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Foreign Agents? Natural Resources & the Political Economy of Civil Society

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Abstract: Resource-rich dictatorships are more inclined to repress civil society than others. In this paper, we identify a tradeoff between political rents from natural resources and the organizational density of civil society. This organizational density determines the extent to which citizens can threaten the dictator with a revolution. We find that, in the occurrence of a negative oil price shock, regime change becomes likely, whereas a positive oil shock increases the extractive capacity of the dictator. When a negative oil price shock occurs, the persecution of failed revolutionaries can prevent revolution if the probability of revolutionary success is already low *ex-ante*. Historical and contemporary illustrations are drawn from Iran, the Soviet Union/Russia and Egypt.

Keywords: natural resources, dictatorship, civil society, organizational density, persecution

JEL Codes : C73, P36, P48, P51, Q34

I. Introduction

In 2012, the Russian parliament passed an amendment to a law from 2006 that became known as the *foreign agent law*. According to this amendment, non-governmental organizations (NGOs) that receive foreign funding and operate in political issues have to register as "foreign agents", which entails financial audits every three months. The process of subordinating civil society to the state started on the grounds of transparency, but has been directed more toward "licensing civil society" (Robertson, 2009: 540). In this paper, we argue that resource-abundant dictatorships are more inclined to control civil society than resource-poor dictatorships due to their vulnerability to energy price shocks. Given that civil society bridges the gap between the citizenry and the state, formal as well as informal associations constitute forms of civic organization (Richter, 2002: 30). The capacity of civil society to constrain governments explains why the external financial support of "foreign agents" is adverse for autocratic regimes. Moreover, refusal of external funding may seem contradictory taking into account that a plethora of these states have a high abundance of natural resources and generate rents from exporting oil and other minerals. These countries are highly dependent on the international prices of their natural resources, which is oil in most cases. In this regard, Ross (2012: 51) has ascertained that the price of oil

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has fluctuated annually by an average of 26.5% since 1970. Isham, Woolcock, Pritchett & Busby (2005: 143) differentiate between point resources (including oils, minerals and plantation crops) that are geographically concentrated and diffuse resources that are not. The former are connected with poor institutional quality (Isham et al. 2005: 143), which is based on the fact that point resources are easier to control and go hand-in-hand with vertical power relationships, and hence with a concentration of rents to a small elite (Bulte, Damania & Deacon 2005, 1031).

Acemoglu & Robinson (2006) (further: A&R 2006) take a certain stage of development of civil society as given; they do not examine the mechanism between civil society and regime stability. Desai, Olofsgård & Yousef (2009) develop a theoretical model of authoritarian bargain in which rents are used to buy off citizens and test it on 80 non-democracies over a period of 25 years. Their model rests on the hypothesis that repression is insufficient for a dictatorship to survive because the citizens might only pretend to be supportive but secretly plan a rebellion (Desai, Olofsgård & Yousef 2009: 93). The theoretical model thus shows how the interplay of available rents to the dictator, transfers to the citizens and a policy over which dictator and citizens do not agree (political freeness) act as balancing mechanisms helping the dictator survive. They confirm empirically that the availability of rents – for example, through windfalls from oil revenues – are supportive from the standpoint of negotiating and thus of the assertive force and survival of the dictator (ibid.: 106-125). Furthermore, Haber and Menaldo (2011) observe that there is no causal inference to be drawn on the positive effect of natural resources on dictatorship.

By examining a panel of U.S. states from 1970-2001, Boyce & Emery (2011: 7-11) observe lower growth rates in per capita income but higher levels of per capita income; they point out that institutional failure is the cause behind the negative relationship of natural resources and growth found thus far. Robinson, Torvik & Verdier (2006) show in their two-period probabilistic voting model that politicians inefficiently over-extract natural resources but also that resource booms lead to increased public sector employment and simultaneously decreased private sector employment; the institutional features of an economy determine whether the total income will increase or decrease (Robinson, Torvik & Verdier 2006: 456-462). This is in line with Ross (2001) who demonstrates that resource abundance of oil has a negative impact on the democratization process of a country. Furthermore, Cuaresma, Oberhofer & Raschky (2011) find, using a dataset of 106 dictators and controlling for different definitions of dictatorship, that higher levels of oil production strengthen the political power of dictators such that they can extend their authoritarian survival. Even when testing the robustness of their results by including institutional variables, i.e. by checking if the institutional quality of the state is

the only variable with an effect on the duration of dictatorships, they continue to find that oil significantly influences the duration of dictatorships.

Ghandi & Przeworski (2006: 6-9) distinguish between a cooperation, a cooptation and a turmoil equilibrium which mainly depend on the net severity of punishment of the opposition and the probability that the opposition overthrows the dictator, i.e. the strength of the opposition and the policy concession that the dictator makes. The essential element in their investigation is thus the need of the dictator to cooperate with the opposition (ibid.: 19). In a similar vein, Acemoglu, Robinson & Verdier (2004) propose a model of a kleptocratic ruler who expropriates the citizens' wealth but remains in power due to his divide-and-rule policy tactic. To overthrow the dictator, the citizens would need to cooperate but the kleptocrat is able to attract part of the populace to his side by using tax revenues and natural resource rents as a bribe (ibid.). Concentrating even more on natural resources, Egorov, Guriev & Sonin (2009) explore why resource poor dictators allow freer media. Free media are needed to monitor bureaucrats, but at the same time they indicate the strength and ability of a dictator to prevent a revolution (ibid.: 647); they refer to the Soviet Union under Gorbachev, who seemed forced to introduce glasnost under declining oil prices and a major budget deficit.

Shifting the focus on civil society, Putnam, Leonardi & Nanetti (1994: 83) see the involvement of civil society and closeness of the civil community as reasons why some regions have better functioning institutions than others. They identify features that are important for democratic development, such as political equality, cooperation and solidarity, trust and tolerance. As they point out, trust helps citizens to overcome defection from collective action. Ostrom (2009: 188) proposes a number of parameters that shape the emergence of collective action: the number of participants in the group, whether the potential gain is a public good or a common-pool resource, the heterogeneity of the group in regard to the individuals, the possibility of direct communication, what the production function looks like and whether the collective action occurs in a repetitive manner. Tilly (1978: 100) states that the relevant action space of collective action ranges from facilitation to repression and along these lines the group is able to promote or impede collective action. Accordingly, organizational density reflects facilitation mechanisms (Kim & Bearman, 1997: 75) that can make civil society develop more or less smoothly. This definition constitutes a measure of cooperation as described in Ghandi and Przeworski (2006: 5). More than that, it captures the notion of trust as a crucial element, as outlined in Putnam, Leonardi and Nanetti (1993: 89).

Organizational density stands close to social capital, which is described as the key element of civil society (Fukuyama 2001: 7). Social capital can reduce the costs of transactions that occur in

economies as a result of the problem of coordinating the mechanisms of the economy (ibid.: 10). Paxton (2002: 256) emphasizes that social capital is embedded in the interactions of the citizens. Moreover, it is often a by-product of social and historical interactions and roots such as religion (Fukuyama, 2001: 16-17). Bernhard (1993: 309) points out that civil society is separated from the state and needs to be sanctioned by it. In this sense, civil society is thought of as a bounded space which the dictator can limit or expand but not intervene in. Fukuyama (2001: 18) indicates that not only can the government promote the development of social capital by investing in education, but it can also prevent its growth. If the state does not ensure the supply of public goods essential for cooperation among citizens, such as property rights protection and public safety, social capital cannot evolve, which may also explain authoritarian stability.

Bernhard and Karakoç (2007: 540) analyze the participation in organizational life and protests that they associate with the emergence of civil society in 42 countries that used to be dictatorships before becoming democracies. One of their main findings is that the duration of the antecedent regime critically influences the rise of a post-transition, democratic civil society (ibid.: 556). Diamond (1994: 7-11) refers to the democratic functions and dynamics of civil society: the limitation of state power, i.e. to monitor and democratize authoritarian states; the stimulation of political participation; the strengthening of democratic features such as tolerance, articulation and representation of interests; the mitigation of political conflict by allowing pluralistic views; and the training of new political leaders and the spread of information (Diamond 1994: 7-11). Fox (1996) investigates the development paths and opportunities of civil society organizations in authoritarian rural Mexico and identifies the existence of long-run horizontal cooperation and reciprocity.

In our theoretical model, we propose that dictators prefer a restrained civil society and high rents from natural resources; civil society can empower citizens against the dictator, whereas rents from natural resources strengthen the *de facto* power of the dictator and therefore increase the cost of revolution for citizens. Our paper defines the critical threshold of cooperation and trust at the level of civil society, where active resistance against an authoritarian government starts taking place. This is captured by what we call the *organizational density* of civil society. Evidence from Iran, the Soviet Union/Russia and Egypt confirms that, in the presence of a negative oil price shock, oil dependence and a dense civil society can lead to revolution, whereas, in the presence of a positive oil price shock, persecution by the dictator is likely to occur.

This paper is organized as follows. The civil society protest and persecution games are introduced and solved in section II, both in static and dynamic forms. Section III discusses historical

and contemporary evidence on the role of civil society in regime change from Iran, Egypt and the Soviet Union/Russia. Section IV concludes.

II. The Model

We propose a game-theoretical framework on the interaction between the organizational density of civil society and the availability of resource rents for the dictator based on A&R (2006, particularly chapter 5) and Desai, Olofsgård & Yousef (2009). There are two players, the dictator *d* and the citizen *c*. The number of citizens is normalized to one and it is assumed that all citizens have the same income and policy preferences. There is perfect information. As in Egorov, Guriev and Sonin (2009: 652), the economy consists of a natural resource sector, which is the main income source of the dictator, and a "modern" sector, which integrates the citizens into the economic sphere and in which they generate their income.

The natural resource sector is set up in the following way: the country under consideration is endowed with a natural resource nationalized by the dictator. This natural resource is considered to be oil, but may also be any other natural resource. The oil market is exogenous and therefore the dictator cannot actively intervene, for example, by reducing the oil production. Furthermore, the extraction of oil is costless and the dictator always extracts the same amount of oil denoted by *q*, which is normalized to one. The price of oil is the state variable, which is exposed to fluctuations in the international oil market. In a non-shock situation, the price of oil is normalized to one, so that $p=1$. In the case of a shock, nature decides on the price p^j, which can be either high *h* (positive shock) or low *l* (negative shock), such that $p^j \in \{p^l, p^h\}$ and $p^l < p = 1 < p^h$. The probability of a high price is $\Pr(p = p^h) = \pi$, such that $\pi \in (0,1)$. It follows that $\Pr(p = p^l) = 1 - \pi$. The oil price determines how many rents the dictator can receive from oil extraction.

