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Conference Paper

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Beiträge zur Jahrestagung des Vereins für Socialpolitik 2018: Digitale Wirtschaft - Session: Development Economics III, No. G14-V3

Provided in Cooperation with:

Verein für Socialpolitik / German Economic Association

Suggested Citation: Schwuchow, Soeren (2018) : Extractive Institutions, Choking Taxes, and War: On the (Beneficial) Impact of Inequality in Autocracies, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2018: Digitale Wirtschaft - Session: Development Economics III, No. G14-V3, ZBW - Leibniz-Informationszentrum Wirtschaft, Kiel, Hamburg

This Version is available at:

<https://hdl.handle.net/10419/181530>

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Extractive Institutions, Choking Taxes, and War: On the (Beneficial) Impact of Inequality in Autocracies*

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August 12, 2018

Abstract

We develop a framework for analyzing how the distribution of income-earning ability among citizens affects an autocrat's extractive policies and her intended risk of war. Relying on a general equilibrium model, we show that (i) autocrats can utilize the military for redistribution and (ii) are most powerful for extreme un-/equal distributions. Consequently, ordinary citizens benefit from not-too-low inequality. Our model also implies that disastrous economic policies, characteristic for many kleptocratic autocracies, are not necessarily unintended side effects of rent-seeking but rationally chosen governance. Depending on the level of inequality, autocrats can deter foreign threats by choking the economy. This policy may prevent hostilities but also causes ordinary citizens to favor war since the autocrat would then lose her grip at home. Our results help to explain why some autocrats maintain far-too-great armies, while others suffocate their economies, and yet others were drawn into wars.

JEL classification H56, D74, D31

Keywords Inequality, autocracies, corruption, conflict

*The author thanks Thomas Apolte, Federica Carugati, Andreas Freytag, Casper Sakstrup, Petros Sekeris, Avner Seror, and several participants of the 2nd Conference on the Political Economy of Democracy and Dictatorship, the 2018 Meeting of the European Public Choice Society, the 17th session of the Institutional and Organizational Economics Academy, and the 18th Jan Tinbergen Peace Science Conference for helpful comments. All remaining errors are mine.

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1 Introduction

About one third of all countries worldwide are labeled “Autocracies”, whose regimes limit their citizens’ political participation and civil liberties (EIU, 2018). Although those regimes have in common that they all deny their citizens basic civil rights, they differ regarding other important characteristics. While some provide sufficient (economic) standards of living for its citizens and can be even more thriving than democracies, others let their citizens live in poverty. Similar, the degree of (economic) freedom or access to the ruling elite can also differ widely between autocracies. In some, small closed groups run the state just for their own (economic) benefit and consider their citizens only as a source for plunder, whereas in others the regime merely hold its grip on political power, allowing extensive economic activities and, more or less, meritocratic access to governmental positions.¹

Given these differences, we are interested in their roots and whether some of them could be explained by the impact of vertical inequality on an autocrats behavior. For that, we focus on so called kleptocracies, in which corruption and rent-seeking are a *way of governance*, (rationally) chosen by a ruling elite in order to maximize its rents. Kleptocracies are perfectly suitable for this analysis because those regimes’ single objective is to maximize its own rents. In other words, corruption is, “rather than a weakness or a disorder, [...] the effective functioning of systems designed to enrich the powerful” (Chayes, 2017, p. 146). Kleptocratic governments thus “not only fail to provide public goods and protect citizens’ property. They are in fact the primary threat to their citizens’ property rights and security” (Leeson, 2007, p. 690). At the same time, poor economic outcomes caused by highly inefficient economic policies are symptomatic for many kleptocracies (see, e.g., Acemoğlu et al., 2004; Egorov and Sonin, 2011).

¹See Wintrobe (1998) for a detailed classification.

For our analysis, we study a formal model, which provide a framework for addressing two fields of research on autocracies regarding the impact of vertical inequality. (i) How inequality affects the ability of kleptocrats to secure their rule by participating powerful challengers on the rents while still being able to extract a high income? (ii) How these incentives are affected by foreign military threats? More concisely, our model considers an autocrat’s rule from two different perspectives: First, with a domestic focus, we analyze the impact of vertical inequality on the autocrat’s decisions to impose extractive politics or redistribute funds. Second, with an international focus, we are interested in the question, how inequality *in a state* affects an autocrat’s defensive capabilities and, thus, the likelihood of *interstate* war.

This second question has so far been neglected in the literature.² Although there is a wide range of research on the war-proneness of different regime types³ and especially autocracies,⁴ this research often has a different focus or, for example, considers warfare as (negatively) influencing inequality (see, e.g., Coşgel and Ergene, 2012; Scheidel, 2017). Our model, in contrast, examines this relation from the reverse perspective. In the following, we will provide evidence that inequality may have an impact on the dictator’s defensive capabilities by affecting the military’s costs and the country’s value and, thus, on the

²There is indeed a lot of research on inequality and conflict (see, e.g., Østby, 2013, for a survey) but this research is, as far as we know, almost always limited to the relation between (horizontal) inequality or economic polarization and (civil) conflict (see, e.g., Hegre, 2008; Østby, 2008; Brown and Langer, 2010; Bartusevičius, 2014).

³Research often concentrates on the so called “Democratic Peace” that institutionally mature democracies are less likely to go to war to each other compared to other regime combinations. See, e.g., Maoz and Russett (1993), Dixon (1994), or Dafoe et al. (2013). Blank et al. (2017) found evidence for a reverse relation in pre-modern Europe very recently.

⁴There is evidence that the war-proneness of autocracies depends on its characteristics (see, e.g., Weeks, 2012). According to Weeks, personalistic autocrats, irrespective of being civilian or military, are, for different reasons, more belligerent than non-personalistic regimes. Lai and Slater (2006) or Debs and Goemans (2010) found similar evidence that military dictatorships seems to be less war-prone. Kim (2017) offers an interesting explanation for the second finding, according to which military dictatorships more often emerges in states facing external territorial threats.

occurrence of wars. Hence, rising inequality could, to a certain degree, facilitate the ability of an autocrat to deter foreign threats.

