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DICTATORS' BEHAVIOR UNDER CONDITIONS OF ECONOMIC SANCTIONS CUMULATIVE EFFECT

Dictators' Behavior Under Conditions of Economic Sanctions Cumulative Effect[*]

Kirill Chmel[1], Alexander Demin[2][†], Kirill Kazantcev[3]

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Abstract: Economic sanctions, like the most of political events involving numerous states, are almost always explicitly aimed to alter internal policies and affect domestic issues. Sanctions are not a discrete event, rather they are a long lasting insidious process. It is significant to consider not only the state of the country under sanctions or without them, but also the effect of *the time under sanctions*. Hence, the research question is as follows: How does cumulative effect of sanctions influence the dictators behavior in terms of repressions and co-optation? In order to find a feasible answer to that question, first, we build a theoretical model and draw empirical implications from it. The main argument that we develop in the paper is as follows. The overall effect of sanction is robustly important for the dictator, fostering repressions and co-optation (separately treated) as the ways of buttressing the regime legitimacy. Moreover, cumulative effect of sanctions (i.e. the influence of all the previous periods under sanctions) increases the levels of repressions with decreasing marginal effects.

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1 Introduction

Both in international relations and comparative politics, sanctions have been growing importance and scientific attention for recent years. Essentially, economic sanctions, like the most of political events involving numerous states, are almost always explicitly aimed to alter internal policies and affect domestic issues. Concurrently, economic and political indicators of targeted and sending countries are becoming increasingly related to international interventions and limitations.

On the whole, sanctioning policies do not distinguish between political regimes, economic development or other seemingly irrelevant characteristics of target countries, although autocracies are more frequently being the aim of economic sanctions (Escribà-Folch and Wright, 2015). Describing modern (after the WW II) autocracies, researchers generally emphasize following characteristics: institutions, durability and strategies. Elections, parties and other ones have ceased to be unequivocally bounded to democracies, and authoritarian regimes increasingly incorporate these practices, which allow them to abandon traditionally attributed forms of violent coercion and terror. Hence, authoritarianism today is characterized by its institutional stability, which does not assume that autocrats' actions are tend to be futile. Strategies that the dictator uses are numerous and perplexed, but we attempt to focus on the most important and prevailing in the literature couple of them: repressions and co-optation.

Moving back, researches usually tend to emphasize the external dimension of sanctions. Domestic repercussions of sanctions and dictators internal reactions to international economic constraints are, on average, still understudied. However, observing such causal mechanisms can be especially important for autocracies since their resource and loyalty base heavily depend on the external context. In the conditions of economic globalization and the influence of international organizations, authoritarian regimes are becoming responsible for their decisions not only before domestic actors, but also before external ones. Hence, sanctions definitely may create a potential problem for authoritarian domestic politics and may be the impetus for adapting strategies to the international requirements.

Moreover, sanctions are not a discrete event, rather they are a long lasting insidious process. It is significant to consider not only the state of the country under sanctions or without them, but also the effect of *the time under sanctions*. Hence, the research question is as follows: How does cumulative effect of sanctions influence the dictators behavior in terms of repressions and co-optation?

In order to find a feasible answer to that question, first, we build a theoretical model and draw empirical implications from it. Second, we test those implications on panel data from 1976 to 2006 for 112 countries. We use models with mixed effects for time dynamics, once again emphasizing the importance of cumulative factor for authoritarian regimes.

Sanctions are not presumed to have direct political consequences because of their economic nature and we account for this in the theoretical part, explaining those consequences indirectly. We argue that, generally, regardless of cumulative effects, repressions and co-

optation are useful for the dictator to produce internal consent and legitimacy. However, the effect of long-lasting sanctions differs for those strategies. On the one hand, repressions tend to increase with decreasing marginal change through time. This is a consequence of effectiveness of repression in reducing the average demands of the population and the elite, even given the growing limitations for the costs of repressions. On the other hand, the more time sanctions are present less likely use of co-optation becomes. This happens due to comparatively costly technology of co-optation which will be efficient only in the earlier periods of economic sanctions.

The rest of the paper is organized as follows. In the next section we examine the existing literature on the topic, in Section 3 we introduce, analyze and interpret formal model. Section 4 contains description of data and statistical evidences for theoretically driven implications. In Section 5 we discussed the results and Section 6 concludes.

2 Existing Research

Our work is a contribution to the analysis of the behavior of autocrats within the framework of the theory of rational choice. There are three basic assumptions derived from the rational choice theory that we will use in our work.

First, authoritarian leader's utility maximization is understood as maximization of his tenure in power. If he is ousted, he cannot be sure even in his survival (Wintrobe, 2009). This idea is exhaustively formulated by Geddes: "It's often dangerous to be an ex-dictator" (Geddes, 2005, p. 22). Thus, survival is the main objective of dictator's utility function.

Second, we think about political regimes in Schumpeterian tradition where political regime is understood as a specific type of "institutional arrangement for arriving at a political decision" (Schumpeter, 1994, p. 242). Therefore, authoritarian regime is characterized by the set of specific, non-democratic features: absence of independent legislatures, political parties and competitive fair elections (Gandhi and Przeworski, 2007).

Third, decisions of an authoritarian leader are not random or completely unlimited by the system of internal checks. We look at his decisions as an institutionally constrained actions. Therefore, it is necessary to understand the institutions as stable Nash equilibriums in the interactions of rational players. "Rules of the game" are constraints rationally accepted by all players, so there is no reasonable deviation from the chosen strategy (Hall and Taylor, 1996).

2.1 Dictator's strategies

Important contribution to the concept of dictatorship as a stable equilibrium was made by Ronald Wintrobe who developed the concept of the "dictator's dilemma" (Wintrobe, 2009). From this point of view dictator maximizes his utility using repression and loyalty. However, resources of each leader are limited, so such maximization has some budget constraint. Stability of the dictatorship, described as an equilibrium levels of oppression and distribution

of political (and economic) rents, heavily depends on the total amount of feasible resources. Sanctions, regardless of their main objective, usually impose additional costs on the regime (Smith, 1995), so it becomes no longer possible to maintain the equilibrium. Under sanctions dictator has to deal with new threats which may arise from destabilization.

Existing tradition of studying means of the "authoritarian rule" identifies two main instruments that the dictator can use: repression and co-optation (Wintrobe, 1990). Both of these strategies are used by a dictator to prolong his survival and to protect himself from possible threats. However, they are fundamentally different in their mechanisms. Hence, they require investments in different and very specific institutions (legislatures, parties, elections for co-optation and secret police, army for repression). Thus, it is important to treat these strategies separately.

Notably, those are not the only possibilities that an authoritarian leader dispose. Firstly, censorship and state propaganda are a wide-spread phenomenon under authoritarian rule, through which an authoritarian regime produces necessary for its survival information and refines informational channels. The success of such actions deeply depends on the other institutions, as propaganda itself can more (Hugo Chavez in Venezuela) or less (Nicolae Ceausescu personality cult in Romania triggering lethal for the regime and the ruler civil rebellion) successful. The main detail about them, mentioned in recent studies, is that state propaganda, on average, complements co-optation (Guriev and Treisman, 2015). Needless to say, fabricating a game with incomplete information dictators favor the legitimacy of the regime (Gerschewski, 2013).

Secondly, the authoritarian leader is usually capable of weakening the opposition by facilitating its inner division. Creating new groups, parties and organizations among the opposition (what is called "organizational proliferation" (Haber, 2008, p. 702-705)) definitely hinders collective action and possible unification of opposing groups, what is considered to be a critical aspect for regime breakdown (Magaloni, 2010).

Needless to say, these are only several types of behavior patterns usually witnessed in autocracies gleaning a general image of different types of actions. Arguably, a myriad of potential dictators' strategies are beyond the descriptive abilities of comparative studies. However, such a classification gains political science an applicable toolkit for analyzing and understanding authoritarian politics. Nevertheless, the most well studied, measured strategies are repressions and co-option, which include other strategies or the main aspects of them.

Repressions are asserted to be the element of political reality which even lies in the nature of the authoritarian government. Although repression levels vary significantly across countries, almost all authoritarian regimes use repressions. The main purpose of the repressions is to impose a cost on the target and to deter "specific activities and/or beliefs perceived to be challenging to government personnel, practices or institutions" (Davenport, 2007a, p. 2), so it always implies violations of the basic rights of the citizens such as private property rights, freedom of speech and association, personal integrity rights, etc.

Investigating dictator's reaction to the sanctions, we should try to understand preciesley how repression serve as a legitimation mechanism for a regime. In other words, we should understand what are the functions of repression. Above all, repressions is an effective instrument for preventing possible or suppressing ongoing anti-governmental rebellion (Guriev and Treisman, 2015). In this case it is importnant to distinguish two different sources of rebellion (Bove, Platteau, and Sekeris, 2016). Probably the most prominent type of domestic upheaval is elite betrayal in the form of *coup d'etat*. There is no dictator who can rule alone, each one needs a group of organaized supporters. At the same time such a group creates the main threat for the security of the dictator's power since it is an organized group (Haber, 2008). Interaction between the leader and the elite can be understood in the market terms: autocrat buy loyalty of the elite members providing them with private goods (Bueno de Mesquita, Smith, Siverson, and Morrow, 2003). Consequently, the goal of dictator is to follow the agreement with coalition and provide public benefits in time to keep members of coalition loyal. It may become impossible under sanctions, so elite has incentives to overthrow the autocrat (Svolik, 2009). Therefore, repressions against elite allow to shrink the elite and, therefore, shrink its demand (Svolik, 2012).

