalition, in which case individual gifts are more modest but the number of beneficiaries is larger.

The mechanism behind this trade-off is the following. When the random selection strategy is applied, a revolution cannot be achieved by a small group of hardcore opponents, but will rather take the form of a popular uprising - meaning that those agents whose power is the highest have but a small claim in the overall pie. If, however, these individuals are compensated in an appropriate manner, the revolution can be averted. When considering, next, a more rebel-oriented society, a small proportion of the population constitutes a real danger to the ruler, since the hard-core opponents are able to spark a revolution. The "winning coalition" (Bueno de Mesquita et al., 2003) being very small, these individuals' bargaining power increases accordingly. The corollary of this result is the increased required individual transfers for these clients to remain disciplined. Thus, if the model's parameters confer too much bargaining power to some particularly disruptive agents, the ruler may choose to randomly select his clients, rather than embrace the mighty.

In the present work we have not dealt with the transition for societies controlled by an allmighty king to situations where a dominant coalition is in charge of affairs. We therefore take as granted the outcome of the transition that has received various interpretations (North, 1989; Tilly, 1990; Grossman, 2002; North et al., 2007).

To the most 'autocratic' end of the political continuum we can certainly place those ruthless regimes that bloomed soon after declaring independence from colonial rule. If we think of Mobutu, Idi Amin, or more recently Robert Mugabe, these tyrants have ruled their country as absolut monarchs by dispatching generous gifts to their small sized court, when the bulk of their people have been struggling for their survival. Surprisingly, however, instead of receiving an angry welcome by frustrated mobs during their visits around the country, the subjects' signs of admiration and devotion legitimized their behaviour. Those three regimes certainly exhibited a very strong military that acted as a deterrent to any opposition movement (high Π), and that certainly equally exacerbated the tendency to denounce dissidents (second-order punishment). But, as our discussion makes clear, no state apparatus is strong and efficient enough to secure power on its own. We believe that the colonial burden of these and many other ex-colonies must have pushed down the subjects' political preferences after their intense and prolonged exposition to unfair treatments that were eventually deemed fair. The rent seeking behavior of many african rulers is therefore considered as legitimate by the ones being robbed, hence untying the central power's hands. We believe that it is a general feature that autrocatic modes of governance are much more likely to emerge in societies where the heavy cultural burden dictates individuals not to question the ongoing social hierarchy. Take for instance the ex-communist block. The fate of its citizens after the disintegration of the USSR has varied immensely since some countries have already joined the European Union, while others have seen the re-instauration of a despot after having experienced a short period of power-vacuum. We argue that the mentality of the russian people, that have invariably through history been in a constant quest of security and stability and that have always eulogized the strong, has undoubtly contributed to Vladimir Putin, sometimes designated as 'the Tsar', establishing his dictatorial powers while shrinking his clientele to the tiniest possible size.

Moving along the political continuum towards less autocratic regimes we can locate somewhere between the two edges the Iranian regime or Venezuela. Both Ahmadinejad and Chavez are populist leaders that have secured the support of a much widder pool of subjects than the autocracies just described, without this implying, however, that the dissidents can freely express their opposition to the central regime, or that everyone has access to the country's wealth. Censorship is widespread and the opposition is extremely careful in the steps it takes. There is, however, internal strife. Highly ranked officials in Iran dare question the regime's decisions at times and the recent alienation from the west and the democratic values has intensified the firmness of the opposition. Similarily, Chavez recently tried to extend his presidential powers, just to face a cruel deception when the population being asked to express its opinion through a referendum blocked the project. With regards to our model, the equilibrium best matching those situations is the random selection of the clientele. Indeed, the leader's subjects are much more reluctant to exploitation, which in turn pushes the central power to look for alternative allies to the mightiest elements of the population so as to mitigate their bargaining power. By adopting a more populist mode of governance, such a regime exposes itself to a wider public expression of discontentment that is orchestrated by those most expressive elements of the society.