Regarding our first question, there already exists a wide variety of research but without our focus on vertical inequality. Wintrobe (1990, 1998) develops a first seminal approach for analyzing the so called “Dictator’s Dilemma”. In short, this dilemma originates from the dictators lack of knowledge on the extent of her support among her citizens. The inevitable use of repression in order to suppress dissent and criticism in autocracies intensifies this problem: The more repression is used, the more potential for dissent and criticism emerges and, thus, the less the dictator is able to determine her popularity. According to Wintrobe, the easiest way to overcome this problem is to overpay certain groups in society to secure their support. Conversely, Acemoğlu et al. (2004) analyze how kleptocratic autocrats could secure their political survival *and* their high rents, even without a supportive political base, by *potentially* applying a divide-and-rule strategy. Solely due to this credible threat, the dictator’s potential challengers refrain from a coup because they anticipate that the former is able to divide them by buying one of them out and punishing the other. Consequently, the autocrat can extract her high rents without fear of being potentially overthrown.

Similar to Wintrobe (1990, 1998), Miquel (2007) argues that current (impoverished) supporters can also be disciplined by the fear to be excluded from any patronage system under another ruler. Acemoğlu et al. (2010) analyze the military’s ambiguous role as a natural ally but also a potential threat to rulers. Comparable to our results, they show that larger inequality sets incentives for the ruling elite to enlarge the military at the costs of also empowering the latter. Egorov and Sonin (2011) analyze the loyalty-competence trade-off, according to which competent subordinates often pose the threat of a coup. Dictators could thus be forced to choose less competent aides, yielding poor economic outcomes. Additionally, other research analyze, broadly spoken, the impact of threats of

coups or revolutions (e.g., Gilli and Li, 2015), the impact of extractive politics on growth (e.g., Overland et al., 2005; Shen, 2007; Mizuno et al., 2017), or the consequences of the regime’s internal relations (e.g., Fan, 2006).

As we analyze kleptocratic behavior, which is, broadly defined, an extreme kind of corruption, our research also contributes to the literature on the relation of inequality and corruption. In the related empirical literature, there is a more or less broad consensus on a positive relationship with regional anomalies but not on the direction of the effect.⁵ Regarding the theoretical evidence, Dusha (2014), analyzing the relationship between entrepreneurs and (corrupt) bureaucrats, Dutta and Mishra (2013), who focus on the credit market, as well as Alesina and Angeletos (2005), who link inequality to corruption via governmental redistribution, support the empirical evidence that higher inequality should yield more corruption.

Our research contributes to the existing literature in the following way. First, we offer a novel theoretical explanation for the relation of inequality and the likelihood of interstate war. Here, our results show that an autocrat is less willing to deter foreign threats and, thus, interstate war is more likely when she is less able to extract rents. Put differently, if the autocrat’s share on total rents is relatively small she is less willing to spend funds for deterrence in order to receive a small but secure payoff and prefers to gamble for a higher price instead. Second, we are also able to link inequality to extractive institutions. Interestingly, extortion is more beneficial for the dictator for extreme inequality and for ex-

⁵Ades and di Tella (1997), Li et al. (2000), Gupta et al. (2002), Rothstein and Uslaner (2005), Gyimah-Brempong and de Gyimah-Brempong (2006), and Dincer and Gunalp (2012) suppose an effect from corruption to inequality (i.e., more corruption yields higher inequality), whereas Jong-sung and Khagram (2005) and Glaeser and Saks (2006) assume the reverse. Regarding regional anomalies, Dobson and Ramlogan-Dobson (2010) and Andres and Ramlogan-Dobson (2011) found evidence for a negative relation in Latin America. See, e.g., Wong (2016) for an explanation. According to yet other authors (e.g. Chong and Gradstein, 2007; Apergis et al., 2010; Uslaner, 2010; Ariely and Uslaner, 2016), the relation is more complex and inequality and corruption affects each other, creating a vicious circle of mutually reinforcing inequality and corruption. See, e.g., Schwuchow (2018) or Chaturvedi (2017) for possible channels.

treme equality. In other words, not-too-low inequality poses constraints on the autocrats ability to impose extractive politics and, thus, should result in more economic activity. These results are generally in line with the literature on inequality and corruption but suggest that increasing inequality can also restrain corruption for very small inequality. Third, our results show that inefficient economic policies are not necessarily a side effect of kleptocratic rent maximization. Instead, those policies are an atrocious but rationally chosen way of governance, which secures the autocrats grip on power against foreign threats. More consicely, autocrats have incentives to impose bad economics policies when threatened by powerful foreign countries because a ruined economy is less attractive to the latter to overtake but still more lucrative for the dictator than a war-torn society or being exiled.

This last consideration can be illustrated by the situation in North Korea,⁶ which is the perfect role model for our approach. The North Korean society, suffering from a crippled economy, is one of the poorest, most suppressed and least free world wide. Reports of famines and constant malnutrition of the general population are regularly getting in the news (e.g., McCurry, 2017; BBC, 2017; Salam and Haag, 2018). At the same time, the kleptocratic North Korean regime spends, according to the UN Human Rights Council (UN HRC), “a significant amount of the state’s resources on the purchase of imported luxury goods” (estimated \$645.8 million in 2012) and channels money in “parallel funds”. These funds are “kept at the personal disposal of the Supreme Leader and used to cover personal expenses of the Supreme Leader, his family and other elites surrounding him”, primarily the military leadership. In addition, the regime relentlessly follows a military-first doctrine, even in times of starvation, but “fail[s] to feed ordinary soldiers” (UN HRC, 2012, p. 200ff.). Nonetheless, the North Korean military is, by far, the largest in relation to its population.⁷

⁶See Wintrobe (2013) for a more detailed analysis.

⁷According to IISS (2018, p. 275), more than 5% of the North Korean citizens are in active duty; including paramilitary organizations this rises to 27%.

This military-first policy is often explained by the hostile international environment North Korea faces or with domestic consolidation of power (Kwon, 2003).

Due to this behavior and to systematic massive human rights abuses, the North Korean regime is sanctioned on a large scale and more or less internationally isolated. Consequently, the Kim clan or its allies should not be able to secure its grip on power or even its large revenues after any kind of reunification with Korea's southern part. Reunification should thus pose a threat to the Northern regime's rule, similar to the foreign military threat we consider in our model (i.e., the regime loses its rents). Regarding the South Korean perspective, its society still has a predominantly positive attitude towards an eventual reunification but the support is not as high as it used to be in the past; this is especially true for the younger generations, in which the skepticism partly prevails (Terry, 2014). Interestingly, one main obstacle for South Koreans are the huge economic costs of reunification (Harlan, 2011). After decades of kleptocratic mismanagement in the North, these costs are estimated around US-\$1–3 trillion (Economist, 2016; Revesz, 2017). At the same time, although the North Korean regime's collapse was already predicted several times by outside observers and despite the huge poverty and its rule based on fear, the Kim clan is still in charge and seems to be surprisingly stable (Terry, 2014; Delury, 2017; Kang, 2017).