Another source of rebellion threat comes from outside the regime. Each dictatorship excludes huge part of the population from the decision-making process, limiting the ability of the disenfranchised citizens to articulate their demands. In this case repression increases the opportunity costs of citizens (Bazzi and Blattman, 2014; N. K. Kim, 2014). Since they are trated as rational players, they have utility functions which should involve possible costs of participating in rebellion, especially in unsuccessful one. Actually, there are empirical evidences that repressions decrease the probability of dictator's ousting (Escriba-Folch, 2013). That is not, however, to posit repressions always successful in eschewing or suppressing rebellions, for there are several vivid examples of a contrary situation (like in Nicolae Ceausescu rule, mentioned above).

Obviously, repression strategy heavily depends on the short-run goal of the dictator. For example, authoritarian leader dealing with ongoing popular uprising may use mass terror with army engaged in politics (Escriba-Folch, 2013). In the case of stable political process or in the pre-election period targeted repression against specific members of elite, extrajudicial imprisonmnet or killings of opposition leaders are more favorable (E. Frantz and Kendall-Taylor, 2014; Richards, 1999).

Nevertheless, repressions as a tool of domestic politics are not that lucid and straitforward because it has negative long-run effects. They can frame the ruling-leader image and increase the probability of being killed after losing the power (Egorov and Sonin, 2015). Repressions are also closely related to the representation of a country in international relations and organizations. Being interested in finding direct foreign investments and receiving financial aid from more developed countries, a dictator is compelled to respect human rights and obey the international law (Hafner-Burton and Tsutsui, 2005; Hafner-Burton, 2005).

Co-optation is another strategy exploited by dictators. This way of action implies that a

dictator includes a part of opposition into the decision-making process to some degree. That is to say, co-optation in authoritarian regimes includes vesting some members of opposing groups with political authority and competence as well as uniting rulling elite (Erica Frantz, 2007). This definition implies redistribution of political rents since even opposition members can pretend to receive economical benefits if they are included into the institutional system of the regime.

Some properties of co-optation should be discussed. First, co-optation in the authoritarian regimes usually takes the form of quasi-democratic institutions such as legislatures, parties and elections (Gandhi and Przeworski, 2006). Second, such institutions facilitate cooperation wich is useful for the dictator's rule in several aspects. Incoprated opposition gives additional legitimacy to the current leader and to the regime in general (Geddes, 2005), thus, deterring rebellions and prolonging leadres tenure (Gandhi and Przeworski, 2007; Geddes, 1999). Moreover, better conditions for cooperation create incentives for different actors and foster economic growth (Gandhi, 2008). Finally, institutional co-optation allows to mitigate credible commitment problem which is present in authoritarian regimes not intermittedly, but almost permanently and examplifies one of the main factors of destabilization (Maher and Peterson, 2008). Institutions create the framework for interaction, some credible rules that cannot be violated so easily. Besides, co-optation brings some degree of transparency into authoritarian governance creating the platform where elite and opposition can monitor dictator's actions (Magaloni, 2008).

However, co-optation is not a panacea for authoritarian government due to its negative consequences for the leader's power. Institutions are extremly costly, ecpecially if there are no already established institutuions and they are started from scratch (Boix and Svolik, 2013). Although co-optation is a plausible option in fighting against threats such as rebellions (institutions can even deter the militiary intevention into politics (Geddes, 2005)), it creates new threats to the authoritarianism (Gandhi and Lust-Okar, 2009). For instance, parties and legislatures not only legitimize the authority of the ruling leader, but also create the platform for solving collective action problem for opposition. In this context elections are the double-edged sword. On the one hand, they allow to accumulate information about civic unrest (Gandhi and Lust-Okar, 2009), but on the other hand elections can lead to the democratization (Donno, 2013). Besides, elections may trigger protests and uprisings since the autocrat which runs the risks of holding elections usually has to commit an electoral fraud (Magaloni, 2010).

To sum up, both repression and co-optation are two main strategies that dictator can use to accumulate the power and to strengthen his positions. However, they are almost entirely different in functions they perform. Repressions is a tool of elimination of the citizens and elite members from the decision-making process, while co-optation, on the contrary, is an inclusive mechanism, demanding institution building and power sharing.

2.2 Dictators and Sanctions

Economic sanctions are a prevalent instrument of international politics nowadays. Notably, they have become an integral part of relationships between states after II World War coinciding with the growing number of authoritarian political regimes worldwide. Interestingly, several prolific researches have found that at least $\frac{3}{4}$ of all international economic sanctions were targeted at countries which could be classified as autocracies (Kaempfer, Lowenberg, and Mertens, 2004, Escribà-Folch and Wright, 2015).

Strictly speaking, sanctions are a diplomatic and economic "tool for coercing target governments into particular avenues of response" (Hufbauer, Schott, Elliott, and Oegg, 2007, p.5), as the most opt-cited definition reads. It implies two important features of economic sanctions which will be of vital importance for this work. Firstly, economic sanctions are always imposed with particular intentions to modify or completely change policies in the target country. Hence, such tools are not used as a mean of overall duress towards a given country since it always needs a specific justification.

Secondly, implementation of economic sanctions is one of numerous instruments of political leverage which, consequently, has to be effective and efficient. The baseline formal model shows that sanctions, albeit demanding resources from both target and sending countries, are *ex post* efficient and reasonable (Kaempfer and Lowenberg, 1988). Due to this the majority of researches focus on the costs of economic sanctions for the target country which are almost always as high as to foster political actions of the target government (Dashti-Gibson, Davis, and Radcliff, 1997; Drury, 1998).

Therefore, some scholars convincingly argue that sanctions destabilize the leader of a target country due to creating *political* costs, otherwise being futile (Marinov, 2005). Although an autocrat has possible mechanisms to amplify the effect of sanctions, e.g. decrease the spending of public goods and, hence, the resources of the opposition (Oechslin, 2014), the overall political effect of sanctions is deemed to be present. In this paper we are approaching exactly the same internal effect of sanctions, though searching for rigorous economic explanations of the dictator's political actions. Essentially, it seems to be at least unconvincing to presume the *political* costs of sanctions arise directly from the fact of external *economic* restrictions being imposed. Focusing only on the more or less obvious economic repercussions of sanctions, we trying to build a thorough economic explanation of those political changes caused by sanctions.

However, sometimes it is contended that country-specific characteristics (which leaders behavior patterns evidently are) may not significantly affect long-run economic growth (Easterly, Kremer, Pritchett, and Summers, 1993). Notably, such an argument provides no fruitful explanations for external economic effects on the "political growth", i.e. the institutional development of a given country.

For example, several empirical studies show an indirect effect of sanctions on the level of state repressions. Sanctions lead to numerous violations of humanitarian rights and hardships in lives of the citizens, but also destabilize the incumbent and engender state-sponsored

repressions (Peksen, 2009, Wood, 2008). The explanation for this phenomenon is too vague as the repressions are deemed to be an instrument of comparatively cheap defense of key supporters and creating internal stability and consent (Wood, 2008). In terms of economics, the transformation of state coercion into political legitimacy is neither clear, nor plausible *per se*. This is the case especially for authoritarian governments (Tanneberg, Stefes, and Merkel, 2013), where "force generally substitutes legitimacy" (Escriba-Folch, 2013, p.5) as usually pointed out in the literature without more meticulous economic argumentation.

Apparently, repressions are not the only tool of creating legitimacy and stability that a dictator disposes. Sometimes it's argued (though for anomalies like Soviet Union system) that simultaneous implementation of co-optation and repressions might be a viable option to gain loyalty (Gershenson and Grossman, 2001). As noted above, repressions and co-optation may have somewhat overlapping effect on the stability of the regime creating domestic order and complience with rules. However, the very topic of dictators' choice between repressions and co-optaton under resource constraints remains understudied.

An important theoretical explanation of the mechanisms through which economic sanctions impact an authoritarian dictator suggests two important implications. Firstly, imposed sanctions only under very restrictive circumstances may not decrease the budget of an autocrat, secondly, costs of repressions as a way of gaining support will be higher (Kaempfer et al., 2004). On the one hand, we do not contradict and even build upon this model in the theoretical part of the paper. On the other hand, we will try to avoid evaluating the direct effect of economic sanctions on political surrounding of a dictator and consider different types of his responses, not only repressions. Furthermore, we capturethe factor of internal time dynamics which proved to be crucial in an international game between target and sending country (Smith, 1995, Morgan and Schwebach, 1997), but completely abandoned in the explanation of the internal effect of economic sanctions.

There were outstanding attempts to empirically understand how economic sanctions affect repressions and co-optation in authoritarian regimes. For example, it was found, that, depending on the "severity" of the damage caused by sanctions, an autocrat will vacillate between producing goods for selectorate and repressing the opposition (Escribà-Folch, 2012). The problem here is that co-optation is not exactly a direct transfer of money to the political elite of the country. Co-optation, as mentioned before, has long lasting effects of political power redistribution, not compared to such an attempt to buy off. This note gains even greater importance during the period of imposed economic sanctions due to its insidious and long-term impact on the resource and loyalty base of the regime. Thus, bearing in mind those drawbacks in the existing literature, we proceed to theoretical model and empirical investigations.