A Appendix

A.1 Proof of Result 2

Proof. Because of the stationarity of the markov strategies, if the ruler finds it optimal to transfer a vector of gifts $\vec{x}^{'}$ such that $F_{P|\vec{x}'} \leq \Pi$, then at any subsequent time period this same vector will be transfered. This implies that the ruler's life time utility of following this strategy equals:

$$\frac{r - \sum_i r^{'}_{i \in C}}{1 - \delta}$$

If, however, the ruler chooses to keep all the pot for himself, he just earns r once. Comparing those two terms, we conclude that the leader opts for the former strategy if $\sum_i r^{'}_{i \in C} < \delta r$. Whenever this condition is verified, that the vector of gifts $\vec{r}^{'}$ is enough to avoid a revolution, and that there does not exist a vector $\vec{r}^{''}$ satisfying those conditions and such that $\sum_i r^{'}_{i \in C} > \sum_i r^{''}_{i \in C}$, $\vec{r}^{'}$ is an equilibrium vector of gifts. If, however, this vector is non-feasilbe, a revolution occurs anyway and no gift is transferred at equilibrium. $\square$

A.2 Comparative statics for the no-coordination scenario

By taking the derivative of (14) w.r.t. π_E, we obtain:

$$\frac{\partial \pi_B}{\partial \pi_E} = \frac{-\big(z(\pi_E) + \pi_E z(\pi_E)' + \pi_E \bar{p}\big)\bar{p}\Big(1 - \pi_E - \frac{z(\pi_E)}{\bar{p}}\Big) + \bar{p}\Big(1 + \frac{z(\pi_E)'}{\bar{p}}\Big)\Big(\Pi - \pi_E z(\pi_E) - \frac{\pi_E^2 \bar{p}}{2}\Big)}{\Big[\bar{p}\Big(1 - \pi_E - \frac{z(\pi_E)}{\bar{p}}\Big)\Big]^2}$$

This term is then positive if:

$$\bar{p}\Big(1 + \frac{z(\pi_E)'}{\bar{p}}\Big)\Big(\Pi - \pi_E z(\pi_E) - \frac{\pi_E^2 \bar{p}}{2}\Big) > \big(z(\pi_E) + \pi_E z(\pi_E)' + \pi_E \bar{p}\big)\bar{p}\Big(1 - \pi_E - \frac{z(\pi_E)}{\bar{p}}\Big)$$

$$\Leftrightarrow \pi_B = \frac{\Pi - \pi_E z(\pi_E) - \frac{\pi_E^2 \bar{p}}{2}}{\bar{p}\Big(1 - \pi_E - \frac{z(\pi_E)}{\bar{p}}\Big)} > \frac{z(\pi_E) + \pi_E z(\pi_E)' + \pi_E \bar{p}}{\bar{p}\Big(1 + \frac{z(\pi_E)'}{\bar{p}}\Big)}$$

$$\Leftrightarrow \frac{\pi_B}{\pi_E} = \frac{\frac{z(\pi_E)}{\bar{p}\pi_E} + \frac{z(\pi_E)'}{\bar{p}} + 1}{\frac{z(\pi_E)'}{\bar{p}} + 1} > 1$$

This last inequality is impossible to be satisfied since if $\pi_B > \pi_E$, then $p_{\pi_B} < z(\pi_E)$, meaning that the ruler is co-opting at least one individual that would not protest if he was not co-opted. Hence $\frac{\partial \pi_B}{\partial \pi_E} < 0$.

By taking the derivative of (12) w.r.t. π_E, we obtain:

$$\frac{\partial \pi_C}{\partial \pi_E} = \frac{\partial \pi_B}{\partial \pi_E} - \Big(1 + \frac{z(\pi_E)'}{\bar{p}}\Big)$$

We know from above that $\frac{\partial \pi_B}{\partial \pi_E}$. We then have $\frac{\partial \pi_C}{\partial \pi_E} < 0$ if $1 + \frac{z(\pi_E)'}{\bar{p}} > 0 \Leftrightarrow \bar{p} > -z(\pi_E)'$. And since $\bar{p}$ is the slope of $g(\pi)$, that $g(\pi_E) = z(\pi_E)$, that $z(\pi)' < 0$, and that $z(\pi)'' < 0$, we must have $\bar{p} > -z(\pi_E)'$. Hence $\frac{\partial \pi_C}{\partial \pi_E} < 0$.