In contrast to the oil sector, the modern sector includes everything requiring human capital and citizen interaction, such as the communications sector. Contrary to Egorov, Guriev and Sonin (2009: 652), the modern sector is not dependent on the provision of a public good but rather on the organizational density α of the civil society. It is assumed that $0 < \alpha < 1$. In the modern sector, prices and quantities are normalized to one; both sectors are of equal size in a non-shock situation. The dictator can impose an income tax in the modern sector, which can be either high or low, such that $\tau^i \in \{\tau^l, \tau^h\}$, $0 \le \tau^j \le 1$. This is an extractive tax used only as a rent instrument for the dictator rather than for

redistribution. Citizens can threaten the power of the dictator, which is described as the possibility of a revolution. They either start a revolution, *R*, or restrain from it, *N* (non-revolution). A&R (2006: 120) call this the revolution constraint.

Table 1: list of variables

d	Dictator
c	Citizens
n	Nature
$U^j(\cdot)$	Utility of player j in static game (= payoff)
$V^j(\cdot)$	Utility of player j in dynamic game
$p^j \in \{p^l, p^h\}$	Price of oil; being either in a high or low state (shock) or one (non-shock) $p^l < p = 1 < p^h$
π	Probability of p^h; $\pi \in (0,1)$; $\Pr(p = p^h) = \pi$; $\Pr(p = p^l) = 1 - \pi$
α	Organizational density of civil society, $0 < \alpha < 1$
$\tau^i \in \{\tau^l, \tau^h\}$	Extractive tax, $0 \le \tau^j \le 1$
R	Revolution, decision variable of the citizens
N	Non-revolution, counterstrategy to *R*
S	Persecution variable, strategy of the dictator to either persecute citizens after failed revolution (*S*) or not (*NS*)
σ	Probability of winning a revolution for the citizens
$c(S)$	Cost of persecution

We use the Markov perfect equilibria (MPE) definition of Maskin and Tirole (2001) for the dynamic games of our paper. The behavior of the players at a certain point of the game depends only on the state of the game and not on the entire history of the game. By using MPEs, we avoid the occurrence of possible commitment problems (Acemoglu and Robinson, 2006: 153). The strategies of the players are formalized as σ^d and σ^c. The strategy of the dictator is to select the tax rate τ^j conditional on α and p^j, i.e. $\sigma^d = \{\tau^j(\alpha, p^j)\}$. The strategy of citizens is to opt for or against revolution, which is denoted by ρ, where $\rho = 1$ indicates a revolution and $\rho = 0$ indicates non-revolution. The decision for or against revolution depends on the events that occur beforehand, i.e. on p^j and τ^j. Therefore, the strategy of citizens is also a function, such that $\sigma^c = \rho(p^j, \tau^j) : [0,1] \to \{0,1\}$. The strategies $\tilde{\sigma}^d$ and $\tilde{\sigma}^c$ are defined as sub-game perfect equilibrium strategies, which are best responses of the players in all sub-games.

The Civil Society Protest Game

The timing of the civil society protest game is the following (figure 1):

1. Nature decides on the oil price shock, with a probability π of having a high price p^h.
2. The dictator decides on tax τ^j such that $\tau^j \in \{\tau^l, \tau^h\}$.
3. The citizens decide between revolution *R* and non-revolution *N*.

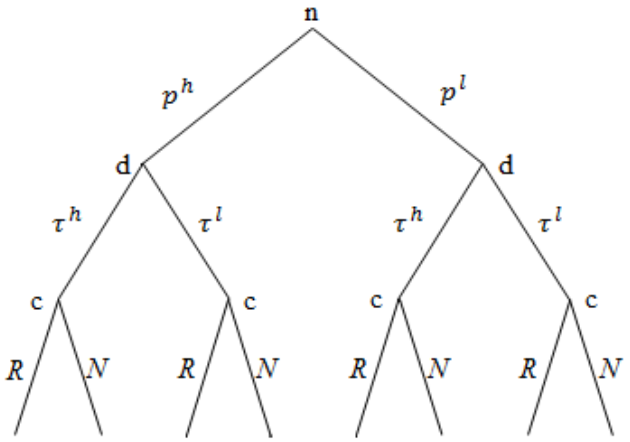


Figure 1: the civil society protest game

In this static version, the game is non-repetitive, i.e. played only once; ending – as indicated – in revolution or non-revolution. This will change in the Markovian (dynamic) version later on.

In the case of a non-revolution, the payoff for the dictator consists of the taxes he collects and the rents he receives from oil such that:

$$U^d(N, p^j, \tau^j) = \frac{1}{1-\alpha}\tau^j + p^j q$$

The payoff of citizens is simply their after-tax income:

$$U^c(N, \tau^j) = \frac{1}{1-\alpha}(1-\tau^j)$$

In the case of a revolution, citizens always win and overthrow the dictator. The dictator receives nothing, which is independent of all other variables such that:

$$U^d(R) = 0$$

The citizens receive their income $y = \frac{1}{1-\alpha}$ without paying the extractive tax but have to bear the cost of revolution $c^R(p^j) = \frac{1}{\alpha}p^j q$; hence, they fully appropriate the modern sector such that:

$$U^c(R, p^j) = \frac{1}{1-\alpha} - \frac{1}{\alpha}p^j q$$

The cost of revolution can be thought of as the cost of fighting against the dictator. The costs increase with the price of oil because, in this case, the dictator has more *de facto* power or monetary power to subdue a revolution. Furthermore, more organizational density is associated with better, and more, revolution planning capacity. The partial derivatives of the cost function with respect to p^j and α are indicative:

$$\frac{\partial c^R(p^j)}{\partial p^j} = \frac{1}{\alpha} q > 0 \text{ and } \frac{\partial c^R(p^j)}{\partial \alpha} = -\frac{1}{\alpha^2} p^j q < 0$$

Moreover, the citizens prefer low taxes:

$$\frac{\partial U^c(N, \tau^j)}{\partial \tau^j} = -\frac{1}{1-\alpha} < 0$$

The dictator prefers to have high taxes and high prices for oil, which can be seen in the derivative with respect to τ^j and p^j:

$$\frac{\partial U^d\left(N, p^j, \tau^j\right)}{\partial \tau^j} = \frac{1}{1-\alpha} > 0 \text{ and } \frac{\partial U^d\left(N, p^j, \tau^j\right)}{\partial p^j} = q > 0$$

The revolution constraint in the static game is defined as follows:

$$U^c\left(N, \tau^j\right) = \frac{1}{1-\alpha}\left(1-\tau^j\right) < \frac{1}{1-\alpha} - \frac{1}{\alpha} p^j q = U^c\left(R, p^j\right) \Rightarrow \frac{1}{1-\alpha}(1-\tau^j) < \frac{1}{1-\alpha} - \frac{1}{\alpha} p^j \Rightarrow \tau^j > \frac{1-\alpha}{\alpha} p^j$$

The dictator sets a tax according to this such that the revolution constraint is not quite binding: $\tau^j \leq \frac{1-\alpha}{\alpha} p^j$. The dictator sets the tax τ^l in non-shock situations, which is the highest possible tax level at which the citizens do not revolt, such that $\tau^l = \frac{1-\alpha}{\alpha} p$. It follows that the threshold value α^* for organizational density (which is the actual value of organizational density) is defined as $\alpha^* = \frac{p}{\tau^l + p}$. It is also the case that $\alpha = \frac{p^j}{\tau^j + p^j}$, which is the combination of all the variables external to the organizational density that exert pressure on it and reveals the levels and combinations of p^j and τ^j at which the strategy of the citizens is $\rho = 1$ (revolution).

Proposition 1

The static civil society protest game has the following unique sub-game perfect equilibrium, such that:

1) *In the case of a negative oil shock (p^l), the revolution constraint is binding regardless of which tax (τ^l or τ^h) the dictator sets.*

2) *In the case of a positive oil shock (p^h):*

   a) *if $\alpha > \alpha^*$, the dictator sets τ^l and remains in power.*

   b) *if $\alpha \leq \alpha^*$, the dictator sets τ^h and remains in power.*

Proof: See the appendix

It can be stated that for lower values of $\frac{p^j}{\tau^j + p^j}$ the citizens are more likely to start a revolution, meaning that for lower values of p^j, i.e. p^l, and higher values of τ^j, i.e. τ^l, a revolution is more likely.

Comparative Statics

A high organizational density and a negative price shock reduce the probability of the dictator setting a tax that is sufficiently low in order to buy off citizens and avert a revolution:

$$\frac{\partial \tau^j}{\partial p^j} = \frac{1-\alpha}{\alpha} > 0 \text{ and } \frac{\partial \tau^j}{\partial \alpha} = -\frac{1}{\alpha^2} < 0$$

The best-case scenario for the dictator is when p^j is in a high state, p^h, and α is low, whereby the costs of a revolution are rising. In this case, the probability is high that the dictator will set a tax that will not lead to revolution. If the dictator sets the tax τ^h and there is still no revolution, a critical $\underline{\alpha}$ can be derived. If $\alpha < \underline{\alpha}$, there will never be a revolution. The worst-case scenario for the dictator is when the cost of revolution is low, which suggests that $p^j = p^l$, and α is so high that the citizens have high organizational density.

Corollary 1

There exists a critical $\alpha \geq \bar{\alpha}$ such that the dictator cannot prevent a revolution and $\frac{p^h}{\tau^l + p^h} < \bar{\alpha} \leq \alpha$. Similarly, there exists a critical $\alpha \leq \underline{\alpha}$ such that no revolution occurs and $\frac{p^l}{\tau^h + p^l} \geq \underline{\alpha} \geq \alpha$.

Proof: See the appendix

Moreover, the significance of the oil sector may change as compared to the modern sector. The dictator can set a higher tax such that $\frac{\partial \tau^j}{\partial q} = \frac{1-\alpha}{\alpha} p^j > 0$. Revolution becomes increasingly costlier for the citizen as *q* increases.

Markovian Equilibria

As per A&R (2006, 152), in an infinite horizon the utilities of players are now defined over their discounted sums of incomes at time $t = 0$ such that $U^i = E_o \sum_{t=0}^{\infty} \beta^t y^i$ for $i = c, d$. We assume that the

stage is now repeated. This way, the players account for their possible future gains or losses in their current utilities and adjust their strategies accordingly.

The timing of the civil society protest game is therefore as follows:

1) Nature decides p_t^j, with a probability π of having a high price p_t^h;
2) The dictator selects the tax τ_t^j, being either τ_t^h or τ_t^l;
3) Citizens decide between revolution *R* and non-revolution *N*. If they select R, they have to bear the cost of revolution in period *t* but enjoy the payoff of democracy in all further periods. If they decide for *N*, the game is repeated.