3 The Model

3.1 Setup and Justification

In a country all citizens are divided into two groups with different political power: elite (the minority) and population. *Among elite* there is a dictator which will be understood as a person or a small group of people who are directly responsible for making political decisions. Here we do not distinguish between different "types of dictators" since the very process of decision making is not a point of crucial interest for the paper. We suppose that one of two conditions are being suited: it is either a single person, which technically (not necessarily effectively) makes the main decision, or a coalition which solves the inner collective action problem one way or another. The remaining part of the elite, that does not belong to the "dictator", is enfranchised to impact the selection of the dictator and, hence, has an institutionally embedded political power. Yet, the population has no influence on the composition of decision-making body through formal channels, rather, it has only informal power of civic unrest or rebellion. So, this country can be characterized as an autocratic system.

The country's gross income is normalized to 1 and is completely under control of the dictator. Hence, the basic logic of modeling the dictators' behavior is as follows: given the *budget constraint* of the gross disposable income, the dictator has to settle the *loyalty requirements*, understood in economic terms. This means that both the population and the elite have economic preferences about the portion of the countries' budget which must be left for the group. Such a portion we will call "elite demands" and "population demands" and denote respectively:

$$\alpha(e), \beta(e) \in [0,1], \text{ where } e \in [0, 0.5) \text{ is the size of the elite}$$

$$\frac{\partial \alpha(e)}{\partial e} > 0, \ \frac{\partial \beta(e)}{\partial e} < 0$$

$$\frac{\partial^2 \alpha(e)}{\partial^2 e} < 0, \ \frac{\partial^2 \beta(e)}{\partial^2 e} < 0$$

These simple parameters enable us to account for the demands of the population and the elite since, in the case they are not satisfied, a rebellion occurs which brings the dictator strictly negative payoff. The precise mechanism of the rebellion lays beyond the borders of the paper. However, there are two important assumptions about the loyalty requirements:

(a) the elite demands ($\alpha(e)$) monotonically grow with growing size of the elite and, reversely, the population demands ($\beta(e)$) monotonically decrease;

(b) in both cases the growth is not linear.

The first assumption means that, if the elite grows in its size, then the demands posed by the elite will be greater than earlier. Though it might possibly be true that the demands

simply do not decrease and may retain stable at some point of the elite size, we exclude this option to make more plausible and important second assumption. This assumption means that increase (decrease) in the elite (population) demands with respect to the elite size is non-linear and has decreasing marginal effects of growing elite size. Hence, each additional member of the elite will increase the elite demands (and decrease the population demands) less significantly than the previous one. Those functional dependencies are illustratively shown in the Figure 1.
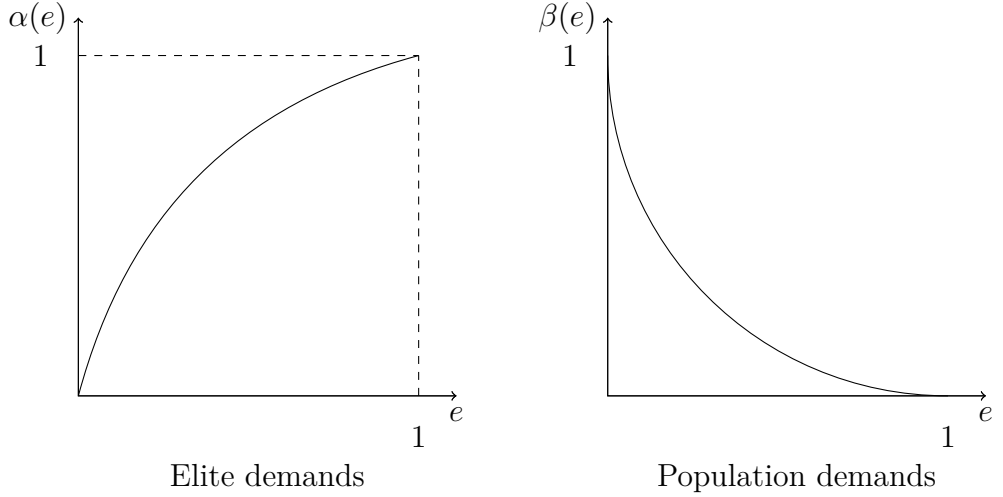
Figure 1: Elite and population demands *vs.* the elite size

Hence, a stable authoritarian government in one time step is set when the sum of both elite and population demands is not greater than the gross income which the dictator can distribute. Technically, one-shot stable authoritarianism can be characterized by the expression (1):

$$1 - \alpha(e) - \beta(e) \geqslant 0 \tag{1}$$

Albeit these conditions may be true quite often, we are interested in the perturbations caused by imposed economic sanctions. They directly affect *only* the gross product of the country, since empirical results bring convincing evidences for such impacts. However, this assertion does not rule out the possibility that such impacts may occur through different instruments as embargo policies, export, foreign trade, or investments constraints. Moreover, it is still unclear whether the very fact of economic sanctions leads to some political repercussions, i.e. how economic hardships transform to political actions. On the one hand, some argue this will lead to rally-around-the-flag effect and overall unifying of the population against the external enemy. However, this effect is heavily contingent upon the estimated power of the enemy or sending country in the context of sanctions (Whang and Kim, 2015). On the other hand, there are convincing arguments that economic sanctions undermine the trust of the elite and opposition to the dictator leading (directly) to expanding civic unrest (Escribà-Folch and Wright, 2015). In this work, we try to avoid such doubtful claims about the direct political effect of sanctions, rather it is being derived from the obvious economic consequences of sanctions which proved to be present in many cases (Kaempfer et al., 2004;

Marinov, 2005; Escribà-Folch and Wright, 2010).

Formally, this means that imposed *sanctions* lead to extra costs which the dictator has to pay from the budget – $s \in (0,1]$. First, the dictator compares the costs of the sanctions (damage to the budget constraint) to the value of the policy that the sanctions are being targeted to – $\pi \in [0,1]$. If $\pi < s$, then the dictator better change the policy in the current period so that to eschew paying sanctions costs. Hence, further on we focus on the situation, where $\pi \geqslant s$. To keep problem interesting, we also suppose that after paying the costs of sanctions the dictator has not enough resources to satisfy the elite and population demands:

$$1 - s < \alpha(e) + \beta(e)$$
$$1 - s - \alpha(e) - \beta(e) < 0$$
(2)

Otherwise, if $1 - s - \alpha(e) - \beta(e) \geqslant 0$, this is, by definition, a one-shot stable autocracy where the dictator will pay the sanctions costs and suite the requirements of elite and population. In other words, any political consequences of economic sanctions can be engendered only in the case of incompatibility of loyalty and budget requirements for the regime. Although, it does not imply any direct influence of sanctions on the political behavior of internal actors.

Second, given comparatively effective sanctions imposed (as implied by (2)), the dictator decides on the size of elite. This parameter may be manipulated through two different strategies: co-optation and repressions. *Co-optation* means that the dictator pays some costs to bring a part of the population into the enfranchised elite. In our notation, it can lead to growing $\alpha(e)$ and decreasing $\beta(e)$. Here we can vividly see the reason to imply non-linear dependency between the demands of the elite and its size: if this relation was linear, there would be no reasonable argument for dictators to use repressions since they would only spend resources and not decrease the overall demands. Hence, it is plausible to imply that at some point $\left|\frac{\partial \beta(e)}{\partial e}\right| > \left|\frac{\partial \alpha(e)}{\partial e}\right|$. The respective costs of co-opting in a given period will be denoted as $c \in [0,1]$. Those costs will refer to the resources and time being devoted to creating institutions (e.g. legislature or elections). As a consequences, for the regimes with already firmly set co-opting institutions those costs will be comparatively low.

Repressions are violent actions which are aimed to suppress the contentious and opposing views and actions. There are myriads of types of repressions (at least they can affect physical integrity of the target, or retrain the amount of information and number of known opportunities at hand), but their overall effect, in terms of our model, is the same: they decrease both elite ($\alpha(e)$) and population ($\beta(e)$) demands, though differently. This means that through violent actions, which are as different as media propaganda and mass killings are, the dictator achieves lower aggregate requirements for the regime. We assume henceforth that, in the case of repressions, the sum of demands are being changed, not the elite and population demands separately. Since there is a region where $\left|\frac{\partial \beta(e)}{\partial e}\right| > \left|\frac{\partial \alpha(e)}{\partial e}\right|$, the sum of marginal effects of repressions is negative. Likewise the co-optation, the costs of repressions in a given period will be denoted as $r \in [0,1]$, behind which we understand the resources and

time spent on creating and maintaining repressions institutional system.

Ultimately, the decisions that we are focusing on is the decision of the dictator about the level of co-optation and repressions in a given period. Firstly, we introduce a first look at the results of one period game. Afterwards, we look at time dynamics and analyze the results.

3.2 Analysis of the One-Shot Game

In one period the logic of the dictator's decision will be as follows: the utility of not complying with the requirements of the sanctions and paying the costs must be not greater than the utility of surrendering. However, this is always true, since without repressions and given $s \leqslant \pi$:

$$1 - s - \alpha(e) - \beta(e) \geqslant 1 - \pi - \alpha(e) - \beta(e)$$

Not surprisingly the left part of the inequality may be increased by using co-optation and/or repressions. We treat them separately because otherwise we must have implied some relation between co-optation and repressions. This relation, though, is not clear from the perspective of empirical studies, so in our work we focus on those strategies as two different (but not mutually exclusive) ones. At this point we leave this fact without a rigorous explanation until we get and analyze the results further on.