By using (12) we can obtain:

$$\frac{\partial(\pi_C - \pi_B)}{\partial \pi_E} = -\Big(1 + \frac{z(\pi_E)'}{\bar{p}}\Big) < 0$$

A.3 Comparative statics in the dominant coalition scenario under the strategic selection strategy.

Varying the discount rate, δ

$$\frac{\partial V_L^s}{\partial \delta} = \frac{r\delta\left(\delta + 2n\pi^s - n\pi^s\delta\right)}{\left[\left(1-\delta\right)\left(\delta + n\pi^s\right)\right]^2} > 0$$

Varying the number of subjects, n

$$\frac{\partial V_L^s}{\partial n} = -\frac{r\delta^2\left(\pi^s + n\frac{\partial \pi^s}{\partial n}\right)}{\left(1-\delta\right)\left(\delta + n\pi^s\right)^2}$$

Using the value of the percentage of agents to be bribed under the strategic selection of clients, π^s, as given by equation (32), we deduce that $\frac{\partial \pi^s}{\partial n} = \frac{\partial \pi^s}{\partial \pi_E}\frac{\partial \pi_E}{\partial n}$. Given, however, that $\pi_E(n)$ is an implicit function, we set expression (33) equal to zero and define Φ as:

$$\Phi = z(\pi_E)\pi_E + \frac{\pi_E^2\bar{p}}{2} - \frac{\Pi}{n} = 0$$

We then apply the implicit functions theorem on this expression and obtain:

$$\frac{\partial \pi^s}{\partial n} = \frac{\partial \pi^s}{\partial \pi_E}\frac{\partial \pi_E}{\partial n} = -\left(\frac{z(\pi_E)'}{\bar{p}} + 1\right)(-)\frac{\frac{\Pi}{n^2}}{z(\pi_E) + z(\pi_E)'\pi_E + \bar{p}\pi_E} \tag{A-1}$$

The first (bracketed) multiplicative term is positive because, at π_E, the slope of $z(\pi_E)$, $z(\pi_E)'$, is necessarily less steep than the slope of $f(\pi)$, $\bar{p}$. For this same reason the denominator of the second multiplicative term is also positive, thus allowing us to conclude that $\frac{\partial V_L^s}{\partial n} < 0$.

Varying the subjects' power, p

$$\frac{\partial V_L^s}{\partial \bar{p}} = \frac{\partial V_L^s}{\partial \pi^s}\frac{\partial \pi^s}{\partial \pi_E}\frac{\partial \pi_E}{\partial \bar{p}} = -\frac{rn\delta^2}{\left(1-\delta\right)\left[\delta + n\pi^s\right]^2}(-)\left(\frac{z(\pi_E)'}{\bar{p}} + 1\right)\frac{\partial \pi_E}{\partial \bar{p}}$$

To compute $\frac{\partial \pi_E}{\partial \bar{p}}$ we once again apply the implicit functions theorem on the Φ function defined above and obtain:

$$\frac{\partial \pi_E}{\partial \bar{p}} = -\frac{\frac{\Phi}{\bar{p}}}{\frac{\Phi}{\pi_E}} = -\frac{\pi_E}{2\Big(z(\pi_E)' + \frac{z(\pi_E)}{\pi_E} + \bar{p}\Big)} < 0$$

With the sign of this expression following from $\bar{p} > -z\left(\pi_E\right)^{'}$.

We therefore conclude that $\frac{\partial V_L^s}{\partial \bar{p}} < 0$.