This allows for an interesting interpretation. The North Korean mismanagement, its shameless self-enrichment, and waste of wealth seem not to loosen the regimes grip on power but even to enforce it because the South Korean society is not willing to pay every price for a reunification. More concisely, by crippling its own economy and, as a result, devastating the “prize” of reunification for the south, the North Korean regime was able to deter the South of the prospect of a reunification and, thus, to secure its own survival. Even if the possible rents for the Northern regime should be higher with a more thriving economy it should be questionable whether the Kim clan would then be able to secure its

grip on power. Interestingly, this strategy is completed by one of the (relatively) largest armies worldwide, which absorbs a large number of young men and women but also huge funds from society. Even if the conditions in the army are very poor compared to other countries these should probably be better than the alternative, working on a subsistence level.

The remainder of this paper is organized as follows. In Section 2, we develop our model by combining a general equilibrium model with game theory. This enables us to analyze the impact of a dictator's behavior on the economy and, thus, on the behavior of its citizens. Due to the model's structure, we have to use numerical techniques to be able to present a solution. In Section 3, we present the results of the model and discuss possible implications. Section 4 sums up and conclude.

2 Model

For our model, we consider two countries, Domestic (D) and Foreign (F). The domestic society is populated by a large number of *ex ante* heterogeneous citizens (C) and governed by a dictator (for simplification, also D), who appropriates her income from the citizens' production. The dictator's reign relies on two factors, (i) the support of the officer corps (C), who controls the military and (ii) on redistributive policies, with which she compensates the poor for the extraction. To analyze the domestic society, we characterize it by modeling its economy and the impact of the dictator's decisions on the economy. After that, we analyze the dictator's behavior, her interaction with the officer corps and with the foreign country. The latter's task is to pose a military threat to the domestic society.

2.1 Domestic Economy

In the domestic society, the citizens, which's mass is normalized to one, differ with respect to their income-earning ability $\epsilon \in \mathbb{R}^+$. This ability is log-normal distributed in the population. The cumulative distribution function is denoted by $F(\cdot)$, with μ_ϵ and σ_ϵ as the mean and the standard deviation, respectively, of the normal distributed $\ln(\epsilon)$. We assume that a citizen's utility function

$$U(c, l) = c^a l^{(1-a)} \tag{1}$$

only consists of two factors, the value of his/her consumption (c) and leisure (l) and is of the Cobb-Douglas type. In this regard, $a \in (0, 1)$ is the elasticity of utility with respect to consumption or, more intuitively, the share of working hours $w \in \mathbb{R}^+$ in total time $T \in \mathbb{R}^+$. For simplification, leisure $l \in \mathbb{R}^+$ is the remaining time ($T = w + l$).

Every citizen has two possibilities to generate an income for consumption: (i) s/he can work in the public sector⁸ as a soldier or (ii) s/he can seek for employment in the private sector as a laborer. Regarding serving as a soldier, we assume that those ordinary citizens could only serve in the (lowest) enlisted ranks and, hence, are not and also could not become members of the officer corps. Consequently, the decision to become a soldier is not affected by considerations about becoming a member of the officer corps. Furthermore, those citizens' income-earning abilities do not affect their job performance as they serve as "cannon fodder" for the most part. Based on these considerations, a soldier receives an income $y_S = s w_S$ for working w_S hours with the pay $s \in \mathbb{R}^+$. Soldiers have no

⁸For simplicity, we restrict the public sector to the military. However, it would be easily possible to integrate an additional public administration. In this case, the dictator would mainly use the military for deterrence and the public administration for redistribution. This would reduce her need to participate the officer corps in the rents but would also deprive her of the security from the military regarding her own citizens. To be able to neglect these considerations, the dictator must rely on the military for rent-seeking and the latter's presence implicitly serves as a counterbalance for possible public unrest.

tax obligations but their income is reduced by the amount of $P \in \mathbb{R}^+$, which adds to the dictator's own income. Here, we do not assume that the dictator directly steals the citizens' money but the former extracts it from society and every citizens' consumption is thereby be reduced. In other words, the dictator's exploitation of the society's wealth reduces the possibilities for consumption of all citizens alike.

Taking this into account, a soldier takes the policy parameters s and P and the behavior of all other citizens as given and uses working time w_s to maximize his/her utility subject to the consumption restriction

$$c_S = s w_S - P \quad (2)$$

and the time restriction $l = T - w_S$. The first order condition for an optimum yields a soldier's optimal working time

$$w_S^*(s, P) = aT + \frac{(1-a)P}{s}. \quad (3)$$

and, by substituting equation (3) in (2), a soldier's optimal consumption

$$c_S^*(s, P) = a(sT - P). \quad (4)$$

Laborers on the private market are similarly motivated than soldiers but are object of different restrictions. They are subject to taxes, levied in order to finance the military, and their wages depend on their income-earning ability. More concisely, laborers pay an income-related tax rate t and their remuneration matches their respective income-earning ability ϵ .⁹ In addition, they are also subject to the dictator's extraction P . Accordingly,

$$c_L = (1-t)(\epsilon w_L) - P \quad (5)$$

⁹See, e.g., İmrohoroğlu et al. (2000) for a similar approach.