In this case, for the level of repressions with positive r the optimization problem for the dictator is as follows:

$$1 - s - \alpha(e + \Delta e) - \beta(e + \Delta e) - r \to \max_{r} \text{ with budget constraint}$$

$$1 - s - \alpha(e + \Delta e) - \beta(e + \Delta e) - r \leqslant 0$$

In this notation, $\alpha(e + \Delta e) = \alpha(e) + \alpha(\Delta e)$ (likewise for $\beta(e + \Delta e)$), where only the second part of increase (decrease) in the elite size depends on r, but for simplicity we do not write it explicitly in the remainder of the paper. Using Lagrange multiplier, we solve this optimization problem with respect to r (see full solution in Appendix A.1):

$$\begin{cases} \frac{\partial \alpha(\Delta e)}{\partial r} + \frac{\partial \beta(\Delta e)}{\partial r} = -1 \\ r \leqslant 1 - s - \alpha(e + \Delta e) - \beta(e + \Delta e) \end{cases} \tag{3}$$

The first part equation (3) gains an implicit solution for the optimal level of r whether the second part of (3) puts constrains on this parameter. Hence, the growing impact of economic sanctions will put harsher constraints on the possible levels of repressions and even under serious assumptions about $\alpha(e)$ and $\beta(e)$ will bring repressions inefficient.

Likewise, we solve the problem for the co-optation level (the dull solution is in the Appendix A.2), though the main difference is in the effect of elite size change in the demands

of elite and population:

$$\begin{cases} \frac{\partial \alpha(\Delta e)}{\partial c} - \frac{\partial \beta(\Delta e)}{\partial c} = -1 \\ c \leqslant 1 - s - \alpha(e + \Delta e) - \beta(e - \Delta e) \end{cases} \quad (4)$$

The system (4) should be interpreted in the similar way as the previous one: the first part can be implicitly solved for the optimal level of co-optation costs, the second part draws limitations for those costs. Interestingly, other things being equal, greater economic sanctions costs will cause a dictator to choose lover levels of co-optation.

However, as compared to the results of the previous model (3) the choice between the co-optation and repressions will heavily depend on the functional form of $\alpha(e)$ and $\beta(e)$. Their responsiveness to the change of r and c will influence the choice, as the dictator will devote more resources to more responsive mechanism of declining the demands. Technically, it stems from both parts of systems (3) and (4): the difference between $\beta(e + \Delta e) - \beta(e - \Delta e)$ and the difference of partial derivatives. In other words, technology of co-optation and repressions will be one of the important factors in choosing between these two crucial strategies, but more detailed look at such a choice lays beyond the limitations of our paper.

3.3   Analysis of the Repeated Game

Now we are getting to analyzing the influence of time and cumulative effect of sanctions on the levels of co-optation and repressions. The main difference from the previous model is that in a given period the dictator witnesses the overall effect of sanctions which has been aggregated for all the previous periods of sanctions. Moreover, the dictator can anticipate the time period, when the costs of sanctions (fixed for each time period) will be comparatively lower than the value of targeted policy. In other words, the sanctions will end in the time period $\bar{t}$, such that:

$$\int_0^{\bar{t}} s^t \cdot dt = \pi$$
$$1 - s^{\bar{t}} = \frac{(1 - s) \cdot \pi}{s} \quad (5)$$
$$\bar{t} = \log_s \left(1 - \frac{(1 - s) \cdot \pi}{s} \right)$$

So, the dictator will be paying the sanctions costs only $\bar{t}$ periods of time. Now we can glance at comparative statics of this threshold value with respect to the value of the targeted policy and the sanctions costs.

$$\frac{\partial \bar{t}}{\partial s} < 0; \qquad \frac{\partial \bar{t}}{\partial \pi} > 0 \quad (6)$$

Calculating the corresponding partial derivatives, we get the results as described in (6), which can be interpreted as follows. First, the increase in the costs of sanctions (s) decrease the threshold value for $\bar{t}$. In other words, greater costs paid will make the dictator comply with the sanctions earlier. Conversely, the higher is the value of the targeted policy (π), other

things being equal, the longer will be the period of sanctions. For example, if the sanctions are driven by a devotion to change the regime in the targeted country, this will lead to respectively longer period of sanctioning.

After deducing the upper threshold for the time when the dictator does not comply with the demands of the sanctioning country, we now proceed to analyzing the dictator's decision about the levels of repressions and co-optation. During all periods of time in the region $[1,\bar{t}]$ the dictator makes a decision. Hence, there is technically infinite number of time periods until the end of sanctions. The analysis will be conducted in the same venue as in the case of one-shot game, but it will be possible to account for the effect of time on the dictator's behavior.

The notable particularity about this model is, as in (5), the cumulative effect of sanction in a period $t < \bar{t}$ is the sum of all previous effects. The main argument for such form of cumulative effect is that in each period a particular portion of gross product is being devoted to pay for sanctions.

Hence, for repressions the optimization problem in a period $\hat{t} \in [1,\bar{t}]$ is:

$$1 - \int_1^{\hat{t}} s^t \cdot dt - \alpha(e + \Delta e) - \beta(e + \Delta e) - r \to \max_r \text{ with budget constraint}$$

$$1 - \int_1^{\hat{t}} s^t \cdot dt - \alpha(e + \Delta e) - \beta(e + \Delta e) - r \leqslant 0$$

As previously, using Lagrange multiplier, we solve the problem (full solution can be found in Appendix A.3) and get the following results.

$$\begin{cases} \frac{\partial \alpha(\Delta e)}{\partial r} + \frac{\partial \beta(\Delta e)}{\partial r} = -1 \\ r \leqslant 1 - s\frac{1 - s^{\hat{t}}}{1 - s} - \alpha(e + \Delta e) - \beta(e + \Delta e) \end{cases} \tag{7}$$

Likewise, we get the following results for co-optation:

$$\begin{cases} \frac{\partial \alpha(\Delta e)}{\partial c} - \frac{\partial \beta(\Delta e)}{\partial c} = -1 \\ c \leqslant 1 - s\frac{1 - s^{\hat{t}}}{1 - s} - \alpha(e + \Delta e) - \beta(e - \Delta e) \end{cases} \tag{8}$$

All in all, the systems (7) and (8) represent the final results, which will be interpreted in details in the next section.

3.4 Formal Model Results and Empirical Implications

The formal model implies several important conclusions. *First*, growing costs of sanctions which the dictator pays in each period decrease the overall level of repressions as well as co-optation. More precisely, the increase in the parameter *s* will put more limiting constrains on the possible values of repressions and co-optation costs. This consideration is quite natural, as the dictator will have less resource in hand in a given period, if the sanctions sending

country affects the gross income significantly harsher. Hence, there can be a situation when the first parts of both (7) and (8) can not be satisfied and there will be no equilibrium co-optation and/or repressions efforts.

However, it worth mentioning that *s* can be bounded from above due to reasons not being addressed in the paper, e.g. the costs of sending sanctions, transaction costs, etc. Moreover, in case the aim of sanctions is democratization in the targeted country and struggle with repressions, merely bring the sanctions up will simultaneously hinder creation of inclusive political institutions and even lead to greater human rights violations (Peksen and Drury, 2009). Thus, to assert such a relation between sanctions costs and restrictions for the costs of co-optation and repressions is not deem sanctions ultimately and clearly efficacious.

Second, there is a negative and decreasing marginal effect of time on the restrictions for both repressions and co-optation (as shown in (9)). That is, the duration of sanctions until the period in which the dictator makes the decision puts larger and larger constrains on the possible costs of both strategies.

$$\frac{\partial r}{\partial t} < 0; \qquad \frac{\partial^2 r}{\partial^2 t} < 0 \tag{9}$$

Although this effect is negative, not surprisingly, it decreases with growing time. Naturally, the dictator will be getting adjusted to the political demands of the sending country as well as to the damages to the gross income. This serves as the mechanism which helps the ruler to overcome the flux after sanctions being imposed. Hence, there will be reached a more or less stable optimal level of repressions and co-optation costs after a particular period of time.

Third, as compared to repressions, usage of co-optation as an instrument of manipulating the demands of elite and population heavily depends on the technology of co-optation. This technology determines the comparative grows of α and decrease of β. In what concerns repressions, dictators are left with deciding on the equilibrium costs which will fit the existing budget constraints. This will happen since the sum of changes in the elite and population demands due to implemented repressions is always negative, hence, the difference between overall demands can be easily compared to both requirements for optimum r from the system (7). In the case of co-optation, such a comparison will be obscured by the fact that the change in α and β is reverse. As a matter of fact, this difference is the very reason why technology of co-optation is more important for such a decision, than the technology of repressions.

Moreover, the technology of co-optation is not a flexible and cheaply malleable characteristic of a political system. Given the budget constrain getting narrower with time and the cumulative damage of sanctions, the possible higher bound of co-optation costs will be getting lower. This is even more serious restriction for the dictator as a discrete change in co-optation may demand composition of new institutions or rebuilding the old ones. As a consequence, while the technology of repressions is not comparatively efficient, the use of co-optation may be inefficient for the dictator in the later periods of game. Putting it another

way, using co-optation as a strategy will be a more viable option in the earlier stages of the game, i.e. not long after the imposition of sanctions. Probably, that might be the precise reason why personalist regimes are destabilized by economic sanction to a higher degree as compared to one-party and military regimes (Escribà-Folch and Wright, 2010). The former two regimes already have relatively solid institutions for co-optation and repressions what decreases their costs of those strategies and makes economic sanctions less harmful.