We use Bellman optimization and the MPE concept. The payoff from democracy for citizens is the income they generate in the modern sector. We assume that the oil sector is destroyed in the revolution and an investment by the democratic government is necessary to rebuild it. The citizens and the dictator therefore have the following respective payoffs from democracy:

$$V^c(D) = \frac{1}{(1-\alpha)(1-\beta)}$$

$$V^d(D) = 0$$

Furthermore, the citizen payoff from revolution is the following:

$$V^c(R, p^j) = \frac{1}{1-\alpha} - \frac{1}{\alpha} p^j q + \beta\left[V^c(D)\right] \Rightarrow V^c(R, p^j) = \frac{1}{1-\alpha} - \frac{1}{\alpha} p^j q + \beta\left[\frac{1}{1-\alpha}\right] \Rightarrow$$

$$V^c(R, p^j) = \frac{1}{(1-\alpha)(1-\beta)} - \frac{1}{\alpha} p^j q$$

As stated above, the oil sector is missing in this equation due to a lack of investment for rebuilding. The payoffs for the dictator and the citizen from non-revolution have the following form:

$$V^d(N, p^j) = \frac{1}{1-\alpha}\tau^j + p^j q + \beta\left[V^d(N, p^j)\right] \Rightarrow V^d(N, p^j) = \frac{1}{1-\beta}\left[\frac{1}{1-\alpha}\tau^j + p^j q\right]$$

$$V^c(N, \tau^j) = \frac{1}{1-\alpha}(1-\tau^j) + \beta\left[V^c(N)\right] \Rightarrow V^c(N, \tau^j) = \frac{1}{(1-\beta)(1-\alpha)}(1-\tau^j)$$

The revolution constraint is therefore binding if and only if:

$$V^c(N, \tau^j) = \frac{1}{(1-\beta)(1-\alpha)}(1-\tau^j) < \frac{1}{(1-\alpha)(1-\beta)} - \frac{1}{\alpha} p^j q = V^c(R, p^j) \Rightarrow \tau^j > \frac{(1-\alpha)(1-\beta)}{\alpha} p^j$$

Revolution can be averted if $\tau^j \le \frac{(1-\alpha)(1-\beta)}{\alpha} p^j$, and so the dictator sets the highest possible tax. A threshold value $\alpha^{**} = \frac{p(1-\beta)}{\tau^l + p(1-\beta)}$ is derived. This is the actual value of the organizational density of the

civil society that makes the citizen indifferent between revolution and status quo preservation such that $\alpha = \frac{p^j(1-\beta)}{\tau^l + p(1-\beta)}$, which is the combination of the variables that exert external pressure on the organizational density.

Proposition 2

In the civil society protest game there exists a Markov-perfect equilibrium, such that:

1) *In the case of a negative oil shock (p^l), the revolution constraint is binding such that there is a revolution regardless of which tax (τ^l or τ^h) the dictator sets.*
2) *In the case of a positive oil shock (p^h):*
   a) *if $\alpha > \alpha^{**}$, the dictator sets τ^l and remains in power.*
   b) *if $\alpha \leq \alpha^{**}$, the dictator sets τ^h and remains in power.*

Proof: See the appendix

Proposition 2 and the reasoning behind it are in the same direction as those used by Olson (1993). Olson (1993, 568) distinguishes between roving and stationary bandits who both exploit and repress citizens. However, whereas the roving bandits leave few incentives for the citizens to invest in production and the economy, the stationary bandits have an interest in a well-functioning economy and give the citizens incentives to increase productivity. In this way, a stationary bandit maximizes his wealth. Unsurprisingly and in line with this work, the stationary bandits are the dictators (Olson 1993: 569). The differentiation of Olson (1993, 568) between roving and stationary bandits can be transferred to non-consolidated and consolidated dictatorships in this model. The assumption that in discontinuous societies (frequent regime changes) the evaluation of the political state of society looks like that in proposition 2 is, however, debatable. It is quite conceivable that proposition 1 has to be considered again for these regimes.

Comparative statics

A high α, a high β and a low p^j (i.e. p^l) make it more likely that the dictator is not able to buy off the citizens with a low tax to avert revolution. The partial derivatives are the following:

$$\frac{\partial \tau^j}{\partial p^j} = \frac{(1-\alpha)(1-\beta)}{\alpha} > 0$$

$$\frac{\partial \tau^j}{\partial \alpha} = -\frac{1}{\alpha^2}(1-\beta)p^j < 0$$

$$\frac{\partial \tau^j}{\partial \beta} = -\frac{(1-\alpha)}{\alpha}p^j < 0$$

With an increase in α or an increase in β the dictator has to set a lower tax to avert a revolution. However, an increase in p^j enables the dictator to set a higher tax without facing a credible threat of revolution.

Corollary 2

There exists a critical $\alpha \geq \overline{\overline{\alpha}}$ *such that the dictator cannot avert a revolution and* $\frac{p^h(1-\beta)}{\tau^l + p^h(1-\beta)} < \overline{\overline{\alpha}} \leq \alpha$. *Similarly, there exists a critical* $\alpha \leq \underline{\underline{\alpha}}$ *such that no revolution occurs and* $\frac{p^l(1-\beta)}{\tau^h + p^l(1-\beta)} \geq \underline{\underline{\alpha}} \geq \alpha$.

Proof: See the appendix

A negative oil shock will always lead to a revolution because this is a less costly choice for citizens and the dictator can make no credible offer to prevent it from happening. Only if there is a positive oil shock can the dictator increase his extraction rate over the economy.

The Civil Society Persecution Game

It has already been made clear that civil society can be considered to be a threat to the dictator who, in turn, intends to restrict this *foreign agent*. We consider the subgame starting from the low state p^l, when the *de facto* power of the dictator is reduced due to low oil revenues. Therefore, the assumption that the citizens always win a revolution if they start it is dropped. We introduce the probability $\sigma \in (0,1)$ of winning a revolution for citizens. Moreover, the dictator does not have to select an extractive tax, but to decide on the imposition of persecution of citizens who revolt but fail. The strategy of the dictator changes to $\sigma^d = S : [0,1] \rightarrow \{0,1\}$, where $S = 1$ indicates persecution (*S* for sanction) and $S = 0$ indicates non-persecution after a failed revolution.[3] The tax is always set at τ^l because, as seen earlier, a higher tax rate makes a revolution more likely and this is what the dictator intends to avoid. This timing of events is now the following (figure 2):

1) Nature decides on a negative oil shock, resulting in p^l.
2) The dictator decides whether he will persecute a failed revolution (*S=1*) or not (*S=0*).
3) The citizens decide on revolution *R* or non-revolution *N*.
4) If the citizens decide on *R,* then they win the revolution with a probability of σ.

[3] A&R (2006, 133) observe that the ruling elite promises improvements to the poor citizens; however, this can also be treated in negative terms, namely that the ruling elite promises to persecute defiant behavior by citizens. A&R (2006, 186) also propose a model of repression, which has functioned as an inspiration for this model.

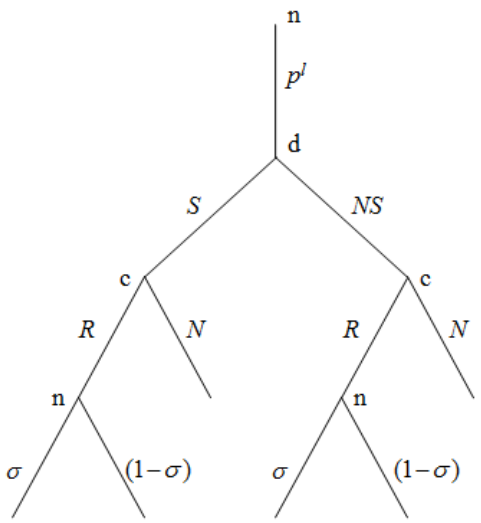


Figure 2: the civil society persecution game

In the occurrence of persecution and failed revolution, the respective payoffs for the citizen and the dictator are as follows:

$$U^c(S=1)=0$$

$$U^d(S=1)=\frac{1}{1-\alpha}-c(S)+p^l q$$

where $c(S)$ denotes the cost of persecution. This persecution may include total appropriation of the citizens' income by the dictator. If σ is interpreted as the share of the citizens engaged in revolution such that the probability of a successful revolution increases with the number of participating citizens, the interpretation of persecution as brutal physical force becomes more realistic. Nevertheless, the dictator has to think about declining tax revenues now paid by only a share of $1-\sigma$ citizens.[4] It is also assumed that $U^c(S=0,\tau^l)=U^c(N,\tau^l)$, with the result that the citizens keep their after-tax income. All other payoffs remain the same. The revolution constraint is set up as follows:

$$U^c(N,\tau^l)<\sigma U^c(R,p^l)+(1-\sigma)U^c(S=1)$$

Alternatively, if the dictator does not want to punish the citizens, the revolution constraint changes to $U^c(N,\tau^l)<\sigma U^c(R,p^l)+(1-\sigma)U^c(S=0,\tau^l)$. It is obvious that the strategy not to punish the citizens results in the same outcome as in the first game (proposition 1). This is due to the assumption that

[4] The dictator has to identify the tradeoff between persecution and non-persecution such that: $\sigma U^d(R)+(1-\sigma)U^d(S=1)>\sigma U^d(R)+(1-\sigma)U^d(S=0,\tau^l)$. Assuming $U^d(S=1)=\frac{1}{1-\alpha}-c(S)+p^l q$ and $U^d(S=0,\tau^l)=\frac{1}{1-\alpha}\tau^l+p^l q \Rightarrow c(S)<\frac{1-\tau^l}{1-\alpha}$ indicates that the dictator will persecute citizens-revolutionaries when this condition holds. But since refraining from persecution will always lead to revolution in the case of p^l (which can be seen in the revolution constraint for the citizens), the dictator has no other chance than to persecute or to give up.

