A Model of Political Uprisings

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Abstract

Political violence is ubiquitous in many regions of the world, in particular the Middle East. This paper makes two contributions to our understanding of the outbreak of civil conflicts. We first extend the authoritarian bargain model to include uncertainty regarding the potential transfers available to the ruler to appease popular discontent. In our model, citizens care more for their "share of the pie" than the absolute size of the bargain transfer. We also expand the set of policies available to the ruler by including political repression. The second contribution is empirical: contrary to most of the literature, we use discrete-variable dynamic panel data models to consider that the likelihood of observing a civil war in a country at any point in time depends on having observed a conflict in the previous periods. This allow for proper modelling of unobserved heterogeneity, in particular with regards to initial conditions.

ملخص

ينتشر العنف السـياسي في كثير من مناطق العالم، ولا سـيما الشـرق الأوسـط. تقدم هذه الورقة مسـاهمتين في فهمنا لاندلاع الصـراعات الأهلية. نوسـع أولاً نموذج الصـفقة الاسـتبدادية ليشـمل عدم اليقين فيما يتعلق بالتحويلات المحتملة المتاحة للحاكم لإرضاء السـخط الشـعبي. في نموذجنا، يهتم المواطنون بـــ «نصيبهم من الفطيرة» أكثر من الحجم المطلق لتحويل الصـفقة. كما نوسع مجموعة السـياسـات المتاحة للحاكم من خلال تضـمين القمع السـياسي. المسـاهمة الثانية تجريبية: على عكس معظم الأدبيات، نسـتخدم نماذج بيانات ديناميكية متغيرة منفصـلة لاعتبار أن احتمال مراقبة حرب أهلية في بلد ما في أي وقت يعتمد على ملاحظة صـراع في الفترات السـابقة. ويسـمح ذلك بوضـع نماذج سليمة لعدم التجانس غير المرصود، ولا سيما فيما يتعلق بالظروف الأولية.

1. Introduction

During the past 50 years political violence was ubiquitous in many regions of the world, in particular Africa, the Middle East, and Latin America. Between 1960 and 1990, the number of countries suffering from civil war tripled, as shown in Figure 1, largely reflecting the impact of decolonization and the Cold War. Subsequently, there was a significant decline in conflicts until the mid 2000s, when the number of civil conflicts started to rise again. By 2019 there were over 25 ongoing civil wars.

This paper makes two contributions to our understanding of the outbreak of civil conflicts. We first extend the authoritarian bargain model of Desai (2009) to include uncertainty regarding the potential transfers available to the ruler to appease popular discontent and expand the policy choices available to the incumbent when offering a political bargain to the citizens. We include the fact that, when deciding to attempt an overthrow of the incumbent, the citizens are unsure about the total amount of resources available to the ruler for political bargaining and must make a conjecture based on available information. If relative to the other individuals the transfer offered by the incumbent is below (above) the expected value, the individual will reduce (increase) the support for the ruler; that is, the individual cares primarily for his "share of the pie" and less for the absolute size of the transfer. In our model the support for the ruler is endogenous and subject to economic and informational shocks. We also expand the set of policies available to the ruler by including political repression. The incumbent can spend resources to increase the cost of a violent conflict for the citizens, thus reducing the appeal of an overthrow attempt.

The second contribution of this paper is empirical. As customary, we use a binary variable to identify countries in civil war. The empirical literature on conflicts has typically used static Probit or Logit techniques for discrete dependent variable to estimate empirical models and has largely ignored the dynamic nature of conflicts. It is nevertheless quite obvious that civil conflict is a persistent phenomenon and that the likelihood of observing a civil war in a country at any point in time depends on having observed a conflict in the previous periods. In this regard, history matters which our model takes into account. *Our dynamic panel data models* have two additional benefits vis-à-vis other estimation techniques. This class of models allow for proper modelling of unobserved heterogeneity, which characterize the use of cross-country data, in particular when modelling initial conditions for which there is no previous information. Furthermore, the estimated models allow for identifying the impact of changes in the fundamental determinants of conflict –such as political polarization or resource rents—on the transition from peace to civil war and vice-versa, as well as on the expected duration of a conflict.

Figure 1. Countries in Civil War, 1960-2019
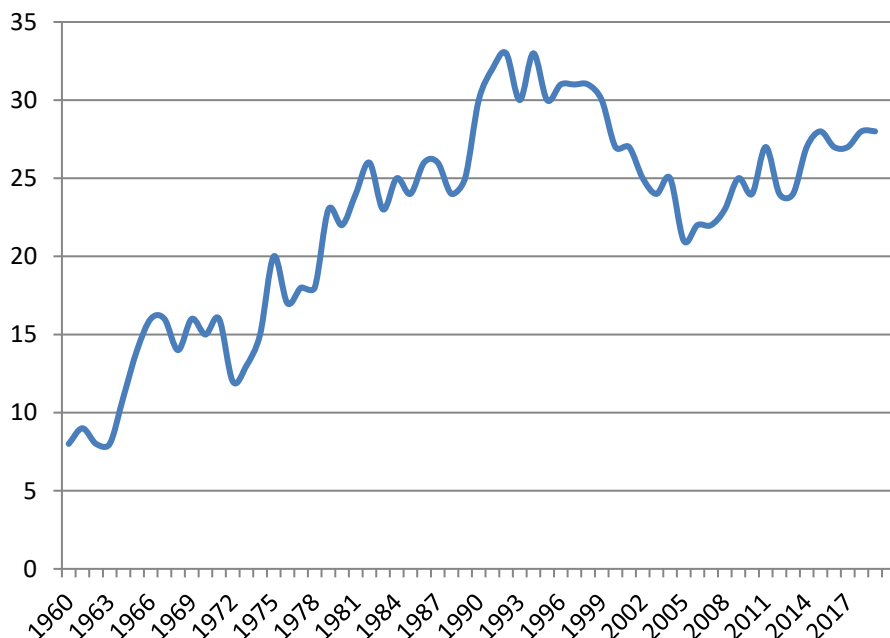
Source: Authors' elaboration based on data from UCDP/PRIO (2022).

The paper is organized as follows. Section 2 provides a brief description of the different theories on the outbreak of civil wars and authoritarian bargaining, as well as the main results of the empirical literature. Section 3 presents our theory, highlighting the role of ideology, resource transfer, uncertainty, and repression, and the main insights it provides to our understanding of the outbreak of civil violence. In section 4 we take our model to the data using a sample of 125 emerging economies observed during the period 1990-2019 (we exclude industrial economies and the anomalous years of the Covid pandemic). Section 5 concludes.

2. The received knowledge

The literature on the determinants and consequence of civil conflicts is vast and there are good surveys of both theoretical models (e.g., Fearon 1995, Garfinkel and Skaperdas 2007, Bodea and Houle, 2023) and empirical results (e.g., Blattman and Miguel 2010, Couttenier and Soubeyran, 2015, Makdisi and Soto, forthcoming). In what follows we provide a summary of its main insights, aiming at supporting the theory we develop below.

Models of civil conflicts can be categorized according to two main traditions, grievances and greed. Our theory fuses the salient elements of these two traditions. First, there is a long-standing literature focusing on current inequities and past misdeeds –by the government on the population, or among political groups—as the source of grievances which, under certain conditions, can spark a civil war. Grievances reflect in political, ethnic, or social polarization,

sectarianism and exclusion from political life, and income and wealth inequities. The role of ethnic divisions in the onset of civil wars has been thoroughly investigated but the evidence is unclear (Montalvo and Reynol-Querol, 2005; Cederman et al., 2011). Similarly, studies that have assessed the relationship between inequality and civil war empirically have reported both positive and negative findings (Østby, 2008; Wimmer et al., 2009, among others). Bodea and Houle (2023) observe that recent advances in studying the role of grievance are driven by the goal of understanding the way economic inequality is overlaid by social factors, and conclude that the results from this more novel literature dismiss the notion that grievance has only a limited role in explaining the onset of civil war.

Second, Collier and Hoeffler (1998) pioneered the vast literature describing wars as the result of strict economic calculus –the greed motive—whereby agents engage in violence when they have both the opportunity and the capacity to overthrow the government, as well as the expectation of collecting some valuable reward (e.g., capturing land, industries, or an economic resource, diverting government resources towards constituencies, etc.). In this vein, Fearon and Laitin (2003) advance the hypothesis that opportunity structures created by weak state capacity can be a cause of civil war onset, and find supporting evidence in favor of insurgency as a mechanism.