Ultimately, the decision between two strategies will be a consequence of comparing marginal utilities of repressions and co-optation mitigating effects which will be important in a twofold manner. Firstly, derivatives of functions $\alpha(\Delta e)$ and $\beta(\Delta e)$ with respects to r and c must differ. The theoretical argument, drawn from the model, coincides with the empirical intuition: if those derivatives were the same, using repressions would be a strongly dominating strategy for the dictator, regardless of other factors, which is simply not true. Secondly, since those derivatives are different, the respective budget constraints in the systems (7) and (8) are different. That is natural to suppose, due to reasons mentioned above in the context of co-optation technology, that Δe is greater in the case of co-optation with fixed co-optation and repressions efforts. Hence, the budget constraint for the (8) will be more limiting, what explains why co-optation is a comparatively rare, but influential event.

Furthermore, there are some evidences that implementing co-optation drastically influences the use of repressions. Creating co-optation institutions, like legislature and parties, the leaders becomes incapacitated to easily detect possible rebels what makes broad repressions inefficient (E. Frantz and Kendall-Taylor, 2014). This is one of possible mechanisms how the difference between technologies might work. Given existing institutions as possible channels for incorporating opposition into the regime power system, co-optation has greater influence on decreasing population demands than on increasing the elite's $\left(\left| \frac{\partial \beta(e)}{\partial e} \right| > \left| \frac{\partial \alpha(e)}{\partial e} \right| \right)$.

However, the composition of our model and the last assertion does not provide us with a rigorous and empirically testable hypothesis about the co-optation–repressions relation. The precise mechanisms of repressions and co-optation on the demands of the elite and population is an important drawback of our model, but a more sophisticated elaboration on this topic lays beyond the bounds of this paper. As a consequence, in the next empirical section we treat those strategies separately, only suggesting several comparisons between co-optation and repressions.

4 Empirical Evidence

4.1 Data and Sample

In the following section, we test assumptions driven from the formal model. Due to measurement limitations and time series restrictions, the sample consists of all available data from 1976 to 2006 for 112 authoritarian countries. As the criterion to subset authoritarianisms we use Geddes, Wright, and Franz classification of authoritarian regimes. The lower borderline

for time series is determined by the Political Terror Scale data availability; the upper ones –
by data on sanctions cases in Hufbauer, Schott and Elliott.

Dependent variables. As we desribed it above, strategies of an autocrat are distinct and
unordered between themselves. Rationale behind this, as it is mentioned above, that any
efforts to generalise and compare strength of strategies with each other are unreliable and
could not be operationalized with the available data. Hence, as in formal model, we sepa-
rate repressions as forms of state violence and coercion from cooptations as non-predatory
institutional transformations of an authoritarian regime (with negative consequences in sev-
eral cases). In conformity with this assumption, we believe that a data generating process
and causal inference are similarly different, but are comparable being generalised by their
definition as dictator's strategies.

We use Amnesty International Scale from The Political Terror Scale dataset as the op-
erationalisation of repressions. The PTS measures levels of political violence in a particular
year based on a 5-level "terror scale". Point 1 means "Countries under a secure rule of law,
people are not imprisoned for their views, and torture is rare or exceptional; political mur-
ders are extremely rare". Polint 5 means "Terror has expanded to the whole population;
the leaders of these societies place no limits on the means or thoroughness with which they
pursue personal or ideological goals". As the variable of interest it demonstrated its validity
and reliability in the set of previous studies of authoritarianisms.

To operationalise cooptations we use a 5-level scale of cooptations from Svolik. The
variable takes values of 1 (a legislature exists but it is either unelected or appointed by
another body); 2 (a legislature exists and is elected but only one party may contest seats);
3 (largest party controls more than 75% of seats); 4 (largest party controls less than 75% of
seats); 5 (largest party controls less than 50% of seats).

Independent variables. As the variable of interest we use sanctions in its four interpreta-
tions. We analyze the effect of presence or absence of sanctions in particular year as dummy.
The second strategy is to test for the cumulative effect measured by the years under sanctions
in particular year. Due to possible nonlinear interrelation, we include the squared cumulative
effect. Another implication of sanctions can be found in its success for a sanctioning country.
The last one is the imposition of sanctions effect as dummy for year in which it was imposed.
We use data on sanctions from Hufbauer, Schott and Elliott dataset.

Controls. We also add a set of control variables in each model specification. First, as
findings of previous studies demonstrate, the effect of sunctions varies across different types
of authoritarianisms. Following (Davenport, 2007b), we use Geddes, Wright, and Frantz,
2014 classification (party, personalistic, military and monarch as the base category). Second,
internal and external instability factors also significantly affect the decision of a dictator
about strategies (Vreeland, 2008). Hence, we include one-year lag of Civil Wars and one-year
lag of Wars, data for which is retrieved from The Peace Research Institute Oslo dataset. As
traditional controls we use a logarithm of population (Henderson, 1993), a share of urban

population, trade and a logarithm of GDP per capita (Hafner-Burton and Tsutsui, 2005), one-year lag of Net ODA received per capita(all mentioned data is from the World Bank) (Wright, 2009).

4.2 Descriptives and Preliminaries

We start our analysis from several descriptions of the sample. Descriptive statistics are in Table 1 below. As we have unbalanced panel, there are 2746 observations in the sample. According to Geddes, Wright, and Franz classification there are 1352 Party, 729 Personalistic, 363 Military and 282 Monarch authoritarian regimes. We find that 1513 observations are signed as Not Free, 1040 as Partly Free and only 101 – Free (Freedom House). From the side of the internal instability, civil wars are observed in 607 cases. Wars as external factors are observed in 97 (wars) cases. Right-skewed data on population and GDP per capita is logged, hence it a bit more corresponds with the normal distribution form.

Statistic	N	Mean	St. Dev.	Min	Max
Political Terror Scale	2,139	2.066	0.988	0	4
Cooptations (Svolik)	2,407	2.082	1.428	0	5
Sanctions Dummy *	2,746	0.192	0.394	0	1
Sanctions Cumulative	2,746	1.554	5.200	0	52
Sanctions Imposed *	2,746	0.025	0.157	0	1
Sanctions Success	2,746	1.178	2.881	0	16
Party Dummy GWF *	2,746	0.492	0.500	0	1
Personal Dummy GWF *	2,746	0.265	0.442	0	1
Military Dummy GWF *	2,746	0.139	0.347	0	1
Monarch Dummy GWF *	2,746	0.103	0.304	0	1
Wars PRIO *	2,746	0.035	0.185	0	1
Civil Wars PRIO *	2,746	0.221	0.415	0	1
Log Population	2,678	16.080	1.377	12.689	20.994
Log GDP per capita	2,284	7.322	1.247	4.871	11.653
Log Aid	2,484	3.384	1.420	-3.723	7.476
Urban Population	2,681	40.572	22.260	3.101	100.000
Trade	2,247	0.696	0.488	0.0002	4.304

Table 1: Descriptive Statistics for all variables; categorial or dummy ones are marked by an asterisk (*)

As we can see, the mode for Political Terror Scale is 3, which means that in most cases in our sample there are extensive political imprisonment, common political murders and unlimited detention. Surely, it does not imply those repressions to be a natural event for autocracies, neither it tells anything about the (non-)violent nature of authoritarianism. The mode for Cooptations is 2 (largest party controls more than 75% of seats) which strongly corresponds with the actual state of authoritarianisms, where democratic institutions and regulations are spreading out for last decades, but are spoiled by personalism and authoritarian informal rules.

Sanctions are common practices against authoritarian policy, and according to our sample the state under sanctions is observed in 526 cases. The longest cumulative effect we observe in Democratic People's Republic of Korea, where by 2001 it was 52. In this case Cooptations get values of 2 and PTS achieves 4th level on the political terror scale, which seems not clear and quite ambiguous. Move on to the analysis of simple interrelations between sanctions and autocrat's strategies.

	Estimate	Std.Error	Adjusted R2	F Statistics
Sanctions Cumulative	0.007	0.006	0.18	31.03***
Sanctions Cumulative2 (Est. for Cumulative 0.013 (0.014)	-0.0003	0.0006	0.18	28.65***
Sanctions Imposed	0.057	0.108	0.18	30.91***
Sanctions Dummy	0.166**	0.057	0.18	31.77***
Sanctions Success	0.014	0.008	0.19	31.227***

Note: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Table 2: Country Fixed-Effects Regressions on Political Terror Scale (within transformation); controls are included but omitted from table

For PTS and Cooptations we build two types fixed-effects models (country-fixed and year-fixed) for each measure of sanctions. We also suppoose that the cumulative effect of sanctions can be non-linear, hence we include squared variable in another model. Controls are included in all model specifications and omitted for presentation purposes. Results for regressions on PTS are shown in Tables 2 and 3.

	Estimate	Std.Error	Adjusted R2	F Statistics
Sanctions Cumulative	0.033***	0.006	0.41	26.81***
Sanctions Cumulative2 (Est. for Cumulative 0.073*** (0.014)	-0.002**	0.000	0.40	26.58***
Sanctions Imposed	0.281*	0.126	0.38	25.57***
Sanctions Dummy	0.471***	0.053	0.41	28.53***
Sanctions Success	0.059***	0.007	0.41	28.04***

Note: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

Table 3: Year Fixed-Effects Regressions on Political Terror Scale (LSDV model); controls are included but omitted from table

In regression models with country fixed-effects, we observe that the effect of sanctions is not statistically significant, except for the model where it is counted as a dummy variable. Positive coefficient here means that on average otherwise equal, authoritarian countries tend to use harsher repressive atrategies on 0.166 points. This interpretation does not seem to be contradictory, but the following models confirm that the effect of sanctions is not linear.