$U^c(S=0,\tau^l)=U^c(N,\tau^l)$. Hence, $U^c(N,\tau^l)<\sigma U^c(R,p^l)+(1-\sigma)U^c(N,\tau^l)$, which suggests that the revolution constraint is the same as in the initial game, $U^c(N,\tau^l)<U^c(R,p^l)$. The more interesting part is when the dictator decides to persecute. The revolution constraint can be written as $\frac{1}{1-\alpha}(1-\tau^l)<\sigma\left[\frac{1}{1-\alpha}-\frac{1}{\alpha}p^l q\right]\Rightarrow\frac{\sigma p^l}{\sigma p^l+\sigma+\tau^l-1}<\alpha$, which implies that $\frac{\sigma p^l}{\sigma p^l+\sigma+\tau^l-1}=\alpha^{***}$. This α^{***} can be interpreted as the pressure of all the variables combined that are external to the citizen and that challenge the organizational density of the civil society. For simplicity, it is assumed that $1<\sigma+\tau^l$. Given that $\alpha^*=\frac{p}{\tau^l+p}$ because we assume that the probability of winning a revolution has no influence on the actual value of the density of civil society, we observe that if $\alpha^{***}>\alpha^*\Rightarrow\frac{\sigma p^l}{\sigma+\tau^l+\sigma p^l-1}>\frac{p}{\tau^l+p}\Rightarrow\sigma<\frac{p^l\tau^l-p}{p^l\tau^l-p}$. Thus, we can conclude that for all values of σ for which $\sigma<\frac{p^l\tau^l-p}{p^l\tau^l-p}$ holds, citizens will decide on non-revolution, because this σ, in turn, influences the size of the combined external pressure α^{***}

Proposition 3

The static civil society persecution game has a unique sub-game perfect equilibrium, such that:

1) *If the dictator decides not to persecute citizens after a failed revolution* $(\sigma^d=\{S=0\})$, *a revolution occurs.*
2) *If the dictator decides to persecute citizens after a failed revolution* $(\sigma^d=\{S=1\})$, *then:*

   a) for $\frac{1-\tau^l}{1+p^l}<\sigma<\frac{p\tau^l-p}{p^l\tau^l-p}$, *such that* $\alpha^{***}>\alpha^*$, *the strategy of the citizens is N, such that* $\sigma^c=\{N\}$

   b) for $\frac{1-\tau^l}{1+p^l}<\frac{p\tau^l-p}{p^l\tau^l-p}<\sigma$, *such that* $\alpha^{***}\le\alpha^*$, *the strategy of the citizens is R, such that* $\sigma^c=\{R\}$

Proof: See the appendix

Comparative Statics

Taking the derivatives of τ^l with respect to σ, p^l and α, we find:

$$\frac{\partial\tau^l}{\partial\sigma}=\frac{p^l}{\alpha}-1-p^l<0$$

$$\frac{\partial\tau^l}{\partial p^l}=\frac{\sigma}{\alpha}-\sigma>0$$

$$\frac{\partial\tau^l}{\partial\alpha}=-\frac{\sigma p^l}{\alpha^2}<0$$

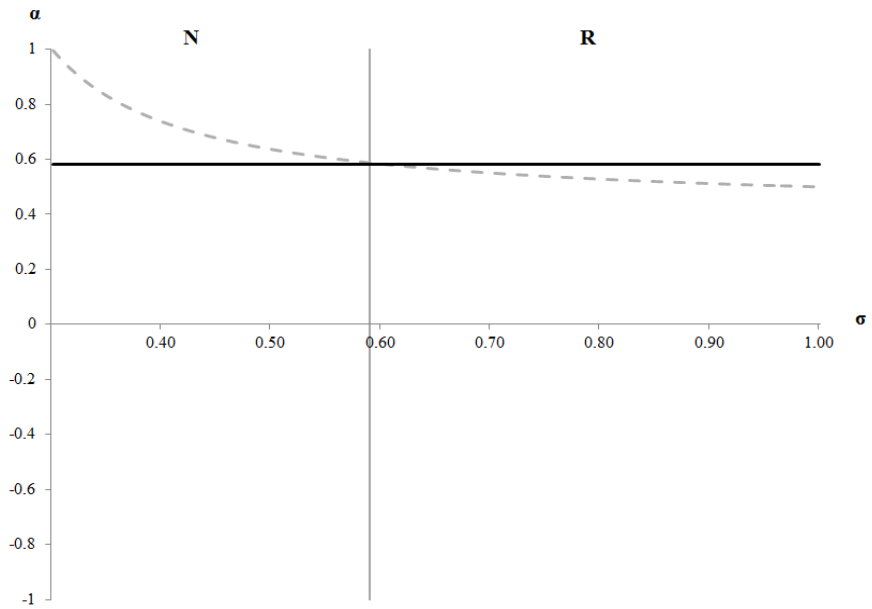
If the probability of a successful revolution increases, the dictator has to decrease the tax rate to prevent revolution; however, he can increase the tax rate for increasing values of p^l. Moreover, with increasing levels of the organizational density of civil society, the dictator has to decrease the tax rate if he wants to prevent revolution. An increase in the quantity q has the same effect in this model as in the first model. To see this, one has to solve the revolution constraint for the tax rate $\tau^l = 1 - \sigma\frac{1}{pq} + \sigma\frac{1-\alpha}{\alpha}\frac{p^l}{p}$ and take the first derivative with respect to q such that $\frac{\partial \tau^l}{\partial q} = \sigma\frac{1}{pq^2} > 0$.

Corollary 3

The extractive tax set by the dictator is monotonically decreasing with the probability of persecution.

Numerical Example

Figure 3 depicts the equilibria for the citizens in the $[\alpha, \sigma]$-space, where the organizational density is a function of σ (dashed light grey line) and the reference value is assumed to be $\alpha^* = \frac{p}{\tau^l + p} = 0.58$ (solid black line)[5], $p^l = 0.7$ and $\tau^l = 0.7$. These values yield the threshold of $\frac{p\tau^l - p}{p^l\tau^l - p} \approx 0.59$ (thin light grey line).



[5] $\alpha < 0.66$ is considered a low value for the organizational density. Values for the network density can be found in Kim & Bearman (1997: 88).

Figure 3: equilibria in the [a, σ] space

Markovian Equilibria

We introduce the following Bellman payoffs in the civil society persecution game for the dictator and the citizens:

$$V^c(S=0,\tau^l)=V^c(N,\tau^l)$$
$$V^d(S=0,\tau^l,p^l)=V^d(N,\tau^l,p^l)$$
$$V^c(S=1,p^l)=0$$
$$V^d(S=1,p^l)=\frac{1}{1-\beta}\left[\frac{1}{1-\alpha}-c(S)+pq\right]+q\left(p^l-p\right)$$

Therefore, the revolution constraint has the following form:[6]

$$V^c(N,\tau^l)=\frac{1}{(1-\alpha)(1-\beta)}(1-\tau^l)<\sigma\left[\frac{1}{(1-\alpha)(1-\beta)}-\frac{1}{\alpha}p^l\right]+(1-\sigma)0=V^c(R,p^l)\Rightarrow$$
$$\frac{1}{(1-\alpha)(1-\beta)}(1-\tau^l)<\sigma\left[\frac{1}{(1-\alpha)(1-\beta)}-\frac{1}{\alpha}p^l\right]\Rightarrow\alpha>\frac{\sigma p^l(1-\beta)}{\sigma+\tau^l+\sigma p^l(1-\beta)-1}\Rightarrow\tilde{\alpha}=\frac{\sigma p^l(1-\beta)}{\sigma+\tau^l+\sigma p^l(1-\beta)-1}\Rightarrow$$
$$\tilde{\alpha}>\alpha^{***}.$$

Whereas $\tilde{\alpha}$ describes the combination of external pressures for this dynamic version of the game, α^{***} has this definition in the static part of the game. We take α^{**} as the actual value of organizational density, as was the case in the first dynamic game, and compare the external pressure to the actual value.

<u>Proposition 4</u>

In the civil society persecution game there exists a Markov-perfect equilibrium, such that:

1. *If the dictator decides not to persecute citizens after a failed revolution* $(\sigma^d=\{S=0\})$*, proposition 2 applies, i.e. there will be a revolution.*
2. *If the dictator decides to persecute citizens after a failed revolution* $(\sigma^d=\{S=1\})$*:*
   a. *for* $\frac{1-\tau^l}{1+p^l(1-\beta)}<\sigma<\frac{p\tau^l-p}{p^l\tau^l-p}$*, such that* $\tilde{\alpha}>\alpha^{**}$*, the strategy of the citizens is N, i.e.* $\sigma^c=\{N\}$
   b. *for* $\frac{1-\tau^l}{1+p^l(1-\beta)}<\frac{p\tau^l-p}{p^l\tau^l-p}<\sigma$*, such that* $\tilde{\alpha}<\alpha^{**}$*, the strategy of the citizens is R, i.e.* $\sigma^c=\{R\}$

Comparative statics

[6] The revolution constraint in the case of no persecution is not shown since it will be identical to the one developed in the civil society protest dynamic game.

We take the derivatives of τ^l with respect to σ, p^l, α and β:

$$\frac{\partial \tau^l}{\partial \sigma} = \frac{p^l(1-\beta)}{\alpha} - 1 - p^l(1-\beta) < 0$$
$$\frac{\partial \tau^l}{\partial p^l} = \frac{\sigma(1-\beta)}{\alpha} - \sigma(1-\beta) > 0$$
$$\frac{\partial \tau^l}{\partial \alpha} = -\frac{\sigma p^l(1-\beta)}{\alpha^2} < 0$$
$$\frac{\partial \tau^l}{\partial \beta} = \sigma p^l \frac{1+\alpha}{\alpha} > 0$$

The results reflect those of the static game to the extent that an increase in σ or α implies that the dictator has to reduce the tax rate in order to stay in office. An increase in p^l or β has the opposite effect: the dictator increases the tax rate if the price of oil increases. This is because this increases the cost of revolution for the citizens whereas the first-mentioned effect decreases those costs. Since σ has not changed, the conclusions in the comparative statics part of the static game apply to σ from proposition 4. In contrast to the static persecution game, we see that $\tilde{\alpha} > \alpha^{***}$, with the result that the bound to be exceeded for revolution for the actual organizational density of civil society (α^*) becomes higher, i.e. more difficult to reach and the dictator is more likely to stay in power.

III. Historical & Contemporary Illustrations: Iran, Soviet Union/Russia & Egypt

Iran, the Soviet Union/Russia and Egypt were non-democracies before their respective major revolutions in 1978-79, 1989-91 and 2011 and their economies are heavily dependent on natural resource revenues. Considering the Polity IV data, which systemizes countries according to their state of political regime with a ranking from -10 (autocracy) to +10 (full democracy), Iran scored the lowest value of -10 during the Pahlavi era and then scored -6 directly after the revolution (Polity IV Project 2014b). It is also the second largest producer of oil in the world, maintaining 10% of proven reserves, while oil accounted for an average of 20% of Iran's GDP between 1970 and 2006 (Farzanegan and Markwardt, 2009: 134). Furthermore, about 90% of total export earnings and 60% of annual government revenues are generated by oil export revenues (ibid.).