Among the economic causes of conflict, natural resources figure prominently. Several channels tie natural resources to conflict. Collier and Hoeffler (1998) argue that natural resources may lower the startup cost of war and provide rebels with an easy way of financing conflicts. Natural resources may also make the state a more lucrative prize for capture, further decreasing the opportunity cost of insurgency (Ross, 2006). More resources may soften the government's budget constraint, thereby increasing state capacity and the associated capacity to tame potential opponents (Bazzi and Blattman, 2014). De Luca et al. (2018) observe that in resource-rich societies, an autocratic ruler may find an internal conflict an acceptable cost to bear in terms of foregone tax base, in order to maximize the tax rate. Acemoglu et al. (2004) suggest rulers implement profitable kleptocratic policies by weakening the opposition via selective incentives given to constituencies, thereby making it impossible for a successful challenging coalition to emerge. Padro i Miquel (2007) considers the case where the fear to fall under an equally inefficient and venal ruler that favors another group is sufficient to discipline supporters of the incumbent. By dampening the livelihood of the other ethnic groups, the ruler obtains support from his own group and still manages to extract rents from them. Rulers may increasingly seek the support of counter-elites while stepping up repression of the population at large, resulting in lower levels of conflict (Bove et al., 2017).

The observation that natural resources figure prominently in conflict-afflicted societies – where rents are around twice as high as in non-conflict nations according to World Bank, 2023— belies the fact that several richly-endowed countries remain peaceful, and indicates

the need to look for other factors that may be at work .Collier and Hoeffler (1998) suggest that states with low GDP per capita are more likely to experience civil war, because low average income makes earnings through conflict a more lucrative prospect. In fact, per capita income is commonly found to be an important predictor of civil war (Sambanis and Hegre, 2006). Countries in conflict have not only a lower level of GDP and often anemic growth, but also tend to display chronic malaises and imbalances. Unemployment –in particular, youth unemployment—has been identified as capable of fueling political violence: the unemployed would have a lower alternative cost of participating in violent activities (Urdal, 2006; Cramer, 2011) and, possibly, obtain a higher return from violence (Yair and Miodownik, 2016).

De Soysa and Fjelde (2010) argue from an opportunity-cost perspective that the payoffs to rebellion are structured by how an economy is governed. Closed economies are likelier than more open ones to accumulate 'rebellion specific capital' because of high payoffs to organization in the shadows. They find that countries more favorable to free enterprise have a reduced risk of war onset, a result that is robust to the inclusion of institutional quality, per capita wealth, and sundry controls.

Other authors claim that corruption breeds violent conflict (Collier and Hoeffler, 2004; Fearon and Laitin, 2003), while others find evidence for the opposite, namely that conflict provides space for corruption to flourish (Lohaus and Bussman, 2021). Beyond corruption issues, Oberg and Melander (2010) argue that autocratic regimes rely on various government agencies to inform them about the state of public opinion and that this makes the quality of the government bureaucracies important for the maintenance of civil peace in autocratic states. The idea is that more autonomous and meritocratic bureaucracies provide better the information needed to devise strategies and policies that reduce the risk of violent challenges to government power.

Long-term economic transformations may also play a role in sparking conflict. Vestby et al. (2021) suggest that civil struggles may arise when modern, dynamic sectors expand in backward, traditional economies: while in the modern sector high labor productivity facilitates labor mobility and wage growth, thus reducing the viability of rebellion, in the traditional sector low opportunity cost and high share of immobile wealth increases conflict risk.

The theory we develop in what follows aims at integrating greed and grievance motives for violent uprisings, showing that these explanations need not be mutually exclusive but that indeed they interact, complement, and reinforce each other.

3. A Theory of Civil Conflicts

We extend the work of Desai et al. (2009) and Soto (2019) and posit a game between an incumbent and the citizens[4], where political power entails command over the allocation of economic rents (e.g., arising from natural resources) as well as the authority to implement non-market policies.

According to the classical greed motive[5], while control of economic rents would allow the incumbent to increase his welfare, sharing a fraction of such rents with his constituency would rally political support for him and lower the probability of success of an overthrow attempt. Rent sharing can take many forms, including direct transfers as well as guaranteed public jobs at a wage premium, labor market protection in the private sector, subsidies for schooling, housing, and utilities, gifts in the form of land, etc.

On the other hand, the incumbent's wish to enact non-market policies reflecting his "ideological" preferences (e.g., religious, political, social, or ethnical) which may not match those of the citizens, thus leading to grievances as a motive for political struggle.[6] Grievances take the form of sense of alienation, mortifications from corruption, affronts to dignity and the repression of family members at the hands of the state, among other factors (Cammett and Salti, 2018).

These two motives for political struggle are the main concerns for the ruler and will guide his policy decisions. We then assume that the (welfare) utility of the incumbent can be described by:

$$(1) \qquad U_i(R_t - S_t - a_t) + v_i(x_t | x_i^*)$$

where R_t represents the available rents, S_t is the total transfer offered to citizens[7], a_t is the amount of resources devoted to political repression, x_t is the ideological policy variable, and x_i^* is the incumbent's ideal ideological policy. Equation (1) indicates that utility is separable

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[4] We treat citizens as one unit and abstract from the case of political violence among groups of citizens. Acemoglu et al. (2010) and de Luca et al. (2018) explore this issue using models that, contrary to our theory, ignore the role of uncertainty in the decision to attempt an overthrow.

[5] The classic greed motive for civil conflict is eloquently discussed in Collier and Hoefler (2004) which conclude that civil wars can be expected to break out where the opportunity costs of fighting are low because of poverty and where wartime gains stemming from looting of natural resources lead to personal enrichment and financing of rebels' combat activities. This opportunity logic is more likely to erupt in weak states than in those with stable and resourceful governments.

[6] Dyrstad and Hillesund (2020) organize the vast empirical literature on grievances in two groups: those arising from socioeconomic inequalities and those resulting from ethnic political exclusion. The assumed mechanism is that that intergroup inequalities motivate people to challenge the status quo and increase the opportunity to do so because grievances that are linked to strong identity groups facilitate leadership, successful collective action frames, group solidarity and anger, and the activation of preexisting social networks and organizations.

[7] The incumbent offers a transfer $s_{i,t}$ to each individual in society, such that $S_t = \sum s_{i,t}$.

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and concave in each argument. We assume that the incumbent experiences disutility from sacrificing on ideological matters and, therefore, $v_i(x_t|x_i^*) < 0$; when the incumbent can impose his ideal policy $v_i(x_i^*|x_i^*) = 0$. As discussed below, the incumbent´s spending on political repression acts as a deterrence to citizens to engage in political violence.[8]

The welfare of the citizens depends on consumption (net of the resources devoted to violence in the case of an uprising), the amount of transfers received from the incumbent, and the type of non-market policy implemented by the authorities. Utility is separable and concave in each argument.[9] The incumbent offers a bundle (s_t^i, x_t) to each of the "i" citizens, which we call the "political bargain". Note that the citizens are not informed of total rents (R_t) nor of total transfers (S_t) and must make a rational conjecture about the latter, which we discuss below. Citizens can accept the offer (peace scenario) or reject it and attempt at overthrowing the incumbent (conflict scenario). In what follows we discuss the payoffs of these scenarios.

Peace Scenario

If the bargain is accepted, then the welfare of the citizens will be:

(2) $W_c(C_t + S_t) + v_c(x_t|x_c^*)$

where $W_c(C_t + S_t)$ is welfare from private consumption[10] and transfers and $v_c(x_t|x_c^*)$ is the utility derived from ideological policies, given the citizen's ideal concerning ideological issues, x_c^*.[11] We normalize $v_c(x_c^*|x_c^*) = 1$. Note that, unless $x_t = x_i^*$, the ideological component of the political bargain always increases welfare, from satisfying all or part of the ideological demands of the citizens.

Conflict Scenario

The alternative to accepting the political bargain is to attempt at overthrowing the incumbent. Recurring to violence entails paying a cost of $m\{a_t\}$ in terms of consumption, which is pure waste: as the incumbent increases its expenditures in political repression, citizens pay a higher cost of an attempt at overthrowing the government $[m'_{a_t} > 0]$.[12]

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[8] Authoritarian regimes do not rely exclusively on repression as it is a costly policy (Fjelde, 2010)
[9] Following Acemoglu et al. (2004), we assume that all citizens act in cohesion in the political game. This is a natural assumption here, since there are no individual costs of political action, and all agents within a group have the same preferences, so there is no free-rider problem.
[10] Without loss of generality, we assume private consumption to be exogenous but stochastic.
[11] Since the model considers a representative agent of the citizens, the transfer offered by the incumbent is to be allocated to all members of a group. We do not dwell into the details of this inner group transferring process. Nevertheless, transfers –and thereby support for the incumbent—will be smaller as groups grow larger, suggesting a negative correlation between population density and political stability, for any given size of transfers.
[12] In what follows, we use the prime mark to denote the first derivative of a function $f(\cdot)$, i.e., $f'(\cdot)$.