Table 3 demonstrates the significance of sanctions effect on PTS. First, the cumulative effect of sanctions increases to the limit with the increase in years, for which an authoritarian country is under sanctions. If we include sanctions in model as dummy variable, regardless

of whether we take into account the short-term effect (only imposition) or the state of the country as a whole (dummy variable), the effect is equally positive and statistically significant. Besides, we also distinguish the effect of sanctions on repressions in accordance with the success of the sanctions themselves. So, with the increase in the success rate per unit, on average, otherwise equal, a terror scale increases by 0.059. It follows that the more successful the imposed restriction on authoritarian politics appeared, the more inclined it is to resort to harmful strategies.

	Estimate	Std.Error	Adjusted R2	F Statistics
Sanctions Cumulative	0.002	0.0101	0.20	41.421***
Sanctions Cumulative2 (Est. for Cumulative -0.009 (0.021)	0.0006	0.001	0.21	37.991***
Sanctions Imposed	-0.305	0.166	0.21	41.81***
Sanctions Dummy	-0.039	0.086	0.21	41.436***
Sanctions Success	-0.008	0.0121	0.21	41.472***

Note: *p <0.1; **p <0.05; ***p <0.01.

Table 4: Country Fixed-Effects Regressions on Cooptations (within transformation); controls are included but omitted from table

Compare this results with Tables 4 and 5, where we use the same model specifications, however as a dependent variable we use Cooptations. Unlike repression, we notice that the effect of sanctions on ooptation is not statistically significant in any of the fixed-effect model specifications. An exception is a model with a year fixed-effect, where the effect of Cumulative sanctions is negative, statistically significant and linear. In repressions, we observe the opposite result. This once again confirms our rationale that these strategies are different and can not be systematically ordered.

	Estimate	Std.Error	Adjusted R2	F Statistics
Sanctions Cumulative	-0.030**	0.010	0.30	17.4***
Sanctions Cumulative2 (Est. for Cumulative -0.022 (0.024)	-0.0004	0.0012	0.30	17.01***
Sanctions Imposed	0.0560	0.217	0.29	17.11***
Sanctions Dummy	0-0.022	0.095	0.29	217.11***
Sanctions Success	-0.012	0.012	0.29	17.14***

Note: *p <0.1; **p <0.05; ***p <0.01.

Table 5: Year Fixed-Effects Regressions on Cooptations (LSDV model); controls are included but omitted from table

4.3 Modeling

We use mixed-effect linear model for time dynamics. As we showed in the previous part, the regularities in time are fundamentally important for the effect of sanctions. However,

models with fixed-effects do not explicitly take into account temporal dynamics. Moreover, the model with mixed effects, due to shrinkage, allows to get more reliable estimates for unbalanced panels. In both cases of dependent variables this models are appropriate. ICC for model with PTS is 0.47 (0.39; 0.54) and for Cooptations is 0.46 (0.40; 0.55).

	Dependent variable:				
	Political Terror Scale				
	(1)	(2)	(3)	(4)	(5)
Time	−0.037***	−0.035***	−0.041***	−0.031***	−0.041***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Time Squared	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Success	0.025***				−0.013
	(0.008)				(0.015)
Cumulative		0.031**			−0.055**
		(0.013)			(0.024)
Cumulative Squared		−0.001*			0.002*
		(0.001)			(0.001)
Dummy			0.243***		0.556***
			(0.056)		(0.145)
Imposed				0.053	−0.238*
				(0.102)	(0.126)
Civil Wars	0.684***	0.687***	0.687***	0.688***	0.687***
	(0.056)	(0.056)	(0.055)	(0.056)	(0.055)
Personal	0.406*	0.425**	0.385*	0.458**	0.374*
	(0.210)	(0.213)	(0.208)	(0.217)	(0.210)
Military	0.459**	0.474**	0.450**	0.498**	0.448**
	(0.212)	(0.216)	(0.211)	(0.220)	(0.212)
Population	0.178***	0.181***	0.175***	0.177***	0.173***
	(0.046)	(0.046)	(0.045)	(0.047)	(0.046)
Trade	−0.186**	−0.164*	−0.169*	−0.187**	−0.180**
	(0.088)	(0.090)	(0.088)	(0.090)	(0.089)
Constant	−0.528	−0.644	−0.528	−0.509	−0.432
	(0.923)	(0.941)	(0.916)	(0.953)	(0.927)
Observations	1,631	1,631	1,631	1,631	1,631
Log Likelihood	−1,720.181	−1,728.729	−1,714.038	−1,722.372	−1,725.073
Akaike Inf. Crit.	3,476.362	3,495.458	3,464.076	3,480.743	3,494.146

Note: *p<0.1; **p<0.05; ***p<0.01

Table 6: Mixed-effect linear model on PTS (insignificant controls are omitted from the table)

Following the logic of a mixed-effects model building, first we specified the time-part. As a result, for both models we choose a specification, where time and quadratic time are included as fixed effects. In accordance with the results obtained, the effect of time is decreasing in the limit for PTS and infinitely increases for Cooptations. Random constants and time are

also included in model specifications.

	(1)	(2)	(3)	(4)	(5)
	Dependent variable:				
	Co-optations				
Time	0.034**	0.033**	0.033**	0.034**	0.031**
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Time Squared	0.001**	0.001**	0.001**	0.001*	0.001**
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Success	0.002				−0.017
	(0.011)				(0.021)
Cumulative		0.003			−0.060*
		(0.019)			(0.034)
Cumulative Squared		0.0003			0.002*
		(0.001)			(0.001)
Dummy			0.059		0.438**
			(0.079)		(0.206)
Imposed				−0.209	−0.423**
				(0.140)	(0.178)
Civil Wars	0.281***	0.282***	0.279***	0.284***	0.279***
	(0.076)	(0.076)	(0.076)	(0.075)	(0.076)
Party	1.310***	1.303***	1.298***	1.308***	1.256***
	(0.336)	(0.337)	(0.335)	(0.335)	(0.333)
Personal	0.976***	0.972***	0.962***	0.971***	0.902**
	(0.357)	(0.358)	(0.357)	(0.357)	(0.355)
Constant	−0.102	−0.025	−0.112	−0.179	0.002
	(1.594)	(1.607)	(1.593)	(1.593)	(1.587)
Observations	1,705	1,705	1,705	1,705	1,705
Log Likelihood	−2,295.874	−2,301.764	−2,293.645	−2,292.236	−2,303.175
Akaike Inf. Crit.	4,627.748	4,641.528	4,623.291	4,620.472	4,650.349

Note: *p<0.1; **p<0.05; ***p<0.01

Table 7: Mixed-effect linear model on Co-optations (insignificant controls are omitted from the table)

Results of estimation are shown in Tables 6, 7. We build 4 models for separate measures of sanctions and one model without defferentiations between types of sanctions measurements (simultaneous inclusion). Due to fact, that our models are from the same class specifications, the results are comparable from both implications. As we see, the pattern of time remains different for cooptations and repressions. In the first one, it is still infinitely increases and in the last one time decreases in the limit. Time effect remains statistically significant in all models.

We also observe several similar patterns in controls. Civil wars, for instance, affect strategies of autocrat positively and significantly in the same way. Opposit to this, the effect of external instability factor of wars is not statistically significant in any specifications. The

rest of controls have no systematicaly the same pattern.

	(1)	(2)	(3)	(4)	(5)
	Dependent variable:				
	Co-optation (dummy)				
Dummy	0.056				0.190
	(0.147)				(0.457)
Cumulative		0.122***			0.103
		(0.042)			(0.086)
Cumulative Squared		−0.010***			−0.009**
		(0.002)			(0.004)
Imposed			−0.119		−0.287
			(0.341)		(0.448)
Success				−0.001	−0.014
				(0.020)	(0.041)
Civil Wars	0.622***	0.601***	0.634***	0.633***	0.605***
	(0.131)	(0.132)	(0.129)	(0.131)	(0.133)
Party	1.609***	1.664***	1.622***	1.621***	1.666***
	(0.201)	(0.204)	(0.200)	(0.201)	(0.204)
Personal	1.768***	1.800***	1.780***	1.779***	1.802***
	(0.221)	(0.222)	(0.219)	(0.220)	(0.223)
Military	1.124***	1.141***	1.142***	1.139***	1.154***
	(0.228)	(0.229)	(0.226)	(0.229)	(0.231)
War	−0.403	−0.492	−0.399	−0.397	−0.506*
	(0.300)	(0.304)	(0.299)	(0.299)	(0.306)
Population	0.610***	0.620***	0.611***	0.610***	0.619***
	(0.054)	(0.054)	(0.054)	(0.054)	(0.055)
Urban Population	0.040***	0.042***	0.040***	0.040***	0.042***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Trade	1.022***	1.069***	1.016***	1.016***	1.069***
	(0.177)	(0.181)	(0.177)	(0.177)	(0.181)
GDP per capita	−0.194**	−0.210**	−0.196**	−0.196**	−0.208**
	(0.091)	(0.092)	(0.091)	(0.091)	(0.092)
Aid	0.390***	0.389***	0.389***	0.389***	0.389***
	(0.053)	(0.054)	(0.053)	(0.053)	(0.054)
Constant	−13.312***	−13.483***	−13.316***	−13.301***	−13.486***
	(1.247)	(1.260)	(1.247)	(1.247)	(1.262)
Observations	1,984	1,984	1,984	1,984	1,984
Log Likelihood	−1,159.468	−1,145.296	−1,159.480	−1,159.540	−1,144.985
Akaike Inf. Crit.	2,342.935	2,316.592	2,342.960	2,343.081	2,321.969

Note: *p<0.1; **p<0.05; ***p<0.01

Table 8: Country fixed-effects logit models

The cumulative effect of sanctions is significant for PTS model, and the pattern shows that sanctions increases in the limit a level of the PTS terror-scale. This pattern remains in model with all types of sanctions measures. However, in the Cooptations model, despite

the insignificant cumulative effect in separate model specification, when we include measures simultaneously the effect becomes negative and significant, but rather weak. Constant effects of sanctions (as imposition or dummy) are significant only in PTS models both in separate and simultaneous inclusion models. The same interrelation is between strategies and imposition in simultaneous inclusion model which is negative and statistically significant. As we also observe, the effect of successful imposition for external actor is also positive and statistically significant in its influence on PTS, but this not relevant for Cooptations.