Varying the ruler's power, Π

$$\frac{\partial V_L^s}{\partial \Pi} = \underbrace{\frac{\partial V_L^s}{\partial \pi^s}}_{-} \underbrace{\frac{\partial \pi^s}{\partial \pi_E}}_{-} \frac{\partial \pi_E}{\partial \Pi}$$

Applying the implicit functions theorem on Φ yields:

$$\frac{\partial \pi_E}{\partial \Pi} = -\frac{\frac{\Phi}{\Pi}}{\frac{\Phi}{\pi_E}} = \frac{1}{\pi_E\Big(z(\pi_E)' + \frac{z(\pi_E)}{\pi_E} + \bar{p}\Big)} > 0$$

And we therefore deduce that $\frac{\partial V_L^r}{\partial \Pi} > 0$.

A.4 Comparative statics in the dominant coalition scenario under the random selection strategy.

Varying the discount rate, δ

$$\frac{\partial V_L^r}{\partial \delta} = \frac{-n^2 r}{(1-\delta)\left[n(1+\delta)+\delta-n\delta\pi^r\right]^2} + \frac{r\left(n+\delta-n\delta\pi^r\right)}{(1-\delta)^2\left[n(1+\delta)+\delta-n\delta\pi^r\right]}$$

Putting the two expressions under a common denominator, and rearranging yields:

$$\frac{\partial V_L^r}{\partial \delta} = \frac{n^2 r\left[(1-\delta\pi^r)-(1-\delta)\right]}{(1-\delta)^2\left[n(1+\delta)+\delta-n\delta\pi^r\right]^2} + \frac{nr\delta + r\left(n+\delta-n\delta\pi^r\right)\delta\left(1+n-\delta\pi^r\right)}{(1-\delta)^2\left[n(1+\delta)+\delta-n\delta\pi^r\right]^2} > 0$$

Varying the number of subjects, n

$$\frac{\partial V_L^r}{\partial n} = -\frac{r\delta^2\left(1+n^2\frac{\partial \pi^r}{\partial n}\right)}{(1-\delta)\left[n(1+\delta)+\delta-n\delta\pi^r\right]^2}$$

Using the value of the percentage of agents to be bribed under the strategic selection of clients, π^r, as given by equation (44), we deduce that $\frac{\partial \pi^r}{\partial n} = \frac{\partial \pi^r}{\partial \pi_E^{'}}\frac{\partial \pi_E^{'}}{\partial n}$. Given, however, that $\pi_E^{'}(n)$ is an implicit function, we set expression (41) equal to zero and define Φ as:

$$\Phi = \pi_E^{'}\Big(\bar{p} + z(\pi_E^{'})\Big) - 2\Pi/n = 0$$

We then apply the implicit functions theorem on this expression and obtain:

$$\frac{\partial \pi^r}{\partial n} = \frac{\partial \pi^r}{\partial \pi_E^{'}}\frac{\partial \pi_E^{'}}{\partial n} = -\left(\frac{z(\pi_E^{'})^{'}}{\bar{p}} + 1\right)(-)\frac{2\Pi}{n^2\left(\bar{p} + z(\pi_E^{'}) + z(\pi_E^{'})^{'}\pi_E^{'}\right)} \tag{A-2}$$

The first (bracketed) multiplicative term is positive because, at π_E, the slope of $z(\pi_E^{'})$, $z(\pi_E^{'})^{'}$, is necessarily less steep than the slope of $f(\pi)$, $\bar{p}$.

Regarding the second multiplicative term, its sign will depend on the sign of the denominator, since the numerator is necessarily positive. This term is necessarily positive since $\bar{p} > -z(\pi_E^{'})^{'}$.

We hence deduce that $\frac{\partial \pi^r}{\partial n} > 0$, thus implying that $\frac{\partial V_L^r}{\partial n} < 0$.