If the attempt is successful and the incumbent is overthrown, then citizens capture all rents and implement their preferred policy:
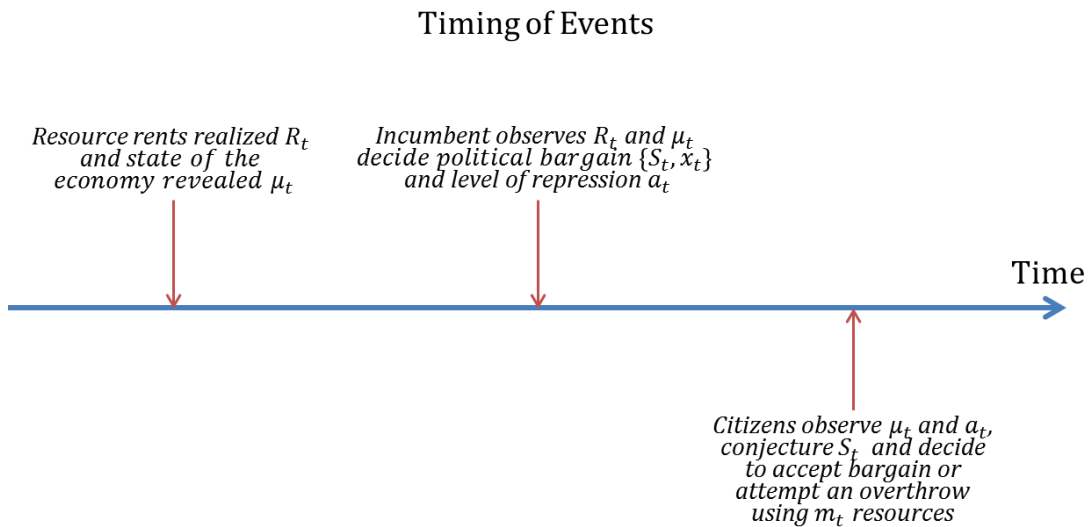
(3) $W_c(C_t + R_t - m\{a_t\}) + v_c(x_c^*|x_c^*)$

If unsuccessful, the incumbent does not provide any transfer to the citizens $(S_t = 0)$ and enacts his ideal ideological policy $(x_t = x_i^*)$. The citizens obtain only $W_c(C_t - m\{a_t\})$ since $v_c(x_i^*|x_c^*) = 0$.[13]

Timing of Events

The timing of the game is depicted in Figure 1. First, the level of resource rents is revealed to the incumbent but not the citizens, and the state of the economy is revealed for both. Next, the incumbent decides on the political bargain: having observed the total level of resources available, the incumbent decides the total amount to be transferred to the citizens, as well as the ideological policy. The incumbent also decides the amount of resources allocated to political repression (e.g., spending on the armed forces or the police). Finally, the citizens decide whether to accept the bargain offered by the incumbent (peace scenario) or attempt an overthrow of the regime by sacrificing some consumption in order to finance political violence (conflict scenario). The latter has only a probability of being successful that, as described below, depends on the state of the economy as well as on the political allegiance that the incumbent can raise by transferring resources to the citizens.

Figure 1

Timing of Events

Resource rents realized R_t and state of the economy revealed μ_t

Incumbent observes R_t and μ_t decide political bargain $\{S_t, x_t\}$ and level of repression a_t

Time

Citizens observe μ_t and a_t, conjecture S_t and decide to accept bargain or attempt an overthrow using m_t resources

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[13] The model can easily be extended to allow for $v_c(x_i^*|x_c^*) < 0$, i.e., the case when the preferred ideology of the incumbent directly reduces the welfare of the citizens.

The uprising is successful with probability $p(z_t, \mu_t)$, which depends inversely on the political support given to the incumbents by the citizens, z_t, and directly on the general state of the economy, μ_t, which we summarize using the unemployment rate.[14] Desai et al. (2009) assume that the probability of success is fixed and exogenous. Soto (2019) allows for the probability to be endogenously determined but only by the size of transfers. We extend Soto's analysis to have a more realistic situation where the probability also depends on the general state of the economy and responds to macroeconomic shocks that are beyond the realm of the government (e.g., an external shock that raises unemployment, lowers private consumption, and thereby fuels discontent).

Political support for the incumbent is endogenously determined as a function of the expectations on the total transfer (fully described below): the higher the support for the incumbent, the less likely that an overthrow attempt is successful ($p_z' < 0$). Economic hardships also increase the probability of success because the alternative cost of dedicating time to rebel is lower ($p_\mu' > 0$)[15] or because they fuel political grievances that would, in turn, give rise to violent behavior (Bodea and Christian, 2023). The following expected utility of the citizens arises from an overthrow attempt:

(4) $p(z_t, \mu_t)[W_c(C_t + R_t - m\{a_t\}) + 1] + (1 - p(z_t, \mu_t))[W_c(C_t - m\{a_t\})]$

The citizens will not attempt at overthrowing the government if the welfare from accepting the political bargain (peace scenario in equation 2) is higher than the expected benefit from rebelling (conflict scenario in equation 4). When determining the political bargain, the incumbent is aware of the economic calculus by the citizens and, consequently, a successful political bargain equilibrium which avoids the risk of an overthrow attempt is the solution to the following optimization problem for the incumbent:

(5) $max_{S_t, x_t, a_t} \; U_i(R_t - S_t - a_t) + v_i(x_t | x_i^*)$
       s.t. $W_c(C_t + S_t) + v_c(x_t | x_c^*) \geq$
            $p(z_t, \mu_t)[W_c(C_t + R_t - m\{a_t\}) + 1] + (1 - p(z_t, \mu_t))[W_c(C_t - m\{a_t\})]$

[14] Alternatively, one can model probabilities as in a Tullock contest. Feng and Liu (2017) show that the equilibrium is unique in a 2-player game, even when valuations and discriminatory power are asymmetric.
[15] A standard explanation for uprisings –in particular, the Arab Spring—relies on the notion that high and chronic unemployment –in particular, youth unemployment—fuels political violence because, according to strict economic calculus, the unemployed would have a lower alternative cost of participating violent activities. (Cramer, 2011; Urdal, 2006).

Endogenous Political Support for the Regime

Before discussing the insights of the model, it is necessary to specify the nature of the political support given to the incumbent. Consider that there are a large number of identical individuals in society, each providing support to the incumbent with intensity between 0 and 1. Our key assumption is that *the support given by each individual to the incumbent depends on the relative size of the transfer received vis-à-vis that of the rest of the individuals* (i.e, his "share of the pie"). Each individual observes the received transfer ($s_{i,t}$) but is uncertain about the total size of transfers (S_t) and must form a conjecture in order to determine if his relative position –and thereby the support for the regime—has changed. Let $\mathbb{E}(S_t|\Omega_{t-1}, s_{i,t})$ be the conjecture of the total transfer based on the available *public* information[16] (Ω_{t-1}) and the *private signal* received, $s_{i,t}$.[17] The offer of support of the representative individual i at time t, $z_{i,t}$, would thus take the following simple form (in logs):

(6) $z_{i,t} = \gamma\left(s_{i,t} - \mathbb{E}(S_t|\Omega_{t-1}, s_{i,t})\right)$

Parameter γ is positive indicating that support increases with a higher (expected) share of the pie. Consider the case when the rents of the natural resource dwindle, and the incumbent is forced to reduce the total transfer to the citizens. The individual observes his cut in transfers but not the decline in the total transfer and, therefore, must guess whether the received transfer maintains his share of the pie. Support will reduce if the expected relative share of the pie declines. Likewise, during a bonanza (e.g., a commodity price boom) the individual would assess if he is getting his fair share of the windfall.

Individuals, therefore, must forecast the size of the total transfer. We assume that while they may make mistakes when forming their conjecture of the total transfer, they do not make systematic errors. Then, it must be the case that:

(7) $S_t = \mathbb{E}(S_t|\Omega_{t-1}) + \varepsilon_t$

where ε_t denotes a purely random error-term, with zero mean and constant variance (σ_ε^2). We discuss the nature of this variance and its impact on the strategies of the ruler below.

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[16] Note that public information contains only information at t-1 and, thereby, excludes current resource rents or expenditures in political repression.

[17] We assume that it is not in the interest of the individual nor feasible to inform others about the received transfer. This verifies in reality where, while some transfers can be easily quantified (e.g., subsidies for schooling, housing, and utilities, or gifts in the form of land), others are rather difficult to assess (e.g., guaranteed public jobs at a wage premium, labor market protection in the private sector, access to profitable businesses).

It is also reasonable to assume that the transfer received by each individual is stochastic, since it usually contains non-monetary benefits, such as allowing citizens to operate profitable businesses, various forms of cronyism, partaking in government spending, or receiving public jobs and wages (Hall, 2020). A simple way to include this element is to consider that, while the incumbent aimed at giving each individual a specific transfer s_i, actual individual transfers may deviate from its target by a random shock, $v_{i,t}$, with zero mean and constant variance (σ_v^2). That is, $s_{i,t} = s_i + v_{i,t}$. Summing all over the individuals, it must be the case that $\sum v_{i,t} = 0$.