4.4 Robustness

Among others, since we have received rather weak effects for co-optation models, we additionally test them for robustness. For this reason, we use the operationalization of co-optations in accordance with Cheibub, Gandhi and Vreeland. Since the frequencies are distributed unevenly, we turned this variable into a dummy one and built a logistic regression model. The results are shown in the table below. It shows that in this specification we find a significant cumulative effect of sanctions. Moreover, this pattern is more consistent with the particular pattern of repression model pattern.

	Dependent variable:					
	Political Terror Scale			Co-optation (Svolik)		
	(1)	(2)	(3)	(4)	(5)	(6)
Cumulative	0.034***			0.027		
	(0.011)			(0.012)		
Cumulative Squared	−0.001			−0.002		
	(0.001)			(0.001)		
Dummy		0.252***			0.080	
		(0.043)			(0.047)	
Imposed			0.142**			−0.062
			(0.097)			(0.114)
Wars	−0.024	−0.038	0.0004	−0.141	−0.127	−0.121
	(0.089)	(0.089)	(0.089)	(0.099)	(0.099)	(0.099)
Civil Wars	0.632***	0.620***	0.657***	0.044	0.046	0.056
	(0.039)	(0.038)	(0.038)	(0.042)	(0.042)	(0.042)
Population	0.131***	0.134***	0.122***	0.191***	0.193***	0.193***
	(0.018)	(0.017)	(0.017)	(0.016)	(0.016)	(0.016)
GDP per capita	−0.058	−0.063	−0.067	−0.144	−0.138	−0.138
	(0.034)	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)
Urban population	0.006**	0.006**	0.007**	0.016***	0.015**	0.015**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Trade	−0.233***	−0.224***	−0.264***	0.147	0.164	0.150
	(0.050)	(0.050)	(0.049)	(0.037)	(0.037)	(0.037)
Aid	0.008	0.011	−0.0003	0.092*	0.096*	0.093*
	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)	(0.017)
Personal	−0.014	−0.029	0.018	0.733	0.714	0.730
	(0.074)	(0.074)	(0.074)	(0.086)	(0.086)	(0.085)
Military	0.207	0.183	0.238*	−0.179	−0.184	−0.167
	(0.078)	(0.078)	(0.077)	(0.095)	(0.096)	(0.095)
Party	0.003	−0.015	0.045	1.034*	1.011*	1.029*
	(0.071)	(0.071)	(0.070)	(0.080)	(0.080)	(0.080)
Observations	6,560	6,560	6,560	6,876	6,876	6,876
Log Likelihood	−22,270.550	−22,263.490	−22,278.690	−24,956.950	−24,962.840	−24,964.100

Note:	*p<0.1; **p<0.05; ***p<0.01

Table 9: "Blow-up and cluster" estimation for ordered logit models with country fixed effects

Finally, we account for the ordinal nature of our dependent variables, so we use "blow-up and cluster" method to estimate ordered logit models with country fixed effects (Baetschmann,

Staub, and Winkelmann, 2015). We also use original form of the legislature variable with 5 levels. Results are very similar to the results in our main specification (see Table 9).

5 Discussion and Conclusion

The empirical results presented in the previous section may seem tedious and perplexing, however they coincide with the predictions of the theoretical model rather well. We now proceed to interpreting those results in the context of our framework and existing research.

There are four main crucial assertions that directly flow from our formal and empirical analysis. *First*, presence of economic sanctions increases the level of repressions in a given country. As implied by our theoretical model, sanctions costs which the dictator is compelled to pay in each period (s) damage the budget constraint. Consequently, the ruler decides to use repressive mechanisms to reduce the elite and population demands. Moreover, this result is consistent with previous investigations about the effect of sanctions on repressions in autocracies (Kaempfer et al., 2004; Escribà-Folch, 2012). However, our approach supplies the empirical results with plain and rigorous theoretical explanation. As we have shown, economic sanctions do not necessarily transform into political repercussions. This effect has place only in the case of comparatively high damage to the state budget constraint which the dictator uses to distribute goods between the elite and population to satisfy their demands.

Second, sanctions have positive decreasing cumulative effect on the level of repressions that dictator chooses in a given period. This empirical result completely supports that was shown by the formal model. On the one hand, growing cumulative effect only put more limiting constraints on the gross internal income fostering a dictator to act more vigorously. The wider is gap between the sum of demands ($\alpha(e) + \beta(e)$) put forth by the elite and population the more urgent becomes the need of manipulating those demands. Repressions, as other researches show too (Tanneberg et al., 2013), are still effective in all the periods of sanctions game.

On the other hand, this growing cumulative effects also hinders dictators from implementing as harsh repressions as would be optimal for the situation. Due to technologies of repressions some countries can be unable to produce enough support with coercion since the marginal costs of repressions will overwhelm the decrease in demands. This effect can be called an *attrition effect* since only for comparatively long periods of sanctions repression costs will be exceedingly restricted. Furthermore, such an assertion can also be supported by relatively small absolute value of the coefficient for the quadratic cumulative effect because it is in effect for higher values of time periods.

Basically, repressions turned out to be an effective way of struggling with the consequences of economic sanction both in theory and in reality. Presence of sanctions and their growing cumulative effect on the internal gross income produce urgent threats to the loyalty to the regime. Although, repressions are not an *ultima ratio* of internal autocratic policies being constrained by the attrition affect. However, the degree to which such an attrition can

go depends on exogenous factors, like sanctions costs for the sending country at least. Most notably, in what concerns repressions, economic sanctions do not immediately decrease the level of repressions in a given country, but negatively affect them in the long-term period.

Third, concerning co-optation, there is no stable and robust effect of present sanctions on the level of co-optation. This is the effect of ambiguous nature of co-optation which involves growing elite demands with decreasing population demands. In this case the viability of using co-opting strategies will, arguably, more importantly depend on long-run institutional characteristics of the regime (Brownlee, 2007). However, the only type of regime that can gain rather large benefits from solving creadible commitment problem is personalistic regime (Boix and Svolik, 2013), as illustrated by our results. In terms of formal model, in personalistic regimes the technology of co-optation may be relatively efficient due to eliciting popular support and mitigation of their demands and slow growth of elite demands.

Claims about the effect of institutional surrounding on the co-optation as a strategy implicitly brings us to the discussion of co-optation as comparatively rare events. As was mentioned above, co-optation as a strategy has limited effect and at some point discrete change in the demands will lead to significant costs of creating and modifying institutions. This theoretically driven explanations may be applied to the analysis of data which shows that *overall* effect of sanctions is significant. Sanctions, thus, engender overall positive changes in co-optation, which are severely limited not only by the context, but by the cumulative effect of sanctions.

Consequently, the *fourth* assertion that we make is negative decreasing cumulative effect of sanctions on co-optation implementation. In other words, the longer the sanctions are present the lower will be the probability of a dictator creating inclusive political institutions, though this effect is not completely robust in the empirical part. Such a results vividly shows the equivocal interaction of technology of co-optation and the budget constraints. On the one hand, co-opting previously disenfranchised population into the regime is still a crucial option for the dictator. Paying relatively low costs of co-optation, the dictator may significantly decrease the threat from below, i.e. the the population upheaval.

On the other hand, the cumulative effect (as in the case of repressions) of sanctions is not negligible in the long run since it poses a growing complication for the use of internal income. The sum of previous effects will create harsher bounds for the costs of co-optation making them less likely in the later periods of game. Given that in the majority of cases the significant effect of co-optation may be achieved through institutional changes, those changes must be more and more cheap to co-opt after a long period of sanctions. Arguably, this intuition seems to be misleading, what is exactly supported by the empirical results about the cumulative effect of sanctions.

To summarize, the effect of sanctions on co-optation is more confused as compared to repressions. Though this is a useful instrument for the dictator, it will work out only in the earlier periods of sanctions game due to harsh limitations for the costs of co-optation.

Overall, as we have demonstrated, the cumulative effect of economic sanctions is not an

unambiguous one. Nowadays, the interest in sanctions literature turns to the topic of internal consequences of sanctions, especially in the case of authoritarian regimes. As commonly noted in the literature, autocratic leaders are always under two main constraints — budget and loyalty limitations. Both of them are damaged by economic sanctions. However, one of the main drawbacks in the existing studies pf internal effects of economic sanctions is the presupposition of existing political costs of sanctions. In our theory we find a rigorous economic explanation for political actions in autocracies caused by imposed sanctions.