Varying the subjects' power, p

$$\frac{\partial V_L^r}{\partial \bar{p}} = \frac{\partial V_L^r}{\partial \pi^r} \frac{\partial \pi^r}{\partial \pi_E^{'}} \frac{\partial \pi_E^{'}}{\partial \bar{p}} = -\frac{rn^2\delta}{(1-\delta)\left[n(1-\delta)+\delta-n\delta\pi^r\right]^2}(-)\left(\frac{z(\pi_E^{'})^{'}}{\bar{p}}+1\right)\frac{\partial \pi_E^{'}}{\partial \bar{p}}$$

To compute $\frac{\partial \pi_E}{\partial \bar{p}}$ we once again apply the implicit functions theorem on the Φ function defined above and obtain:

$$\frac{\partial \pi_E^{'}}{\partial \bar{p}} = -\frac{\frac{\Phi}{\bar{p}}}{\frac{\Phi}{\pi_E^{'}}} = -\frac{1}{\frac{\bar{p}}{\pi_E^{'}} + z(\pi_E^{'})' + \frac{z(\pi_E^{'})}{\pi_E^{'}}} < 0$$

With the sign of this expression following from $\bar{p} > -z\left(\pi_E^{'}\right)^{'}$.

We therefore conclude that $\frac{\partial V_L^r}{\partial \bar{p}} < 0$.

Varying the ruler's power, Π

$$\frac{\partial V_L^r}{\partial \Pi} = \underbrace{\frac{\partial V_L^r}{\partial \pi^r}}_{-} \underbrace{\frac{\partial \pi^r}{\partial \pi_E^{'}}}_{-} \frac{\partial \pi_E^{'}}{\partial \Pi}$$

Applying the IFT on Φ yields:

$$\frac{\partial \pi_E^{'}}{\partial \Pi} = -\frac{\frac{\Phi}{\Pi}}{\frac{\Phi}{\pi_E^{'}}} = \frac{2}{\bar{p} + z(\pi_E^{'})'\pi_E^{'} + z(\pi_E^{'})} > 0$$

And we therefore deduce that $\frac{\partial V_L^r}{\partial \Pi} > 0$.

A.5 Comparative Statics for the Optimal Co-optation Strategy

Proof of Result 3

Proof. The first step to establish this proof consist in showing that $\pi_E^{'} < \pi_E$. Once this has been shown, because $z(\pi)^{'} > f(\pi)^{'}$, we can deduce Result 3 is true.

Notice that the slope of $g^{'}(\pi)$ is smaller (more negative) than the slope of $g(\pi)$ since $-\frac{\pi_C^{'}}{\pi_E^{'}}\bar{p} < \bar{p}$ as a consequence of $\pi_C^{'} > \pi_E^{'}$. Next, since Π has the same value under the two selection mechanisms, if π_E is such that 33 is true, then, given that the y-origin of $g(\pi)^{'}$ is bigger to the y-origin of $g(\pi)$, $\int_0^{\pi_E^{'}} g^{'}(\pi)d\pi = \Pi/n$ only if $\pi_E^{'} < \pi_E$. □

Proof of Result 4

Proof. When comparing equations 28 and 38, Result 4 holds if:

$$\delta + n\pi^s < \pi^r \left(n + \delta \left[n + 1 - n\pi^r\right]\right)$$

Since $\pi^s < \pi^r$, $n\pi^s < n\pi^r$, implying that the above inequality is verified if:

$$\delta < \pi^r \left(\delta \left[n + 1 - n\pi^r\right]\right)$$

$$\Leftrightarrow n\pi^r > 1$$

And this last inequality necessarily holds for, otherwise, no subject is co-opted. □

Derivation of Expression (46)

The king's payoff is higher under the strategic selection mechanism if:

$$r - n\pi^s x_i^s > r - n\pi^r x_i^r \Leftrightarrow \pi^r x_i^r > \pi^s x_i^s$$

$$\Leftrightarrow \frac{\delta r}{n + n\delta - n\delta\pi^r + \delta} > \frac{\delta r}{\delta/\pi^s + n}$$

$$\Leftrightarrow \delta/\pi^s > n\delta - n\delta\pi^r + \delta$$

$$\Leftrightarrow 1 - \pi^s > n\pi^s(1 - \pi^r)$$

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