Consequently, individuals observe a composite error ($v_{i,t}$ and ε_t), and their problem is deciding how much of this composite error is due to mistakes in forecasting the aggregate transfer level ($\varepsilon_{i,t}$) and how much is due to the relative transfer shock ($v_{i,t}$).[18] Note that only the latter leads to altering the support to the incumbent. The solution comes in the form of a "signal extraction"; as shown in Lucas (1973) among others[19], the conditional expectation of the size of the transfer is optimally formed using Bayes rule as:

(8) $\mathbb{E}(S_t|\Omega_{t-1}, s_{i,t}) = (1 - \theta)\mathbb{E}(S_t|\Omega_{t-1}) + \theta s_{i,t}$ where $\theta = \dfrac{\sigma_\varepsilon^2}{\sigma_v^2 + \sigma_\varepsilon^2}$

This expectation is a weighted average of the private information included in the transfer received by the individual and the public information used to form the expectation of the total transfer available. The weight depends on the relative variance (or uncertainty) of the private and public information, θ, such that, when forming expectations, the individuals will assign more value to those components that are less uncertain.

In this case, because θ is decreasing in σ_v^2, the incumbent has an interest in keeping individual transfers as steady as possible and/or make public information as opaque as possible. This would explain why incumbents prefer to adjust public investment as opposed to public employment and/or wages when necessary. The logic in equation (8) matches the empirical evidence. Williams (2011), among others, show that in countries where resource rents are sizable government policies tend to be much less transparent than in other economies.

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[18] We assume that the probability distribution functions of $\varepsilon_{i,t}$ and $v_{i,t}$ are common knowledge and that γ does not vary among individuals.

[19] Bao and Duffy (2021) report on an experiment examining whether individuals can solve a simple signal extraction problem of the type in this paper and conclude that, at the aggregate level, signal extraction provides a good characterization of subjects' behavior, but at the individual level, there is considerable heterogeneity in subjects' ability to perform signal extraction.

Opacity makes public information less reliable and increases the relative value of the private signal. [20]

The support that each individual gives to the incumbent is $z_{i,t} = \gamma\theta\left(s_{i,t} - \mathbb{E}(S_t|\Omega_{t-1})\right)$ and the collective support for the incumbent when aggregating across all individuals is:

(9) $\qquad z_t = \gamma\theta(S_t - \mathbb{E}(S_t|\Omega_{t-1}))$

This equation indicates that the incumbent can only increase political support if actual transfers are higher than expected: whenever transfers are lower than expected, political support dwindles. Note that the change in support provided by an additional unit of transfer is $\gamma\theta$. In addition, the larger it is γ, that is the tighter it is the connection between allegiance and transfers, the less valuable is a revolt for the citizens.

Therefore, the political bargain for the incumbent takes the following form:

(10) $\qquad max_{S_t,x_t,a_t} U_i(R_t - S_t - a_t) + v_i(x_t|x_i^*)$
$\qquad$ s.t. $W_c(C_t + S_t) + v_c(x_t|x_c^*) \geq$
$\qquad\qquad p(S_t, \theta, \mu_t)[W_c(C_t + R_t - m\{a_t\}) + 1] + \left(1 - p(S_t, \theta, \mu_t)\right)W_c(C_t - m\{a_t\})$

Main Insights of the Theory

An analytical solution of this model is not possible without identifying utility functions $U_i(\cdot)$ and $W_c(\cdot)$, as well as the ideological-policy valuation functions $v_i(\cdot)$ and $v_c(\cdot)$. Still, we can learn much from our theory of uprisings by scrutinizing the first order conditions of equation (10), as shown in Appendix A. The following are the main insights:

A. For any given level of resource rents and ideal policies, an increase in transfers to the citizens lowers the consumption and utility of the incumbent, but it raises the payoff of the peace scenario for the citizens and his political support, thereby reducing the probability of a successful overthrow of the regime. This is the capital policy trade-off for the incumbent and its first maneuvering margin.

B. For any given level of resource rents and transfers, ideological concessions to the citizens raises the payoff of the peace scenario, making less likely to observe an attempt at overthrowing the regime. Aligning the ideal ideological policies of the incumbent to that of the nationals would reduce the (sacrifice) cost of securing political allegiance. Alternatively, transfers can be used by the incumbent to counterbalance the political cost

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[20] Vadlamannati, K.C. and I. De Soysa (2016) find evidence among 128 economies that, after accounting for democracy and quality of institutions, countries deriving rents from natural resource are, indeed, less likely to adopt freedom of information laws.

of imposing his ideal policies over those of the citizens. This is the second maneuvering margin of the incumbent.

C. For any given level of resource rents and ideal policies, an increase in spending on political repression lowers the utility for the incumbent but it raises the cost of an attempt at overthrowing the government by violence. This is the third policy trade-off of the incumbent.

D. For any given level of resource rents, ideal policies, and transfers, the incumbent would like to secure the trust and loyalty of citizens. Beyond the amount of money transferred, the incumbent would like that citizens highly trust the information value of the individual transfer and disregard the publicly available information. Consequently, the incumbent would highly favor stable and predictable links with ethnic, regional, social, and religious interest groups and would be reluctant to change prior commitments on the "share of the pie". This is the fourth maneuvering margin of the incumbent.

E. For any given level of resource rents, ideal policies, and transfers it is less expensive for the incumbent to raise political support when citizens find it difficult to estimate the actual size of resource rents and, thereby, available transfers. Information opaqueness works in favor of the incumbent. This would explain why incumbents tend to be reluctant to release information vis-à-vis the size of resource rents and, in particular, commodity exports. This is the fifth policy trade-off of the incumbent.

Despite the numerous margins that the incumbent can use maintain political control over the citizens, he is subject to shocks that are beyond his control and that may impinge on his ability to remain in power. In particular:

F. For any given level of resource rents, ideal policies, and transfers a negative exogenous shock to the economy –that lowers employment and/or real wages—increases the probability of an uprising because it lowers the alternative cost of engaging in violence. It has become customary to blame unemployment –in particular, youth unemployment— for fueling political violence in MENA countries (Cramer, 2011; Urdal, 2006). According to strict economic calculus, the unemployed would have a lower alternative cost of participating in violent activities.

Regarding the incentives of citizens to rebel, we can re-write the payoffs of the peace and conflicts scenarios as follows:

(11) $$[W_c(C_t - m\{a_t\}) - W_c(C_t)] + [p(S_t, \theta, \mu_t)W_c(R_t) - W_c(S_t)] + [p(S_t, \theta, \mu_t)v_c(x_c^*|x_c^*) - v_c(x_t|x_c^*)]$$

If this expression is positive, the citizens will not accept the political bargain and will attempt to overthrow of the regime. The following stylized facts emerge:

G. The first term in equation (11) $W_c(C_t - m\{a_t\}) - W_c(C_t) < 0$ reflects the alternative cost of rebelling in terms of welfare. [21] Note that because the cost of rebelling is paid regardless of the outcome of the conflict, a higher cost of the conflict (larger m) lowers the incentives to rebel.[22]

H. The term $p(S_t, \mu_t, \theta)U_c(R_t) - U_c(S_t)$ is the expected net gain of rebelling in terms of welfare. That is, the difference between the utility of appropriating all rents (in expected terms) less the certain utility of the offered transfer. Note larger rents increase the payoff of a successful overthrow, thereby requiring the incumbent to provide additional transfers to lower the probability of success of a revolt. This would explain, for example, the generous transfers given to citizens by GCC incumbents during the Arab Spring (Heydemann, 2020).

I. The term $[p(S_t, \theta, \mu_t)v_c(x_c^*|x_c^*) - v_c(x_t|x_c^*)]$ is the expected ideological gain from rebelling, that is the difference between the expected gain of imposing the citizens ideology (should they win the conflict) less the ideological gain of accepting the bargain. Note that higher transfers reduce the expected ideological gains of rebelling, by lowering the probability of success. Likewise, a more pro-citizens ideological offer, also lowers the expected gain of rebelling but higher unemployment breeds violence through the ideological gap.

The above set of stylized facts culled from our theory provides guidance for the econometric estimation and results which follows. Although our theory is quite ambitious, we extend our model to include variables that have been found in the literature to be statistically significant when modelling uprisings and civil wars. First, we add a dummy variable to check for the phenomenon of ~~the~~ "Arab exceptionalism" (Bellin, 2004), i.e., the situation whereby Arab countries tend to be refractory to democratization and reliant on authoritarian bargains. Second, we add an additional dummy variable to account for contagion effects, i.e., the case where open war in a neighboring countries spillover to a country and act as a fulminant for domestic violence.

4. Econometric Estimation

In this section we take our theoretical model to the data. Prior to the description of the econometric strategy and the results it is convenient to describe the data on armed civil conflicts, as well as on their potential determinants. The choice of around 125 developing

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[21] This expression also indicates that, given the concavity of the utility of consumption, a drop in consumption increases the probability of an overthrow attempt because any decline in consumption is more valued when consumption is low than when it is high.