is the consumption restriction of a laborer with income-earning ability ϵ . This laborer also takes the policy parameters s , t , and P and the behavior of all other citizens as given and maximizes his/her utility subject to the consumption restriction above and the time restriction $l = T - w_L$ with respect to his/her working time w_L . The first order condition for an optimum yields this laborer's optimal working time

$$w_L^*(\epsilon, P) = aT + \frac{(1-a)P}{(1-t)\epsilon} \quad (6)$$

and, by substituting equation (6) in equation (5), a laborer's optimal consumption

$$c_L^*(\epsilon, P) = a[(1-t)\epsilon T - P]. \quad (7)$$

A citizen choose his/her occupation according to the relative utility from both possibilities. S/he becomes a soldier if the utility from being a soldier is higher than from being a laborer and *vice versa*. Hence, $U(c_L^*, T - w_L^*) = U(c_S^*, T - w_S^*)$ yields the threshold

$$\epsilon_T = \frac{s}{1-t}, \quad (8)$$

from which citizens with equal or higher income-earning ability ($\epsilon \geq \epsilon_T$) turn into laborers *et vice versa*. Given that rational soldiers would have identical optimal working hours, the total manpower of the military service is $M_D = w_S^* F(\epsilon_T)$, with $F(\epsilon_T)$ as the number of soldiers (i.e., citizens with $\epsilon < \epsilon_T$). In the private sector, the value of society's total production (GDP_D) matches the untaxed total pay of all citizens in the private sector

$$GDP_D = \int_{\epsilon_T}^{\infty} \epsilon w_L^* dF(\epsilon) \quad (9)$$

and the state collect total taxes $R_D = tGDP_D$. For evaluating the impact of the dictator's

behavior on the citizens we use the latter's total utility

$$\Omega_D(s, t) = \int_0^{\epsilon_T} U[c_S^*, T - w_S^*] dF(\epsilon) + \int_{\epsilon_T}^{\infty} U[c_L^*, T - w_L^*] dF(\epsilon) \quad (10)$$

as a measure.

Our society is in a competitive equilibrium for a given set of policy arrangements s , t , and P and a distribution function $F(\cdot)$ if the citizens decide on consumption and leisure such that

1. they all maximize their utility and choose the optimal occupation,
2. all produced goods are consumed and *vice versa* (i.e., the goods market clears):

$$GDP_D = \int_{\epsilon_T}^{\infty} \epsilon w_L^* dF(\epsilon) = \int_0^{\epsilon_T} c_S^* dF(\epsilon) + \int_{\epsilon_T}^{\infty} c_L^* dF(\epsilon) + P = C_D \quad (11)$$

3. without budget surpluses, the tax revenues cover the (military) budget:

$$R_D = t GDP_D = s M_D = G_D. \quad (12)$$

Due to the condition of a balanced budget, the dimension of the policy space is reduced from three to two because the tax rate t uniquely determines soldiers' pay s .

2.2 The Dictator & the Military

The domestic dictator is a rational income-maximizing agent and, as we already said, she extracts her income from the citizens' production. Hence, the dictator chooses s (by choosing t) and P such that it maximizes her payoff

$$\pi_D[s(t), P] = P - A \cdot F(\epsilon_T) \quad \text{with } A \in \mathbb{R}^+. \quad (13)$$

This income is determined by the per-capita extraction P , which equals total extraction and the payment to the officer corps $A \cdot F(\epsilon_T)$, which secures its support. We assume that the dictator's payment to the officer corps proportionally increases with the size of the military. More intuitively, the dictator pays an amount of A for every single soldier to the officer corps. For simplification, we assume that the members of the officer corps just accept that money and keep the military calm provided that they get their share.¹⁰ Based on these considerations, the payoff of the officer corps is $\pi_O = A \cdot F(\epsilon_T)$.

Regarding the dictator's optimal behavior, a rational dictator would always choose

$$P^* = P(s^*) = s^*(t^*) T \quad (14)$$

with $s^*(t^*)$ as the optimal pay for a soldier, given that debts are ruled out and that no citizen can have a negative consumption. This results from the following considerations: $\pi_D[s(t), P]$ rises monotonically and linearly in P because P does not affect $F(\epsilon_T)$. Hence, the dictator would lift P until infinity without any other constraint. However, as consumption must be nonnegative ($c_L, c_S \geq 0$), $P \leq sT$ must hold true, according to equations (4) and (7) and threshold ϵ_T . The dictator's utility is thus in its maximum for $P = s^* T$ for a given optimal $s^*(t^*)$. Substituting this in equation (3) yields an soldier's final working time $w_S^* = T$, *viz.*, soldiers have no leisure.¹¹

The dimension of the policy space is thus further reduced to one because the dictator's optimal pay for a soldier $s^*(t^*)$ uniquely determines the optimal extraction of wealth per capita P^* . Hence, the dictator maximizes her utility subject to equation (14) and to the

¹⁰We thus implicitly assume that the officer corps is the elite's agent. This assumption is common in the literature (see Acemoglu et al., 2010, p. 3).

¹¹Even if our assumption of citizens self-selecting into the military sector may appear as unrealistic, the result is exactly the same as for forced conscription: All soldiers devote their entire time to the military.

conditions for an societal equilibrium with respect to the tax rate

$$t^* = \arg \max \pi_D(t) \quad (15)$$

and under consideration of the budget constraint, since t^* determines the soldiers' optimal pay s^* . Unfortunately, there is no convenient general analytical solution for those maximization problems and we have to numerically evaluate or simulate the results.

Before we start analyzing the dictator's optimal behavior, we take a look at the external threat, which limits the dictator's behavior, too. As we mentioned before, the dictator is threaten by a foreign country F , which could potentially attack the dictator's domestic country and, if victorious, appropriate its wealth. We assume that the foreign country has enough resources to recruit an appropriate number of soldiers but, considering conflict's inherent opportunity costs $s_F \in \mathbb{R}^+$, attacks only if the expected benefits exceed the costs. The foreign country's chances to emerge victoriously from the battlefield

$$\omega_F(M_F, M_D) = \frac{M_F}{M_F + M_D} \quad (16)$$

are modeled by a contest success function using the countries' manpowers as efforts. Accordingly, the foreign country maximizes its payoff from the attack

$$\pi_F = \omega_F(M_F, M_D) \cdot V - s_F \cdot M_F \quad \text{with} \quad V = (1 - t) GDP_D. \quad (17)$$

Here, the conflict's prize V is only the laborer's consumption or their taxed income (incl. P), respectively. More concisely, we assume that the foreign country could not appropriate the tax revenues, but the domestic dictator and the officer corps would lose their loot.