Wintrobe (1998: 7-11) classifies the Soviet Union as a totalitarian dictatorship in which repression of the population and control of the economy by bureaucrats were the main pillars of the state. In the Polity IV Index, the Soviet Union scored -7 or less during most of its existence and received

a score of 0 in the late-1980s (Polity IV Project 2014c) when regime change was already on its way. Since the collapse of the Soviet Union, Russia has scored between 3 and 6, only obtaining the rating of a democracy between 2001 and 2007, but having a score of 4 since 2008, which classifies the country as a semi-authoritarian regime (ibid.). As Ahrend (2005: 595) notes, Russia's natural resource exports made up 55% of total exports in 2004. Moreover, the description resource abundant applies to the Soviet Union, with rents from extraction of oil reaching a maximum in 1981 when they accounted for over 40% of GDP (Gaddy and Ickes 2005: 562).

Egypt is also treated as an autocracy, constantly scoring below zero on the Polity IV Index – namely ranging between -6 and -7 between 1954 and 2005 since the rule of Nasser (1954-1970) (Polity IV Project 2014a). Its score rose to -3 in 2005 (Polity IV Project 2014a) when there was a constitutional amendment which paved the way for multi-candidate elections for the office of president (Adly 2011: 304), but it has been decreasing again since 2013 (Polity IV Project 2014a). While Egypt has been classified by Ross (2012: 59) as an oil-poor economy when compared to Iran, Springborg (2012: 295) ascertains that oil and gas exports accounted for up to a quarter of government revenues from 1986 to 2006.

Figure 4 shows the development of yearly average levels of oil production of the three countries and the oil price path from 1973 to 2014.[7]

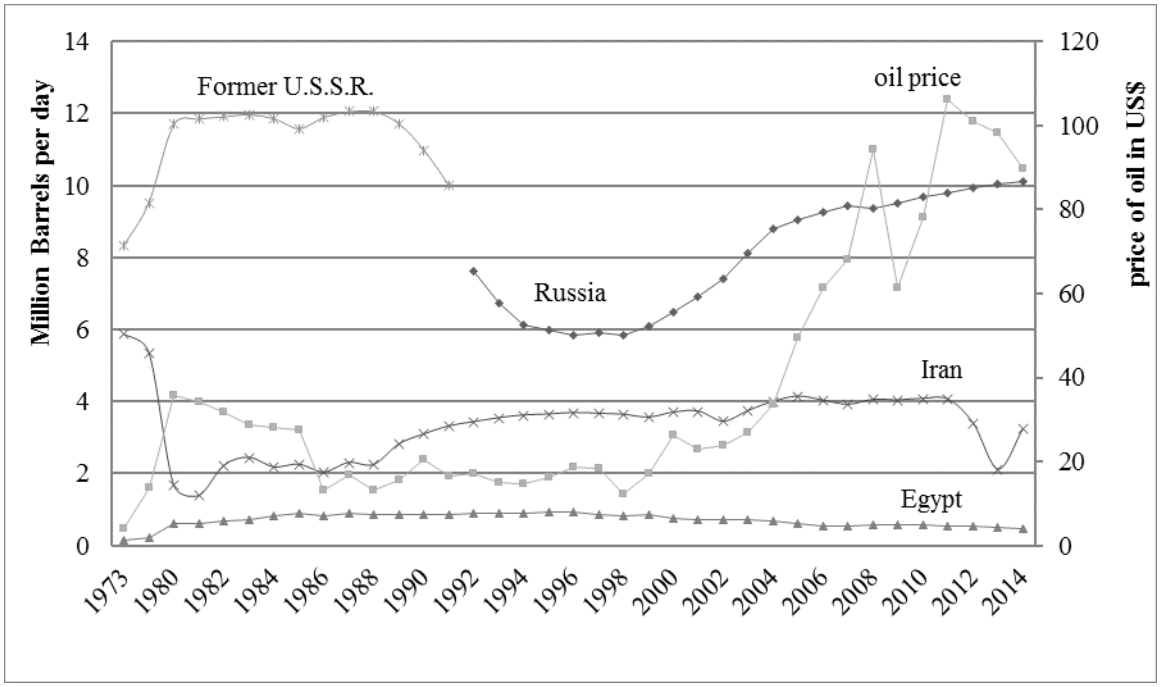


Figure 4: oil production in Iran, Russia and Egypt & price of oil from 1973-2014

[7] Data is missing from the years 1974 and 1976-1979.

Source: U.S. Energy Information Administration (2016c), 133 & 166-167 and BP (2015), 15.[8]

Iran

The White Revolution of the Shah aroused a clergy-led opposition (including Ayatollah Khomeini) in Qum to preach in religious schools against the Shah and start demonstrations with students against failed land reform and the regime's connection with the United States. Demonstrations spilled over to other universities and cities and lasted for a couple of days until they were violently crushed with hundreds of people losing their lives (Keddie 1981, 157-158). Therefore, authors such as Ashraf (1988, 550) see these urban demonstrations in 1963 as a preface to the revolution in 1979.[9] However, based on this, it is puzzling why this uprising was not successful and why there was no successful revolution before the one in 1979. Bearing in mind the previously developed model, one could argue that the increased military and security capabilities that were available due to the increased oil rents would have led to unbearable costs of revolution for the citizens. However, due to the even higher military expenditure in 1977, this would be counterintuitive.

Nevertheless, the arrest and killing of regime critics and opponents reflects the tradeoffs of the civil society persecution game. Kamrava and O` Mora (1998: 903) state that traditionally there have been three civil society institutions in the Middle East: *ulama* (recognized religious scholars and authorities), tribes and tribal confederacies, and the *bazaaris* (traditional merchants). Smith (2003: 186) points out that formal structures may lead to the successful organization of movements in democratic systems but informal networks hold much more importance in non-democratic systems because they do not involve government repression. The bazaar is such an informal system of networks in pre-revolutionary (as well as in post-revolutionary) Iran (ibid.). Skocpol (1982: 271) identifies the bazaar as the center of urban life in Iran. Ashraf (1988: 538-539) notes that the bazaar together with the mosque was the place for the development of social networks outside family ties. During all the demonstrations, urban uprisings and the weakening of institutions in the Pahlavi dynasty the bazaar endured and withstood government threats (Smith 2003: 185; Ashraf 1988: 544). In addition to the existence of informal communication norms, the bazaar had its own credit and internal mediation system where the individual reputation of each bazaari was crucial (Smith 2003: 193). This is why the bazaar is a perfect specification for the

[8] From 1980-2011 the data for the spot price of crude oil is taken from BP (2015, 15) (brand: Dubai; dollar/barrel). Due to a gap in the data of BP (2015) the values for the oil price from 1973, 1975 and 2011-2014 are estimated to be close to the refiner acquisition costs from U.S. Energy Information Administration (2016c: 133) since they resembled the BP (2015) data quite well for the rest of the time series.

[9] Speaking about a preface to revolution it is hard to maintain the MPE theory insofar as only the current state of the game is considered for equilibrium strategies.

modern sector of the economy, where higher organizational density means better business and more income.

Skocpol (1982) and Ashraf (1988) underscore the linkages between the mosque and the bazaar in Iran. As Ashraf (1988: 541) points out, the bazaaris traditionally had strong connections with the non-officially appointed *ulama*. The geographical structure of a traditional Islamic town stresses the connection between the bazaar and the mosque on the basis of pure proximity. Both institutions are organizations of communal character. Moreover, the ulama was dependent on the financial support of the bazaar (Ashraf 1988: 541-542). It was possible for wealthy bazaaris to close down their shops during the demonstrations and therefore show not only citizens but also the regime on which side they were standing (ibid: 558). The bazaaris, the ulama and student activists formed the "triangle of revolutionary coalition" (ibid: 554). According to Smith (2003: 186), the religious leaders of the revolution were able to use the communication networks of trust and cooperation in the bazaar for the purposes of religious revolution.

Events after 1973-74 explain why the Iranian oil sector was a pitfall for the government despite the observed oil price increase (see figure 4). Both in 1975 – the year of the Qum protests – and in 1978 – when the Islamic Revolution started – the economy of Iran was in recession (Kurzman 2003: 295). Abrahamian (1980: 25) proposes that there was spiraling inflation between 1975 and 1977, which the state was not able to control. Unfortunately, there are no reliable statistics for this matter due to concerns about political manipulation (Kurzman 2003: 296). Nevertheless, a comparison of different statistical sources with respect to real GDP per capita allow the conclusion that the economy went through recession after the oil boom years of 1973 and 1976. Falling from 11.6% in 1973 to 3.0% in 1974 and then to -2.0% in 1975, the real GDP per capita increased again to 11.4% in 1976 but decreased to -6.5% in 1977 (Penn World Tables 1994, also cited in Kurzman 2003: 296).[10] In addition, figure 5 shows Iran's GDP per capita compared to oil prices from 1977 to 2000, where the movement of the former variable seems to be linked to the latter.

[10] Kurzman (2003: 296) cites in his work two more sources (the Central Bank of Iran and the International Monetary Fund). Both those sources are in the same direction as the Penn World Tables, even if the Central Bank of Iran provides much more positive estimations than the other two sources.

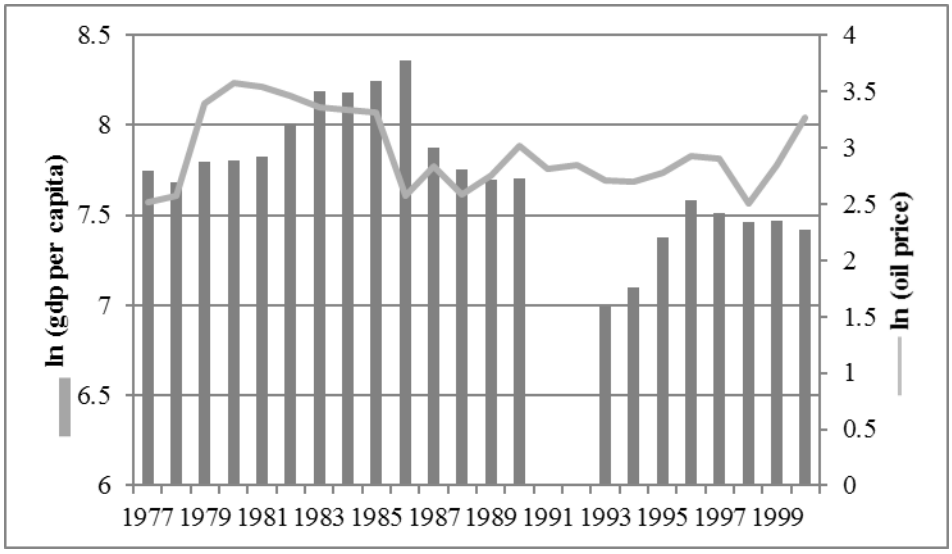


Figure 5: Iran's GDP per capita[11] and oil price, 1977-2000

Source: Farzanegan and Markwardt (2009: 135), with data from BP (2015, 15) and World Bank (2016).