[22] Acemoglu et al. (2010) suggest a more nuanced effect: while it is true that a civilian government can successfully defeat rebellious factions by creating a relatively strong army, in weakly institutionalized polities this opens the way for excessive influence or coups by the military. Therefore, civilian governments whose rents are largely unaffected by civil wars then choose small and weak armies that are incapable of ending insurrections. Only when civilian governments need to take more decisive action against rebels, they may be forced to build oversized armies.

countries and the period (1990-2019)[23] was dictated by the availability of data which, in this context, is rather restrictive. The data, nevertheless, comprise all continents, and covers around 85% of the world's population.[24] All explanatory variables are lagged one period to avoid simultaneity biases (reverse causality) and standard errors of the estimated parameters are clustered for statistical efficiency.

We define a civil war in a given country as an internal conflict that concerns at least two parties (government being among them), with a use of armed forces resulting in over 25 (battle-related) deaths per year. The data are collected by The Peace Institute of Oslo (PRIO). We include internal armed conflict occurs between the government of a state and one or more internal opposition group(s) with and without intervention from other states.[25]

Following the insights of our theoretical model, the explanatory variables can be grouped in five categories. First, those pertaining to the political realm, for which we rely mainly on the Varieties of Democracy database (Coppedge et al. 2022). These data cannot differentiate nuances but give sufficient "spatial and temporal coverage". As a measure of the ideological gap between the incumbent and the citizens, we include *political polarization,* but results do not change significantly when using other available measures of divergence (such as social polarization). In terms of our theory, this variable measures $v_c(x_t|x_c^*) - v_c(x_t|x_i^*)$. We also include a measure of *political control of public information*, namely the degree at which the government respect press and media freedom and allow ordinary people to freely discuss political matters at home and in the public sphere. We include also a variable reflecting to what extent *Access to public employment is distributed by a political group,* which in our theory strengthens the bonding between the citizens and the incumbent and lowers the likelihood of a rebellion. Finally, we use a proxy variable to control for political repression (a_t); in the absence of other reliable data, we use a *filtered measure of military personnel* (as share of the labor force). We use econometric methods to filter out of the data the impact of other determinants of the size of the armed forces in a country, including geographic size, being an island or landlocked, population, etc.

Turning now to economic variables, for which we mainly rely on the World Economic Indicators (World Bank, 2022), a second group of variables include those linked to economic development. We include *real GDP per capita* as a measure of overall development and, indirectly, of the sacrifice cost of a civil conflict. We also include a measure of *financial integration with the world economy*, again as an indirect measure of the alternative cost of an overthrow attempt. A third group of variables includes economic shocks. As discussed in

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[23] We exclude the abnormal years of the Covid-19 pandemic.

[24] The list of countries, the data sources, and its main characteristics are presented in Appendix B.

[25] We thus exclude extra-systemic armed conflict (between a state and a non-state group outside its own territory) and interstate armed conflict (between two or more states).

the theoretical model, the citizens must assess the information content of aggregate and individual shocks when deciding their support for the incumbent. We consider *inflation* – both chronic level and cyclical components—to reflect the difficulties faced by citizens when forecasting the real value of the "share of the pie" offered by the ruler, in the context of continuous and often unexpected changes in the price level. Inflation erodes public information needed for an accurate forecasting of government resources, it raises the value of private signals and, thereby, makes rebelling less likely. Negative macroeconomic shocks are likely to increase the probability of an overthrow attempt. We consider *unemployment* (total and youth unemployment) as well as *negative GDP shocks* as summary variables for the stance of an economy. Finally, we include real resource rents (as share of GDP as well as per-capita, both total rents and hydrocarbons). Resource rents are defined as the value added that a country obtains from resource production (earnings net of costs), independently if the goods are consumed internally or exported. Resource rents are a natural proxy for the amount of potential resources that the ruler could commit to transfers citizens to the citizens and we, thus, use it as an instrument for transfers.

Estimation of Discrete Variable Models in Panel Data

The variables of interest in this paper are binary –either a country is or is not in conflict— requiring the use of discrete dependent-variable models. Consider an observed binary outcome variable defined in a panel-data context as:

(12) $y_{it} = \begin{cases} 1 & if \ y_{it}^* \geq 0 \\ 0 & else \end{cases}$

where subscript i denotes individuals and subscript t time periods, and y_{it}^* is the latent dependent variable. The associated log likelihood function for a sample of size (N, T) is:

(13) $log \ L \ = \Sigma_{i=1}^N \Sigma_{i=1}^T log \ g(y_{it}, \beta x_{it} + c_i, \theta)$

where, x_{it} is a vector of exogenous explanatory variables, c_i are (unobserved) individual-specific effects, β is the vector of slope coefficients, and θ is an ancillary parameter (e.g., scale parameter or the dispersion of disturbances). Function $g(.)$ is usually the logistic or normal distribution, giving rise to logit and Probit models, respectively.

In static contexts, the maximum likelihood estimator is usually available, but estimates must be obtained by numerical approximation and tend to be cumbersome because of the presence of the unobserved individual effects. If individual effects are treated as predetermined (fixed effects), estimation of the slope parameters by Probit or logit methods leads to the incidental parameter problem, i.e., estimators are biased when the time dimension T is fixed, even if the cross-section dimension N tends to infinity (Neyman and Scott, 1948). Only the conditional

logit estimator, based on those units that change state (from 0 to 1 or vice versa), is consistent and thereby available. However, it does have the major shortcoming of precluding the computation of the partial effects or estimating of the predicted probabilities for the outcomes. Therefore, this approach limits the analyst to infer only about β. Given the limitations of fixed-effects models, the random-effects estimator is an attractive alternative. In panel data, nevertheless, it is only computationally tractable for the Probit model and, while tractable, it requires the use of complex numerical integration methods.

In a dynamic context, additional complications arise, and the choice of estimation methods narrows. When taking into consideration the persistent nature of civil conflicts –which tend to span over several periods—the likelihood of observing a conflict in a country in a given year ought to depend on the pre-existence of the conflict in previous years. In such case, the log-likelihood function becomes:

$$(14) \qquad log\ L\ = \Sigma_{i=1}^{N}\ \Sigma_{i=1}^{T}\ log\ g(y_{it}, \beta x_{it} + c_i + \gamma y_{it-1}, \theta)$$

The inclusion of the lagged dependent variable allows us to estimate state dependence, i.e., the dependence of the current state (peace or conflict) on history. Estimates of state dependence also allow us to compute the probability of switching from conflict to peace or vice-versa, which is of interest for understanding the inertia and dynamics of conflicts. However, identifying state dependence rests on the assumption of no correlation between unobserved heterogeneity and the outcome variable (Heckman, 1981).

A second issue arises because estimation requires an assumption about the initial observation, y_{i0}, and about its relationship with the unobserved components c_i. The assumption giving rise to the simplest form of model for estimation is to treat the initial conditions to be exogenous and uncorrelated with c_i. This would be appropriate if the start of the process coincides with the start of the observation period for each individual, but this is typically not the case. Under this assumption a standard random-effects Probit estimation procedure can be used, since the likelihood can be decomposed into two independent components (one for the first observation and the other for the rest of the sample) and the joint probability for $\{t = 2, \dots, T\}$ can be maximized without reference to that for $\{t = 1\}$. However, if the initial conditions are correlated with the c_i, as would be expected in civil conflicts, this estimator will be inconsistent and will tend to overestimate γ and the extent of state dependence.

The initial condition problem has been tackled by either modeling the initial response jointly with the subsequent response as proposed by Heckman (1981) or conditioning on the response at the initial period y_{i0} as proposed by Wooldridge (2005). In the empirical analysis of this paper, we rely on a recent estimator by Grotti and Cutuli (2018) that bypasses the

inconsistency problem of the Wooldrige estimator and avoids the computationally cumbersome Heckman-based estimators.

Grotti and Cutuli (2018) propose an extension of Wooldridge's model to cope with the initial condition problem. Based on Rabe-Hesketh and Skrondal (2013) the unobserved individual effect can be written as:

$$(15) \qquad c_i = \alpha_0 + \alpha_1 y_{i0} + \alpha_2 \bar{Z}_i + \alpha_1 Z_{i0} + \alpha_i$$

where y_{i0} and Z_{i0} represent the initial value of the response variable and of the time-varying explanatory variables in x_{it}, respectively. The term $\bar{Z}_i = \frac{1}{T} \sum_{i=0}^{T} Z_{it}$ stands for the within-unit averages of these explanatory variables, where the averages are based on all periods. Finally, α_i is a unit-specific time-constant error term, normally distributed with mean 0 and constant variance. Under the assumption that the unobserved heterogeneity is captured by equation (15), the lagged value of the response variable can be interpreted as genuine state dependence—that is, as the causal effect exerted by the pre-existence of a conflict on observed conflicts.