The first order condition for a optimum of equation (17) yields

$$M_F^* = \sqrt{\frac{(1 - t) GDP_D M_D}{s_F}} - M_D \quad (18)$$

as the foreign country’s optimal manpower for an attack. Effective deterrence now requires prohibitive foreign opportunity costs of an attack. $M_F^* = 0$ yields the defense threshold

$$s_F^T(s, t) = \frac{(1 - t)GDP_D}{M_D}, \quad (19)$$

from which foreign country abstains from an attack ($s_F \geq s_F^T$). For the case of a successful attack, we assume that both, the dictator and the officer corps, would be expelled and, subsequently, lose all their payoffs. Their expected payoff is then $E(\pi_D) = \omega_F [sT - A \cdot F(\epsilon_T)]$ and $E(\pi_O) = \omega_F [A \cdot F(\epsilon_T)]$, respectively. Similar considerations apply to the citizens. Their expected utility in times of war is $E(\Omega_D) = \omega_D \Omega_D$.

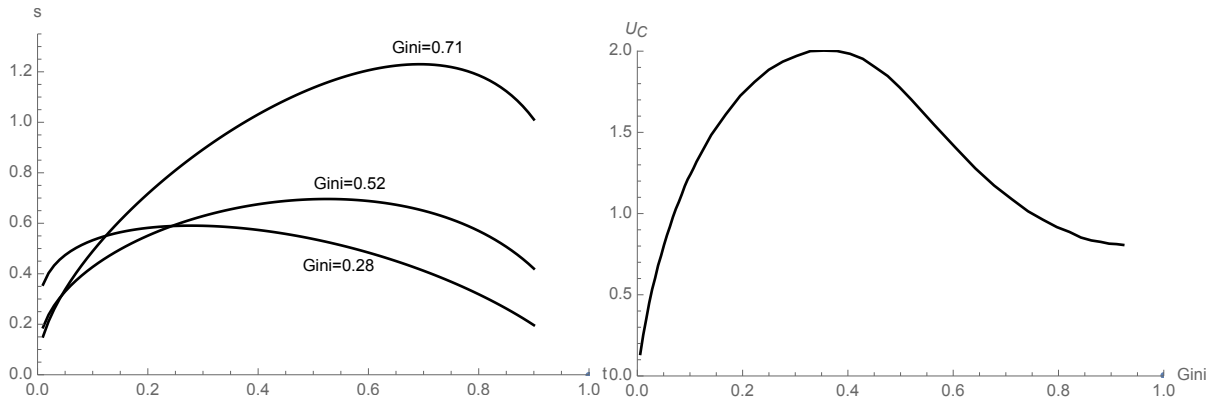
In the next section, we will utilize this model in order to analyze the impact of the distribution of income-earning ability and of the foreign strength on the dictator’s optimal behavior.

3 Results & Discussion

To characterize the equilibria of our model and to analyze the impact of the distribution of income-earning ability (ϵ) or the external threat (measured by s_F) on the dictator’s behavior, we rely on numerical techniques.¹² Regarding the impact of the distribution of income-earning ability, the distribution’s standard deviation (σ_ϵ) could be used as a measure for the society’s inequality regarding the *possibility* to generate income. Hence, it is a measure for institutional constraints on the labor market or on entrepreneurship but

¹²The evaluation’s results were crosschecked by a multi-agent simulation. In addition, we also evaluated a slightly different model in order to check our model’s robustness. Due to the characteristics of a log-normal distribution, a larger σ increases not only the standard deviation of the society’s ability to generate income but the total ability, too. Hence, an increasing σ also results *inter alia* in a larger potential GDP_D . Taking this into account, we evaluate a model, which compensates for this effect. However, the results are similar. We will provide the code for all calculations, both numerical evaluation and the simulation, which are programmed in the proprietary software Mathematica, upon request.

Figure 1: Budget threshold (left) and citizens' welfare (right) depending on inequality



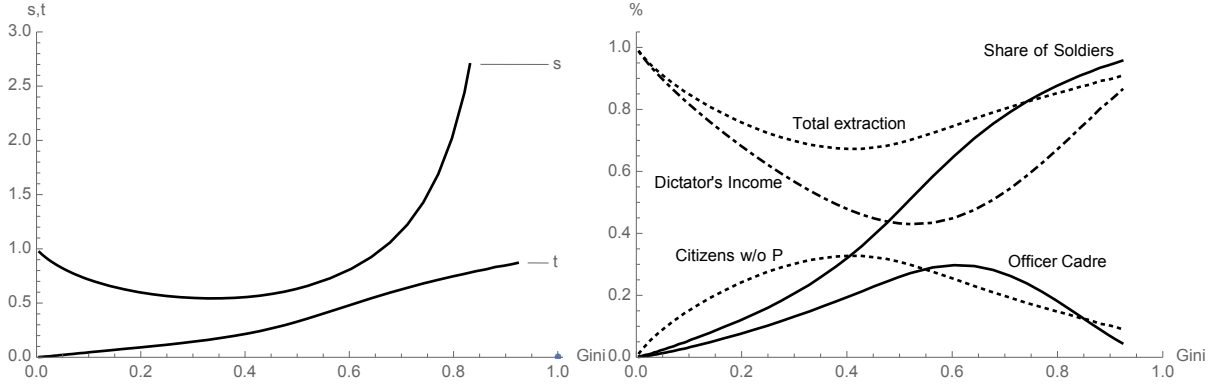
Source: Own illustration with $A = 5$, $T = 10$, $\mu = 0$, and $a = 1/2$.

also for, in the broadest sense, social discrimination (e.g., educational inequity). In order to make this measure more tangible, we use the Gini coefficient instead of the standard deviation in the illustrations.¹³

For the dictator, two constraints are particularly important: the budget constraint, which ensures sufficient funds for the military, and the defense threshold, which determines whether the foreign country attacks or not. Here, only the first is a mandatory constraint (i.e., budget surpluses or deficits are ruled out) whereas the second is not (i.e., the dictator needs not necessarily to deter the foreign country). Regarding the budget constraint, the tax rate t and the soldiers' pay rate s have an inverse u-relation (see Figure 1 – left side). Therefore, every tax rate could finance one pay rate but not all pay rates are affordable and, of the affordable pays, all except one could be funded with two tax rates. Interestingly, the higher tax rate is always inefficient from a societal point of view: A higher tax rate implies *ceteris paribus* less total utility because, as a consequence, laborers consume less and work more while soldiers do not adjust their behavior. At the same time, according to

¹³According to Shimizu and Crow (1987, p. 11), the Gini coefficient I of a log normal distribution is $I = 2\Phi(\sigma_\epsilon/\sqrt{2}) - 1$, with $\Phi(\cdot)$ as the cumulative distribution function of the standard normal distribution.