The main argument that we develop in the paper is as follows. The overall effect of sanction is robustly important for the dictator, fostering repressions and co-optation (separately treated) as the ways of buttressing the regime legitimacy. Moreover, cumulative effect of sanctions (i.e. the influence of all the previous periods under sanctions) increases the levels of repressions with decreasing marginal effects. The main reason for this is efficiency of repressions and corresponding harsher limitations for the costs of repressions. However, the similar effect has a different nature for co-optation: previous periods of sanctions decrease the likelihood of co-opting opposition. The possible explanation for this fact stems from high variation in technologies of co-optation which include both decrease of population demands and increase of the elite's. Relation between these two effects will determine whether the benefits of such action will overwhelm the costs. As the empirical investigations show, due to this reason co-optation are a mostly used toll in the earlier periods of sanctions.

However, there are several important limitations of the paper. Due to the lack of knowledge about the precise mechanisms of co-optation and repressions (i.e. about the technologies of these strategies) it is an nontrivial problem to compare their relative costs and benefits. This is a possible venue for future fruitful investigations.

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Appendices

A Appendix: Equation Solutions

A.1 One-Shot Game Repressions Problem

Full solution for the one-shot optimization problem for repressions:

$$
\begin{cases}
\frac{\partial(1-s-\alpha(e+\Delta e)-\beta(e+\Delta e)-r+\lambda(1-s-\alpha(e+\Delta e)-\beta(e+\Delta e)-r))}{\partial r} = 0 \\
\frac{\partial(1-s-\alpha(e+\Delta e)-\beta(e+\Delta e)-r+\lambda(1-s-\alpha(e+\Delta e)-\beta(e+\Delta e)-r))}{\partial \lambda} \geqslant 0
\end{cases}
$$

$$
\begin{cases}
(\lambda - 1) \cdot \frac{\partial(-\alpha(e+\Delta e)-\beta(e+\Delta e)-r)}{\partial r} = 0 \\
\frac{\partial(1-s-\alpha(e+\Delta e)-\beta(e+\Delta e)-r)}{\partial \lambda} \geqslant 0
\end{cases}
$$

$$
\begin{cases}
(1 - \lambda) \cdot \frac{\partial(\alpha(\Delta e)+\beta(\Delta e))}{\partial r} + (1 - \lambda) = 0 \\
1 - s - \alpha(e + \Delta e) - \beta(e + \Delta e) - r \geqslant 0
\end{cases}
$$

$$
\begin{cases}
(1 - \lambda) \cdot \frac{\partial(\alpha(\Delta e)+\beta(\Delta e))}{\partial r} = -(1 - \lambda) \\
1 - s - \alpha(e + \Delta e) - \beta(e + \Delta e) - r \geqslant 0
\end{cases}
$$

$$
\begin{cases}
\frac{\partial\alpha(\Delta e)}{\partial r} + \frac{\partial\beta(\Delta e)}{\partial r} = -1 \\
r \leqslant 1 - s - \alpha(e + \Delta e) - \beta(e + \Delta e)
\end{cases}
$$

The solution of this system exists, since $\frac{\partial\alpha(\Delta e)}{\partial r} < 0$ and $\frac{\partial\beta(\Delta e)}{\partial r} < 0$, moreover, $\frac{\partial^2\alpha(\Delta e)}{\partial^2 r} < 0$ and $\frac{\partial^2\beta(\Delta e)}{\partial^2 r} < 0$, hence the implicit solution larger than zero (as given by the second equation in the system) must exist.

A.2   One-Shot Game Co-optation Problem

Full solution for the one-shot optimization problem for co-optation:

$$
\begin{cases}
\dfrac{\partial(1-s-\alpha(e+\Delta e)-\beta(e-\Delta e)-r+\lambda(1-s-\alpha(e+\Delta e)-\beta(e-\Delta e)-c))}{\partial c} = 0 \\[2mm]
\dfrac{\partial(1-s-\alpha(e+\Delta e)-\beta(e-\Delta e)-c+\lambda(1-s-\alpha(e+\Delta e)-\beta(e-\Delta e)-c))}{\partial \lambda} \geqslant 0
\end{cases}
$$

$$
\begin{cases}
(\lambda-1)\cdot\dfrac{\partial(-\alpha(e+\Delta e)-\beta(e-\Delta e)-c)}{\partial c} = 0 \\[2mm]
\dfrac{\partial(1-s-\alpha(e+\Delta e)-\beta(e-\Delta e)-c)}{\partial \lambda} \geqslant 0
\end{cases}
$$

$$
\begin{cases}
(1-\lambda)\cdot\dfrac{\partial(\alpha(\Delta e)-\beta(\Delta e))}{\partial c} + (1-\lambda) = 0 \\[2mm]
1-s-\alpha(e+\Delta e)-\beta(e-\Delta e)-c \geqslant 0
\end{cases}
$$

$$
\begin{cases}
(1-\lambda)\cdot\dfrac{\partial(\alpha(\Delta e)-\beta(\Delta e))}{\partial c} = -(1-\lambda) \\[2mm]
1-s-\alpha(e+\Delta e)-\beta(e-\Delta e)-c \geqslant 0
\end{cases}
$$

$$
\begin{cases}
\dfrac{\partial\alpha(\Delta e)}{\partial c} - \dfrac{\partial\beta(\Delta e)}{\partial c} = -1 \\[2mm]
c \leqslant 1-s-\alpha(e+\Delta e)-\beta(e-\Delta e)
\end{cases}
$$

The proof for existence of solution is the same as in Appendix A.1, but a positive solution will exist only for comparatively effective technology of repressions, i.e. $\left|\dfrac{\partial\beta(\Delta e)}{\partial c}\right|$, as discussed in the Section 3.4.

A.3   Repeated Game Repression Problem

Full solution for the repeated optimization problem for repressions:

$$
\begin{cases}
\dfrac{\partial\left(1-\int_1^{\hat{t}} s^t\cdot dt-\alpha(e+\Delta e)-\beta(e-\Delta e)-r+\lambda(1-\int_1^{\hat{t}} s^t\cdot dt-\alpha(e+\Delta e)-\beta(e+\Delta e)-r)\right)}{\partial r} = 0 \\[2mm]
\dfrac{\partial\left(1-\int_1^{\hat{t}} s^t\cdot dt-\alpha(e+\Delta e)-\beta(e+\Delta e)-r+\lambda(1-\int_1^{\hat{t}} s^t\cdot dt-\alpha(e+\Delta e)-\beta(e+\Delta e)-r)\right)}{\partial \lambda} \geqslant 0
\end{cases}
$$

$$
\begin{cases}
(\lambda-1)\cdot\dfrac{\partial(-\alpha(e+\Delta e)-\beta(e+\Delta e)-r)}{\partial r} = 0 \\[2mm]
\dfrac{\partial(1-\int_1^{\hat{t}} s^t\cdot dt-\alpha(e+\Delta e)-\beta(e+\Delta e)-r)}{\partial \lambda} \geqslant 0
\end{cases}
$$

$$
\begin{cases}
(1-\lambda)\cdot\dfrac{\partial(\alpha(\Delta e)+\beta(\Delta e))}{\partial r} + (1-\lambda) = 0 \\[2mm]
1-\int_1^{\hat{t}} s^t\cdot dt-\alpha(e+\Delta e)-\beta(e+\Delta e)-r \geqslant 0
\end{cases}
$$

$$
\begin{cases}
\dfrac{\partial(\alpha(\Delta e)+\beta(\Delta e))}{\partial r} = -1 \\[2mm]
r \leqslant 1-s\dfrac{1-s^{\hat{t}}}{1-s}-\alpha(e+\Delta e)-\beta(e+\Delta e)
\end{cases}
$$

$$
\begin{cases}
\dfrac{\partial\alpha(\Delta e)}{\partial r} + \dfrac{\beta(\Delta e)}{\partial r} = -1 \\[2mm]
r \leqslant 1-s\dfrac{1-s^{\hat{t}}}{1-s}-\alpha(e+\Delta e)-\beta(e+\Delta e)
\end{cases}
$$

The solution will exist for exactly the same reasons as in Appendix A.1.

B Appendix: Time-Part Model Specification

	Dependent variable:			
	Political Terror Scale			
	(1)	(2)	(3)	(4)
Time	0.012***	0.011**	−0.016	−0.027
	(0.002)	(0.005)	(0.010)	(0.017)
Time Squared			0.001***	0.001**
			(0.0002)	(0.0004)
Constant	1.805***	1.778***	2.000***	2.124***
	(0.080)	(0.114)	(0.130)	(0.158)
Observations	2,139	2,139	2,139	2,139
Log Likelihood	−2,487.128	−2,334.570	−2,336.976	−2,279.114
Akaike Inf. Crit.	4,982.256	4,681.140	4,687.953	4,578.227
Bayesian Inf. Crit.	5,004.925	4,715.143	4,727.620	4,634.894
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 10: Time-part for mixed effect model with time dynamics; model 2 and 4 includes random effect for time (statistically significant); specification 4 is appropriate for the following model buildings

	Dependent variable:			
	Cooptations			
	(1)	(2)	(3)	(4)
Time	0.052***	0.050***	0.012	0.015
	(0.002)	(0.007)	(0.008)	(0.010)
Time Squared			0.001***	0.001***
			(0.0002)	(0.0002)
Constant	1.216***	1.173***	1.436***	1.381***
	(0.102)	(0.137)	(0.111)	(0.142)
Observations	2,407	2,407	2,407	2,407
Log Likelihood	−3,440.571	−3,110.707	−3,434.531	−3,104.713
Akaike Inf. Crit.	6,889.142	6,233.415	6,879.063	6,223.426
Bayesian Inf. Crit.	6,912.284	6,268.127	6,907.987	6,263.920
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 11: Time-part for mixed effect model with time dynamics; model 2 and 4 includes random effect for time (statistically significant); specification 4 is appropriate for the following model buildings

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