Results

Table 1 presents the main econometric results of testing our theory of civil conflicts. In general, the results lend strong support to our theory and, in particular, to our choice of estimation technique.[26] Different specifications were estimated to test for the sensitivity of the results to slight changes in the definition of some explanatory variables.

First, the evidence rejects the hypothesis that countries are homogenous and, thereby, the implication that a pooled-data model is adequate, thus calling for the use of panel-data techniques. Second, the lagged dependent variable is highly significant in all specifications indicating that a dynamic specification is needed, and the results from those static models widely used in the literature are most likely biased. As a point of reference, the results of estimating a static Probit model are presented in column 1, which allow us to gaze the size of the significant biases in the estimated parameters, both in terms of point estimates as well as standard errors. Third, there is evidence in all models that unobserved initial conditions do matter and that ignoring this form of heterogeneity biases the estimation of the econometric models. This heterogeneity is due primarily to the persistence of past conflicts and is conditional to the level of development of the countries.

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[26] The number of countries and observations varies slightly among the different specifications because of missing data, but the results do not depend on the sample being unbalanced.

Turning to the empirical evidence, we first discuss the econometric estimation results (as shown in Table 1) and then the implications of these estimates for the likelihood of observing a country achieve peace, and for the expected duration of a civil war (as shown in Table 2). Given the high collinearity among political variables and between GDP per capita and other economic variables (such as resource rents or financial openness), we do not focus on individual p-values but rely on full model likelihood tests when evaluating our specifications.

Model 1 in Table 1 corresponds to our basic specification while models 2 to 8 provide alternative specifications that consider variations in the definition of three explanatory variables: inflation, resource rents, and unemployment. The estimation results for Model 1 indicates that, as predicted by our theoretical model, the probability of having a civil war is highly dependent on politico-ideological variables and, in particular, that it increases with political polarization. Lowering polarization reduces the likelihood of a civil war outbreak, as suggested above in insight (B) of our model. This result is statistically strong and robust across specifications. Below we measure by how much changes in political participation affect the probability of observing a civil war.

In addition, these results indicate that the ruler can lower the probability of an overthrow attempt by increasing transfers to his constituency (furthering preferential access to public jobs) as suggested by insight (A), and/or by increasing political repression (military presence) as indicated by insight (C).[27] The empirical evidence also suggests that implementing a tougher control over the media and public information can reduce the probability of an overthrow (as implied by insight D), but the estimated parameter is statistically insignificant (most likely because our measure of media control is rather coarse or because evidence is masked by the aggregation of conflicts of various types into one civil war category.

Beyond political reasons for conflict, economic variables are also important determinants of the onset of a civil war. We find that the probability of a civil war decreases sharply with economic development and integration to capital markets. Taken together, these results are statistically strong and robust across specifications. This reflects how incentives to engage in an overthrow attempt weaken when the alternative economic cost of political violence increases (insight G). This result has been found before in the context of static models (e.g. Holtermann, 2012; Elbadawi and Soto, 2013). Inflation and inflationary shocks also lower the likelihood of observing a civil conflict: in line with our theory, inflationary shocks destroy the informational value of public information and lower the appeal of engaging in political violence.

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[27] When tested, other forms of preferential treatment for constituencies were not statistically significant, including access to state jobs by social group, access to state business opportunities by political group, and access to public services distributed by social group.

Table 1. Main Econometric Results

	Static Model	Dynamic Models						
		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Lagged Endog. Variable	-	2.805*** (0.000)	2.797*** (0.000)	2.788*** (0.000)	2.787*** (0.000)	2.793*** (0.000)	2.809*** (0.000)	2.790*** (0.000)
Political Polarization	0.457*** (0.000)	0.215** (0.022)	0.206** (0.025)	0.207** (0.026)	0.207** (0.028)	0.203** (0.027)	0.195** (0.042)	0.194** (0.042)
Public Job for Constituencies	-0.789*** (0.009)	-0.183 (0.174)	-0.206 (0.121)	-0.213 (0.111)	-0.219 (0.105)	-0.231* (0.081)	-0.265** (0.045)	-0.244* (0.070)
Control of Media	-0.115 (0.561)	-0.060 (0.430)	-0.081 (0.255)	-0.091 (0.192)	-0.062 (0.359)	-0.060 (0.385)	-0.071 (0.315)	-0.072 (0.313)
Military Personnel	-9,024 (0.709)	-28.10*** (0.006)	-24.66** (0.015)	-26.42*** (0.007)	-26.28*** (0.008)	-25.24** (0.012)	-25.62** (0.012)	-23.82** (0.018)
Development Level	-1.433*** (0.027)	-0.811* (0.056)	-0.763* (0.076)	-0.773* (0.070)	-0.786* (0.079)	-0.807* (0.071)	-0.793* (0.080)	-0.803* (0.068)
Integration to World Economy	-0.593 (0.453)	-0.517 (0.172)	-0.504 (0.175)	-0.487 (0.202)	-0.407 (0.294)	-0.414 (0.287)	-0.506 (0.189)	-0.466 (0.227)
Economic Downturns	-0.098 (0.933)	2.355*** (0.003)	2.294*** (0.004)	2.328*** (0.004)	2.467*** (0.003)	2.445*** (0.004)	2.397*** (0.003)	2.323*** (0.004)
Chronic Inflation	-0.037* (0.070)	-0.008*** (0.000)	-0.009*** (0.000)	-	-	-	-	-
Inflationary Shock	-	-	-	-0.012*** (0.000)	-0.011*** (0.000)	-0.011*** (0.000)	-0.010*** (0.000)	0.011*** (0.000)
Unemployment (age 15+)	0.116*** (0.001)	0.023* (0.072)	-	0.027** (0.045)	0.027**** (0.040)	-	-	-
Unemployment (age 15-24)	-	-	0.015* (0.062)	-	-	0.015** (0.040)	0.016* (0.053)	0.016** (0.047)
Resource rents (% of GDP)	-	-	-	-	1.299 (0.403)	-	-	-
Resource rents decline	-	-	-	-	-	3.956 (0.280)	-	-
Resource rents boom	-	-	-	-	-	0.768 (0.719)	-	-
Hydrocarbons rent decline	-	-	-	-	-	-	4.910 (0.195)	-
Hydrocarbons rent boom	-	-	-	-	-	-	-5.852*** (0.002)	-4.631*** (0.007)
MENA exceptionalism	1.414 (0.434)	0.474 (0.265)	-	-	-	-	-	-
Neighbor countries at war	-0.351 (0.287)	-0.266 (0.579)	-	-	-	-	-	-
Constant	6.664 (0.171)	-0.124 (0.903)	-0.355 (0.740)	-0.471 (0.649)	-0.433 (0.672)	-0.336 (0.751)	-0.363 (0.731)	-0.319 (0.766)
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unob. Heterog.	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2832	2832	2832	2818	2788	2780	2776	2776
Countries	124	124	124	124	124	124	124	124
Log Likelihood	-486.2	-271.7	-272.6	-271.6	-267.0	-266.0	-264.6	-265.6

Note: p-values in parenthesis, (***, **, *) significant at 1%, 5%, 10%, respectively.

The likelihood of observing a civil war increases during economic downturns (insight E) and with higher unemployment (insight I). We found that total unemployment as well as youth unemployment breed violence, despite the coarseness of the official statistics used in the estimation. Unemployment rates ignore underemployment and the role of informal labor markets: our estimate is thus biased downwards due to the well known "delusion effect". The estimated parameters for youth unemployment are around one-half of that of total

unemployment in all specifications, most likely because the variance of the former is around twice as high as that of the latter. Downturns, on the other hand, do increase the probability of a civil war onset; this result is statistically strong and robust across specifications.

Finally, we focus on the role of resource rents as a proxy variable for the availability of money in the hands of the incumbent to support the authoritarian bargain. It can be seen that resource rents are statistically insignificant (Models 4 and 5) when considering all forms of natural resources, despite the fact that the point estimates are positive (as expected according to insight A). However, when focusing only on rents arising from hydrocarbon extraction (Models 6 and 7), we found that a boom in oil and gas rents lower the probability of a civil war onset.

In our initial specifications (in columns 1 and 2 of Table 1) we included a dummy variable to control for the Arab exceptionalism (taking value 1 when it is a country from MENA and 0 otherwise) but it proves to insignificant, thus suggesting that Arab countries are not intrinsically different than other countries in the world when it comes at recurring to political violence.