Figure 2: Optimal “s” and “t” (left) and society’s state (right) depending in inequality



Source: Own illustration with $A = 5$, $T = 10$, $\mu = 0$, and $a = 1/2$.
 Citizens w/o P, Dictator’s income and Officer corps’s share are shares of total GDP.

equation (8), more citizens become soldiers (who generate less utility) since being a laborer becomes less attractive for higher taxes ($\epsilon_T \uparrow$). The dictator’s income also decreases: More soldiers force the dictator to transfer more funds to the officer corps, whereas the extracted wealth remains unchanged. Hence, without other incentives, a dictator would never use the higher tax rate. However, as we will show in the following, for rather high foreign threats, a dictator could nonetheless have an incentive to finance her army with this too-high tax rate because she can deter the foreign country by deteriorating her own economy.

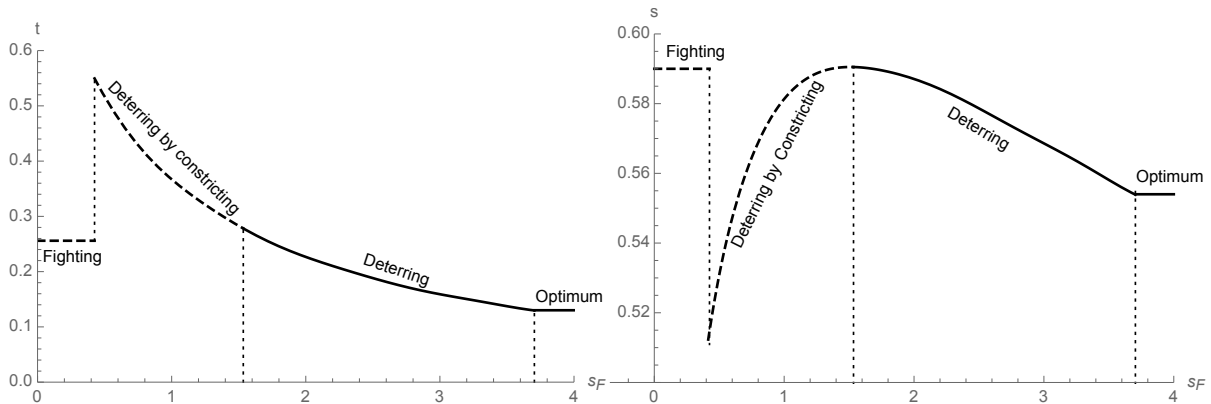
For the analysis, we start with the dictator’s behavior when the military threat is rather small and, thus, does not affect the autocrat’s strategy. In that case, a dictator does not need an army for defense and should keep its military as small as possible in order to prevent the officer corps from becoming too powerful. Anyway, even without a military threat, dictators have an incentive to maintain an army. By using the military as a mean for redistribution in favor of the poor, the dictator could increase her own income because, as we show before, P increases with s . More concisely, because dictators need to avoid citizens having negative utility in order to prevent civic unrest, the income of the poorest

citizen is the threshold for the dictator per-capita-extraction from the society's wealth. Dictators, hence, have an incentive to increase the income of poor citizens. Maintaining an army and thus enabling all citizens to obtain a remuneration irrespective of his/her income-earning ability serves this purpose. At the same time, a dictator has no interest in getting the army to powerful since the former has to pay a higher compensation to the officer corps in order to secure the latter's allegiance.

The distribution of income-earning ability affects those considerations and, thus, the dictator's optimal decisions. Figure 2 (left side) illustrates that less equal societies have higher tax rates but the relation between inequality and pay rates for soldiers is u-shaped. As a result, a society's militarization (percentage of soldiers) rises with increasing inequality (see Figure 2 – right side), i.e., a dictator maintains a larger army in more unequal societies even if there exists no external military threat. However, if a dictator acts according to this incentive this could cause a pressure on her to justify an oversized army and could maybe result in the creation of an (artificial) enemy. Despite this incentive to use an army (or, in the broadest sense, the public administration) as a source for kleptocratic redistribution, our model reveals another interesting result. Measured as the actors' share of total rent (GDP_D), the dictator is most powerful in extreme equal or extreme unequal societies (see Figure 2 – right side). Under those circumstances, she is able to appropriate a high share of the rents. Contrarily, the citizens and the officer corps are in better positions if income-earning ability is not too (un-)equally distributed. Regarding the citizens' utility (see Figure 1, right side), societies with extreme distributions are also less beneficial for the citizens. Hence, citizens benefit from not-too-low inequality as it limits the dictator's extractive policies. This consideration is also illustrated by Figure 2 (right side), which shows that the share of extracted wealth is lower for those distributions.

Regarding the domestic defensive capabilities, those are, according to equation (19),

Figure 3: Optimal “s” and “t” depending on foreign costs of conflict

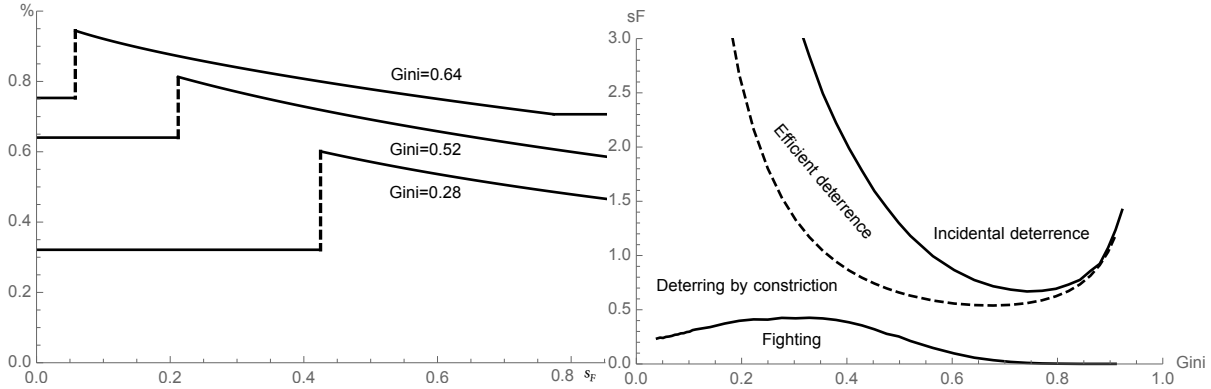


Source: Own illustration with $A = 5$, $T = 10$, $\sigma = 0.5$, $\mu = 0$, and $a = 1/2$.

the better the higher are the foreign opportunity costs of an attack because the foreign country then invests less into an attack. Depending on the level of the threat, the dictator could choose to deter the foreign country by making it prohibitively costly to attack her or she could decide to go to war. In the second case, the dictator anticipates that her defense is not sufficient for deterrence and that she will thus be attacked.