Soviet Union/Russia

Without knowing what would happen in 1991, Gustafson (1989: 136) pointed out that an oil crisis would occur in the 1990s if the Soviet government did not modernize the oil sector. Easterly and Fischer (1995: 345-346) ascertain that the performance of the Soviet economy, conditional on investment and human capital, was at the bottom of world rankings for the period between 1960 and 1980, being even worse than the performance of poor and small states such as Jamaica, Suriname and Zambia. As a reason for this slowdown, they identify the diminishing returns to capital accumulation with a low substitutability of capital for labor. By testing for Granger causality with data from 1918 until 2003, Reynolds and Kolodziej (2008: 279) suggest that a decline in oil production led to a recession in the Soviet and Russian economies. As Gustafson (1989: 9) notes, even though the Soviet Union was one of the few industrial states that was independent in its energy supply, it was plagued by shortages which were accompanied with massive spending to maintain an inefficient system. The reserve pyramid of Russian oil from 1958 to 2000 indicates that the share of proven reserves in all the explored reserves heavily decreased from 69.5% in 1960 to 27.3% in 1986 (to only 26.5% in 2000); however, the number of oil fields increased during the same time from 408 to 2,349 (Dienes 2004: 328). This investigation is a strong argument for the inefficient management of resources rather than insufficient sources for oil production being the cause of this.

[11] In current US dollar; Data for 1991 and 1992 is missing in the source.

Jakobson et al. (2001: 16) describe the time of development of the civil society from October 1917 until the mid-1980s as marking an expansion in civil society organizations in all areas where there was a lack on the side of the state, such as trade unions or scientific organizations. In addition to art, cultural and scientific organizations, including the well-known Russian Geographical Society, there were local movements for peasants and the non-elite population, providing welfare to poorer members of society (Buxton and Konovalova 2013: 774-775). However, the state used these mass organizations for repression purposes and they became part of the government machine (Buxton and Konovalova 2013: 775). Therefore, a civil society independent of the state was difficult to find in the formal socio-economic system of the Soviet Union. From our model's perspective, while the financial situation of the oil sector deteriorated, the organizational density of civil society was ambivalent. On the one hand, it was used by the Party as a control mechanism (see Havel & Wilson (1985-86)) and, on the other hand, it was strengthened through cooperation in the gray/black market and facilitated higher levels of education. The improvement in possibilities for communication and information can be interpreted as raising levels of α. Furthermore, Suny's (1993: 154-155) argument that Gorbachev's "[…] 'revolution-from-above' [moved] to a massive, multinational series of revolutions from below" can also be interpreted as an uprising of civil society.

After the collapse of the Soviet Union, civil society in Russia was necessary in order to survive the deteriorated living standards, as Russian real per capita income decreased by 42% between 1988 and 1993 (Milanovic 1998: 34). Self-help groups, associations for disadvantaged people and charitable organizations were founded with the help of preferential policies (Jakobson et al. 2011: 17). In April 2006, a law named "On Introducing Amendments into Certain Legislative Acts of the Russian Federation" (Non-governmental organization (NGO) law) was passed; besides higher administrative costs due to expanded registration facilities, the state gained more control over NGOs by demanding mandatory audits and having the possibility to send representatives to NGO meetings. After some amendments, the law has been called the *foreign agent* law since 2012 because NGOs receiving foreign financial help or donations have to provide a report every three months. The official argument behind the law is to preserve Russian sovereignty by restricting the influence of Western foreign funding (Crotty, Hall and Ljubownikow 2014: 1254). Crotty, Hall and Ljubownikow (2014: 1255) distinguish between controlled organizations that do not represent civil society, grassroots organizations that are locally based and only have voluntary staff and traditional organizations that have paid staff and are funded from abroad. The new law undermined the viability of traditional NGOs, while it facilitated the emergence of more government-controlled civic institutions.

Nevertheless, Russian civil society has been able to mobilize. After State Duma elections in 2011, there were nonviolent demonstrations against fraudulent intervention of the state (Aron 2013: 62). The citizens see protests as an expression of the rejection of the current political system (ibid.: 63). The demonstrations not only took place in Moscow and St. Petersburg, but also spilled over to more than 100 cities and towns in late 2011 and early 2012 (ibid.: 66).[12] The authorities reacted to these demonstrations with persecution, charging 27 of the opposition leaders, three of whom were placed under house arrest (Lanskoy and Suthers, 2013: 81; Enikolopov, Makarin and Petrova, 2016).[13]

Domjan and Stone (2010: 39) identify Russia's strategy in the energy sector as resource nationalism; the oil price has been falling since 2014 due to a slowdown in the growth of major industrial countries as well as emerging markets such as China. Furthermore, there is a steady depreciation of the Russian ruble against the US dollar and the Euro (Dreger, Kholodilin, Ulbricht and Fidrmuc, 2016: 2). Even if Dreger et al. (2016: 11) do not find that the economic sanctions of the United States and the European Union significantly change the trend of the ruble, it cannot be claimed that these sanctions do not have an influence on the macroeconomy. The main factor in the exchange rate of the ruble is identified by Dreger et al. (2016: 10-11) to be the oil price: in an impulse-response function, the oil price can explain 8% of the behavior of the ruble after five days and 12% after one month. While Dreger et al. (2016, 2) evaluate the currency losses and the decline of the oil price as being negative for the Russian economy, the recent rise in oil production may counterbalance these developments.

Egypt

Economic dependence on natural resources is not as obvious for Egypt as it is for Iran and Russia. Figure 6 depicts the development of oil production and consumption in Egypt between 1980 and 2013.

[12] In his presidency from 2000-2008, Putin's approval from the citizens was at least 60%, reaching as high as 87% at times (Treisman 2011: 590). Treisman (2011: 595) explains Putin's popularity scores with the economic performance of the country during his reign.

[13] These protests of 2011 are just a mere example. Indeed, there were protests before and after Putin's first reelection. For detailed information about those and other protests in Putin's Russia please, for example, refer to Robertson (2009) who also reports about ersatz social movements that are coordinated by the regime.

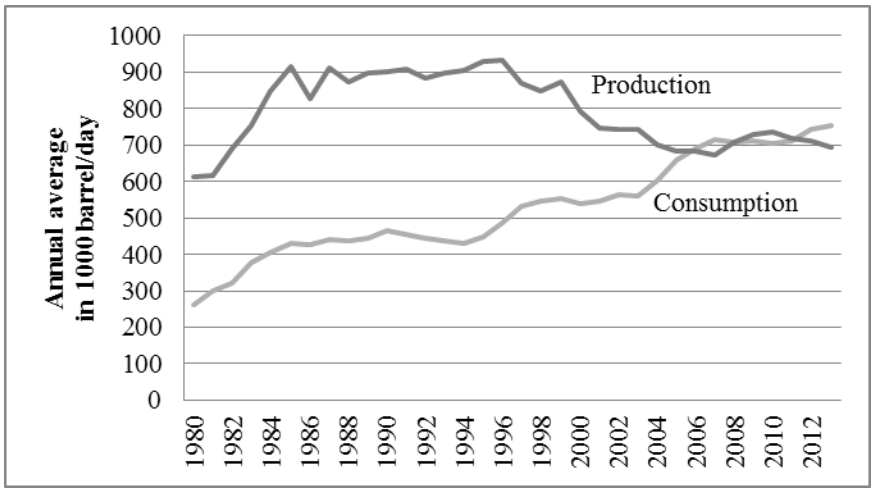


Figure 6: oil production and consumption in Egypt, 1980-2013

Source: U.S. Energy Information Administration (2016b).

The declining trend in oil production since 1996 becomes apparent, whereas there is a steady increase in consumption. Finally, oil consumption (689,000 barrels/day) exceeded oil production (683.000 barrels/day) in 2006, making Egypt a net oil importer. According to this data, the production of oil decreased by 23% from 1996 to 2011 (year of revolution) whereas at the same time the consumption of this resource increase by 46%. This is in line with the observations of Adly (2011: 295), who states that while 9.5 million tons of oil were exported in 1993/94, this number decreased to 2.9 million in 1998/99 and state revenues generated by oil trading fell from 11% of total revenues in 1990 to only 2% in 2000. This development and the low oil prices contributed to the decline in total exports by about 2.5% between 1990 and 1999 (Adly 2011: 295). At the same time, the natural gas sector has expanded since the late 1990s, as is depicted in figure 7.

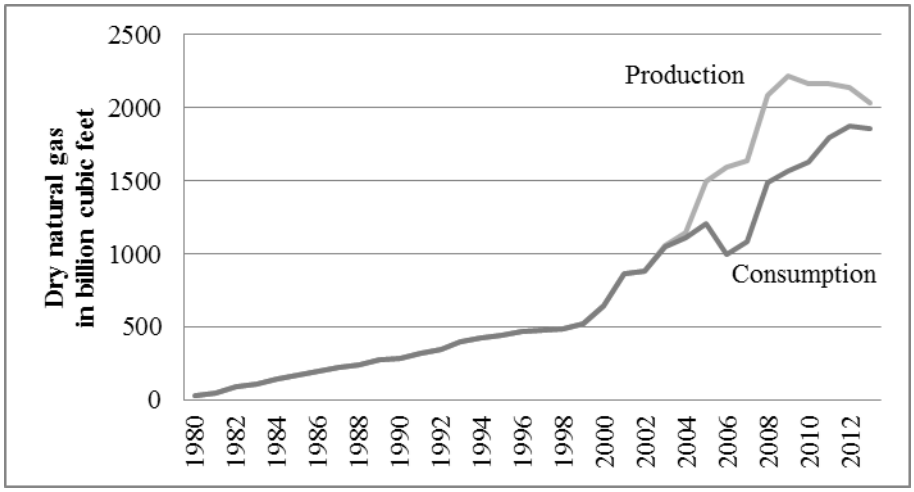


Figure 7: dry natural gas production and consumption in Egypt, 1980-2013

Source: U.S. Energy Information Administration (2016a).

Springborg (2012, 296) confirms that not only has the production of natural gas clearly increased since 2000, but the consumption of gas has also increased by 10.8% annually in Egypt since 2000. Nevertheless, the increase in gas production could at least partly balance out the decrease in oil production in times of growing energy consumption. According to the data depicted in figure 7, gas production decreased by 2% from 2009 (the point of highest production) to 2011 (the year of revolution). At the same time, gas consumption increased by 14%. Calculating the growth rate of the production available for the export of gas, i.e. the growth rate of the difference between production and consumption, the trend in this natural resource becomes even more apparent. Whereas there were 647 billion cubic feet of gas available for export in 2009, this number decreased to 371 billion cubic feet in 2011, which results in a growth rate of -43%.