In Table 2 we present counterfactual exercises based on the marginal effects of the transition probabilities as predicted by Model 8 of Table 1. We ask the following questions: when varying the level of the fundamentals, (a) by how much does the probability of remaining in peace improve? (b) by how much does the probability of remaining in civil conflict decline? and, (c) by how much does the expected duration of a civil conflict shortens? To homogenize the computation of these scenarios we consider changing one fundamental at a time and the magnitude of the change is made to be the equivalent of moving from percentile 25 to percentile 75.[28]

The results in Table 2 show how crucial it to compute marginal effects –as opposed to merely looking at estimated parameters—when evaluating the effects of the fundamentals on the probability of observing a civil war in a country. A margin is a statistic based on a fitted model calculated over a dataset in which some of or all the covariates are fixed at pre-determined values deemed of interest for the analysis. In our case, marginal effects are average predicted probabilities which take into account not only the estimated parameters but also the fact that the model is non-linear and dynamic. It can be seen that the probability of an onset of a civil war do respond to moderate changes in fundamentals.

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[28] The only exception is for the hydrocarbon shock, where the change is equivalent of moving from percentile 25 to percentile 95, because of the extreme asymmetry of the distribution of shocks.

Table 2. Counterfactual Exercises

	Change in Probability of maintaining peace	Change in Probability of achieving peace	Change in expected duration of conflict (in years)
Lowering Political Polarization	1.9%	9.9%	-0.4
Increasing Public Job for Constituencies	2.5%	13.0%	-0.6
Increasing control of the media & information	1.0%	4.0%	-0.2
Increasing military presence	0.5%	2.5%	-0.1
Achieving higher per capita GDP	7.9%	40.8%	-2.6
Integrating to Global Economy	1.2%	8.0%	-0.3
Lowering Youth Unemployment	1.4%	6.3%	-0.3
Avoiding Negative Economic Downturn	0.9%	4.7%	-0.2
Avoiding Negative Inflation Shocks	0.0%	0.1%	0.0
Avoiding Hydrocarbon Price Shocks	1.0%	5.0%	-0.2

Source: own elaboration.

Consider, first, a reduction in political polarization, from the levels observed in Lebanon, Syria, or Bahrain to those existing in the rest of the GCC. Arguably, this is a significant change, but over 25 countries in our sample amply exceed the GCC benchmark. The conditional probability that a country remain in peace does not change much with lower levels of political polarization but the probability of achieving peace when at war is around 10 percentage points higher. Moreover, lower levels of polarization also reduce the expected duration of a war by around 5 months. This, in turn, assigns importance for devising mechanisms to avoid polarizing political life (see Axelrod et al, 2021 for a discussion). Table 2 also indicates that favoring constituencies is an effective strategy to avoid civil conflict; a higher allocation of public employment to members of the incumbent's constituencies significantly increases political loyalty and lengthen he probable duration of peace after conflict, but it has little effect on the onset of civil wars. This, of course, is double-edged sword: on one hand, favoring constituencies rally support and prolong peace but when it exceeds reasonable levels it may aggravate grievances which, in turn, breed discontent. Media control –as measured by our coarse measure—seems to have little effect on the probability of remaining in peace or achieving during civil wars.

We now turn to economic fundamentals. Undoubtedly, the most significant contribution to maintaining peace and achieving peace after conflict is due to rising income levels . In our simulations, we increase GDP per capita from levels equivalent to those observed in Egypt or Tunisia to those of Lebanon or Iran. It can be seen that in a country with higher income

the expected length[29] of a civil conflict is around 2.5 years shorter than in less developed economies, that achieving peace has around 40% higher probability, and that maintaining peace has also much higher probability. The insistence of many observers of civil conflict that attaining a fast recovery after a peace agreement is crucial for success is supported by our results. Integrating to global markets also pays a peace dividend: more open economies have around 8 percentage points higher probability of achieving peace and conflicts are, on average, expected to last around 4 months shorter.

Another important determinant of the likelihood of moving out of the conflict case is to lower unemployment rates and, perhaps more crucially, youth unemployment. Our estimates indicate that unemployment rates in the neighborhood of 7 to 8 percent –from currently observed two-digit levels in MENA economies—would increase the probability of achieving peace by around 6%.

Finally, shocks do play a role in affecting the opportunities for a country to move away from conflict. Avoid cyclical downturns –for example, by engaging in active and timely fiscal and monetary policies—could increase the probability of achieving peace by around 5 percentage points. All MENA economies received a negative GDP shock in 2010/2011 but in the following 5 years GCC economies reacted vigorously undertaking expansive domestic policies (undoubtedly financed by their deep financial pockets and access to financial markets), while in the rest of MENA economies recessionary years followed, thus fueling popular discontent. Likewise, transferring resources to the population also increase significantly the likelihood of escaping from civil war.

A final conclusion to be obtained from our econometric model refers to the effects of "unobserved heterogeneity in the initial conditions of development and integration to the global economy" on the predicted probability of maintaining or achieving peace. We split the inferred distribution of initial states into 10 deciles and compute the probabilities of remaining in peace or civil war, as well as the probabilities of switching status. Figure 2 shows the high persistence of being in peace (left half of the figure) or at civil war (right half of the figure). For all initial conditions, countries at peace at time "t-1" have a low probability of engaging in civil war at time "t". For almost all initial conditions, countries at war at time "t-1" have a high probability of remaining in conflict at time "t". Nevertheless, the probability of remaining at war reduces significantly for those countries located in deciles 9 and 10, i.e., those economies with the relatively higher development levels and which are more integrated to the global economy.

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[29] The expected length of a spell of conflict is computed as $1/Pr(0|1)$, where $Pr(0|1)$ is the conditional probability of switching from conflict at time "t-1" to peace at time "t".

The persistence of states is really not surprising; a casual look at the data suffices to make the inference. However, Figure 2 shows how quickly the probabilities of entering a civil war decline with better initial conditions: as shown in the left half of the figure, for countries located in the higher deciles of initial conditions the probabilities are significantly lower than for those located in lower deciles. Again, these results come from the crucial role of income per capita and point to the importance of engineering rapid recovery after peace agreements.

Figure 2
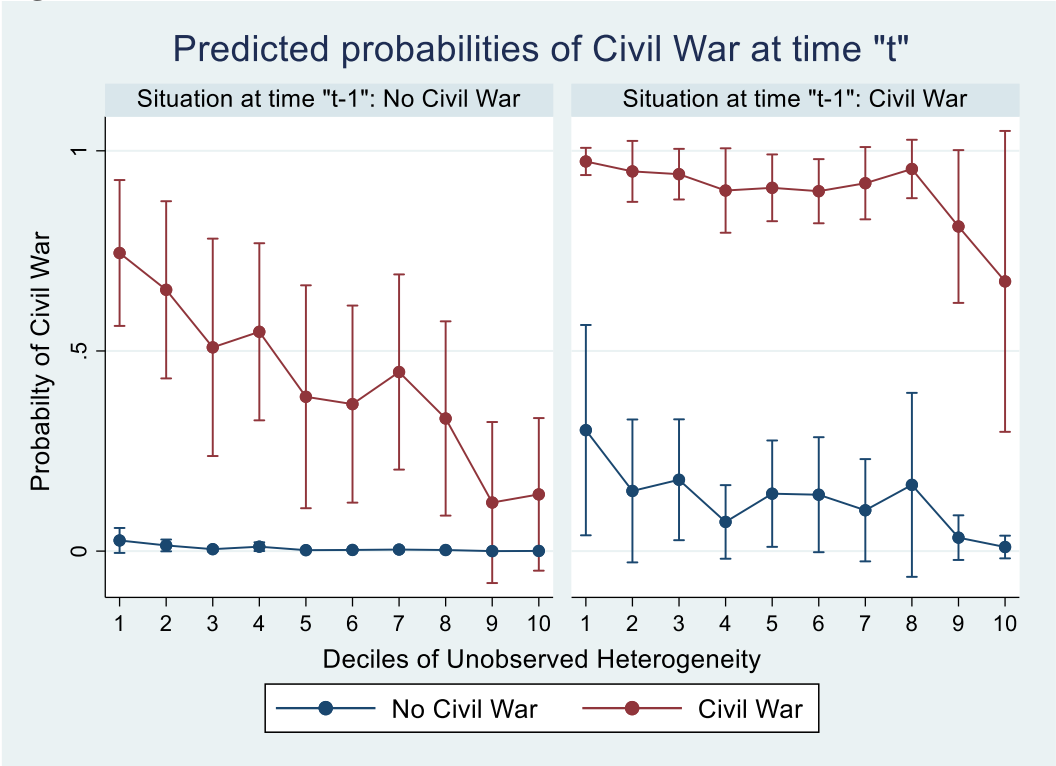
5. Concluding Remarks

The econometric analysis presented above leads to four noteworthy policy conclusions:

Firstly, national political polarization has been a major factor in the outbreak of civil conflicts which post conflict authorities should seek to address; otherwise, it would continue to be a potential spur for conflict. This, in no way, should imply control of diverse political activities, the essence of any politically democratic environment; on the contrary, countries emerging from national conflicts should aspire to establish such environment if the conditions for a possible return to conflict are to be eliminated and the road to national peace is to be well established. The failing post conflict recovery of most of the Arab countries where uprisings have broken out attests to this assertion.