For deterrence, the dictator could use two relevant parameters: (i) the defense capacity by enhancing her military, (ii) her attractiveness as a victim by ruining the economy. Interestingly, she resorts to both in our model. As Figure 3 illustrates, the dictator reacts to smaller threats by increasing the soldiers’ pay rate (and increasing the tax rate to finance it) and to larger threats by decreasing the soldiers’ pay but, at the same time, choking the economy by financing the military with an inefficient-high tax rate (dashed lines in Figure 3). It is worth to notice that this incentive disappears once deterrence becomes too costly due to a too-large military threat. The dictator responds to such an inevitable war by returning to an efficient funding, what causes a sharp and sudden increase (decrease) of the soldiers’ pay (tax rate). This behavior results in a counterintuitive observation: The deterring dictator, using choking taxes, has a *larger* military machinery than the fighting

Figure 4: Militarization (left) and defense (right) depending on s_F and inequality



Source: Own illustration with $A = 5$, $T = 10$, $\mu = 0$, and $a = 1/2$.

dictator (see Figure 4, left side). Consequently, the former does not use the military to deter the opponent with her military clout but the military is simply used as a justification for wasting wealth in order to discourage the opponent from an attack.

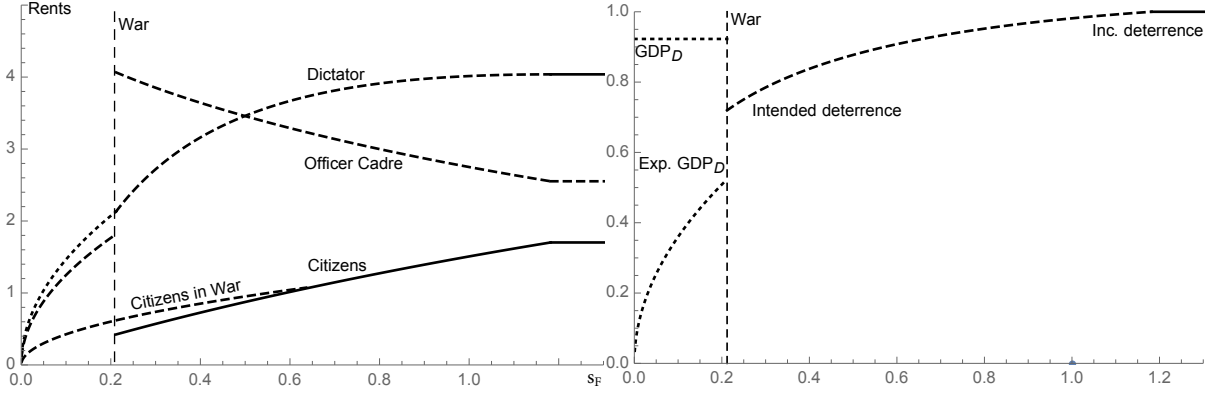
In this regard, the right side of Figure 4 reveals additional interesting results. First of all, by maintaining a military for redistribution, irrespective of the threat's level, the dictator already deters less-powerful foreign countries ("Incidental deterrence" area above the upper solid line in Figure 4, right side). Apart from that, the society's defensive capabilities are affected by the distribution of income-earning ability and, thus, are closely linked to the domestic actors' relative positions of power, measured by their shares on rents. Our model shows that societies with extreme equal or unequal distributions are more attractive to foreign conquerors *and* to domestic dictators. For the latter, this higher value also increased the need for deterrence in both situation. However, there are considerable differences in detail: Dictators from more equal societies are more endangered but are able to deter with efficient tax rates ("Efficient deterrence" area), whereas their counterparts from more unequal societies are less endangered but almost always need to deter opponents with inefficient tax rates ("Deterrence by constriction" area).

Regarding societies with medium levels on inequality, their defensive capabilities depend on the positions of the military elite and of the civil society (i.e., citizens). In societies with medium-high level of inequality, the officer corps receives relatively high rents and deterrence is comparatively easy. In contrast, the civil society remains the relatively highest share of rents for medium-low levels of inequality but those are also quite attractive to foreign conquerers. Interestingly, dictators from those societies are less willing to deter foreign threats. In other words, deterrence and, thus, secure payoffs are less attractive for smaller rents available and the autocrats then risk war in order to potentially get higher payoffs in reach. Dictators from more unequal societies are, instead, almost always able to deter external aggressors. For those dictators, war is only an option if the foreign country can attack more or less without costs (see “Fighting” area under the lower solid line in Figure 4, right side).

Besides, our model allows for another interesting interpretation, which could partly explain, why some dictators “slide” in – for them – unbeneficial wars. Regarding the decision between war and deterrence, we identify two possible sources for conflicts in our society: (i) between the dictator and the officer corps and (ii) between the dictator and her citizens. Unlike the dictator, whose payoffs decrease with a rising foreign threat, the officer corps’s payoff is, without war, the higher the larger is the foreign threat (see Figure 5). At the same time, the officer corps should be an important advisor on military issues. Hence, the officer corps has an incentive to exaggerate the threat by the foreign country because this makes the dictator enlarging the military (Figure 4, left side).

This is, however, a potentially dangerous undertaking if it is taken into account that, outside our model, the officer corps should only be imperfectly informed about the dictator’s beliefs on the state of society. If the officer corps wrongly estimates the dictator’s beliefs about the opponent’s strength the former could become convinced that war is inevitable,

Figure 5: Payoffs, welfare (left), and GDP_D (right) depending on the foreign threat



Source: Own illustration with $A = 5$, $T = 10$, $\sigma = 1$, $\mu = 0$, and $a = 1/2$.

what maybe be just trigger a war. Due to that critical consequences, such a strategy is, as illustrated by Figure 5 (left side), dangerous for the officer corps: At the tipping point between war and peace (dashed vertical line), the dictator's payoffs only change slightly when a war breaks out. Hence, choosing war creates no real obstacles for her but is much worse for the officer corps. As the latter's payoff depends on the military manpower, which is, as we already mentioned before, considerably reduced in times of war, the officer corps's payoff also decreases in those situations. Regarding the impact of inequality, officer corps in more unequal societies are less endangered that this strategy may fail because (rational chosen) wars are more or less impossible for more unequal distributions.