Khallaf and Tür (2008, 128) write that two historical developments were responsible for shaping the character of the Egyptian civil society: the 1952 revolution and Sadat's *infitah*[14] policies during the 1970s along with the Mubarak regime and its dual strategy of restrictive openness. Both events contributed to forming a civil society sector that was highly skewed towards service delivery (Khallaf and Tür 2008: 128). This focus seems to be necessary considering that 40% of the population is living on less than 2 dollars a day (Herd 2011: 2). Moreover, the Mubarak regime constantly cut the direct subsidies for food and other basic needs from about 12.2% in 1990 to about 5.2% in 2000 from total expenditures (Adly 2011: 303).

This Mubarak repression system was enabled and expanded due to the circumstance that Egypt had constantly been under emergency law since 1981, which was justified by Mubarak to protect the citizens from terrorism (Reza 2007: 533 and 544).[15] The law enabled the government to order surveillance and censorship, to confiscate any kind of property and to prohibit participation in movements or other kinds of assemblies.[16]

However, civil society had already diminished before Mubarak's regime. Although Langohr (2004: 182) states that the Egyptian voluntary associational sector is one of the oldest in the Arab world, the Nasser regime had passed a law that heavily increased its control over voluntary associations (law 32 of 1964). The Mubarak government declined this support and introduced law 153 in 1998 that granted organizations that were not politically active more liberties and enhanced the possibilities of

[14] "'*Infitah*' is an Arabic word meaning 'open door' and refers to Sadat's policies of 'opening the door'to private investment in Egypt." (Khallaf and Tür 2008: 141)

[15] The emergency law expired in 2012, but was temporarily reimposed in 2013 (Bhuiyan 2015: 499).

[16] As Reza (2007, 545) points out, the state intended to suppress the Muslim Brotherhood in particular. However, Reza (2007, 545) also states that it is uncertain whether emergency law could counteract terrorism or whether terrorism was a consequence of the repression under the law.

these groups to fund themselves domestically. At the same time, it restricted oppositional organizations even more than before because the Ministry of Social Affairs was now able to dissolve these organizations. The ministry had also to give its permission before a civic organization could receive foreign financial support (Langohr 2004: 194). This is similar to the Russian *foreign agent* law. The organizations concerned expressed their discontent openly and achieved a redrafting of the law, which was then revoked before the law passed on May 25, 1999 (Langohr 2004: 196-197). Furthermore, numerous civic organizations were co-opted by the regime, such as the Egyptian Trade Union Federation, (Abdelrahman 2012: 616-617). Thus, workers were prevented from forming unions to strengthen their positions against their employers and the state. Nevertheless, tax collectors could establish the first independent trade union in 2009 (ibid.: 619).[17]

Formal structures of legal opposition such as protecting the citizens against the regime were –as already seen in the analysis of Iran and Russia – repressed under emergency law and could only emerge in the declining period of Mubarak's regime. Once more, the formation of informal structures became important. In 2004, before the presidential referendum for Mubarak's fifth term in office in 2005, two grassroots movements, Popular Campaign for Change (Freedom Now) and Egyptian Movement for Change using the slogan *Kifaya* (Enough!), became active in protests against the government. *Kifaya* became known for demanding the end of Mubarak's regime. Two network groups organized and announced the mass protest on January 25 – the national Egyptian police day – on their Facebook pages and over 80,000 Facebook users supported the event by agreeing to participate (Omotola 2012: 716). Moussa (2015: 786) indicates that free access to information, as provided by the Internet, helps to develop democratic structures within civil society. Lynch (2011: 302) states that social media and other forms of new informational structures, such as satellite television, certainly contribute to citizen mobilization by lowering transaction costs, breaking informational barriers and allowing space for opinion expression.

Two and a half years later, on June 30 2013, Egyptian citizens demonstrated again, this time against the Morsi regime. These demonstrations were organized by the National Salvation Front, an alliance of political parties and groups opposed to Morsi and the Muslim Brothers, as well as *Tamarrod* (rebellion), a grassroots movement to depose Morsi because he had failed to lead the Egyptian economy

[17] The Muslim Brotherhood defines itself as a political organization that wants to influence parliamentary politics and Islamic business. Furthermore, the penetration of civil society and social institutions belongs to its strategy (Duval-Leroy 2007: 6). Moussa (2015: 789) suggests that the youth of the Muslim Brothers were engaged in the demonstrations of 2011. Even though the Muslim Brothers are the main political opposition in Egypt and were members of parliament under Mubarak, they were also repressed by the regime of Mubarak (Adly 2011: 305).

and society in a transition path from dictatorship to democracy. Thus, this second revolution was based upon the organizational structures of the first movement, even if other groups launched it.

IV. Conclusions

The purpose of this paper is to show the effects of oil price shocks and the organizational density of civil society on the survival horizon of dictatorships. Civil society balances power between the dictator and citizens, whereas rents from natural resources strengthen the *de facto* power of the dictator and thus increase the cost of revolution for citizens. The organizational density of civil society and natural resource rents drive regime stability in resource-rich dictatorships. Evidence from Iran, Soviet Union/Russia and Egypt suggest that oil dependence and a dense civil society can lead to both revolution, in the case of a negative oil price shock, and persecution by the dictator, under the conditions of a positive oil price shock.

The oil price indicates the quantity of rents that the dictator is able to extract from the natural resources sector. Similarly, the organizational density of civil society determines not only the sector in which the citizens generate their income but also the cost of revolution against the dictator. In the civil society protest game, we show that only a negative price shock can lead to a revolution initiated by the citizens. In any other case, the price of a revolution is too high and the state of the organizational density is not sufficient to balance out the extractive capacity of the dictator. In the civil society persecution game, the dictator can avert revolution, if there is a high probability that the revolution is going to fail.

As evidence from Iran suggests, the communication and cooperation structures of the bazaar and the mosque were used to oppose the regime and organize revolution. In the case of the Soviet Union, we find that these structures in the gray/black market result from economic shortages. Contemporary Russian developments underscore the conservative-progressive divide in civil society. Moreover, the Arab Spring of 2011 and particularly Egypt reveal the significance of the Internet and social media websites in the organization of a revolution, thus opening a new dimension to the system of civil society. It turns out that the organizational density of civil society develops path-dependently (the bazaar in Iran), and particularly in times of uncertainty. Authoritarian stability has long-run institutional roots and is vulnerable to exogenous oil price shocks. Thus, our paper offers some optimistic predictions about democratization in resource-rich dictatorships with a significant tradition of horizontal cooperation and civic institutions.

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Appendix

Proof of Proposition 1

In the main text, we derived, by solving the revolution constraint, the threshold value of the organizational density $\alpha^* = \frac{p}{\tau^l + p}$ in a non-shock situation that will not quite lead to revolution. Now, we can compare this threshold value to the different shock scenarios, indicating that the external circumstances have changed but the organizational density of civil society remains at its threshold value. Furthermore, by assumption we know that $p^l < p = 1 < p^h$. Based on the assumption that if the revolution constraint is binding there will be a revolution, we can state that for every $\alpha < \alpha^*$ there will be revolution since the revolution constraint is binding. Vice versa, for every $\alpha > \alpha^*$ the revolution constraint is not binding and there will be no revolution.

For the first part of proposition 1, we can take the following steps to derive at $\frac{p^l}{\tau^l + p^l} < \frac{p}{\tau^l + p} = \alpha^*$, based on the assumption that $p^l < p$:

$$p^l < p \Rightarrow p^l\tau^l < p\tau^l \Rightarrow p^l\tau^l + p^l p < p\tau^l + p^l p \Rightarrow p^l(\tau^l + p) < p(\tau^l + p^l) \Rightarrow \frac{p^l}{\tau^l + p^l} < \frac{p}{\tau^l + p}$$

Furthermore, since $\tau^l < \tau^h$, it can be shown that $\frac{p^l}{\tau^h + p^l} < \frac{p^l}{\tau^l + p^l} < \frac{p}{\tau^l + p}$, so that a negative shock will always lead to revolution, regardless of the tax rate set by the dictator:

$$\tau^l < \tau^h \Rightarrow \tau^l p^l < \tau^h p^l \Rightarrow \tau^l p^l + p^l p^l < \tau^h p^l + p^l p^l \Rightarrow p^l(\tau^l + p^l) < p^l(\tau^h + p^l) \Rightarrow \frac{p^l}{\tau^h + p^l} < \frac{p^l}{\tau^l + p^l}$$

For the second part of proposition 1, we can take the following steps to derive at $\frac{p^h}{\tau^l + p^h} > \frac{p}{\tau^l + p} = \alpha^*$ based on the assumption that $p^h > p$:

$$p^h > p \Rightarrow p^h\tau^l > p\tau^l \Rightarrow p^h\tau^l + p^h p > p\tau^l + p^h p \Rightarrow p^h(\tau^l + p) > p(\tau^l + p^h) \Rightarrow \frac{p^h}{\tau^l + p^h} > \frac{p}{\tau^l + p}$$

Assuming that $p^h > \frac{\tau^h}{\tau^l}, p^h\tau^l > \tau^h \Rightarrow p^h\tau^l > \tau^h p \Rightarrow p^h\tau^l + p^h p > p\tau^l + p^h p \Rightarrow p^h(\tau^l + p) > p(\tau^h + p^h) \Rightarrow$

$$\frac{p^h}{\tau^h + p^h} > \frac{p}{\tau^l + p} = \alpha^*$$

This fulfils the condition that the revolution constraint is not binding and there is no revolution.

Proof of Corollary 1

To prove corollary 1, one has to prove that $\underline{\alpha} \leq \frac{p^l}{\tau^h + p^l} < \frac{p^h}{\tau^l + p^h} < \overline{\alpha}$ is correct. Considering this and $\tau^l < \tau^h$, the following statements can be made: $\frac{p^l}{\tau^h + p^l} < \frac{p^l}{\tau^l + p^l}$ and $\frac{p^h}{\tau^h + p^h} < \frac{p^h}{\tau^l + p^h}$. Now, a combination of these two statements can be used to verify $\underline{\alpha} \leq \frac{p^l}{\tau^h + p^l} < \frac{p^h}{\tau^l + p^h} < \overline{\alpha}$. First, $\frac{p^l}{\tau^h + p^l}$ is compared to $\frac{p^h}{\tau^h + p^h}$. It is assumed that $\frac{p^l}{\tau^h + p^l} < \frac{p^h}{\tau^h + p^h}$, which can be shown quite easily: $p^l(\tau^h + p^h) < p^h(\tau^h + p^l)$. Rearranging and shortening yields $p^l < p^h$, which is true by assumption and so by transitivity it can be written that $\frac{p^l}{\tau^h + p^l} < \frac{p^h}{\tau^h + p^h} < \frac{p^h}{\tau^l + p^h}$. Now, based on proposition 1 where $\alpha^* = \frac{p}{\tau^l + p}$ and a positive price shocks leads to *N*, whereas a negative price shock leads to *R*, this α is changed for $\frac{p^h}{\tau^l + p^h} < \overline{\alpha} \leq \alpha$ to be higher than $\frac{p^h}{\tau^l + p^h}$. The decision rule is to revolt if the threshold value is higher than the calculated value, which is the case here. The reasoning behind the statement that $\frac{p^l}{\tau^h + p^l} \geq \underline{\alpha} \geq \alpha$ is simply the other way around: α is changed such that it is lower than $\frac{p^l}{\tau^h + p^l}$, which always results in non-revolution.