Secondly, a weak or faltering economic development with limited employment opportunities for the youth that tend to breed violence has also been another major factor in the emergence of national conflicts; the experience of a number of developing countries that came out from civil conflicts attests to the various political and socio-economic challenges they had to face in charting a solid and stable post conflict economic recovery. While some of them have succeeded in meeting these challenges, though to varying degrees, others have not, and this includes the above Arab countries again except perhaps for Tunisia at least at the political level.

Thirdly, developing countries and especially those emerging from civil wars are prone to economic national shocks or cyclical downturns. To shield their economies against their perverse effects they should engage in active and timely fiscal and monetary policies that help counter them. Again, post conflict experiences vary, some countries being more successful than others in implementing the required policies.

Fourthly, as countries that have experienced conflicts succeed in building a solid economic foundation the probability of a return to conflict recedes; this is especially the case for those which succeed in engineering rapid recovery after peace agreements.

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Appendix A

First order Conditions and Optimization Problem

The Lagrangean of the decision problem for the incumbent is:

$$\mathcal{L} = U_i(R_t - S_t - a_t) + v_i(x_t|x_i^*) + \lambda\big[W_c(C_t + S_t) + v_c(x_t|x_c^*) - p(S_t, \mu_t, z_t)[W_c(C_t + R_t - m\{a_t\}) + 1] - \big(1 - p(S_t, \mu_t, z_t)\big)W_c(C_t - m\{a_t\})\big]$$

Obtain the following first order conditions, which depict the main trade-offs that the incumbent faces:

(a) $\quad \frac{\partial \mathcal{L}}{\partial x_t} = v_i'(x_t|x_i^*) + \lambda v_c'(x_t|x_c^*) = 0$

(b) $\quad \frac{\partial \mathcal{L}}{\partial S_t} = -U_i'(\cdot) + \lambda\big[W_c'(\cdot) - p_S'(\cdot)[W_c(C_t + R_t - m\{a_t\}) + 1 - W_c(C_t - m\{a_t\})]\big] = 0$

(c) $\quad \frac{\partial \mathcal{L}}{\partial a_t} = -U_i'(\cdot) + \lambda[p(\cdot)W_c'(\cdot)m_a' + (1 - p(\cdot))W_c'(\cdot)m_a'] = 0$

Equation (a) implies that $\lambda = \frac{-v_i'(x_t|x_i^*)}{v_c'(x_t|x_c^*)}$. This is a marginal rate of substitution depicting the relative value of ideological concessions (i.e., political freedoms) between the incumbent and the citizens contained in the bargain.

Equation (b) can be re-written as follows:

$$U_i'(\cdot) = \lambda\big[W_c'(\cdot) - p_S'(\cdot)[W_c(C_t + R_t - m\{a_t\}) + 1 - W_c(C_t - m\{a_t\})]\big]$$

which indicates that the incumbent will sacrifice utility by transferring resources to the citizens with two objectives. First to directly increase the welfare value of the peace scenario for the citizens ($W_c'(\cdot)$). Second, to reduce the probability of success –and the expected value—of a revolt, given that $p_S'(\cdot) < 0$, since a higher-than-expected transfer to the citizens increase political support for the regime.

Re-write equation (c) as $U_i'(\cdot) = \lambda[W_c'(\cdot)m_a']$. This indicates that the incumbent will spend resources in repression up to the point where his marginal sacrifice $U_i'(\cdot)$ equals the marginal sacrifice of the citizens in welfare terms, $W_c'(\cdot)m_a'$, should they decide on rejecting the political bargain.

Fourth, consider that the incumbent can affect the transparency of public information and, thereby, make citizens more willing to trust the private signal when forming expectations and deciding the support to the regime. Note that:

$$\frac{\partial p(S_t, \mu_t, z_t)}{\partial \sigma_\varepsilon^2} = \frac{\partial p(\cdot)}{\partial z} \frac{\partial z}{\partial \theta} \frac{\partial \theta}{\partial \sigma_\varepsilon^2} < 0$$

And therefore:

$$\frac{\partial \mathcal{L}}{\partial \sigma_\varepsilon^2} = \lambda \left[-p_z'(S_t, \mu_t, z_t) \frac{\partial z}{\partial \theta} \frac{\partial \theta}{\partial \sigma_\varepsilon^2} [W_c(C_t + R_t - m\{a_t\}) + 1 - W_c(C_t - m\{a_t\})] \right] > 0$$

Since, obviously, $W_c(C_t + R_t - m\{a_t\}) + 1 > W_c(C_t - m\{a_t\})$.

By the same token, the incumbent can induce the citizens to trust the private signal when forming expectations and deciding the support to the regime.

$$\frac{\partial \mathcal{L}}{\partial \sigma_v^2} = \lambda \left[-p_z'(S_t, \mu_t, z_t) \frac{\partial z}{\partial \theta} \frac{\partial \theta}{\partial \sigma_v^2} [W_c(C_t + R_t - m\{a_t\}) + 1 - W_c(C_t - m\{a_t\})] \right] < 0$$

A negative exogenous shock to the economy that lowers employment and/or real wages increases the probability of an uprising.

$$\frac{\partial \mathcal{L}}{\partial \mu_t} = \lambda \left[-p_{\mu_t}'(S_t, \mu_t, z_t) [W_c(C_t + R_t - m\{a_t\}) + 1 - W_c(C_t - m\{a_t\})] \right] > 0$$

Appendix B

Appendix Table 1. Variables definitions and data sources

Variable	Definition	Source
Development Level	Real GDP per capita	World Bank *World Economic Indicators 2022*
Political Polarization	Degree of polarization into antagonistic, political camps?	Coppedge et al (2022) *Varieties of Democracy (V-Dem) Project*
Public Jobs to Constituencies	Access to public employment distributed by political group	Coppedge et al (2022) *Varieties of Democracy (V-Dem) Project*
Information Control	Government respect for press and media freedom, freedom of ordinary people to discuss political matters at home and in the public sphere, as well as the freedom of academic and cultural expression.	Coppedge et al (2022) *Varieties of Democracy (V-Dem) Project*
Chronic Inflation	Inflation trend, obtained using Hamilton's filter	Own elaboration based on World Bank *World Economic Indicators 2022*
Deflationary Shock	Negative component of inflation shocks, obtained using Hamilton's filter	Own elaboration based on World Bank *World Economic Indicators 2022*
Economic downturn	Negative component of the business cycle, obtained using Hamilton's filter	Own elaboration based on World Bank *World Economic Indicators 2022*
Financial Integration to world economy	Capital account *de-jure* openness	Chin and Ito Database
Resource rents	Calculated as the difference between the price of a commodity and the average cost of producing it. Unit rents are then multiplied by the physical quantities' countries extract or harvest to determine the rents for each commodity as a share of GDP.	World Bank *World Economic Indicators 2022*
Military personnel and expenditures		SIPRI database
Unemployment	Official unemployment rates for 15+ years of age	ILO Statistics

Appendix Table 2. List of Countries

Albania	Colombia	Haiti	Mexico	Senegal
Algeria	Comoros	Honduras	Moldova	Sierra Leone
Angola	Congo, Dem Rep	Hungary	Mongolia	Slovak Republic
Argentina	Congo, Rep	India	Morocco	Slovenia
Armenia	Costa Rica	Indonesia	Mozambique	South Africa
Azerbaijan	Cote d'Ivoire	Iran	Myanmar	Sri Lanka
Bahrain	Croatia	Israel	Namibia	Sudan
Bangladesh	Djibouti	Jamaica	Nepal	Suriname
Belarus	Dom. Republic	Jordan	Nicaragua	Syria
Benin	Ecuador	Kazakhstan	Niger	Tajikistan
Bhutan	Egypt	Kenya	Nigeria	Tanzania
Bolivia	El Salvador	Korea, Rep	Macedonia	Thailand
Bosnia	Eq. Guinea	Kuwait	Oman	Togo
Botswana	Estonia	Kyrgyz Republic	Pakistan	Tunisia
Brazil	Eswatini	Lao PDR	Panama	Turkey
Bulgaria	Ethiopia	Latvia	P.New Guinea	Turkmenistan
Burkina Faso	Fiji	Lebanon	Paraguay	Uganda
Burundi	Gabon	Lesotho	Peru	Ukraine
Cabo Verde	Gambia, The	Libya	Philippines	U.Arab Emirates
Cambodia	Georgia	Lithuania	Poland	Uruguay
Cameroon	Ghana	Madagascar	Qatar	Uzbekistan
C. African Rep.	Guatemala	Malaysia	Romania	Venezuela
Chad	Guinea	Mali	Russia	Vietnam
Chile	Guinea-Bissau	Mauritania	Rwanda	Zambia
China	Guyana	Mauritius	Saudi Arabia	Zimbabwe