However, the risk of an undesired war becomes actually more urgent if the second source of conflict is taken into account. Figure 5 (left side) also illustrates that, quite surprisingly, the citizens are more war-prone than the dictator or the officer corps. As we can see from that, the citizens prefer war well before the dictator. By relying on inefficient taxes for deterrence, the dictator squeezes her citizens so heavily that the latter even prefer war to force the former to loosen her grip. In this regard, war acts as a relief for the economy and GDP_D and the citizens' rents at wartimes are higher than with deterrence using choking

taxes. Based on these consideration, the option of an undesired and unbeneficial war, caused by an officer corps exaggerating the opponent's strength, citizens' demands and the dictator's indifference between war and peace, should be definitely realistic.

4 Conclusion

In this paper, we developed a model that considers the impact of both, vertical inequality and foreign military threats, for the analysis of kleptocracies, which rulers form an alliance with the military. This extends the literature by enabling us to analyze the impact of vertical inequality on, first, the dictator's ability to introduce extractive institutions and, second, her defensive capabilities and, thus, on the likelihood of interstate war. Especially the second point was hitherto hardly addressed in the literature.

Our results allow for the conclusion that the relation between inequality on one side and the dictator's relative power and her defensive capabilities on the other are more complex than expected. According to our results, dictators in extreme unequal and extreme equal societies have to invest greater efforts to deter foreign threats but also have higher potential gains. Put differently, societies, which are more valuable for the dictator, are also more valuable for foreign conquerers and, thus, harder to defend *et vice versa*. At the same time, societies with medium levels of inequality may be less lucrative *for small threats* but easier to defend and, thus, may be more attractive *for larger threats*. On the other side of the story, somewhat higher inequality is beneficial for the citizens, too, as it restricts the dictator's extraction and, thus, increases the citizens' share of the rents and their welfare. However, those improvements do not come without a downside. We also show that the autocrat is less willing to deter foreign threats for smaller rents and, hence, the risk of war becomes urgent. This allows for the interpretation that autocrats behave riskier (i.e.,

choose to gamble with the opportunity of higher profits instead of settling for the secure payoffs) for smaller gains in order to make up for the lower rents available.

Besides that, we are also able to offer an explanation for the poor economic outcomes caused by highly inefficient economic policies, which are symptomatic for many kleptocracies (see, e.g., Acemoğlu et al., 2004; Egorov and Sonin, 2011). According to our results, autocrats can use taxes for deterrence. For large military threats, autocrats have incentives to impose bad economic policies (here: inefficient high tax rates, choking the economy) because a ruined economy is less attractive to foreign countries to overtake but still more lucrative than a war-torn society for the dictator. This motivation, to use the military only as a measure to waste wealth, becomes more apparent if the military manpower for deterrence is compared to that of war: For an actual war, the dictator scales her military down and maintains a smaller military for actual fighting. Based on our results, we thus argue that those highly inefficient economic policies are not side effects of kleptocratic rent maximization. Instead, those policies are an atrocious but rational chosen way of governance, which secures the autocrats grip on power against foreign threats. Put exaggeratedly, those autocrats are not just indifferent regarding their citizens' well-being but they rather use their citizens' suffering as a weapon by implementing a continuous policy of scorched earth.

As mentioned at the beginning of this paper, the North Korean regime is the perfect role model for our considerations. We argued at the beginning that an eventual reunification of both Korean countries poses a threat to the North Korean regime similar to the foreign military threat of our model (i.e., the regime loses its access to rents). At the same time, although the general population suffers, the Kim clan embezzles large funds and relentlessly pursues a military-first policy resulting in around 5% of the population in active duty but equipped with outdated deteriorating conventional military technology. Hence, the North

Korean military is a “weakened force” (SecDef, 2012, p. 18), there is a “widening military disparity” (SecDef, 2012, p. 13) and an “expanding gap in national power compared to South Korea” (SecDef, 2015, p. 4). Consequently, its capabilities are only sufficient for limited military operations outside its own territory and, hence, its foremost purpose is to secure the rule of the Kim clan by deterring foreign threats (SecDef, 2017).

This situation fits into our model quite perfect. According to our results, autocrats can use the military to redistribute funds and are also able to extract more rents from society this way. At the same time, we show that the incentive to enlarge the military for redistribution is the larger the higher is inequality in a society. Even if there is no reliable data on inequality in North Korea it is definitely acceptable to assume a very unequal distribution of income-earning ability due to the restrictive official discrimination on the basis of social classes in the North Korean society.¹⁴ This could partly explain the large size of the North Korean military. However, its extreme oversize and its simultaneous weakness should not be just results of those considerations. Instead that could be measures to deter threats from South Korea or the USA. By maintaining a large military in connection with its nuclear weapons, the North Korean regime is able to make Southern/US military operations in the North extremely costly and, thus, to deter them from a regime change by military means.

However, this should not deter South Korea from pushing for a reunification by other means (e.g., accelerating North Korean internal conflicts) because the costs for triggering a reunification this way should be very low and are not affected by the North Korean military

¹⁴This practice is called “Songbun” and North Korean citizens are assigned to 3 main and around 50 sub-groups, based on their own behavior but also depending on the behavior of relatives and ancestors. Members of the highest class are “given priority in every known social welfare and support category” (Collins, 2012, p. 7). For example, only they are allowed to attend university (Hunter, 1999). At the same time, while downgrades due to several offenses are quite common and affect the whole extended family, improving songuns are rare occurrence (Collins, 2012). This should result in a very unequal distribution of opportunities.

virtue.¹⁵ Here, we argue that, instead, the extreme oversize of the North Korean military in connection with the massive mismanagement of public resources choke the economy and deter the South of the prospect of a reunification due to its high costs. In other words, the North Korean regime is probably able to secure its own survival by crippling its own economy and, as a result, devastating the prize of reunification. This correspond to our model's prediction of actors choking their economy for very small foreign costs of conflict.

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¹⁵These are the costs to trigger a reunification, not its follow-up costs.

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