Proof of Proposition 2

For the first part of proposition 2, the following steps are taken: if $\alpha^{**} = \frac{p(1-\beta)}{\tau^l + p(1-\beta)}$ is the threshold value that just leads to non-revolution, then $\frac{p^l(1-\beta)}{\tau^l + p^l(1-\beta)}$ has to lead to revolution because $\frac{p^l(1-\beta)}{\tau^l + p^l(1-\beta)} < \frac{p(1-\beta)}{\tau^l + p(1-\beta)} = \alpha^{**}$ since $p^l < p$:

$$p^l(1-\beta)(\tau^l + p(1-\beta)) < p(1-\beta)(\tau^l + p^l(1-\beta)) \Rightarrow p^l\tau^l < p\tau^l \Rightarrow p^l < p$$

Because $\frac{p^l(1-\beta)}{\tau^h + p^l(1-\beta)} < \frac{p^l(1-\beta)}{\tau^l + p^l(1-\beta)}$, changing the tax rate does not help the dictator but instead makes a revolution even more certain: $p^l(1-\beta)(\tau^l + p^l(1-\beta)) < p^l(1-\beta)(\tau^h + p^l(1-\beta)) \Rightarrow \tau^l < \tau^h$, which is true by assumption.

For the second part of proposition 2, we use the assumption that $p^h > p$. Moreover, it also holds that $\frac{p^h(1-\beta)}{\tau^l + p^h(1-\beta)} > \frac{p^l(1-\beta)}{\tau^l + p^l(1-\beta)}$ so that $\frac{p^h(1-\beta)}{\tau^l + p^h(1-\beta)} > \alpha^{**}$ and the revolution constraint cannot hold:

$$p^h(1-\beta)(\tau^l + p^l(1-\beta)) > p^l(1-\beta)(\tau^l + p^h(1-\beta)) \Rightarrow p^h\tau^l > p^l\tau^l \Rightarrow p^h > p^l$$

Similarly, $p^h > p$.

Now, we additionally assume that $p^h > \frac{\tau^h}{\tau^l}$, such that:

$$p^h\tau^l > \tau^h \Rightarrow p^h\tau^l > p\tau^h \Rightarrow p^h\tau^l + p^h p(1-\beta) > p\tau^l + p^h p(1-\beta) \Rightarrow p^h(\tau^l + p(1-\beta)) > p(\tau^h + p^h(1-\beta)) \Rightarrow$$

$$p^h(1-\beta)(\tau^l + p(1-\beta)) > p(1-\beta)(\tau^h + p^h(1-\beta)) \Rightarrow \frac{p^h(1-\beta)}{\tau^h + p^h(1-\beta)} > \frac{p(1-\beta)}{\tau^l + p(1-\beta)}$$ such that

$\frac{p^h(1-\beta)}{\tau^h + p^h(1-\beta)} > \alpha^{**}$ and there will be no revolution.

Proof of Corollary 2

This proof resembles the one from corollary 1. To prove corollary 2, one has to prove that $\underline{\underline{\alpha}} \leq \frac{p^l(1-\beta)}{\tau^h + p^j(1-\beta)} < \frac{p^h(1-\beta)}{\tau^l + p^h(1-\beta)} < \bar{\bar{\alpha}}$ holds. Considering this and $\tau^l < \tau^h$, the following statements can be made: $\frac{p^l(1-\beta)}{\tau^h + p^l(1-\beta)} < \frac{p^l(1-\beta)}{\tau^l + p^l(1-\beta)}$ and $\frac{p^h(1-\beta)}{\tau^h + p^h(1-\beta)} < \frac{p^h(1-\beta)}{\tau^l + p^h(1-\beta)}$. Now, a combination of those two statements can be used to verify $\underline{\underline{\alpha}} \leq \frac{p^l(1-\beta)}{\tau^h + p^j(1-\beta)} < \frac{p^h(1-\beta)}{\tau^l + p^h(1-\beta)} < \bar{\bar{\alpha}}$.

First, $\frac{p^l(1-\beta)}{\tau^h + p^l(1-\beta)}$ is compared to $\frac{p^h(1-\beta)}{\tau^h + p^h(1-\beta)}$. It is guessed that $\frac{p^l(1-\beta)}{\tau^h + p^l(1-\beta)} < \frac{p^h(1-\beta)}{\tau^h + p^h(1-\beta)}$, which can be shown quite easily: $p^l(1-\beta)(\tau^h + p^h(1-\beta)) < p^h(1-\beta)(\tau^h + p^l(1-\beta))$. Rearranging and shortening yields $p^l < p^h$,which is true by assumption and so by transitivity it can be written that $\frac{p^l(1-\beta)}{\tau^h + p^l(1-\beta)} < \frac{p^h(1-\beta)}{\tau^h + p^h(1-\beta)} < \frac{p^h(1-\beta)}{\tau^l + p^h(1-\beta)}$. Now, based on proposition 2 where $\alpha^* = \frac{p(1-\beta)}{\tau^l + p(1-\beta)}$ and a positive price shocks leads to *N*, whereas a negative price shock leads to *R*, this α is changed for the lower bound to be higher than $\frac{p^h(1-\beta)}{\tau^l + p^h(1-\beta)}$. The decision rule is to revolt if the threshold value is higher than the calculated value, which is the case here. The reasoning for the upper bound is simply the other way around: α is changed such that it is lower than $\frac{p^l(1-\beta)}{\tau^h + p^l(1-\beta)}$, which will always result in non-revolution.

Proof of Proposition 3

For the first part of proposition, we consider that $V^c(N) = V^c(S=0)$. This way, it can be seen with minor rearrangements that proposition 3.1) resembles proposition 1.1). To see this, the revolution constraint is established, such that:

$$V^c(N) < \sigma V^c(R) + (1-\sigma)V^c(S=0) \Rightarrow V^c(N) < \sigma V^c(R) + (1-\sigma)V^c(N) \Rightarrow \sigma V^c(N) < \sigma V^c(R) \Rightarrow V^c(N) < V^c(R)$$

For the second part of proposition 3, we compared the result of the revolution constraint to the threshold value $\alpha^* = \frac{p}{\tau^l + p}$, yielding expression $\sigma < \frac{p\tau^l - p}{p^l\tau^l - p}$. Basically, if the threshold value is higher than the result of the revolution constraint, the strategy of the citizens is *R*, which is shown in b), otherwise they will decide not to revolt (*N*) which is shown in a). Furthermore, it can be proven that $\frac{1-\tau^l}{1+p^l} < \frac{p\tau^l - p}{p^l\tau^l - p}$ by contradiction; assuming that $\frac{1-\tau^l}{1+p^l} > \frac{p\tau^l - p}{p^l\tau^l - p}$ and using $p^l\tau^l - p < 0$ because $0 < p^l < 1, 0 < \tau^l < 1$ and $p = 1$:

$$(1-\tau^l)(p^l\tau^l - p) < (p\tau^l - p)(1+p^l) \Rightarrow p^l\tau^l - p - p^l\tau^l\tau^l + \tau^l p < p\tau^l - p + p^l p\tau^l - pp^l \Rightarrow$$
$$p^l\tau^l - p^l\tau^l\tau^l < p^l p\tau^l - pp^l \Rightarrow \tau^l(1-\tau^l) < \tau^l - 1 \quad ,$$

which is false because the left-hand side is positive and the right-hand side is negative given $0 < \tau^l < 1$

.

Proof of Corollary 3

The derivative of τ^l with respect to *q* is $\frac{\partial \tau^l}{\partial q} = \sigma \frac{1}{pq^2} > 0$, such that τ^l is increasing in *q*; the second derivative is $\frac{\partial^2 \tau^l}{\partial q^2} = -\sigma \frac{1}{2pq^3} < 0$, such that the marginal tax rate is decreasing in *q*.

Proof of Proposition 4

For the first part of proposition 4, please, check the proof of proposition 3.

For the second part of proposition 4, the revolution constraint is set up such that there will be no revolution, indicating that the threshold value of α^{**} is lower than the actual value of organizational density $\tilde{\alpha}$:

$$\frac{\sigma p^l(1-\beta)}{\sigma + \tau^l + \sigma p^l(1-\beta) - 1} > \frac{p(1-\beta)}{\tau^l + p(1-\beta)}$$

Now, $\sigma < \frac{p\tau^l - p}{p^l\tau^l - p}$ can be derived using the fact that the denominator is positive based on the assumption that $\sigma + \tau^l > 1$, which is shown above.

The lower bound is derived in the following way: for $\frac{\sigma p^l(1-\beta)}{\sigma+\tau^l+\sigma p^l(1-\beta)-1}$ to be positive the denominator needs to be positive because the nominator consists only of positive numbers (since $\beta<1$ it can be concluded that $(1-\beta)$ is also positive):

$$\sigma+\tau^l+\sigma p^l(1-\beta)-1>0 \Rightarrow \sigma>\frac{1-\tau^l}{1+p^l(1-\beta)}$$

Furthermore, it can be shown that $\frac{1-\tau^l}{1+p^l(1-\beta)}<\frac{p\tau^l-p}{p^l\tau^l-p}$:

since $p^l\tau^l-p<0$, one can write:

$$(1-\tau^l)(p^l\tau^l-p)>(p\tau^l-p)(1+p^l(1-\beta)) \Rightarrow p^l\tau^l-p-p^l\tau^l\tau^l+p\tau^l>p\tau^l-p+p\tau^l p^l(1-\beta)-pp^l(1-\beta) \Rightarrow$$
$$p^l\tau^l-p^l\tau^l\tau^l>p\tau^l p^l(1-\beta)-pp^l(1-\beta) \Rightarrow \tau^l-\tau^l\tau^l>\tau^l(1-\beta)-(1-\beta) \Rightarrow \tau^l(1-\tau^l)>(1-\beta)(\tau^l-1)$$

Since $(1-\beta)>0$ and $0<\tau^l<1$, then $\tau^l(1-\tau^l)>0$ but $\tau^l-1<0$ so that the left-hand side is positive and the right-hand side is negative and thus definitely smaller than the left-hand side.

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